

Chapter 5. Participation Strategy and Outreach and Education

This part of the HCP discusses the Wisconsin Karner Blue Butterfly HCP partners' plans for involving additional landowners and land users in statewide conservation efforts. It is broken into three sections:

- ☞ An introduction and summary
- ☞ A description of a the non-partner participation plan
- ☞ An outreach, education and assistance strategy

It is believed that by involving additional participants in HCP implementation, the likelihood of successful conservation is greatly increased.

A. Introduction and Summary

This innovative approach to endangered resources conservation was designed to move the regulated community beyond compliance and into efforts to proactively apply conservation measures on the land while engaging in their land management activities. Congress, in establishing the incidental take permit (ITP) provision of the ESA expressed the hope that it would encourage creative partnerships between the public and private sectors and among governmental agencies in the interest of species and habitat conservation and provide a framework to permit cooperation between the public and private sectors. Those goals are achieved by this HCP that arose out of and was developed through a solid and diverse grassroots effort in Wisconsin.

The Karner blue butterfly is dependent on periodic disturbance regimes or management programs designed to assure that the habitat is not lost because of the natural succession of competing vegetation. Therefore, this conservation plan is designed to encourage disturbance activities to the habitat rather than prohibit them. To accomplish a disturbance and management regime statewide, this strategy has been developed with the design to include all Wisconsin landowners and land users that might affect the species, regardless of land size and use. The HCP creates a broad statewide partnership in conservation while realizing the limitation on resources to accomplish its objectives. The strategy seeks to incorporate conservation into everyday land management and on-going work. The HCP is built upon the extensive land ownership and a conservation commitment of the 37 partners identified in this HCP, but seeks to go beyond those partners to include the assistance and participation of other landowners, nonprofit groups, environmental and industrial organizations and a variety of governmental units.

This HCP, with its biological approach, focuses its efforts on geographic areas and activities, which provides the highest potential to sustain or enhance Karner blue butterfly habitat. The strategy seeks to reach all landowners and land users, but will vary in approach and process. The HCP's inclusion strategy includes:

1. A concept of non-voluntary participants that must formally apply for and receive a Certificate of Inclusion from the DNR because of the value their land and activities provide to conservation of the species; and

2. A provision for voluntary participants that receive ITP coverage, without further process, so as to encourage land management activities that may benefit the species; and
3. An extensive public outreach and education plan to reach all landowners and land users, and others, to describe the effort and encourage their cooperation and participation in this conservation effort; including a strong focus on landowners in recovery areas (called Biological Recovery Zones or BRZs); and
4. A recovery component that includes a direct role in recovery by the DNR, and a support role by all Partners who may have an opportunity to provide assistance in a variety of ways, e.g. direct outreach and education to landowners in recovery areas, financial or on the ground support for recovery monitoring, among other needs designated by the DNR's Wisconsin Recovery Working Group, Local Recovery Teams and recovery properties. (*Refer to Chapter 6. Recovery for more information*)

As applied to participation, this approach is designed to provide incentives for conservation through cooperative partnerships. It includes a notification system designed to inform landowners and land users, where possible and feasible, of the opportunities presented under this HCP. Finally, this plan has a geographical focus on the areas that have the highest potential to support the species and its habitat. (*See Figure 6.10, Karner Blue Butterfly Biological Recovery Zones on p. 53*). By this plan, the partnership intends to achieve the endangered species conservation goals while protecting the economic interests of non-federal landowners through this increasing partnership statewide.

B. Participation by Non-partners (New Partner Inclusion)

Recognizing a need for greater involvement in the HCP process, the partners developed a participation plan for non-partners. Details of this participation plan are outlined in this section. A flow chart for determining options for ITP coverage is included in Appendix D.

The participation plan addresses only *occupied* lands; those lands on which the Karner blue butterfly is present in any of its life forms. Non-partner efforts are intended to focus primarily on *voluntary, cooperative* efforts and participation. Nevertheless, requisite participation based upon scientific considerations and the biological needs of the species is also a component of the plan. Inclusion in this HCP will provide the landowner or user with authorization (incidental take permit coverage) to incidentally take Karner blue butterflies while conducting lawful land management or land use activities. *Intentionally taking* Karner blue butterflies, regardless of location or activity, is still *prohibited* unless specifically authorized by the USFWS.

Non-partner participants are divided into two groups:

- ☞ **Non voluntary-** non-partner landowners and land users that are required to obtain a Certificate of Inclusion (See pages 43-46). Landowners and land users in this category are within the High Potential Range, own or manage lands, and are engaging in activities that would take Karner blue butterflies should they be present.
- ☞ **Voluntary- non vs. partner** landowners and land users that are *not* required to obtain a Certificate of Inclusion (See pages 46-49 Landowners and land users in this category will be covered in the HCP and ITP without further application or inclusion processes.

Non-voluntary Category (Certificates of Inclusion required)

Non-partner landowners and land users engaged in activities and in locations that may significantly affect the Karner blue butterfly are required to obtain a "Certificate of Inclusion" from the DNR, either as a single project applicant or as a partner. Through application to and review by the DNR, these landowners and land users may ultimately be covered under the ITP. Landowners or land users who do not meet the criteria to be included in the "Voluntary Category" are required to apply to the DNR, if they: (1) own land or engage in activities within the High Potential Range, and (2) are involved in the following activities or activities resulting in permanent take:

- ☞ Right-of-way or corridor development and maintenance, or
- ☞ Commercial forestry, or
- ☞ Permanent take,

The ROW or corridor development and maintenance category includes all landowners, land users and other agencies or entities engaged in road or highway, railroad, utility, communication, power and pipeline development or maintenance . Participation from this group is required because the development of roadways or other corridor facilities may involve permanent take. Moreover, the maintenance regimes associated with right-of-way or corridor management provide the opportunity to encourage the continuation of Karner blue butterfly habitat and provide important dispersal corridors for the butterfly.

Participation by commercial forest owners is required because of the known Karner blue butterfly occurrences on such land, the flexibility these landowners and managers may have in management and the benefits that may accrue to Karner blue butterflies through implementation of on-going forest management activities. Forest owners in this category must own in excess of 1,000 acres of forest land in Wisconsin. Forest owners who own 1,000 acres or less and those with greater than 1000 acres of land where the land is not primarily managed for the purpose of forestry (e.g. managed for recreation, as camps or lake associations) are considered "voluntary" participants and are not required to obtain a Certificate of Inclusion for coverage under the ITP (See pages 50-53). "Forest land" can include land in the Forest Crop, Woodland Tax, or Managed Forest Law classifications under the Wisconsin Tax Assessment Classification system for real

property, as well as land that is designated as "Industrial Forest" by the DNR under its forest tax law programs.

Permanent take is an impact to Karner blue butterfly habitat through land management or land use activities, which precludes Karner blue butterfly occupation. Such long-term impact involves taking that does not allow for the restoration and reoccupation of the site for a minimum of five years. Activities or projects that may fall within the definition of permanent take include, but are not limited to:

- ☞ construction of roadways and parking lots;
- ☞ construction of buildings or structures and associated facilities;
- ☞ other construction or development projects that cover or replace the habitat in a permanent manner (at least 5 years), such as an airport or a flowage; and
- ☞ residential housing developments subject to subdivision plat (ch. 236, *Wis. Stats.*), certified survey (ch. 236, *Wis. Stats.*), or condominium (ch. 703, *Wis. Stats.*) approvals. [**Note:** This category does not include a permanent or second home and associated structures that are owned or built by the owner for his or her own use; landowners in this category are considered part of the voluntary category (see below). This provision applies only to those housing developments approved after September 27, 1999, the date of issuance of the first ITP for implementation of the HCP permit issuance.]

Landowners and land users not meeting the criteria for inclusion in the voluntary category that are involved in activities that result in permanent take of the Karner blue butterfly will be required to provide compensatory mitigation in a manner acceptable to the DNR and the USFWS. Mitigation may take the form of land, activities or monetary compensation. Mitigation in the form of land compensation may occur either on land owned or managed by the applicant, or on those of another. In-kind services or monetary compensation in the form of annual payments during the life of the ITP may also be used as mitigation to defray the implementation costs associated with mitigation.

Current HCP Partners who hold a Certificate of Inclusion are authorized to do incidental take in the course of their land management activities. However, authorization for permanent take is only issued upon approval of a mitigation plan consistent with the HCP Construction Guideline.

For those non-partners who do not manage land and only seek authority for permanent take for a single project, a "one-time permit" inclusion can be provided. For non-partners who also manage land, ongoing conservation efforts such as those provided by HCP Partners may lessen the fees imposed on an applicant. (*Refer to the New Partner Inclusion Procedure in the HCP User's Guide in Appendix E.*) If ongoing management requires periodic disturbance resulting in take, these entities will be encouraged to become a HCP partner.

The Application process for coverage under the ITP for those in the Non-Voluntary category is described in the "Inclusion Procedure" in Appendix E and in the HCP User's Guide (*Refer to DNR's Karner Blue HCP webpage for most current version.*).

The requirements to request approval for permanent take can be found in the HCP's "Construction Guideline" and applicable protocols. (*Refer to Appendix E or the HCP User's Guide on the DNR's HCP webpage.*)

Voluntary Participation (Automatic Inclusion)

The voluntary non-partner participation category includes those landowners, land users, or activities that either (1) do not meet the criteria requiring a Certificate of Inclusion, i.e. those in the non-voluntary category who are involved in ROW or corridor development and management, commercial forestry or some types of permanent take for commercial or residential development (*see non-voluntary participation p. 46-47*), or (2) are listed as an exception to the requirement. Participation in the conservation effort by this group is voluntary; such an approach to endangered and threatened species conservation has historically been successful in Wisconsin. Activities that result in incidental take, including permanent take engaged in by landowners and managers in this category will be automatically covered by the ITP without further approval or process whether the Karner blue butterfly is incidentally taken or not. The exceptions are described below and include:

- ☞ Non-commercial Forestry Landowners
- ☞ Agricultural Community
- ☞ Non-subdivision Residential Development

Non-commercial Forestry Landowners (Voluntary Category). Non-commercial forestry landowners in this HCP are defined as landowners with 1000 acres or less, or those with greater than 1000 acres of land where the land is not primarily managed for the purpose of forestry (e.g. managed for recreation, as camps or lake associations).

Many of the forest land owners in the state; private and corporate have entered their land under the DNR's forest tax law management programs (Forest Crop, Woodland Tax, Managed Forest Land programs). These forest management programs distinguish commercial forestry as greater than 1000 acres, and non-commercial forestry as 1000 acres or less.

Agricultural Community (Voluntary Category). The inclusion of the agricultural community in the voluntary non-partner participation category is based on the experience and knowledge of Karner blue butterfly habitat requirements and the location of historic Karner blue butterfly element occurrences. Most agricultural operations do not appear to support habitat for the Karner blue butterfly or present a threat to the continued existence or recovery of the Karner blue butterfly in Wisconsin. For the purpose of this strategy and exception "Agricultural lands, activities or use", shall have a similar meaning as that provided in s. 91.01(1), *Wis. Stats.*, which describes agricultural use to mean:

... beekeeping, commercial feedlots; dairying; egg production; floriculture; fish or fur farming; forest (except "commercial forest" as defined above) and game

management; grazing; livestock raising; orchards; plant greenhouses and nurseries; poultry raising; raising of grain, grass, mint and seed crops; raising of fruits, nuts and berries; sod farming; placing land in federal programs in return for payments in kind; owning land, at least 35 acres of which is enrolled in the conservation reserve program under 16 USC 3831 to 3836; participating in the milk production termination program under 7 USC 1446(d); and vegetable raising.

Although agricultural agencies at the federal, state and county levels will be involved in this program, the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) will be the principal partner, through a memorandum of understanding with the DNR, orchestrating the efforts of the agricultural community. The DATCP has committed to working on request with the various growers organizations, as well as the owners and users of agricultural land, to assist in outreach, education and assistance related to pesticide use and informs the pesticide user community that issuance of a permit by the FWS for implementation of the HCP does not authorize an intentional take of the Karner blue butterfly. The DATCP will make follow-up contacts with agricultural landowners and other pesticide users to assure legal pesticide use. The DATCP, with input from agricultural businesses and growers groups, has produced recommendations for protecting Karner blue butterflies from pesticide injury on agricultural lands. These recommendations are part of the educational materials the DATCP is providing these groups to distribute to their members and clients. Where the DATCP works with individuals to develop a management plan, plans and affected sites will be periodically examined for workability and habitat health or butterfly occupancy.

Non-subdivision Residential Development (Voluntary Category). Another activity exempted from the requirement of obtaining a Certificate of Inclusion is small scale residential development. Landowners or persons building a permanent or seasonal home with associated structures, such as a garage or driveway, are not considered a threat to the continued existence of the Karner blue butterfly or its recovery.

Voluntary participation in conservation efforts, however, will be encouraged through outreach, education and assistance. Through this strategy, the partnership is confident that it will gain the cooperation of many non-partner landowners.

C. Outreach, Education and Assistance

The Outreach, Education and Assistance strategy is key to the effectiveness of the voluntary, non-partner segment of this conservation effort. As part of a non-regulatory approach, statewide public outreach, education and assistance programs will be conducted to foster partnerships and encourage conservation efforts on a voluntary basis. The Partners intend this outreach and education program to be user-friendly and non-threatening. In order to encourage cooperation in this conservation strategy, landowners and land users in the voluntary participation category must be given assurances that engaging in conservation efforts will not be disadvantageous. It is essential that landowners and land users be guaranteed that participation in conservation efforts will

not result in restrictions due to the presence of the Karner blue butterfly. Therefore, persons in this category have assurances within the ITP for a period through (and beyond its duration, if the ITP is renewed) that there will be no restrictions on incidental take including permanent take nor on the use of the land with regard to the Karner blue butterfly. Otherwise, a landowner may be reluctant to engage in conservation efforts.

The objectives of this effort will be to:

- ☞ Educate landowners, land users and others about the unique circumstances of Karner blue butterflies and landowners in Wisconsin;
- ☞ Identify those who would engage in conservation activities for the Karner blue butterfly, whether voluntary or non-voluntary;
- ☞ Offer the opportunity to become involved in this unique conservation effort to those who are willing; and
- ☞ Seek to develop cooperative conservation alliances as described elsewhere in this section.

New Partner Recruitment of Landowners and Land Managers in the Non-Voluntary Category. Those landowners or land users, who require permit coverage, are offered an opportunity to participate in this HCP (and associated ITP coverage) through a variety of processes and mechanisms consistent with the “HCP Communication Plan”. *(Refer to Appendix D.)*

Landowners and land users who may incidentally take Karner blue butterflies will be subject to a variety of methods of public outreach, education, or assistance. HCP Partners and collaborative groups, field foresters, property managers, county offices, trade associations, environmental land trusts and other organizations, as well as other state and federal agencies representing particular interests or activities are aware of the HCP and have and will continue to communicate informational materials prepared by the DNR and the HCP partners to those affected. The DNR and HCP Partners will be responsible for providing information on the Karner blue butterfly to landowners or land users within Biological Recovery Zones who are not associated with such interests or activities.

Permanent take. It would be impossible to comprehensively anticipate all those that may be involved in a permanent take of Karner blue butterflies in the future. The Karner Blue HCP has been the subject of widespread outreach and education since 1995. With this broad awareness, information regarding inclusion requirements is widely available from cooperating consulting and engineering firms and regulators (e.g. the DNR Bureau of Endangered Resources, the DNR Office of Energy and the USFWS) who are often approached by affected parties. This information can also be accessed via the DNR’s widely used HCP Webpage.

The outreach and education strategy has as its strongest geographic focus, those broadest biological population areas, which include Karner blue recovery properties at their core. These areas are called “Biological Recovery Zones” (BRZ) *(Refer to Figure 6.10 Karner Blue Butterfly Biological Recovery Zones on p.53)*. Outreach and education commitments

are not an annual, mandatory requirement of partnership. Not all partners will have the opportunity to provide outreach and education in BRZs. However, as goals in the BRZs are realized, the scope of voluntary efforts will extend to areas throughout Wisconsin.

Biological Recovery Zones (BRZ). As noted above, landowners and land users within BRZs will be subject to an outreach and education program designed to encourage conservation and provide information on plan requirements. Direct contacts will be made in BRZs where the recovery property can not achieve recovery goals within the property boundaries and seeks assistance from neighboring landowners. In addition to direct contacts, information will be distributed through the HCP webpage with the assistance of partners, participants and governmental agencies. Technical assistance, when available, will also be offered. The DNR, HCP Partners and other collaborators including the USFWS Partners for Fish and Wildlife Program will target areas with known occurrences or a high potential for continued populations for focused landowner contact and participation.

High Potential Range. The remainder of the Karner Blue Butterfly High Potential Range, which is outside of BRZs, as indicated in Figure 2.10 (page 12), covers a large area. Like the BRZ's, this category maintains a geographical focus, but of a lesser priority for outreach and education as there is less opportunity for long-term Kbb conservation outside the BRZs.

Landowners and land users within the High Potential Range, but outside of the BRZs will be subject to the outreach and education program designed to encourage conservation and provide information on plan requirements. Information will be distributed through the HCP webpage with the assistance of partners, participants and governmental agencies. Technical assistance, when available, will also be offered. Outreach and education will be primarily passive in this area.

Karner blue butterfly specimens as an educational resource. Up to a total of 20 voucher specimens (including both male and female adults) may be collected by the WDNR under the permit for outreach, education and training purposes. Specimens would include dead specimens found in the field, and adults taken after the peak of the second flight. Adults would only be collected from sites where removal would not jeopardize the health of the KBB population. Specimens would be identified as belonging to the U.S. Fish and Wildlife Service and be kept in secure locations.

Chapter 6. Recovery of the Karner Blue Butterfly in the Wisconsin Statewide HCP

This chapter provides a discussion of the federal Karner blue butterfly recovery effort, the HCP partner's recovery role and distinguishes the practical and implementation differences. It is divided into the following sections:

- ☞ An overview of the relationship of federal recovery embedded in this HCP
- ☞ A brief discussion of DNR's participation in the federal Karner blue butterfly recovery program
- ☞ A discussion of HCP Partners' role in recovery efforts

A. Recovery and HCP's

The Federal ESA requires the USFWS to develop recovery plans for species listed as endangered or threatened, unless the Secretary of the Interior finds that such a plan will not promote the species conservation. The goal of recovery planning is to establish recovery goals, guidelines and funding priorities for restoring imperiled populations to viable levels into the indefinite future. The goal of the Karner Blue Butterfly Recovery Plan (2003) (Recovery Plan) is to establish viable populations of the Karner blue butterfly across its U.S. range so that it may be reclassified as threatened and eventually delisted.

The ESA further provides a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved [and] to provide a program for the conservation of such... Species... Habitat Conservation Plans (HCP's) under section 10(a)(1)(B) of the Act provide for partnerships with non-Federal parties to conserve the ecosystems upon which listed species depend, ultimately contributing to their recovery (USFWS July 2009).

B. Participation in the Federal Karner Blue Butterfly Recovery Program

HCP Partners Involved in Recovery. The DNR is currently the only HCP partner to have made a commitment to participate in Federal recovery efforts on lands they manage. Other partners are unable to commit for a variety of reasons including no land ownership, no Kbbs on their lands, long term financial implications, and legal obstacles to making a permanent commitment of lands for this purpose.

Table 6.10 (below) identifies specific DNR properties that will be involved in recovery efforts along with acreages both managed for and supporting the recovery effort. The acreage figures reflect the acreage of identified recovery sites that can potentially support the metapopulations on these properties. Additional sites and acreage may be added as needed to achieve population goals. The timetable for habitat restoration and the establishment of populations meeting the goal criteria will depend primarily on adequate funding and climatic conditions. A detailed listing by property of population goals is found in the Karner Blue Butterfly Recovery Plan (2003), Appendix B-12. Interested

parties should refer to Appendix B of that Plan (http://ecos.fws.gov/docs/recovery_plan/030919.pdf) for details and a map illustrating the location and recommended recovery goals for each recovery unit.

Table 6.10 DNR Lands and Acreages Managed for Recovery

Property	Acreages			
	Management to Feature and Enhance			Total
	Long-term Habitat	Shifting Mosaic	Corridors	
Black River State Forest (including Dike 17 WA and Bauer Brockway Barrens SNA)	200	2,000		2,200
Crex Meadows and Fish Lake Wildlife Areas	325	9,675		10,000
Meadow Valley (federal) and Sandhill Wildlife Areas	700	2,300		3,000
Greenwood Wildlife Area	53	1,384		1,437
White River Marsh Wildlife Area	45	3,955		4,000
Emmons Creek Fisheries Area	150	500	3	653
Hartman Creek State Park	13	50		63
Total	1,486	19,864	3	21,353

C. The Role of Karner Blue Butterfly Recovery in the HCP

This HCP is uniquely designed with a complex and sometimes confusing multi-faceted recovery role that overlaps HCP implementation with active participation in the Federal Recovery Plan by the DNR on a subset of properties; that is, the DNR is actively involved in achieving recovery goals and managing Kbb populations in perpetuity. The DNR is also a HCP Partner as the legal mechanism for incidental take authority for both recovery and non-recovery activities that result in incidental take. In turn for incidental take authority, DNR recovery properties follow much the same conservation measures and ITP reporting requirements as all other Partners. No other HCP Partner currently has

this dual role.

However, all HCP Partners, including the DNR voluntarily support the recovery effort through the HCP. While “achieving Kbb recovery” is not a written goal of the HCP, the HCP Partners realize the ultimate importance of Kbb recovery in Wisconsin and choose to support the recovery effort in voluntary ways that support those actively involved in the recovery effort. The Articles of Partnership (see Appendix C) describes the HCP Partners’ role, which includes, *“To assist in Karner blue butterfly recovery in Wisconsin. The HCP partners’ role in recovery can best be described as voluntary and a support role”,* and *“The Partnership in the implementation of the Conservation Plan has no direct responsibility to the Recovery Plan; however, an open and clear line of communication between the Karner Blue Recovery team and this Partnership will be maintained in a support role consistent with these Articles and for the exchange of technical information.”*.

Implementation of this HCP has already contributed to achieving several other Federal recovery goals identified in the Recovery Plan. These tasks include the development and distribution of educational and outreach materials, development of management guidelines (e.g., see Appendix E) and the collection of critical ecological data on the Karner blue butterfly and its habitat.

An important recovery support role for Partners will be to assist in recruiting landowner support for recovery:

- ☞ Direct personal contacts focused on lands in BRZ’s where recovery goals may not be met without the assistance of landowners outside recovery property boundaries. All landowners will be encouraged to participate in conservation/recovery efforts on a voluntary basis.

Participation by other public and private landowners is a welcome contribution to support designated recovery populations in particular, and statewide Karner populations in general. This participation and contribution is especially helpful in the Biological Recovery Zones (*See Figure 6.10 Karner Blue Butterfly Biological Recovery Zones on p. 53*) surrounding each recovery property. Biological Recovery Zones (BRZ’s) are areas including and around recovery properties (all) which constitute and/or support the same metapopulation as exists on and around the recovery property.

This can include areas of known or high probability habitat such as dispersal corridors, living corridors, open habitat and forested land that has suitable Kbb habitat and could likely contribute to the recovery of viable Kbb metapopulation associated with the recovery property.

Other support opportunities for HCP Partners include:

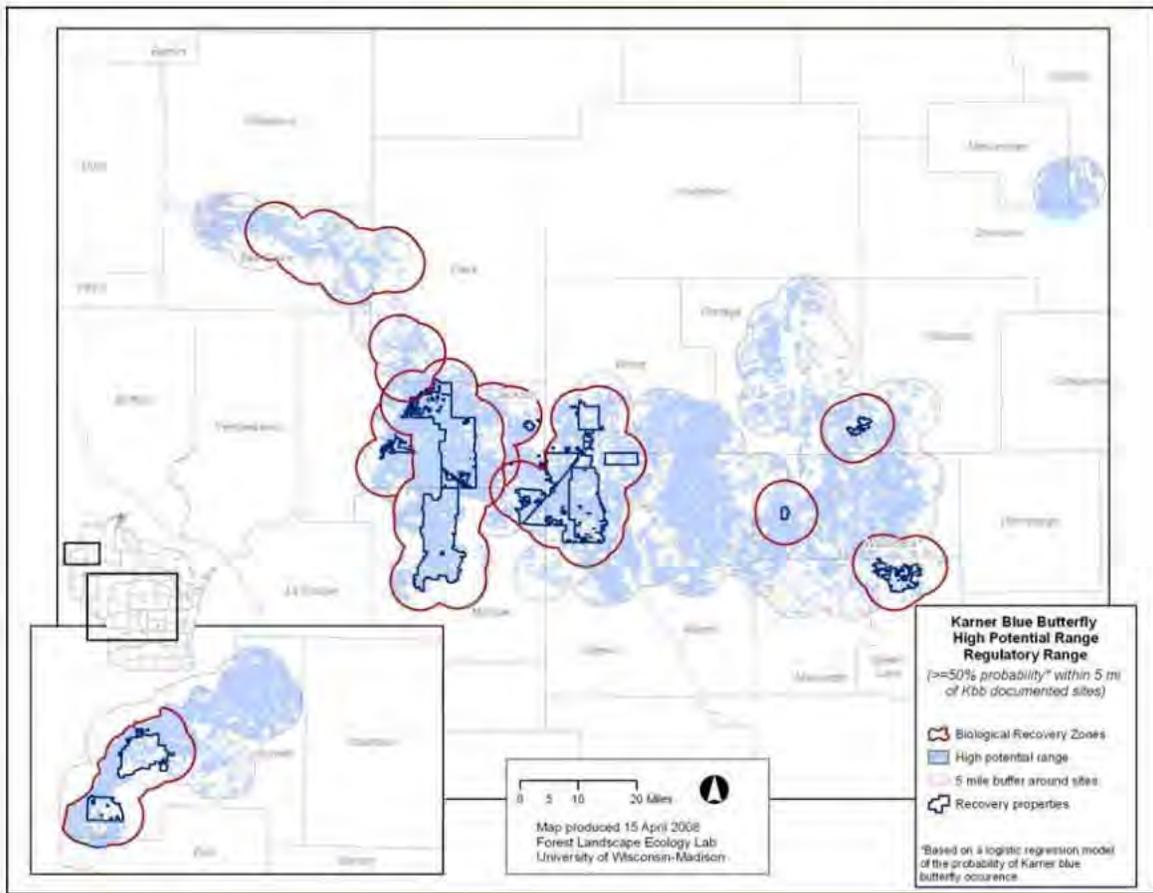
- ☞ Land acquisition or conservation easements for recovery or long term maintenance. Based on the availability of funds, the DNR or other partners will consider acquiring land from voluntary sellers in areas suitable for application of

management practices and recovery purposes.

- ☞ Land acquisition or conservation easements for conservation activities. The DNR and other partners may acquire land from voluntary sellers for conservation purposes, including the possibility of its use for a mitigation or mitigation banking strategy.

All HCP Partners may not have opportunities, landowner relationships or other connections, or economic resources to provide support, but many Partners may have an opportunity to provide assistance in a variety of ways, e.g. direct outreach and education to landowners in recovery areas, financial or on the ground support for recovery monitoring, among other needs identified by the DNR’s Wisconsin Recovery Working Group, Local Recovery Teams and DNR, Federal and private recovery property managers.

Figure 6.10. Karner Blue Butterfly Biological Recovery Zones



Chapter 7. HCP Funding

A. Funding Overview

The strength of this unique statewide conservation plan is the commitment of conservation measures on large tracts of public and private land (partner lands) throughout the State of Wisconsin. The HCP partners and other cooperators have committed to continue to work together in a grassroots cooperative plan designed to assure the future of the Karner blue butterfly through their collective conservation efforts conducted while continuing their normal management and land use activities.

The participation plan of the HCP brings together tremendous resources of support. This conservation effort, therefore, differs from other HCP's, as does the approach to funding. The strength behind the guarantee of funding is not to be found in the detail of dollars that might be located in an escrow account, but rather in the DNR's and the HCP Partners' commitments outlined in the Implementing Agreement and individual Partner's conservation agreements.

Therefore, in this plan, there will be a continuing effort through funding mechanisms and sources identified below and through joint partnering efforts:

- ☞ With the guidance of the IOC, the DNR will continue to establish funding mechanisms needed to support the implementation of the HCP;
- ☞ The DNR will continue to include in its annual budget requests, funds to fulfill its obligations under the HCP and the Implementing Agreement (Refer to Chapter 8 of the HCP for staffing and support details). However, the DNR can only obligate state funds for future activities to administer the ITP and implement the HCP, after they are appropriated by the state legislature;
- ☞ The USFWS will continue to seek adequate funding to fulfill its administration and assistance commitments and meet its statutory requirements (e.g., assist with permit monitoring and oversight issues and provide assistance on permit and HCP implementation issues). The USFWS further agrees to assist in identifying and pursuing funding for activities in the HCP that contribute to the recovery of the Karner blue butterfly;
- ☞ The partners will continue existing collaborative efforts and will develop further funding opportunities as needed.

This partnership approach has worked successfully over the last 10 years to provide funding to effectively implement the HCP. However, if at any time in the implementation and administration of the HCP funding appears to be unavailable to meet the commitments, the DNR will consult with the USFWS to determine whether the HCP or ITP needs amendment or modification.

B. HCP Organizational Structure

Implementation Needs. To anchor the HCP implementation infrastructure, DNR will continue to provide a full-time, permanent employee as the HCP Coordinator. This position will be stationed in the Division of Forestry and will be supported by segregated forestry funds.

There continue to be several unknowns around this HCP:

- ☞ The uncertainty of state and federal funding,
- ☞ The fact that the ultimate number of partners is unknown, and
- ☞ The magnitude of different activities.

As a result, the diverse financial needs of implementing the HCP continue to require that:

- ☞ A variety of funding sources be available and
- ☞ The management of these funds be flexible.

Administrative costs to administer the ITP, to implement the HCP and to operate the adaptive management system will continue to be largely be born by the DNR's Forestry Division: jointly funded and supported by:

- ☞ Forestry Division general purpose revenue (GPR) and segregated forestry funds;
- ☞ In-kind support from various DNR staff through cross program cooperation negotiated through the Department's work planning process;
- ☞ In-kind support from partners' staff participating on the IOC and its working subcommittees; and
- ☞ Non-refundable application and entry fees for future applicants requiring certificates of inclusion or partner status.

Partner Commitments. The main body providing partner support to the general implementation of the HCP will continue to be the partners' Implementation Oversight Committee (IOC). Operation of the IOC will be mostly self-funded with in-kind contributions of service and support of the IOC standing members. All partners are responsible to participate on the IOC during the course of the ITP. (*Refer to Chapter 8 for detailed information about the IOC.*)

Through individual conservation agreements, partners are committed to fund their management activities, which give consideration to, or enhance and favor the Karner blue butterfly and/or its habitat. Partners are likewise committed to fund required surveying and monitoring on lands they manage.

C. Implementation Process

Monitoring Impacts. Partners will continue to commit funds for biological monitoring needs, as outlined in Chapters 4 of the HCP. Recovery monitoring costs will be primarily born by the DNR. Funding sources include:

- ☞ DNR (will seek federal funding assistance);

- ☞ In-kind monitoring volunteered by partners and other cooperators; and
- ☞ Possibly a portion of inclusion fees and in-kind services from future applicants.

Each Partner will continue to support their required surveying and monitoring of lands entered into the management strategies under the conservation agreement. The funding to support pre-management surveying and monitoring related to partners' normal management activities is the responsibility of each partner. Each partner is obligated to perform this monitoring by their commitment in their conservation agreement. Verification that this obligation has been met will be part of the compliance auditing process.

Compliance Auditing. Compliance auditing (a.k.a. compliance monitoring) satisfies the USFWS' and the public's "need to know" that the parties involved are honoring their agreements. This form of monitoring will continue to primarily be the responsibility of the DNR.

Funding Commitments for the HCP's Conservation Program. Land management activities that result in the positive and necessary disturbances required for Karner blue butterflies to persist are inherent in each partner's normal land use activities. This is the very thing that has allowed the Karner blue butterfly's continued persistence on the Wisconsin landscape. A detailed description of funding commitments to perform existing normal work is irrelevant since these are the normal activities which would otherwise occur on the landscape. It is necessary and desirable that partners continue these activities when the ITP is renewed. For those situations where normal work will be modified, and the modifications result in additional costs, the partners are committing to funding additional in-kind effort as reflected in their conservation agreements.

Collection and Management of Funds, Fees and Fines. The state legislature approved a mechanism for the DNR to collect and manage funds from certain groups. HCP related funds deposited in this account will be approved for use by the IOC and the DNR.

Data Management and Analysis. The DNR will be responsible for coordinating and providing most data management and GIS activities. Funding will come from: DNR through work planning; commitments from some partners; outside sources; and may use a portion of inclusion fees from future applicants.

Research. Research priorities are identified in Chapter 4 of the HCP (pages 40-41). The HCP is fortunate to be the beneficiary of research already being pursued or planned by other parties. The DNR's Division of Forestry has invested a considerable amount of money for research.

Observation and analysis of monitoring data will continue to fuel the adaptive management process. Other research, which may be beneficial, will be pursued as its priority becomes more important and as funding becomes available. Commitments of large sums of funding for additional research are not being made. However, at the discretion of the IOC and the DNR, the partnership may make use of a portion of

inclusion fees from future applicants and in-kind services.

Some research is fundamental to the federal recovery process (Refer to the Karner Blue Butterfly Recovery Plan 2003) and may also benefit the HCP. The HCP Partnership will look to the USFWS and its recovery partners to help support research in this category.

Training. Training staff who are implementing the HCP may take a variety of forms, depending on the ultimate audience and demand. Funding for, or in-kind training services may be provided by one or more of the following:

- ☞ The DNR - Bureaus of Endangered Resources, the Division of Forestry and the HCP Coordinator;
- ☞ The DNR regional and area offices;
- ☞ The HCP Partners that have committed to internal and some external training in their conservation agreements;

The partners may also make use of a portion of inclusion fees from future applicants and in-kind services for training.

D. Additional Conservation Efforts

Outreach and Education. An important element of the HCP is the effort to spread broad awareness and understanding of the Karner blue butterfly and the opportunities to participate in this HCP. Coordination and basic outreach will be funded by the DNR.

Education may take a variety of forms, depending on the ultimate audience and demand. This will be provided by one or more of the following:

- ☞ The DNR Bureaus of Endangered Resources, the Division of Forestry and the HCP Coordinator;
- ☞ The DNR Regional and Area offices and Customer Service Centers;
- ☞ The DNR Bureau of Communication and Education;
- ☞ HCP Partners that have committed to outreach and education measures in their conservation agreements;
- ☞ The existing cooperative relationships with organizations like The Nature Conservancy, Wisconsin Woodland Owners Association, Audubon Society and Sierra Club; and
- ☞ The extended cooperative partnerships which will be developed with organizations such as UW-Extension, county land conservation agencies, tree farm families and others.

As with training, the partners may make use of a portion of inclusion fees from future applicants and in kind services for education and outreach.

Public Awareness. It is anticipated that there will continue to be a great deal of interest and inquiry around this HCP effort. Much of this could be academic or otherwise not directly related to recruiting additional conservation efforts. Funding for public awareness in the form of public relations will primarily be the responsibility of the DNR. Funding will continue to come primarily from the Division of Forestry Where the DNR

feels it is appropriate, the IOC will be consulted for advice or assistance.

Chapter 8. Implementation Organization

This part of the updated HCP describes the HCP partners' commitments to institutional arrangements for implementation of the HCP. It is divided into eight sections:

- ☞ DNR Organizational Structure for Implementation
- ☞ DNR-Partner Conservation Agreements
- ☞ Implementation Oversight Committee (IOC)
- ☞ Future Applications for Partner Status or Participation
- ☞ Permit Period
- ☞ Permit Amendments
- ☞ Permit Renewal
- ☞ USFWS "No Surprises" Policy

A. DNR Organizational Structure for Implementation

The lead programs for the HCP within the DNR will continue to be the Land Division's Bureau of Endangered Resources and the Division of Forestry. The focal position will be a full-time, permanent HCP Coordinator, stationed in the Bureau of Forestry, who will provide general project management and leadership within the DNR, coordination and facilitation for both the DNR and the Implementation Oversight Committee (IOC), planning, process design, development and training, as well as related duties. The DNR commits to provide a variety of other staff that will support the project as needed.

As the lead applicant for the Incidental Take Permit (ITP), the DNR will act as the permit administrator. In this capacity the DNR, among all other partners, will have the final authority and responsibility for decisions related to the ITP, although the agency will routinely seek advice from the partners and the Implementation Oversight Committee (IOC). In matters related to the implementation of the HCP, the DNR will share responsibility with the partners, most often through the IOC. This team, which represents the diverse interests of the partnership, is described below (pages 59-66). The IOC will operate within the Articles of Partnership (see Appendix C) and will act as an advisor to the DNR. However, as the permit holder, the DNR will be responsible for final decisions to assure the ITP is complied with and is not jeopardized.

Authority. The DNR has agreed to act as the lead applicant and permit administrator in accordance with any federal ITP issued. The DNR acts in this capacity under the authority of ss. 23.09 and 23.11, *Wis. Stats.*, regarding DNR's general powers; and 29.415, *Wis. Stats.*, the state endangered species law and s. 29.175, *Wis. Stats.*, regarding the protection and regulation of nongame species.

The DNR's implementation of the HCP is structured by an Implementing Agreement between the DNR and the USFWS. The agreement defines the roles and responsibilities of the DNR regarding implementation of the HCP and integration of other landowners or users, including the partners, with the DNR to obtain coverage under the ITP. The HCP and the Implementing Agreement are complementary to each other.

HCP partners, other than the DNR (lead applicant and co-partner), receive coverage under the ITP through their binding contracts with the DNR. These binding contracts, called Species and Habitat Conservation Agreements (conservation agreements), are supplementary to the Implementing Agreement. All are to be implemented and administered consistent with the HCP and the ITP. Any incidental take of Karner blue butterflies, then, must be consistent with the HCP, the conservation agreements or the Implementing Agreement, the ITP and other applicable federal and state laws.

The processes for addressing unforeseen or extraordinary circumstances, amending the HCP and ITP if necessary, reviewing implementation of the HCP and funding are discussed in this HCP and more briefly in the Implementing Agreement. A comprehensive definition of responsibilities for implementation of the conservation program is also included in the Implementing Agreement.

DNR Commitments. For the duration of the permit, the DNR, in addition to its conservation and recovery commitments under the HCP, will provide staff and fund one permanent, full-time employee to administer the ITP on behalf of the DNR and to coordinate implementation of the HCP. The coordinator will be responsible for both coordination of the DNR-owned lands' prescribed management activities with DNR property managers (and other conservation measures committed to by DNR in the implementation agreement) and the collective implementation of the HCP, including compliance audits of HCP partners.

The DNR's Division of Forestry will provide funding for the HCP Coordinator's salary and other expenses related to the position, including supplies, travel, information, communication and meeting expenses for HCP partner meetings. The DNR will share in some of the administrative and operational needs of the IOC and the partnership.

The DNR will provide or seek funding for DNR support services as needed to fulfill its obligations and commitments in implementing the HCP and administering the ITP.

Assurances. Public entities typically do not have complete control in decision making regarding the allocation and dedication of public monies. Through a variety of planning processes, however, they have an opportunity for justifying activities, such as those needed to implement the HCP. The first of those is the *Property Master Planning Process* as governed by Chapter NR 44, Wis. Adm. Code. This process provides for the logical and progressive planning of objectives and activities for management on state-owned, DNR-managed lands.

To the greatest extent possible, *work planning* also ensures the DNR will implement the HCP on DNR-managed lands. Work planning is an official operating procedure in the manual code (synonymous with standard operating procedures) that all DNR programs establish in conjunction with the state's biennial budget process. The development of *County Forest 10-Year Plans* supports the implementation of the HCP on County Forests much the same way as DNR master plans do on DNR lands.

B. DNR-Partner Species and Habitat Conservation Agreements (Conservation Agreements)

The Wisconsin Karner Blue Butterfly HCP partners are guided in their participation by binding Species and Habitat Conservation Agreements (conservation agreements). Templates of a conservation agreement for Full Partners and another for Limited Partners are included in Appendix D. These agreements have been entered into by and between each partner and the DNR. Once the Partner has an agreed upon conservation agreement, the DNR will issue the Partner a Certificate of Inclusion. The conservation agreements form the basis of the DNR's application for the statewide incidental take permit (ITP). With the ITP, the DNR will implement and oversee the statewide Karner blue butterfly conservation program, involving the partners and other landowners and users in the state.

Each conservation agreement is consistent with and tailored to the resources, capabilities and commitments of individual partners. Each partner's conservation agreement addresses and details:

- ☞ The lands and activities included in the conservation effort;
- ☞ The obligations of partners to modify land management or land use activities as a result of adaptive management; and
- ☞ The monitoring, reporting and auditing responsibilities the partners agree to conduct and be subject to during the length of the commitment;
- ☞ Any additional conservation efforts a partner intends to engage in;
- ☞ Public outreach and education activities partners agree to implement;
- ☞ The period for which it will bind the partner, as well as any renewal, modification and amendment opportunities under it;
- ☞ Data sharing of Natural Heritage Inventory data for Karner blue butterfly element occurrences.

The commitments of the partners are detailed in their individual conservation agreements. Most partners have agreed to follow the guidelines and protocols included in the HCP User's Guide in Appendix E. Others will do a mix of what is in the HCP and some specific conservation measures outlined in their individual conservation agreements. All commitments, however, are stated in the partners' conservation agreements, especially in cases where they have chosen to operate differently than what is outlined in the HCP.

Any incidental take of a state or federally-listed species other than the Karner blue butterfly requires a permit or approval, other than the ITP granted for this HCP, from the DNR and/or the USFWS.

Such a permit was issued by the DNR to the HCP Partners in 1999 that allows for the incidental take of a specific suite of state-only listed species that will likely benefit from the Kbb conservation measures in the HCP and are able to withstand the minimal amount of impact from land management activities.

Access to the lands and relevant records of each partner, for the purpose of implementing the conservation program and assuring compliance with the agreement, is described in

the conservation agreement. It is necessary for the DNR, and others including the USFWS, to access partner lands for the purposes of auditing and implementing the ITP.

The conservation agreements also include provisions to address the assignment of privileges and the transfer of lands, including the process to address proposed transfers. The transfer of lands or modification of obligations will be addressed by notice to the DNR.

Remedies Finally, the conservation agreements detail the remedies available in the event that a partner violates provisions of the agreement. A partner violating provisions of the conservation agreement may not only lose coverage under the ITP and be subject to prosecution by the USFWS if take is involved, but will also be subject to various civil remedies and damages the DNR may seek for contract breach. Decisions on when to seek such contract remedies by the DNR will involve the IOC. The final decision on conservation agreement enforcement will rest with the parties; therefore, a partner's violation of the conservation agreement will be the DNR's responsibility to enforce. The decision to seek enforcement for an unauthorized take under the ESA will be solely the decision of the USFWS.

The goal of this contractual relationship between the partners and the DNR is that of most service contracts. The parties want to continue their relationship in an amicable and reasonable manner to achieve the goal of the contractual agreement. In this case, both parties want to assure the conservation of the Karner blue butterfly, but be allowed to reasonably continue land management and use activities. With this species, both can be reached. Few contractual relationships flow without bumps in the road. Minor infractions could take place, but should not jeopardize the completion of the contract or achievement of the goals it was entered into to achieve. Therefore, levels of contract enforcement or administration are common. These may include:

- ☞ Notification to fully comply, pointing out an infraction not needing correction, with no further pecuniary remedies or loss of ITP coverage;
- ☞ Notification to comply and correction of an infraction within a certain period of time, with no further pecuniary remedies or loss of ITP coverage;
- ☞ Notification of an infraction and the seeking of pecuniary damages, but *no* loss of ITP coverage; or
- ☞ Notification of an infraction and the seeking of pecuniary damages *with* loss of ITP coverage.

These stages of contract administration cannot be well-defined. Sound judgment and understanding must be included in contract administration and is an obligation of both the DNR and the partners. Strict and unreasonable administration and enforcement on the part of either party might assure that the goals of the agreement cannot be reached. *(For specifics regarding remedies, see the conservation agreement (SHCA) templates in Appendix D.)*

This HCP partnership relies and must be based on an open and honest relationship that encourages on-going communication. Immediate notification to the DNR of any

violations of the conservation agreements, especially if they involve an unauthorized take of the Karner blue butterfly, is expected. Likewise, the reaction of the DNR to the information and notice should recognize this working partnership and the efforts to jointly conserve and protect the species. Responses should be molded to encourage the process to mitigate or address take in a reasonable and responsible manner through reasonable and realistic contract administration and remedy selection.

At any time that a partner engages in unauthorized take of Karner blue butterflies (i.e. take not covered by the ITP), the issue of ESA enforcement by the USFWS arises. This may result in civil or criminal penalties being assessed against the partners involved. The enforcement will be at the discretion of the USFWS.

Any contractual administration, as will be the case with the conservation agreements, must be flexible and have the latitude to address infractions or violations of agreements in a manner which includes the exercise of sound judgment, consideration of the resource, and furtherance of the conservation goals of the agreement. This conservation plan relies on continuing activity by the partners. Similarly, the continuation of activity by the partners may rely on their authorization under the ITP. Partners often depend on employees and agents, that they cannot constantly supervise, to conduct land management and use activities. Conservation measures in contracts and directions for conducting activities will, in large part, assure they conform to the ITP. Through the IOC and other partners and participants, a wide variety of views and experiences will be available to assure sound, reasonable and equitable administration and enforcement of the agreements, including any remedies that may be sought consistent with them.

C. Implementation Oversight Committee (IOC)

The Implementation Oversight Committee (IOC) is a subset of partners and non-partner cooperators, which primarily exists to represent the partners' interests during the permit period. Non-partner participation is encouraged to provide a broader perspective of shared goals for successful conservation of the Karner blue butterfly and its habitat. There are four levels of participation in which the IOC will act:

- 1) Advising the DNR,
- 2) Making decisions on behalf of the partners,
- 3) Actively planning and providing services, and
- 4) Making recommendations to the partnership and the DNR.

Each of these roles is briefly discussed below.

The IOC will act in an advisory capacity, to provide guidance to the "permit administrator" (DNR) in any and all matters pertaining to the HCP. The implementation activities which the IOC, in its advisory role, will review and offer recommendations to the DNR include the following:

- ☞ The approval of new partner applications (Note: ITP coverage for new partners requires issuance of a Certificate of Inclusion by the DNR);

- ☞ The withdrawal of partners from the HCP and termination of conservation agreements;
- ☞ The transference of incidental take authority by way of the transfer of land rights (as defined in the agreements);
- ☞ HCP review process and permit renewal;
- ☞ The approval of amendments and changes to the HCP;
- ☞ Disposition of funds common to the partnership [Note: This does not include funds and in-kind services belonging to an individual partner or the state.];
- ☞ Review of partner audit reports with non-compliances and consideration of remedies for non-compliant performance (agreement violations);
- ☞ Remedies for conservation agreement violations;
- ☞ Public relations and communications; and
- ☞ Adaptive management and research guidance.

The IOC will act as a decision maker on behalf of the partnership in some matters, including:

- ☞ IOC administrative issues, such as membership, IOC operating rules and processes;
- ☞ Establishment of IOC operating ground rules/rules of conduct;
- ☞ Composition and assignment of IOC subcommittee responsibilities and operations; and
- ☞ Creation of programs for annual HCP partnership meetings.

The IOC will play an active role in planning and providing services and products in some areas, by both working as a committee and through IOC working subcommittees. Some of these areas are:

- ☞ Developing funding strategies and coordinating and seeking funding;
- ☞ Providing guidance on outreach and education activities;
- ☞ Providing materials and guidance on public relations and communications issues and activities; and
- ☞ In conjunction with the HCP Coordinator, developing, planning and co-hosting periodic HCP partner meetings.

In matters of direct concern for all partners, the IOC will assess available information and make recommendations or offer alternatives to the partners regarding matters requiring a full partnership decision. In these cases, the Articles of Partnership will be followed for partner decision making and voting. Issues for entire partnership include:

- ☞ Issues governing changes to IOC decision making process and authority, and
- ☞ Amendments to the HCP including ESA listing status changes.

IOC Leadership and Partner Participation. The DNR performs two roles for the HCP: permit administrator and partner. As a partner, the DNR will be a permanent member of the IOC. The DNR HCP Coordinator will act as the DNR representative and facilitate IOC meetings.

Any qualifying Full partner may sit on the IOC. This includes new partners added during

the permit period. Limited partners are not expected to participate in HCP or IOC meetings, but are welcome to attend and fully participate, except in cases of voting. The IOC will be composed of one member from each type of partner. The current entity groups which will be represented are:

- ☞ Utility managers,
- ☞ Road rights-of-way managers,
- ☞ Forest industry,
- ☞ County forests,
- ☞ The DNR, and
- ☞ The DATCP.

Members may be added in the future as new entity groups join the HCP. Membership will rotate on a staggered basis among partners. Each partner should consider it a serious responsibility of membership in the HCP to contribute their time to serve at least one term on the IOC. Representation of their interests will depend on their participation.

A partner other than the DNR will chair the IOC. Elections will be held consistent with the IOC administrative procedures (*Refer to the IOC Administrative Procedure in Appendix E*) to determine the chair person. Several members of the IOC may be "sub-committee chairs" of specific areas or ad hoc teams. They will not be involved in the day-to-day operations of the HCP, but will serve an advisory function for major issues brought to them by the HCP Coordinator, the IOC, the Partners, the Wisconsin KBB Recovery Working Group or the USFWS. The sub-committees' role will mostly be to research issues (often outside the partnership), develop information on issues, communicate information to those concerned and lead discussions at IOC meetings.

IOC Representation by Non-Partners. Five non-partner participants will be encouraged to be formal members on the IOC in the same manner as they were during the HCP development process. These participants are the Wisconsin Audubon Council, the Sierra Club, the Wisconsin Paper Council, the Wisconsin Woodland Owners Association and The Nature Conservancy.

Consistent with the Articles of Partnership, if they choose to, these non-partner IOC members have the opportunity to participate in an advisory capacity; with their opinions being considered in consensual discussions and decision making. Non-partner members will not vote with partners on partner-only decisions. Non-partners will not be eligible to chair the IOC, as described elsewhere in this subsection.

Other non-partners are welcome to attend public-noticed IOC meetings as observers, but will only be allowed to passively participate, as IOC meetings are not public forums for general discussion, but working committee meetings. Where it would further the goals of the HCP and the IOC, other non-partners may be considered for formal membership, as approved by the IOC.

The special advisory role of the USFWS in the HCP development process is encouraged to continue as an advisory member to the IOC. Direct participation by the USFWS in

IOC meetings is welcome, but not mandatory.

IOC Sub-committees. IOC sub-committees will provide focal points for and distribution of responsibility associated with preparation and leadership on key IOC issues. Sub-committees will primarily investigate action items between IOC meetings and develop recommended courses of action. All members of the IOC can serve as sub-committee chairs. IOC sub-committee chairs will interface with individuals and organizations outside the IOC to gather information essential to IOC matters and discussion (e.g., seeking opinions of other entity members or others regarding the appropriateness of a corrective action or remedy involving an agreement violation; investigating science-related issues with outside experts; or seeking financial accounting data or funding information from the funding sources, such as a foundation or the DNR). IOC sub-committee chairs will coordinate and/or present informational field trips or presentations, which enhance the knowledge of IOC members and participating guests.

Recommendations for IOC sub-committee areas include:

- ☞ Approval of new partners,
- ☞ Approval of modifications to the HCP,
- ☞ Disposition of funds,
- ☞ Auditing and non-compliance,
- ☞ Partner support of Kbb recovery,
- ☞ Public relations and communications, and
- ☞ Adaptive management and research guidance.

IOC Operating Procedures. All IOC meetings will be noticed as a public meeting. The IOC will operate in an environment respecting anti-trust policies (see HCP Partnership anti-trust statement in Appendix C), and the IOC and the HCP partners will continue to follow the Articles of Partnership. (*Refer to Appendix E, the administrative procedures in the HCP User's Guide for detailed IOC operating procedures and processes.*)

D. Future Applications for Partner Status or Participation

Application Processing. The participation plan discussed in Chapter 5 of the HCP provides that those landowners or users requiring permit coverage will be offered the opportunity to join this conservation effort either as a Full partner, a Limited (Local) partner or a one-time sub-permittee. A person or entity desiring to join as a Full partner must be willing to assume all obligations and duties of a partner, and will in turn, obtain the benefit of continued coverage and a voice in the continuing administration and implementation of the ITP. Limited partners (further described in Chapter 3 of the HCP) are county highway departments and townships that follow best management practices to perform a limited suite of road ROW maintenance activities. Limited partners have fewer obligations and responsibilities than full partners. The abbreviated nature of their participation is reflected in a simpler conservation agreement. One-time permittees requesting permit coverage for permanent take are required to agree to a compensatory mitigation plan. Under any category, the person or entity wishing to join the conservation program will seek to enter through an application and review process. (*The Application*

process for coverage under the ITP for those in the Non-Voluntary category is described in the "Inclusion Procedure" in Appendix E and in the HCP User's Guide ; Refer to DNR's Karner Blue HCP webpage for most current version .).

E. Incidental Take Permit Period

Based upon partner responses gathered at the 2008 annual Partner's HCP Team meeting, the DNR is applying to renew the ITP for a 10-year extension with the opportunity to extend the period of coverage again if needed.

F. Incidental Take Permit and HCP Amendments

Amendments are anticipated to fall into two categories: major and minor. Major amendments will likely require amendment of the ITP and related documents as appropriate. Minor amendments to the HCP or ITP will be handled administratively and coordinated internally between the DNR and USFWS. With the adaptive management strategy being used, it is anticipated that ITP and major HCP amendments will be infrequent, if at all. HCP minor amendments will occur more often as new information informs changes to the HCP's conservation program.

Major Amendments to the ITP and HCP. Major amendments to the ITP and HCP proposed by the DNR will be processed by the USFWS in accordance with the ESA and permit regulations of 50 CFR Parts 13 and 17. Amendments to the ITP are needed when the DNR wishes to significantly modify the conservation program as described in the HCP (i.e., if the net effect on the species involved and level of take are significantly different than that analyzed under the original HCP and USFWS decision documents). Examples of modifications that would require amending the ITP include, but are not limited to:

- ☞ The addition of federally-listed species to the permit that were not previously addressed in the HCP;
- ☞ Substantive reduction in the total acres that have been committed to the conservation program, if the reduction will significantly reduce the conservation effort to the extent its goals cannot be attained; and
- ☞ Adjusting any mitigation to address "unforeseen circumstances" (unless adjustment is minor; see discussion of "No Surprises rule" on pages 68-69).

Minor Amendments to the ITP and HCP. Minor changes or amendments to the ITP or HCP can be completed administratively without amending the permit. Minor amendments are those that do not substantially modify the conservation program in the HCP. To qualify as a minor change, the net effect of the proposed change on the species involved cannot be significantly different than that analyzed under the original HCP and USFWS decision documents. Examples of minor changes include, but are not limited to:

- ☞ New activities not covered in the original HCP
- ☞ New conservation and implementation strategies not considered in the original HCP program

- ☞ New guidelines, protocols or administrative procedures

Routine revisions and clarifications to operating and administrative procedures do not warrant a formal minor amendment, (*Refer to IA provision 11.6 (14) (a) and the Amendment Administrative Procedure in App/E*) examples include:

- ☞ Revisions and clarifications to survey and monitoring protocol,
- ☞ Changes in land ownership that do not otherwise alter the effectiveness of the HCP.
- ☞ Changes in the total acres that have been committed to in the conservation program that do not otherwise alter the effectiveness of the HCP, and

Detailed ITP/HCP amendment procedures can be found in the HCP administrative procedures. (*Refer to Amendment Procedures in appendix E and the HCP User's Guide.*)

The USFWS will retain its right to amend the permit for just cause at any time during the permit term, upon written finding of necessity.

G. Incidental Take Permit Renewal

At the end of the permit period, the DNR may choose to request a renewal or extension. The DNR will work with the USFWS and the HCP Partners to identify any information needed to extend the ITP. Any request for renewal or extension will be in writing and will comply with any applicable USFWS permit application guidelines.

H. USFWS Habitat Conservation Plan Assurances ("No Surprises" Rule)

The USFWS's final rule, entitled Habitat Conservation Plan Assurances ("No Surprises" Rule) dated February 23, 1998, (CFR 63(35):8859-8873) is intended to provide economic and regulatory certainty for non-federal property owners with approved and properly implemented HCPs in the event of "unforeseen circumstances." HCPs must provide provisions for addressing both "unforeseen" and "changed circumstances" not already addressed in the conservation plan. The provisions of the rule and their application to this HCP are discussed below.

Unforeseen Circumstances

Pursuant to the rule, *unforeseen circumstances* are changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by the plan developers at the time of the HCP's negotiation and development, and that result in a substantial and adverse change in the status of the covered species. Unforeseen circumstances, therefore, would include natural disasters of a scale or magnitude that would not be anticipated under normal circumstances. Events such as tornadoes or wildfires that might reasonably be anticipated to occur in Wisconsin would not meet this definition; however, events such as a wildfire of unanticipated size, an earthquake or other catastrophic event that would not normally occur in Wisconsin

would meet the definition of unforeseen circumstances.

Changed Circumstances and Conservation Measures to Address Them

Unforeseen circumstances should not be confused with *changed circumstances*. Changed circumstances are changes in circumstances affecting the Karner blue butterfly within the High Potential Range, the lands included in the HCP that are subject to Partners' conservation agreements and that can reasonably be anticipated. Changed circumstances not already covered in other sections of the HCP that may occur during the permit period will be addressed by the DNR, USFWS and affected partners in the manner presented in Table 8.10 (pages 70-71).

Changed Circumstances Not Provided for in the HCP. In the event of *changed circumstances* with no conservation measures provided for in the plan, the USFWS will not require any conservation or mitigation measures above and beyond what is provided for in the HCP (and associated agreements), without the consent of the permittee and affected partner(s), provided the HCP is being properly implemented. The USFWS will coordinate and work cooperatively with the DNR and affected partners to explore ways that the operating conservation program can address the impact.

Unforeseen Circumstances and Measures to Address Them

Pursuant to the Rule, should *unforeseen circumstances* occur the following steps will be taken:

1. The USFWS will demonstrate that unforeseen circumstances exist and determine whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the Karner blue butterfly.
2. If the USFWS determines that additional conservation and mitigation measures are necessary to respond to unforeseen circumstances, the USFWS will work cooperatively with the DNR and appropriate Partners on additional conservation measures or mitigation measures that may be taken to address the impacts however:
 - A. Requested modifications will be limited to the HCP's operating conservation program and maintain the original terms of the conservation plan to the maximum extent possible.
 - B. The USFWS will not ask for more lands, financial compensation, or additional restrictions on land use, or other natural resources otherwise available for development or use without the consent of the DNR, who in turn, will obtain consent from the HCP partners as appropriate.

Table 8.10 Changed Circumstances and Assessment and Management Adjustments to Address Them

Changed Circumstance	Assessment and Management Adjustments
Forest fires and other wildfires of anticipated degrees and fire suppression activities related to them	Prior to a management action on lands impacted by the changed circumstance, the land manager will assess any necessary changes in management that may be needed to further the conservation of the Kbb and incorporate those measures into the management plan (e.g., burn management on lands impacted by a forest fires or other wildfire may have to be adjusted (e.g., postponed). There are no specific reporting requirements above and beyond normal annual reporting.
Natural weather events such as tornadoes and flooding	Same procedures as for forest and other wildfires

Partner Assurances. The DNR and HCP partners acknowledge that the assurances provided by the Rule are extended to this HCP provided the permittee and partners are properly implementing the HCP, Implementing Agreement, associated conservation agreements and the ITP.

Processing Conservation Plan Changes as a Result of Unforeseen or Changed Circumstances. Changes to the conservation program will be processed as amendments to the ITP and/or HCP, as appropriate, with commensurate changes to partners' conservation agreements, as needed.

Relationship of Changed Circumstances to the HCP's Adaptive Management Strategy. In the event of changed circumstances that may be adequately addressed through the adaptive management strategy, the HCP Partnership will respond to those changed circumstances, as specified in and consistent with the HCP, Implementing Agreement and associated conservation agreements, during the life of the ITP.

The changed circumstances noted in Table 8.10 (page 70) will be addressed in the context of the adaptive management strategy outlined in this HCP.

Among other things, adaptive management is intended to detect changes in Karner blue butterfly populations and habitat over time. The process is designed for normal circumstances, to observe and analyze the results of management activities and

treatments. This is a relatively long-term view looking at cumulative effects. In contrast, changed circumstances are the result of a short-term or real-time event, the adverse effects of which may be realized simultaneous to the event. If the event negatively affected occupied habitat in a manner not reasonably expected under management and use of the land without the event, a process for appropriate and available corrective action will result as a normal application of the adaptive management process.

Chapter 9. Amendments for Future Species Listings

If a currently unlisted species is federally listed as endangered or threatened pursuant to the ESA after the ITP has been issued, and the partners desire incidental take coverage for that species, the DNR shall coordinate with the USFWS on a permit amendment to include the newly listed species.

This process shall entail the review of the HCP and conservation agreements to determine if the conservation measures identified in those documents are adequate for conservation of the newly listed species. If determined adequate by both parties, the DNR shall request an amendment to the ITP to include the newly listed species.

If conservation of the species is not adequately covered by the HCP and conservation agreements, the DNR shall submit a revised or supplementary HCP and supporting documentation including amended conservation agreements (as appropriate) with the request to amend the ITP. While DNR may negotiate an amendment to include other species, participation regarding additional species through this amendment provision is on a partner-by-partner basis, and would only bind a partner should they choose to amend their own conservation agreement. Any permit amendment for take of newly listed species would only cover those partners with conservation agreements that conserve the species. The USFWS is responsible for completing environmental compliance documents under NEPA (although the DNR may assist with this process) and for all internal compliance under section 7 of the ESA.

Chapter 10: List of Preparers

A. Major Contributors

Individuals who contributed significantly to the drafting and editing of the HCP and EIS documents and their qualifications are listed briefly in this section.

David R. Lentz received his B.S. in Natural Resource Management from the University of Wisconsin-Stevens Point in 1975. He has worked at the Wisconsin DNR since 1993, first as a Fisheries Biologist and since 1995 as the coordinator of the Karner Blue Butterfly HCP program. Dave has consulted and lectured nationally on HCP and team processes. Prior to 1993, Dave was in the private sector in industrial management for 12 years. He spent half of this time in the management and reclamation of open pit mining, and the other half in Total Quality Management in manufacturing, focusing on group facilitation and team dynamics.

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A number of other participants in the Wisconsin Karner Blue Butterfly HCP process contributed to the development of the HCP and EIS documents by providing information, reviewing and editing portions of the document, contributing ideas in HCP meetings and discussions, and in other ways too numerous to list. These individuals are listed in this section.

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Appendix A. Karner Blue Butterfly Biology

The following summary of Karner blue butterfly biology and ecology is excerpted from the USFWS Final Karner Blue Butterfly Recovery Plan (USFWS 2003). For a complete copy of the Federal Recovery Plan, please go to the following USFWS website:

<http://www.fws.gov/midwest/endangered/insects/kbb/kbbRecPlan.html>

Since this appendix consists of material excerpted from another document, some clarification is merited. The federal Recovery Plan was used as the source for this appendix because it includes the most succinct and current summary of Karner blue butterfly biology. References to "this recovery plan" found in this excerpt refer to the Karner Blue Butterfly Recovery Plan (USFWS 2003), *not* the Wisconsin Karner Blue Butterfly HCP (the HCP is not a federal recovery plan). Similarly, mention of appendices made in this excerpt refers to appendices of the Karner Blue Butterfly Recovery Plan (USFWS 2003), not material appended to the HCP. To reduce redundancy and costs, references cited in the excerpt are not included in the updated HCP. Readers should refer to the recovery plan for proper citations. However, table and figure references included here do refer to tables and figures in the excerpt.

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U.S. Fish and Wildlife Service. 2003. Final Recovery Plan for the Karner Blue Butterfly (*Lycaeides melissa samuelis*). U.S. Fish and Wildlife Service, Fort Snelling, Minnesota. 273 pp.

PART I. INTRODUCTION

The Karner blue butterfly (*Lycaeides melissa samuelis*) was proposed for Federal listing on January 21, 1992 [U.S. Fish and Wildlife Service (USFWS) 1992a], and on December 14, 1992 it was listed as federally endangered rangewide (USFWS 1992b). Historically, the Karner blue butterfly occurred in 12 states and at several sites in the province of Ontario. It is currently extant in seven states (New Hampshire, New York, Ohio, Indiana, Michigan, Wisconsin and Minnesota) with the greatest number of occurrences in the western part of its range (Michigan and Wisconsin). The Karner blue is considered extirpated from five states and the Canadian province of Ontario. Reintroductions are underway at three sites, Concord, New Hampshire, West Gary, Indiana, and in Ohio. The historic habitat of the butterfly was the savanna/barrens ecosystems. Much of these ecosystems has been destroyed by development, fragmented, or degraded by succession, and has not been replaced by other suitable habitat, especially in the eastern part, and along the margins of the butterfly's range. The loss of suitable habitat resulted in a decline in Karner blue locations and numbers, with some large populations lost, especially in the eastern and central portions of its range. Presently, the Karner blue butterfly occupies remnant savanna/barrens habitat and other sites that have historically supported these habitats, such as silvicultural tracts (e.g. young pine stands), rights-of-ways, airports, military bases, and utility corridors.

The ecology of the Karner blue butterfly is closely tied to its habitat which provides food resources and key subhabitats for the butterfly. The larvae feed only on one plant, wild lupine (*Lupinus perennis*). Adults require nectar sources to survive and lay sufficient eggs. Because these habitat components can be lost to succession, Karner blue butterfly persistence is dependent on disturbance and/or management to renew existing habitat or to create new habitats. The distribution and dynamics of these habitats in the establishment of viable metapopulation of this species forms the ecological basis for recovery planning.

TAXONOMY AND DESCRIPTION

Taxonomy

The taxonomy of the Karner blue (*Lycaeides melissa samuelis*) follows Lane and Weller (1994) who have conducted the most recent review of its taxonomy. The Karner blue is a member of the genus *Lycaeides* (Lepidoptera: Lycaenidae: Polyommatainae) (Elliot 1973, Nabokov 1943, 1949). In North America there are two species of *Lycaeides*, *L. idas* (formerly *L. argyrognomon*) and *L. melissa* (Higgins 1985, Lane and Weller 1994). *Lycaeides melissa* is comprised of six subspecies, *L. m. melissa*, *L. m. annetta*, *L. m. inyoensis*, *L. m. mexicana*, *L. m. pseudosamuelis*, and *L. m. samuelis* (Lane and Weller 1994). Vladimir Nabokov conducted the taxonomy for this group in the 1940s. Sometime after this work was published, Nabokov commented in private letters that the Karner blue should be classified as a distinct species (Nabokov 1952, 1975, 1989). Nabokov noted that the male genitalia of *L. m. melissa* were very variable geographically, but the male genitalia of *L. m. samuelis* were remarkably constant over the entire range of the subspecies. The wing shape of *L. m. samuelis* is rounder and less pointed than that of *L. m. melissa*, especially the female hindwing. Moreover, *L. m. samuelis* uses only one host plant throughout its geographic range, while *L. m. melissa* uses many species of host plant. The taxonomic work to elevate *L. m. samuelis* to the species level was never completed,

and the currently accepted status of the Karner blue butterfly is subspecific (Miller and Brown 1983, Nabokov 1943, 1949, Opler 1992, Opler and Krizek 1984, Lane and Weller 1994). While other work has been done on the taxonomy of the Karner blue, the data thus far does not support a change in the classification of the butterfly.

Packer et al. (1998) described protein variation detected by starch gel electrophoresis in a study of 34 loci in two samples of the Karner blue (Wisconsin and New York) and one sample of the Melissa blue (Minnesota). Based on their application of a phylogenetic species concept criterion for species-level distinctness requiring fixed allele differences between the two supposed species, they concluded that the Karner blue and the Melissa blue are not distinct enough to be considered different species. They also reported that the genetic identity values between samples from the different subspecies (0.967 and 0.976) were less than between the two samples of Karner blue (0.989). They observed that these identity values were within the ranges of values reported for subspecies and intraspecific populations of other insects. Genetic data alone, according to their interpretation, is consistent with both population-level and subspecies-level divergence. The utility of these data for making inferences about taxonomy and population structure is limited by the small number of populations sampled and the small number of individuals (ranging from 3 to 17 individuals, depending on the population and locus) sampled. In addition, genetics data alone should not be used in making taxonomic decisions; it must be considered together with morphological, life history, and ecological data.

Nice et al. (2000) investigated the taxonomy of the genus using male genital morphology and variation in nuclear (microsatellite) and mitochondrial (mt) DNA, sampled from over 60 *Lycaeides* populations. The microsatellite DNA data support the treatment of the Karner blue as a distinct evolutionary unit (coherent taxon). Genetic distances based on DNA among taxa in this genus were small relative to the differentiation in morphological and ecological traits. Microsatellite allele frequency data indicate that the Karner blue population is a well defined, closely related group, distinct from other *Lycaeides* taxa. Indeed, microsatellite data indicate that the Karner blue is the most clearly defined of the North American *Lycaeides* taxa.

The morphology of *Lycaeides* male genitalia indicated that while other forms of *L. melissa* are more variable (as Nabokov noted), there was no diagnostic distinction between them and the Karner blue. These data support the treatment of *L. melissa* as a distinct taxonomic unit. They do not refute the indications of the microsatellite data that Karner blue is a clearly defined taxon, but they cannot be used to support the concept either.

In contrast, mtDNA variation found by Nice et al. (2000) was inconclusive. These data did not support the concept of *L. melissa* or the Karner blue as a coherent taxonomic unit, and cannot be used for inferences about the genetic distinctions among populations of the Karner blue butterfly. The Wisconsin and Minnesota Karner blue populations share mtDNA haplotypes with populations of *L. melissa* and *L. idas* in the western U.S. Two unique haplotypes were found in Karner blue populations east of Lake Michigan (i.e., Indiana, Michigan, New York, New Hampshire), but haplotypes associated with European species were also related to these eastern populations. The mtDNA haplotype data suggest that there may have been movement of haplotypes among *Lycaeides* species and among *L. melissa* subspecies (Nice et al. 2000). [However, use of these mtDNA data for making any taxonomic inferences, including inferences about gene movement is limited by the small sample size from some of the sites (one sample

each from Minnesota and Michigan) and limited number of base pairs analyzed (Robert Zink, University of MN, pers.comm. 2002).]

Taken as a whole, the genetic, morphological, ecological, and life history data support treating the Karner blue as a coherent taxon, with taxonomic affinities to both the *L. melissa* and *L. idas* groups. Karner blue butterfly populations are distinct from other nearby *Lycaeides*. They are bivoltine, dependent on *Lupinus perennis* (wild lupine), and possess distinct wing pattern elements. In addition, there is no evidence of morphological intermediacy in the Karner blue populations sampled (Chris Nice, pers. comm. 2002).

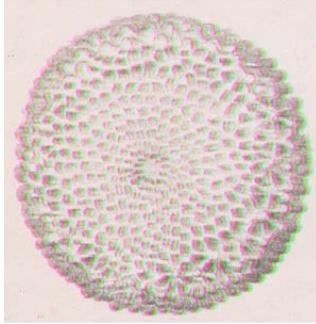
While additional genetics work, done with larger sample sizes, additional sample sites, and more analyses of nuclear and mtDNA may be helpful to further determine if *Lycaeides melissa samuelis* should be divided into two or more subspecies, such work is considered a low recovery priority for the reasons noted above.

Description

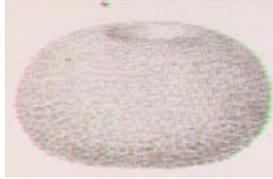
Figure 1 depicts the various life stages of the Karner blue. Karner blue butterflies are small with a wingspan of about 2.5 cm. (one inch). The forewing length of adult Karner blues is 1.2 to 1.4 cm for males and 1.4 to 1.6 cm for females (Opler and Krizek 1984). The wing shape is rounded and less pointed than *L. m. melissa*, especially in the female hind wing (Nabokov 1949). The upper (dorsal) side of the male wing is a violet blue with a black margin and white-fringed edge. The female upper side ranges from dull violet to bright purplish blue near the body and central portions of the wings, and the remainder of the wing is a light or dark gray-brown, with marginal orange crescents typically restricted to the hind wing. Both sexes are a grayish fawn color on the ventral side. Near the margins of the underside of both wings are orange crescents and metallic spots. The black terminal line along the margin of the hind wing is usually continuous (Klots 1979, Nabokov 1944). Nabokov (1944, 1949) believed that male genitalia were the most reliable character for distinguishing adult *L. m. samuelis* from other subspecies (and species). The work of Nice et al. (2000) however, did not find the morphology of the male genitalia to be a good diagnostic characteristic.

The eggs of Karner blue are tiny and radially symmetric, about 0.7 mm in diameter, somewhat flattened, and pale greenish-white in color (Dirig 1994). The surface is deeply reticulated with a fine geometric pattern (Scudder 1889). Larvae are a pea-green color, pubescent and dorsally flattened, with a brown-black to black head capsule. The head is often not visible as it is tucked under the body. Older larvae have pale green (to white) lateral stripes, and a dark-green longitudinal stripe dorsally. In pre-pupal larvae, the lateral stripes become less distinct and the color becomes a duller green. Larvae have four instars (larval development stages) (Savignano 1990), and three glandular structures that are known to mediate interactions with ants in other species of Lycaenidae (Refer to PART I, LIFE HISTORY AND ECOLOGY, Associated Ants, and Savignano 1994a and references therein). Some of these glandular structures mediate interactions with ants in Karner blue, but it is not known what is secreted by any of the structures and if any of the structures are active throughout larval life.

Figure 1. Life stages of the Karner blue butterfly



Egg, top view
[-----]
0.7mm



Egg, side view



Egg on lupine



Larva on lupine



Larva tended by ant
Larval feeding damage on lupine



Pupae on lupine



Adult Female



Adult Male



Photo credits. Drawings of eggs from Scudder (1889); Karner blue larvae tended by ant courtesy of the Wisconsin DNR, all other photos courtesy of Paul Labus, The Nature Conservancy, Whiting, Indiana (refer also to: <http://nature.org/wherewework/northamerica/states/indiana/preserves/art9126.html> for additional images).

Ants are known to tend larvae during their larval stage (Figure 1). Pupae are bright green and smooth, changing to a light tan with hints of purple shortly before emergence when the adult cuticle separates from the cuticle of the pupal case.

Distinguishing Karner blue from similar species

In the eastern United States, the Karner blue butterfly can be confused readily with the eastern-tailed blue (*Everes comyntas*) and less readily with the spring azure (*Celastrina argiolus*) complex (Opler 1992, Scott 1986). Eastern-tailed blues are on average smaller than Karner blue and they have black projections or "tails" on the outer angle of the hind wings (Opler 1992, Scott 1986). These tails may be broken off but usually leave some remnant indicating their former presence. On the underside of the wings, eastern-tailed blues lack orange crescents on the forewing, and four spots, two large and two small, are present on the hind wing (Opler 1992, Scott 1986). It may be difficult to distinguish a large male eastern-tailed blue from a small male Karner blue when they are in flight. Spring azures lack the orange crescents on the undersides of their wings (Opler 1992).

In the Midwest, Karner blue butterflies can be confused with Nabokov's blue (*L. idas nabokovi*), Melissa blue (*L. melissa melissa*), eastern- and western-tailed blues (*Everes comyntas* and *E. amyntula*), Reakirt's blue (*Hemiargus isola*), greenish blue (*Plebius saepiolus*), marine blue (*Leptotes marina*), acmon blue (*Icaricia acmon*), spring azure (*Celastrina argiolus*) complex, and silvery blue (*Glaucopsyche lygdamus*) (Opler 1992, Scott 1986). Species occurrence varies throughout the Midwest and to determine the species present locally, it is best to consult local guides and checklists. Eastern-tailed blue is the only species that is confused readily with Karner blue. Spring azure, silvery blue, Reakirt's blue, and marine blue lack the orange crescents on the under sides of their wings (Opler 1992, Opler and Krizek 1984, Scott 1986). Eastern- and western-tailed blues have tails (as described above), orange crescents are absent on the underside of the forewing, and there are, respectively, four or one orange spot(s) on the hind wing (fewer than Karner blue). The greenish blue has one or more orange marginal crescents, which are, however, much smaller in size than the spots on Karner blue. The marginal crescents on the dorsal side of the male acmon blue hind wing, tend to be more pink than orange (Opler 1992). Melissa blue can be distinguished from Karner blue by the orange banding on the upper (dorsal) side of the forewing (females only), genitalia differences and differential habitat use (Nabokov 1943, 1949, Scott 1986). Melissa blue larvae can feed on *Astragalus* sp., *Glycyrriza lepidota*, *Lupinus* sp., and several other species (Scott 1986). The occurrence of Melissa blue comes closest (30 miles) to Karner blue sites in southeastern Minnesota. The range of Nabokov's blue, *L. idas nabokovi*, overlaps with Karner blue in certain areas, but the Karner blue is typically found in oak and pine savanna/barrens, whereas Nabokov's blue is found primarily in forest clearings (Masters 1972). Also, the two species have different host plants. The Karner blue feeds exclusively on wild lupine (*Lupinus perennis*), and Nabokov's blue feeds on dwarf bilberry (*Vaccinium cespitosum*) (Nielsen and Ferge 1982). Although there are superficial differences in coloration between these two subspecies (Masters 1972), unequivocal identification would require dissection and examination of the male genitalia (Nabokov 1944). Interested readers should consult the cited references for more details.

DISTRIBUTION

Rangewide Distribution of Karner Blues

Historically, the Karner blue butterfly occurred in a geographic band between 41° and 46° North latitude extending from Minnesota to Maine (Dirig 1994) (refer to Figure B-1, APPENDIX B). The butterfly is commonly found on sandy soil types that have populations of *Lupinus perennis* (the only known larval food source), and often inhabits communities similar to oak and pine savanna/barrens communities. In this recovery plan, the term "lupine" will refer to *L. perennis* to the exclusion of all other species of *Lupinus*.

Dirig (1994) reviewed all of the locality records of the Karner blue he could find, whether or not they were confirmed with vouched specimens. His work is an exhaustive summary of the reports of Karner blue occurrence. To establish a definitive historic geographic range, this recovery plan only includes locality records with confirmed specimens. Additional information from Dr. Robert Dirig, requested by the Recovery Team, was especially critical for evaluating records from Pennsylvania, New Jersey, Maine, and Wisconsin. These findings are summarized here and presented in greater detail in APPENDIX B.

The historic northern, eastern, and western limits of the butterfly correspond roughly with the distributional limits of lupine. In all three regions, the present distribution of the butterfly has contracted away from these limits, with extirpations of populations occurring in all three geographic directions. The northernmost population of the Karner blue occurs in the Superior Outwash Recovery Unit (RU) in Wisconsin, the westernmost population in the Paleozoic Plateau RU in Minnesota, and the easternmost population in the Merrimac/Nashua River System RU in New Hampshire (refer to APPENDIX B, Figures B2 and B4).

The historic southern limit of the butterfly did not correspond to the distribution of lupine, which occurred historically much further south than the butterfly. But even here the distribution of Karner blue has contracted away from the historic distribution. The southernmost population of Karner blue is now in the Indiana Dunes RU (refer to APPENDIX B, Figure B3).

As of Fall 2002, extant populations of the Karner blue occur in Indiana, Michigan, Minnesota, New Hampshire, New York, Wisconsin, and Ohio. Reintroductions are currently ongoing in Ohio, at Concord, New Hampshire, and in West Gary, Indiana. Almost all known extant populations occur on sandy soils associated with glacial outwash plains and terraces, glacial moraines, the shores and bottoms of glacial lakes, the glacial shores of existing lakes, and dissected sandstone outwashes (Andow et al. 1994 and references therein, APPENDIX B). Wisconsin and Michigan have the largest number of local populations with the greatest numbers of individuals; New York has one large population (Baker 1994). Many local populations of the butterfly appear extirpated, and the States of Iowa, Illinois, Pennsylvania, Massachusetts, Maine, and the Canadian province of Ontario no longer support populations of the butterfly (Baker 1994).

State Distribution of Karner Blues

This section briefly reviews survey efforts and the distribution of the Karner blue in each state where recovery units (RUs) have been established via this recovery planning process. Survey efforts to identify additional Karner blue sites are continuing in Wisconsin, Michigan and New York, with additional Karner blue butterfly localities identified in all three states since Federal listing of the species. Several of the survey efforts are a result of formal section 7 consultations with Federal agencies including the Department of Defense (Fort McCoy) in Wisconsin and the U.S. Forest Service in Michigan (for forest management activities on the Huron-Manistee National Forest [NF] and for gypsy moth control). For a glossary of terms used in this recovery plan (Plan) refer to APPENDIX A. For information and locations on the 13 RUs and six potential RUs established by this Plan refer to APPENDIX B.

New Hampshire (Merrimack/Nashua River System RU)

No native Karner blue populations remain in New England. The last native population occurred in the Concord Pine Barrens in Concord, New Hampshire, and was extirpated in 2000. That last population, which existed in a powerline right-of-way and the grassy safeways of the Concord Airport had declined from 3,700 estimated butterflies in 1983 (Schweitzer 1983, 1994), to 219 butterflies in 1991, and to less than 50 in 1994, making this site at extreme risk for extinction (Peteroy 1998). A reintroduction program was started in 2001 at Concord, with the donor population coming from the Saratoga Airport in New York (refer to PART I, Translocation/Reintroduction, Captive rearing).

New York (Glacial Lake Albany RU)

The Karner blue butterfly was once common in New York (Cryan and Dirig 1978, Dirig 1994). In the Albany area alone, the Karner blue probably inhabited most of the 25,000 acres of the original Albany Pine Bush, the area from which Karner blues were first described. The Albany Pine Bush area once supported an estimated 17,500 butterflies in one 300 acre site during 1978 (Sommers and Nye 1994). By the mid-1980's, however, much of the Albany Pine Bush had been destroyed by development and degraded by introduction of non-Pine Bush species and natural succession. By 1988, only 2,500 acres of the original 25,000 acres remained (Givnish et al. 1988), and loss of habitat has continued. Current populations number only in the several hundreds (Schweitzer 1994a), and existing habitat continues to undergo succession and degradation.

Additional Karner blue butterfly sites occur in the Saratoga Sandplains and Saratoga West areas north of Albany. The majority of the sites in these areas support less than 100 butterflies. The largest population of the butterfly is at the Saratoga Airport, and is estimated to support 10,000 Karner blue butterflies.

Currently the New York Department of Environmental Conservation (NY DEC) has identified 70 Karner blue localities and 56 subpopulations (using the 200 meter separation criteria for subpopulations, refer to APPENDIX A) in the Glacial Lake Albany RU. Of those, 43 subpopulations are within the three recovery areas: 7 in the Albany Pine Bush, 27 in Saratoga Sandplains, and 9 in Saratoga West. Of these 43 subpopulations, only 15 are anticipated to have

more than 10 butterflies in the annual index counts. Eight subpopulations are within the Queensbury Sandplains in Warren County, which is considered a location for recovery under the state's draft recovery plan. Five subpopulations are within Glacial Lake Albany RU, but are isolated from any expected interaction with the sites in the recovery areas. The NY DEC considers a site occupied until at least five years of adequate survey has failed to find the species. Some of the New York subpopulations are extremely small and vulnerable and will be considered extirpated if Karner blues are not found in the next year or two (Gerald Barnhart, NY DEC, *in litt.* 2002).

Michigan: (Ionia, Allegan, Newago and Muskegon RUs)

The Karner blue butterfly is currently found in 10 of the 11 Michigan counties in which it historically occurred. Early surveys by Wilsmann (1994) noted that the Karner blue populations were reduced and highly fragmented. The majority of the Karner blue sites occur on state land (Flat River and Allegan State Game Areas [SGAs]) in the Ionia and Allegan RUs, and on Federal lands (Huron-Manistee National Forest) in the Newago and Muskegon RUs.

Survey efforts during 1994-1996 by the Michigan Natural Features Inventory (NFI) of 65 areas within the Ionia RU on public and private lands revealed nine extant Karner blue sites, eight within the Flat River SGA; with the exception of one site, all supported low numbers of butterflies (Cuthrell and Rabe 1996). Based on data through 1998, eight subpopulations (defined as separated by 200 meters of unsuitable habitat) have been identified at the Flat River SGA and 23 at the Allegan SGA. In addition, two other subpopulations occur on private property; one near each of these state properties (Daria Hyde, Michigan NFI, pers. comm. 1998). The Ionia RU is the least well surveyed of all the Michigan RUs with much of the area outside of the Flat River SGA developed for agriculture and other uses (Baker 1994, Wilsmann 1994). The most sizable populations in the state occur at Allegan and Flat River SGAs and most likely on the Huron-Manistee NF (Jennifer Fettinger, pers. comm. 2002).

Many locations in the Newago and Muskegon RUs that supported Karner blue butterfly populations 35-40 years ago have been lost to succession, agricultural conversion, forestry, and residential and commercial developments (Wilsmann 1994). The majority of Karner blue sites in these two RUs occur on the Huron-Manistee NF. As of the fall of 2002, a total of 13,792 acres of the Huron-Manistee NF were surveyed for the Karner blue, with butterflies found on 2,026 acres in 267 locations. As of 2002, 78 subpopulations (using the 200 meter criteria) were reported on the Huron-Manistee NF; these includes seven along powerline ROWs (Jennifer Fettinger, MI NFI, pers. comm. 2002). In 2002, the Michigan NFI surveyed 58 sites on the Huron-Manistee NF and found the Karner blue at 40 of these sites. Surveys on private lands within the Manistee National Forest boundary have documented an additional 56 localities on about 440 acres (Joe Kelly, pers. comm. 1998, Jennifer Fettinger, pers. comm. 2002). Some utility companies (e.g., Consumers Energy and Wolverine Power Company) in Michigan are surveying their transmission line corridors for Karner blues.

As of the fall of 2002, Michigan, excluding the Allegan SGA, supported 158 subpopulations of Karner blues (based on a 200 meter separation criteria) (Jennifer Fettinger, Michigan NFI, pers. comm. 2002). As noted above, in 1998, Allegan SGA supported 23 subpopulations of Karner blues; this number is currently under revision to reflect 2002 numbers.

Indiana: (Indiana Dunes RU)

Historically, the Karner blue was reported from eight counties in Indiana. In 1990, Karner blue butterflies were identified at 10 sites out of 35 potential sites surveyed (Martin 1994). Two population clusters were identified within two counties (Lake and Porter), the majority of which was associated with medium to high quality Karner blue habitat (Martin 1994). The early surveys in Porter County (which includes the National Park Service's Indiana Dunes National Lakeshore [IDNL]) identified between 1,000 and 10,000 second brood Karner blue adults (Baker 1994). In Lake County, at the IDNL, several thousand second brood adults were estimated (Schweitzer 1992), and in other Lake County sites, the subpopulations likely number between 100-500 (John Shuey, The Nature Conservancy (TNC), pers. comm. 1998).

Currently it is estimated that 17 subpopulations of Karner blues (using the 200 meter separation criteria) occur at IDNL (Ralph Grundel and Noel Pavlovic, U.S. Geological Survey (USGS), pers. comm. 1998). In West Gary, about 21 tracts clustered into 11 individual preserves and management areas have been identified as potentially able to at least periodically support the Karner blue (Shuey, undated); these sites are associated with a remnant dune and swale complex. In 1998, four of these tracts supported Karner blues (John Shuey, pers. comm. 1998); however, by 2000, Karners were gone from all four sites. In 2001, a reintroduction project was started to restore Karner blues to West Gary (refer to PART I, Reintroduction/Translocation, Captive rearing)

Wisconsin: (Morainal Sands, Glacial Lake Wisconsin, West Central Driftless, Wisconsin Escarpment and Sandstone Plateau and Superior Outwash RUs)

The Wisconsin Department of Natural Resources (WDNR) began systematic statewide surveys for the Karner blue in 1990 including surveys of 33 of the 36 known historic butterfly sites. Initial surveys by Bleser (1993) reported that only 11 of the 33 historical sites supported Karner blues, and also identified 23 previously unknown sites. Additional survey efforts were subsequently conducted by the Wisconsin DNR, the U.S. Fish and Wildlife Service (Service) [Trick 1993, Necedah National Wildlife Refuge (NWR)], Fort McCoy (Leach 1993), and other biologists (Swengel 1994, Bidwell 1996). By 1993, an estimated 150 to 170 discrete Karner blue sites were documented in Wisconsin (Baker 1994). In recent years, additional surveying has been done by partners to the Wisconsin Statewide Habitat Conservation Plan for the Karner Blue Butterfly (HCP) including eight county forest departments, several private forest and utility companies, The Nature Conservancy, and the Wisconsin Department of Transportation. Partners to the HCP routinely survey for the butterfly prior to conducting management activities in an effort to avoid adverse impacts to the Karner blue. In addition, partners monitor for Karner blues annually as part of the HCP effectiveness monitoring program coordinated by the Wisconsin DNR.

Two separate but related sources of data on the Karner blue and its habitat in Wisconsin currently demonstrate that Karner blue butterfly populations in Wisconsin are numerous and widely distributed across the state. As of April 2002, Wisconsin DNR's Natural Heritage Inventory (NHI) database noted 311 Karner blue butterfly occurrences (using a one-half mile separation criteria) across 20 counties in Wisconsin. This reflects an 815 percent increase in recorded NHI Karner blue occurrences since listing. Similarly, the HCP annual monitoring

program has documented 256 Karner blue occupied sites as of December 2002 on HCP partner lands, reflecting a 241 percent increase in Karner blue occupied sites on partner lands between 1998 and 2002 (Darrell Bazzell, WDNR, *in litt.* 2002). Most of the 256 Karner blue occurrences on partner lands are a subset of the NHI data (i.e. included in the 311 NHI occurrences), although further analyses is necessary to determine if some of these sites are new NHI occurrences (greater than 1/2 mile from an existing occurrence).

The number of known lupine sites on HCP partner lands in Wisconsin has also increased. About 252,299 acres of land (WDNR 2002a) are covered by the HCP, and partners implement measures that contribute to the conservation, and in some cases, recovery of the butterfly on these lands (WDNR 2000) (not all this acreage supports Karner blues). In 1998, there were 90 identified lupine sites on shifting mosaic (i.e. forestry) habitat that contained at least 25 plants or clumps of lupine at a density of 50 lupine plants/acre, or 25 lupine plants/200 meters for linear sites (e.g., rights-of-way). Annual HCP monitoring since 1998 has identified an additional 220 sites containing lupine, bringing the total to 310, an increase of 244 percent from 1998 to 2002. In addition, approximately 1,600 identified long-term habitat (e.g. barrens, rights-of-ways) sites in Wisconsin contain lupine.

Taken as a whole, the data demonstrate that of all the states, Wisconsin has the most numerous and widespread Karner blue occurrences, and that the butterfly is likely to be more stable in Wisconsin than previously believed (additional detailed review of HCP monitoring data is needed to further assess this possibility). In addition, there are many thousands of acres of suitable or potentially suitable habitat for the Karner blue in Wisconsin especially on HCP partner lands. The data strongly suggests that future monitoring will continue to identify new occupied Karner blue occurrences as well as additional suitable habitat in Wisconsin. For these reasons it appears appropriate for the Recovery Team to thoroughly review the data on the distribution, status, and threats to the butterfly in Wisconsin and to re-evaluate the recovery goals and criteria for the state, and if appropriate, to revise the goals as warranted. A recovery task has been added to this plan to that effect (refer to PART II, RECOVERY TASKS, Task 6.3).

Most of the Wisconsin subpopulations can be lumped into about 15 large population areas, many of which are found on sizable contiguous acreages in central and northwest Wisconsin (WDNR 2000). At least one sizable population occurs in each of the five Wisconsin recovery units (refer to APPENDIX B). Some of the largest Karner blue populations are found at Necedah NWR, Fort McCoy, Glacial Lake Grantsburg Work Unit [which includes Fish Lake and Crex Meadows State WAs], Eau Claire County Forest, Jackson County Forest, and Black River State Forest. Some larger populations occur on HCP partner lands.

Minnesota: (Paleozoic Plateau RU)

Karner blue butterflies currently only occur at the Whitewater Wildlife Management Area (WMA) in southeastern Minnesota. Two to possibly five small local populations are located in a 1770-acre expanse of poor to high quality oak savanna at the WMA. Translocation of butterflies into an unoccupied site was initiated in 1999 and was repeated in 2000 and 2002. Some success of this effort was evidenced by the discovery of butterflies during the first flight in 2001, thus indicating over-wintering survival (refer to PART I, CONSERVATION MEASURES, Reintroduction/Translocation).

Permanent transect counts conducted at two sites since 1992 (Cuthrell and Historic Sites) recorded peak second flight counts ranging from 0.63 to 4.00 butterflies per 1,000 square meters of transect (mean = 1.40) at the Cuthrell Site, and from 0 to 1.33 butterflies per 1,000 square meters of transect (mean = 0.60) at the Historic Site. These numbers represent relative abundance, and the relationship between numbers counted and total population size is unknown but is probably linear (Lane 1999a, Edwards 2002). Because other butterfly monitoring research has shown that only a portion of the butterflies in a sample area are counted and that in this case only a fraction of each site is surveyed, population numbers are considerably greater than the observed transect count numbers.

There are other locations in the southeastern and east-central part of the state that formerly supported lupine. The only other known location to have supported the Karner blue butterfly in Minnesota is the Cedar Creek Natural History Area (CCNHA). Surveys of 50 potentially suitable sites in Minnesota (oak savanna with sandy soil and lupine) revealed that many lupine sites were no longer present and that Karner blues had been extirpated from the CCNHA site (Lane and Dana 1994).

LIFE HISTORY AND ECOLOGY

Karner Blue Butterfly

The life history of the Karner blue butterfly has been studied by Scudder (1889), Dirig (1976, 1994), Cryan and Dirig (1978), Savignano (1990), Swengel (1995), Swengel and Swengel (1996, 1999, 2000), and Lane (1999b). The Karner blue butterfly is bivoltine, which means that it completes two generations per year (Figures 2 and 3). In typical years, first brood larvae (caterpillars) hatch from overwintered eggs in mid- to late April and begin feeding on wild lupine (*Lupinus perennis*), the only known larval food source (Figure 2). Larvae pass through four instars (developmental stages), between which the relatively soft larval exoskeleton is shed. Feeding by first and second instar larvae results in tiny circular holes in the lupine leaves while older larvae eat all but the upper or lower epidermis, creating a characteristic window-pane (Figure 1) appearance (e.g., Swengel 1995). Larvae feed for about three to four weeks and pupate (transform from larvae to adult) in late May to early June. Ants commonly tend larvae (refer to PART I, LIFE HISTORY AND ECOLOGY, Associated Ants). Mature larvae enter a wandering phase, after which the pre-pupal larvae attach themselves to various substrates with a silk thread. Karner blues are known to pupate in the leaf litter, on stems and twigs, and occasionally on lupine leaves (Dirig 1976, Cryan and Dirig 1978). Dirig (1976) reported that pupation generally lasted seven to eleven days in the field. Laboratory-reared pupae typically took seven to nine days, and sometimes up to eleven days before emerging as adults (Savignano 1990, Herms et al. 1996). First flight adults begin emerging in late May with the flight extending through late June (Swengel and Swengel 1996). At peak flight the sex ratio typically exceeds 50% males. The Swengels (1996) have reported 70 percent males at peak flight. The percent males decrease as the flight period progresses (Leach 1993, Swengel and Swengel 1996). Adults are believed to live an average of four to five days but can live as long as two to three weeks. First flight adult females lay their eggs primarily on lupine plants, often singly on leaves, petioles, or stems, or occasionally on other plants or leaf litter close to lupine plants.

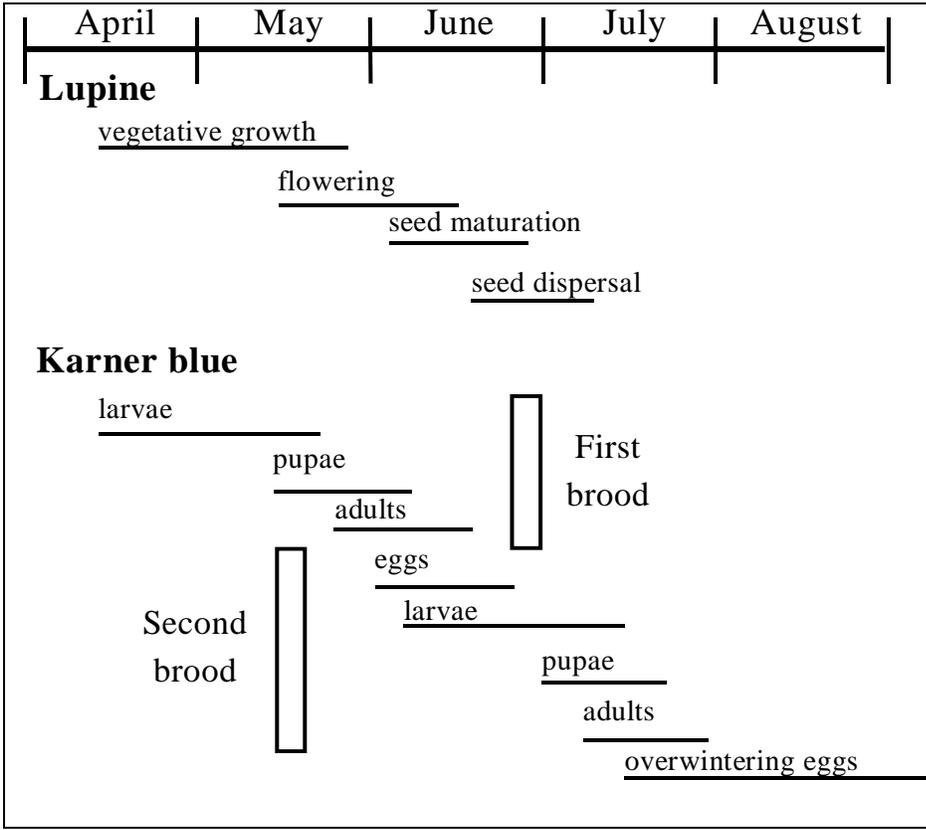
Second brood eggs hatch in five to ten days, and larvae can be found feeding on wild lupine leaves and flowers from early June through late July. Typically, a larva can survive on one large lupine stem; however, the larva moves from leaf to leaf on the lupine stem, often returning to leaves fed on during earlier instars, and it may even move to other lupine stems (Lane 1999b). Larvae are found often on the lower parts of the stems and petioles. Ants also typically tend second brood larvae, but during midday on hot days tending may be reduced. Pupae are also frequently tended by ants (Cynthia Lane, pers. comm. 1997). Refer to Figure 1 which depicts the different life stages of the Karner blue.

Second brood adults begin to appear in early to mid-July and fly until mid to late August, and in some years into early September (Swengel and Swengel 1996). Flight phenology may be delayed because of cool wet summers and result in an adult flight period lasting through late August (Cathy Bleser, pers. comm. 1995; Cynthia Lane, pers. comm. 1995). The peak flight period usually lasts one to two weeks. Generally, there are about three to four times as many adults in the second brood compared with the first brood (Schweitzer 1994b). Maxwell and Givnish (1994) surveyed Karner blue populations at 46 locations at Fort McCoy, Wisconsin, during 1993; they found that locations with

high first flight butterfly counts also had high second flight counts ($r^2 = 0.674$) and that populations were three to four times as abundant during the second flight. However, the pattern is highly variable, and in some years, the second brood is not larger than the first brood (Swengel and Swengel 1996). The first brood is usually smaller most likely due to high overwintering mortality of eggs, the inability of larvae to find lupine in the spring, or greater oviposition success of first-flight females.

It is important to note that there is a significant amount of annual variation in adult abundance relative to peak flight date and in brood timing and length among years (Swengel and Swengel 1996, 1999). Based on extensive survey data, the Swengels (1999) suggest four kinds of variability to consider when assessing the butterfly's phenology: "1) inter-generational

Figure 2. Phenology of the Karner blue and lupine. In colder (warmer) areas and years phenologies will be delayed (advanced).



fluctuations in abundance, 2) phenological differences among years and 3) among sites, and 4) inter-annual variation in span between spring and summer generations.”

Second flight females usually land on green non-senesced lupine, crawl down the stem, and lay eggs primarily on grasses and sedges, other plant species, leaf litter near lupine stems, and occasionally on lupine (Lane 1999b). In general, insects that overwinter in the egg stage often lay their eggs on various materials close to the ground because these sites afford better winter protection (Bernays and Chapman 1994). The eggs laid by second flight females are the overwintering stage (evidence summarized by Haack 1993), and studies by Spoor and Nickles (1994) and VanLuven (1993, 1994a) provide strong experimental evidence of this phenomena. Spoor and Nickles (1994) observed second brood eggs through November and determined hatching rates of these eggs the following spring. Researchers in New Hampshire and Wisconsin have successfully overwintered eggs for rearing experiments (VanLuven 1993, 1994a; Curt Meehl, University of Wisconsin-Stevens Point, pers. comm. 1997).

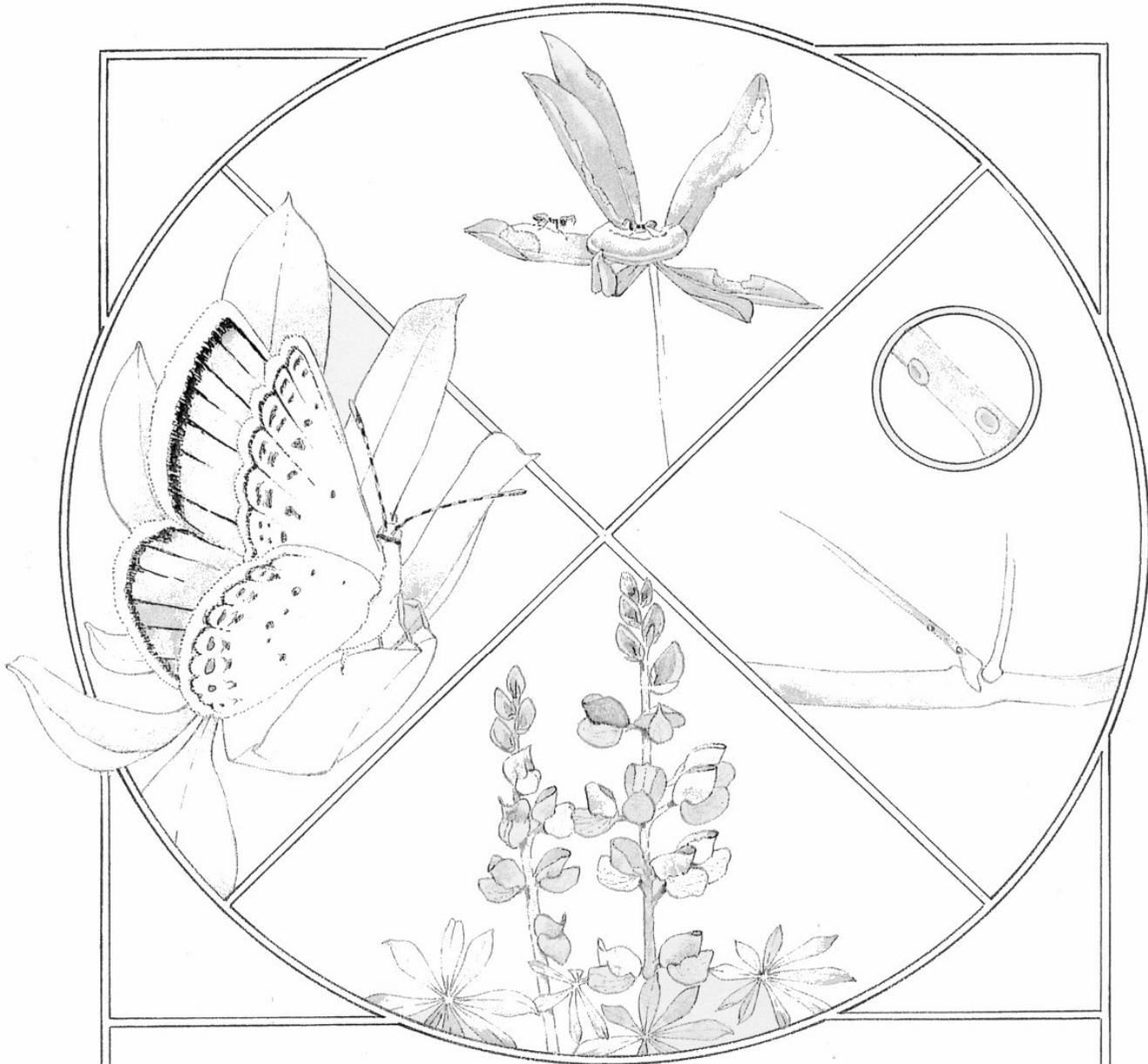
Karner blue adults are diurnal and initiate flight between 8:00-9:00 a.m. and continue until about 7:00 p.m. [although they have been observed flying as early as 6:51 a.m. by Swengel and Swengel (1996)], a longer flight period than most butterflies. Butterflies become more active with increasing temperature and/or sunshine (Swengel and Swengel 1998). Adult activity decreases at temperatures lower than 75° F, and during heavy to moderate rains (Haack 1993).

Lupine Food Resource

Lupinus perennis is a member of the pea family (Fabaceae) and has the common names wild lupine and blue lupine. Lupine is the only known food plant of larval Karner blues and is an essential component of its habitat. Two varieties have been identified: *Lupinus perennis* var. *occidentalis* S. Wats. and *L. perennis* var. *perennis* L. (Ownby and Morley 1991). The varieties are morphologically similar except the former has spreading pilose hairs and the latter thinly pubescent hairs (Boyonoski 1992). The Karner blue may use both varieties, but the details of the interaction are not known. The inflorescence is a raceme of numerous small flowers which are two lipped, with the upper lip two-toothed and the lower lip unlobed. Flower color ranges from blue to violet and occasionally white or pink (Gleason and Cronquist 1991). Peak bloom typically occurs from mid-May to late June within the geographic range of the Karner blue, but varies depending upon weather, degree of shading, and geographic location in its range. Stem density and flowering is greatest in open- to partial-canopied areas (Boyonoski 1992), and in greenhouse studies lupine were larger in full light conditions (Greenfield 1997). However, areas receiving high solar radiation can have low lupine densities and may be less than ideal habitat (Boyonoski 1992). Plants in dense shade rarely flower.

Lupine distribution extends from Minnesota east to New England, then southward along the eastern Appalachian Mountains to southern Virginia and along the eastern coastal plain to Georgia wrapping around the Gulf coastal plain to Louisiana (Dirig 1994). Surveys of lupine throughout its northern range report populations to be declining and many sites have been extirpated (Cuthrell 1990, Boyonowski 1992, Grigore 1992). The primary cause of this decline appears to be loss of habitat from conversion to housing, retail, light industrial, and agricultural development, and degradation of habitat because of the deep shade that develops when disturbance is interrupted. *Lupinus perennis* is state-listed as threatened in New Hampshire.

Figure 3. Illustration of life history stages of the Karner blue.



Karner Blue Butterfly Life History: The Karner blue butterfly produces two broods of young each year, a spring brood and a summer brood. Larvae emerge in April from eggs that have overwintered and feed on wild lupine, *Lupinus perennis*, the only known larval food plant of the butterfly. The larvae are often attended by ants, which collect a sugary solution secreted by the larvae, and in turn may protect the larvae from predation and/or parasitism. Near the end of May, the larvae pupate and adults emerge in late May or early June. The butterfly then mates and lays eggs on the lupine plant. The second brood of butterflies emerge mid-July to early August. Their eggs overwinter to hatch again in April.

DAVID ROFFLYCKE 1992

Lupine abundance and Karner blue

Management for sufficient lupine is critically important for the Karner blue, because it is the only food plant for the larvae. Significant increases in the abundance of lupine will usually not be detrimental to the Karner blue, and may in many cases be beneficial. Lupine, however, is not the only factor limiting Karner blue butterfly subpopulations, and it is important to manage for additional factors important to the butterfly.

A positive association between lupine abundance and Karner blue abundance or persistence would indicate that lupine abundance could be a factor limiting Karner blue populations. Several researchers have found a positive correlation between lupine abundance and number of Karner blue butterfly adults in New York, Michigan, and Wisconsin (Savignano 1994b, Bidwell 1995, Herms 1996, Smallidge et al. 1996, Swengel and Swengel 1996, Lane 1999). In Wisconsin, lupine abundance and proximity to the middle of a large lupine population were correlated with adult Karner blue abundance (Swengel and Swengel 1996). Savignano (1994b) found a significant correlation between Karner blue numbers and the number of lupine rosettes in New York studies. At one site with abundant lupine but few butterflies, Savignano (1994b) suggested that a dearth of nectar plants limited the butterfly. Herms (1996) found a significant positive correlation between lupine density and Karner blue abundance at the Allegan SGA in Michigan.

The reproductive status of lupine was found to be a key in explaining butterfly numbers at Fort McCoy, Wisconsin, where Maxwell (1998) found significantly greater second brood larval densities in shady plots which had a higher proportion of non-reproductive lupine. Second brood adult abundance increased with the frequency of non-reproductive lupine plants, but declined with increasing cover of flowering plants. Maxwell (1998) also detected that lupine plants in open areas, which tended to be reproductive, senesced earlier than those in shaded areas and suggested that early senescence could result in larval starvation. However, the study year (1995) was particularly hot and studies by Lane (1999) suggest that in most years larvae are able to reach pupation before lupine senesces. In addition to the influence of lupine abundance on the Karner blue, it is important to consider lupine quality (refer to Lupine quality and the Karner blue below).

Lupine was not a good predictor of Karner blue abundance in Minnesota. Lane (1994a, 1999b) found that of her study sites, the site with the densest lupine did not support Karner blues; however, this site was over 2.5 kilometers (1.6 miles) from occupied habitat. Lawrence (1994) and Lane (1994a, 1999b) suggest that other factors, such as microhabitat might influence the butterfly's population dynamics.

Lupine abundance at a site may vary temporally within a year or between years. Late emergence or early senescence of lupine might result in larval starvation, although Swengel's (1995) field observations suggest that larval and lupine phenology are well synchronized even in years with delayed lupine appearance. The timing of lupine senescence varies with canopy cover and annual weather. Lane (1994b) observed that second brood larvae disappeared from lupine that senesced early. These individuals probably died because lupine density was low, and successful dispersal to another plant was improbable. Maxwell (1998) suggested that the

shadiest lupine patches serve as “nurseries” for second brood larvae due the greater availability of non-reproductive lupine, which are not as susceptible to mildew and remain green throughout the larval stage.

It is unlikely that a single factor, such as the density of lupine, would account for variation in abundance of the Karner blue throughout its range. In places where it does, however, such as in the Glacial Lake Albany RU in New York, and at Fort McCoy, Wisconsin, it suggests that Karner blue populations might be enhanced by increasing the amount of lupine available. In localities where there is a poor correlation between lupine abundance and adult Karner blues, such as in the Paleozoic Plateau RU in Minnesota, and possibly, the Allegan SGA in Michigan, other factors may be important such as lupine quality, microhabitat, and distance from the nearest occupied site.

Lupine quality and the Karner blue

Variation in plant quality, as influenced by nutrient composition, secondary plant chemistry, morphology, and other factors can have significant effects on Lepidoptera (Bernays and Chapman 1994). *Lupinus* species have secondary plant compounds, typically alkaloids, that influence lupine’s suitability as insect food. Levels of alkaloids in *Lupinus* species vary with plant part and are highest in reproductive parts and the epidermis (Bernays and Chapman 1994). In addition, habitat differences in sun and shade may affect host plant quality by influencing host plant nutrients, secondary plant compounds, phenological state, and/or physical condition (Mattson 1980, Waterman and Mole 1989, Dudd and Shure 1994, Ravenscroft 1994).

Laboratory and field feeding studies have shown that the quality of lupine as larval food is affected by growing conditions (Grundel et al. 1998a, Maxwell 1998, Lane 1999). Grundel et al. (1998a) tested the effects of nine types of lupine on larval growth and survival. Lupine type was based on several factors including: age, reproductive/phenological status (non-flowering, flowering, seed, and senesced), percent canopy cover where lupine was growing, water status, presence of powdery mildew, and soil type. These laboratory feeding studies demonstrated that larvae fed leaves from shade grown plants that had gone to seed grew faster than larvae fed leaves from sun grown plants that had gone to seed (Grundel et al. 1998a). Lane (1999) also conducted laboratory feeding studies, using six lupine types, and found that larvae fed sun grown lupine in seed had the lowest survival rates of the lupine types tested (Lane 1999). Results from these studies are significant because during the second brood larvae feed extensively on leaves from plants that have gone to seed.

Larvae fed wilted lupine took significantly more days to pupate than larvae fed all other lupine types (Lane 1999). Grundel et al. (1998a) found that water stressed lupine was one of four types of lupine that produced slow larval growth rates. Lane (1999) also observed a lower percent survival to pupation for larvae fed wilted leaves than for three of the six other lupine types tested.

Faster growth rates are often advantageous to immature stages as they are then vulnerable to parasitism and predation for a shorter period of time. For Karner blue larvae, faster growth rates for second brood larvae may offer the additional benefit of allowing larvae to complete their development before lupine plants senesce (Grundel et al. 1998a).

During field studies, Maxwell (1998) counted a greater number of larvae on non-flowering lupine than on reproductive lupine. In addition, summer brood adult abundance was positively associated with the frequency of non-flowering lupine and negatively with the frequency and density of reproductive lupine.

The quality of lupine as a larval food plant does not appear to be affected by whether the soil is predominately sand or one with an organic O and A horizon (Grundel et al. 1998a). However, because lupine abundance and reproduction on sandy soils can be low (N.B. Pavlovic and R. Grundel unpublished data), selecting sites where soils have greater organic content will be important if increasing lupine abundance is a primary management goal.

Studies have also examined the influence of powdery mildew, a common leaf disease, on lupine quality. Maxwell (1998) counted the number of lupines with larval feeding damage and found less larval feeding where the proportion of lupine infected with powdery mildew was the greatest. However, although feeding intensity may be lower in these areas, laboratory feeding studies by Grundel et al. (1998a) found that larvae grew faster when fed leaves with large scale infections of powdery mildew than similar plants without such an infection.

Fire may also influence lupine quality. Maxwell (1998) observed a fire-mediated improvement in lupine quality that was reflected in a significantly greater abundance of second brood larvae on burn plots.

In general, field and feeding studies suggest that lupine grown in partial to closed subhabitats provide a superior food source for Karner blue larvae, especially during the second annual brood of larvae. Female Karner blues have been observed ovipositing relatively more frequently in moderately shaded areas than in open areas where lupine is most abundant (Grundel et al. 1998b). The growth advantage of eating shade-grown lupine may explain this relative overuse of shaded areas by ovipositing females and larvae. Nonetheless, although lupine quality may be superior in areas with shade, the larger quantity of lupine in openings at some sites may result in a greater total number of butterflies produced from open subhabitats (Lane 1999). Therefore, a mixture of sun and shade across the landscape can increase the viability of Karner blue populations by providing for a tradeoff between lupine quality and quantity.

Lupine growth, reproduction, dispersal, and propagation

Lupine reproduces vegetatively and by seed. Seedpods have stiff hairs with an average of 4-9 seeds per pod (Boyonoski 1992). When seedpods are dry, they suddenly twist and pop open (dehiscence), throwing seeds several feet. Dehiscence is the only known dispersal mechanism and Celebrezze (1996) suggests that lupine colonization would be very slow, about 0.5 to 2 meters (20 to 79 inches) per year. Alternatively, these results may imply that there is another unidentified dispersal agent. Seeds are known to remain viable for at least three years (Zaremba et al. 1991), do not have a physiological dormancy, and will readily germinate if moisture and temperature conditions permit. The hard seed coat produces an effective dormancy, and germination is usually enhanced by scarification, stratification, and/or soaking in water (Boyonoski 1992, Zaremba and Pickering 1994) (Bob Welch, Waupaca Field Station, pers. comm. 1995).

Lupine also reproduces vegetatively by sending up new stems from rhizomatous buds. Usually, plants a few years old will form a clump of several stems and in areas with dense lupine, it is difficult to distinguish individual lupine plants. Established lupine plants do not grow every year. It is not known how long established plants can remain dormant.

Lupine can be propagated by planting seed or transplanting seedlings. Direct germination from seed appears to result in higher first-year survival than seedling transplants (VanLuven 1994b, Zaremba and Pickering 1994). Seedling establishment from seed in New Hampshire was between 3-43 percent in the first year, and survival of seedlings was about 50-60 percent per year (VanLuven 1994b). Large quantities of seed will be necessary to establish dense stands of lupine in this area. Welch (pers. comm. 1994) established lupine patches with over 5,000, 8,500, and 17,500 seedlings, two to four months old, and uncounted numbers of seeds near Waupaca, Wisconsin. The patches were established successfully, but no data are available on survival. Maxwell and Givnish (1994) established lupine by direct seeding in experimental plots in 1993. Although soil preparation was homogeneous, lupine establishment was better in the compacted subsided soils associated with an old trail. This area had less vegetative cover, and the lupine was growing in association with *Cycloloma atriplicifolium* (pigweed), which may have protected it from deer browsing. During the dry 1995 season, *C. atriplicifolium* was absent and lupine on this trail developed faster and senesced earlier than the surrounding lupine, and lupine cover was greater where the seeded perennial grasses had established the best (Maxwell and Givnish 1996). These observations suggest that nurse plants may be useful for establishing lupine.

Renewal of lupine habitat

Lupine is an early successional species adapted to survive on dry relatively infertile soils. Even the seedlings have long taproots that presumably allow the plant to reach soil moisture. It can grow on soils low in nitrogen because of its association with the nitrogen fixing bacterium *Rhizobium lupina*, and does not do well when grown without *R. lupina* (Zaremba and Pickering 1994). Similar to other legumes, it probably does best when growing on nitrogen-poor soils that have sufficient phosphorus. Lupine does not reproduce in dense shade. All available evidence suggests that lupine thrives on nitrogen-poor soils in partial- to open-canopied areas, and is suppressed by shade; it is possibly out-competed by other plants on nitrogen-rich and phosphorus-poor soils.

Based on Greenfield's (1997) work, lupine growing under trees may benefit from the lower pH levels caused by tree leaf litter. However, while lupine appears to benefit from association with trees (Boyonoski 1992, Greenfield 1997), without periodic disturbance to reduce tree cover, light levels under the canopy may become too low to support lupine growth.

Several species of pines, oaks, and shrubby vegetation are adapted to the same soils and habitat as lupine (Nuzzo 1986, Haney and Apfelbaum 1990), and without disturbance, these species will close the canopy, shading and suppressing lupine (Haney and Apfelbaum 1990, Apfelbaum and Haney 1991). The rate of closure will vary from locality to locality, based on edaphic and prevailing climatic conditions, and current and historic management practices. If the habitat supports high grass and sedge productivity, litter could build up and suppress lupine. Consequently, disturbances that reduce tree and shrub canopy cover are necessary for lupine to

persist, and under some conditions, occasional disturbances that remove the litter layer are needed for lupine regeneration. Several disturbances have been suggested to be beneficial for renewing lupine habitat, including prescribed fire, mowing, tree removal, and a variety of methods to kill trees and shrubs such as girdling and brush-hogging (Swengel 1995, Swengel and Swengel 1996, Smallidge et al. 1996, Maxwell 1998). Frequency of management treatment to reduce woody cover is an important consideration. Smallidge et al. (1996) found that infrequent removal of woody stems often resulted in an increase in woody plant density and suggested the use of frequent mechanical treatment or a seasonally timed application of an appropriate herbicide (refer to APPENDIX G)

Other factors affecting lupine

Mechanical disturbance of the soil can affect lupine. Research at Fort McCoy has demonstrated that military training activities appear to be beneficial to the Karner blue (refer to PART I, HABITAT/ECOSYSTEM, Renewal of Habitat for the Karner blue, Other contemporary habitats).

Lupine is browsed by deer, woodchucks, and insects. The relationship between grazer density, grazing intensity, and Karner blue populations is largely unknown. If deer populations are too abundant in the spring and browse is scarce, excessive browsing could occur on lupine, with potential detrimental effects on the Karner blue (Schweitzer 1994a). Heavy spring flower browse by deer reduces the number of seedpods for that season's lupine (Straub 1994). Transplanted lupine may be less able to recover from being browsed than field sown plants (Zaremba and Pickering 1994). Herbivory by the painted lady butterfly (*Vanessa cardui*) has caused severe defoliation of lupine foliage (Cynthia Lane, pers. comm. 1996), but the potential detrimental effects on the Karner blue are not documented. Lupine species typically contain alkaloid compounds, which are hypothesized to serve as chemical defense mechanisms against herbivory (Dolinger et al. 1973), but the significance of these compounds in the ecology of the Karner blue is not known. Several diseases of lupine are known, but their effects on Karner blue or lupine populations are unknown.

Recolonization or regeneration of lupine to areas that have had closed canopy or little disturbance for long periods may be reduced or even absent after disturbance. Sferra et al. (1993) used cutting and burning to restore savanna structure in Michigan but did not see increases in lupine abundance possibly because no plants or seeds were present on the site to regenerate, and because lupine was not able to recolonize. Celebrezze (1996) found less lupine on cultivated/homesteaded sites than would be expected. Also, no long distance dispersal mechanism is known for lupine. Celebrezze's (1993) work suggests that lupine might only move 0.5 to 2 meters per year. Without active disturbance/seeding regimes, lupine could undergo gradual elimination due to very slow reinvasion following local extirpation. There is concern that lupine habitat lost due to maturation of red pine stands may not be able to regenerate after harvest [refer to Recovery Task 5.25(d)].

Nectar Food Resources

Adult Karner blue butterflies feed at flowers, sipping nectar and presumably obtaining nourishment; adult feeding increases longevity and fecundity in many Lepidopteran species,

especially butterflies (Chew and Robbins 1989). Although increased longevity and fecundity have not been specifically demonstrated for the Karner blue butterfly, it is generally agreed that nectar is an essential adult resource. Adult Karner blue butterflies spend considerable time nectaring on a wide variety of plant species (refer to APPENDIX C). Adults have been observed during the first brood to feed on flowers of 39 species of herbaceous plants and 9 species of woody plants, and during the second brood, on flowers of 70 species of herbaceous plants and 2 species of woody plants. Indeed, nectar plant availability may be a key factor in determining habitat suitability (Fried 1987). Lawrence and Cook (1989) suggested that the lack of nectar sources may limit populations at the Allegan SGA in Michigan, and Packer (1994) implicated the dearth of nectar sources as one of the causes of the extirpation of populations in Ontario. Bidwell (1994) found a positive correlation between nectar plant abundance, specifically abundance of *Monarda punctata* (horsemint), and the number of Karner blue butterflies. Other researchers, Herms (1996), and Richard King (USFWS, pers. comm. 1996), did not find a correlation between adult butterfly numbers and nectar plant abundance. Herms (1996) suggested that the lack of correlation between Karner blue and nectar sources could also mean that the minimal requirement for nectar was met and that nectar was not limiting during the years of study. It is generally accepted that nectar plant phenology, presence, distribution, and abundance can vary from year to year on any given site. In addition, absence of correlation might also mean that other factors, such as larval density, are more directly determining adult population numbers.

Some plant species appear to be utilized more frequently than others (Fried 1987, Bleser 1993, Leach 1993, Bidwell 1994, Lane 1994a, Lawrence 1994, Herms 1996). The nectar plant used most frequently in the field may be the one that is spatially or temporally available or most abundant, and not the species that is preferred. Observations of nectaring frequency, however, can indicate the relative utility of the species as a nectar resource. For example, Herms (1996) found that *Asclepias tuberosa* was the most frequently used summer nectar sources two years in a row, but was consistently rare on all sites. Common nectar plant species used by first and second brood Karner blues in Minnesota, Michigan and Wisconsin are summarized in Table 1. A more comprehensive list of nectar plants used by the Karner blue can be found in APPENDIX C, Table C1.

Studies by Grundel et al. (2000) at IDNL suggest that the Karner blue is opportunistic in selecting nectar plants, choosing species with the greatest total number of flowers or flowering heads. However, the studies also showed that the Karner blue preferred certain select nectar species (Table 1) and nectar plants with yellow or white flowers.

In addition to nectaring, males and females sip at moist earth (mud-puddling) and human perspiration, and males sip at animal droppings (Swengel and Swengel 1993). Adults may be obtaining sodium or other substances from this behavior.

Subhabitats

Karner blue adults and larvae use a variety of subhabitats created by variation in tree canopy cover, topography, and soil moisture, and the population dynamics of the butterfly is probably influenced by these factors. Adult butterflies use open-canopied areas for nectaring, roosting, mate location, and oviposition (Packer 1987; Lawrence and Cook 1989; Lawrence

1994; Maxwell and Givnish 1994; Lane 1994a, 1994b, 1995, 1999b; Grundel et al. 1998b). The majority of Karner blue nectar plants require medium to high levels of sun to produce flowers and the adults nectar most frequently in open-canopied areas. The phenology of flower production also varies with subhabitats; therefore, subhabitat diversity may provide a more guaranteed source of nectar. For example, wetlands adjacent to suitable Karner blue habitat at IDNL or Necedah NWR may provide almost unlimited nectar resources. Extremely xeric sites, on the other hand, such as Allegan SGA, may have limited adult nectar resources, which could limit butterfly populations (Lawrence and Cook 1989).

Adults are commonly found in open-canopied areas. In Minnesota, Lane (1994a) classified habitats with lupine or adult butterflies, and showed that adults were found in areas with less than five percent canopy cover. In western Wisconsin, Maxwell and Givnish (1994) collected data on the physical structure of habitat and cover estimates of selected vegetation, and found a positive correlation between adult Karner blue butterfly abundance and grass cover. Because the grass was used as adult roosting sites, they suggested that this indicated the importance of roosting sites for healthy populations of Karner blue. Grass cover may also indicate open canopy on less xeric, slightly more fertile areas of savanna, which could be beneficial in other ways to Karner blue.

Specific adult behaviors are commonly seen in open-canopied areas. Adults have been observed roosting in open- to closed-canopied areas during the day on several woody and herbaceous plant species, but at night adults have been seen roosting in the open on grasses such as big bluestem (*Andropogon gerardii*) (Schweitzer 1989). Male Karner blue butterflies used open habitat areas for nearly 90 percent of their activities - primarily mating and nectaring activities (Grundel et al. 1998b). Males are commonly observed in open areas, and in studies on butterfly movement, Bidwell (1994) frequently observed males flying back and forth through open areas.

Female activity is more spread across subhabitat than male activity. Females have been observed ovipositing (laying eggs) in open- to closed-canopy areas and in a variety of slopes and aspects (Lane 1993, 1994c, 1999b; Grundel et al. 1998b; Maxwell 1998). Females may be ovipositing in open- and partial-canopied areas in response to the greater lupine, nectar plant, and male abundance in these subhabitats. In addition, during periods of cool weather, open and sunlit areas appear to enable butterflies to achieve threshold temperatures needed for flight activity (Lane 1994c, 1999b). Based on experiments that tested the minimum temperatures needed for Karner blue flight and measurements of temperatures in open- and closed-canopy areas, the average number of hours available for first flight females is 10.5 hours in the open versus one to two hours in partial to closed-canopy areas (Lane 1999b). In addition, observations of adult butterflies determined that a greater proportion of females occur in partial- and closed-canopied areas at higher temperatures. Studies also suggest that females were not moving into shaded areas to escape high temperatures (Lane 1999b).

In general, females tend to oviposit in partial to closed subhabitats (Lane 1999). Grundel et al. (1998b) measured an average canopy cover at oviposition sites of 54.8 percent. For spring flight females, a larger number of eggs were laid per lupine stem in partial and closed subhabitats than in open subhabitats (Lane 1999b). However, based on informal adult counts in New York, Karner blue adults did not appear to utilize lupine in heavily shaded areas (Dolores Savignano,

pers. comm. 2002). Lupine quality in shaded subhabitats, direct benefits from shade, and avoiding male harassment are all factors thought to contribute to the observed oviposition patterns (Grundel et al. 1998b, Lane 1999). Lupine quality influences on larval growth and survival are reviewed above in the “Lupine quality and Karner blue” section.

The direct effects of shade have been shown to contribute to higher larval survival rates in field studies (Lane 1999b). In closed-canopied areas, larvae may be more protected from temperature extremes, wind and rain, and/or natural enemies. It may be that natural enemies do not inhabit these areas or are less efficient at searching these areas. Although the proportion of older larvae tended by ants has been found to be similar in open- and closed-canopy areas, early instar larvae have been found to be tended more in partial-canopy areas (Lane 1994b). Moreover, Lane (1999b) found tending ant species were different in different subhabitats.

At Fort McCoy during 1995, the summer drought conditions resulted in early senescence of lupine (Maxwell 1998). In open-canopied areas, late-maturing second brood larvae were often seen on completely senesced plants, while in shady areas senescence was delayed. Karner blue populations declined during this generation and were more abundant in the shade suggesting that early lupine senescence may have been the cause. Lupine quality has also been shown to be affected by shade (refer to Lupine quality and the Karner blue).

Another factor influencing oviposition site may be male harassment. Studies by Lane (1999b) indicated that a greater number of females were harassed by males in open- versus closed-canopy areas. The interruption of activity caused by harassment may encourage females to shift to partial- and closed-canopied areas during oviposition.

Egg deposition in a variety of subhabitats may also serve to mitigate physical or biological risks to immature stages (Bidwell 1994, Lane 1994c, 1999b). For example, several researchers have suggested that lupine senescence is earlier in xeric, open-canopied areas and may result in larval starvation, particularly during drought years.

Optimal subhabitat for larval stages contrasts with that used by adults (Savignano 1990; Lane 1994b, 1999b; Grundel et al. 1998a, 1998b; Maxwell 1998). Studies on larvae in Minnesota and Wisconsin found significant differences in larval survivorship between open-, partial-, and closed-canopy areas (Lane 1994b, 1999b). For second brood larvae, survival was highest in closed-canopied areas, intermediate in partial-canopied areas, and lowest in open-canopied and very xeric areas (Lane 1999b). The cause of higher mortality for larvae placed in the very xeric areas is uncertain. However, the lupine often were heavily infested with powdery mildew and the introduced predator, the seven spotted lady beetle (*Coccinella septempunctata*) (Schellhorn et al. unpublished), both of which may have contributed to observed mortality (Lane 1999b). Maxwell (1998) found lupine shaded by shrubs and dense herbaceous cover contributed to the larval survival and noted that removal of tree and shrub cover over a large area can be detrimental to the butterfly even when nectar and lupine resources are enhanced.

In summary, mating and adult feeding take place primarily in open-canopied areas. Oviposition occurs in many types of subhabitats, but larval growth and survival may be best in partial- to closed-canopy areas. Small-scale variation in topography and soil moisture could be

Table 1. Nectar plant species used commonly by first and second brood Karner blue butterflies. Percent of all nectaring observations at a locality for all plant species used by more than 10 percent of the observed butterflies.

Plant species	Percent of butterflies nectaring at plant species									
	First Brood	MI ¹	Locality		WI ³	WI ⁴	WI ⁵ #			
		MI ¹	WI ²	MI ⁷	MI ⁸	MI ⁹	WI ²	WI ³	WI ⁴	WI ⁵
* + <i>Arabis lyrata</i>							50			11
<i>Hedyotis longifolia</i>							14			
<i>Hieracium aurantiacum</i>								56		
<i>Lupinus perennis</i>								29		13
<i>Melilotis officinalis</i>			16							
* <i>Potentilla simplex</i>										35
+ <i>Rubus flagellaris</i>	89		19							
<i>Rubus</i> sp.										20
Second Brood	MN ⁶	MI ¹	MI ⁷	MI ⁸	MI ⁹	WI ²	WI ³	WI ⁴	WI ⁵	
<i>Amorpha canescens</i>						15	39	16		
* <i>Asclepias tuberosa</i>		66	40	22						
<i>Asclepias verticillata</i>							11			
<i>Berteroa incana</i>								23		
<i>Centaurea biebersteinii</i>				33	40					
* <i>Euphorbia corollata</i>				33						11
<i>Euphorbia podperae</i>						12				
<i>Helianthus occidentalis</i>										13
<i>Liatris cylindracea</i>				11						
*+ <i>Melilotus alba</i>						38				
* <i>Monarda punctata</i>	91	20	20		60	13	25	13		
<i>Rudbeckia hirta</i>								28		
* <i>Solidago speciosa</i>										17

References: 1 = Lawrence 1994, 2 = Leach 1993, 3 = Maxwell and Givnish 1994, 4 = Lane pers. comm. 1994, 5 = Swengel and Swengel 1993, 6 = Lane 1994a, 7 = Papp 1993, 8 = Sferra et al. 1993, Site 1, 9 = Sferra et al. 1993.

Notes: * Species most frequently chosen by Karner blues; also *Coreopsis lanceolata*, *Rubus spp.* and *Helianthus divaricatus*. (Grundel et al. 2000).

+ Nectar species preferred by Karner blues at IDNL; also *Coreopsis lanceolata*. (Grundel et al. 2000).

averages based on 4 years of data.

beneficial to Karner blue. A highly variable microtopography creates a highly variable thermal environment and a highly variable plant community and canopy structure. Variation in soil moisture will also contribute to variation in plant community and canopy structure. In addition, variation in plant community and canopy could be beneficial to Karner blue in the long-term. In hot dry years Karner blue can be found using shady moist subhabitats, while in cool years, they are more strongly associated with sunny and partially sunny subhabitats.

Given the different habitat requirements of adult and larval stages, and the relatively low within habitat mobility observed for the Karner blue, it is important that canopy cover subhabitat types be within close enough proximity for butterflies to move easily between them (Lane 1999b) (refer to Within-Habitat Movement and Between-Site dispersal, below).

Associated Ants

Immature stages (egg, larva and pupae) of the Karner blue butterfly have a mutualistic relationship with ants. Larvae tended by ants (Figure 1) have a higher survival rate than those not tended by ants (Savignano 1990, 1994a; Lane 1999b), presumably because the ants provide some protection from the natural enemies of larvae. In addition, laboratory feeding studies have demonstrated that larvae tended by ants grow relatively rapidly and gain weight more rapidly per amount of food eaten (Grundel et al. 1998a). Ants benefit from this relationship by using as food, a liquid secreted from specialized glands on the larvae that contains carbohydrates and possibly amino acids (Savignano 1990).

Tending levels for late instar larvae are close to 100 percent. The percentage of early instar tending varied between studies. Both Savignano (1990) and Lane (1999b) observed that a lower percentage of early instar larvae were tended by ants, while Herms (1996) found all instar age classes to be tended at similar proportions (88 to 92 percent). Herms (1996) suggested that early instar larvae in her studies may have been tended by different ant species than in other studies, and that some ant species may be more likely to tend early instars. Several ant species have been observed to tend Karner blue larvae (Table 2). Some species of ants appear to provide greater protection than other species. For example, larvae last tended by *Formica lasiodes* had significantly higher survival than those last tended by other ant species (Savignano 1990, 1994a).

During pupal survival studies, Lane (1999b) observed eight ant species to be associated with Karner blue pupae (Table 2). One species of ant built nests of dead vegetation around the pupae. Pupae within these nests were observed to emerge as adults, but how the ants influence pupal development or survival is not clear.

At the Crossgates Mall site in New York, Spoor (1993) observed ants (*Myrmica* sp.) removing eggs of Karner blue from lupine stems. Removal rates were sometimes exceedingly high (39 to 74 percent of eggs missing in one series of observations). Whether these eggs were killed or reared by the ants is unknown. A species of *Myrmica* in Europe carries larvae of the large blue butterfly (*Maculinea arion*) into its nests, where the butterfly larvae then feed on the ants' larvae (Thomas 1980). Spoor (1994, and pers. comm. 2002) also observed *Monomorium emarginatum* opening eggs and pulling larvae out whole or in two pieces.

Although ants appear to be important in the life cycle of the Karner blue, it is uncertain if it is necessary to manage habitat to ensure their presence. The interaction between Karner blue and ants appears to be facultative, and the ants appear to be opportunistic in tending, so that any species that is present might tend the larvae and pupae. In contrast, the apparent variation in protection provided by different ant species could influence Karner blue abundance and population dynamics, and therefore methods to manage the habitat to encourage more beneficial ant interactions may merit consideration.

Within-Habitat Movement and Between-Site Dispersal

Dispersal has not been carefully defined in the Karner blue literature. Dispersal usually refers both to the movement of individuals within and between suitable habitat sites. Because these two types of movements have different ecological implications, they will be separated in this discussion. The movement of individuals away from their natal site of suitable habitat, leaving the site and potentially finding another site will be referred to as dispersal between sites and will include dispersal from sites. Movement that remains in a habitat site (or within the local subpopulation) will be called within-habitat movement. Because suitable habitat sites vary in size, the frequency of these types of movement will vary from site to site. Dispersal from sites may lead to recolonization events, while movement within sites can result in greater use of the site, but will not contribute to recolonization. Karner blue butterfly movements range from relatively short within habitat movements to dispersal movements between sites greater than 1000 meters (1093 yards) apart that are separated by unsuitable habitat. Refer to APPENDIX G (Table G1) for a summary of the within-habitat movement and between-site dispersal studies discussed below.

Within-habitat movement

Nearly all researchers that have examined Karner blue dispersal concluded that Karner blue movements within sites are relatively low and short with nearly all movement less than 100 to 200 meters (110 to 220 yards) (Fried 1987, Givnish et al. 1988, Lawrence and Cook 1989, Sferra et al. 1993, Welch 1993, Bidwell 1994, Lawrence 1994, Fuller 1998, King 1998, Knutson et al. 1999) (refer to APPENDIX G, Table G1). Knutson et al. (1999) found that 75 percent of the movements recorded were less than 100 meters (110 yards). The mean distance moved per day ranged from 32 meters (± 3 meters) (Bidwell 1994) to 191 meters (± 52.5 meters) (35 to 209 yards) (Lawrence and Cook 1989). Mean distance moved per day tended to be shorter at the relatively more closed IDNL sites, ranging from 46.4 to 55.0 meters (51 to 60 yards) (Knutson et al. 1999) than in the open landscape of Necedah, where dispersal ranged from 48.2 to 173.2 meters (53 to 189 yards) (King 1998). However, the distances reported by King (1998) are averages of within habitat movements and between site dispersal. Because he recorded many longer dispersal distances, averages are expected to be lower for within habitat movement alone.

Lane (1994a) measured within-habitat flight distances by following individuals and marking all landing points. The average flight distance between points was 4.99 meters (5.5 yards) for males and 1.49 meters (1.6 yards) for females, i.e. most within-habitat flights were short distances, but adults took many small flights in a day (Lane 1994a). The total distance traveled was also calculated from flight data on individuals (time per activity, and distance, angle, and direction of

Table 2. Ant species tending Karner blue butterfly larvae and pupae.

Ant Species Tending Larvae	Locality	Reference
<i>Aphaenogaster rudis</i>	Ont	Packer (1991)
<i>Brachymyrmex debilis</i> Emery	MN, WI	Lane (1999)
<i>Camponotus americanus</i> Mayr	NY	Savignano (1994a)
<i>Camponotus ferrugineus</i>	WI	Bleser (1992)
<i>Camponotus novaeboracensis</i> Fitch	NY	Savignano (1994a)
<i>Camponotus pennsylvanicus</i>	Ont	Packer (1991)
<i>Crematogaster ashmeadi</i>	WI	Bleser (1992)
<i>Crematogaster cerasi</i> Fitch	NY	Savignano (1994a)
<i>Crematogaster lineolata</i> (Say)	MI	Herms (1996)
<i>Dolichoderus (Hypoclinea) plagiatus</i> Mayr	NY, WI	Savignano (1994a), Lane (1999)
<i>Dolichoderus mariae</i> Forel	MI, WI	Herms (1996), Lane (1999)
<i>Dolichoderus pustulatus</i> Mayr	MI	Herms (1996),
<i>Formica difficilis</i> Emery	NY	Savignano (1994a)
<i>Formica exsectoides</i>	Ont	Packer (1991)
<i>Formica fusca</i>	WI	Bleser (1992)
<i>Formica lasioides</i> Emery	NY	Savignano (1994a)
<i>Formica montana</i>	WI	Bleser (1992)
<i>Formica (Neoformica) incerta</i> Emery	NY, MN, WI	Savignano (1994a), Lane (1999)
<i>Formica (Neoformica) nitidiventris</i> Emery	NY	Savignano (1994a)
<i>Formica (Neoformica) schaufussi</i> Mayr	NY, MI	Savignano (1994a), Herms (1996)
<i>Formica neogatates</i> Emery	MI	Herms (1996)
<i>Formica obscuripes</i> Forel	WI, MI	Herms (1996), Lane (1999)
<i>Formica obscuriventris</i> Mayr	MI	Herms (1996)
<i>Formica querquetulana</i> Wheeler	NY	Savignano (1994a)
<i>Formica schaufussi</i>	WI	Bleser (1992)
<i>Formica subnuda</i> Emery	WI	Lane (1999)
<i>Formica subsericea</i> Say	NY, MI, WI	Savignano (1994a), Herms (1996), Lane (1999)
<i>Lasius alienus</i> Foerster	NY, MN, WI	Savignano (1994a), Lane (1999)
<i>Lasius neoniger</i> Emery	NY, MI	Savignano (1994a), Herms (1996)
<i>Monomorium emarginatum</i> DuBois	NY	Savignano (1994a)
<i>Monomorium pharaonis</i> (L.)	MI	Herms (1996)
<i>Myrmica americana</i> Weber	NY, MI, MN, WI	Savignano (1994a), Herms (1996), Lane (1999)
<i>Myrmica emeryana</i> Forel	MN, WI	Lane (1999)
<i>Myrmica fracticornis</i> Emery	NY, MI	Savignano (1994a), Herms (1996)
<i>Myrmica lobifrons</i>	MN, WI	Lane (1999)
<i>Myrmica punctiventris</i>	Ont	Packer (1991)
<i>Myrmica sculptilis</i>	NY	Savignano (1990)
<i>Paratrechina parvula</i> Mayr	NY	Savignano (1994a)
<i>Prenolepsis imparis</i> (Mayr)	MN	Lane (1999)
<i>Tapinoma sessile</i> Say	NY, WI, MN	Bleser (1992), Savignano (1994a), Lane (1999)
<i>Tetramorium caespitum</i>	WI	Bleser (1992)

Ant Species Tending Pupae	Locality	Reference
<i>Crematogaster lineolata</i> (Say)	WI	Lane (1999)
<i>Dolichoderus tashenbergi</i> (Mayr)	WI	Lane (1999)
<i>Formica obscuripes</i> Forel	WI	Lane (1999)
<i>Lasius alienus</i> Foerster	WI	Lane (1999)
<i>Lasius neoniger</i> Emery	WI	Lane (1999)
<i>Leptothorax</i> sp.	WI	Lane (1999)
<i>Myrmica emeryana</i> Forel	WI	Lane (1999)
<i>Tapinoma sessile</i> Say	WI	Lane (1999)

flight) (Lane 1999b). Based on the average total square displacement per minute, after five days (the average life span of Karner blues), most of the butterflies would be expected to be within a 2.5 hectares area (6.2 acre). Individuals engaged in certain sets of behaviors (e.g., oviposition, roosting, testing for oviposition site) may be expected to move farther and be within a 32 hectare (79 acres) circular area after five days. Grundel et al. (1998b) also observed short movement distances, particularly for females. During one minute observation periods, only 8.4 percent of females moved greater than 10 meters (11 yards). The overall picture that emerges is that within-habitat movements of the Karner blues are short and frequent.

Between-Site Dispersal

There is a fair amount of variation in dispersal tendency of Karner blues between habitat sites as demonstrated by various dispersal studies. Distances between populations that are likely to facilitate recolonization in a metapopulation most likely fall in the range of 0.5-2 kilometers (0.31-1.24 miles) and will depend on the nature of the habitat, especially canopy cover between habitat sites. For a detailed discussion of between-site dispersal refer to APPENDIX G, INCREASING THE COLONIZATION RATE OF SUBPOPULATIONS WITHIN A METAPOPOPULATION, Between-Site Dispersal and Table G1.

Dispersal barriers

Many factors have been suggested to be dispersal barriers for Karner blue butterflies. Anecdotal evidence has indicated that many geographic, vegetational, and human-constructed structures might act as dispersal barriers, including four-lane highways with heavy traffic in urban or semi-urban areas, steep embankments and cliffs, forested areas if no openings such as trails or roads are present, and residential and commercial areas (including paved parking lots and roads). Scientific evidence supporting any of these speculations is absent.

Dispersal corridors

Little data exists regarding dispersal corridors for Karner blues. It is widely believed that open-canopied areas through wooded landscapes provide the Karner blue with a dispersal corridor, but except for anecdotal observations, this hypothesis has remained unproven. Welch (1993) found that dispersing butterflies almost always followed canopy openings along fencerows, woodland trails, or small gaps in the canopy, stopping frequently to bask in the sun. During these between-site movements, open-canopied areas may be needed for thermoregulation (Lane 1994c), orientation (Welch 1993), or both. Based on observations of Karner blue movement patterns at IDNL (a more closed habitat area), Grundel et al. (1998b) suggest that patches of several 25 meter (27 yards) openings, positioned less than 300 meters (328) from a neighboring patch, will allow the butterfly to persist in the patch and disperse. Thus, dispersal corridors may be formed by a network of partially connected canopy gaps and trails (refer also to APPENDIX G, INCREASING THE COLONIZATION RATE OF SUBPOPULATIONS WITHIN A METAPOPOPULATION, Facilitating Directed Dispersal Using Corridors, Corridors and Living Corridors).

HABITAT/ECOSYSTEM

Structure

The physical features that affect Karner blue butterfly habitat vary across its geographic distribution. The western part of the range is subject to greater continental effects, which include greater annual variation in temperature, lower precipitation, and greater year-to-year variation in precipitation. Average annual precipitation is higher in the eastern part of the range than in the western part of the range. Annual variation in precipitation is generally less than 10 percent of normal in the East, but more variable in the West at 15 percent of normal. In the East, the annual range in temperature is less than 28°C, but in the West the annual range is greater than 28°C. Thus, in the West, Karner blue habitat will be subjected more frequently to drought and temperature extremes, such as cool springs or hot summers, than in the East.

Throughout its range, the Karner blue butterfly was historically associated with native barrens and savanna ecosystems, but it is now associated with remnant barrens and savannas, highway and powerline right-of-ways, gaps within forest stands, young forest stands, forest roads and trails, airports, and military camps that occur on the landscapes previously occupied by native barrens and savannas. Almost all of these contemporary habitats can be described as having a broken or scattered tree canopy that varies within habitats from 0 to between 50 and 80 percent canopy cover, with grasses and forbs common in the openings. The habitats have lupine, the sole larval food source, nectar plants for adult feeding, critical microhabitats, and attendant ants. The stature and spacing of trees in native savannas is somewhat variable, reflecting differences in soils, topography and climate (Nuzzo 1986), and the distribution of trees in contemporary habitat is similarly diverse. Soils are typically well drained sandy soils which influence both plant growth and disturbance frequency. These conditions are generally wet enough to grow trees but dry enough to sustain periodic fires (Breining 1993). Topography is diverse and includes flat glacial lakebeds, dune and swale lakeshores, and steep dissected hills.

In order to restore viable metapopulations of Karner blues to the landscape, it will be important to establish and maintain the early successional habitat that the butterfly depends upon. This entails assuring that appropriate disturbance and/or management regimes (e.g., prescribed fire, mechanical management, etc.) necessary to renew existing habitat or to create new habitat are incorporated into management plans for the species.

Remnant native habitats

Barrens are often separated from savannas on the basis of soil type, plant species and form, fire frequency, etc.; however, the classification is not consistent among systems. For example in the Midwest Oak Ecosystems Recovery Plan (Leach and Ross 1995), barrens are considered to be a treeless type of savanna, and by this definition, most Karner blue habitat would be considered savanna, but not barrens. In other classification systems, savannas are wet/mesic habitats with burr oak and other mesic oak species, while barrens are xeric with 20-80 percent canopy cover on sandy soils. To further confuse this issue, Karner blue habitat in Minnesota is classified as dry oak savanna, barrens subtype (MNDNR 1993). Given the lack of

a generally accepted classification system, in this document "oak and pine barrens and savanna" ("barrens and savanna" in short) will be used to describe the types of ecosystems providing habitat for the Karner blue.

Most of the eastern range of Karner blue habitat is dominated by pitch pine (*Pinus rigida*), scrub oak (*Quercus ilicifolia*), or both. This ecosystem has been referred to as the pitch pine barrens, Northeast pine barrens, or (Albany) pine bush (Dirig 1994, Schweitzer and Rawinski 1987). Karner blue habitat around Saratoga, New York, appears to resemble oak savanna (Schweitzer 1990).

In the Midwest, black oak (*Quercus velutina*), white oak (*Q. alba*), pin oak (*Q. ellipsoidalis*), bur oak (*Q. macrocarpa*), jack pine (*Pinus banksiana*), or any combination of these dominate suitable Karner blue habitat. Composition can vary from predominantly oak, especially black or pin, to mixtures of oak and jack pine, to predominantly jack pine. Black and pin oak dominated communities have been classified by Curtis (1959) as oak barrens. Those dominated by black oak, with or without white oak and jack pine, are referred to as oak barrens. Sites dominated by jack pine, such as portions of central and northwest Wisconsin where prescribed burns have not eliminated the pines, are called jack pine barrens.

Some of the common species found in the understory of these barrens and savanna habitats are big bluestem grass (*Andropogon gerardii*), blueberry (*Vaccinium angustifolium*), little bluestem (*Schizachrium scoparium*), Indian grass (*Sorghastrum nutans*), butterfly weed (*Asclepias tuberosa*), sweet fern (*Comptonia peregrina*), spotted knapweed (*Centaurea maculosa*), *Rubus* spp., soapwort (*Saponaria officinalis*), bee balm (*Monarda fistulosa*), bracken fern (*Pteridium aquilinum*), New Jersey tea (*Ceanothus americanus*), and goat's rue (*Tephrosia virginiana*).

Dune and swale habitats are one of the most biologically diverse in the Great Lakes Basin (Rankin and Crispin 1994), originally extending along the shore of Lake Michigan from southern Wisconsin through the Chicago and Gary metropolitan areas and north into southwestern Michigan. The dunes are in close proximity to the swales, creating an extreme diversity of regularly alternating subhabitats from xeric, sandy upland habitats to wetlands, and back to uplands and again to wetlands over distances of less than 50 meters. Karner blue populations can be found in the uplands, which are oak barrens habitats, but adults will forage on nectar-producing plants in the adjacent wetlands.

The spatial characteristics and arrangement of habitat patches also appears to be important for Karner blue butterfly populations (Greenfield 1997, Lane 1999). Habitat patches supporting the Karner blue in the Allegan SGA, Michigan, were found to have an edge density more than two times as large as patches without Karner blue butterflies (Greenfield 1997). Habitats with a large amount of edge would tend to have a high proportion of partial canopy subhabitat, one of the key habitats for Karner blue (refer to Subhabitats above). The arrangement of habitat patches, in particular distance between patches, has been correlated with the presence and abundance of Karner blue butterflies (Greenfield 1997, Lane 1999). Greenfield (1997) found that stands with Karner blue butterflies and lupine were significantly more concentrated, i.e. had a lower mean nearest neighbor distance [69.9 meters, (76.4 yards)]. Consistent with these findings are results from comparative studies between the densely

populated habitats in Wisconsin and sparsely populated sites in Minnesota. In Wisconsin sites, habitat patches are essentially contiguous, whereas in Minnesota habitat is separated into many patches, often separated by more than 100 meters (110 yards) of dense oak woodland (Lane 1999).

Other contemporary habitats

Karner blues also occur in many other habitats managed for various purposes. These include powerline and highway rights-of-way, airport safeways, young managed forest stands, open areas within managed forest stands, along forest trails and roads, on military bases, and many other such areas. These areas all have soils that are suitable for lupine growth, an open canopy, and management that causes soil disturbance or suppression of perennial shrub and herbaceous vegetation (such as by mowing, brush-hogging, logging, chemical control, or prescribed fire). These habitats are very diverse vegetationally, and support herbaceous species that co-occur with lupine in the native remnant barrens and savanna habitats.

Renewal of Habitat for Karner Blues

Karner blue habitat is maintained in the balance between its decline from canopy closure and its renewal from external disturbance (Shuey 1997). Natural disturbances, such as fire (Chapman 1984) and large animal grazing (Hobbs and Huenneke 1992), that open canopy have decreased since the time of European settlement; thus, this balance is largely maintained by management activities (refer to APPENDIX G). These management activities intervene to influence the rates at which suitable habitat declines in quality and is renewed. Thus, an understanding of both natural factors and the interaction with management is essential to understanding the maintenance of Karner blue habitat. It is likely that the gradients in temperature and precipitation that occur from the eastern to western part of the range of Karner blue butterfly affect these rates. In the drier more variable climates of the western part of the range, it might be predicted that rates of canopy closure will be slower and rates of natural renewal, such as fire will be faster, which would result in a natural landscape with more early successional barrens and savanna and healthier Karner blue populations.

Many ecological processes act on Karner blue habitat to maintain populations of the butterfly. In the native barrens and savanna habitats, many factors, including deliberate fire, wildfire, disease, such as oak wilt, and herbivory, probably interacted to maintain the native vegetation and the associated Karner blue populations. In habitats dominated by anthropogenic activities, many management activities probably have been inadvertently beneficial to Karner blue butterfly. In general, the relation between specific management practices and Karner blue populations is not well characterized, yet the persistence of Karner blue on these managed ecosystems suggests a basic compatibility between Karner blue and alternate land uses that would merit additional study. For example, in New York, approximately half of the Karner blue subpopulations occur on powerline rights-of-way, and the largest subpopulation occurs on annually mowed airport lands (Smallidge et al. 1996). In Wisconsin, Karner blues persist on forested landscapes. Prescribed fire and targeted removal or suppression of trees and shrubs are methods commonly suggested for renewing Karner blue habitat, and are discussed in APPENDIX G and reviewed below. However, research to date has not identified a single

management practice that correlated well with abundance of Karner blue or vegetation patterns (Smallidge et al. 1996, Swengel 1998, King 2000), which suggests that many management factors could be beneficial to the butterfly.

Remnant native habitats

The native barrens and savanna ecosystem and its unique combination of species developed from the interplay of natural disturbance processes, edaphic factors, climate, etc. (Forman 1979, Tester 1989, Faber-Langendoen 1991). Fire is recognized as the key element maintaining savanna vegetational structure and species composition (Tester 1989, Haney and Apfelbaum 1990, Faber-Langendoen 1991, Wovcha et al. 1995). Fire influences ecosystem dynamics by decreasing soil nitrogen and organic matter and raising pH (Tester 1989). It exposes mineral soils and reduces woody plant cover, conditions required by many savanna adapted species (Payne and Bryant 1994), and clears the understory but does not eliminate the adapted tree species. These trees survive by resisting fire with thick barks, by resprouting, or by germinating seeds after disturbance by fire. These setbacks of the woody vegetation maintain a mixture of open- to densely-canopied patches of habitat (Nuzzo 1986, Shuey undated). Fire suppression in recent history has resulted in succession of these barrens and savannas to woodlands.

Mammalian grazing, burrowing, trampling, etc., are considered by some to be a critical element in maintaining the oak savanna ecosystem (Hobbs and Huenneke 1992, Swengel 1994). Elk (*Cervus elapus*) and bison (*Bison bison*) are likely to have once grazed and browsed in Minnesota and Wisconsin (Hamilton and Whitaker 1979, Jackson 1961). During spring, elk feed extensively on grasses, sedges, and weeds. During summer, grasses, shrubs, and trees are eaten, and the diet shifts solely to shrubs and trees during fall. Bison feed on species similar to those consumed by domestic cattle, primarily grasses. Deer browse and occasionally graze on legumes and other selected plants. Deer are at very high population levels at some sites with Karner blue. For example, an average of 60-80 deer per square mile occur in the Whitewater WMA in Minnesota (Jon Cole, Whitewater WMA, pers. comm. 1996). Browsing by deer probably has helped to maintain the open canopy that is characteristic of savanna by killing or suppressing tree seedlings. In some areas browsing is so high on oak and jack pine seedlings and selected herbaceous species that several age classes of trees are missing (Cynthia Lane, pers. comm. 1995). If browsing by deer continues at these levels, regeneration of trees may be insufficient to maintain savanna. Similarly, deer grazing may reduce reproduction and survival of herbaceous plant species, such as lupine (Packer 1994, Straub 1994) (Dale Schweitzer, pers. comm. 1994).

It is possible that extirpation of bison and elk and increased numbers of deer have resulted in changes to the structure and species composition of the remnant barrens and savanna ecosystem. At the Whitewater WMA, grass litter has accumulated in open areas and certain age classes of trees are missing. In Ontario, extremely high deer populations consumed from 30 percent to 90 percent of the lupine plants in some areas, and probably contributed to the extirpation of the Karner blue butterfly (Boyonoski 1992, Packer 1994, Schweitzer 1994a).

Soil disturbances created by small mammals, such as plains pocket gopher (*Geomys bursarius*), can also affect the composition and abundance of oak savanna plant species (Reichman and Smith 1985, Davis et al. undated). For example, the savanna herb *Penstemon*

grandiflorus (Scrophulariaceae) has increased growth rates and earlier reproduction when growing on areas disturbed by the northern plains gopher (Davis et al. undated). Lupine germination and growth on gopher mounds has not been studied; however, the early successional disturbance-associated niche of lupine suggests that it might benefit from gopher disturbances.

Insects and diseases that remove canopy trees have also contributed to the persistence of barrens and savannas in the central United States. Many remnants of high quality oak savanna are in areas where canopy trees have died as a result of oak wilt (*Ceratostyis fagacearum*). Two-lined chestnut borer (*Agrilus bilineatus* Weber), jack pine budworm (*Choristoneura pinus* Freeman), and gypsy moth (*Lymantria dispar* L.) are likely to reduce canopy cover in overgrown barrens areas (Coulson and Witter 1984).

Soil type and topography have contributed to the maintenance of barrens and savanna species composition and structure. The sandy well-drained soils characteristic of Karner blue habitat retain little moisture. These xeric conditions reduce growth of woody species (Burns and Honkala 1990) (Klaus Puettmann, UM-St. Paul, pers. comm. 1995), and only species tolerant of these conditions persist. In combination with soil type, many savanna species owe their persistence to topographic effects, especially in the unglaciated driftless regions in Wisconsin and Minnesota (Wilde et al. 1948, Lane 1994a). The steep slopes exhibit natural slumping, creating exposed mineral soil that favors early successional species. Many of these slopes are south and southwest in aspect, further enhancing their xeric quality and resulting in further suppression of woody plant species. In addition, during spring snowmelt and summer rain storms, several valleys experience erosion, exposing the mineral soils that benefits early successional species, such as lupine.

Other contemporary habitats

The maintenance of Karner blues in contemporary habitats such as on forest lands, right-of-way corridors, military lands, or airports, requires the maintenance of the early successional habitat required by the Karner blue.

Silvicultural practices can have beneficial or detrimental effects on Karner blue, many of which are summarized in Lane (1997). For example, in some parts of Jackson, Juneau, Wood, and Burnett counties in Wisconsin, summer harvest, road building and maintenance, site preparation, tree planting, slash burning, and other activities appear beneficial to lupine and the Karner blue. Within this complexity of management activity, however, it is important to focus on how various practices affect the balance between local extirpation of butterflies in a stand and recolonization of stands by butterflies. Forestry practices disturb habitat and butterflies in ways that can be related to the type of disturbance (mechanical, chemical, or prescribed fire), its spatial extent (area affected), its intensity (direct effect on the soil, lupine, and Karner blue), and seasonal timing. The effects of these management practices will be quite diverse, but these effects can be categorized as direct effects on populations of the butterfly, effects on important plant species, such as lupine, nectar plants, and competing plants, and effects on the soil that influences these plant responses. All of these effects will depend on many habitat characteristics, such as the spatial distribution and abundance of plant resources, site quality and topography, the previous history of the site, and the recent history of management. Because there is little

scientific information for using silvicultural practices to enhance Karner blue butterfly, management planning should take an adaptive management approach.

Because silvicultural practices are implemented to achieve multiple management goals, there will be inevitable tradeoffs between achieving the various goals. For example, at a particular site, a manager may desire maximum immediate financial returns, minimal risk on investment, maximum sustained yields, optimal wildlife game animal production, and increased Karner blue butterfly populations. In most cases, it will not be possible to optimize simultaneously all economic and wildlife goals. Instead, it will be necessary to understand which silvicultural practices are compatible with each of these many possible goals and which practices create trade-offs among them. For some managers, such compatible practices may be those that, for example, enable sufficient financial return while supporting sufficient butterflies. Forest management activities vary considerably, and a better understanding of the complexities of management and their consequences for the Karner blue butterfly in the working landscapes is needed.

Silvicultural practices continually evolve as demand and technology changes. For example, because red pine fiber is now preferred to jack pine fiber in pulp processing, there has been a shift to replacing jack pine plantations with red pine plantations in many commercial forests. The effect of this shift on the Karner blue is not known, but because red pine has a denser canopy at similar stand densities and is grown on a longer rotation than jack pine, this shift may result in declines of the butterfly over the long term.

The monitoring program of the Wisconsin Statewide HCP in Wisconsin is providing insight into the effects of silviculture on the Karner blue. Information from Plum Creek Timber Company (Lorin Hicks, *in litt.* 2002) notes that 54 percent of their young red pine plantations had lupine present, and 25 percent of the stands with lupine supported Karner blues. Their data also shows that prior to harvest, 28 percent of mixed oak/jack pine stands had lupine present prior with 25 percent of the stands supporting Karner blues. This information supports the existence of Karner blue on young red pine stands and to a lesser extent in older mixed stands; however, it will be important to learn how Karner blues persist on forest lands dominated by red pine stands as the stands age and whether lupine and nectar plants would regenerate after harvest of mature stands [refer to Recovery Task 5.25 (d)]. Measures should be considered on forest lands that maintain early successional habitat, dispersal corridors, and forest openings; these measures include less dense plantings and creation of wider roads, trails, and landing sites that can serve as habitat and dispersal corridors for the butterfly (Lane 1997). The effects of silvicultural practices on Karner blue should be evaluated carefully through an adaptive management process.

Information from the Wisconsin DNR's HCP compliance audit program is showing that shifting mosaic habitat patterns occur on HCP forest partner lands due to the spatial arrangements of age classes and harvest rotations. These habitat patterns are likely responsible for the persistence of Karner blues on these lands (refer to PART I, DISTRIBUTION, Rangewide Distribution of Karner Blues, Wisconsin). About 227,191 acres are currently managed in Wisconsin with the goal of maintaining a shifting mosaic of habitat on HCP partner lands. It is anticipated that many non-partner lands have been and will continue to be managed in this manner into the future. The Wisconsin DNR believes that the demand for forest products

over the next century or more is expected to perpetuate Karner blue habitats in Wisconsin, much as it has in the past (Darrell Bazzell, *in litt.* 2002). The HCP monitoring data is and will continue to be valuable in furthering our understanding of the ability of forest lands to support viable populations of Karner blues [refer to PART II, RECOVERY TASKS, Task 5.25(e)]

Understory legumes, such as lupine, can raise soil nitrogen levels, improve rates of mineral cycling, reduce surface runoff and soil erosion, and may improve soil organic matter content, soil structure, and cation exchange capacity, and inhibit soil-borne pathogens (Turvey and Smethurst 1983, Smethurst et al. 1986). Many of these effects could benefit forestry production. Although a potential cost might be competition between lupine and the establishing of trees, in many situations it may aid production goals to encourage the growth of existing lupine and associated Karner blue butterflies, as long as it is not necessary to plant lupine.

Military training appears beneficial to the Karner blue when managed appropriately. The Fort McCoy Military Reservation contains some of the largest populations of Karner blues in Wisconsin (Leach 1993, Bleser 1994), with over 93 percent of the lupine patches occupied by the butterfly (Wilder 1998). It appears that military training activities, particularly inadvertent fires caused by artillery and mechanical disturbance by tracked vehicles, have created a mosaic of successional states similar to those in native habitats. Several studies have examined the effects of tank traffic on Karner blue butterflies and/or their habitat (Bidwell 1994, Maxwell and Givnish 1996, Maxwell 1998, Smith et al. 2002). Comparative studies relating the intensity of training activities to the density of butterflies suggest that these activities have been beneficial to the Karner blue (Bidwell 1994, Smith et al. 2002). Maxwell and Givnish (1996) and Smith et al. (2002) evaluated the effect of tank traffic on plots of established lupine at Fort McCoy, Wisconsin. In both cases greater lupine abundance was associated with areas where track vehicles had traveled as compared with areas where no tracked vehicles had traveled. Maxwell and Givnish (1996) suggested that this kind of traffic causes greater soil disturbance than ORV traffic, and could be comparable to some of the traffic during site preparation and harvest of commercial forest stands. They found that tank traffic crushed emerging lupine plants. Yet, within several weeks, seedling germination was observed on the disturbed soil, and the crushed plants re-grew with a three-week delay in developmental phenology. In the following year, plants on the disturbed areas developed about two weeks faster than the surrounding plants. Smith et al. (2002) measured the greatest lupine abundance in the median strip between vehicle ruts, although lupine regrowth was observed in the ruts and on eroded margins of the tracked vehicle trails. Maxwell and Givnish (1996) concluded that mechanical disturbance could create greater heterogeneity in lupine development. However, Smith et al. (2002) cautioned that repeated disturbance by tracked vehicles might have a negative effect on lupine because of repeated disturbance/damage to lupine roots and/or repeated duff removal.

Areas disturbed by tracked vehicles also had higher nectar plant abundance and lower shrub cover as compared with areas unaffected by tracked vehicles (Smith et al. 2002). However, because of experimental design constraints, it was not possible to determine if tracked vehicle traffic contributed to the reduction of shrub cover or if areas with low shrub cover were preferentially selected as easy routes.

Historical disturbances were also responsible for the pattern and abundance of Karner blue habitat at Fort McCoy (Bidwell 1995, Maxwell 1998). Maxwell (1998) found lupine frequency to be significantly higher in areas of military disturbance. Military caused fire may be one of the primary factors influencing Karner blue habitat and abundance at Fort McCoy (Smith et al. 2002). Some of the largest lupine patches occur in the ordnance impact area, a portion of which is burned each year by military activities.

Although Maxwell's (1998) study plots were monitored to assess the effects of prescribed burns, they were often subjected to light military traffic with untracked vehicles which resulted in an immediate flush of new seedlings in closed canopied plots. Her research indicates that the efforts to regenerate lupine in late successional sites may benefit from disturbance to soils to reactivate the seed bank.

Maintenance of suitable Karner blue butterfly habitat on rights-of-way and near airport runways in New York has been studied by Smallidge et al. (1996). The effects of eight management methods and two management modes (broadcast or selective mechanical and/or herbicide treatments) on Karner blue abundance and several habitat characteristics were examined. No clear pattern was detected between management scheme and vegetation patterns. However, both Karner blue and lupine abundance were greater at sites that had been more recently managed. Broad-scale applications of broad-spectrum herbicides can be detrimental to existing lupine in these habitats, but could be beneficial if they suppress lupine competitors and enable lupine to establish. Smallidge et al. (1996) suggest that frequent mechanical treatments or applications of herbicides (using the appropriate type, methods and timing) will be effective in maintaining suitable Karner blue habitat. Disturbance activities related to building, mowing, and grading activities in rights-of-way possibly can have beneficial effects on lupine and butterflies, but the magnitude and direction of the effects may depend on the scale and timing of the activity. Refer to APPENDIX G, REDUCING LOCAL EXTIRPATION RATES, Improving and Maintaining Karner Blue Habitat). Much work has been done by utility companies and highway departments (partners to the HCP) in Wisconsin to alter the timing of mowing in order to minimize the take of the butterfly, while still promoting habitat conditions that favor the butterfly (Darrell Bazzell, in litt. 2002)

Prescribed fire

Fire has been widely regarded as an effective means of maintaining an early successional habitat suitable for growth of lupine in native barrens/savanna ecosystems (Payne and Bryant 1994). Fire influences savanna/barrens structure and composition in many ways including reducing woody plant cover, increasing the abundance of some species while decreasing the abundance of others, and exposing mineral soil. Fire also volatilizes nitrogen (returning it to the atmosphere) while leaving much phosphorus behind in ash; together with opening the canopy, these two processes should strongly favor plants associated with nitrogen fixing bacteria, such as lupine.

When using fire as a management tool, it is important to recognize the balance between Karner blue (and other insect) mortality in the short term, and improvement in the quality of their savanna/barren habitats in the long term (Givnish et al. 1988, Andow et al. 1994, Maxwell and Givnish 1996, Swengel and Swengel 1997, Schultz and Crone 1998). In addition, the use of

prescribed burn for habitat restoration will require different considerations than when fire is used for habitat maintenance. Some of the key factors to consider in developing habitat restoration and maintenance plans that include prescribed fire as a tool are: 1) site history and current condition, 2) amount of direct Karner blue mortality likely to occur during the fire, 3) potential for Karner blues to reoccupy the site, 4) characteristics of prescribed fire, 5) response of lupine and nectar plants to fire, and 6) other habitat responses. Because each recovery unit presents a unique combination of many of these key factors, it is important to develop site specific fire management plans for each Karner blue population. Refer to Appendix G for a review of each of the key factors noted above, background research relative to these factors, and recommendations regarding the use of fire.

Removal and suppression of trees and shrubs

Tree and shrub removal and suppression via mechanical means (mowing, brush-hogging and tree girdling), or with herbicides, can be effective ways of reducing canopy cover when timed and conducted in ways to minimize harm to the Karner blue, lupine, and nectar plants. Tree harvesting operations that remove canopy and disturb soil can have beneficial effects on lupine and Karner blue. Smallidge et al. (1995) recorded a greater percent of lupine cover on sites managed with herbicides. An Arsenal-Accord mix has been used to reduce woody cover in rights-of-way management in New York, and observations suggested that the response was positive for lupine (Scott Shupe, Niagara Mohawk, pers. comm. 2002). Infrequent mechanical removal may actually increase woody plant density because of re-sprouting after herbicide application or cutting (Smallidge et al. 1996). Karner blue sites mowed in late summer in Wisconsin were found to support an abundance of larvae the following spring (Swengel 1995). In general, many of the methods for removing and suppressing tree and shrub canopy can have a net positive effect on lupine and the Karner blue and should be timed and carried out in ways that minimize harm to the butterfly and its food resources (lupine and nectar plants). The effects of these management practices should continue to be documented in a wide range of Karner blue habitat types. Refer to APPENDIX G, for further information and guidance on use of these management tools.

Associated Species

Remnant native Karner blue habitats are home to an impressive variety of additional rare and imperiled plants and animals, but the healthy communities once associated with barrens and savanna habitats have declined dramatically because of habitat conversion, fragmentation, and disruption of disturbance regimes. The unique ecological conditions created by the xeric sandy soils, drought-like conditions, and frequent fire disturbances produced a suite of species that, because of their specialized adaptations, rarely occur outside of barrens and savanna habitats. Thus, although the Karner blue butterfly is perhaps the most frequently referenced member of this highly specialized community, many other regionally and globally rare species also depend on these same habitats. Because barrens and savannas are rare habitats in many of the states that have Karner blues, many of the species restricted to these habitats are regionally imperiled. The ecologies of many of these species are not well enough understood to know how adapted these species are to other contemporary anthropogenic habitats. APPENDIX D provides state lists of Federal and state imperiled species and species of concern known to be associated with savanna and barrens communities in states with designated recovery units for the Karner blue. These lists

were compiled by the state agencies responsible for rare species. Consequently, not all of the species listed will be found in occupied or occupiable Karner blue habitat, and not all of the species that are rare in Karner blue habitat will be listed. These listings indicate that restoring, preserving, and managing these dynamic barrens and savanna habitats is anticipated to benefit not only the Karner blue, but other rare species associated with them (Table 3). Management plans for the Karner blue should include management strategies that are compatible with other rare species that share its habitat (refer to APPENDIX G).

The Kirtland's warbler, *Dendroica kirtlandii* in Wisconsin is the only federally-listed endangered species included in these lists. The bald eagle, *Haliaeetus leucocephalus* in Michigan, and prairie bush clover, *Lespedeza leptostachya* in Wisconsin are federally-listed as threatened.

Table 3. Number of designated state endangered, threatened, or special concern species potentially associated with Karner blue habitats (for each state with extant Karner blue populations). The number of species that are listed as Federal endangered, threatened, or species of concern is in parentheses. The number of invertebrates does not include the Karner blue, and not all federally-listed species are listed by each state.

State	Vertebrates	Invertebrates	Plants
New Hampshire	0 (0)	3 (0)	3 (0)
New York	6 (0)	0 (1)	3 (1)
Michigan	11 (3)	14 (2)	50 (4)
Indiana	8 (3)	2 (1)	24 (2)
Wisconsin	26 (5)	41 (5)	50 (5)
Minnesota	2 (1)	3 (0)	7 (0)

In Wisconsin, Kirk (1996) conducted a thorough review of the rare species associated with dry prairie, barrens, and savannas in Wisconsin. Forty-one species were identified as associated with Karner blue habitat in the known range of the butterfly, of which 24 were further reviewed. Ten of the species (seven butterflies, two tiger beetles and the sharp-tailed grouse) were considered to have a high Karner blue association. Kirk (1996) discusses the taxonomy, range, habitat, life history, and management concerns for all 24 species. A companion document by Borth (1997) provides further information including management recommendations for 10 of the rare butterfly species discussed in Kirk (1996).

THREATS TO SURVIVAL

The most important threats to the Karner blue range wide are habitat loss, which has been accompanied by increased fragmentation of the remaining suitable habitat, and habitat alteration primarily resulting from vegetational succession. Related to these is the threat of incompatible management stemming from conflicting and potentially conflicting management objectives. Large-scale disturbances, such as large wildfire and unusual weather, are also threats to Karner blue populations. More detailed discussion of the threats to Karner blues in each recovery unit is provided in APPENDIX B. Threats in Wisconsin are not as imminent as in some other portions of the range because implementation of the Wisconsin Statewide HCP by its 26 partners plays a

significant role in the conservation of the butterfly. Overall, the partners have committed to implementation of the HCP's conservation program on about 252,299 acres of land in Wisconsin (WDNR 2000, WDNR 2002a).

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

As noted above, the most significant threat to the Karner blue range wide is habitat loss, alteration, and destruction. Habitat loss has resulted in a reduction in the number of Karner blue subpopulations, habitat fragmentation, and smaller-sized occupied sites. Habitat alteration has reduced the abundance and quality of the Karner blue's food resources (lupine and nectar plants) and subhabitat diversity. Non-management of habitat has resulted in habitat loss over time due to ecological succession. Loss to commercial, industrial, and residential development is more a threat in areas where Karner blue populations are in close proximity to cities or desirable recreational lands (e.g. West Gary, Indiana, the Glacial Lake Albany Recovery Unit in NY, and Concord, New Hampshire, and the Morainal Sands Recovery Unit in Wisconsin).

Loss and alteration of native habitat

The major threat to native habitats is conversion to alternate uses, such as agriculture, forestry, industrial, residential and commercial development, and road construction. Originally, barrens and savanna were widespread in the central United States but rare in the eastern United States. In both regions, there has been a precipitous decline in these habitats. Remaining barrens and savanna usually consist of isolated patches that persist because of droughty soils, insects and disease, and human disturbance such as mowing, light grazing, and intermittent prescribed or wild fires.

The major threat to the survival of the Karner blue butterfly in native habitats is habitat alteration resulting from vegetation succession from barrens and savanna habitat to woodlands and forests. Other threats include incompatible management actions for other wildlife and natural areas goals that do not take into account the needs of the butterfly, such as restoration and maintenance of native vegetation, encouragement of game animals, and recreational use (refer to Types of incompatible management, below). Human use of these native habitats and adjacent developed habitats has often resulted in suppression of disturbance and decline of Karner blue butterfly populations. Although wildlife and other management goals are often compatible with enhancement for Karner blues, too vigorous a pursuit of these other goals can be detrimental to the butterfly.

Loss and alteration of other contemporary habitats

The Karner blue butterfly inhabits several non-native habitats, including some silvicultural habitats, mowed rights-of-way, and roadside edges. Some of these habitats are being lost to commercial and residential development. Agricultural impacts that could pose threats include use of pesticides near Karner blue sites, conversion of large acres (e.g., in Wisconsin) to cropland (e.g., potato fields), cranberry beds, or hog farms. However, agriculture in sandy soil areas favored by the Karner blue may diminish in Wisconsin over time as it is becoming increasingly costly, and therefore less profitable to support agriculture on sandy soils.

Global warming is expected to reduce agriculture on these more arid soils over the next century (Darrell Bazzell, in litt. 2002).

Some silvicultural habitats that are suitable for Karner blues are being converted to residential and commercial uses, and others to intensive forestry practices that may affect the ability of these lands to support Karner blues. Conversion of former jack pine plantations to red pine could result in a loss of Karner blue habitat because red pine canopy is thicker and closes more rapidly. In addition, it is questionable whether lupine will regenerate after harvest of mature stands, but this requires confirmation (refer to PART I, HABITAT/ECOSYSTEM, Renewal of Habitat for Karner Blue, Other contemporary habitats).

Silvicultural habitats that are suitable Karner blue habitats degrade as the trees mature and the canopy closes. This is a natural part of the production cycle, and as long as other silvicultural habitat is opened up within dispersal distances of extant Karner blue butterfly subpopulations, such as by harvesting (creating a shifting mosaic of habitat), a metapopulation may remain at viable levels. Silvicultural habitats supporting Karner blues can degrade in more subtle ways, such as by changing the management objective for land that was previously suitable for the butterfly. Shifting objectives can change the balance between the duration of a Karner blue subpopulation on a site and the proportion of total area that is suitable for the butterfly. For example, suppose a particular silvicultural objective results in canopy closure occurring ten years after planting, and maturation and harvest in year 40. If a Karner blue subpopulation occupies a site for those 10 years before canopy closure, then 25 percent of the land managed for that objective (10 out of 40 acres) could support habitat suitable for the Karner blue butterfly. If the land is managed for a different objective, so that canopy closure occurs faster and subpopulations can only persist for 6 years, and stand maturation takes 60 years, then only 10 percent of the land managed for this objective could have habitat suitable for Karner blue. The exact percentage will vary from year to year depending on the proportion of the land harvested, variation in growth among sites, and changes in management objectives for a particular site. The longer the subpopulation can persist at higher population numbers, in general, the better for the butterfly. Currently in Wisconsin, the HCP monitoring program is demonstrating that Karner blues are persisting on forested landscapes, however questions remain as to the impact of various forest operations on the butterfly (refer to PART II, RECOVERY TASKS, Task 5.25)

The Karner blue butterfly also inhabits power line and railroad rights-of-way (Smallidge et al. 1996, WDNR 2000). If these are managed with herbicides or mowing during the late spring to the early summer, lupine and nectar plants would be suppressed, reducing habitat quality for the Karner blue butterfly as well as butterfly numbers. On some roadside corridors, native vegetation is being replaced by more uniform, exotic vegetation. On other corridors, ORV use is degrading habitat. It has been suggested that development of dedicated ORV trail systems may alleviate this problem (Scott Shupe, Niagara Mohawk, in litt. 2002).

Types of incompatible management

Incompatible management practices threaten some populations of Karner blues and can occur when land managers have several management goals and they either are unaware how pursuit of these other goals could have detrimental effects on the Karner blue or they judge the

trade-off with its detrimental effect on the butterflies to be acceptable. Incompatible management practices can occur as described below:

1. Pesticide Use

Poorly timed or poorly located use of herbicides can have a negative effect on Karner blue butterflies, by killing or suppressing lupine or important nectar plants. Application of herbicides in Karner blue butterfly occupied areas is best done after lupine and nectar plants senesce.

Most insecticides are not target-specific and can kill most insects in the treated area including the Karner blue butterfly. In laboratory tests, even the relatively specific insecticide, *Bacillus thuringiensis kurstaki* (*Btk*), used to control the gypsy moth killed about 80 percent of the Karner blue larvae fed Btk treated lupine leaves (Herms 1997). Because the timing of Btk applications for gypsy moth control typically coincides with the larval stage of the Karner blue, application of this insecticide results in Karner blue mortality (Herms 1997). Individuals and agencies (e.g. U.S. Forest Service) wishing to use Btk for gypsy moth suppression are encouraged by the Service to use alternative, non-lethal control methods in Karner blue butterfly areas. Miller (1990) found that *Btk* reduced the number of non-target Lepidoptera species and suggested that if any of the species had been limited in its distribution, it would have been at high risk of becoming extirpated. The effect of biological control agents on non-target insects is poorly documented. Analysis of the effects of releases of the biological control agent *Trichogramma nubilale* (an egg parasitoid) (Andow et al. 1995) showed the risk to be small. An examination of the introduced insect predator *Coccinella septempunctata* (seven-spotted ladybird beetle) in Karner blue habitat (N.A. Shellhorn, UW-Madison, pers. comm. 1997) suggests that the risk could vary with predator density, prey density, and microhabitat. The direct or indirect effects of fungicide applications on the Karner blue butterfly is not known. Refer also to APPENDIX G, REDUCING LOCAL EXTIRPATION RATES, Improving and Maintaining Karner Blue Habitat, Pesticides.

2. Mowing

While mowing can be an effective management tool (Swengel 1995), some precautions are warranted. Mowing between late spring and early summer is anticipated to have detrimental effects on Karner blue populations. Mowing can damage lupine, eliminating food for larvae. Although mowing may reduce shade and competition, it could also favor plant species not used by the Karner blue (Givnish et al. 1988). Mowing during adult nectaring periods can greatly reduce flower number and nectar availability. Mowing of lupine and nectar plants before seeds mature and disperse could reduce reproduction of these food plants, and have a long-term detrimental effect on Karner blues. In addition, mowing can kill larvae that are present, and may crush eggs laid on lupine plants. Refer to APPENDIX G, Alternatives to fire management for more information and guidance regarding mowing.

3. Prescribed fire

Fire is being used as a management and restoration tool (sometimes in conjunction with mechanical management) on several Karner blue sites e.g., the Albany Pine Bush Preserve (Albany, New York), Necedah NWR (Wisconsin), and at several Wisconsin DNR properties with positive effects for the Karner blue. Fifty years of fire and mechanical management on the Crex Meadows and Fish Lake WAs in Wisconsin have produced 12,000 acres of quality barrens habitat and monitoring has demonstrated the maintenance of a Karner blue population on the property. Necedah NWR currently manages about 500 acres of savanna habitat for the butterfly, mostly through a prescribed burning program.

While prescribed fire is a very useful management and restoration tool, it may threaten Karner blue populations e.g., if the burning is conducted on the majority of the habitat at one time, and if high intensity fires are used at frequent intervals. For a review of the effects of fire on the Karner blue and its food resources and for guidance on use of fire in Karner blue butterfly habitat refer to APPENDIX G.

4. Deer and grouse management

High deer densities can devastate Karner blue butterfly habitat and cause direct mortality by ingestion of larvae (Packer 1994, Schweitzer 1994a). Schweitzer recommends that deer populations be managed to levels where no more than 15 percent of lupine flowers are consumed (Schweitzer 1994a), but this recommendation has not been rigorously tested. Fencing may be useful in some situations to exclude deer from habitat areas. New economic solar powered electric fencing is currently available (David Wagner, University of Connecticut, *in litt.* 2002). Ruffed grouse habitat does not support lupine, because the dense, shrub vegetation favored by these game birds casts too much shade to allow lupine to thrive. Because Karner blues can occur on lands managed for sharptail grouse, burn management should be designed to promote conservation of the butterfly as well as grouse. Currently brush prairies that support sharptail grouse at Crex Meadows WA also provide the best habitat for Karner blues (Paul Kooiker, WDNR, pers. comm. 1997).

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Collection of the Karner blue butterfly has occurred in the past (USFWS 1992a and 1992b), but is not considered a significant factor in population decline. In the parts of its range where only a few small populations remain, however, extensive collections could have a detrimental effect. Although it has been suggested that collecting of three Karner blue butterflies in Illinois in the Kenosha Potential RU (refer to APPENDIX B) may have contributed to the extirpation of the butterfly in this RU, it is highly unlikely that this could have been the main cause of extirpation.

Disease or Predation

Very little research has been conducted on the natural enemies of the Karner blue butterfly, so the significance of these biotic factors as threats to the butterfly cannot be definitively stated. Similar to most other insects, the mortality of Karner blue immature life

stages is very high (Savignano 1990, Lane 1994b). Part of this mortality is caused by predators, parasitoids, or pathogens (Savignano 1990). Larval predators include pentatomid stink bugs (*Podisus maculiventris*), wasps (*Polistes fuscatus* and *P. metricus*), ants (*Formica schaufussi* and *F. incerta*) (Savignano 1990, 1994a), spiders (Packer 1987), and ladybird beetles (*Coccinella septempunctata*) (Schellhorn et al. unpublished data). Four larval parasitoids have been reared from field collected larvae: a tachinid fly (*Aplomya theclarum*), a braconid wasp (*Apanteles* sp.), and two ichneumonid wasps (*Neotypus nobilitator nobilitator* and *Paranoia geniculate*) (Savignano 1990). Several insect predators have been observed attacking adults, including spiders, robber flies, ambush bugs, assassin bugs, and dragonflies (Packer 1987, Bleser 1993). Disease pathogens of the Karner blue butterfly have not been identified, but probably exist.

It is unknown whether birds or mammals cause significant mortality at any life stage of the Karner blue. Bird beak-marks are occasionally observed on adult wings. Direct mortality to Karner blue larvae by deer browse can have a detrimental effect on the butterfly (Schweitzer 1994a).

Plant diseases of lupine could reduce its food quality or render it unsuitable, resulting in larvae mortality or reduced adult fecundity. Lupine leaves are attacked by both powdery mildew (*Erysiphe polygoni*) and a leaf rust (*Puccinia andropogonis*). Research on the effect of powdery mildew on Karner blue butterfly host plant quality is inconclusive. Maxwell (1998) found lower densities of larvae in areas where the proportion of lupine with mildew was the greatest. However, Grundel et al. (1998a) fed mildew infected leaves to larvae in laboratory feeding studies and measured more rapid larval development on post-flowering mildewed leaves than on comparable uninfected lupine.

Of particular interest is how fragmentation and degradation of habitat influences the population dynamics of natural enemies and competitors of the Karner blue butterfly and lupine, and the ultimate effect on Karner blue metapopulations. For example, the abundance of predators and parasitoids varies with tree canopy cover and therefore some subhabitats may provide refuges for Karner blue (Lane 1994b, Schellhorn et al. unpublished data).

Inadequate Regulatory Mechanism

While most states still supporting butterfly populations have legislation that protects the butterfly (refer to PART I, CONSERVATION MEASURES, State Protection), provisions for protection and management of the habitat are incomplete to non-existent (USFWS 1992a and 1992b). This is an important gap in that loss and degradation of suitable habitat are primary reasons for population extirpation and decline in numbers, and recovery of the species will depend on ensuring an adequate base of suitable habitat. Implementation of management agreements, development of conservation easements, and outright land purchase could be used to ensure the habitat base. Other, more flexible regulatory mechanisms could be developed to ensure this habitat base.

Populations of Karner blues that occur on Federal and state lands are protected from destruction, but Federal and state land managers might not manage actively for appropriate savanna or barrens habitat. Developing streamlined procedures for incorporating concerns for Karner blue butterflies into current management plans is recommended in this plan.

Other Natural or Man-made Factors Affecting Its Continued Existence

Stochastic events, such as unusual weather, can detrimentally affect Karner blue populations. Spring and summer drought can stress lupine and may reduce larval populations, and reduce flowering of nectar plants (Cynthia Lane, pers. comm. 1996) which may result in greater adult mortality. Cool springs can delay lupine emergence until after egg hatch (Lane, unpublished data). Cold, wet weather during the flight periods reduces the time available for oviposition and could increase adult mortality. A combination of summer drought and cool, wet springs is one of the suspected causes of population extirpation in Ontario (Packer 1994, Schweitzer 1994b) although habitat damage also contributed to extirpation. In particular home building in some key lupine areas at the Port Franks Estate site and logging at the Port Franks Bowl site were detrimental. The greatest impact of the logging was thought to be the removal of one large shade tree in the center of the most suitable habitat area at the Port Franks Bowl site. The reduction in shade increased light levels which may have made the site more susceptible to drought (Packer 1994).

Heavy browse by mammals (e.g., deer, rabbit, woodchuck), or insect herbivores on lupine in Karner blue areas can also have a detrimental effect. Larvae may starve if lupine is severely defoliated. Browse or herbivory on the flowers or fruits can reduce lupine seed and possibly affect the long-term survival of the lupine population (Straub 1994). Insect herbivores, such as painted lady larvae (*Vanessa cardui*) and blister beetles, can defoliate high percentages of the lupine in an area, which may result in larval starvation.

Large-scale wildfire could destroy a large metapopulation. These events are infrequent, but potentially devastating. Although these rare events would have large detrimental effects that last for several years, it is possible that the metapopulation could recover if enough healthy unburned populations existed nearby or if the fire left patches of unburned refuge areas.

Aggressive exotic (non-native) plant species may pose a threat by out-competing other plant species required by the Karner blue butterfly. Orange hawkweed (*Hieracium aurantiacum*), leafy spurge (*Euphorbia esula*), crown vetch (*Coronilla varia*), white sweet clover (*Melilotus alba*), and Pennsylvania sedge (*Carex pennsylvanicus*) can dominate some Karner blue habitats and reduce lupine and the diversity and abundance of nectar plants available to the Karner blue adults. Spotted knapweed (*Centaurea maculosa*) is used as a nectar plant, but its dominance can reduce the diversity of nectar plants, increasing the risk of extirpation of the subpopulation. In the absence of management, dense cover of buckthorn (*Rhamnus catharticus*), American hazelnut (*Corylus americana*), black locust (*Robinia pseudoacacia*), or other woody shrubs will eventually eliminate lupine.

Global warming may also pose a threat to the Karner blue. A hotter longer growing season may cause a reduction in the habitat quality of some areas by causing early senescence of lupine. Recovering Karner blues in the more northern recovery units of its existing range should help address this concern.

Appendix B. Species Associated with the Karner Blue Butterfly and its Habitat

This appendix includes information on species associated with the Karner blue butterfly and its habitat in Wisconsin. It is comprised of two reports that were prepared to support development of the statewide Wisconsin Karner Blue Butterfly HCP:

Kirk, K. 1996. The Karner blue community: Understanding and protecting associated rare species of the barrens. Final Rept. to USFWS (Amendment #38 to Cooperative Agreement #14-16-0003-89-933). Wisconsin Dept. Natural Resources, Madison. (Pages B-3 - B-84)

Borth, R.J. 1997. Karner blue management implications for some associated Lepidoptera of Wisconsin barrens. Unpub Rept. to HCP partners. Wisconsin Gas, Milwaukee. (Pages B-85 - B-113)

These reports have been reformatted and reproduced here without editing.

A. "The Karner Blue Community: Understanding and Protecting Associated Rare Species of the Barrens" by K. Kirk

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Introduction

The barrens habitat of central and northwestern Wisconsin is a diverse community of native plants and animals whose lives are intertwined with each other and the natural elements of sun and shade, wind and rain, fire and drought. Each species has evolved mechanisms to ensure the survival of its kind in the context of the large and small-scale disturbances that are integral to the barrens habitat. For many, disturbance has become a necessity to provide the diversity or specificity of habitat elements required. With the arrival of humans, the cycles of disturbance were altered as was the land itself.

The challenge has become one of provision for the native inhabitants while satisfying the needs and desires of human society. Over one hundred and fifty years of change to the landscape has left a long list of the native species in isolated, reduced populations that are increasingly vulnerable to further losses from reduced genetic diversity and the effects of inbreeding depression, stochastic events, inordinate predation pressures, increased interspecific competition, collecting, and inadvertent destruction by human activities.

Most recently the spotlight has fallen on one animal of the barrens community: the Karner blue butterfly. Extensive research is proceeding to illuminate the biological and ecological needs of the species. Since the Karner blue was listed as federally endangered by the U.S. Fish and Wildlife Service in December, 1992, any human activity which may result in the loss of individual butterflies must be carefully scrutinized. The development of a Habitat Conservation Plan (HCP) to ensure no net loss to the species is required by federal law for all lands with Karner blue habitat. The Wisconsin Department of Natural Resources is meeting this conservation challenge with a holistic approach.

First, the development of a comprehensive plan that integrates conservation practices and economic land use on Wisconsin Karner blue habitat will result in a statewide HCP. This plan will be the first creation of its kind by a partnership of public and private landowners with diverse interests. Secondly, the Wisconsin DNR has committed its resources to manage for biodiversity on state lands that support the Karner blue butterfly and, through the HCP process, to encourage a multi-species approach on private lands as well. Such proactive planning for conservation offers the opportunity to better understand and protect the natural community of flora and fauna in which the Karner blue butterfly is but one of the residents.

In the fall of 1994, a list of 122 rare species associated with dry prairie, barrens, and savanna in Wisconsin was reviewed by experts familiar with the various taxa. Forty-one species from the list were identified as associated with barrens in Karner blue butterfly range. The list of species under consideration was further refined in March, 1995 to those rare species highly associated with barrens habitat in Karner blue butterfly range or those species moderately associated but listed or candidates for listing at either the state or federal level. The sharp-tailed grouse is rather a special case. It is only moderately associated with Karner blue butterfly habitat but is of special concern in the state and the large areas needed to meet its breeding and population requirements are primarily within Karner blue range.

Twenty-two species and two subspecies are considered in this document. Thirteen are federally or state listed or under consideration for listing. Of the remaining nine, eight species are insects highly associated with the habitat of the Karner blue butterfly and therefore can be expected to be particularly affected by environmental alterations made during management for the Karner blue. The ninth species is the sharp-tailed grouse.

The following accounts will introduce each species and describe the range and habitat, taxonomic affiliations, life history, and management concerns. Briefly, the needs of each species are simple: food, water, reproductive success, freedom from bodily harm, maybe shelter. The plants need pollinators, periodic removal of litter, and gaps in the canopy. Response to disturbance appears to vary for the plants. Turtles need stable water levels for hibernation in winter; sunny, sandy, perhaps previously disturbed upland areas for nesting; and safe passage in the uplands.

Roads are lethal to all the reptiles. The massasaugas spend time basking and foraging in the shrubby upland areas around the wetlands and may suffer mortality from burning or mowing. Forest succession reduces their habitat as it does for the slender glass lizard. The glass lizard needs open, grassy areas with lots of invertebrates and mammal burrows. The lizards however, have poor adaptations to fire and require patches of unburned habitat for survival.

Each kind of bird responds to a different but specific habitat structure: shrubs or low trees within fairly tall grasses for shrikes, large stands of small jack pines for Kirtland's warblers, large open areas with additional shrubby areas, some trees, and wooded wintering areas for sharp-tailed grouse. The lepidopteran species need food plants for both larvae and adults. They need protection for vulnerable life stages and/or opportunity to recover from population losses. The species discussed here vary in tolerance of habitat degradation, habitat specificity, and ability to recover after population losses. Eight of the ten lepidopterans are single-brooded indicating a slow recovery time. The phlox moth appears to hibernate in the soil and the frosted elfin may be underground in the winter as well, but the other species hibernate in the leaf litter or within the host plant where the immature animals are vulnerable to winter disturbance. The red-tailed leafhopper requires undisturbed patches of prairie dropseed. Tiger beetles require open patches of sand with abundant insect prey and are most vulnerable in the egg stage to habitat disturbance or degradation.

The land management activities undertaken in barrens habitat where Karner blue butterflies reside and timber is harvested will be moderated by the characteristics of the individual sites involved. Burn management, clearcuts, mowing, and various degrees of soil disturbance each have their places in the complex of the landscape where microhabitats coexist with silviculture. Some sites overlapping in space and time can be managed to provide the needs for the natural community while timber harvest and recreational activities are taken into account. Other sites will not so easily bend to diverse demands.

Close scrutiny of the information included herein will reveal not so much a bewildering array of hopelessly opposing considerations but patterns of nature. These species are but twenty-two snapshots of the life embellishing 'barren' land. Threads of the pattern appear in considering how each of the species manage to survive winter, adapt to a landscape ravaged by wildfire, minimize competition with similar animals for necessary resources, and opportunistically maximize the survival of their kind with the 'help' of other species without destroying those neighbors.

RARE SPECIES ASSOCIATED WITH KARNER BLUE BUTTERFLY HABITAT THAT ARE DISCUSSED IN THIS DOCUMENT

State or Federally Listed Species or Candidates for Listing

<u>Species</u>	<u>Common Name</u>	<u>Status-St.</u>	<u>Status-Fed.</u>
<i>Talinum rugospermum</i>	prairie fameflower	SC	C2
<i>Asclepias ovalifolia</i>	oval-leaved milkweed	PTHR	none
<i>Viola fimbriatula</i>	sand violet	END	none
<i>Aflexia rubranura</i>	red-tailed pr. leafhopper	SC	C2
<i>Schinia indiana</i>	phlox moth	END	C2
<i>Incisalia irus</i>	frosted elfin	THR	none
<i>Phyciodes batesii</i>	tawny crescent	SC	C2
<i>Clemmys insculpta</i>	wood turtle	THR	none
<i>Emydoidea blandingi</i>	Blanding's turtle	THR	C2
<i>Ophisaurus attenuatus</i>	W. slender glass lizard	END	none
<i>Sistrurus c. catenatus</i>	eastern massasauga	END	C2
<i>Lanius ludovicianus</i>	loggerhead shrike	END	C2
<i>Dendroica kirtlandii</i>	Kirtland's warbler	SC	END

Species with High Karner Blue Butterfly Habitat Association

<u>Species</u>	<u>Common Name</u>	<u>Status-St.</u>	<u>Status-Fed.</u>
<i>Incisalia henrici</i>	Henry's elfin	SC	none
<i>Chlosyne gorgone</i>	Gorgone checkerspot	SC	none
<i>Erynnis martialis</i>	mottled dusky wing	SC	none
<i>Erynnis persius</i>	Persius dusky wing	SC	none
<i>Hesperia leonardus</i>	Leonard's skipper	SC	none
<i>Hesperia metea</i>	cobweb skipper	SC	none
<i>Atrytonopsis hianna</i>	dusted skipper	SC	none
<i>Cicindela p. patruela</i>	tiger beetle	SC	none
<i>C. patruela huberi</i>	tiger beetle	SC	none
<i>Pedioecetes phasianellus</i>	sharp-tailed grouse	SC	none

END=State Endangered; THR=State Threatened; PTHR=Proposed State Threatened (1995); SC=State Special Concern; C2=Federal Category 2 (candidate, under review for listing)

Rough-Seeded Fameflower (*Talinum rugospermum* Holzinger)

Taxonomy and Status Fameflowers are succulents in the family Portulacaceae. Two species of fameflower occur in the Midwest. Prairie fameflower, *Talinum parviflorum*, is the more common species and occurs in similar habitats to that of the rare rough-seeded fameflower, *Talinum rugospermum*. Rough-seeded fameflower was long thought to be a Midwestern endemic but recent finds in Kansas, Nebraska, and Texas place it within the flora of the Great Plains from which it spread probably by long distance post-Pleistocene dispersal to become disjunct in the Midwest (Cochrane, 1993). Refer to Gleason and Cronquist (1991) for a description of the species. Rough-seeded fameflower is of special concern in Wisconsin but occurs often enough in the state to be apparently secure. The U.S. Fish and Wildlife Service is reviewing the species as a candidate for listing.

Range Rough-seeded fameflower is found in Kansas, Nebraska, and Texas, eastern Minnesota and Iowa to northern and central Illinois, southern Wisconsin, and northwestern Indiana. Throughout most of its range it is considered rare and localized. At some Wisconsin stations, the species is quite common. Rough-seeded fameflower has been collected from 95 stations in 23 counties of Wisconsin, primarily in the southwest but collections have also been made in Pepin, Polk, Pierce, and St. Croix counties. Historical records exist from Burnett and Jackson counties (Barloga, et al., 1989). The site in Polk County is very near a jack pine savanna site of the Karner blue butterfly (NHI, 1994). Rough-seeded fameflower is extant in oak barrens of Columbia, Iowa, and Monroe counties (Barloga, 1989).

Habitat *Talinum rugospermum* inhabits open, exposed sites where there is minimal competition from other species. It occurs on xeric prairies, sand barrens, sandy and rocky outcrops, gravel river terraces, old fields, trail edges, openings in sandy woods, and margins of sand blows. In Minnesota the species is found in a barrens habitat of black oak or jack pine with shifting sand dunes along the Mississippi River (Coffin and Pfanmuller, 1988). In Indiana, and Illinois as well, the species is found in black oak barrens habitat with sand dunes. In Iowa, colonies have been found on sand dunes of the Upper Iowa River, sandy bluffs, and sand blowouts. The Kansas stations are in sand prairie where the plants grow on the sides and tops of dunes and in sparsely-vegetated flat areas (Cochrane, 1993).

Associated species in sand prairie and barrens in Wisconsin are *Andropogon scoparius*, *Selaginella rupestris*, *Opuntia compressa*, and *Panicum virgatum*. *S. Rupestris* is a good indicator species for fameflower as are *Allium stellatum*, *Isanthus brachiatus*, *Hedyotis longifolia*, and *Ambrosia artemisiifolia* (Judziewicz, 1994). Species that may co-occur as well, on dry prairies of sandstone bedrock or outcrop are *Tephrosia virginiana*, *Hedeoma hispida*, and *Gnaphalium obtusifolium* (Cochrane, 1993). *Asclepias amplexicaulis*, clasp milkweed, and *Hudsonia tomentosa*, beach heath, occur with rough-seeded fameflower in

Minnesota (Coffin and Pfanmuller 1988) In Kansas, prairie fameflower, *Talinum parviflorum*, co-occurs with the rare species.

Talinum rugospermum can also be found on open outcrops of Precambrian metamorphic and igneous rock in Wisconsin. It has been discovered on both basalt and granite where it lives in thin soils and is accompanied by brittle prickly pear, *Opuntia fragilis*, a state-threatened species. In the Baraboo hills *T. rugospermum* has been located on a rhyolite outcrop (Cochrane, 1993).

Life History *Talinum rugospermum* is a rosette-forming perennial with loose cymes of less than a dozen flowers. Each pink flower opens one day only and strictly in the afternoon in July and August. Morning flowers belong to *T. teretifolium* of western Minnesota. Seeds of the species require light to germinate so that a thick layer of litter or shading from a plant such as *Carex pennsylvanica* will discourage germination (Pavlovic, pers.comm.), though seedlings can emerge from a depth of 12mm in sand. The plants grow slowly; a one-year old may have only six small leaves. With age, plants develop multiple stems. Flowers do not appear until the plant is 3-4 years old. Rainfall may be one factor that initiates blooming synchronous with insect activity. Flowers are capable of autogamy late in the blooming period. There is some evidence that *Talinum* spp. can propagate vegetatively from rhizome pieces if sufficient moisture is available (Pavlovic, 1989).

Management Concerns *Talinum rugospermum* is a specialist with narrow ecological requirements which restrict it to few habitats. It is not an effective colonizer though it is a pioneer of disturbed ground. It does not colonize old fields or roadsides with other prairie species nor is it found in young fields with weedy species (Cochrane, 1993). Rogers found *T. rugospermum* to appear in old fields only after 11 or more years. Not until the field was over 25 years old did the numbers of rough-seeded fameflower equal that found in unplowed prairie (1979).

Talinum rugospermum is dependent on microsite-scale disturbance, such as the natural sand movements of its dune habitat. Plants often colonize anthropogenic disturbance patches. Activities, including vehicular traffic or soil erosion, that create small areas of open habitat benefit the species. This was recently documented in plots disturbed by soil preparation and herbiciding for subsequent planting of lupine when fameflower was found to occur in much higher densities within the plots than without. For some plots with fameflower, no other plants were found outside the plot boundaries (Maxwell and Givnish, 1994).

Some *T. rugospermum* populations have been found in old wheel tracks. Gopher digging can lead to expanded populations (Rogers, 1979). Disturbance of the soil by all-terrain vehicles and tanks has encouraged *T. rugospermum* at Fort McCoy in Wisconsin (Leach, 1993) and resulted in some areas of dense coverage by the species. At Indiana Dunes National Lakeshore, however, continued ATV use has negatively impacted the populations where the plants are too often uprooted (Pavlovic, 1989). Pavlovic has often observed the populations to suffer from heavy trampling (1995). Unfortunately, aggressive or invasive exotic species which compete with *Talinum* are also encouraged by soil disturbance.

The plant is quite shade intolerant and will not survive under canopy conditions although seed germination may occur before leaves unfurl on black oaks (Pavlovic, pers.comm.). The species is a poor competitor against taller herbs and grasses that create shade. Fire, which reduces competition from shrubs and herbaceous species as well as removing litter from the soil surface, appears to benefit the plant populations. At a site in Illinois, the presence of *Talinum rugospermum* increased after wildfire (Cochrane, 1993). Pavlovic has found that the adults are tolerant of fire, though seedlings are more vulnerable (1995). Plants have been observed to be killed by fire, presumably because the buds of next year's growth are at the soil surface (Pavlovic, 1989).

In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the above was drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of botanists most familiar with the species and others of its kind. In this case, research into the response of the species to soil compaction and timing and intensity of fire, and the proximity to soil disturbance of a seed source for colonization would be most valuable to generate further informed land management decisions concerning *Talinum rugospermum*.

Oval Milkweed (*Asclepias ovalifolia* Dec)

Taxonomy and Status Milkweeds, *Asclepias*, are in the family Asclepiadaceae. The genus *Asclepias* is composed of about 95 species, mostly in the New World. Twelve species occur in Wisconsin and inhabit communities from dry prairie to swamp. Two species are listed Threatened in the state, *A.lanuginosa* and *A.sullivantii*. A third species, *A.purpurascens*, is listed as Endangered in Wisconsin. *Asclepias ovalifolia* is proposed Threatened in Wisconsin. It has no federal status and is moderately associated with barrens habitat. Refer to Gleason and Cronquist (1991) for a description of the species. Sterile stems are difficult to distinguish from stems of the common species, *A. syriaca*.

Range Oval milkweed ranges from southern Saskatchewan, Manitoba, and the Dakotas to eastern Wisconsin and northern Illinois. Wisconsin state herbaria have specimens from approximately 50 locations in the state where *Asclepias ovalifolia* was collected between 1879 and 1984 (Westad, 1993). A search of 22 historical sites that could be relocated in 1993 by Westad confirmed the species flowering at only six sites with about 500 individuals present at all sites. Those sites are in the counties of Barron, Burnett, Monroe, Oconto, Marinette, and Menominee. Oval milkweed has also been reported from Polk, Jackson, Juneau, Adams, Wood, and Vernon Counties (NHI, 1994; Swengel, 1995).

Habitat Curtis found *A.ovalifolia* modal in southern dry forest (1959) and did not list the species in dry prairie or barrens habitat. Noamesi and Iltis (1957) report the species on prairies, sandy roadsides, and woodlands. Westad found oval milkweed in prairies, but almost as often in sandy, open, pine-oak woods (1993). The species has been found at

Fort McCoy in a dry forest of jack pine with oak sapling understory (Leach, 1993). The largest population in Wisconsin is in a treeless railroad right-of-way mesic prairie (Westad, pers.comm.).

All of the sites found in 1993 are on level to gently sloping sand to sandy loam soils over deep sand or sand and gravel. The pH ranges from 4.5 to 6.0. Most of the soils have 0.5 to 2.0% organic matter but the site with the largest number of individuals has 8.9% organic matter (Westad, 1993).

Life History The yellowish or greenish flowers of *A.ovalifolia* are present from early June to mid-July (Noamesi and Iltis, 1957). Like other milkweeds, it is insect-pollinated, probably by species of Diptera (Betz, 1996). Pods harbor mature seeds in October. One collection of wet-stratified seeds had a germination rate of 95% (Westad, 1993).

Management Concerns Oval milkweed needs gaps in the canopy to create the open environment in which it will thrive. All of the extant populations found in 1993 had received some canopy management, including burning and tree cutting. The railroad right-of-way is open and some other sites are on the edge of woods along roads (Westad, 1993). Leach did not find the species at historic sites at Fort McCoy and observed that white pines were invading the barrens creating a shaded environment for groundcover (1993). Westad did not find the species to be associated with mechanical disturbance although at one site it appears in open areas created by the destruction of woody seedlings by vehicular traffic (1993). In Barron County, however, the species was extirpated from a site that was graded during road leveling (Hoffman, pers.comm.). Like many prairie milkweeds, *Asclepias ovalifolia* probably thrives with management to maintain an open habitat, such as grazing or mowing. Any mowing however, such as is often used along roads and rights-of-way, should be postponed until after seed set in October.

Too small an area of habitat in which the remnant populations are found may not have enough food for insect pollinators, according to Hugh Iltis of the University of Wisconsin Herbarium. In such circumstances the plants may only survive as adults spreading slowly clonally in an area where the pollinators are locally extirpated (Iltis, pers.comm.).

In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the above discussion was drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of botanists most familiar with the species and others of its kind. In this case, research to identify pollinators, best timing and extent of fire management, and the effects of soil disturbance would be most valuable to generate further informed land management decisions regarding *Asclepias ovalifolia*.

Sand Violet (*Viola fimbriatula* J.E. Smith)

Taxonomy and Status The family Violaceae is composed of 21 genera but two-thirds of the species are in the genus *Viola*. There are between 550 and 650 species of *Viola* in the world, with the greatest diversity centered in western North America, Mexico, the Andes, southwestern Europe, and Asia (Ballard, 1994). The species are difficult to separate, particularly because they hybridize freely, the hybrids exhibiting intermediate characteristics of the parents. *V. fimbriatula* is known to hybridize with eleven other species of violets (Alverson and Iltis, 1981). Voss relied heavily on experts in writing the Violaceae chapter of Michigan Flora (1985) and it would be wise for anyone wandering into the family to do the same. Harvey E. Ballard, Jr. at the UW-Madison Botany Department is one of the few with expertise in violets. Voss lumps *V. fimbriatula* with *V. sagittata*, considering the Michigan specimens of *V. fimbriatula* as perhaps an environmental variant (1985). It is also known as *Viola sagittata* A.T. var. *ovata* (Nutt.) T. and G. (McKinney, 1992)

Good *V. fimbriatula* specimens are densely hairy and the leaves are never lobed in contrast to *V. sagittata* which may be deeply lobed (Ballard, pers.comm.). However, suspected individuals should be confirmed by an expert. *V. sagittata* is quite common and modal in oak barrens, according to Curtis (1959). Wisconsin considers three violets in the state of special concern, but *Viola fimbriatula* is listed as state Endangered. It has no federal status.

Range *Viola fimbriatula* ranges from Nova Scotia, New England, and Quebec to western Michigan, southern Ontario and south to the mountains of Georgia, Alabama, and eastern Tennessee. Russell (1965) has suggested that the violet moved into the North from the Appalachian Mountains. The Wisconsin stations are considered disjunct from the main distribution of the species. The one station in Iowa, four in Illinois (McKinney, 1992), and the Wisconsin collections represent the most western extent of the sand violet, suggesting it may have been introduced to the area relatively recently (Alverson and Iltis, 1981). There are four to six annotated specimens in Wisconsin, the first collected in Jackson County in 1947. Single collections are also known from Burnett and Portage Counties (Alverson and Iltis, 1981). One Station is on the line between Jackson and Clark Counties (BER, 1993). McKinney lists a station in Rock County (1992). Although habitat appears to be abundant for the violet at Fort McCoy in Monroe County, it has not been found there (Leach, 1993).

Habitat Throughout its range the sand violet is found in dry, open woods and clearings, forest edges, and dry fields. The Wisconsin collections are from dry, sandy jack pine-oak woods characteristic of the central sands region of the state. The plant does not tolerate shade and prefers to grow where there is little leaf litter. In Michigan the sand violet is found in sand prairies and openings in savannas (Ballard, pers.comm.).

Life History *Viola fimbriatula* is a perennial, arising from prostrate rhizomes. It flowers in the upper Midwest from April through June (Voss, 1985). Most violets are pollinated

by butterflies, moths, or bees (Ballard, 1991). Violets have both cleistogamous and chasmogamous flowers, the former being produced later in the season than the petaliferous flowers and continuing through much of the summer. The cleistogamous flowers remain tightly closed and the self-pollination produces seeds more abundantly than do the outcrossed flowers. The three-valved capsules produce seeds in early-to-mid summer. (Ballard, 1992) Violet seeds are known to be dispersed by ants.

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into specific pollinators, and the effects of fire and soil disturbance would be most valuable to generate further informed land management decisions regarding *Viola fimbriatula*.

Little is known about the ecology of the sand violet. However, management activities are warranted which maintain an open environment in woods or savanna supporting the violets and avoid degradation of the habitat supporting pollinators and ants. It is likely that disturbance favors the species (Dobberpuhl, pers.comm.). Periodic burning to reduce litter and cool season grasses would appear to benefit the low-growing violets. Although the species is itself a cool-season perennial, early spring burns may not directly injure the populations other than to disrupt flowering for the season as has been observed to be the case for the early prairie species, *Anemone patens* (Eldred, pers.comm.). Mowing and haying, where applicable, may result in the same benefits without loss of spring flowers.

Red-Tailed Leafhopper (*Aflexia rubranura* DeLong)

"Red-veined leafhopper"

Taxonomy and Status The name, red-veined leafhopper, is a misnomer. The animal does not have red veins, *rubra* (red)-*neura*(nerve), but the male has two red spots near the tail as indicated by the scientific name, *rubra*(red)-*nura*(tail). Hereafter the species will be referred to as the red-tailed leafhopper per Hamilton (1993).

Cicadellidae is one three families of Homoptera to be intimately associated with the plants of prairies. The other two families are represented by less than a dozen prairie species while the Cicadellidae have over 700 species across the North American grasslands (Hamilton, 1992). The red-tailed leafhopper was first ascribed to the *Flexamia* genus, a group of grass-feeding Cicadellidae. These leafhoppers range from southern Canada to the deserts of Mexico. *Aflexia* is a monospecific taxon, represented solely by the red-tailed leafhopper of the upper Midwest which is found only with the perennial grass, prairie dropseed, and *Sporobolus heterolepis*. See DeLong (1948) for a description of the species. Leafhoppers however, are notoriously difficult to identify and suspected individuals should be examined by a specialist. *Aflexia rubranura* is under consideration for endangered status in Wisconsin and a federal Category 2 species, a candidate for listing.

Range The actual range of *Aflexia rubranura* is unknown. It may be truly rare or lack of collection may exaggerate its rarity. The species was first described in 1935 from wet, blacksoil prairie near Chicago, Illinois where it occurred in large numbers (DeLong, 1935). Since that time, it has been collected from prairie remnants in Manitoba, Wisconsin, Minnesota, and South Dakota. Recent surveys in Minnesota revealed the species in only 8 high quality prairie remnants. In Wisconsin, the species has been discovered recently on sand prairie in Sauk County (Hamilton, 1993), a dolomite ridge in Monroe County (NHI, 1994), and sand prairie in Kenosha County (Panzer, R. pers.comm.). *Aflexia* was recorded from Columbia and Waukesha Counties in the early 1960's (Hamilton, 1993). A survey of over two dozen sites in 1994 produced no further locations for the species (Ballard, H. pers.comm.).

Habitat Rather than the deep soil prairie habitat where *Aflexia* was first found, the richest sites for leafhoppers around the Great Lakes are sandy areas and alvar grasslands associated with thin soil over limestone outcrop (Hamilton, 1992). The alvar grasslands are wet in spring but become very dry during the summer. On a few islands in Ontario, the red-tailed leafhopper has been found in large numbers where prairie dropseed grows from crevices in alvar plains accompanied by spike rush, *Eleocharis elliptica* (Hamilton, 1993). The presence of *Aflexia* and other prairie endemics on these islands may be evidence that some Ontario prairies are remnants of a periglacial grassland that spread across the continent from the prairies to at least southern Ontario during the ice age. These grasslands were most likely shifting upland openings in spruce forest. The prairie leafhoppers belong to the group of their kind which moved north with the glacial retreat and are currently represented most strongly in the western Canadian grasslands (Hamilton, 1992). In Minnesota, *Aflexia* has been found on dry prairies on moraine or

limestone ridges, though a few individuals have been found in large, unburned hay fields (Hamilton, 1993). Ron Panzer (pers.comm.), studying the species in Illinois, has found the leafhoppers at sites with very different characteristics including black soil, gravel, and deep sand soils.

Life History Leafhoppers are related to cicadas, spittlebugs, and scale insects. Like these other Homoptera, *Aflexia* undergoes gradual metamorphosis in which there is no pupa stage and the nymphs hatch from the eggs resembling the adults. They live in the same habitat as the adults and eat the same foods. As leafhopper nymph's molt and progress toward adulthood they change primarily in size and body proportion until the stage of maturity is reached. Red-tailed leafhoppers are bivoltine in the Midwest (Panzer, pers.comm.). Adults of the first generation are present from mid-June to mid-July and the second generation of adults is present mid-August to mid-September. Females deposit eggs into the grass tissue. Panzer speculates that *Aflexia* eggs and nymphs are probably located higher in the *Sporobolus* plants than are associated leafhoppers whose populations are less reduced by fire (see below). The species spends the winter in the egg stage.

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into A, B, and C would be most valuable to generate further informed land management decisions in regard to the red-tailed leafhopper.

Presence of *Aflexia* in its chosen habitat is dependent on both the characteristics of prairie dropseed and the animal itself. In Wisconsin, Curtis considers *Sporobolus heterolepis* a prairie indicator. It is present in dry to mesic prairies and is also found in cedar glades (1959). In Wisconsin, the plant is present across the southern part of the state and up the western edge as far north as Polk County (Fassett, 1951). On a Wisconsin sand prairie, a study of the effects of cultivation and gopher disturbance revealed that prairie dropseed was found only on unplowed prairie sites including those unplowed sites disturbed by gopher activity. The species was not found in old field sites, even those that had not been disturbed for 25 years or more (Rogers, 1979). Curtis observed the plant populations to decrease in response to grazing pressure as well (1959). Groundcover disturbance will affect the leafhopper populations in so far as the exact *Sporobolus* plants that are inhabited by the leafhoppers are destroyed (Hamilton, pers.comm.).

Most leafhoppers do not disperse rapidly or over great distances. The females of many prairie-adapted leafhoppers are often entirely flightless, reducing dispersal capabilities (Hamilton, 1992). The size of the animal in this case is of interest. At less than 4.0 mm in length, *Aflexia* is close to the size of a mature floret of *S. heterolepis* which has disarticulated from the persistent glumes of the spikelet. *Aflexia* is usually wingless in both sexes though Panzer has found as much as 10% of the females in the spring brood

fully winged. These fully-winged forms are probably also flightless. They have been found only in unburned areas and do not appear to invade adjacent burned areas (Panzer, pers.comm).

The leafhoppers Hamilton studied were rare on hill prairies, though low hills had some of the largest populations of *Aflexia* that he found (1993). Hamilton found that small sites of less than 0.1 ha had *Aflexia* only if they were alvar sites (1993).

The red-tailed leafhopper is usually accompanied by a more common cicadellid, *Memnonia nr. grandis* (*Parabolocratus grandis* Shaw) that has flightless females and is common on prairies and alvars. This leafhopper is also a specialist on prairie dropseed (Hamilton, 1993). *Memnonia* appears to be more resistant to fire than is *Aflexia* and has been found to be abundant on repeatedly burned sites where it seems to recover from fire in one generation (Panzer, pers.comm.).

On a sand prairie in Sauk County, Wisconsin, *Aflexia* and other prairie endemics were found only on a steep slope where prescribed fires were probably cooler and not as close to the ground as in other areas of the site. At a Minnesota prairie wildlife area, the leafhoppers were found only in the unburned areas and not in the areas managed with a 1-2 year fire frequency (Hamilton, 1993). In several fire-managed prairies, *Aflexia* was found confined to sandblows or other areas where the fire presumably had jumped and left refugia (Ballard, H. pers.comm.). *Aflexia* may repopulate from refugia though Panzer reports some survivors even in completely-burned patches (Panzer, pers.comm.). Collection at a number of fire managed sites in recent years has led researchers to suggest that frequent fire management can contribute to a depauperate leafhopper community (Hamilton, 1993). Most leafhoppers, including the red-tailed leafhopper, appear to recover completely from burns within 2-3 years according to Panzer. However, Hamilton suggests four years between burns of the same burn unit to protect population losses of Cicadellids (Hamilton, pers.comm.). Some of the most productive sites where Hamilton searched for leafhoppers are managed by mowing (1993).

Phlox Moth (*Schinia Indiana* Smith)

Taxonomy and Status The phlox moth, *Schinia Indiana* is one of the diurnal *Schinia* species in the family Noctuidae (owlet moths) that occur in Wisconsin. The Noctuidae family has many taxa and includes such illustrious members as the cutworm, the looper moth, and the armyworm. Like most members of the subfamily Heliiothidinae in the world, the genus *Schinia* is best represented in arid to semi-arid regions. *Schinia* reaches greatest diversity in North America in the southwestern United States. The phlox moth is not often described though Hardwick (1958) offers a detailed description. Identification is best learned by field study with one who has experience with the species. Once the moth has been seen however, there is little difficulty in identification as the species is quite distinctive. The phlox moth is a federal Category Two species under review for listing and is listed as Endangered in Wisconsin.

Range. Although the phlox moth was previously reported from Indiana, Illinois, North Carolina, Arkansas, Texas, Nebraska, Wisconsin, Minnesota, and Michigan, only the latter three states currently report populations (Balogh, 1987; Wilsmann, 1990; Rattray, 1994).

In Wisconsin, *Schinia indiana* was first discovered in 1973 in Eau Claire County, 6 miles east of Eau Claire at the Seymour School Forest, and further verified in the same area (Eau Claire Powerline Barrens) in 1986, 1987, 1989, and 1990. In 1991 and 1992, another population was found at Legend Lake in Menominee County where *Phlox pilosa* (downy phlox), larval food plant of the moth, is widespread along roadsides and trails in the barrens.

At Fort McCoy in Monroe County, a *Schinia indiana* pair was released in 1990 along Hwy. 16 when the Eau Claire powerline site population appeared to be in jeopardy from habitat loss. *Schinia indiana* was found at twenty-six sites on Fort McCoy in 1993-1995, some as far as eight miles from the introduction site (Maxwell and Ferge, 1994; Kirk, 1994; Kirk, 1995) nor does a scatter plot of inhabited sites appear to implicate the introduction. All these populations are unlikely to have been derived from the released pair in just 5 generations (Ferge, pers.comm.). Two additional sites were located in Burnett County and five sites in Jackson County in 1994 (Ferge, pers.comm.; Swengel, 1994).

Habitat The phlox moth inhabits sandy, scrub oak-pine barrens and prairies and is known primarily from these habitats in the Midwest. The phlox moth co-occurs with Karner blue butterflies (*Lycaeides melissa samuelis*) in Wisconsin and Michigan (Balogh, 1987; Haack, 1993). There are two subspecies of downy phlox in Wisconsin. *Phlox pilosa ssp.fulgida* is widespread in Wisconsin below the Tension Zone. *P.p.ssp.pilosa* is rare in Wisconsin, having been collected in only a few scattered counties (Smith and Levin, 1966). *Phlox pilosa ssp.fulgida* occurs in a wide variety of grassland habitats in Wisconsin from low, damp areas to dry, calcareous "goat prairies"; in open, sandy oak savanna, open oak woods, railroad rights-of-way, and jack pine stands. Common associates include *Andropogon scoparius*, *Heuchera richardsonii*, *Dodecatheon meadia*, *Fragaria virginiana*, *Lithospermum canescens*, *Rudbeckia hirta*, *Silphium laciniatum*, *Krigia biflora*, and *Comandra richardsiana* (Swink and Wilhelm, 1979). Although *Phlox pilosa* does not appear to be dependent on soil disturbance, it may occur at great densities along roads and trails where it often spreads in response to disturbance and the moth has been found in these sites as well. In open areas of the jack pine-oak barrens community and in damp places below railroad embankments, the plant may be found locally abundant. It also occurs scattered widely but thinly under relatively closed-canopy situations in oak woods in low areas adjacent to roadways or openings. The plant flowers from mid-May to early July in Wisconsin and fruiting occurs from late June to late July.

Life History In late May adult phlox moths emerge when the downy phlox begins to flower and the moths will often fly up to the third week of June. *S.indiana* is one of a number of *Schinia* species including the leadplant flower moth, *S.lucens*, also in our area, that exhibit a remarkable resemblance in coloration to the flowers of their larval food plants. Hardwick (1958) reports those diurnal noctuid moths that show the highest degree

of protective coloration have the most sedentary habits. However, the fact that *S.indiana* is rarely observed flying is probably more a result of the rapid flight of its kind than is its sedentary nature. The species is best observed on cloudy or drizzly days when resting on or in the blossoms of *Phlox pilosa*. The dusted skipper (*Atrytonopsis hianna*) has been observed nectaring on the same blossoms with *Schinia indiana* (Balogh, 1987).

The species of univoltine; Eggs are laid on the inner surface of the flower sepals next to the corolla tube or sometimes between buds. Like others of its relatives, *Schinia* larvae feed on the flowers and fruit of the host plant. The larvae will feed temporarily on the bud if the flower is still closed but soon heads for the developing seeds. The larva tunnels into the seed capsule and seals itself inside to develop further. Mature larvae will cut the stem below the seed capsule and have been observed on the stem below the cut (Hardwick, 1958). Pupation occurs within 27-35 days of oviposition, apparently in the soil (Schweitzer, 1994; Maxwell and Ferge, 1994).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into dispersal ability, depth of hibernation, and response of the species to fire management during the larval period would be most valuable to generate further data to inform land management decisions in regard to the phlox moth.

Fire has historically played a part in the maintenance of the prairie and barrens communities in which the phlox moth is found. Downy phlox is known to inhabit recently burned jack pine stands (Smith and Levin, 1966). The moth is much less common than is the food plant, though it has been found in both prairies and barrens. *S.indiana* is thought to be underground during the period August through April when prescribed burns are often used to maintain open habitat. Fire in late spring however, can injure or destroy the plants present as well as killing eggs and larvae. If fire management is used in areas supporting the phlox moth, burns on no less than a 4-5 year rotation with no more than 20-25 percent of the area burned in one year are considered by some lepidopterists to be the minimum strategy which may offer the least threat for rare lepidoptera (Swengel, 1991; Maxwell and Ferge, 1994).

Several of the phlox moth locations in Wisconsin are rights-of-way where roadside mowing may be safely undertaken in August when presumably the species is underground (Maxwell and Ferge, 1994). Depth of hibernation is unknown for this species, so effects of soil disturbance or fire management during the period August through April cannot be ascertained at this time. Schweitzer considers the underground pupae in the East invulnerable to fire (1994). Prior to August, the species may be susceptible to insecticides sprayed during the larval period (Haack, 1993).

A highly-fragmented landscape often leads to local population extinctions when animals are unable to disperse between small habitat patches. Tree planting removes open areas and creates barriers in the barrens community. Tree planting has been implicated as a factor in habitat loss for the phlox moth (Schweitzer, 1989). Management to maintain openings and edges is most conducive to downy phlox though it is uncertain as to how this management will impact the moth.

Frosted Elfin (*Incisalia irus* (Godart))

Taxonomy and Status The large butterfly family, Lycaenidae, is composed of numerous tribes. The elfins and hairstreaks form a tribe that is most diverse in the American tropics with about 75 species in North America. The frosted elfin, *Incisalia irus*, is one of five species of *Incisalia* that occur in Wisconsin. A sixth species, the western pine elfin, may have recently entered the state on trees brought from the west. It is possible that *Incisalia irus* is actually two species based on morphological differences and larval food plants (*Lupinus perennis* or *Baptisia* sp.) (Schweitzer 1994b). The frosted elfin may be difficult to distinguish from other *Incisalia* spp., particularly *Incisalia henrici*, but it associates strongly with wild lupine, the same food plant as that of the Karner blue butterfly. Refer to Opler and Krizek (1984) for a description of the species or Bureau of Endangered Resources for materials and photos to separate similar elfins. The frosted elfin currently has no federal status but is listed as Threatened in Michigan where the lupine-feeding form is most abundant. The species is listed as Threatened in Wisconsin as well.

Range The frosted elfin ranges from southern Maine across the north to below Lake Michigan and into Wisconsin's central barrens, south along the Atlantic coast and Appalachians to Alabama and Georgia with isolated populations of *I.i.ssp.hadros* in Louisiana, Arkansas, and Texas.

Ebner was not aware of the frosted elfin in Wisconsin when he wrote "Butterflies of Wisconsin" in 1970, as the species was not collected here until 1977. Kuehn (1983) reported the frosted elfin in Adams and Juneau counties and, in recent years, more sites have been discovered in Jackson and Wood counties as well (Swengel, 1994). In spite of repeated attempts to locate the species in the barrens habitat of Burnett County (Swengel, 1994) the butterfly has eluded investigators.

Habitat The frosted elfin always occurs in localized colonies across its range (Opler and Krizek, 1984) in habitat of woodland edges, old fields, pine-oak scrub or barrens where the larval host plants grow. It is most often found however, in sand, shale, or serpentine barrens. The species is confined to barrens in Pennsylvania (Opler, 1985) and is an associate of Karner blue butterflies in the grassy openings of pine barrens habitat in New York, Massachusetts, and New Hampshire where the vegetation is much the same as in midwestern openings (Schweitzer, 1994).

In Wisconsin the butterfly inhabits the sandy, open woods habitat of jack pine barrens in the above-mentioned counties, a subset of Karner blue range in the state. Swengel has

found the species in patches of high-density lupine in woods openings or within 5-10 feet of canopy cover in a more open landscape (1994). Of the three known lupine-feeding butterflies in Wisconsin, *Lycaeides melissa samuelis*, *Incisalia irus*, and *Erynnis persius* (Persius dusky wing), the frosted elfin is the most localized and uncommon.

Life History The larvae of *Incisalia irus* feed only on the flowers and developing pods of wild lupine in Wisconsin but also use yellow wild indigo, *Baptisia tinctoria*, in the eastern part of the range. *B. tinctoria* occurs across southern Michigan in sandy openings (Voss, 1985) and has appeared in Wisconsin but is not native to the state. Blue false indigo (*Baptisia australis*) and rattlebox (*Crotalaria sagittalis*) are also used at times (Opler and Krizek, 1984). It is unknown whether the butterfly might make use of other species of wild indigo that occur in Wisconsin.

The frosted elfin is single-brooded. The flight period in Wisconsin is from early May to early June with the prime flight period between May 15 and May 25 just before peak bloom period of lupine (Swengel, 1994). The flight period may be quite short in the northwestern counties. In the eastern states the flight period stretches from the end of April through June (Opler, 1985) probably because of the use of yellow wild indigo for larval food. The males of the hairstreak tribe perch in the afternoon to await females (Opler and Krizek, 1984). The females oviposit eggs singly on flower buds, usually the calyxes. The larvae hatch in 3-5 days and tunnel into the flowers (Cook, 1906). Pupation occurs in a loose cocoon in litter at the base of the host plant (Cook, 1906; Opler and Krizek, 1984). The species winters over in the pupal stage in litter at the base of the host plant (Opler, 1985; Scott, 1986) or underground (Schweitzer, 1985). Location of pupation in Wisconsin has not been determined.

Management Concerns In an effort to provide land managers with available information on the possible response of the species to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind.

Like the Karner blue butterfly, this species is believed to have always existed in metapopulations characterized by local extinctions and colonizations within a dynamic landscape (Givnish, et al., 1988). The frosted elfin requires open areas and is averse to flight through woods according to the experience of early observers. The ovipositing female never leaves the open, "refusing to fly through dark spots and turning aside to circle a tree rather than come under its shadow" (Cook, 1906). Little is known about the dispersal abilities of the butterfly, but open corridors would be required for recolonization to proceed. The current thought is that management for Karner blues would be equally appropriate for frosted elfins (Schweitzer, 1990; Packer, 1987). Note however, that in Wisconsin the frosted elfin is more restricted than Karners by habitat requirements, abundance, and management tolerances.

Schweitzer has attributed regional declines in the species to fire suppression (1985). Schweitzer believes it unlikely that frosted elfin populations decrease with fire. In fact he

knows of sites frequently burned that support the species. Where the species is known to pupate underground, as in New York and New Hampshire, the frosted elfin survives fires between early July and mid-May (Schweitzer, 1985). The butterflies have been observed on new lupine growth within two weeks of a burn (Schweitzer, 1994).

Observations in Wisconsin however raise doubts about fire management of frosted elfin sites. Swengel has found no frosted elfins in 65 fire-managed areas even though those areas had abundant lupine. Fires in May may be particularly detrimental by altering lupine phenology and flower abundance as well as direct egg mortality (Swengel, 1994). Significantly more butterflies have been found however, in areas burned by wildfire over five years previously (Swengel, 1994). Wildfire areas are surrounded by habitat that has been left unburned for much longer than are fire-managed areas where the entire habitat is burned by units on a rotational basis.

Areas managed with late-season mowing and with only part of the habitat cut each year appear to benefit the species according to Swengel's observations at several rights-of-way sites in Wisconsin (1994). Frosted elfins have been observed in these areas as well as at sites with unintensified timber management with about the same frequency as observations in wildfire areas (Swengel, 1994). In Ohio, a bulldozed firebreak in oak barrens was found later to support lupine populations. The plants were colonized by frosted elfins the following year (Chapman, et al., 1993).

Henry's Elfin (*Incisalia henrici* (Grote and Robinson))

Taxonomy and Status The large butterfly family, Lycaenidae, is composed of numerous tribes. The elfins and hairstreaks form a tribe that is most diverse in the American tropics with about 75 species in North America. The Henry's elfin, *Incisalia henrici*, is one of five species of *Incisalia* that occur in Wisconsin. A sixth species, the western pine elfin, may have recently entered the state on trees brought from the west. Swengel reports the butterfly difficult to view because it is easily flushed and flies rapidly (1994). Refer to Opler and Krizek (1984) for a description of the species or contact the Bureau of Endangered Resources for materials and photos to separate similar elfins. Henry's elfin has no federal status but is of special concern in Wisconsin due to extreme rarity making it especially vulnerable to extirpation from the state.

Range Henry's elfin is considered rare throughout its range which extends along the Atlantic Coast from Nova Scotia to central Florida and westward to Texas, Kansas, and Nebraska. *I.h.ssp.henrici* covers most of the range with *I.h.ssp.margaretae* in southern Georgia and Florida and *I.h.ssp.solatus* in central Texas and New Mexico (Scott, 1986). Henry's elfin also inhabits the Great Lakes states, Quebec and Ontario and across Canada to southeastern Manitoba.

Incisalia henrici is decidedly less abundant in Wisconsin than either the frosted elfin or the Karner blue butterfly. In 7 years Swengel has found only 4 individuals (Swengel, 1994). Henry's elfin was collected in the 1950's from Marinette Co. (Ebner, 1970). In the northeastern portion of Wisconsin collections have also been made in Langlade, Oneida (Kuehn, 1983), Shawano, Waushara (Ferge, 1988), and Outagamie counties (Ferge, 1991). Within Karner Blue butterfly range, Henry's elfins have been reported from Douglas, Chippewa, St.Croix, Juneau (Kuehn, 1983), Jackson (Swengel, 1994), and Burnett counties (Ebner, 1970; Ferge, 1989; Swengel, 1994). The latter two counties are the only areas where the species has been found in Karner blue habitat in recent years.

Habitat Henry's elfin is highly associated with barrens habitat with acidic, sandy, or rocky soils (Opler and Krizek, 1984) and inhabits openings of jack pine-oak woods in Burnett County, especially in areas with heaths (*Vaccinium* spp.) (Swengel 1994). Henry's elfin is found in Wisconsin with the frosted elfin (*I.irus*) and on Karner blue butterfly sites. Although the food plant of the larvae has not been positively determined for Wisconsin Henry's elfins, researchers agree that heaths, especially blueberry, are the prime candidates (Ebner, 1970; Ferge, 1989; Swengel, 1994). Blueberry and huckleberry (*Vaccinium* sp.) seem to be larval hosts in diverse areas across the range (Opler and Krizek, 1984). Wild plum (*Prunus americana*) (Ebner, 1970) and maple-leaf viburnum (*Viburnum acerifolium*) (Ferge, 1989), have also been mentioned. Redbud (*Cercis canadensis*) appears to be the primary host farther south (Opler and Krizek, 1984). Ferge found violets (*Viola* spp.), puccoon (*Lithospermum* spp.), and rock cress (*Arabis lyrata*) available at Namekagon Barrens for nectar sources (1989). Wild plum, willow, and hawthorn (*Crataegus* spp.) flowers are used in other states (Opler and Krizek, 1984).

Life History Adults emerge and fly from mid-to-late May. There is one brood. Oviposition varies depending on the host but eggs are laid most often on flowers and buds. The larvae feed on buds and young leaves of the host plant. Henry's elfin overwinters in the pupal stage most likely in the litter at the base of the host plant (Opler and Krizek, 1984).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind.

In Burnett County, Ferge has found the species at Namekagon Barrens in openings of jack pine-oak scrub or along the fire lanes at the edge of areas managed with prescribed burns where nectar sources were most abundant (Ferge, 1989). Because of the rarity of this species, little information is available on land management effects on Henry's elfin populations. The dependence of the species on small trees or shrubs signals concern over zealous clearing of woody species by the use of fire, brushing, or thinning in occupied habitat. Early spring fast-moving fires may have little direct effect on the animals by skipping over the pupae in the litter but the subject has not been adequately studied and the rarity of the species leaves little room for in situ experimentation.

Gorgone Checkerspot (*Chlosyne gorgone* Hubner)

Taxonomy and Status The Nymphalidae are the brush-footed butterflies, so called because of the reduced forelegs used for chemoreception rather than locomotion. The Nymphalidae is a large, diverse family of about 4,500 species divided into nine subfamilies. The subfamily Nymphalinae which includes the fritillaries and anglewings, are the spiny brush-footed butterflies whose mature larvae are covered with stiff branching spines. Of these, the tribe of checkerspots and crescents occurs throughout the Northern Hemisphere. There are seven representatives in Wisconsin: four checkerspots and three crescents. Only the two pearl crescents are common; the tawny crescent (*Phyciodes batesii*) and the gorgone checkerspot (*Chlosyne gorgone*) are of special concern in Wisconsin by virtue of rarity. The gorgone checkerspot appears to be secure across its range and has no federal status. It is considered to be highly associated with barrens. See Opler and Krizek (1984) for a description of the species.

Range The gorgone checkerspot occurs from Michigan, Minnesota, and the Canadian Prairie provinces southward through the Mississippi River valley, the Great Plains, and the east coast of the Rockies to northern Mexico. Isolated populations occur in the Appalachians and a subspecies, *C.g.ismeria*, occurs in Georgia, Alabama, and South Carolina.

Ebner reported collections from Douglas, Burnett, and Dunn Counties in the western part of Wisconsin as well as from Shawano, Brown, and even Racine Counties (1970). Kuehn reported the species statewide except in the northcentral area (1983). The Natural Heritage Inventory reports the species in Burnett, Crawford, Dodge, Grant, Iowa, Jackson, Monroe, Sauk, Marquette, Outagamie, and Winnebago Counties (NHI, 1994). In recent years large numbers have been found in Jackson County (Swengel, 1994).

Habitat *Chlosyne gorgone* inhabits ponderosa pine forests in the Rockies and hardwood forests in the Southeast but is primarily a grassland species across most of its range where it can be found on prairie slopes and ridges as well as grassy areas near streams (Opler and Krizek, 1984). It is not primarily a barrens or savanna species outside Wisconsin and is absent from these habitats east of western Michigan (Schweitzer, 1994). In Wisconsin, the species inhabits both barrens and dry to dry-mesic prairies (Kuehn, 1983; Swengel, 1994). Barrens habitat in Burnett, Monroe, and Jackson Counties support gorgone checkerspots. Swengel has found the species in sites with up to 50% woody cover (Swengel, 1994b). In analysis of abundance of butterflies in barrens, Swengel found no correlation between Karner abundance and gorgone checkerspot abundance at the same site. This suggests that the conditions favoring the larval food plants of each are not complementary (Swengel, 1994).

Life History Although the species is univoltine in the northern part of its range and may regularly produce several generations to the south and west (Scott, 1986), at the latitude of Wisconsin it usually produces two generations with adult flight periods in May to early June and again in July. There is some evidence for a third brood in Wisconsin (Swengel, 1994). Adults usually rest with wings spread and males patrol near host plants to find females (Scott, 1986). Males perch on hilltops in the western part of range to await females. This behavior is less often observed in the Midwest.

Larval host plants are in the family Asteraceae and the primary genus used is *Helianthus* which, along with *Aster* spp., are most often reported as host plants in Wisconsin (Ebner, 1970; Kuehn, 1983). Swengel has observed western sunflower (*Helianthus occidentalis*) to be common to the gorgone checkerspot sites she has visited (Swengel, 1994). Larvae have been observed on *Ratibida pinnata* in Winnebago County (Ferge, 1991). The eggs are laid in clusters under the leaves of the host and the larvae feed communally on the leaves. The butterflies hibernate as third-stage larvae (Scott, 1986).

Across the range, adult gorgones nectar primarily on yellow flowers (Scott, 1986; Swengel, 1995). The Swengels have observed spring adults taking nectar from orange hawkweed (*Hieracium aurantiacum*), pucoon (*Lithospermum* spp.), and lyre-leaved rock cress (*Arabis lyrata*) with fewer observations on cinquefoil (*Potentilla* spp.) and groundsel (*Senecio* spp.). Summer individuals have been seen nectaring at silky aster, black-eyed susan (*Rudbeckia hirta*), orange hawkweed, and western sunflower (Kons, 1990; Swengel, 1994). In Illinois, researchers report sunflowers, asters, and milkweeds as nectar sources (Hess and Sedman, 1994).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into larval location, dispersal ability, and response to fire management and timber harvest would be most valuable to generate further informed land management decisions in regard to gorgone checkerspots.

Location of the hibernating larvae is unknown. Thus, the larvae may be vulnerable to early spring burns or winter timber harvest. Fire after mid-May threatens eggs and larvae on the leaves of host plants. If hibernating larvae are in the leaf litter or soil, fall mowing would avoid killing the insects. Any management with concern for this species must be careful to maintain Asteraceae for food plants of both larvae and adults.

Tawny Crescent (*Phyciodes batesii* Reakirt)

Taxonomy and Status The Nymphalidae are the brush-footed butterflies, so called because of the reduced forelegs used for chemoreception rather than locomotion. The Nymphalidae is a large, diverse family of about 4,500 species divided into nine subfamilies. The subfamily Nymphalinae which includes the fritillaries and anglewings, are the spiny brush-footed butterflies whose mature larvae are covered with stiff branching spines. Of these, the tribe of checkerspots and crescents occurs throughout the Northern Hemisphere. There are seven representatives in Wisconsin: four checkerspots and three crescents. Only the two pearl crescents are common; the tawny crescent (*Phyciodes batesii*) and the gorgone checkerspot (*Chlosyne gorgone*) are of special concern in Wisconsin by virtue of rarity. The tawny crescent has disappeared from much of the Eastern range and is under review for listing by the U.S. Fish and Wildlife Service. It is considered to be moderately associated with barrens. Tawny crescents may be seen flying with the pearl crescent (*Phyciodes tharos*) and the northern pearl crescent (*Phyciodes pascoensis*) with which it can be confused (Maxwell and Ferge, 1994). See Scott (1986) for a description of the three species.

Range The tawny crescent ranges from Maine, New York, and Pennsylvania to southern Quebec and Ontario to the northern Great Lakes states, Manitoba, Nebraska and Colorado. Scattered populations are reported from the Appalachian states (Opler and Krizek, 1984).

A few reports of the species exist from far northern Bayfield County, Marathon County, and the northeastern counties of Florence, Forest, and Marinette (NHI, 1994). Kuehn reported the species "as far south as Adams and Juneau Counties" (1983). Most recently the butterfly has been reported from Oneida, Oconto (Ferge, 1990; Ferge, 1991), Outagamie (Kons, 1989), and Monroe Counties (Maxwell and Ferge, 1994). In Karner

blue range, the tawny crescent has been reported from wetland areas of Namekagon Barrens and Crex Meadows in Burnett County (Ferge, 1990; NHI, 1994).

Habitat Habitat of the tawny crescent is primarily moist situations in the Midwest (Opler and Krizek, 1984; Ferge, 1990b; Swengel, 1991), though the species inhabits dry, rocky bluffs above rivers or rocky upland pastures with much big bluestem grass in the Appalachians (Opler and Krizek, 1984) and the Northeast (Scott, 1986). At Fort McCoy the species was found in wet areas: sedge meadow, wet trail near a creek, wet-mesic forest, moist opening in oak savanna (Maxwell and Ferge, 1994). In Oconto County the species occurs with the northern blue butterfly in jack pine barrens.

Life History Unlike the multi-voltine pearl crescent (*Phyciodes tharos*) with which it may be confused, the tawny crescent has only one generation per year. The adults fly from mid-June to mid-July in Wisconsin. The species has been collected July 17 in Outagamie County (Kons, 1989). The larval food plant used by the tawny crescent in Wisconsin is unknown. *Aster undulatus* is the only species of aster mentioned by researchers to support the larvae in the wild. *A.undulatus*, a species of dry habitat, does not occur in Wisconsin (Shinners, 1941; Gleason and Cronquist, 1991; U.W.Herbarium, pers.comm.). Eggs are laid in batches on the underside of aster leaves, hatch in about a week, and the larvae live communally in webs on the underside of the plants, feeding on the leaves of the host plants. The third instar larva enters diapause and completes development in early spring (Opler and Krizek, 1984). Opler states that the larvae overwinter at the base of the host plant (1985).

Management Concerns Until the larval food plant of the tawny crescent is known, all asters in *P.batesii* sites must be considered necessary to the survival of the butterflies. Specifically, the following species occur in barrens habitats: *Aster umbellatus*, *A. junciformis*, *A. simplex*, *A. puniceus*. The tawny crescent is a univoltine species and may therefore be vulnerable to fire during any period of the year. However, because the species is found in Wisconsin on asters in moist areas, the butterflies may be protected from fire on the landscape. Within the barrens mosaic, populations of the butterfly are vulnerable to isolation.

Mottled Dusky Wing (*Erynnis martialis* Scudder)

Taxonomy and Status Only two of the four subfamilies of skippers (Hesperiidae) in North America occur in the Midwest, the branded skippers (Hesperiinae) that perch primarily with fore and hind wings at an angle and the open-winged skippers (Pyraginae) that land with wings open. *Erynnis* belongs to the latter group and is the genus of black dusky wing skippers. Ferge (1990) lists eight *Erynnis* species in Wisconsin. Refer to Scott (1986) for a description of the species. The mottled dusky wing has no federal status but is of special concern in Wisconsin because it is especially vulnerable to extirpation from the state. The species is highly associated with barrens.

Range The mottled dusky wing ranges from Massachusetts and New York westward through the Great Lakes area to western Iowa and southward to Georgia and central

Texas. Isolated populations occur in the Black Hills and central Colorado. In Wisconsin, the skipper is considered locally uncommon in the southwest (Swengel, 1991) and "common at times" northward along the western counties (Kuehn, 1983). Early collectors found this skipper common in the area of Racine and Milwaukee and reported the species from Dane and Sauk Counties as well (Ebner, 1970). Kuehn reports the skipper from Burnett, Eau Claire, Douglas, Juneau, and Waukesha Counties (1983). The species was reported in Brown County in the early 1980's but in recent years the mottled dusky wing has been reported only from sand prairies and barrens in Burnett and Jackson Counties (NHI, 1994).

Habitat The mottled dusky wing is most often found in hilly habitat such as those sites where it occurs in the Loess Hills of Iowa. In the eastern United States it is found in shale or serpentine barrens with acidic soils, often near woods or shrubby areas (Opler and Krizek, 1984). The butterfly is an associate of Karner Blue butterflies in the grassy openings of pine barrens in New York, Massachusetts, and New Hampshire where the vegetation is much the same as in Midwestern openings (Schweitzer, 1994). Mottled dusky wings inhabit both prairies and barrens in Wisconsin and Swengel has found the species in Wisconsin sites with up to 55% woody cover (1994).

Life History There are two generations per year of mottled dusky wings with adults flying in the last week of May to the first week of June and mid-July to early August in Wisconsin (Swengel, 1994). In the western states, males perch on hilltops awaiting females though this behavior is less common in Wisconsin. Nectaring has been observed on hoary vervain (*Verbena stricta*), gromwell (*Lithospermum* spp.), and bush houstonia (*Houstonia* spp.) (Opler and Krizek, 1984). Eggs are laid singly on the flower pedicels of the host plant. Like most *Erynnis* spp., the larvae live in leaf nests and feed on the leaves of woody plants. In this case, the caterpillars feed strictly on New Jersey Tea (*Ceanothus* sp.) (Opler and Krizek, 1984). *Ceanothus americanus*, considered the most often used larval food plant in the East, inhabits mesic habitat such as oak openings and mesic prairie in Wisconsin as well as the xeric sites. *Ceanothus ovatus* (*C. herbaceous*) inhabits the pine barrens and is the likely host of *Erynnis martialis* in Karner blue butterfly range (Curtis, 1959). Full grown larvae hibernate in a leaf shelter and pupate in a cocoon the following spring (Opler and Krizek, 1984).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into locations of larvae and cocoons would be most valuable to generate further informed land management decisions in regard to mottled dusky wings.

Schweitzer (1994) has commented that the frequent fires at Crex Meadows in Burnett County may be working reasonably well for this species, but numbers would probably increase with less fire. As mentioned above, larvae and pupae are above the ground.

Thus, the species is particularly vulnerable to spring burns until the adults emerge in late May. In the fall, larvae are present in the vegetation as well. At Namekagon Barrens in Burnett County, Ferge (1989) found the species in firebreaks where nectar sources were most abundant rather than in the burn units. The host plant, also known as redroot because of the large gnarly root, is able to withstand fire. Curtis names both *Ceanothus ovatus* and wild lupine as heavy-seeded species that appeared after a fire at Crex Meadows in 1956 (Curtis, 1959). In New York, the mottled dusky wing was very scarce at a large site maintained by August mowing which would presumably eliminate the second brood larvae. Schweitzer suggests mowing sections of habitat during the dormant season if *Ceanothus* is present (1994).

Persius Dusky Wing (*Erynnis persius* Scudder)

Taxonomy and Status Only two of the four subfamilies of skippers (Hesperiidae) in North America occur in the Midwest, the branded skippers (Hesperiinae) that perch primarily with fore and hind wings at an angle and the open-winged skippers (Pyraginae) that land with wings open. *Erynnis* belongs to the latter group and is the genus of black dusky wing skippers. Ferge (1990) lists eight *Erynnis* species in Wisconsin. The Persius dusky wing is very often confused with the wild indigo dusky wing (*E.baptisiae*) and the columbine dusky wing (*E.lucilius*). These three species are often referred to as the "Erynnis persius complex". Refer to Opler and Krizek (1984) for a description of the species, however these species cannot be reliably separated in the field and usually requires a specimen under magnification (Schweitzer, 1994). A suspected *E.persius* after early June is definitely NOT a Persius dusky wing. A good photo can rule out the species but not confirm it. To complicate matters further, *E.baptisiae* does not confine itself to *Baptisia* species but uses lupine for the larval food plants as well (Schweitzer, 1994).

Other subspecies of *E.persius* occur in the western United States. *Erynnis persius persius*, the subspecies in Wisconsin, has no federal status although some believe it should be a candidate for listing (Schweitzer, 1994). It is of special concern in Wisconsin because it is very vulnerable to extirpation from the state. The species is highly associated with the barrens community.

Range The historical range of the Persius dusky wing extends through New York, Massachusetts, Pennsylvania, Michigan, Wisconsin, and Minnesota. Records exist from a few other eastern states as well as Quebec and Ontario (Schweitzer, 1986). The species occurs in the central sands region and northwestern barrens areas of Wisconsin (Ferge, 1990). In the last six years the species has been reported from Adams (Ferge, 1989), Juneau, Jackson, Monroe, Clark, and Burnett Counties. A site in Menomonie County was discovered in 1992 (NHI, 1994).

Habitat In the eastern United States, the Persius dusky wing is said to inhabit wet areas with willows or aspens, open fields, or open areas in forest (Opler and Krizek, 1984). The species is a lupine-feeder and an associate of Karner blue butterflies in the grassy openings of pine barrens in New York, Massachusetts, and New Hampshire where the

vegetation is much the same as in midwestern openings (Schweitzer, 1994). In Wisconsin, the skipper inhabits jack pine-oak barrens (Swengel, 1994). Swengel has found species of the Persius dusky wing complex in sites with up to 50% woody cover in Wisconsin (1994). At Fort McCoy in Monroe County, Wisconsin the species is found on sites supporting Karner blue butterflies in both open and shady oak woodland with the groundlayer rich in grass and herbs. The Persius dusky wing has been found at Fort McCoy with the dusted skipper (*Atrytonopsis hianna*), the pine elfin (*Incisalia nippon*), the roadside skipper (*Amblyscirtes vialis*), and several other dusky wings (*Erynnis icelus*, *juvenalis*, *brizo*) (Maxwell and Ferge, 1994).

Life History The Persius dusky wing flies from mid-May to mid-June in Wisconsin (Ferge, 1990), about one to two weeks earlier than the first Karner blue butterfly flight. Males perch all day on ridges or hilltops awaiting females. Eggs are laid singly on the underside of host leaves. Larvae eat the leaves and live in rolled-leaf nests. Two known larval food plants are *lupinus perennis* and yellow wild indigo (*baptisia tinctoria*) though willows and poplars are reported as the primary hosts in the eastern states (Opler and Krizek, 1984). Yellow wild indigo is primarily a species that occurs east of Wisconsin and has been found in the state only occasionally. Full grown Persius dusky wing larvae hibernate in leaf shelters and pupate in the spring (Opler and Krizek, 1984).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into dispersal ability, response to mowing and timber harvest and the intersection between sets of Persius dusky wing-inhabited patches of lupine and Karner blue-inhabited patches of lupine would be most valuable to generate further informed land management decisions in regard to Persius dusky wings.

Schweitzer attributes regional declines in the species primarily to fire suppression (1985) which contributes to habitat loss. Schweitzer has stated that management for this species would be essentially the same as for Karner blue butterflies (1990) and recommends no less than five years between fires (1994). The skipper has been found at Fort McCoy in recently burned areas (Maxwell and Ferge, 1994), although this should not be interpreted to mean that these areas support viable populations. The Persius dusky wing spends no part of the year underground, is univoltine, and has poor dispersal ability (Swengel, 1993). These characteristics make the species particularly vulnerable to fire, certainly more so than Karner blues. There is no question that it is rarer than Karner blues in Wisconsin and the few small populations in specialized habitats make the species especially slow to recover from fire (Swengel, 1995). Plans for corridors and attention to both larval food and nectar plants in burn units can help provide for recolonization following local extirpations. Like the Karner blue, this species is believed to have always existed in metapopulations characterized by local extinctions and colonizations within a dynamic landscape (Givnish, et al., 1988).

Soil disturbance can be beneficial to the species. In Ohio, a bulldozed firebreak in oak barrens produced lupine populations that were colonized the following years by *Persius dusky wings* (Chapman, et al., 1993). Mowing considerations for roadside maintenance indicate that fall mowing may help to maintain the habitat but food plants should not be cut prior to mid-July (Schweitzer, 1986).

Leonard's Skipper (*Hesperia leonardus* Harris)

Taxonomy and Status Only two of the four subfamilies of skippers (Hesperiidae) in North America occur in the Midwest, the branded skippers that perch primarily with fore and hind wings at an angle and the open-winged skippers that land with wings open. The Leonard's skipper, *Hesperia leonardus*, is a member of the group of branded skippers (Hesperiinae), a group so named for the special scent scales on the forewing of the male. Refer to Opler and Krizek for a description of the species (1984) or the Bureau of Endangered Resources for materials and photos to distinguish the species from others of its kind. The Leonard's skipper has no federal status but is of special concern in Wisconsin and is highly associated with the barrens habitat.

Range. The Leonard's skipper is one of many *Hesperia* species in the eastern United States. However, it is the only butterfly in most of that area that flies only in the fall (Opler and Krizek, 1984). *Hesperia leonardus ssp. leonardus* occurs from New England westward to Ontario and Minnesota and southward into North Carolina, Louisiana, and Missouri. The Pawnee skipper, *H.l.ssp.pawnee*, covers the Plains area and intergrades with *H.l.ssp.leonardus* in Minnesota and Wisconsin and the Loess Hills of western Iowa (Scott and Sanford, 1981; Spomer, et al., 1993). See Scott and Sanford (1981) for a discussion of the distinguishing characteristics of the subspecies. A third subspecies is found only along the Platte River in Colorado (Scott, 1986).

Of the three bluestem-feeding skippers in Wisconsin barrens, (*Hesperia leonardus*, *H.metea*, *Atrytonopsis hianna*) the Leonard's skipper is the most widespread and abundant skipper. It has been reported from Sauk and Juneau Counties, Green County, Grant, Jackson, Burnett, and Bayfield Counties in the western part of the state as well as Menomonee County (Ferge, 1988; 1989; 1990) and Marinette County (Ebner, 1970). Ebner reported possible collections in the Milwaukee area over 70 years ago (1970).

Habitat Leonard's skipper inhabits open grassy areas or meadows, grassy slopes, pine-oak barrens (Opler and Krizek, 1984), and prairies (Hess and Sedman, 1994), especially ridgetop prairies (Spomer, et al., 1993). In Wisconsin it may be found in both prairies and barrens and in woodland clearings with up to 55% woody cover (Swengel, 1994). *H.l.leonardus* appears to inhabit moist meadows more often than *H.l.pawnee* which is more closely associated with dry prairie (Scott and Stanford, 1981). The species appears to be associated with small stands of bluestem grass that harbor the dusted skipper (*Atrytonopsis hianna*) (Opler and Krizek, 1984) and the cobweb skipper (*Hesperia metea*)

(Swengel, 1994). It is often found in at roadside puddles and concentrations of *Liatris aspera* (Maxwell and Ferge, 1994).

Life History There is one generation per year of Leonard's skippers. The adults fly from mid-August to mid-September or even into October in Wisconsin (Swengel, 1994) Males perch all day near *Liatris* species awaiting females (Opler and Krizek, 1984). The butterflies choose purple flowers most often for nectar (Opler and Krizek, 1984) and depend most strongly on *Liatris* species (Spomer, et al., 1993; Hess and Sedman, 1994). In Wisconsin they use rough blazingstar (*L. aspera*) and dwarf blazingstar (*L. cylindracea*) but have also been observed at silky and smooth asters (*Aster* spp.) (Swengel 1994) Elsewhere they have been observed on goldenrod (*Solidago* spp.), Joe Pye Weed (*Eupatorium purpureum*), thistles (*Cirsium* spp.), bergamot (*Monarda fistulosa*), and annual sunflower (*Helianthus annuus*) (Scott and Stanford, 1981; Spomer, et al., 1993; Hess and Sedman, 1994; Maxwell and Ferge, 1994).

Shortly after emerging from the egg, the young larvae hibernate and mature during the following summer (Scott and Stanford, 1981). Like all *Hesperia* spp. they probably live in silken sacs at the base of the grasses and leave the shelter only to feed (Opler and Krizek, 1984).

Native grasses are the larval food plants, both *Andropogon gerardii*, and *A. scoparius* with needlegrass (*Stipa* spp.) and dropseed (*Sporobolus heterolepis*) (Swengel, 1993) as well as *Panicum virgatum*, *Eragrostis alba*, and *Agrostis* spp. (Opler and Krizek, 1984). The larvae pupate in early August probably amid plant debris like other *Hesperia* species (Opler and Krizek, 1984; Schweitzer, 1985).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind.

From early spring to August, the Leonard's skipper is a caterpillar living primarily in the base of the grasses. Like most skippers it is quite vulnerable to fire, though cool, fast-moving fires are likely less lethal (Schweitzer, 1985). Although Leonard's skippers are present at Crex Meadows in Burnett County, Schweitzer believes their numbers would probably increase with less fire management (1994). Among rare grass-feeding skippers, Leonard's skippers appear to be more tolerant of habitat degradation as well as better colonizers than cobweb or ottoe skippers (Swengel, 1994). In Illinois, the species has been observed to decrease in numbers at Lake Argyle State Park. Researchers believe this to be in response to the planting of pines and resulting loss of native habitat (Hess and Sedman, 1994).

Cobweb Skipper (*Hesperia metea* Scudder)

Taxonomy and Status Only two of the four subfamilies of skippers (Hesperiidae) in North America occur in the Midwest, the branded skippers that perch primarily with fore and hind wings at an angle and the open-winged skippers that land with wings open. The cobweb skipper, *Hesperia metea*, is a member of the group of branded skippers (Hesperiinae), a group so named for the special scent scales on the forewings of the male. The species of branded skippers are numerous in the eastern United States. Refer to Opler and Krizek for a description of the species (1984). The cobweb skipper has no federal status but is proposed Threatened in Wisconsin and is highly associated with barrens.

Range The cobweb skipper is known from the Gulf coast through the Appalachians to New York and up the Mississippi Valley into the Great Lakes states. *Hesperia metea ssp. licinus* is restricted to Texas and Arkansas (Scott, 1986) with gradation between the subspecies in the Ozarks.

Ebner reported the species to have been common in the Racine area of Wisconsin in the distant past and specimens are known from Marinette and Oconto counties (1970) but within the last five years, the species has been reported from only a few isolated sites of barrens habitat in Burnett, Eau Claire, Monroe, Jackson, and Sauk Counties (NHI, 1994; Swengel, 1994).

Habitat Habitat of the cobweb skipper has been described as grassy fields or grassy forest clearings (Ebner, 1970; Scott, 1986). Across the midwestern and eastern states however, the species in some cases inhabits primarily shale, serpentine, sand, or pine-oak barrens on dry or rocky sites (Opler and Krizek, 1984). It occurs where bluestem grasses (*Andropogon* spp.), the larval food plants, are dominants of the groundlayer. In the Ozarks and Pennsylvania the skipper inhabits dry, often rocky hillsides closely associated with woodland areas (Shapiro, 1965; Heitzman and Heitzman, 1969) and usually near the top of the slope where the bluestem grasses are most prominent. Some cobweb sites in Wisconsin may have up to 45% woody cover (Swengel, 1994).

The cobweb skipper is found in both dry prairies and barrens in Wisconsin. In the barrens community, locations of the cobweb skipper correlate strongly with the dusted skipper (*Atrytonopsis hianna*) and probably also Leonard's skipper (*Hesperia leonardus*), both species of concern in Wisconsin (Swengel, 1994). In other states as well, the dusted and cobweb skippers are found together (Shapiro, 1965; Heitzman and Heitzman, 1974). At Fort McCoy in Monroe County, the sites of the cobweb skipper coincide with those of the ottoe skipper (*Hesperia ottoe*), another grass-feeding skipper (Bleser, pers.comm.).

Life History *Hesperia metea* is usually the first branded skipper to fly in the spring. It may be found in mid-to-late May with the dusted skipper which emerges slightly later (Heitzman and Heitzman, 1974; Opler and Krizek, 1984). The cobweb skippers fly for only a few weeks and the less-flighty females can be found in the litter at the base of the host plants where they lay their eggs. Females are known to emerge about six days after the males and the following ten days defines the survey period (Shapiro, 1965) when they are best observed during cooler periods of the day. Although there are skippers similar in appearance to the cobweb skipper, the early flight period is distinctive for this species.

Wild strawberry (*Fragaria* spp.) and bird's-foot violet (*Viola pedata*) are favorite nectar sources (Opler and Krizek, 1984; Heitzman and Heitzman, 1969) which the butterflies visit primarily in the morning hours (Shapiro, 1965). Labrador tea (*Ledum groenlandicum*), winter cress (*Barbarea* spp.), and red clover (*Trifolium pratense*) are also used by the butterflies (Opler and Krizek, 1984) as are wild hyacinth (*Camassia scilloides*), wild larkspur (*Delphinium carolinianum*), and vervain (*Verbena* spp.) by females later in the season (Heitzman and Heitzman, 1969). *D. carolinianum* does not occur in Wisconsin though *D. virescens* occurs in prairies and barrens in Jackson County

and north to St. Croix and Dunn Counties. *Camassia scilloides* is an endangered species associated with damp prairies, roadsides, and rights-of-way in a few southern Wisconsin counties that are outside Karner blue range (BER, 1993). Recently, skippers in Wisconsin have been observed at lyre-leaved rock cress (*Arabis lyrata*) and wood betony (*Pedicularis canadense*) (Swengel, 1994).

The species is single-brooded and, like all *Hesperia*, the larva lives in a silken sac at the base of grasses. The cobweb larva leaves its shelter only to feed on bluestem grasses, particularly *Andropogon scoparius*, but also *A. gerardii* or *A. virginicus* (Shapiro, 1965; Scott, 1986). The later instars actually tunnel below ground where they aestivate for long periods in late summer and early fall. The larvae overwinter in tightly sealed chambers between leaf blades in the center of the grass plant. Mortality appears to be quite high during hibernation (Heitzman and Heitzman, 1969). Pupation occurs early in the spring amid debris (Opler and Krizek, 1984).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into larval location, and timber management would be most valuable to generate further informed land management decisions regarding the cobweb skipper.

The cobweb skipper is narrow in its habitat requirements and tolerance to habitat degradation (Swengel, 1994). Within the barrens habitat in Wisconsin, locations with abundant Karner blue butterflies were not found by Swengel (1994) to favor cobweb skippers or vice versa. The open grassy habitat of cobweb skippers within the barrens may not offer the right conditions for wild lupine.

In Burnett County, Ferge has found the species at Namekagon Barrens in openings of jack pine-oak scrub and, in areas managed with fire, along the fire breaks at the edges where nectar sources were most abundant (1989). Because the animals pupate in the debris in early spring, April or May burns could be expected to result in losses to the populations of skippers. Schweitzer has found survival of cobweb skippers to be good after cool, fast-moving fires (1985). Shapiro found the skippers in burned-over sites the second year following wildfire which has allowed the bluestem grasses to become dominant (1965). Woody growth, of course, will shade out the grasses creating a less desirable habitat for the skippers. Fall mowing and fall or winter timber management activities may be relatively innocuous when the larvae are underground, though information on the depth in the soil to which the larvae tunnel is not yet known.

Dusted Skipper (*Atrytonopsis hianna* Scudder)

Taxonomy and Status Only two of the four subfamilies of skippers (Hesperiidae) in North America occur in the Midwest, the branded skippers that perch primarily with fore and hind wings at an angle and the open-winged skippers that land with wings open. The dusted skipper, *Atrytonopsis hianna*, is a member of the group of branded skippers (Hesperiinae), a group so named for the special scent scales on the forewing of the male. There are eight species in the genus *Atrytonopsis* that inhabit North America. The dusted skipper is the only species in the eastern United States. See Opler and Krizek (1984) for a description of the species or the Bureau of Endangered Resources for materials and photos to distinguish the species from others of its kind. *Atrytonopsis hianna* has no federal status but is a species of special concern in Wisconsin and highly associated with barrens habitat.

Range and Habitat *Atrytonopsis hianna* ranges from southern New England to the Plains states and southern Manitoba. Another subspecies, *A.h.loammi*, inhabits Florida, North Carolina, and Louisiana. Little was known about the dusted skipper when Ebner wrote *Butterflies of Wisconsin* (1970) except its possible occurrence in the Racine area. Dusted skippers have since been found to be locally uncommon in sand barrens and dry prairie in western Wisconsin (Swengel, 1991). It has been reported from Burnett, Eau Claire, Monroe, Jackson, Grant, and Sauk Counties (Ferge, 1988; Ferge, 1989).

Habitat Across its range the species is found with bluestem grasses in dry habitats including old fields, woodland clearings, cedar glades, and rights-of-way (Heitzman and Heitzman, 1974; Opler and Krizek, 1984). In Wisconsin the species has been found more often in pine barrens than in dry prairies where locations of the dusted skipper correlate strongly with the cobweb skipper (*Hesperia metea*) and probably Leonard's skipper (*Hesperia leonardus*), both species of concern in Wisconsin (Swengel, 1994). The dusted and cobweb skippers are consistently found together in other states as well (Shapiro, 1965; Heitzman and Heitzman, 1974) The dusted skipper has also been found nectaring on the same blossoms as the phlox moth (*Schinia indiana*) in Wisconsin (Balogh, 1987).

Life History The dusted skipper has one flight period except in the far southeastern portion of the range. Adults fly mid-to-late May into early June in Wisconsin (Swengel, 1994), the dusted normally emerging one to two weeks later than cobweb skippers (Heitzman and Heitzman, 1974). Males perch on the ground or grass stems throughout the day to await females (Scott, 1986) and are quite aggressive in their territorial displays. Females emerge about six days after the males and the following ten days is the optimum survey period (Shapiro, 1965).

Larvae feed on the leaves of native grasses, primarily *Andropogon gerardii* and *A. scoparius*. They live in rolled or tied leaf tents on the grasses, though higher in the plant than do the *Hesperia* larvae (Scott, 1986). Although both cobweb and dusted skippers use the same food plants during the same time period, resource partitioning appears to minimize competition. *Hesperia metea* instars live at the base of grass clumps while

Atrytonopsis hianna instars live one to several feet above the ground in the grass plants (Heitzman and Heitzman, 1974).

The dusted skipper is often discovered while visiting flowers in late afternoon and early morning (Shapiro, 1965) though a better assessment of numbers may be made when the skippers are most active during the hotter part of the day. It has been observed nectaring at phlox (*Phlox* spp.), and puccoon (*Lithospermum* spp.) in Wisconsin with fewer observed visits to bird's foot violet (*Viola pedata*) and wild lupine (*Lupinus perennis*) (Swengel, 1994). Other nectar sources are Japanese honeysuckle (*Lonicera japonica*), blackberry (*Rubus* spp.), red clover (*Trifolium pratense*), wild strawberry (*Fragaria* spp.), vervain (*Verbena* spp.), and wild hyacinth (*Camassia scilloides*) (Shapiro, 1965; Opler and Krizek, 1986). The latter three species are most often used by dusted skippers in the Ozarks (Heitzman and Heitzman, 1974). In Wisconsin, *Camassia scilloides* is an endangered species associated with damp prairies, roadsides, and rights-of-way in a few southern counties that are outside Karner blue range (BER, 1993).

Dusted skippers hibernate as mature larvae (Scott, 1986) and overwinter in a sealed nest at the base of the host plant (Opler and Krizek, 1984). Pupation occurs in the spring at the base of the grass clump 1-3 inches above the ground in a case of silk and grass leaves (Heitzman and Heitzman, 1974).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into locations of dusted skippers within Karner blue-inhabited areas would be most valuable to generate further informed land management decisions because the skippers appear to require management differently than would be used for Karners.

Compared to other rare grass-feeding skippers in the barrens community, dusted skippers appear to be more tolerant of habitat degradation and be better colonizers than either the cobweb or ottoe skippers. Within the barrens habitat, locations with abundant Karner blue butterflies were not found by the Swengels' study in Wisconsin to favor abundance of dusted skippers or vice versus (Swengel, 1994). The open grassy habitat of dusted skippers within the barrens may not be the right conditions for wild lupine. Pupation up to three inches above the ground and larvae up to several feet above the ground places this species in a location vulnerable to mortality by any destruction of inhabited grasses throughout the year.

Tiger Beetles (*Cicindela patruela patruela* (Dejean)) and (*Cicindela patruela huberi* (Johnson))

Taxonomy and Status The subfamily of tiger beetles, Cicindelinae, is in the insect order Coleoptera. Taxonomists have also variously classified them as a subfamily, tribe, or supertribe of the family Carabidae, the carabid beetles. Cicindelids are world-wide with the exception of Tasmania, Antarctica, and remote oceanic islands (Pearson, 1988). There are 2,028 species of tiger beetles in the world with 111 species in the United State (Pearson and Cassola, 1992). Color variation is typical of the family Cicindelidae and is exhibited by a number of the tiger beetles species. Color is also influenced by environment and may even vary by the age of the individual (Graves, 1963; Pearson, 1988).

There are three known races of the tiger beetle, *Cicindela patruela*, which are distinguishable by the predominant color of the individuals in a population. *C.p patruela patruela*, the nominate race, is called the green race; *C.p. consentanea*, the black race; and individuals of *C.p. huberi* are predominantly muddy green to bronze brown. (Lawton, 1970; Johnson, 1989). *Cicindela patruela* may be found in Willis' key to the species (1968) and *C.p. huberi* is described by Johnson (1989). Both Wisconsin subspecies are globally rare and vulnerable to extinction though neither have federal status. Both are of special concern in Wisconsin and highly associated with barrens. *C.p. patruela* is rare and uncommon in the state and *C.p. huberi* is of uncertain status because so little occurrence information is available.

Range The green race occurs in eastern Ontario and ranges across the northeastern United States as far west as Minnesota and south into the southern Appalachians of the Carolinas and Tennessee. Collections from Wisconsin come from Dane, Shawano, Sauk, Columbia, Jackson, and Douglas Counties (NHI, 1994). The black race has been found only in the New Jersey Pine Barrens and Long Island, New York. *C.p. huberi* has been collected in a few sites in central Wisconsin in Monroe, Juneau, Columbia, Adams, and Iowa Counties (Johnson, 1989; NHI, 1994). Much of this area is within the Great Wisconsin Swamp area of the former Glacial Lake Wisconsin. The population of *C. patruela* here was most likely isolated during the glacial period and evolved separately, developing its own coloration (Johnson, 1989).

Habitat Like the majority of North American temperate zone species of Cicindelidae, *C.patruela* inhabits relatively exposed, dry situations with little vegetation including paths, roads, bare fields, and sandy levels (Balduf, 1935). In Michigan it is frequently found in association with the more common species, *C.longilabris*, of the conifer and mixed forests of the Upper Peninsula. *C.longilabris* inhabits the dry, sandy country of jack pine, blueberries, and reindeer moss (*Cladonia* sp.) (Graves, 1963). In Minnesota, Ron Huber describes the habitat of *C. patruela* as sunlit, sandy jackpine openings, often created by roads, clearings, firebreaks (1988). In Ontario, a whole colony lives on a sandy lane (Wallis, 1961). *C.p.huberi* was collected in Wisconsin on sandy lanes in jack pine-oak forest with much blueberry undergrowth, "usually on dry upland, away from the bogs...", and appears to prefer the grass along the lanes (Johnson, 1989). Lawton did not find *C.p.huberi* in areas devoid of grasses (1970).

Life History Life history of the tiger beetles was first described by Shelford in the Chicago area in 1909. He did not discuss *C.patruela* for which there is still little detailed information. However, the following information from Criddle (1907), Shelford (1909), Balduf (1935), Wallis (1961) and Pearson (1988) is enlightening concerning the genus.

The female beetle lays about 50 eggs, each about 2mm long. Each egg is laid singly in holes she makes 3-5mm deep in bare, open ground. With species observed in Canada this process takes 15-25 minutes (Balduf, 1935). The larva hatches in 9-29 days (Pearson, 1988), digs its way out, then turns around and begins to deepen the burrow, to 10-15cm by beetles in the Chicago area (Shelford, 1909). The larva then excavates somewhat around the entrance and packs it well to the size of its head. The head of the larva and the special chitinized plate behind the head which usually bears sand and soil, plug the top of the burrow and effectively blend with the surroundings. The larva waits with jaws agape and feet and spurred back wedged against the sides of the burrow for passing prey. Then it throws itself out and snaps the mandibles shut, usually on smaller invertebrates.

Cicindela larvae go through three instars (Pearson, 1988). The tunnel is enlarged after each molt and the depth of the tunnel ranges from 15-200cm depending on the species and instar (Pearson, 1988). Typically, the first *Cicindela* instar feeds about 3-4 weeks before crawling to the bottom of the burrow to molt. After 5-7 days the second instar larva enlarges the opening and feeds about 5 weeks. The second instar molts after another week and it is the third instar which deepens the burrow the farthest and overwinters (Shelford, 1909). *C.patruela* requires two years to complete its life cycle. From June eggs, the second or third instar larva overwinters. During the second summer, pupation occurs and immature adults overwinter to appear in May, mate, and leave the next generation of eggs in June. Two groups of the species cycle through the life stages but offset one year from each other with adults of one group mating and laying eggs while the other group is in the larval form preparing for pupation (Smith, W. pers.comm.).

To prepare for pupation, the burrow is closed above. Some species even fill in part of the upper burrow before constructing the special pupal cell or an enlargement of the main burrow shaft. Only a few minutes are required for the third instar larva to change to the pupal form, though the pupal stage may take up to 30 days (Pearson, 1988). Temperature

probably affects pupal duration. In captivity, Shelford observed pupation to occur up to one week sooner under moist soil conditions (1909). After transformation the new adult must dig its way up through the column of soil which takes about three days (Pearson, 1988).

Hibernating burrows are usually quite deep. Adults and larvae of the same species usually overwinter in burrows of the same depth (Wallis, 1961). Burrow depths recorded in Manitoba may reach 1.8m, though some may be as short as 15cm (Criddle, 1907). The longer ones angle down about 7-20cm, and then drop further vertically, perhaps taking several days to create. The beetle will throw out the dirt for the first 15-30cm, then this upper part is filled in loosely and the last 10-25cm or more are left unfilled. Depth and angle of the burrows varies depending on species. Within species, the depth also varies with substrate, water table, and other edaphic factors. Shelford found that larvae dig deeper burrows if the soil surface temperature is warmer (1909). The burrows may be dug 2-3 times deeper in sandy soil than in clay (Criddle, 1907). Most but not all beetles dig below the frostline to hibernate (Criddle, 1907; Wallis, 1961). Criddle observed that the beetles prefer a south-facing slant and are attracted to shallow holes in which to dig their overwintering burrows. The burrows of adults are often found grouped 2.5-5cm apart within a 60cm-diameter area (Criddle, 1907).

Adults are swift diurnal predators with excellent short-distance acuity. They may be considered the invertebrate equivalent to the cougar or wolf in the insect food chain. Ants are the favorite prey item (Huber, 1988). Some *Cicindela* are more selective of their prey than others which will feed on any kind of land Crustacea. Although the adults avoid predators well, they may become food for larger beetles, robber-flies, dragonflies or black widow spiders as well as small vertebrates such as the kestrel or kingbird (Huber, 1988). Balduf reports predation by skunks in Kansas (1935) and Criddle reports badger predation in Manitoba (1907). Parasitoids are their major enemies, particularly parasitic wasps and bombyliid flies (Pearson, 1988).

Adults may take cover under sticks or stones during the day but usually they dig shallow, quickly-created burrows for shelter from cold, rain, and darkness and also perhaps against extreme heat and drought. These burrows are usually no more than about 3cm deep. The adult beetles respond quickly to weather changes, becoming quite inactive under clouds, but again prompted to activity by sunshine. On rainy or gray days as well as on very hot, dry days, the beetles may remain constantly underground. Some species burrow in for the night by late afternoon and remain until mid-morning (Balduf, 1935). Larvae too have been observed to pass long intervals of inactivity in their burrows during the summer. At these times they plug the openings closed. This behavior is probably a response to extreme heat or dryness (Balduf, 1935).

Management Concerns Tiger beetles as a group are habitat specialists. This is one reason why *Cicindela* has been suggested as an appropriate indicator taxon for regional patterns of biodiversity (Pearson and Cassola, 1992). However, this specialization and their position as predators makes tiger beetles highly susceptible to habitat changes. On the other hand, they are less area sensitive and able to maintain viable populations in

small areas of habitat (Pearson and Cassola, 1992). Temperature and water loss are the most important physical factors for adults. Tiger beetles maintain high body temperatures just below their lethal limits and are primarily ectothermic, requiring behavioral adaptations to maintain temperatures for functioning. The reflectivity of tiger beetle elytra (wings) varies greatly between species and functions in thermoregulation; diurnal beetles being more reflective than those that are active at night, for instance. Color variation probably aids in thermoregulation as well (Pearson, 1988).

The larvae are more sensitive to variation in edaphic factors than are the adults, particularly to soil moisture, soil composition, and temperature. The effect of changes in soil chemistry is yet unknown (Pearson, 1988). Because the beetles require a specific habitat, *C.patruela* is particularly vulnerable to habitat loss. Throughout its range the species has suffered loss of habitat to development.

Soil disturbance may be detrimental to the larvae depending on the instar and depth of the tunnel. The larvae drop quickly to the bottom of the burrow when threatened. Early season instars remain closer to the soil surface than the later stages. As mentioned above, the hibernating burrows are quite deep, especially in a sandy substrate. Although the hibernating depth of *C.patruela* is unknown, it is likely below the level of vulnerability to winter timber management activities. Because the beetles can dive below ground, fire poses little threat except in June when the eggs are vulnerable (Smith, pers.comm.). Research into the depth of hibernation of the larvae, the effects of soil chemistry changes on the larvae, and the effects of soil disturbance accompanying timber activities on both larvae and adults would be most valuable to generate further informed land management decisions in regard to the rare tiger beetles.

Wood Turtle (*Clemmys insculpta*)

Taxonomy and Status The wood turtle belongs to the family, Emydidae, the pond and river turtles. Emydidae is the largest turtle family with 85 species worldwide in temperate and tropical climates excluding Australia. Refer to Oldfield and Moriarity (1994) for a description of the species. The wood turtle currently has no federal status but the U.S. Fish and Wildlife Service was petitioned to list the species as Federally Threatened in 1994. It is listed as Threatened in Wisconsin and Minnesota. In Iowa where only one population is known, the species is ranked as Endangered (Christiansen and Bailey, 1988). Most states that harbor the turtle have some legislation for protection. A Wisconsin Threatened species may not be collected without a permit from the Bureau of Endangered Resources of the Wisconsin DNR. In addition, salvaging a dead animal is in violation of the law unless the local conservation warden or the Bureau of Endangered Resources is contacted. Contact BER in Madison at (608) 266-7012.

Range The turtle is found in Nova Scotia and northeastern United States then westward as far as northeastern Iowa and eastern Minnesota. The range of the species reaches only as far south as northern Virginia. The turtles inhabit Wisconsin primarily north of a line from Green Bay to Prairie du Chien (NHI, 1994; Casper, 1995). South of this line, the

wood turtle has been found in counties along the Wisconsin River with scattered reports in counties further east. The Wisconsin Herpetological Atlas Project has documented records of the wood turtle in all counties in Karner blue butterfly range with the exceptions of Barron, Dunn, Clark, and Juneau Counties, though the species is believed to occur in those counties as well (Hay, pers.comm.).

Habitat In Wisconsin, the wood turtle is present in fast-moving rivers and streams such as the Black, Wisconsin, Brule, St.Croix, and Baraboo Rivers. Smaller tributaries with wood turtles include both warm and cold water streams. Wood turtles are almost exclusively riverine, inhabiting aquatic, riparian, and upland habitats primarily within a forested landscape. Wood turtles are considered semi-terrestrial and spend part of their lives in the uplands, though it appears that western individuals remain closer to the water than do those in the more eastern parts of the range. Vogt has found individuals in the river in July in Wisconsin (1981). In contrast, some individuals spend little time in the water (Nedrelo, 1994). Usually turtles forage in open, grassy meadows and deciduous woods adjacent to the rivers throughout the summer and return to the water in the fall. In Iowa, the turtles are more often seen moving through forest than in the water (Christiansen and Bailey, 1988). Brewster and Brewster (1991) found sandy stream beds, alder (*Alnus rugosa*) thickets interspersed with grass/sedge openings, upland foraging areas, and sandy, sunny nesting substrates to correlate with preferred wood turtle habitat in northern Wisconsin.

Life History Wood turtles become active in late March to mid-April and bask on the sides of the river on warm spring days. They are diurnal and forage in midday. The turtles are omnivorous and consume most of their food on land (Ewert, 1985) eating forbs, willow leaves, berries, mushrooms, slugs, insects, and earthworms. They have also been observed consuming dead fish and birds. Vogt found spruce needles eaten by a turtle in Price County (1981).

Wood turtles mature when they are 14 years old or older (Oldfield and Moriarity, 1994) and they produce a single clutch per year. Mating occurs primarily in the spring though fall mating has been observed (Vogt, 1981). The females nest on sandbars, sandy riverbanks, abandoned railroad grades, and open sandy-soil hillsides. Females leave the water for nest sites in the late afternoon in June and nest communally. False nests may be dug before the female ultimately deposits her eggs. She produces a clutch of 4 to 12 (typically 7 to 9) eggs. The nesting process may take three hours or more. Unlike many other turtle species, there is some evidence that the sexes of wood turtle embryos are not affected by the influence of incubation temperature (Bull, 1985).

Eggs develop in 58-71 days and the young emerge in mid-to-late August or September (Oldfield and Moriarity, 1994). Little is known about the behavior or habitat of young wood turtles. Very few young are ever found. Certainly the nests are highly predated in the present landscape but Vogt states that Agassiz in the 1890's found hundreds of adults and not one yearling (1981). The Brewsters report the young to remain in close association with the edges of alders near rivers (1991). Wood turtles hibernate individually beginning in October under ice in bank undercuts and near log jams

(Oldfield and Moriarity, 1994). They have also been found hibernating in muskrat burrows, under mud at the bottom of the river, or simply resting on the stream bed.

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into the location and habitat uses of juveniles, upland habitat use by adults, and the effects of land management on predator populations would be most valuable to generate further informed land management decisions in regard to wood turtles.

Upland wood turtle habitat has been said to extend within 366 meters of the river (Ewert, 1985). Turtles in northern Minnesota stayed within 100 meters of the river (Oldfield and Moriarity, 1994). Similar data is not yet available from Wisconsin. Upland areas are important to the wood turtle for foraging and nesting. Any soil disturbance in upland areas used by the turtles should be done prior to June or after September.

Adult turtles are usually safe from predation but can be attacked by raccoons and dogs. Like other turtles, wood turtles are vulnerable to death by automobile while traversing the upland areas near rivers. Baby turtles are preyed upon by fish and large birds as well as the raccoons, skunks, and other small mammals that destroy nests. The combination of late maturation, single-clutches, and low survival of eggs and young creates a situation in which populations are dominated by, if not totally comprised of, adults. Wood turtles are slow, mild mannered animals and continue to suffer losses to collection for the pet trade. Protection of information on turtle sites will help to minimize these threats.

Loss of forested stream habitat to development is a threat to the wood turtle. Degradation of water quality and the resulting loss of the plants and small animals of the stream resulting from industrial activities and agricultural runoff threatens the survival of the turtles. Monocultural management of timber lands removes the diversity of plants and animals that the wood turtle uses for food. Protection and maintenance of nesting sites against predation, collection, and natural succession as well as protection of habitats used by all life stages is needed to aid recovery for the wood turtle.

Blanding's Turtle (*Emydoidea blandingii* (Holbrook))

Taxonomy and Status Emydidae is the family of pond, marsh, and box turtles. Emydidae is the largest turtle family with 85 species worldwide. The family reaches its greatest diversity in the eastern United States and Southeast Asia. Emydidae are small to medium sized turtles with twelve marginal carapace scutes along each side and six pairs of scutes on the plastron. The elongated hind feet have some webbing. One species, *Emydoidea blandingii*, is recognized in the genus. There are no recognized subspecies. See Ernst and Barbour (1972) or Oldfield and Moriarity (1994) for a description of the

species. Blanding's turtle is threatened in Wisconsin and is under review for listing by the U.S. Fish and Wildlife Service. A Wisconsin Threatened species may not be collected without a permit from the Bureau of Endangered Resources of the Wisconsin DNR. In addition, salvaging a dead animal is in violation of the law unless the local conservation warden or the Bureau of Endangered Resources is contacted. Contact BER in Madison at (608) 266-7012.

Range Blanding's turtles range from southern Ontario and Quebec south through the Great Lakes region, west to central Nebraska and the southeastern corner of South Dakota, south to Iowa, into the northeast corner of Missouri, the northern half of Illinois and Indiana and the northwestern corner of Ohio extending in that state along the southern border of Lake Erie. The distribution of this species is spotty and disjunct around margins of the range particularly in the East where relic populations may be found in scattered localities in eastern New York, Massachusetts, New Hampshire and Nova Scotia (Ernst and Barbour, 1972; Iverson, 1986).

The Blanding's turtle was formerly more widespread. Archeological records show the species to have inhabited central Missouri, southwestern Kansas and the Oklahoma panhandle during the Pleistocene as well as in Kansas during the late Pliocene (Kofron and Schreiber, 1985; McCoy, 1973). The turtle is found scattered throughout Wisconsin except for the northcentral region and a few counties east and south of Lake Winnebago in eastern Wisconsin (Vogt, 1981). While not documented by museum specimens, the species has also been observed in Bayfield and Barron Counties (Hay, pers.comm.).

Habitat *Emydoidea* is found in marshes, ponds, swamps, bogs, lake shallows, backwater sloughs, shallow slow-moving rivers, protected coves and inlets of large lakes, oxbows, and pools adjacent to rivers; particularly in waters with a soft bottom and abundant aquatic vegetation. Blanding's turtles are found in rivers in Michigan (DeGraf and Rudis, 1983) but primarily prairie marsh and ponds in Minnesota (Oldfield and Moriarity, 1994). Prairie marsh or wet prairie is the preferred habitat in the western part of the range, especially associated with sandy soils (Kofron and Schreiber, 1985; Nyboer, 1992).

In Wisconsin, populations of Blanding's turtles studied by Ross and Anderson (1990) used ponds more often than the marshes which were available. Marsh habitat use was highest in early summer. Ross and Anderson think the use of these ponds as well as ditches might be for travel routes between feeding or activity centers (1990). Use of ponds with sand substrate and no aquatic vegetation was minimal in their study. Wetlands in which the cattails had been cleared in some areas were used by the turtles but not those with dense cattail mats indicating that availability of open water affects wetland use, at least by adults. Marsh habitat use was highest in early summer. Higher water quality encourages invertebrate prey populations and those habitats in Wisconsin with higher dissolved oxygen (>5.0ppm) had greater use by the turtles. Eutrophic conditions are attractive to Blanding's turtles (Graham and Doyle, 1977; Kofron and Schreiber, 1985; Ross and Anderson, 1990) particularly in mid to late summer due perhaps to increased competition during times of high feeding rates (Rowe and Moll, 1991).

In Minnesota, the preferred habitat is calm, shallow water with rich aquatic vegetation. The turtles are found in marsh areas in large river floodplains in the state adjacent to sandy upland areas for nesting (Coffin and Pfannmuller, 1988). In Michigan the turtles use shallow weedy bodies of water such as permanent ponds or open marshes (Harding, 1992). In Ohio, the turtles have been reported uncommon in deeper or more exposed parts of lakes but frequently found in protected coves (Carr, 1952). In states bordering the Great Lakes the turtles are found in central marshes or sedge meadows of islands, peninsulas, or sandspits stretching into the large water bodies (Bleakney, 1963; Adams and Clarke, 1958; Petokas, 1986).

Female turtles avoid nesting in cool, shaded sites (Petokas, 1986). Wisconsin turtles nested in large (>6 ha.) contiguous grassland habitat in Ross and Anderson's study in 1990. 50.6% of the cover at the Wisconsin nest sites was comprised of grasses and Pennsylvania sedge (*Carex pensylvanica*) (Ross and Anderson, 1990). The females in Petokas' study in Ontario chose areas with little or no vegetation. However, nests were found in a clustered distribution, likely because of herbaceous cover along the perimeter of the chosen site where turtles could hide and survey the area before advancing into the open to seek a nest site (1986). They often choose disturbed sites. Petokas suggests that the turtles probably nested in available clearings, on sand and gravel bars, and on muskrat lodges or beaver lodges and dams prior to the modification of the landscape by man. However, all the females in his study chose areas disturbed by humans: tilled plots, cemeteries, a powerline right-of-way, and a road. No nests were on the available beaver dams (1986). Turtles have been known to cross open, sandy soil to nest in a tilled cornfield (Linck, et al., 1988).

Life History Onset of nesting seems to be correlated with temperatures in April encouraging females to complete vitellogenesis. Nesting takes place within the period June 12-July 2 in central Wisconsin though it may vary by as much as two weeks in the same area. The turtles normally nest in the evening beginning when it is still light but rarely completing the nesting until after dark which takes an average time of 2.5 hours from first digging to leaving the nest (Congdon, et al., 1983; Linck, et al., 1988). Turtles in southeastern Ontario have been observed to average slightly less than 2 hours to complete nesting (Petokas, 1986). Because adult *Emydoidea* are fairly invulnerable to predators, they do not have to nest during the day like other turtles that are more easily preyed upon. Eggs are buried 2-3 inches below ground.

Clutch size is usually about 10-11 eggs (DeGraaf and Rudis, 1983; Pope, 1939; Congdon, et al., 1983) although clutches of 20 eggs have been reported for very large females (Petokas, 1986). As in other turtle species, clutch size varies with adult size, not adult age. Incubation period depends on temperature but is relatively short as a selective advantage for a species nesting on ephemeral or unstable substrates such as sandbars and beaches. Incubation may take over 80 days at 24C but only 48 days at 30-32C (Ewert, 1979). *Emydoidea* exhibits temperature-dependent sexual differentiation that favors males if nesting habitats are cool with average incubation temperatures at less than 26⁰C. favors females if nests are in open habitats and incubation temperatures average warmer

than 26⁰C. Hatching begins in mid-to-late August in Wisconsin and continues into September.

Unlike most aquatic turtles, Blanding's turtles will eat food both in the water and out of the water (Pope, 1939; Vogt, 1981). *Emydoidea* are omnivorous (Graham and Doyle, 1977) and may take advantage of abundant sources of high nutrient foods when available. Blanding's turtles have been observed consuming pondweed seeds (*Potamogeton* sp.), golden shiners, and brown bullheads where high nutrient levels from sewage effluent have stimulated the growth of high protein foods in Massachusetts (Graham and Doyle, 1977). Crustaceans and crayfish comprise about 50% of the diet, insects 25% and other invertebrates and vegetable matter 25% for turtles in New England (DeGraaf and Rudis, 1983) and Michigan (Lagler, 1943). Missouri turtles are primarily carnivorous, specializing in crayfish, followed by insects. They eat fish, fish eggs, and frogs as well, with small amounts of duckweed and algae always in association with animal food (Kofron and Schreiber, 1985). In Nova Scotia where crayfish are absent, the turtles eat dragonfly nymphs, aquatic beetles, and other aquatic insects as well as snails and some fish.

Blanding's turtles most often hibernate partially buried in the organic substrate of ponds and creeks. Five of the six overwintering turtles in the Wisconsin study used one of their summer activity centers for overwintering. Most moved from marshes, shallow ponds, and ditches to deeper ponds after September 1. The deeper ponds probably provide stable water levels during the critical overwintering period and a longer period of warmer water temperatures in early fall. Water temperatures ranging from 10-13 C., probably combined with changes in photoperiod, food supply, and rainfall, encourages turtle hibernation in Wisconsin between September 20 and October 22 (Ross and Anderson, 1990). Turtles in Missouri entered hibernation when water temperatures were 6.2C - 7.5C and were found in shallow marsh areas under 15cm mud below 9.5-21cm of water. At these temperatures the turtles would frequently change locations, moving as much as 13m (Kofron and Schreiber, 1985). In states south of Wisconsin, turtles have been known to hibernate beneath brush piles (Rowe and Moll, 1991) and leaves several feet from water (Conant, 1951).

Blanding's turtles live to be 30-40 years old and one individual in Minnesota is thought to have lived 77 years (Brecke and Moriarity, 1989). The longevity of Blanding's turtles is a life history characteristic of the K-strategist. Combined with delayed maturity, single clutches, and a short annual reproductive period, this species is banking on many productive years. According to Congdon, et al. 23-48% of the females in a population will reproduce in a given year (1983) and adults, barring death on the highway, can look forward to at least 15 years of reproductive activity. In this way, populations can be maintained through sufficient reproduction effort and an occasional good year in spite of long periods of low recruitment due to nest failure, predation, or hatchling mortality (Petokas, 1986).

Terrestrial Movement The Blanding's turtle is semi-terrestrial although the degree to which it is terrestrial in Wisconsin is poorly understood. Gibbons only found turtles on

land between aquatic areas in April and in September as well as females in June (1968). Conant considers it to be unusual for turtles in Ohio to be more than 100 yards from the water (1951). However, Rowe and Moll found that terrestrial excursions were a significant part of Blanding turtle activity in Illinois (1991). In Eau Claire County, Wisconsin, researchers have noted terrestrial behavior including aestivation in deciduous forest in summer (Hay, pers.comm.).

Other than movement by females to locate nesting sites, Blanding's turtles may be said to have three other types of terrestrial movement, as noted by Rowe and Moll (1991). During reproductively-active periods, males may move long distances overland to locate mates. Secondly, short overland excursions to other water bodies are common and probably indicate explorations for improved ecological conditions or in response to social interactions. Thirdly, turtles have been observed to remain on land for several hours to several days perhaps to avoid cold water temperatures (Ross and Anderson, 1990; Rowe and Moll, 1991) or in aestivation, as in Eau Claire County, during hot summer weather.

Females do not usually nest in areas adjacent to their home ponds. In 1927, Brown observed that a female Blanding's turtle nested 0.5 mi (805m) from the water body that the turtle presumably inhabited in Ontario. Illinois females wandered overland for 5-17 days and up to 1670m away before nesting 650 to 900m from their home ponds (Rowe and Moll, 1991). Turtles traveled 200 to 1200m to nest in Massachusetts (Congdon, et al. 1983). Turtles in Nova Scotia were nesting 5 miles across a lake from their probable activity centers (Bleakney, 1963). Wisconsin females traveled 246m from non-nesting activity centers to nest on average

168 m from the nearest water body (Ross and Anderson, 1990). Congdon, et al. found females traveling up to 1115m. away from the nearest water body (1983). There is some evidence that Blanding's turtles exhibit nest site fidelity (Congdon, et al., 1983; Petokas, 1986).

Size of activity centers (where daily activities are carried out for several days at a time) do not appear to differ for male and female turtles and range from 0.1 ha to 1.2 ha (Ross and Anderson, 1990; Rowe and Moll, 1991). The activity centers may be quite widely separated however; up to 400-600m in some cases. Activity centers of females in Wisconsin overlapped with other females (average overlap: 26%) and juveniles (7.4%) as well as males (12%). Male activity centers did not overlap with those of other males (Ross and Anderson, 1990) although there is no substantiated evidence for territoriality in freshwater turtles. Daily movements have been recorded between 30m and 50m (Ross and Anderson, 1990; Rowe and Moll, 1991) although females may move as far as 95m in a day during nesting periods.

Management Concerns Little data is available on the extent of habitat needed by *Emydoidea* populations. In the case of this turtle species, nesting site availability is more likely the limiting factor for population size than is wetland habitat. Population densities appear to range from 6 to 16 individuals per hectare in marshes (Gibbons, 1968; Graham

and Doyle, 1977; Congdon, et al., 1983) and up to 55/ha in ponds (Kofron and Schreiber, 1985). Ross and Anderson found 27.5/ha in ponds in Wisconsin (1990).

Considering both the probability of an egg hatching and nest predation, the reality of recruitment is discouraging. A 1983 study in Michigan found the probability for survival to emergence to be only 0.18 (Congdon, et al., 1983). Trails left by females to and from nests are easily followed by predators, especially if the turtle marks the trail in any way for the nestlings to follow. In some turtle studies, 100% of the nests were predated (Petokas, 1986; Ross and Anderson, 1990). The primary predators are usually skunks, raccoons, or red fox.

Age class structures of *Emydoidea* populations that have been studied are highly skewed toward adults (Lagler, 1943; Gibbons, 1968; Graham and Doyle, 1977). Senescence of the populations has been observed in Missouri (Kofron and Schreiber, 1985), Illinois (Fogel, 1992), and Wisconsin (Hay, pers.comm.). Even prior to the 1950's young turtles were rarely reported (Carr, 1952). Perhaps recruitment is periodic to avoid problems of competition. The turtles are neither aggressive nor territorial and perhaps have always lived in groups of primarily older adults. Cyclic flushes of juveniles may have been historically the result of cyclic predation due to environmental conditions inhibiting nest detection, decreased presence of predators, or population explosions of alternate prey during some years. It has been suggested that trapping techniques and locations may be missing the juveniles who do not share the same habitat as the adults. Whether the young turtles are absent or elsewhere are a question yet to be answered.

Habitat manipulation affecting the wetlands in which Blanding's turtles reside has been implicated in the depletion of populations in several states. Cultivation to the edge of the water and use of pesticides, especially those used to destroy aquatic vegetation (Kofron and Schreiber, 1985), as well as actual inundation or drainage of wetlands for agriculture or river channelization (Nyboer, 1992; Coffin and Pfanmuller, 1988) has reduced available habitat. Drawdowns to remove undesirable fish and pesticides sprayed on the exposed lake bottom when the turtles are already moving in late spring are detrimental to turtle survival (Nyboer, pers.comm. Dorff; pers.comm.). Winter drawdowns have been documented in Minnesota to cause heavy mortality due to freezing (Dorff, pers. comm.).

Blanding's turtles are also suffering from losses due to collection for the pet trade, development of upland nesting sites, and road mortality. The turtles' habit of wandering long distances may be a limiting factor in their ability to adapt to the anthropogenic landscape. However, some researchers believe more nesting habitat has been created by human activities allowing populations in some areas to expand beyond presettlement numbers (Petokas, 1986). However, routes from wetlands to nesting areas are often hazardous for the turtles. Turtle tunnels under existing roadways and sensitive routing of new and widened highways may be required to allow the animals to carry out reproductive activities. Habitat succeeding to shrubs creates a cooler incubation environment and skews sex ratios toward males. Nest site fidelity, if significant in this species, compels longterm protection of specific sites for existing populations. Genetic

variability is most secure when populations are within ranging distance by males moving along wetland corridors.

Western Slender Glass Lizard (*Ophisaurus a. attenuatus* Cope)

Taxonomy and Status There are six *Ophisaurus* species in North America. *Ophisaurus attenuatus*, the slender glass lizard, is a limbless lizard. It can be distinguished from a snake by its movable eyelids, external ear openings, and a rigid body. See Vogt (1981) for a description of the subspecies, *O.a.attenuatus*. The western slender glass lizard has no federal status but was listed in Wisconsin in 1979 as Endangered.

Range The western slender glass lizard, *Ophisaurus a. attenuatus*, ranges from northwestern Indiana and southcentral Wisconsin through the Mississippi Valley to southeastern Nebraska and central Texas. In Wisconsin, at the northern edge of its range, the lizard occurs in scattered populations in the central part of the state but was probably historically more widespread in Pine Barrens oak savannas, and sand prairies. The species has been found in LaCrosse, Monroe, and Jackson Counties as well as Adams, Juneau, Marquette, Waushara, Sauk, Columbia, and Dane Counties. Old records exist from Green Lake and Rock Counties (NHI, 1994). The northern prairie skink (*Eumeces septentrionalis septentrionalis*) inhabits the comparable dry, sandy soils in the northwestern section of the state (Casper, 1991).

Habitat The habitat of the slender glass lizard is primarily oak savanna and sand prairie where the lizards are most often seen in clumps of sedge (*Carex pensylvanica*) in areas with lichens and small pines (Vogt, 1981). Hay (pers.comm.) reports them from short-grass prairies dominated by little bluestem (*Andropogon scoparius*) and often at or near habitat borders where adjacent habitats consist of oak savanna. In Kansas, they prefer a tall-grass prairie habitat (Fitch, 1965). Trauth found the lizards in Arkansas most often along grassy roadbanks (1984).

Pleyte studied the lizards in Waushara County, Wisconsin where 94% of all animals captured were found in oak openings and mowed grass areas along the roads (1975). In fact, 143 of Pleyte's 210 captures were in the roadside anthropogenic "habitat". He described the optimal habitat for the animal as having grass with not too much open sand, and cover (usually logs and brush) within 8 meters. The savanna groundcover was dominated by grasses (*Andropogon* spp., *Stipa spartea*, and others) but also included *Lupinus perennis*, and *Carex pensylvanica*. Pine plantations searched by Pleyte did not reveal glass lizards and were probably too shaded to have enough grass as well as having too high a percentage of open sand. The old fields searched appeared to be lacking in cover. The oak barrens studied were dominated by Hill's oak (*Quercus ellipsoidalis*) with a large component of dead oak trees due to oak wilt. Pleyte assumed they had too much grass to be preferred glass lizard habitat. There are glass lizard sites in Wisconsin, however, that are pine plantations or grassy areas with young jack pines (NHI, 1994).

Fitch (1989) considers tall grass essential for the slender glass lizards. Even thick brome (*Bromus inermis*) fields in his Kansas study area had many lizards. Most of the lizards

that Fitch studied were captured in the tall grass of former pastures. Because of their sleek shape the glass lizards move well through grass and likely take cover there when threatened. Slender glass lizards have been found in old fields and barrens in Wisconsin. After grazing is halted the tall grass habitat of early old field succession is rich in small mammals. When woody plants replace grasses, the numbers of small mammals decrease but good shelter for the lizards is available in the abandoned tunnels (Fitch, 1989).

Life History Slender glass lizards exhibit a bimodal activity pattern. In April and May during the breeding season, five times as many adults were observed than in the fall in Arkansas (Trauth, 1984). Late May to early June would be the comparable period of activity in Wisconsin. A second peak of activity is in the fall as the animals prepare for hibernation.

Slender glass lizards may reach sexual maturity in two years in the southern part of the range (Trauth, 1984) but 2-3 years is more typical (Fitch, 1989). They mate in May or early June and six to seventeen eggs are laid in mid-June to early July in hollow stumps, abandoned mammal dens, or spaces under rocks and logs. During the incubation period, the female is very inactive, eating little and remaining with the clutch probably to turn the eggs or keep them moist (Fitch, 1965). The young hatch in August and enter hibernation in the fall. Pleyte found no activity of glass lizards after September 21 in Waushara County (1975). For hibernation, the lizards remain in the same area as they inhabited during the summer but move to below the frostline. Because they do not dig well, they are dependent for hibernation sites on the old burrows of mammals. They wriggle backwards into the loose soil of the burrow to protect themselves from attack during hibernation (Fitch, 1989).

The slender glass lizard becomes inactive at lower body temperatures than other lizards. For this reason, the lizards are most often found active in late afternoon or early evening, especially after rain showers. Pleyte found a marked preference for evening activity in Waushara County (1975). They are most active on days with temperatures between 70 and 77 degrees Fahrenheit (Pleyte, 1975; Fitch, 1989). Pleyte found no lizards above ground in Waushara County when the air temperature rose above 86 degrees Fahrenheit (1975).

Especially in loose soil habitats, the lizards spend extended periods underground in the summer where they burrow and forage for worms, snails, slugs, and other edible lifeforms of the soil. Olfaction plays an important role in *Ophisaurus* foraging (Fitch, 1989). Above ground, the lizards consume a variety of invertebrates. Caterpillars, beetles, snails, and spiders, particularly the wolf spider, are important foods early in the season (Pope, 1944; Fitch, 1989). Later in the summer, katydids, crickets, and especially grasshoppers form the bulk of the diet (Fitch, 1989). Pleyte found grasshoppers, crickets, and scarabid beetles in the Waushara County animals' diet (1975). The lizards will also consume the eggs of ground-nesting birds and reptiles, young mammals, small snakes, and frogs. They daily forage within an area of only a few square meters (Fitch, 1989).

As prey, the slender glass lizard has been taken by red-tailed and broad-winged hawks (Ross, 1989), raccoon, skunk, and snakes. In Kansas, the red-tailed hawk is an especially important predator on this species (Fitch, 1965). If caught the lizard may shed its tail, but only once in its lifetime can it use this avenue of escape. Unlike snakes, the glass lizards do not have scutes or scales to move themselves forward and thus require debris or vegetation to push against. As a result, they are trapped on smooth surfaces such as highways. Unfortunately, the pavement-grass interface is attractive because prey is often more active here and the pavement offers a surface for basking. By avoiding pavement and predators, glass lizards can live to be 8 or 9 years old but Fitch did not find them to survive for more than a few seasons in Kansas (1989).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In

this case, research into anthropogenic grasslands as glass lizard habitat and preserve size and habitat requirements minimizing predation would be most valuable to generate further informed land management decisions in regard to slender glass lizards.

Slender glass lizards have suffered habitat loss through succession to forest, plantations, and agricultural uses. Commercial insecticide spraying and the resulting accumulation of toxins from consumed invertebrates may adversely affect reproduction and survival (Vogt, 1981). Because the lizards are unable to cross roads, they are highly sensitive to habitat fragmentation. Croplands and wetlands are probable barriers to slender glass lizard dispersal.

Slender glass lizards have no obvious adaptations to fire although they inhabit a community dependent on fire. The lizards perhaps escape the fire underground. Prescribed burning may help the lizards by providing more escape cover through an increase in biomass as a result of the burn. Temporarily, however, the loss of vegetation may make them more visible and thus vulnerable to predation. In this case they may be limited to patches of habitat within a burned area such as gulleys, brush patches, woodland edges, or rock outcrops where vegetation remains until regrowth occurs. On a fire-managed prairie remnant in Kansas, Fitch found the lizards present only along the edges and in very low numbers compared to the old pasture sites he studied (1989).

Glass lizards can't live in heavily-grazed fields and are slow to recolonize new areas where prairie grasses have been restored (Fitch, 1965). As succession proceeds in abandoned fields, *Ophisaurus* numbers decline as brush and trees replace grasses. The combination of a slow breeding rate due to late maturity and, at most a single yearly clutch, plus the slow growth rate of young compared to that of other lizards leaves the slender glass lizard poorly prepared to recover from population losses (Fitch, 1965).

Home range sizes vary from 0.14 ha for juveniles to 0.44 ha for adult males (Fitch, 1989) though the ranges are without a focal point "den" and shift as the animal moves about, resting below the mat of groundcover when needed. Fitch found 400-700 individuals in a 7-ha site during a three-year MRR study (1989). Pleyte observed a population density of between 1.3 and 2.4 lizards per hectare, with home ranges between 2.0 and 0.7 hectare (1975). Fitch also reports 33.5 per acre with a home range of about 0.5 acre (1965). An estimate by Curtin of 400-480 acres for the size of habitat needed to support a minimum viable population of 400 glass lizards is the only such attempt to quantify preserve size for this species (1990).

Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus* Raf.)

Taxonomy and Status The family of pit vipers, Crotalidae, is composed primarily of the rattlesnake genera, *Crotalus* and *Sistrurus*. There are seven species or subspecies of *Sistrurus* distributed from Mexico and Texas through Kansas and into the northern Midwest. Two other subspecies of *S. catenatus*, the western massasauga and the desert massasauga, occur southwest of Wisconsin. The massasauga, by most accounts, entered the Midwest during the Hypsithermal about 5,000-7,000 years ago along the prairie corridor created during that warmer post-glacial period (Cook, 1992). The massasauga is a federal candidate for listing and is listed as Endangered or Threatened in most states within its range. The species is endangered in Wisconsin. See Vogt (1981) for a description of the subspecies.

Range *Sistrurus c. catenatus* was first described in 1818 from prairies near Kansas City, Missouri (Beltz, 1990). The subspecies ranges from Missouri and Iowa with a few stations in southeastern Minnesota to southern Ontario, New York, and Pennsylvania (Beltz, 1990). In the 1800's the snakes could be found throughout Wisconsin below the Tension Zone. The Wisconsin Herpetological Atlas reports occurrences of the animal in 16 counties from Pepin and Wood to Walworth and Racine (Casper, 1995). Reliable records indicate isolated populations currently in Buffalo/Pepin, Jackson, Juneau, Walworth, and Trempealeau/LaCrosse counties (Casper, 1992).

Habitat Habitat of the eastern massasauga is often composed of two communities, the wetland habitat and a drier upland area. In Minnesota and extreme western Wisconsin today, the animal is primarily restricted to river bottom forests and adjacent fields (Land and Karns, 1988; Vogt, 1981). In other states and central Wisconsin, the massasauga continues to inhabit prairie marshes (Christansen and Bailey, 1990), swamps, bogs and fen peatlands with low shrubs. In the Chicago area, the rattlesnakes are found in the ecotone between woodland and wet prairie, areas of clay hardpan with uplands of scattered shrubs, or savanna-like communities where sunlight provides for a grassy, herbaceous layer (Mierzwa, 1992). In Ontario, the snakes have been found to inhabit lowland conifer forest (Weatherhead and Prior, 1992). Seasonal wetlands are critical to the species and fens and marshes are preferred over swamps. They prefer habitat with canopies less than 10m in height (Hay, 1992).

Seasonal movements of the massasauga appear to vary with locality. In Missouri, a study showed the animals to be in wet prairie in spring, moving in summer to drier uplands and old fields, and then in fall returning to the wet prairie and associated marshes to overwinter (Siegel, 1986). Telemetry studies on Bruce Peninsula in Ontario tracked the animals and found that they used upland areas with low tree heights or shrubs in the spring but avoided grass-dominated open areas in preference to fairly closed marshes, shrubby swamps, and fens in the summer (Hutchinson, et al., 1993). In the fall, the snakes either remained in those wetland habitats or found hibernation sites in nearby white cedar (*Thuja occidentalis*) swamps (Weatherhead and Prior, 1992). In central Wisconsin where the snakes are being tracked in the upland areas of Necedah NWR, individuals are known

to travel one-third mile (0.53km) or more from wetlands into the surrounding upland areas (King, R. pers. comm.).

The massasauga uses a combination of open, sunlit areas such as openings in conifer forest or old field (Weatherhead and Prior, 1992) and shady woodland or shrubland for thermoregulation. Both uplands and wetlands provide opportunity for foraging. Snakes have been found to move 9.1m per day in Pennsylvania with home ranges of slightly less than 1 hectare (Reinart and Kodrich, 1982). In Ontario, however, snakes move an average of 56m per day (Weatherhead and Prior, 1992). The Ontario researchers found activity ranges of 25 hectares with the females having smaller ranges than the males.

Unlike many other snakes, massasaugas hibernate singly. Areas with the water table near the surface are chosen for hibernation where they may spend the winter underwater. There is some evidence of site fidelity to overwintering locations (Hay, 1992). In Wisconsin and Missouri, massasaugas overwinter at or near the water level in crayfish burrows in bottomlands as well as mammal burrows or sawdust piles (Seigel, 1986). "The presence of crayfish burrows for hibernating may be a very important factor limiting the habitable areas within the range of the massasauga" (Vogt, 1981). Farther north, in Michigan, the snakes use rock crevices and tree root systems for hibernation (Moran, 1992). Tree root hollows are also used for hibernation in swamp forests in Ontario as well. They may move over 2.4km between summer activity areas and hibernacula (Hay, 1992).

Life History Massasaugas emerge in late April during spring flooding in Wisconsin and move to upland areas as waters recede (Oldfield and Moriarity, 1994). During spring and fall they are diurnal but restrict themselves to crepuscular and nocturnal periods in summer (Oldfield and Moriarity, 1994). Massasaugas reach breeding age in 2-3 years. They breed in spring primarily, but fall breeding has also been reported. There is some evidence of a biennial reproductive cycle (Reinert, 1981). Three to twenty live young are born in late August in mammal burrows or under fallen logs (Oldfield and Moriarity, 1994).

The snakes feed primarily on mice, shrews, and voles (Vogt, 1981; Christansen and Bailey, 1990; Oldfield and Moriarity, 1994), though they will consume other cold-blooded vertebrates if necessary, such as garter snakes, spring peepers, or leopard frogs. In the Chippewa River bottoms, more than 85% of the diet is voles (Vogt, 1981). Massasaugas are themselves prey for hawks, owls, large wading birds, skunks, racoons, and foxes. The loggerhead shrike has been known to prey on the massasauga (Chapman and Casto, 1972).

Management Concerns In an effort to provide land managers with available information on the possible response of the species in question to land management activities, the following may be drawn from a variety of sources. This discussion is not exhaustive nor is it meant to be prescriptive. Where studies are lacking, current knowledge depends heavily on the educated observations of biologists most familiar with the species and others of its kind. In this case, research into the location of the snakes throughout the

season would be most valuable to generate further informed land management decisions in regard to massasauga rattlesnakes.

Wetland loss has been the greatest threat to massasaugas. In areas where the wetlands are protected, adjacent upland areas visited by the animals need protection as well. The snakes prefer low shrubby habitat over forested habitat. Forest succession due to timber management or natural processes threatens habitat (Hay, 1992). Protection of information on massasauga sites helps to minimize collection pressures and losses to willful destruction suffered by this species. Massasaugas won't hibernate in flowages or other flooded areas. Also water level control is a threat to hibernating snakes. Drawdowns may cause the animals to freeze to death (Hay, pers.comm.).

Frequent burning of swales in Iowa has resulted in declines in the species (Beltz, 1990), mortality due to late season burning has been observed in Missouri, and Illinois researchers have observed losses from summer mowing (Hay, 1992). Hay recommends controlled burns be performed in the spring before emergence and mowing be conducted when temperatures are cool enough to avoid injuring basking snakes. Also, rotation of management between burning and mowing on management units that include a variety of habitats may help maintain a higher prey base and maintain adequate habitat for normal massasauga activities (Hay, 1992).

Sharp-Tailed Grouse (*Pedioecetes phasianellus*)

(*Tympanuchus phasianellus*)

Taxonomy and Status Grouse belong to the order Galliformes which also includes turkeys, pheasants, chachalacas, quails, and partridges. There are six representatives native to Wisconsin: wild turkey, spruce grouse, ruffed grouse, sharp-tailed grouse, greater prairie chicken, and the northern bobwhite quail. The ring-necked pheasant and gray partridge are gallinaceous birds introduced to the state. Like the prairie chicken, the sharp-tailed grouse is native to prairies. The grouse has no federal status but is of special concern in Wisconsin where the birds primarily exist in areas of managed habitat.

Range The sharp-tailed grouse ranges from Alaska and northern Canada south and east into the Plains states, Wisconsin, Michigan, Ontario, and western Quebec. In Wisconsin it inhabits counties in the northwestern and central areas of the state as well as a few northeastern counties. Douglas and Burnett Counties have populations of the grouse as do to a lesser degree Jackson, Wood, and Clark in Karner blue range. Records exist from Polk and St.Croix Counties as well (Faanes, 1981).

Habitat Sharp-tailed grouse habitat is generally the pine-shrub-grassland community, savanna, or brush prairie. Grouse habitat in Douglas County, for instance, is mixed grasslands with scattered oaks, aspens, or shrubs and patches of jack pine (Faanes, 1981). The birds use different areas depending on the stages of mating and nesting. Preferred courtship sites are slightly elevated clearings such as ridges or grassy knolls in meadows or fields with good visibility. Males may visit these areas for ten months of the year. The

area must be very open. Tall conifers within 1/2 mile will result in the eventual abandonment of the site as dancing grounds (Shively and Temple, 1994).

Nesting sites will be chosen within 1/2 mile of the dancing grounds in grassy areas with dense cover. The chicks are raised in areas with young trees or shrubs for shade but with clearings for an abundance of insects. Later in the summer the brood moves back into denser cover. Wintering areas are in mixed forests where the birds can feed on woody browse. Suitable habitat has been lost over the years in the southern part of the state due to agricultural conversion but logging created habitat in the North. Habitat has decreased however, since the 1930's when fire suppression combined with forest regrowth and pine plantations left the birds in isolated remnant populations (Shively and Temple, 1994). Currently the birds are maintained on managed state wildlife areas and adjacent private lands that consist of about 1,000 square miles of sharptail habitat. The grouse travel extensively and may move 2-3 miles per day and 10 miles seasonally.

Life History Young male sharptails may begin to establish breeding display territories during their first fall. They will return to these leks year after year in early spring to perform the elaborate and competitive courtship display rituals each morning and evening to attract females. After mating occurs the females do not remain with the males but leave the dancing grounds to locate nest sites. There are no pair bonds created in this promiscuous mating system where presumably, there is no advantage for the male to help raise the young. On each lek there is normally a dominant male who mates with most of the females. In one study, a single male grouse performed 17 of 24 matings (Ehrlich, et al., 1988).

The female lays one egg per day until the 10-14 egg clutches is complete. The nest is usually a lined shallow depression in grass or under a shrub. Incubation requires 23-24 days. The young begin to fly about 10 days after hatching and are fully independent in 6-8 weeks. Young sharptails may move several miles from their hatching sites. In winter the grouse form mixed-sex flocks of usually 10-35 birds (Ehrlich, et al., 1988).

Sharp-tailed grouse young are highly insectivorous but the adults eat primarily vegetative matter such as weed seeds, waste grain, wild forb leaves and sprouts in spring; flowers, leaves, and fruits of many green plants in summer; seeds and fruits of trees and shrubs in fall; twigs and buds of paper birch, aspen, and hazel in winter. The adults augment their diet with beetles, grasshoppers, crickets, and caterpillars in summer.

Management Concerns To maintain the shrubby, open habitat required by sharp-tailed grouse, management often consists of a combination of mowing, burning, herbiciding, clearing, and bulldozing. Many Karner blue butterfly sites on public lands are already being managed for sharptail grouse. Areas of Burnett County, for instance, have been managed since the 1950's for brush prairie and support healthy populations of Karner blue butterflies (Evenson, D. pers.comm.). Both species are creatures of a dynamic, disturbed landscape and require a diverse habitat though on different scales.

Loggerhead Shrike (*Lanius ludovicianus*)

Taxonomy and Status Shrikes are in the family Laniidae. Only two species of shrikes occur in North America, the loggerhead shrike and the northern shrike, *L.exucubitor*. Elsewhere in the world are 315 additional species. The loggerhead shrike is considered relatively stable west of the Mississippi but is declining in the East (Fruth, 1988) and is under review for listing by the U.S. Fish and Wildlife Service. The bird was listed as Threatened in Wisconsin in 1979 and reclassified to Endangered in 1982.

Range The loggerhead shrike ranges from the Pacific to the Atlantic coast and from southern Canada to Mexico. Approximately the southern half of the breeding range constitutes the wintering range. Although 11 subspecies have been described, the AOU recognizes only 8 sub-species (Fruth, 1988). The Wisconsin subspecies is *L.l.migrans* which breeds from southern Manitoba to eastern Texas. Eastward, the breeding range intergrades with subspecies *L.l.ludovicianus* along a line through Louisiana, Tennessee, West Virginia and Maryland. To the north the shrike was formerly a resident of the Maritime Provinces but is now found only in limited numbers in Quebec and Ontario. Populations have declined for several decades throughout the species' range in the Midwest, New England, and the Mid-Atlantic States. The Breeding Bird Survey showed the upper Midwestern shrike population to be declining by 6% per year from 1966-1987 (Hands, et al., 1989).

The loggerhead shrike was formerly considered a common summer resident throughout Wisconsin except for the northeastern and northcentral regions. Populations of the shrike began declining in the 1930's and suffered another precipitous drop in the 1960's. Between 1979 and 1987, the average number of breeding pairs per year in Wisconsin was 4.0. In 1987, five pairs were reported in the state (Fruth, 1988). These birds were found nesting in central and westcentral Wisconsin and Door County (Hallowell and Gieck, 1987).

Swengel reported a loggerhead shrike in Burnett County in 1991 (pers.comm.). That same year a bird was reported from Waupaca County and another from Forest County. A nesting pair was reported from Green County. Oconto County produced two nests and 14 birds were seen in that county through the nesting season (Soulén, 1992). The following year shrikes were reported from Green, Iowa, Rock, and Taylor Counties (Soulén, 1993). Two pairs nested in Oconto County in 1993 and one bird was reported from that county in 1994 (Soulén, 1994).

Habitat Shrikes are birds of open country though they require shrubs and low trees for nesting and perching such as those found in native savanna and upland shrub carr. Nests are built in a variety of trees, shrubs, and vines at heights ranging from 1.3 feet in shrubs to 25 feet in trees (Hands, et al. 1989). In Wisconsin, nests are typically 4-8 feet above the ground (Robbins, 1991). Prairies and deserts (in the West) are the natural habitat of

shrikes. In the altered landscape, they are found using pastures and old fields containing scattered trees, shrubs or adjoining hedgerows. In Wisconsin in recent years, shrikes have been reported nesting adjacent to marsh habitat and in hedgerows surrounded by corn fields or near housing developments (Fruth, 1988).

Trees such as hawthorn (*Crataegus* spp.), locust (*Robinia pseudoacacia*), or wild plum (*Prunus americana*) that the shrikes prefer for nesting have thorns on which to impale their prey. Structural qualities of the habitat, however, are as important as the plant species, providing concealed nest sites and suitable perches. Habitat in western Canada often includes dense willow (*Salix* spp.) or clumps of thorny buffaloberry (*Shepherdia argentea*) whereas hawthorn (*Crataegus* spp.) is commonly used in eastern Canada (Telfer, 1987). In Minnesota, shrikes prefer to nest in isolated red cedars (*Juniperus virginiana*) amid agricultural fields (Brooks, 1988). In South Carolina, shrikes prefer to nest in red cedar and enjoy greater nesting success there than in other trees (Gawlik, 1988). Red cedars provide greater protection from nest loss due to adverse weather than do deciduous trees or shrubs. Red cedars as well as wild grape are also commonly used for nesting in Wisconsin.

Shrikes nesting in scattered shrubs or trees appear to suffer fewer losses due to predation than do those nesting along fencelines or hedgerows (Yosef, 1992). In Alberta, however, scattered shrubs were less often occupied than were shrubs stretching along the margin of a railway embankment (Prescott and Collister, 1993). Dead stems or utility wires for perches are a necessary component of the habitat.

Shrikes find their prey in grass; however the type of grassland preferred appears to vary with availability. Active pasture often offers the best opportunity in the context of row crops or lawns (Brooks, 1988; Novak, 1986; Gawlik, 1988). Although Telfer reports the birds across Canada hunting over closely-grazed pastures (1987), in Alberta the birds preferred to nest in areas of taller undisturbed grasses (20.0cm vs. 15.8cm) where short grass areas were the result of heavy grazing (Prescott and Collister, 1993). Although short grasses improve prey capture, such areas contain fewer invertebrates.

Shrikes are the only songbirds that regularly prey on other vertebrates. They typically perch on branches, fences, or telephone wires for a view of the surrounding open terrain and are known for the unique behavior of impaling their prey on thorns or barbed wire in order to tear off small pieces. In early morning and at dusk they actively hunt by making frequent trips to the ground from perches 0.5-6 feet high. During the rest of the day they wait and observe from higher posts where they can detect prey from up to 150 feet (Fruth, 1988). During the breeding season they are primarily insectivorous, capturing mostly grasshoppers and scarab beetles (Mizell, 1993). During the winter vertebrates become the main prey including small birds, lizards and snakes, mice and shrews (Hall and LeGrand, 1989).

Life History Loggerhead shrikes arrive in Wisconsin in early April, find mates, and nest from April 21-July 5 producing 4-6 eggs (Robbins, 1991). Incubation takes an average of 17 days with another 17-21 days for fledging occurring in early June. Robbins reports

that double-brooding (April and July) may be possible for this species (1991). Often the youngest nestling perishes from starvation. Predation by snakes can contribute to further losses. Adverse weather has also been implicated as a contributor to nest losses. Fledging success is 50-88% in Missouri (Kridelbaugh, 1983) and Minnesota pairs produce 3-4 fledglings per female (Brooks, 1988). The shrikes are most easily observed in June and July when both parents are feeding the nestlings. After fledging, the male is primarily responsible for care of the young (Hall and LeGrand, 1989). The shrikes defend a territory of about 3.14ha in Alberta (Prescott and Collister, 1993) and from 1ha to 12ha in Missouri (Hands. et al. 1989). Territory size varies with quality of habitat and nesting stage, being largest during incubation. Two to three clutches are common in the southern states. The birds may begin leaving in August and are usually gone from Wisconsin by October 10 (Robbins, 1991).

Management Concerns Several explanations for the decline of the species since the 1930's have been proposed including loss of breeding habitat, mortality on the wintering range, and poor reproduction. Numerous researchers have concluded that the shrike populations are not limited by availability of breeding habitat (Brooks, 1988; Gawlik, 1988; Kridelbaugh, 1983). In contrast, Prescott and Collister in Alberta found preferred habitat with tall grass to be at a premium in a context of heavily-grazed pastureland (1993) and suggested management for short grass to be contradictory to the needs of the shrikes in southwestern Canada.

Various studies of reproductive success have concluded that the shrike populations are reproducing normally (Gawlik, 1988; Kridelbaugh, 1983). Conversion of grasslands to row crop agriculture in the southern states (Kridelbaugh, 1983) has created dramatic increases in populations of Icteridae that feed primarily on grain (Brooks, 1988). Competition with burdgeoning European starling populations in particular, makes life difficult for shrikes in some areas (Novak, 1986). Mortality during overwintering probably contributes to losses in the northern loggerhead shrike populations. The resident shrikes in the southern states defend winter territories making it harder for the migratory birds to find hunting grounds (Gawlik, 1988).

Because of the position of shrikes near the top of the food chain and habit of foraging along the edges of fields where pesticides have been applied (Novak, 1986), loggerhead shrikes, particularly the immature birds, are vulnerable to the accumulation of residues from ingested toxins. DDT residue concentrations have been found to be higher in loggerhead shrikes two years after application than during the first year (Fruth, 1988). Researchers have implicated ground beetles as an important source of contaminants ingested by shrikes (Anderson and Duzan, 1978).

Kirtland's Warbler (*Dendroica kirtlandii* Baird)

Taxonomy and Status The Kirtland's warbler, *Dendroica kirtlandii*, "The Jack Pine Warbler", is probably the rarest member of the wood warbler family, Parulidae. Because of its habitat specificity and endemism, it has been under intense scrutiny since it was

first discovered. A good field guide can offer a description of the species, however Kirtland's warblers are best located by listening for the singing males in potential habitat. The song of the warbler is loud and the singers usually persistent. Most people can hear the singing male for at least 0.2mi (0.3km). A suspected individual should be verified by a photograph or identification by a qualified observer. The Kirtland's warbler is critically imperiled globally and listed federally as Endangered. In Wisconsin the species is of special concern because it has been found a few times in the state but only as a nonbreeding species. The Kirtland's warbler requires jack pine barrens as its breeding habitat.

Range Jack pine, *Pinus banksiana*, did not enter the upper midwest until the retreat of the Wisconsin glaciers 10,000 years ago. Prior to that time, jack pine was abundant in the southern Appalachians and the southeastern coastal plain where presumably the Kirtland's warbler resided in its chosen habitat, migrating in winter to the nearby Bahama Islands. Recent pollen analysis has indicated that jack pine was absent from the sand outwash plains beyond the glaciers in the Midwest, so the warbler is thought to have entered the area from the southeast with the retreat of the glaciers and the advance of *Pinus banksiana* (Mayfield, 1992).

The Kirtland's warbler was first collected in 1851 on its migration route near Cleveland, Ohio and described in 1852 (Harrison, 1984). In 1903, the breeding habitat of the species was identified. The Kirtland's warbler is endemic to an area that today is about 120 by 160 km in northern lower Michigan. 485 singing males were counted there in 1993. Michigan has conducted censuses for the bird since 1951 and set aside state-owned lands for the warbler beginning in 1956. After the population declined by 60% between 1961 and 1971, yearly censuses were begun in that state (Weinrich, 1994).

Ninety percent of nests found since the first Michigan find in 1903 have been in the drainage of the AuSable River in western Oscoda County, Michigan (Mayfield, 1992). Today, there are approximately 134,000 acres of jack pine designated for Kirtland's warbler nesting habitat in Michigan (Mangold and Richter, 1994). The species is continuing to increase in numbers in Michigan due to intensive recovery efforts including habitat creation and cowbird control (Weinrich, 1994). Areas of likely habitat have been checked since 1977 in several states and provinces. Warblers were found in Ontario, Quebec, and Wisconsin but no nests have been found outside of Michigan (Weinrich, 1994). There are nine verified records of the Kirtland's warbler from Wisconsin from the mid-1880's to 1977. All these birds were found in May in the eastern half of Wisconsin and only two were in counties with jack pine, giving credence to the belief that they were probably migrants. During that period, the only record near Karner blue butterfly range was from Waushara County in 1971 (Tilghman, 1978).

In 1978, the Wisconsin Department of Natural Resources conducted a search for the warbler in the state. Two males were found in a 90-acre jack pine stand in Jackson County where they had set up territories and remained from at least June 10 to July 31 (Tilghman, 1978). An unconfirmed sighting was also reported in northern Juneau County

that year (Robbins, 1991). One and perhaps three males were heard in the same area of Jackson County in 1979 (Hale, 1979). One warbler was heard in Jackson County in 1980 (Tessen, 1980). No further evidence of Kirtland's warblers was reported until 1988 when six males were observed in Douglas, Jackson, and Washburn Counties. A single male was heard in Douglas County in 1989 (Robbins, 1991). One bird was heard through June, 1991 in Jackson County (Soulen, 1992) and one bird was reported from Washburn County in 1992 (Soulen, 1993).

The likelihood of the Wisconsin males finding mates is quite slim (see below). However, it does indicate that suitable nesting habitat exists in the state.

Habitat The nesting habitat for this warbler is quite specific and is a major limiting factor for the species. Jack pine must predominate and be between 1.3m and 6.0m in height (Harrison, 1984; Morse, 1989; Probst and Weinrich, 1993), though Ryel (1981) has found that the birds no longer use areas when trees are taller than 4.9m and Probst and Weinrich found that populations begin to decrease in an area with trees reaching 3.8m (1993). All the nests found during the 1993 Michigan census were in areas of young or middle-aged habitat (Weinrich, 1994). Morse (1989) and Mayfield (1992) have found birds in areas with trees from six to twenty-two years old. The birds appear to prefer naturally-grown jack pines over planted trees (Ryel, 1981) though 34% of the males found in the 1993 census were in areas specifically planted for warbler habitat (Weinrich, 1994). Morse (1989) reports the birds sometimes nest in red pine plantations where they have moved from adjacent jack pine habitat within the Michigan breeding range. Large stands are required, at least 80 acres and perhaps 200 acres or more (Harrison, 1984). This is quite large for warblers, however the habitat includes less vegetation than do most forests inhabited by warblers (Mayfield, 1992). The low ground cover typical of this sandy soil habitat is most naturally maintained by fire. The 1980 Kirtland's warbler survey found three-quarters of the singing males on wild fire sites (Ryel, 1981). Controlled burns have become part of Kirtland's warbler management in Michigan.

Nesting territories have been recorded to range from 0.6ha to 6.7ha (Mayfield, 1992). The Kirtland's warbler recovery team recommends 12ha of young jack pine for a breeding pair (1976). Typically an area is used for only ten to twelve years but use may range from six to nineteen years (Mayfield, 1960). The population generally builds for 3 to 5 years after colonization, levels off for 5 to 7 years, and then declines rapidly. Tree cover in newly-colonized stands is approximately 15-20%, during the years of highest warbler density tree cover may reach up to 60%, and tree cover typically exceeds 60% during the period of decline (Probst and Weinrich, 1993). Kirtland's warbler habitat in Michigan occurs on Grayling sand soils (Mayfield, 1992). The most similar soils in Wisconsin are the Plainfield loamy sands of central Wisconsin and the Vilas, Omega, and Hiawatha sands of northern Wisconsin (Tilghman, 1978).

Life History Male warblers usually arrive on the nesting grounds between May 3 and May 20 with females arriving a few days later. Female Kirtland's warblers build their nests on the ground which is unusual for *Dendroica*. The nest is typically hidden in thick grass, sweet fern, or blueberries under the jack pines and the sandy soil allows the warbler to recess the nest in the ground (Morse, 1989). Egg-laying begins in late May.

Females incubate generally 5 eggs for fourteen days which is the longest incubation time for a North American warbler. The eggs hatch in mid-June. Males feed the females and assist in feeding the young (Harrison, 1984). The nestlings fledge by the ninth day after hatching. The young may be cared for by the parents for up to 44 days after leaving the nest but usually parental feeding ceases by the fifth week (Mayfield, 1960).

The warblers eat a variety of insects from the ground, air, or pine foliage. They tend to hover at the ends of branches and pluck insects out of the pine needle clusters. They also eat berries (Woodard, 1980). There is some evidence that nesting will be unsuccessful in areas that can suffer below-freezing temperatures in early June, thus restricting the species to only the most southern jack pine areas in North America (Mayfield, 1992).

The small area inhabited by Kirtland's warblers is problematic for the species. By missing the Michigan habitat by the width of two counties when returning northward in the spring, a warbler may not find a mate and lose the opportunity to produce a brood (Mayfield, 1992). As a species of successional habitat, the Kirtland's warbler is inclined to occupy new areas. This can also lead to difficulties in finding mates. On the positive side, the species is semi-colonial. Clusters of two to thirty pairs have been found separated by substantial distances of similar habitat (Morse, 1989). Although yearling male Kirtland's warblers may be wide-ranging in their search for territories, females tend to nest closely to the area where they were hatched (Tilghman, 1978). Ecologists speculate that it is this semi-colonial breeding behavior and site fidelity that has kept the species from extinction thus far (Ehrlich, et al., 1988). In the fall, the majority of Kirtland's warblers have left the state for the winter migration to the Bahamas by the first week of September though some remain until early October. The hatching year young leave before the adults, having finished the final molt by September (Sykes, et al., 1989). The overwintering survival rate for adults is about 65% but is much lower for yearlings (Harrison, 1984).

Management Concerns Should introduction of the species to sites outside Michigan be conducted as recommended by the Kirtland's Warbler Recovery Plan, jack pine management practices are generally suitable for provision of habitat for Kirtland's warblers (Tilghman, 1978). In Michigan, management of Kirtland's warbler habitat consists of logging, burning, and planting on a rotational basis to provide a constant supply of early-to-mid successional jack pine as required by the birds for nesting habitat (Mangold and Richter, 1994).

Studies of cowbird parasitism between 1951 and 1971 found that half to three quarters of the Kirtland's warblers nests were parasitized by cowbirds (Morse, 1989). The warblers have no mechanism against nest parasitism. Since 1972, Michigan has been removing an average of 4,025 cowbirds annually from Kirtland's warbler habitat (Mangold and Richter, 1994).

Phenology Charts

Butterflies

The elfins are alike in their yearly life cycles. Both are possibly found where Karner blue butterflies reside. The frosted uses wild lupine as its host plant. Henry's elfin uses a plant most likely of the heath family nectar on violets, puccoons, and perhaps, rock cress. Gorgone checkerspot and tawny crescent are of the same family. Both use plants of the Compositae: asters for tawny and asters or *Ratibida pinnata* or *Helianthus* sp. for gorgone. The checkerspot also chooses yellow-orange flowers for nectaring; i.e. puccoon, orange hawkweed, rock cress. The latter two butterflies are less likely to be found in the same microhabitats of the barrens landscape as are the Karner blues. The tawny crescent, for the most part, inhabits moist areas.

	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	WINTER
FROSTED ELFIN		P	ADULT	Larvae in lupine flowers, eating flowers, pods				Pupae
	Eggs laid singly on flower buds. Pupae in loose cocoon in litter at base of plant or underground.							
HENRY' ELFIN		P	ADULT	Larvae feed on buds and leaves of host shrub				Pupae
	Eggs laid on flower buds.				Probably (?) in litter at base of host plant.			
Gorgone Checker- Spot		P	ADULT	P	ADULT	Larvae feed together on leaves		Larvae
	Pupae where?		Eggs laid clustered under leaves.				Where?	
Tawny Crescent	Larvae		P	ADULT	Larvae in communal webs under leaves			Larvae
	Eggs laid in groups under leaves.				Probably (?) at base of host plant.			
Karner	Eggs	P	AD		P	ADULT	Larvae feed on leaves	Eggs

Plants

	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	WINTER
ROUGH SEEDED FAMEFLOWER				FLOWERING				
	Plants must be older than three years to flower							
OVAL MILKWEED			FLOWERS				SEEDS MA- TURE	
		cf. Diptera pollinators						
SAND	FLOWERING			Lepidoptera or Hymenoptera pollinators				
VIOLET			Mature Seeds	Ant Dispersal				

Folded-wing Skippers

These skippers live on grasses, primarily little bluestem. Leonard's skipper is known to use big bluestem, needlegrass, dropseed, and others. Within the barrens landscape, these skippers are not likely to be found where Karner blues reside on wild lupine because of the dominant grasses needed by the skippers. The skippers visit flowers for nectar. The cobweb has been observed on rock cress, wood betony, and violets. The dusted skipper may be found on downy phlox with the phlox moth and nectars at wild lupine and violets as well. Leonard's skipper chooses purple flowers: asters and *Liatris* spp.

	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	WINTER
Cobweb Skipper			P	ADULT	Larvae in base of grasses and feeding on leaves			Larvae
	Pupae in debris. Eggs laid singly on leaves. Aestivation underground. Center of grass plant.							
Dusted Skipper				P	ADULT	Larvae in leaf tents 1+ ft. up in grasses		Larvae
	Pupae 1-3" up in plant. Eggs laid singly on leaves.						At plant base.	
Leonard's Skipper	Larvae				P	ADULT	Egg...	Larvae
	Where?	Pupae cf. in debris.		Eggs laid singly on leaves.		Where?		

Spread-Wing Skippers

These skippers are likely to be found at Karner blue microsites. The Persius lives on wild lupine. The mottled duskywing requires the shrubs, *Ceanothus ovatus* or *C. americanus*. Nectar sources for these species are less well known than the skippers mentioned above. The mottled has been observed using verbena and *Lithospermum* sp.

	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	WINTER
Persius Dusky-wing	Larvae	P	ADULT	Larvae in rolled leaf nests, feeding on leaves				Larvae
	Pupae in cocoon. Eggs laid singly under leaves.				In leaf shelter.			
Mottled Dusky-wing		P	ADULT	Egg....	ADULT	Larvae in leaf nests		Larvae
	Pupae in cocoon.		Eggs laid singly on flower pedicels.			In leaf shelter.		

Birds

Sharp-tailed grouse consume a variety of plant matter. Shrikes nest in trees or shrubs with spines such as hawthorn, wild plum, or locust but also use red cedar. Kirtland's warblers usually require jack pines.

	APRIL	MAY	JUNE	JULY	AUG	SEPT..	WINTER
SHARP TAILS	Courting	Hatch		Fledge		establish	Mixed
	Lay	Incubate	Nestling	Independent		leks	sex flocks
Food:	grain, seeds, sprouts,forbs		grasshoppers, beetles, caterpillars, flowers			seeds,fruit	twigs,bud
SHRIKE	Arrive	Nesting	Incubation		Fledge		
	Mate	4-8 ft. up	Egg laying		Nestling	Migrate by October 10	
	INSECTIVOROUS: Beetles, grasshoppers, etc.						
KIRTLAND'S WARBLER	Arrive, mate		Fledge		Young leave		
	Ground Nest	Lay	Incubate	Nestling	Parental Care	Sept: Parents migrate	
	Semicolonial nesting. Food: berries, insects, esp. from pine needles						

Additional Invertebrates

The Phlox moth larvae live on downy phlox. The red-tail leafhopper lives on prairie dropseed.

	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	WINTER
PHLOX MOTH		P	ADULT	Egg..Larvae	Pupae			Pupae
	cf. underground							
TIGER BEETLE	Yr.1:		Eggs	Larvae (underground during heat)			Larvae	
	Yr. 2:	Larvae	Pupation	Adults (3 cm burrows for heat, rain, etc.)			Adults	
	Yr.3:	Adults	Eggs (only 3-5 mm into the soil)					
	Larvae live in burrows at least 15 cm deep							
Red-tail Leafhopper	Egg...	Nymph		ADULT	Nymph	ADULT	Egg	Egg
	Nymphs remain on grasses			Eggs are deposited in plant tissue				

Herptiles

The wood turtle nests communally in sandy, sunny open areas. The Blanding's turtle uses open grassland habitat for nesting and lays eggs 2-3" below the soil surface. Both turtles are omnivorous, but the wood turtle makes greater use of vegetation outside of the wetland area.

The massasauga also spends large amounts of time outside the wetland. The slender glass lizard has very specific habitat needs to consider.

	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	WINTER	
WOOD TURTLE		Mating at 14+ years old	Nesting			Emerge		Hibernation under ice, log jams, muskrat burrows	
	Forage in upland woods, meadows for forbs, leaves, berries, insects, worms < 1/4 mi. from river								
	Little time spent in water during the active season.								
BLAND- ING'S TURTLE		Mating	Nesting			Young emerge and go to water		Hibernation in mud below water	
	Females travels upland 1/4-1/2 mi to nest								
	Shallow ponds, marshes			Feeds both in and out of the water		To deeper ponds			
MASSA- SAUGA RATTLE- SNAKE		Diurnal	Nocturnal-Crepuscular			Diurnal			
		Breeding at 2-3 years of age	Sunny openings and shady woodland or shrub areas for basking, foraging			Live young born	Moves up to 1.2 mi. to hibernate. Crayfish burrows, tree roots near water table		
	may be over 1/3 mi from wetlands Food: mice, shrews, voles, frogs								
WESTERN SLENDER GLASS LIZARD		Mating	Nesting	Incubate				Hibernation in old mammal burrows below frostline	
	at 2-3 yrs. of age			Hatch					
	caterpillars, beetles, spiders		Foraging underground and above for katydids, crickets, grasshoppers						

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**B. "Karner Blue Management Implications for Some Associated
Lepidoptera of Wisconsin Barrens" by R.J. Borth with contributions
from G.J. Balogh, T.S. Barina, L.A. Ferge, H.L. Kons, Jr., M.C.
Nielson, J.C. Parkinson and A.B. Swengel.**

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Introduction

Barrens ecosystems were once dependent on natural disturbance to maintain a diverse community of flora and fauna, but are becoming increasingly dependent on informed management to preserve early successional stages. In 1992 the Karner blue butterfly, which is largely associated with barrens habitat, was listed as a federally endangered species by the U. S. Fish and Wildlife Service (USFWS, 1992). After conducting surveys to better understand this species and its remaining stronghold in Wisconsin barrens, a partnership between the Wisconsin Department of Natural Resources and various public and private interests was formed to develop a habitat conservation plan (HCP) pursuant to Section 10 of the Federal Endangered Species Act. Partnership goals were expanded to encourage consideration for other barrens associated species that co-occur with the Karner blue and could therefore be impacted by Karner blue management. This report is designed as a reference summarizing current information on the basic biology of ten other species with varying degrees of association with the barrens community in Wisconsin for those interested in protecting other lepidoptera when managing for the Karner blue.

The Wisconsin barrens are associated with sandy soils and consist of a continuum of communities stretching across the state from southwestern treeless sand barrens and central oak barrens to northwestern jack pine and burr oak barrens. Wild lupine (*Lupinus perennis*), the Karner blue's exclusive hostplant, achieves its maximum presence in the oak barrens (Curtis, 1959). The Karner blue's dependence on ephemeral lupine populations, which are subject to succession and have historically been dependent on wildfires to open new sites of invasion, implies a dynamic mosaic of Karner blue populations with some going extinct as others colonize new sites (Givnish, Menges and Schweitzer, 1988).

The ten species covered in this report were initially treated by Kathryn Kirk in a November, 1996 report to the U.S. Fish and Wildlife Service entitled "The Karner Blue Community: Understanding and Protecting Associated Rare Species of the Barrens." Reviews which questioned certain information in that report, including comments based on broad geographical generalizations not always applicable to Wisconsin, were the catalyst for this report, which substantiates summarized charts for these same 10 species with detailed field observations primarily by Wisconsin lepidopterists and photos in natural habitat by the author.

Each of these 10 species has some association with barrens and is classified as either endangered, threatened or "of special concern" in Wisconsin. Because there are varying degrees of overlap between habitat occupied by Karner blues and these other species there was no consensus among the contributors on which species to include (aside from the Frosted elfin and Persius dusky wing which are host specific on lupine). The fact that only one moth species is included is indicative that current knowledge of moths and their habitat associations is even more limited than for butterflies.

Certain Karner blue sites may not contain any of these other species, while other barrens habitats may include various combinations of species and no lupine or Karner blues. The

HCP can benefit associated species where they co-occur with the Karner blue, but it must not be viewed as an overall strategy to preserve the entire barrens ecosystem in Wisconsin or these associated lepidoptera and other insects. This would require an ecosystem based approach including many sites where the Karner blue is absent. Despite many unknowns about barrens species and their habitat preferences, conservation strategies and management must cautiously proceed.

Species Accounts

The following species accounts are based on current but incomplete information as these species (especially their immature stages) have not been given the same attention as the Karner blue. When Wisconsin information is unavailable, other sources are cited, but these should be used carefully as there may not be consistency between geographic regions. Species identifications were the responsibility of the individual contributors.

Range Maps: The range maps provide each associated species' documented range in Wisconsin based on voucher specimens or photos from the following sources: George Balogh, Thomas Barina, Susan Borkin, Robert Borth, Leslie Ferge, Hugo Kons Jr., Judy Maxwell, James Parkinson, Thomas Rocheleau, Ann Swengel, the Milwaukee Public Museum (identifications checked by R. Borth) and published accounts by Kuehn (1983). The Karner blue data was obtained from the HCP. Figures of each species (actual size) are also shown. It is anticipated that further survey work will yield additional county records.

Life History: The "Life History" summary provides information on the life stages of each species including the Karner blue. Because little basic life history research on the immature stages is available for these species in Wisconsin, this chart and additional comments on the egg, larvae and pupae rely largely on published studies from outside the state. The life cycle may vary between seasons due to differences in weather and other factors as well as between different parts of the state.

Known Larval and Adult Resources: Typical adult nectar sources are based primarily on observations of Wisconsin lepidopterists. Larval host plants are listed. Frequent Karner blue nectar resources are also provided from Bleser (1994).

Status: Status refers to current perceptions, which may be biased by inadequate survey, of how local/restricted in habitat and how numerous a species may be where present in Wisconsin. Ambiguous or inconsistently used terms such as "rare" are deliberately avoided. There is an enormous amount of interesting habitat in Wisconsin that has never benefited from the attention of a lepidopterist. Time and again various species are proclaimed "rare" when as Ferge (1997) notes "what is rare is the intense and time consuming effort to locate and document new populations in the field."

Similar Species: This section highlights other species, using scientific names, that make identifications difficult due to similar appearance and overlapping flight season. Separation from similar species is best learned by studying either an institutional or

personal reference collection with large series of similar species where inter and intraspecific variability (e.g. genetics/environment, sex, season, geography, age, etc.) can be studied in detail. In addition, Scott (1986) has color plates, illustrating upper and underwing surfaces, and descriptions of each of the 9 butterfly species covered here. Voucher specimens or photos showing diagnostic features should be obtained to validate reported occurrences.

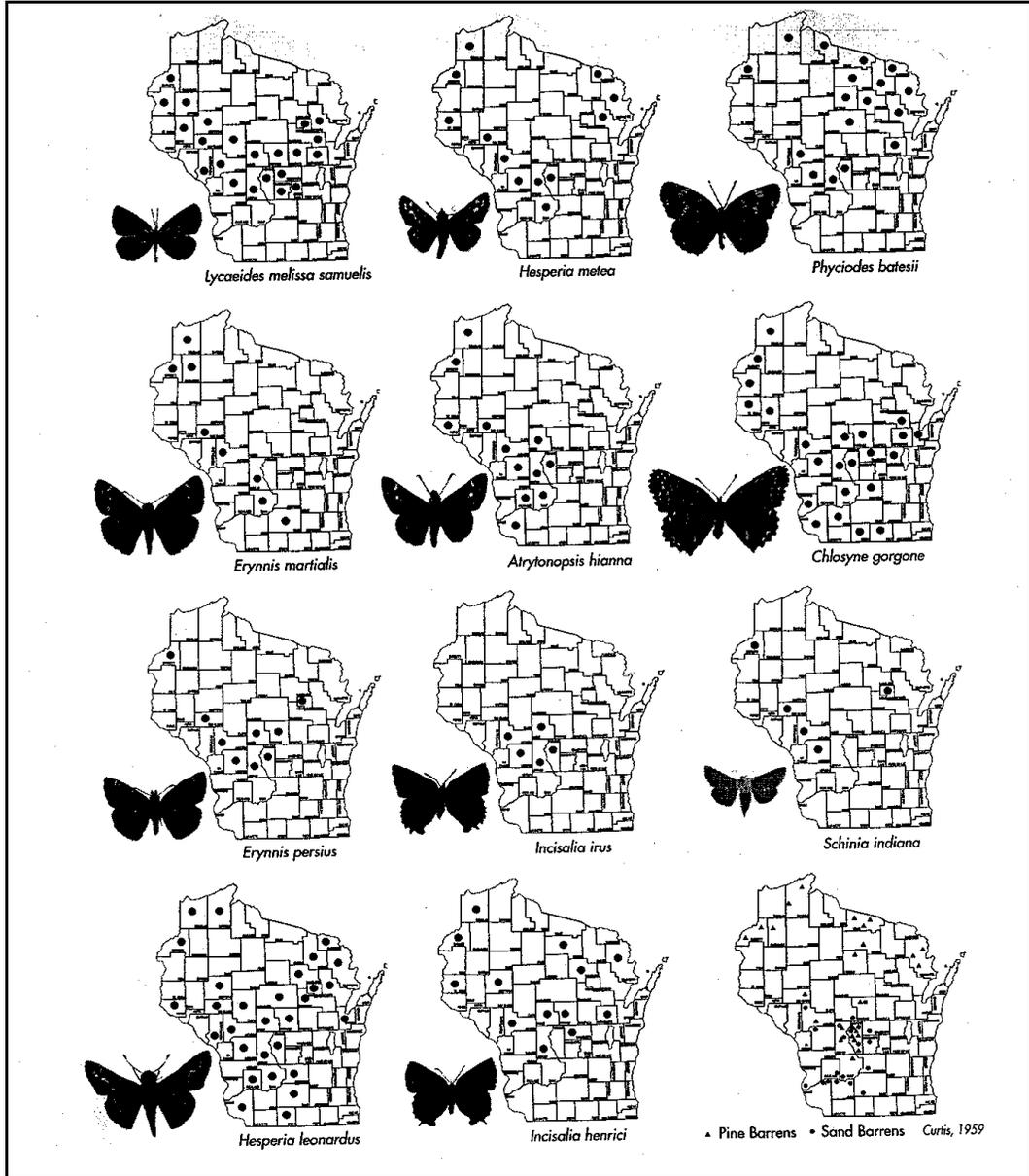
Habitat: This section discusses types of habitat where the associated species have been documented in Wisconsin. While the habitat requirements of each species actually include the habitat needs of both adult and immature stages, most observations are based only on the adults. Knowing these habitat preferences might help predict the possible occurrence of these species in a given site (which should be established by actual survey) and may be useful in designing an appropriate management strategy.

Behavior: This section covers observed behavior, limited to that of adults, with emphasis on Wisconsin.

Dispersal: Dispersal may be motivated by individuals seeking food, mates, or egg laying sites or in some cases it may be migratory (Lane, 1997). For the dynamic landscape model (Givnish et al, 1988) (local extinctions and recolonizations as areas open due to disturbance) to apply, species must display sufficient dispersal ability. This section summarizes dispersal ability inferred by indirect evidence such as records far from known locations of larval hosts or records in areas where a species is not found persistently despite intensive survey. Studies dedicated to dispersal such as King's (1996) Karner blue study have not been done on these species.

Management: This section summarizes the limited information available on management, using Wisconsin data when possible. Caution must be applied when using information from another region. Ideally management should strive to maintain the habitat required for each life stage without causing adverse impacts to populations of other barrens associated species.

Range Maps



Relationships and Strategies

	Rough Estimate of Co-occurrence with Karner blue (1)	Preferred Habitat within Barrens Community	Management Strategies (2) (Vary depending on Site)	
			Recommended	Discouraged
Mottled dusky wing <i>Erynnis martialis</i>		Ceanothus area: patches of bare ground narrow oak branches for perching	Mowing sections of habitat during dormant season if Ceanothus is present	Spring, summer burns Extensive burns
Persius dusky wing <i>Erynnis persius</i>		Lupine area: patches of bare ground narrow oak branches for perching	Late season mowing or moderate methods to maintain openings	Intensive clearing of woody species
Leonard's skipper <i>Hesperia leonardus</i>		Open to scrub forest: purple flowers for nectar esp. liatris	Maintenance of openings	Burning more than a small part of breeding habitat
Cobweb skipper <i>Hesperia metea</i>		Grassy opening: bluestem grasses for perching birdfoot violet available for nectar	Cool, fast moving, patchy fires	Intensive fire rotation Burning more than a small part of breeding habitat
Dusted skipper <i>Atrytonopsis hianna</i>		Sandy grassland: bluestem grass present puccoon available for nectar	To date no active management strategy has been found to be of benefit	Mowing and intense fire
Frosted elfin <i>Incisalia irus</i>		Dense lupine area: some shading from canopy (savannah aspect)	Unintensive late season mowing and timber cutting	Virtually any fire management regime
Henry's Elfin <i>Incisalia henrici</i>		Scrub pine/oak barrens mosaic: some ground cover of heaths Woodland edges	Unintensive cutting	Over-clearing or thinning of woody species Frequent burning
Tawny crescent <i>Phyciodes batesii</i>		Various dry forest edges or barrens /scrub forest	Unknown	Unknown
Gorgone checkerspot <i>Chlosyne gorgone</i>		Dry open areas: Yellow flowers for nectar Prairie/barrens composites for larval hosts	Unknown	Extensive burning, mowing and cutting
Phlox moth <i>Schinia indiana</i>		Dense downy phlox area	Maintenance of openings and edges	Intensive burning

(1) Degree of overlap provides information on how highly the species on the left (indicated by first initial of common name) is associated with the Karner blue (K). For example, *E. persius* and *I. irus* are highly associated with Karner habitat while *P. batesii*, *C. gorgone*, *I. henrici*, and *H. leonardus* are significantly less associated with the Karner blue. See species accounts.

(2) Recommendations are in need of further research. If no management strategy is clearly beneficial it may be prudent to leave significant portions of occupied habitat unmanaged until more is known.

Life History

Species	Immatures:												Pupa	Reference
	April	May	June	July	Aug	Sept	Oct	March	Egg	Larva	Pupa	Reference		
Karner blue (<i>Lycædas melissa samuelis</i>)									Laid on or near wild lupine	Feed on upper/under sides of leaves, flowers and buds. Often attended to by ants attracted to sweet secret.	Yellow-green	(Ding, 1994)		
Mottled dusky wing (<i>Erymis marialis</i>)									Laid singly on flower pedicels and on other parts of the host	Mature larva hibernates in leaf nest, larva leaves shelter only to feed	In nest (i.e. leaves tied together with silk)	(Scott, 1988)		
Persus dusky wing (<i>Erymis persus</i>)									Laid singly under leaves	Mature larva hibernates in rolled leaf nest	Pupates in nest the following Spring	(Opler & Kizek, 1984) (Karpulec, pers. comm.)		
Leonard's skipper (<i>Hesperia leonardus</i>)									Laid singly on leaves	Hibernates as young larva, matures following summer	In plant debris	(Opler & Kizek, 1984) (Nielsen, 1997)		
Cowweb skipper (<i>Hesperia meola</i>)									Laid singly on leaves	Aestivation underground; hibernates at base of grass clumps where its subject to high mortality	Pupates early in Spring in debris	(Heizman, 1974)		
Dusted skipper (<i>Atrypanopsis hianna</i>)									Laid singly on leaves or flower pedicels of host	In leaf tents 1+ feet up in grasses where hibernates as mature larva	1-3" up in plant in sealed case of silk and grass	Heizman, 1974		
Frosted elfin (<i>Musalia flus</i>)									Hatches in 7-8 days. Single on flower buds, usually the calyxes.	Feed on lupine flowers, pods	In loose nest in litter at base of plant or underground	(Svenngel, 1996) (Schweitzer, 1995)		
Henry's elfin (<i>Musalia henrici</i>)									Laid singly on flowers or leaf next to leaf buds	Feeds on buds and leaves of host shrub	Probably in litter at base of host plant (Opler, 84)	(Nielsen, 1995)		
Tawny Crescent (<i>Phycodes balsas</i>)									Eggs in groups under leaves, hatch in about a week	In communal webs under leaves; third instar enters in Spring	Probably at base of host plant	(Opler & Kizek, 1984)		
Gorgone checkerspot (<i>Chlosyne gorgone</i>)									Laid in clusters under leaves	Feed communally. Hibernates as a third stage larva (Scott, 86)	Cream color with reddish mottling	(Williams, 1995)		
Phlox moth (<i>Sobilia indiana</i>)									Laid on inner surface of flower sepals next to corolla tube or between buds	Feed on flowers and fruit of Downy phlox. Larva tunnels into seed capsules to develop	Within 25-35 days of oviposition it pupates apparently in soil (Schweitzer, 94)	(Hardwick, 1958)		

Some overlap between stages occurs

Suspected Larval and Known Adult Resources in Wisconsin

	L.	E. *	E.	H. *	H. *	A. *	I.	I. *	P. *	C.	S. *
Larval Host	<i>melissa</i>	<i>martialis</i>	<i>persius</i>	<i>leonardus</i>	<i>metea</i>	<i>hianna</i>	<i>irus</i>	<i>henrici</i>	<i>batesii</i>	<i>gorgone</i>	<i>indiana</i>
Asters - <i>Aster sp.</i>									X		
Coneflower - <i>Ratibida pinnata</i>										X	
Big bluestem <i>Andropogon gerardi</i>				X	X	X					
Black-eyed susan - <i>Rudbeckia hirta</i>										X	
Blueberry- <i>Vaccinium sp.</i>								X			
Downy phlox- <i>Phlox pilosa</i>											X
Jersey tea- <i>Ceanothus americanus/C. ovatus</i>		X									
Little bluestem - <i>Schizachyrium scoparium</i>				X	X	X					
Maple-leaf viburnum - <i>Viburnum acerifolium</i>								X			
Sunflower- <i>Helianthus</i>										X	
Wild lupine - <i>Lupinus perennis</i>	X		X				X				
Adult Nectar Source											
Asters - <i>Aster sp.</i>	X	X		X							
Birdsfoot violet - <i>Viola pedata</i>					X						
Black-eyed susan - <i>Rudbeckia hirta</i>	X									X	
Blazing star - <i>Liatris sp.</i>	X	X		X							
Bush houstonia - <i>Houstonia sp.</i>		X									
Butterfly milkweed - <i>Asclepias tuberosa</i>	X									X	
Choke cherry - <i>Prunus virginiana</i>								X			
Cinquefoil - <i>Potentilla sp.</i>	X									X	
Dewberry- <i>Rubus flagellans</i>	X					X					
Downy phlox- <i>Phlox pilosa</i>		X				X					X
Flowering spurge- <i>Euphorbia corollata</i>	X										
Goldenrod - <i>Solidago sp.</i>	X										
Heaths - Fam. <i>ericaceae</i>		X						X			
Hoary alysum - <i>Berteroa incana</i>	X										
Horsemint- <i>Monarda punctata</i>	X										
Knapweed - <i>Centaurea biebersteinii</i>	X										
Leadplant - <i>Amorpha canescens</i>	X										
Orange hawkweed- <i>Hieracium aurantiacum</i>	X		X						X	X	
Puccoon - <i>Lithospermum sp.</i>						X				X	
Rock cress - <i>Arabis lyrata</i>	X	X	X		X			X		X	
Sunflower- <i>Helianthus</i>	X			X						X	
White sweet clover - <i>Melilotus alba</i>	X										
Wild bergomont - <i>Monarda fistulosa</i>	X			X							
Wild lupine - <i>Lupinus perennis</i>	X		X			X	X				
Wild strawberry - <i>Fragaria virginiana</i>					X	X					
Other											
mudpuddles	X		X	X			X		X	X	
Urine, salts		X						X	X	X	
Dung	X								X		

* Larval host data from out-of-state records

Mottled Dusky Wing *Erynnis martialis* Scudder

Hesperiidae Pyrginae

Status - This species is local and dependent on extensive barrens habitats in central Wisconsin as well as in the northwestern counties where it may be numerous.

Similar Species - Several other *Erynnis* species can be heavily mottled, making *E. martialis* especially prone to misidentification. Summer brood individuals are easier to identify, as not all *Erynnis* species have second broods.

Habitat - Many adults were seen in a scrub forest/barrens mosaic and adjacent open sandy fire lane by Kons and Borth in the vicinity of the Namekagon barrens, Burnett County, but observations decreased markedly out into the contiguous open, frequently burned (every 4-6 years), treeless barrens (1997). Ferge (1989) reported the species as absent in these burn units.

Behavior - These behavioral observations were made by Kons and Borth in the vicinity of the Namekagon barrens (1997). In both the scrub forest/barrens mosaic and in the open, adults usually fly close to the ground and bask in sunlight with wings outstretched and forewing tips curved slightly inward. Numbers found peaked during intense sunny conditions when individuals were observed patrolling or visiting moist sand to imbibe fluids, rich in salts. Under cloudier conditions, *E. martialis* was generally not found on the open sandy fire lane but would be in the scrub forest barrens mosaic habitat perching up to several feet above the ground on burr oaks and small shrubs. During sunny intervals, some individuals would pursue approaching *Erynnis* or *Incisalia*.

Dispersal - Although dispersal is unknown, this species is a strong flier typical of *Erynnis*.

Management - While a suspected host plant redroot is able to withstand fire (due to the huge underground burl-like root stock) (Curtis, 1959), the larval leaf nest and pupae are above ground rendering the species vulnerable to spring burns. In the East, Schweitzer suggests mowing sections of habitat during the dormant season if *Ceanothus* is present (1994) to protect second brood larvae. Kons and Borth (1997) recommend that in the vicinity of Namekagon barrens maintenance of preferred habitat includes both the scrub forest/barrens mosaic with small oaks and open sandy areas in addition to *Ceanothus americanus*.

Persius Dusky Wing *Erynnis persius* Scudder

Hesperiidae Pyrginae

Status - This species is found in some numbers in a subset of Karner blue sites but it is not as numerous as the Karner blue. Many Karner blue sites have not yet been surveyed for *E. persius*.

Similar Species - *Erynnis persius* is very difficult to distinguish from *E. lucilius* (whose foodplant, Columbine, is found in dry sites throughout central Wisconsin) and *E. baptisiae* (which can also use lupine as a larval host (Schweitzer, 1994)). It may also be mistaken on the wing for the more abundant dusky wings with which it flies. Because this species cannot be reliably separated in the field or by photograph (Schweitzer, 1994a, Nielsen, 1997) it should be documented with voucher specimens.

Habitat - This species is found primarily in openings or perching on sparsely sandy vegetated ground. At the Emmons Creek Public Hunting Area in Portage County (Kons, 1997) *E. persius* adults were found principally in areas with sparser vegetation where open sandy and dormant grass covered ground was interspersed with immature scrub oaks while Karner blue adults were numerous wherever lupine was present at the site (including densely grassy areas). *E. persius* was absent at two sites in Portage County where Karner blues were numerous and these sites lacked the combination of open sparsely vegetated ground and small oaks (Kons, 1997). Maxwell and Ferge report the species in both open and shady oak woodland habitat at Fort McCoy in Monroe County (1994).

Behavior - *E. persius* may pause from its generally quick and erratic flight to bask in sandy sparsely vegetated areas or to nectar on low growing blueberry (pers. obsv. 1997). At Emmons Creek under cloudy conditions Kons observed *E. persius* and *E. brizo* landing on small diameter scrub oak branches and exhibiting “cryptic perching behavior” where they would wrap their wings around a branch covering from half to the entire circumference of the branch with their wings and become very difficult to detect except at very short range. “Cryptic sleeping posture” of *E. brizo* was previously reported by Burns (1969). Kons has found that this species, like the Karner blue, flies through areas of closed forest (1997). In Ohio, *E. persius* will not oviposit on shaded plants (Iftner et al., 1992).

Dispersal - Dispersal is apparently high as two specimens were found by Borth and Kons in Burnett County at least five miles from known lupine plants (Kons and Borth, 1997). At Emmons Creek, Kons inferred that this species dispersed through closed forest based on finding small numbers of *E. persius* in a barrens opening surrounded by forest which contained only 1 lupine plant (1994 and 1995). Kons also found one individual along a road about one mile from the lupine area.

Management - Management that may be beneficial for Karner blues, which may be numerous in sites where this species is absent, may not benefit *E. persius* unless the above habitat requirements are maintained. Shrubs causing excessive shade should be

removed and Schweitzer recommends mowing during the fall - no earlier than mid-July (1986).

While it was found in recently burned areas at Fort McCoy (Maxwell and Ferge, 1994), until more is known fire should be used sparingly in sites occupied by *E. persius*.

Apparently no prior burning or active management was being conducted at Emmons Creek barrens where Kons found many *E. persius* during 1993 and 1994.

Leonard's Skipper *Hesperia leonardus* Harris

Hesperiidae Hesperinae

Status - Of the three bluestem-feeding skippers covered in this report *H. leonardus* is the most widespread and abundant (Parkinson, 1997). It can be locally common in prairie and barrens habitats and can also be found in more degraded sites.

Similar Species - *H. leonardus* also closely resembles *H. comma laurentina* which also flies in barrens, generally north of Karner blue range. *H. leonardus* is also somewhat similar in size and coloration to some other skippers.

Habitat - Although it is frequently found in barrens, associated with stands of bluestem grasses, *H. leonardus* appears to be more tolerant of habitat degradation than *H. metea* (Swengel, 1994b). Males may be found at roadside puddles and patrolling near concentrations of *Liatris aspera* (Maxwell and Ferge, 1994, Parkinson, 1997). This species comes to moisture in numbers along dirt roads through moist forest habitat in northeastern Wisconsin (Kons, 1997, Parkinson, 1997). Nielsen has found *H. leonardus* nectaring in moist meadows and old fields in Michigan (1997).

Behavior - Kons has observed this species primarily on purple flowers, including liatris and asters (Kons, 1996). Nielsen recorded a Michigan observation of a *H. leonardus* being seized by a robber fly (Asilidae) species, *Proctacanthus milberti*, as it flew from feeding on a liatrus flower (1977). This skipper is a strong flier and is often quite wary (pers. obsv.). Nielsen has observed it ovipositing on *Danthonia spicata* in pine barrens in Otsego County, Michigan (1997).

Dispersal - *H. leonardus*' dispersal ability may be substantial. Its appearance in numbers on a dirt road through a moist forest in Marinette County and along the grassy shoreline of a manmade lake at Lake DuBay Park in Portage County may provide evidence either that this species may be dispersing from its breeding habitat or that some populations are not dependent on barrens or prairie habitat (Kons, 1997).

Management - *H. leonardus* showed a very negative effect from fire which may persist for 3-5+ years (Swengel, 1995). Schweitzer also feels it is quite vulnerable to fire, though cool, fast moving fires are likely less lethal (1985).

Comments - Individuals found in the Wisconsin Karner blue range belong to the subspecies of *Hesperia leonardus leonardus*.

Cobweb Skipper *Hesperia metea* Scudder

Hesperiidae Hesperinae

Status - While this species is of localized occurrence it can be found in considerable numbers over extensive barrens in northern Wisconsin.

Similar Species - Its early flight distinguishes it from many other skippers, but the flight overlaps with *Amblyscirtes vialis* and *A. hegon*, the latter of which is similar in size and coloration to female *H. metea*.

Habitat - *H. metea* occurs only where bluestem grasses (*Andropogon* spp.), the larval food plants, are a consistently dominant element of the herbaceous vegetation. Possible sites may be recognized in the fall by the red-brown cast of bluegrass stems forming a dense cover (Shapiro, 1965). It generally flies in dry, open, sterile bleached out grassy areas, but may also be found in areas with some scattered trees (Borth, Kons, Barina pers. obsv.). Within the barrens habitat in Wisconsin, locations with abundant Karner blue butterflies were not found favorable for *H. metea* by Swengel (1994b). Ferge has found the species at Namekagon Barrens in openings of jack pine-oak scrub and along the fire breaks at the edges of areas managed with fire where nectar sources were most abundant (1989).

Behavior - As described in (Kons, 1995), Borth and Kons observed males frequently perching near the tips of dead grass blades in grassy open areas. The skippers were very wary and difficult to approach and would frequently fly up in pursuit of other males patrolling over the grass level. These chases would occur at an accelerated rapid flight, rising up high over the barrens. Because *H. metea* is small and often flies low to the ground in the grass litter, it is difficult to follow in flight. Females flew slower and low to the ground where they would occasionally nectar on birdfoot violet. In Jackson County in shorter grass habitat both males and females flew low to the ground and nectared on birdfoot violet (pers. obsv.).

Shapiro feels that a definite transient territoriality exists where males feed in early morning and then extend their range in late morning, each occupying a specific site and normally returning to it when disturbed (1965). Shapiro observed both sexes flying into the shade for short periods only (1965). Kons found only females on dates ranging from 3 to 10 June during 1993 and 1995 in Marinette County, but earlier in the season on 21 May, 1994 males outnumbered females there (1997).

Dispersal - Dispersal is unknown but this species is a strong and rapid flier.

Management - *H. metea* requires enough management so that little bluestem, which is an early successional species, is not shaded out by woody growth. Although it is not known how deep larvae tunnel underground, in the East Schweitzer has found survival of *H. metea* to be good after cool, fast-moving fires (1985). Shapiro found the skippers in

burned-over sites the second year following wildfire which had allowed the bluestem grasses to become dominant (1965) but notes its disappearance once the grass is shaded out by trees or is replaced by other grasses. Swengel found wildfires more favorable than prescribed burning (1997a).

Dusted Skipper *Atrytonopsis hianna* Scudder

Hesperiidae Hesperinae

Status - This species can be found in numbers, locally, in sandy barrens areas in western Wisconsin. The species appears to be absent from the eastern portion of the Karner blue range in Wisconsin.

Similar Species - Its early flight is helpful for identification but it may be mistaken for other larger dark skippers such as *Thorybes* species.

Habitat - *A. hianna* has been found on dry open sand barrens with sand blowouts as well as open savanna areas and edges (pers. obsv.). Parkinson has seen this species in Wisconsin only where puccoon and phlox are found (1997). The Swengels found no abundance correlation with the Karner blue (Swengel and Swengel, 1997).

Behavior - In sunny weather Shapiro found it to be a much more active and aggressive species than *H. metea* (1965). He found that feeding occurs in early morning and late afternoon and those females fly low, generally 6-8 inches above the ground. Balogh has observed it in Eau Claire County nectaring on the same roadside patch of phlox where a pair of *S. indiana* was found (1987).

Dispersal - Dispersal is unknown in Wisconsin but Shapiro observed in the East that *A. hianna* "wanders a good deal more than *H. metea*" (1965).

Management - Pupation is up to three inches above the ground and larvae are found up to several feet above the ground (Heitzman, 1974) which probably explains its aversion to mowing and un-intensive cutting (Swengel, 1997). Because succession is slower on hot sandy soils it may be that infrequent limited management is best here.

Comment - Females emerge six days after the males and Shapiro believes the following ten days to be the optimum survey period in Pennsylvania (1965).

Frosted Elfin *Incisalia irus* (Godart)

Lycaenidae Theclinae

Status - Swengel has published a detailed account of *I. irus* (1996), which is the basis of much of this discussion and confirms its relatively low numbers (less than a 1:20 ratio compared to Karner Blues) even in its specialized habitats (Swengel and Swengel, 1997). It is clearly the least numerous of Wisconsin's lupine feeding butterflies where it inhabits

a small subset of Karner blue sites. While all of Swengel's *I. irus* sites also supported Karner blues, her findings also suggest a fair degree of niche segregation, as discussed in Shapiro (1974).

Similar Species - It is one of 5 elfins recorded from Wisconsin all of which fly in the spring and may occur in barrens. It is most likely to be confused with *I. henrici* or *I. polios*.

Habitat -Frosted elfins are rarely found in expanses of lupines blooming profusely in wide open, sunny places, but instead are found in somewhat shadier places with enough sun for lupines to flower and enough shade to prolong flowering. Swengel hypothesizes that greater local canopy diversity and higher canopy density (until lupine flowering drops markedly) would be favorable to prolong the flowering season, all the better to ensure adequate food throughout larval development (1996b). Some canopy may also be beneficial during drought periods. Typically a large patch or series of smaller patches of high-density lupine was required. Swengel (1994b) and Parkinson (1997), respectively, have found the species in patches of high-density lupine in woods openings and within 10 feet of canopy cover in a more open landscape.

Behavior - The primary flight is just prior to peak lupine bloom (Swengel, 1996b). Adults exhibit a characteristic low flight with frequent perching on or near clumps of lupine in scattered oak openings (Balogh, pers. comm. 1996). Swengel found that individuals sometimes perched and flew in the shade, but they usually occurred in sunny patches (if the sun was shining) even in areas of high-density canopy (1996). Paired spiral intraspecific flights emanated vertically, sometimes well out of sight (Swengel, 1996b). Some exhibited heat minimizing perching behaviors (angling to reduce its shadow, perching within shaded vegetation) at temperatures over 27 degrees C. (Swengel, 1996b). Balogh observed perching to maximize sun exposure (angled wings sideways) on cool sunny days in Michigan (1997).

Dispersal - Swengel found most on lupine with nearly all within .5 m of lupine. Schweitzer (1994a) has found adults in the East on new lupine growth within 2 weeks of a burn.

Management - Management that is beneficial to Karner blues may be unsuitable for *I. irus*. For *I. irus* it is critically important to maintain not only abundant lupine but also dappled or partial sun (Swengel, 1996c). Unintensive late season mowing and timber-cutting are potentially valuable strategies. Areas managed with late-season mowing and with only part of the habitat cut each year appear to benefit the species according to Swengel's observations at several rights-of-way sites in Wisconsin (1994). Her best and most consistent *I. irus* site was managed with late-season mowing no more frequent than one cut/year, with only a partial cutting of the habitat in many years (1996b).

Fire management of entire sites is extraordinarily averse for *I. irus*, is at least as harmful as no management at all, and should be distinguished from wildfire effects on *I. irus* populations (Swengel, 1996b). Significantly more butterflies have been found in areas

burned by wildfire over five years previously (Swengel, 1996b). Wildfire areas are surrounded by habitat that have been left unburned for much longer than are fire-managed areas where the entire habitat is burned by units on a rotational basis. May fires could be particularly detrimental by altering lupine phenology and flower abundance as well as direct egg mortality (Swengel, 1994). Numbers significantly increased with less frequent fire and with non-fire managements, especially mowing (Swengel and Swengel, 1997).

Henry's Elfin *Incisalia henrici* (Grote and Robinson)

Lycaenidae Theclinae

Status - This species has generally been found locally in northwestern Wisconsin north of Karner blue habitat, where it may be numerous in oak-pine scrub forest/barrens mosaic. It has been found infrequently in the central or northeastern parts of the state.

Similar Species - It can be confused with more numerous *Incisalia polios*, *I. niphon* and *I. augustinus* with which it often flies. It is similar to *I. irus* (above), especially if worn, and to a lesser extent *I. augustinus*.

Habitat - *I. henrici* has been found in considerable numbers in the extensive heath-covered oak and jack pine forest/barrens mosaic habitat that occurs to the north of the Namekagon barrens in Burnett County (Kons and Borth, 1997). Two concentrations were noted here within the scrub forest/barrens mosaic (Kons and Borth, 1997), however some individuals were found throughout the mosaic. Individuals were rarely found on an adjacent open fire lane, and never on the open frequently burned barrens. Only one individual was found by Borth and Kons over 2 years at the Dunbar barrens, which lack scrub forest /barrens mosaic and contain primarily open barrens and closed forest (Kons, 1997). In addition to openings in oak-heath scrub barrens, individuals have been recorded in bogs in northern Wisconsin (Ferge, 1997) and moist forest in Outagamie and Portage Counties (Kons, 1997).

Dispersal - Some evidence of its potential dispersal ability is suggested by only single individuals being found by Kons in an Outagamie County swamp forest and by James Kruse in swamp forest at Schmeckle Reserve in Portage County despite intensive searching during subsequent seasons (Kons, 1997).

Behavior - Its spiraling flight can be rapid and erratic, but it may be approachable when flying slow and close to the ground (Kons and Borth, 1997). Repeated perching behavior towards the ends of bur oak or shrub branches occurs generally below six feet in height (Kons and Borth, 1997). Nielsen has observed *I. henrici* (before full leaf development along Michigan's sandy trails and narrow wooded sunny openings) as they perched on small shrubs, on dried leaves and twigs or on bare sand (1985). Pairs may spiral together at some height and one individual was even seen to land roughly 15 feet up in a jack pine (Kons and Borth, 1997). *I. henrici* may rub its hindwings together (Iftner, 1992), which is characteristically done by members of the hairstreak group (Scott, 1986) to simulate the

head and antennae, to draw the attention of predators to the wings instead of the head (false head hypothesis).

Management - The association of the adults with small trees or shrubs as observed in the vicinity of the Namekagon barrens argues against excessive clearing of woody species or frequent burning in occupied habitat (Kons and Borth, 1997). Some thinning may be necessary as no individuals were found in nearby areas allowed to succeed to dense canopy (Kons and Borth, 1997). *Viburnum*, which has been identified as a larval host shrub in Michigan, is found in wooded edges (Balogh, 1997).

Tawny Crescent *Phyciodes batesii* Reakirt

Nymphalidae Nymphalinae

Status - **Many** contributors questioned this species' inclusion in the report due to its very minimal association with the Karner blue and secure and widespread status especially in the northern part of the state beyond lupine's range. It may be numerous in extensive areas of similar habitat.

Similar Species - This species is very similar in appearance to *P. pascoensis* and *P. tharos* (the latter is infrequent to absent in northern Wisconsin) so voucher specimens are needed. Males are more readily identified than females.

Habitat - In the vicinity of the Namekagon barrens, it was numerous in more open barrens/scrub forest habitat and along an open sandy fire lane at the edge of this habitat (Kons and Borth, 1997). In some barrens areas, including extensive sites in northeast Wisconsin, it is numerous at the edge of dry forests which may maintain some degree of barrens character (Kons and Borth, 1997). In Marinette County the species is much more common in the dry forest edges than on nearby open barrens (Kons, 1997).

Behavior - Its flight is generally low to the ground, and not rapid unless disturbed (Kons and Borth, 1997). Males in particular congregate over sandy roads where they feed on dung and urine (Kons, pers. comm.).

Dispersal - It is difficult to determine the degree of dispersal as the species is often widespread and difficult to distinguish from other species. Adults may disperse out of their breeding habitat for moisture and nectar (Ferge, 1997).

Management - Although no information on management was found it would be useful to maintain areas of asters, potential larval hosts, along forest edges and in the barrens.

Comments - The author feels it would be unwise to list this species as federally threatened or endangered due to its widespread occurrence in Wisconsin and great similarity to other species.

Gorgone Checkerspot *Chlosyne gorgone* Hubner

Nymphalidae Nymphalinae

Status - This species is apparently more associated with barrens and prairies in Wisconsin than throughout the Great Plains where it is found in a variety of habitats. It can be found in numbers, locally.

Similar Species - The underside hindwing pattern is distinctive.

Habitat - In Wisconsin, lepidopterists noted that the species inhabits both barrens and dry prairies (Ferge, 1990). It may be numerous along roadsides or agricultural areas in southwestern Wisconsin in certain years (pers. obsv.) or colonize prairie plantings (Kons, 1997). The Swengels found no correlation between Karner blue and *C. gorgone* abundance (Swengel and Swengel, 1997).

Behavior - Swengel (1995) has found this species nectaring primarily on orange-yellow flowers (31 out of 40 nectar records). This species usually flies low to the ground and in taller prairies flies just over the vegetation (Kons, pers. comm.).

Dispersal - Kons has inferred evidence of substantial dispersal ability due to *C. gorgones'* appearance at two sites in Outagamie County where intensive survey failed to uncover it during prior seasons. One of these sites was a butterfly garden owned by Richard Merkhofer who reared *C. gorgone* larvae found there on Gloriosa Daisies (1997). In addition this species apparently colonized a prairie planting (planted from seed) at Mosquito Hill Nature Center in Outagamie County (Kons, 1997).

Management - Kons (1997) observed that a *C. gorgone* colony in Outagamie County was apparently eradicated after an entire prairie planting was burned during Spring, 1991, providing circumstantial evidence that it is highly sensitive to burns. It had been numerous there the previous 2 years and recolonization had not taken place as of 1995. This species is also averse to mowing and un-intensive cutting (Swengel, 1997).

Comments - Kons (1997) and Swengel (1994) have detected a third or partial third brood in Wisconsin during some years.

Phlox Moth *Schinia indiana* Smith

Noctuidae Heliethinae

Status - This species is listed by the Wisconsin Department of Natural Resources as "endangered" in Wisconsin. This species was first discovered in Wisconsin in an Eau Claire County power line cut in June 1973 by Fay Karpuleon. A total of 49 individuals

were uncovered in Menominee county at 11 sites in the vicinity of Legend Lake over three days of intensive searching by Kons and Borth (1992). *S. indiana* was associated with *P. pilosa* occurring in extensive sandy oak/pines habitat along roadsides and trails. It was then found at 34 sites in oak savannah at Fort McCoy from 1993-1996 (Maxwell and Ferge, 1994; Kirk, 1994; Kirk, 1995). Two Burnett County sites and over 5 Jackson County sites have been found by Swengel (1994). Sparce county records may be indicative of the fact that this species cannot be found by customary collecting techniques.

Similar Species - In contrast to many Noctuidae this is a colorful, diurnal species readily identifiable in Wisconsin.

Habitat - The habitat is pine-oak barrens on sandy soils where *P. pilosa* is found (Balogh, 1987) (Kons and Borth, 1992). In Menomonee County it was found in both sparsely and thickly vegetated phlox areas (Kons and Borth, 1992). It is also found on open prairies in western Minnesota (Balogh, 1997).

Behavior - This species is well camouflaged on Downy phlox blossoms on which it rests, making it difficult to spot. Searches for the moth were not as productive under hot sunny conditions during which some individuals were seen to exhibit a rapid, darting flight (Kons and Borth, 1992). Kons and Borth found moths in both sunny and shaded areas (1992).

Dispersal - It has short range dispersal into and out of patches of phlox (Kons and Borth, 1992), however longer range dispersal is unknown.

Management - Review of the species' life cycle indicates that removal of above-ground phlox growth from May to July would be harmful. Several *S. indiana* locations in Wisconsin are rights-of way where roadside mowing may be safely undertaken in August when presumably the species is underground (Maxwell and Ferge, 1994). Depth of hibernation is unknown for this species, so effects of soil disturbance or fire management during the period from August through April cannot be predicted. Tree planting has been implicated as a factor in habitat loss for *S. indiana* (Schweitzer, 1989).

Management

Management methods that promote lupine growth and enhance Karner blue habitat may, depending on their timing or intensity, have either positive or negative impacts on other species. It should be recognized that nonmanagement is also a management decision. Since research on management of barrens associated species is incomplete, definitive recommendations cannot be made upon current knowledge. However, it is hoped that this information can help lead to an informed land management process based on the best available data.

Under an adaptive management approach (Baskerville, 1985) clear goals are set, pre- and post-treatment observations made, and management practices modified based upon

documented results. Best management practices would suggest first surveying recovery sites for these lepidoptera. Barrens dependent lepidoptera present a broad range of response to management so that their particular needs should be incorporated into the goals of site specific recovery plans. While there is no legal requirement to manage for these associated species, understanding something about their biology may allow the land manager to avoid any incremental costs, and preserve needed habitat for more species.

Because no one management type is favorable to all species, when managing for multiple species it is even more important to divide the site into multiple management plots so as to not include a large portion of a required plant resource in any one plot. Leaving portions undisturbed provides refugia for recolonization for species that may initially suffer high mortality due to management strategies being employed.

It's better for each site to adapt its management to its own particular species and history, rather than blindly follow how other sites are managed. Using different management techniques for similar sites is beneficial because various species differ as to favorable and adverse management types, even among specialists of the same habitat (Swengel and Swengel, 1997). For example, at Swengel's Frosted elfin highway site the ditch may be mowed more than once per year while the power line may not get mowed for several years, providing a gradient of management intensity and shrub transition to the adjoining property (Swengel, 1996c).

Management consistency within a particular site is equally important because the sequential use of different management types may successively eliminate species sensitive to each type (Swengel and Swengel, 1997). In the current fragmented landscape subsets or species assemblages can still be identified and conserved efficiently within the same set of sites.

Barrens management includes strategies ranging from intensive such as prescribed fire, to more moderate such as mowing, haying, thinning, grazing and applying herbicides to doing nothing. Most barrens dependent lepidoptera showed significantly increased numbers associated with less frequent and/or less intrusive managements; however, leaving habitat entirely unmanaged was rarely optimal (Swengel, 1997a). A general discussion of these techniques as they may apply to associated species follows.

Intensive Management

Fire: Fires which open new sites and set back succession have been proposed to have been an integral part of the barrens community. High intensity burns are expected to be needed in areas with closed tree canopies. The thick bark of bur oak makes it more tolerant to fire, while black oak may be top killed with high intensity fire but persists by resprouting and jack pines with thinner bark are less likely to survive fire (Curtis, 1959, Benzie 1977). Examples given by New (1993) of fires benefiting a butterfly were typically infrequent burns that create new habitat patches to be occupied by the butterflies afterward during long fire-free intervals, rather than repeated fires that maintain existing habitat already occupied by the butterfly. Swengel distinguishes between fire

management and wildfire effects because significantly more wildfire areas are surrounded by habitat that has been left unburned for much longer than are fire-managed areas where the entire habitat is burned by units on a rotational basis.

Any application of fire is likely to result in mortality of some barrens associated species in the burned areas. Less frequent burning over 6-18 year intervals has been suggested in Karner blue populations to allow young oaks to establish and grow to a size and age resistant to fire (Grigore 1992, Givnish et al. 1988). Where prescribed fire is used it is advisable to avoid burning contiguous plots (the smaller the burn size the better), to avoid relighting skipped areas and to minimize backfires. Also, the use of fire alone may stimulate woody growth by selectively benefiting fire tolerant variations in woody growth (Schlicht, 1993).

Seasonality of fire influences plant effects, with late spring burning tending to favor warm season grasses and fall burns favoring cool season grasses (Daubenire, 1968, Collins and Glenn 1988). May fires can be particularly detrimental to lupine feeders by altering lupine phenology and flower abundance as well as resulting in direct egg mortality (Swengel, 1994). Skipper larvae may or may not survive in a spring fire. In both cases the species will survive if enough surrounding refugia are left unburned (Nielsen, 1997). Because there is conflicting research about just how deep and how long lethal fire temperature penetrates the soil, refugia should always be preserved.

Swengel (1995) identifies four factors affecting response of prairie butterflies to fire including: (1) habitat niche breadth: species with broad habitat niches are more widespread and more likely to have source populations within dispersal distance for recolonization; (2) voltinism: multivoltine species have more generations in which to recover between fires; (3) location during fire: resident species are vulnerable to fire unless their location (e.g. underground) protects them (cf. McClure, 1981) and (4) vagility: species with a greater dispersal tendency can reoccupy burned sites more quickly.

Karner blues, which have a larval host that benefits from fire (Grigore and Tramer, 1996) appear relatively tolerant of management and of burning, despite apparently high mortality of immatures during fire (Swengel 1995, Swengel and Swengel 1996). According to Swengel (1995), "skipper after skipper we've found experience BOTH short- and long-term declines at fire-managed sites." Fewer, smaller and more restricted lepidoptera populations generally recover slower (if at all) from fire (Swengel, 1995). She found areas burned by a single wildfire 4-18 years ago produced results strongly contrasting with and much more favorable than prescribed burning for the Frosted elfin, Cobweb skipper, Gorgone checkerspot and Leonard's skippers (1997a).

Moderate Management

Mowing/Haying: Areas managed with late-season mowing and with only part of the habitat cut each year appear to benefit a number of species according to Swengel's observations (1994). Most of these barrens dependent species showed significant

increases in numbers associated with less frequent and/or less intrusive management. In contrast to fire management, unintensified management supported relatively dense populations of specialist butterflies (Swengel and Swengel, 1997). Mowing and haying are superior for spring flowers to burning which favors native grasses that shade and choke out spring flowers.

Timing and application of mowing management should be considered. For Karner blues the optimal time to mow is mid to late October when overwintering eggs are present and are laid less than 4" from the soil. While it may be efficient to cut or mow before plants translocate winter stores to roots (mid-June through August), species affected should be considered to make sure they are not in a vulnerable life stage. For example, mowing is best done to benefit Frosted elfins long after lupines finished seeding and the larvae have pupated and are presumably lying well below the mowers blade. The maximum frequency should be once per year to avoid excessive plant damage. Its best that only a portion of the habitat be mowed at a time. Slash and clippings after mowing or cutting should be spread on non-habitat areas.

In some cases medium to more severe intensities of mechanical site preparation are needed to encourage Karner blue plant resources while controlling competing species such as Pennsylvania sedge (*Carex pennsylvanica*).

Grazing: Grazing is more gradual than mowing/haying. Some have proposed that the presence or absence of grazers has a lot to do with control of woody growth. Native grazers which have co-evolved with the plants in these habitats may be preferable to domestic grazers but their feeding preferences should be considered in relation to species present at that site. Experimentation with buffalo grazing is being contemplated in Wood County. Due to the size of most sites grazing should only be used occasionally and for brief periods.

Herbicides: Application of herbicides directly to competing woody vegetation through basal sprays, stump treatments, hack-n-squirt methods, etc. is expected to minimize contact of herbicide with Karner blue plant resources and is generally considered the safest method. Herbicides reducing competition to understory vegetation are expected to result in an increase in the abundance of species present and in species diversity, although increases may only last a few years. Surveys are necessary prior to herbicide release studies. Herbicides may be required for aggressive species and species that create underground suckers from mechanical treatments and should be considered for difficult species such as sumac and black locust.

It should be noted that pesticides can be harmful to many species of lepidoptera. For example, Btk used in control of Gypsy moth is known to kill Karner larvae in laboratory settings and it is expected that applications in Karner blue occupied areas will result in significant Karner mortality and negatively impact non-target butterfly and moth species (Papp, 1996). The U.S. Fish and Wildlife Service recommend that use of BT and Btk within one-half mile of Karner blue occupied habitat be prohibited (Lane, 1997). However, shade is also lost from gypsy moth defoliated trees (Papp, 1996; Lane 1997).

Wisconsin's Department of Agriculture, Trade and Consumer Protection, which is an HCP partner, has drafted guidelines for pesticide use in Karner blue habitat.

Thinning/cutting: Tree cutting or girdling can be used to begin restoring a forested area to more open barrens to allow sufficient light for needed understory vegetation. Red pine stands may require a wider spacing than jack pine to permit sufficient light to reach the forest floor and allow lupine or other host plants to persist. Openings must be large enough to permit flowering of lupine and nectar plants. The size of the opening needed to permit lupine flowering will vary with the tree species, age of trees, and other factors, but is expected to occur at 1.5 to 2 times the average height of surrounding trees or with an average canopy cover of between 40% and 60% (Maxwell and Givnish, 1993). Removal of larger trees should be done in the winter with frozen ground and snow cover in order to protect the suppressed understory species. Setback of woody species can be maximized by cutting and recutting sprouts more than once per year as well as recutting in successive years.

Short-term Nonmanagement

While fire suppression and habitat fragmentation have increased the need for overt management, management may not always be appropriate. In the long-term, an early successional community requires disturbance, however some sites such as hot sandy sites may change very little from year to year and drier soils require less frequent fires. In light of limited information on these sites little or no management may be best in the short-term until more information is known. Some species such as Dusted skippers and Gorgone checkerspots have been found to be adversely affected by even non-intrusive managements. Swengel found the Cobweb skipper and Leonard's skipper rather intolerant of any active management type (1997a).

Additional Considerations

It would be beneficial to broaden research focused on Karner blues to include the species treated here as well as other barrens associated species. Basic life history questions integral to management (such as whether Frosted elfins pupate in leaf litter or underground in Wisconsin) need to be resolved. Observations and photographs of nectaring, mating, ovipositions etc. especially as part of planned studies are very useful. Collecting is an effective way to document/support distribution, life history, behavioral, ecological and evolutionary/taxonomic studies. To reliably evaluate if the lepidoptera component of an ecosystem is being preserved requires a voucher material baseline on species that occur there. Extensive species inventory collections from specialized habitats are needed to improve our understanding of what species are dependent on these habitats. Numbers of specimens collected are generally negligible in terms of insect population levels but these vouchers contribute significantly to identification of quality habitat and our understanding of the barrens ecosystem. Emphasis and concern should not be misplaced on individual organisms with regard to reasonable collecting or

experimentation when considering intensive management and conservation options that may significantly impact populations.

This report includes only one moth species as moth taxa are relatively poorly known compared to butterflies in terms of general biology, habitat association and response to management practices. In Ferge's (1997) opinion, "we hardly have enough data on common forest habitats and various disturbed areas to use as a baseline to evaluate the uniqueness of the barrens or prairie moth fauna." In order to provide HCP partners with some currently available information, Kons and Borth prepared a "Preliminary Wisconsin List of Barrens and Dry Prairie Associated Moths" (1996) based on consideration of well over 15,000 moth records from a diverse array of general and specialized habitats and published larval hosts. While additional information will likely warrant species' additions or deletions, this list is intended to lead to better informed decisions for evaluating habitat quality and site management than species' inventories alone. For example, it cites lead plant, which occurs in some Karner blue habitat, as a critical larval host for several moth species which are highly sensitive to fire (Borth and Barina, 1991).

Concluding Remarks

There is a need to preserve high quality barrens areas of sufficient size that they cannot be entirely consumed by a single fire. We should not try to create Karner blue zoos and wildflower gardens when dealing with large tracts of land, but rather something resembling natural habitat in which the Karner blues and associated species occur in their natural state with as little direct management as possible and on sufficient acreage (Schweitzer, 1994b). Small patches of habitat supporting specialized lepidoptera also have value.

The Karner blue's protective umbrella has many holes with regard to other barrens associated species. However, by taking an ecosystem approach, which also incorporates the biological requirements of other lepidoptera, a land manager can maintain healthy and diverse populations of other barrens associated species in addition to fulfilling legal obligations to protect the Karner blue.

Color Photos

The original report by R.J. Borth and others included one page with nine color photographs. These pictures are not reproduced here due to difficulties associated with printing and publishing.

Species depicted included *Erynnis martialis*, *Erynnis persius*, *Incisalia hanrici*, *Chlosyne gorgone*, *Atrytonopsis hianna*, *Schinia indiana*, *Hesperia leonardus*, *Hesperia metea*, and *Incisalia irus*.

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Appendix C. History of Wisconsin Karner Blue Butterfly HCP Partnership, Articles of Partnership and Partnership Anti-Trust Policy

This appendix provides a brief historical overview of the Wisconsin Karner Blue Butterfly HCP partnership effort. It also provides information on the institutional framework on which the HCP partnership has been based since its inception (i.e. the Articles of Partnership) and compliance with anti-trust laws.

A. History of Wisconsin HCP Partnership

The USFWS listed the Karner blue butterfly as an endangered species in December 1992. This listing extended protection and recovery provisions of the ESA to the Karner blue butterfly and made it unlawful to conduct activities which would result in "take" of this butterfly. Several current and planned land uses and management processes have the potential of resulting in take as defined in the ESA.

In February 1994, representatives of Georgia Pacific Corporation visited with key Wisconsin DNR administrators and staff members to discuss whether or not the DNR would help with the construction of a statewide HCP for the Karner blue butterfly. Georgia Pacific officials were planning to talk to USFWS staff and were interested in exploring the concept further with DNR. The company was interested in constructing an HCP as efficiently as possible and wanted to know what DNR's role could be in such a process.

A short time later, DNR staff met with USFWS Region 3 staff. USFWS staff challenged DNR personnel to "take the lead in the Wisconsin HCP process." DNR staff then met internally to determine which interested parties might be involved. A series of meetings to discuss what procedures and objectives could be outlined to complete the HCP followed. These meetings, involving forest products companies, several utilities, conservation organizations, and state and federal agencies led to the establishment of the HCP Articles of Partnership. These articles served as the process rules for the series of meetings at which the issues involving completion of the HCP were discussed and decided.

Beginning in the fall of 1994 and extending into 1998, HCP partnership meetings were held on a regular basis to provide direction for the development and drafting of the HCP, implementing agreement, individual partner species and habitat conservation agreements, appropriate guidelines and protocols, and other associated documents. On September 27, 1999 the HCP was approved and the DNR along with 25 other partners began to implement the HCP.

Wisconsin Karner Blue Butterfly Habitat Conservation Plan

From 1999 through 2009 the HCP Partners, now numbering 40, successfully implemented the HCP under an aggressive adaptive management program.

Included in this appendix are:

- Articles of Partnership
- Anti-Trust Policy
- HCP 5-Point Plan

The original Articles of Partnership were created to guide the development of the HCP and application for an incidental take permit. The Articles of Partnership included here have since been updated to reflect the ongoing implementation of the approved HCP.

Also included in this section are the Anti-Trust Policy, which precedes all Partner meetings and the HCP 5-Point Plan, which provided guidance to the adaptive management process from 2005-2009.

ARTICLES OF PARTNERSHIP

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan

Mission

1. Implement and maintain the Wisconsin Statewide Karner Blue Butterfly (KBB) Habitat Conservation Plan (HCP), which integrates conservation with economic and other land uses through a partnership among stakeholders sharing their collective knowledge and experience for as long as the species needs our conservation for its populations to be sustainable in the state.

Guiding Principles and Precepts

2. The strength and vision of our statewide partnership is founded in the basic principles of trust, commitment, and service toward a higher goal. Each acre of habitat enrolled in the partnership will contribute to the accomplishment of our overall goal, saving the Karner blue butterfly from extinction, by preserving and promoting a landscape of suitable habitat throughout the state, while continuing to reach our business goals.
3. We affirm that our partnership is formalized via Species and Habitat Conservation Agreements (SHCA) between each individual partner and the DNR;

Therefore, we set forth to achieve the following goals:

Goals

4. Focus primarily on the conservation of the Karner blue butterfly while fulfilling the commitments and responsibilities in respective conservation agreements and consistent with the Federal Endangered and Threatened Species permit number TE060014-x.
5. Provide sound barrens/savanna ecosystem management when performing management activities on the working landscape.
6. Encourage multiple species consideration in management planning for those ownerships where such measures are desirable and feasible and acceptable by the landowners.
7. There will be No Net Loss of Karner blue butterfly Habitat (NNLOH) as a result of HCP partner activities in the KBB High Potential Range (HPR).
8. To assist in Karner blue butterfly recovery in Wisconsin. The HCP partners' role in recovery can best be described as "voluntary" and a "support" role (*Also see article 12*).

9. Seek to reduce or eliminate regulatory compliance requirements associated with the Incidental Take Permit (ITP).
10. Set a good example for collaborative, grass roots conservation and responsible stewardship.

Strategic Intent

The Karner Blue butterfly Habitat Conservation Plan (HCP) intends to:

11. Apply a structured Adaptive Management strategy that incorporates sound science, societal needs and economics.
12. Implement the statewide HCP in ways that will not prevent the management or recovery of other species.
13. Implement the Wisconsin Statewide Karner Blue Butterfly HCP as a collaborative process designed, consistent with these Articles, to include all interested parties.

Description of Partnership

14. Partners are those persons, agencies or organizations:
 - a. Entering into and agreeing to these Articles of Partnership; and
 - b. Having an ownership interest i.e. fee title or easement in land with existing or potential Karner blue butterfly habitat; or
 - c. Having economic assets at risk as a result of the listing of the Karner blue butterfly as endangered; or
 - d. Having a role in implementing the HCP e.g. municipalities, utility providers, etc.

The status (inclusion or exclusion) as a "Partner" will be determined by the Implementation Oversight Committee (IOC). A recommendation of inclusion will be after consideration of an application for partnership, supporting the party's eligibility. A recommendation of exclusion will be determined following consideration of evidence of failure to act in good standing as a partner. A Partner may withdraw by letter of request consistent with their SHCA.

15. Decision making process of the HCP partnership:

- a. Consensus in the partnership process, whether partners or not, will be the goal in making decisions or determining direction. Where consensus cannot be reached, the partners present shall determine. The vote of a minimum of three-fourths (3/4's) of the partners present plus one is necessary to support a decision. All partners are equal in this development process and have an equal vote. Partners may designate proxies.
 - b. Consensus will likewise be the goal of the IOC decision making process. Where consensus cannot be reached, the IOC representatives present shall determine. The vote of a minimum of three-fourths (3/4's) of the IOC members or alternates present is necessary to support a decision. All IOC members are equal in this process and have an equal vote. IOC members may designate proxies when their alternate cannot attend.
16. Persons or organizations other than partners are invited and encouraged to participate in the HCP process. Their opinions and advice will be considered.
 17. Noncompliance with the Articles of Partnership shall result in the Partner(s) forfeiting partnership status and the right to vote under Articles 14 and 15.
 18. The Administrator of the Partnership shall be the Wisconsin Department of Natural Resources. The Department's role shall include, coordination and facilitation of the process, provision of administrative support, oversight of the process, principle administrator of all applicable documents related to the permit, including National Environmental Policy Act (NEPA) documents, holder of the Incidental Take Permit and implementation and oversight of activity under the permit and in accordance with the Implementing Agreement (IA), all consistent with the direction of the Partnership, the IOC and approval of the Natural Resources Board and the Governor and State Legislature. The Department's role as partner will be consistent with this agreement and in furtherance of conservation of endangered species.
 19. The U.S. Fish and Wildlife Service shall be invited and encouraged to serve in an advisory capacity to the process.

Rules of Procedure

20. All meetings of the Partnership shall be noticed and held as public meetings. Participants, as defined in Article 23.c, may provide advice and shall be involved in the business of the meetings consistent with Articles 15 and 16.
21. A minimum of two-thirds (2/3) of the Full partners shall be present at a meeting to constitute a quorum to vote on an issue under articles 14 and 15.

22. Meetings of the Partnership may be held at a variety of locations in the state. Dates and times of meetings shall be determined by the Partnership, Committees, Subcommittees or Teams. Arrangements for meetings shall be made by the HCP Coordinator, committee chairs, or team leaders as appropriate.

23. Meetings shall be subject to the following:

a. The HCP Coordinator is responsible for HCP Team and IOC meeting minutes. A note taker, or the method of recording the discussion and decisions made at a meeting, shall be the responsibility of the HCP Coordinator. Comment periods and requests for information in the minutes shall be consistent with direction of the Partnership, if given. Minutes shall be prepared and distributed to the Partnership, and others attending the meeting. The minutes shall be routinely distributed within twenty (20) working days from the meeting. They may be amended if necessary, and shall be approved at the following meeting.

b. Committees, Subcommittees or Teams may establish review or comment periods for their membership and the Partnership.

c. Participants in the process, other than the Partners, shall be provided meeting minutes. Participants include:

(1) Those who serve in an advisory capacity; or

(2) Those who have a scientific interest in protection and recovery of the Karner Blue butterfly; and

(3) Those that were fully involved in discussions during the plan development and are involved in the implementation. Participants who attend are expected to be prepared for meetings.

d. Other persons interested in this conservation effort, upon request, and consistent with the Communications Plan, shall be provided with regular mailings on the implementation of the HCP and issues related to the ITP.

24. The Articles of Partnership may be amended by a two-thirds vote of the Full Partners.

25. Amendments to the HCP may not be acted on by the Partnership prior to IOC or Partner approval. The IOC will act on behalf of the Partners. However, at the discretion of the IOC, should those amendments be seen as having or potentially having significant, adverse impacts to the partners they represent, those partners will be apprised of the proposed action and given the opportunity to register individual opinion. This review may occur by contacting each partner individually, at a meeting of partners from an entity group, or at an annual HCP Team meeting.

26. Communications and public information, including press releases, shall be consistent with a public information plan or release agreed upon by the Partnership. This provision does not restrict the release of information subject to and consistent with the Public Records Law, Ch. 19, Wis. Stats.
27. The Karner Blue Butterfly HCP shall include and incorporate a public information component designed to effectively inform and update all interested persons on the proceedings and progress of the HCP.
28. The Partnership in the implementation of the Conservation Plan has no direct responsibility to the Recovery Plan; however, an open and clear line of communication between the Karner Blue Recovery team and this Partnership will be maintained in a support role consistent with these Articles and for the exchange of technical information.
29. The Karner Blue Butterfly HCP shall be statewide in scope, with reasonable and prudent goals, incorporating an incentive based approach to assure its broad and effective application in Wisconsin.
30. Land management, monitoring, and reporting activities will be consistent with the ITP, HCP, IA and individual SHCAs.

Original December 13, 1994
1st Amendment January 23, 1995
2nd Amendment April 25, 2009

(End)

Antitrust Policy

The conduct of this assembly is in no way intended to present any federal or state antitrust problems. However, the operation of this assembly requires that representatives of member organizations meet together, and since these member organizations in the normal course of their business may be competitors, it is deemed advisable to set forth this policy with regard to Antitrust Compliance.

The uncompromising policy of this assembly is:

STRICT COMPLIANCE WITH THE SPIRIT AND THE LETTER OF THE ANTITRUST LAWS.

In furtherance of this policy, the following rules are adopted to provide those assembled today with precepts to guide them in their conduct.

NO ACTIVITY OR COMMUNICATION SHALL:

1. be used for the purpose of bringing about or attempting to bring about any understanding, arrangement or agreement, written or oral, formal or informal, express or implied, directly or indirectly, among competitors with regard to (a) prices, terms or conditions of sales, distribution, volume, production, territories or customers, or (b) prices or purchases of any materials, equipment, services of supplies, or suppliers.
2. include discussion, directly or indirectly, for any purpose or any fashion regarding (a) sales prices or pricing methods, production quotas or other limitations on either the timing or volume of production or sales or allocation of products, territories or customers, or (b) purchase prices or pricing methods, purchasing quotas or other limitations on either the timing or volume of purchases or allocation of purchases of materials, equipment, services or supplies or allocations of territories or suppliers.
3. include any discussion which might be construed as an attempt to prevent any person or business entity (a) from gaining access to any market or customer for goods or services, or (b) from obtaining a supply of goods or otherwise purchasing goods or services freely in the market.
4. make any effort to bring about the standardization of any product for the purpose of or have the effect of preventing the manufacture, sale or purchase of any product not conforming to a specified standard.

In all discussions, formal or informal, all assembled are expected to observe and conduct themselves in accordance with these rules and in compliance with all antitrust laws and regulations, both federal and state.

Persons invited to participate in or giving presentations shall be advised of the need to comply with these rules and applicable laws and regulations.

It is the responsibility of all assembled to comply with the letter and spirit of these rules, and with all applicable state and federal antitrust laws.

Karner Blue Butterfly HCP
December 22, 2005 DRAFT
D. Lentz and J. Christenson

“10-YEAR + RECOVERY” PERMIT RENEWAL ALTERNATIVE

Five tenets form the basis of this Five Point Plan:

1. Kbb habitat needs periodic disturbance.
2. There are many more Kbb in Wisconsin than originally imagined; the Kbb is not in jeopardy here.
3. Land management activities that provide beneficial disturbance should not be discouraged by the prohibitions and requirements of the conventional endangered species protection mindset and incidental take permit features.
4. The DNR and other Partners and Participants to Wisconsin’s Karner blue butterfly KBB) conservation program have finite resources available to apply to the KBB. They have realized that in order to finish the conservation program successfully that they must assist in recovery efforts for the species.
5. In making commitments to recovery of the species in Wisconsin, the Partners and Participants recognize that under Section 4(f) of the Endangered Species Act of 1973 (ESA), the federal government is responsible to establish and implement recovery programs for listed species. Therefore, in volunteering to assist in recovery, the Partners and Participants will seek cooperation from the Fish and Wildlife Service to modify commitments to redirect available resources currently solely devoted to the HCP to recovery efforts. They will also seek reasonable modifications of the recovery provisions of the ESA to allow down listing or de listing invertebrates by distinct population segment or on a geographic or jurisdictional basis, e.g. by State or other considerations regarding management and regulatory treatment under the Act .

THE FIVE POINT PLAN FOR A STATEWIDE HCP
BEGINNING TODAY AND BEYOND 2009

1. **FOCUS HCP implementation on recovery areas.**
 - Focus efforts on recovery areas (SPAs and/or ACEs?)
 - De-emphasize focus on non-recovery areas; to the extent possible reduce time and resources for activities that serve to comply with regulations but do not add conservation benefits for the species
 - Eliminate or reduce non-value added, non-ESA required activities that do not add conservation value.
 - Redirect available resources toward the goals and objectives of this plan.
2. **STREAMLINE PROCESSES**
 - Reduce costs to the extent possible to DNR to administer statewide program and to DNR properties and partners to implement the HCP so they may be redirected towards recovery efforts and this Plan.
 - Redirect available resources toward the goals and objectives of this Five Point plan.
 - Develop a repeatable, consistent training and orientation program to assure appropriate and necessary conservation and permit compliance, which provides beneficial disturbance and successional management and reduces mistakes and rework so as to redirect resources to this Plan.

3. **IMPROVE PROTOCOLS AND GUIDELINES, i.e. monitoring and management protocols and guidelines.**
 - Accomplish desired results with only those resource expenditures likely and necessary to accomplish the goals of this Plan.
 - Redirect available resources toward the goals and objectives of this Five Point Plan.
 - Eliminate activities or methods unlikely to provide beneficial conservation or are inconsistent with this Plan.
 - Correct inaccurate or conflicting information.
 - Re-organize protocols & guidelines, and their delivery systems to be user-friendly, easily accessible and clearly understood to assure efficient use of available resources.

4. **RECOVER the KBB in WI**
 - Demonstrate KBB is in reality recovered in WI due to its persistence in the State based on historic and traditional on-going management of the land.
 - Develop recovery implementation plans that describe the long-term management plan being committed to by the DNR which describes how the DNR will maintain sustainable KBB populations.
 - Seek reasonable modification to the ESA to allow Distinct Population & Geographic Segment treatment in the ESA for invertebrates which will recognize efforts of public and private entities, reward those entities for sound conservation efforts and programs for rare species, and make available resources to then be applied to other rare species in the jurisdiction.
 - Document, or continue to develop data supporting KBB down listing for the WI KBB population segment.
 - Redirect available resources to other conservation and partnering opportunities that result from reduction of management and regulatory constraints or result from down listing or de listing the KBB in WI.

5. **Extend the TERM of the permit: Develop 10-Year ITP RENEWAL proposal**
 - Include a provision in the HCP/ITP, that after an additional 10 years of implementation of conservation programs under the HCP/ITP, with an additional focus on recovery that non-recovery area lands are given incidental take authority through the “voluntary” category inclusion.
 - Redraft Articles of Partnership to emphasize (include) and define partners’ recovery goals.
 - Amend HCP and Implementing Agreement, where necessary, to capture recovery direction commitments.
 - Redirect available resources toward the goals and objectives of this plan.

\\ITP Renewal\...\ KBB 5-point plan outline 12-22-05 updated 2009.doc

Wisconsin Karner Blue Butterfly
Habitat Conservation Plan and Environmental Impact Statement

**Appendix D. Participation Plan and Landowner Inclusion
Strategy Supporting Information**

This appendix includes supporting information for the participation plan and landowner inclusion strategy described in Chapter 5 of the HCP. The Appendix is organized as follows:

- A. Communication Plan
- B. Participation Decision flow chart
- C. Application for Inclusion (template)
- D. Inclusion Fees
- E. Species and Habitat Conservation Agreements (Templates)
 - for Full Partners
 - for Limited Partners

A. Communication Plan

Karner Blue Butterfly HCP Strategic Communication Plan Draft 9/12/2007

Introduction

Executive Summary

The Karner Blue Butterfly Habitat Conservation Plan (HCP) has been focused heavily on two valuable processes; Outreach and Education and Adaptive Management. This strategic communication plan is designed to take advantage of these key processes and move the HCP forward by focusing on the following objectives:

- Meet the outreach and education requirements of the HCP, Incidental Take Permit, Implementing Agreement, and support partner Species and Habitat Conservation Agreement commitments
- Provide informational resources to interested landowners and other voluntary, non-partner entities within Wisconsin and to the public at large
- Focus priority outreach and education efforts on those areas that are strategically important to the recovery goals of the Karner blue in Wisconsin
- Provide program and technical information to all HCP partners and interested parties
- Receive and retrieve data and other information regarding the Karner blue program in an efficient manner
- Educate state and federal policy makers and regulators about the Karner blue program needs and experience in WI and the status and activities of the HCP partnership
- Spread awareness about the success of the HCP and the lessons learned throughout the development and implementation of this program to academics, policy makers, conservationists, resource professionals, and others
- Continue to provide expert advice, assistance, and information to the general public, students and other resource professionals interested in the Karner blue butterfly, barrens ecosystems and the voluntary conservation approach of the HCP partnership

Background

The Wisconsin Department of Natural Resources coordinated an effort on behalf of many public and private landowners to develop a landscape scale, multi-partner Habitat Conservation Plan for the Karner blue butterfly. This was an innovative approach in more than one way, but especially in the inclusion of a “Voluntary Category” of property owners that would receive permit coverage for incidental take of the Karner blue, with no additional regulatory requirements.

This innovative approach was predicated on the massive conservation work that the HCP partners agreed to and also a proactive outreach and education program. As quoted from the HCP “a non-regulatory approach, substantial public outreach, education and assistance programs will be included to **foster partnerships** and **encourage conservation efforts** on a **voluntary basis**” (emphasis added)

This approach was anticipated to remove the fear of regulation by property owners and encourage proactive conservation and stewardship on these lands. This assumption was accurate and has proved to be immensely successful. In the first 8 years of the HCP, many thousands of landowners, citizens and students have learned about the Karner blue, its habitat and ways to conserve and restore the imperiled habitat that the Karner blue needs.

The HCP also made the realization that the partners would learn much through implementing the permit and encouraged adaptive management. This adaptive management has fostered efficiency and focus on behalf of the partners, and as detailed in the Situational Analysis, this Strategic Communication Plan helps to support that focus to the larger goals of Karner blue conservation and ultimately recovery.

Situational Analysis

Issue: Outreach and Education should be focused on those areas that provide the greatest conservation benefit

Focus of O&E was recognized in the HCP when the ACEs and SPAs were created. The focus on these areas will transition to be defined by the Biological Recovery Zones. The Communication Strategy should be adjusted as well.

Issue: Resources are scarce

A broad brush approach to O&E around the state has been effective at fostering an understanding of the Karner and its habitat. However, this general approach to O&E has not satisfied some specific HCP goals. This general approach to O&E can become an extra workload for partners with little added conservation value. Systems and processes used to collect, distribute and store information can be made more efficient.

Issue: Efficiencies should be identified, duplication of effort minimized and collaborative efforts sought.

As resources are scarce it is imperative to utilize the available resources to the greatest extent possible. This requires coordination and creativity on behalf of the partners to leverage the existing O&E infrastructure and identify new individuals, organizations and outlets to help support and communicate the message.

Issue: Clear direction and support should be provided to partners.

Commitments vary with partners. O&E has been broadly implemented, often on demand and when opportunities became available rather than by design.

Issue: New tools are available

Web based O&E has reduced workload and improved access to information. The use of web based communication can continue to improve quality and efficiency

of the O&E and other information provided to partners, landowners, regulators, and the public at large. These tools can also help to make the administration of the program by DNR and compliance with the ITP by all partners more efficient.

Issue: Adaptive Management

The HCP partners have taken the time to assess and adjust many aspects of the program. In addition, the DNR is taking steps to make the administration of the permit as efficient as possible.

Communication Plan Components

HCP Partner Component

Goal: Provide HCP Partners relevant and timely information about the HCP, ITP and related issues.

Objectives:

- Inform HCP partners about relevant HCP information
- Provide relevant technical information and resources
- Provide efficient method for partner communication to WDNR
- Promote information sharing between partners
- Provide training, outreach and education support and other items as needed.

Communication Targets:

- Implementation Oversight Committee
- HCP Partners
- Potential Partners

Tools:

- Website
- E-mail
- Newsletter
- IOC and partnership meetings

Process:

- Assess all HCP partner information needs
- Develop website to provide access to all necessary information
- Develop training and orientation modules for partner staff to access
- Encourage partner collaboration through meetings and networking
- Evaluate database and reporting improvement options and make recommendations to HCP Coordinator and IOC

Voluntary Landowner Component

Goal: Encourage conservation by private landowners in the voluntary category through assistance, education and targeted outreach.

Objectives:

- Focus outreach to private landowners in those areas that are strategically important to the recovery goals of the Karner blue. i.e. Biological Recovery Zones
- Provide access to technical information and assistance regarding Karner blue habitat conservation and restoration
- Respond quickly to inquiries
- Offer the opportunity to become involved in conservation efforts for the Karner blue

Communication Targets:

- Landowners and land users located within Biologic Recovery Zones
- Landowners and land users within the High Potential Range
- Other landowners and land users within Wisconsin
- General Public

Tools:

- Website
- Personal contact by partners
- Partner O&E materials
- DNR O&E materials

Process:

- Develop web site to enhance outreach and education to land owners
- Gain feedback, improvement, information and suggestions by land owners and others experienced in working with land owners on Karner blue issues
- Provide assistance to the Wisconsin Karner Blue Recovery program as needed to develop communication and outreach and education strategies

Policy Makers

Goal: Educate policy makers at the state and federal level about the WI Karner blue program to influence future policy decisions with regards to endangered species conservation.

Objectives:

- Inform state legislators about the program, landowner responsibilities, Partner accomplishments and program needs
- Inform federal legislators about the success and lessons learned from implementing this unique approach to endangered species conservation

Targets:

- Local elected officials
- State elected officials
- Federal elected officials
- Appointed agency staff

- Regional agency staff

Tools:

- Partners through trade organizations
- Direct mailings, issue briefs and papers
- One-on-one meetings
- Invitations to HCP celebration events

Process:

- Actively monitor state (not only WI) and federal initiatives, discussions and debates regarding endangered species conservation and especially Endangered Species Act.
- Actively monitor any court proceedings or judgments with regards to the Endangered Species Act
- Develop and provide policy briefs to policy makers

Regulator

Goal: Inform state and federal regulators about the Karner blue program, the reality of partnering success, regulatory process within the Karner blue program to ensure efficiencies with overlap between the HCP and other programs, and to provide a template for innovative, incentive based conservation approach.

Objectives:

- Provide clear descriptions of relevant HCP processes that involve administration of the ITP and relationship of Partner responsibilities under the ITP with other regulatory process (e.g. USACOE, DNR permits etc.)
- Provide assistance to other regulatory departments and agencies on collaboration, cooperation and meaningful regulatory process
- Communicate a new regulatory paradigm that involves partnering and trust

Targets:

- FWS
- USACOE
- DNR
- Other states
- PSC

Tools:

- Presentations at conferences, meetings, and other venues
- Working sessions
- Papers
- One-on-one conversations

Process:

- Assess regulatory agency education needs for Karner blue
- Develop briefings and other tools as needed
- Provide opportunities to inform regulatory agencies about the Karner blue approach through lessons learned presentations, participation in various department and agency meetings

Media

Goal: Inform local and national media of the success of the Kbb program in WI

Objectives:

- Increase national awareness of Kbb HCP (especially the voluntary strategy) and its implications for endangered species management
- Sustain support for the Kbb program within the State of Wisconsin
- Promote the conservation done by all partners
- Promote the conservation approach taken under this HCP
- Provide an additional vehicle to get “good news” about the HCP get to landowners
- Promote public support for conservation and especially recovery efforts for this endangered species

Targets:

- CBS Sunday Morning
- USA Today
- E Magazine
- Gannet Outdoors Report
- Local Newspapers
- Local TV News
- Conservation Magazines

Tools:

- Web
- Press Release

Process:

- Working with DNR media staff, develop a list of media contacts/outlets, state and nationally
- Determine best time and strategy for issuing a press release to various media outlets

General

Goal: Provide access to information about the WI KBB HCP program and encourage Kbb conservation through a variety of means.

Objectives:

- Provide information about the history, innovations and development process of the HCP to academic researchers.
- Encourage understanding of the lessons learned to date by the partnership to NGOs and other states involved with rare species and ecosystem conservation.

Targets:

- NGOs
- General public
- Other states
- Academics

Tools:

- Web site

Process:

- Develop materials that help to tell the story of the Karner blue program in Wisconsin
- Publish educational material regarding the program on the web site including reports completed by academics or conservation organizations
- Provide an on-line resource to access FWS, DNR and other publications regarding the Karner blue and the HCP

Tools, Reference

Tools

Communication Tools Matrix

Component	Communication Tool								
	Web	e-mail	Newsletter	Direct Mail	One-on-One	Press Release	Organizations	Specific O&E materials	Presentations
HCP Partners	X	X	X	X	X			X	X
Landowners	X					X		X	
Legislators	X			X	X	X	X		X
Regulators	X				X				X
Media	X					X			
General	X					X			

Web: This tool is the DNR Karner website, <http://dnr.wi.gov/forestry/karner/>.

This is a great venue for mass communications and can provide the broadest audience with the information that they need, whenever they access. This tool can also be used to communicate relevant information to the HCP Partners and provide access to the necessary forms, documents, templates and other materials they need to comply with the HCP requirements. The web can be the primary mechanism used to meet HCP O&E requirements.

E-mail: E-mail is used to make announcements to a broad audience, and transfer information to a selected group. E-mail distribution lists have been created and used for a variety of purposes.

Newsletter: Newsletters are published and sent or e-mailed to those on the distribution lists at regular intervals throughout the year. The information is diverse as is the audience.

Direct mail: Direct mail is sent postage paid, to the individuals mailing address. Direct mail can include a variety of information or be used to transfer specific printed materials, O&E resources or other items.

One-on-One: One-on-one meetings are especially effective at fostering understanding and building trust about an issue. These meetings are useful in exchanging ideas and brainstorming.

Press Release: Press Releases are issued directly to the media with contact information for a follow-up. This communication tool usually needs to go through various process steps to be released, as it is 'official'.

Organizations: Trade organizations or those representing various entities are useful in providing a national or regional viewpoint, and can also be a good path for getting information to a larger audience, especially policy makers.

Specific O&E Materials: These are designed specifically for an audience or a purpose, e.g. DNR Wildcards

Presentations: Presentations are usually given at trade shows or conferences and can reach a good size audience.

Key Constituents

The primary constituents for this strategic communication plan are the HCP Partners and land owners located within or around biological recovery zones.

The HCP partners need to have a clear understanding of the program, their responsibilities, and access to relevant information, training, O&E materials, and the forms, documents, and other materials that are necessary for compliance.

O&E directed to private landowners is now focused on those areas that are strategically important for recovery of the Kbb in WI. Specific needs will be drawn from the Recovery O&E strategy and utilized by HCP Partners to focus O&E activities. Focusing O&E resources on these areas is the most efficient use of HCP Partner efforts. O&E to other private landowners and interested parties will be primarily through the Kbb website.

Communications to other key constituents is specifically addressed in the implementation plan below.

Key Messages

- Private landowner requirements
- HCP Partners success
- Lessons learned
- Conservation not regulation
- Partnership and collaboration, not command and control
- HCP partner responsibilities

Implementation

The implementation plan is comprised of a section describing the actions needed for each of the plan components detailed in Section II above. These actions are then put into an overall schedule for implementation

HCP Partners

- Develop Orientation training package for new partners or new partner employees
- Develop HCP Users Guide training
- Consult with IOC or Communication Team and receive guidance on Strategic Communications Plan
- Consult with IOC or Communication Team on updates to Kbb website and information needs
- Provide access to all O&E materials via Kbb website
- Provide access to Guidelines and Protocols via Kbb website
- Provide access to training materials via Kbb website
- Provide access to necessary HCP forms via Kbb website
- Assist HCP Partners as needed with targeted Kbb information (e.g. trade orgs, landowners, lobbyists, management)
- Update HCP distribution lists and mechanisms
- Clarify O&E requirements under HCP and SHCAs as necessary, e.g. SPA and ACE requirements change to BRZ

Landowners

- Assist WI Kbb Recovery Program with development and implementation of O&E strategy
- Provide O&E materials to public via Kbb website
- Update website to provide easy access to Kbb and Habitat identification and management information
- Update website to provide access to other relevant Kbb information
- Update website to include clear communication of landowner responsibilities (e.g. gypsy moth, construction, etc.)

Policy Makers

- Monitor relevant legislative and judicial proceedings
- Provide Briefings
- Develop white papers

Regulators

- Assess education needs

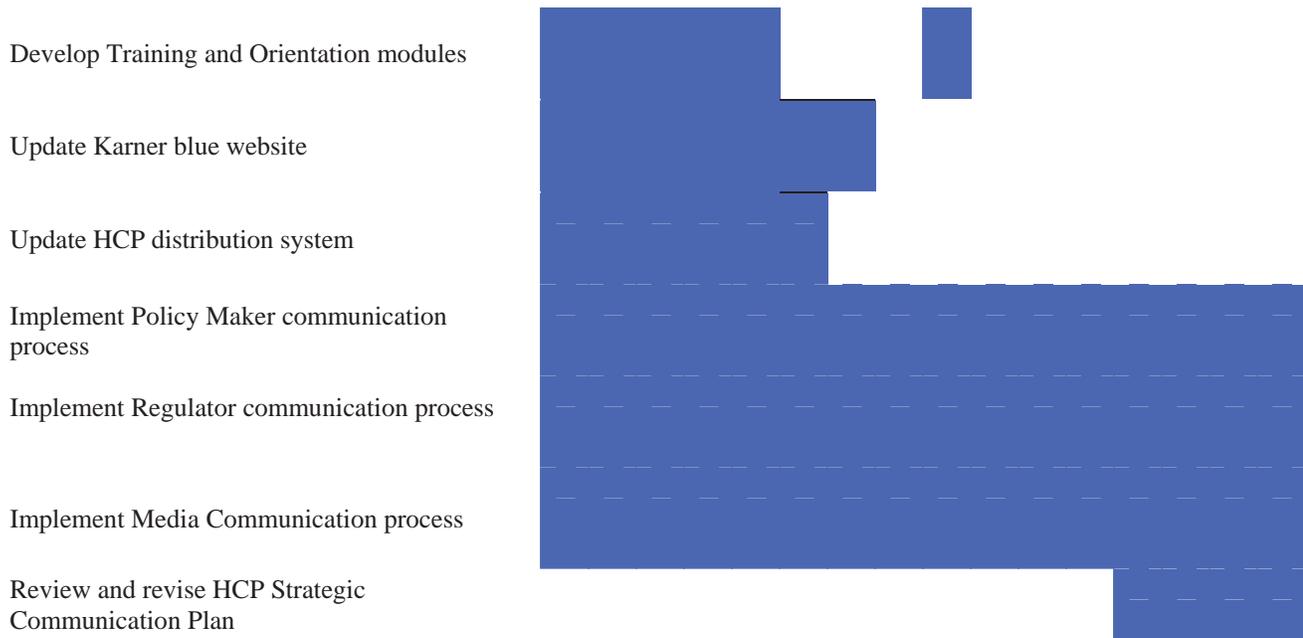
Media

- Develop Media list
- Develop press release strategy and needs

General

Schedule

General task description	S 07	O 07	N 07	D 07	J 08	F 08	M 08	A 08	M 08	J 08	J 08	A 08	S 08	O 08	N 08	D 08
Finalize Communication Plan and any necessary HCP updates																



Resource Needs

- 10-20 hrs/week of DNR LTE
- Assistance from DNR Forestry for Website design and maintenance
- Assistance from DNR forestry for training and orientation module development
- Assistance from DNR Forestry attorney for legislative and judicial monitoring
- Assistance from DNR BER and FWS Partners for Wildlife program in reviewing and providing expertise in land owner outreach actions
- IOC time for review and guidance

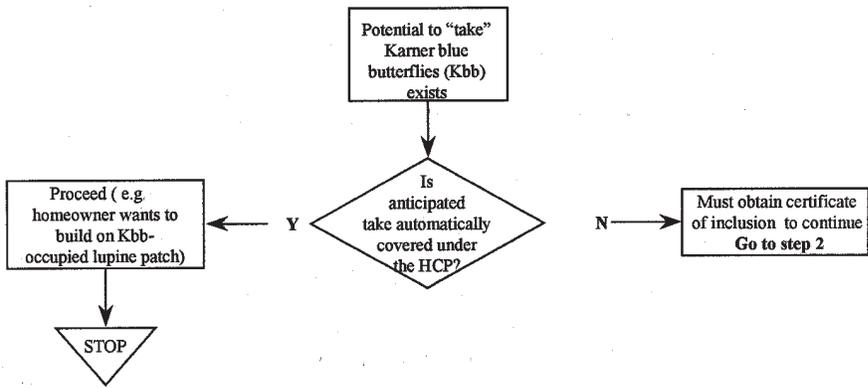
Appendices

- Appendix A: O&E Resource List

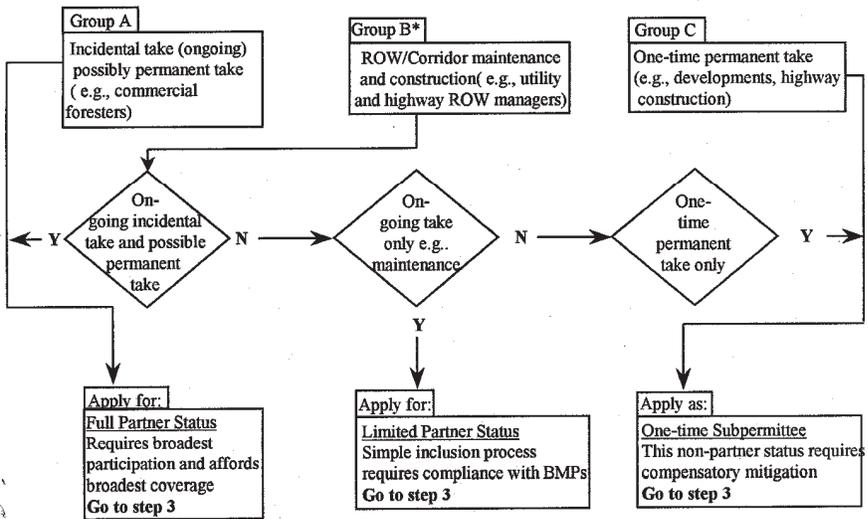
B. Participation Decision flow chart

Figure x.x Flow Chart for Determining Options for ITP Coverage

Step 1 - Determine Need: Do I need to apply for coverage (to "take")?

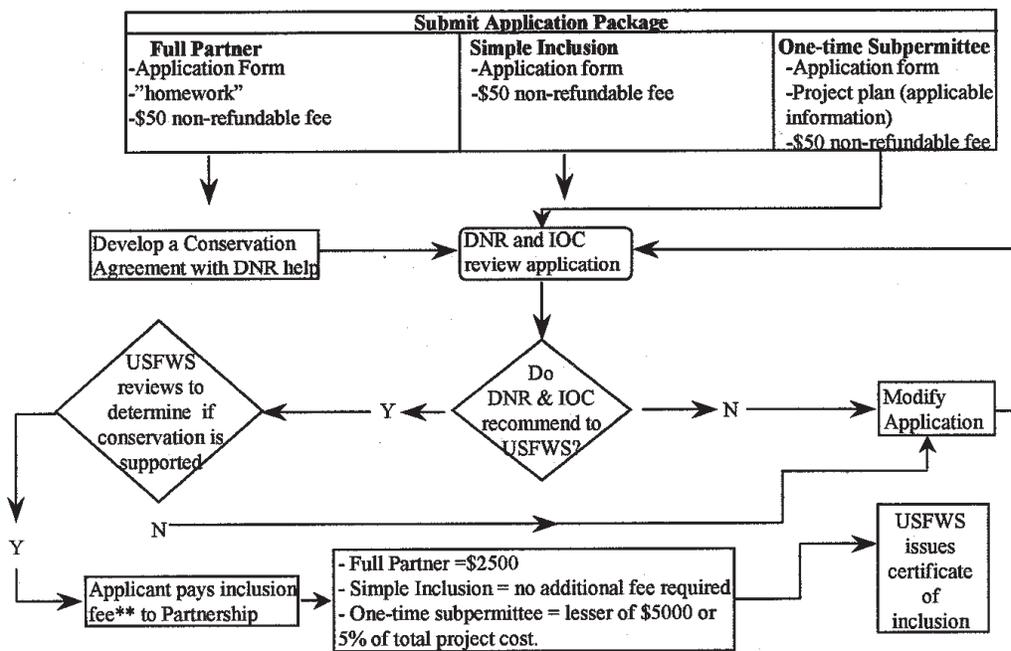


**Step 2 - Participation Status:
- Which participation group best describes my situation?
- Which application process best fits my needs?**



* Option: Applicant may select combination of simple inclusion and mitigate one-time permanent take. Consult with DNR.

Step 3 - The Application Process:



C. Application for Inclusion (template)

This section includes an example of an application for inclusion in the HCP. Such an application will be used by non-partners wishing to be covered by the incidental take permit. The application acts as a screening tool to better assess the needs of the applicant. The application would be made to the Wisconsin DNR.

APPLICATION for CONSIDERATION for INCLUSION in the WISCONSIN STATEWIDE KARNER BLUE BUTTERFLY HCP

When complete, submit this application to Attn: Karner Blue HCP Coordinator, FR/4, Wisconsin DNR, 101 S. Webster St., Box 7921, Madison, WI 53707-7921

(This is an informational questionnaire, and will be used by WDNR to assess applicant's intentions and assist in processing a conservation agreement and request for inclusion under USFWS Permit TE010064)

Applicant Information:
 Organization Name
 Mailing Address

1 st Contact Person _____	Title _____
Phone Number () -	Fax Number () -
2 nd Contact Person _____	Title _____
Phone Number () -	Fax Number () -

Check all that apply:		
<input type="checkbox"/> Full partner status	<input type="checkbox"/> Limited partner status	<input type="checkbox"/> One-time project.
<input type="checkbox"/> Governmental unit	<input type="checkbox"/> Non-governmental organization	
Complete fully and to the best of your ability.		

THIS APPLICATION SHALL NOT BE CONSIDERED COMPLETE AND ACTED UPON UNTIL ALL INFORMATION IN IT, AND AS OTHERWISE REQUESTED BY THE DEPARTMENT OF NATURAL RESOURCES IS PROVIDED.
--

Non-refundable Application fee (\$50): (This fee does not apply to governmental units or transfers from existing partners.)

1. Land ownership by acreage and description (the more specific the better e.g. quarter-quarter section, town, range.)

Note: For road ROWs enter number of miles of ROW and the total average width of vegetation on both sides of road.

2. Land use activities or land management practices you engage in or desire to engage in:
3. If the land involved is forest land, please describe type of vegetation and age class.
4. Describe the extent of land occupied by the Karner Blue butterfly and, to the best of your ability, the number of butterflies (if known).
 - a. What is the occupied site or sites used for currently?
 - b. Are there any natural or managed corridors adjacent to the occupied site that are or might be used for dispersal purposes?
 - c. What is the history of Karner Blue butterflies on the property, to the best of your knowledge? acreage, numbers.
5. What conservation measures are you willing to apply to your land to receive authorization to incidentally take Karner blue butterflies?
For how long?

6. What monitoring capability do you currently have to monitor the species and habitat on your property?
 - a. What monitoring are you willing to conduct?
7. Are you willing to allow the Department of Natural Resources, or its designees, access to your land to assure compliance with any authorization to incidentally take Karner blue butterflies?
8. Are you willing to submit periodic reports to the Department of Natural Resources regarding the status of Karner blue butterflies and habitat on your property?
9. What type of records do you currently keep respecting your land use and management activities? Are you willing to keep records in the form and of the type described in the information attached?
10. Other information you would like considered along with this application:

As and in the capacity of the applicant, I hereby commit to and agree to comply with the plans and conservation efforts contained in this application and submitted for the purpose of obtaining coverage under the Permit issued to the Department of Natural Resources for the incidental take of the Karner blue butterfly in the State of Wisconsin. I also agree to comply fully with any restrictions or conditions included in any Certificate of Inclusion issued to me by the Wisconsin DNR under Permit No. TE010064 as a result of this application for consideration as a partner in this HCP where applicable.

The information above is accurately and correctly stated to the best of my knowledge.

 Print or type name of person filling out application

 APPLICANT'S SIGNATURE DATE

D. Inclusion Fees

This section outlines fees which will be required to obtain incidental take permit coverage through participation in the Wisconsin Karner Blue Butterfly HCP.

Partner

An applicant may join this HCP and ITP in the status of a partner. As such, the applicant must comply with the Articles of Partnership, the "homework" requirements, and any other obligations established by the Partnership, the HCP or the Incidental Take Permit (e.g., reporting, monitoring, etc.)

Application Fee. A non-refundable application fee, except for governmental units, is \$50 per partner application.

Additional Fees to Obtain Coverage

Partner. An applicant seeking the status of a Partner, unless the applicant is a governmental unit, must pay, upon a determination of acceptance as a Partner, an **inclusion fee of \$2,500.**

One-time. An applicant seeking to obtain coverage under the Incidental Take Permit for the purpose of incidentally taking a Karner blue butterfly, must comply with the application and Certificate of Inclusion requirements, and if determined to be acceptable as a participant in the conservation effort, pay the fee of:

A flat fee of \$5000, or 5% of the value of the project to be developed on the land, or the value of the activity e.g. value of timber to be removed, **whichever is less, with a credit to be given** for conservation efforts to be engaged in and continued by the applicant.

The credit to be given the applicant under this option may not exceed 50% of the fee (except for governmental lands or activities - see below) and will be determined by an oversight committee of the Partnership. Criteria to be used in determining the credit will be developed by the oversight committee and made available to applicants.

Governmental Unit. Governmental units, including state, county, town, etc., are not required to pay fees to obtain coverage under the Incidental Take Permit, but are required to comply with application, partnership or certificate of inclusion requirements.

E. Templates for Species and Habitat Conservation Agreement

This section provides a template for species and habitat conservation agreements (conservation agreements) for future HCP partners. There are separate agreements for Full HCP Partners and Limited (Local) HCP Partners. These templates were adapted for use by some HCP partners when renewing their individual conservation agreements prior to the 2009 application to renew the incidental take permit. Conservation agreements are legally-binding agreements between individual partners and the Wisconsin DNR.

Full Partner Conservation Agreement Template

**WISCONSIN KARNER BLUE BUTTERFLY
HABITAT CONSERVATION PLAN**

SPECIES AND HABITAT CONSERVATION AGREEMENT

FULL PARTNER

THIS SPECIES AND HABITAT CONSERVATION AGREEMENT (Agreement) is entered into by and between the State of Wisconsin Department of Natural Resources (DNR) and _____ () for the purpose of implementing the Habitat Conservation Plan (HCP) and authorizing the incidental take of the Karner blue butterfly (KBB) in the State of Wisconsin consistent with and during the period of an Incidental Take Permit (Permit) issued by the U.S. Fish and Wildlife Service (FWS).

WHEREAS, the DNR holds a Permit issued by the United States Department of the Interior, Fish and Wildlife Service (FWS) based upon the Habitat Conservation Plan, Species and Habitat Conservation Agreements (SHCA) with the Partners and Implementing Agreement submitted to the FWS with the application for a Permit;

WHEREAS, the statewide KBB conservation program relies on the inter-relationship of SHCAs, a HCP and an Incidental Take Permit (Permit) to form and direct the KBB conservation plan, as well as clarify commitments and obligations of landowners and land users in this effort;

WHEREAS, the Permit from the FWS authorizes the incidental take of the KBB subject to implementation of conservation measures and compliance with procedures, terms and conditions of this Agreement, the HCP and the Permit, by Partners entering into SHCAs with the DNR; and

WHEREAS, the Partner plans to engage in activities that may result in the incidental take of the KBB and is willing to implement conservation measures consistent with the HCP and the Permit on lands under and to the extent of the Partner's control to avoid, minimize or mitigate the take of such species as further provided herein.

IT IS HEREBY AGREED by the parties, based upon the mutual terms and conditions herein, that this Agreement shall constitute the Partner's commitment and agreement to undertake conservation measures for the KBB upon issuance of a Certificate of Inclusion (Certificate). The parties further agree this Certificate is conditioned on the premise that the Agreement shall be consistent with the HCP and conditions of the Permit.

1. DEFINITIONS.

For purposes of this Agreement, the following definitions apply:

- A.** "Certificate of Inclusion" (Certificate) is a document issued by the DNR as authorized by the FWS, which, thereby, includes the person or entity it is issued to under the provisions of the Permit and authorizes incidental take consistent with the HCP, the Permit and this Conservation Agreement.
- B.** "Implementing Agreement" is a legal contract entered into between the DNR and the FWS that: (1) identifies the responsibilities of all participants to the HCP; (2) legally binds the DNR to their obligations; and (3) is signed by the DNR.
- C.** "Incidental take" is the take of a species incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity.
- D.** "Incidental take permit" (Permit) is a permit issued by the FWS under the authority of Section 10(a)(1)(B) of the Endangered Species Act to authorize the incidental take of a species listed as endangered or threatened under that Act.

- E. "Intentional take" means the purposeful take of a species not incidental to an otherwise lawful activity e.g. collecting.
- F. "Partner", consistent with the HCP Articles of Partnership (AOP) and determined as a Partner by HCP Implementation Oversight Committee (IOC) assigned this task, is a person, agency or organization that:
 1. Enters into and agrees to the HCP and AOP; and
 2. Has an ownership interest i.e. fee title or easement in land with existing or potential KBB habitat; or
 3. Has economic assets at risk as a result of the listing of the KBB as endangered; or
 4. Has a role in implementing the HCP e.g. ASCS, municipalities.

2. PERIOD OF AGREEMENT.

The period of this Agreement shall be from its execution and the issuance of a Certificate authorizing incidental take consistent with this Agreement, during the period of the Permit, unless terminated in accordance with paragraph 11 or amended in accordance with paragraph 12.

3. LANDS SUBJECT TO AGREEMENT.

The lands subject to this Agreement include approximately [REDACTED] acres and are more particularly described in Appendix A (Lands Included) which is attached to and made part of this Agreement, and all future ownership (including, but not limited to, easements and temporary work spaces) within the high potential range of the KBB, subject to the notification and reporting processes, and implementation of conservation practices consistent with this Agreement, the HCP and the Permit.

4. ACTIVITIES/INCIDENTAL TAKE AUTHORIZED/PUBLIC OUTREACH AND EDUCATION/CONSERVATION EFFORTS.

- A. **ACTIVITIES.** The following specified land management or land use activities, in addition to any other activity covered by an HCP guideline, protocol or management direction, may be engaged in on the Lands Included in accordance with this Agreement, and the incidental take of KBB is authorized, if the activities are conducted consistent with the HCP, HCP standard guidelines and protocols, the Permit, this Agreement and any changes and improvements made with HCP participation processes and consistent with the AOP, which amend these documents; and other protocols or management directions attached to, and made part of this Agreement as Appendix B. Standard HCP guidelines and protocols are published and made available on the HCP webpage; any other protocols and management directions defined by the partner will be listed and attached to Appendix B:

[LIST MANAGEMENT ACTIVITIES PARTNER WISHES TO ENGAGE IN HERE.]

- B. **INTENTIONAL TAKE.** The Partner agrees not to engage in the intentional take of the KBB and agree that the entering into of this Agreement does not authorize the intentional take of such species.

C. PUBLIC OUTREACH AND EDUCATION. The Partner agrees to engage in the following public outreach and education activities for the purpose of conserving the KBB consistent with the HCP and Permit:

[LIST O&E ACTIVITIES PARTNER COMMITS TO ENGAGE IN HERE.]

D. CONSERVATION EFFORTS FOR THE KBB. Other than as described elsewhere in this clause, the Partner intends to engage in the following conservation efforts and practices:

[LIST OTHER CONSERVATION ACTIVITIES PARTNER IS WILLING TO COMMIT TO HERE.]

5. OTHER SPECIES.

In addition to those efforts identified in this Agreement for the KBB, the Partner intends to implement the following conservation measures or programs related to the following species:

[LIST OTHER SPECIES OR INSERT "N/A" (Not Applicable) OR "NONE" HERE.]

6. SURVEYS.

The Partner agrees to conduct surveys for the KBB and other species identified in paragraph 5 and their habitat consistent with the HCP, on Lands Included, prior to engaging in or conducting a management or land use activity or practice. Written records of all surveys, including identification and qualifications of the person conducting the survey, the results of the survey as to habitat and occurrences observed, and the conservation strategy to be applied to respond to the findings of the survey, shall be maintained by the Partner during the period of and retained for five years following termination of the Agreement, at the following facility (*Include organization name, contact person's name and title, full mailing address including street, road or RFD number, telephone and facsimile numbers and email address*):

[INSERT NAME and TITLE OF CONTACT PERSON, COMPLETE MAILING AND STREET ADDRESS, TELEPHONE AND FACSIMILE NUMBERS AND EMAIL ADDRESS HERE.]

7. MONITORING.

The Partner agrees to monitor and maintain written records regarding the effects of land management and use practices and activities on KBB and KBB habitat, consistent with the HCP, on Lands Included, during the period of this Agreement and retain them for five years following termination of the Agreement, at the following facility (*Include organization name, contact person's name and title, full mailing address including street, road or RFD number, telephone and facsimile numbers and email address*):

[INSERT NAME and TITLE OF CONTACT PERSON, COMPLETE MAILING AND STREET ADDRESS, TELEPHONE AND FACSIMILE NUMBERS AND EMAIL ADDRESS HERE.]

8. DNR AND FWS INGRESS AND EGRESS.

A. COMPLIANCE MONITORING.

- (1) During the period of this Agreement, the DNR may conduct compliance monitoring of the activities and records of the Partner. Except as provided in Subparagraph A.(2), compliance monitoring shall be preceded by reasonable notice, not to be less than 24 hours, and shall be conducted in the presence of a representative of the Partner, if the representative is available at the noticed time and date, or other time agreed upon by the Partner and auditing personnel. Access to the property involved, to the extent of the Partner's authority, is authorized. Access to Lands Included and records required by this Agreement, or the HCP, shall be for the purpose of assuring compliance with this Agreement and the HCP, and be unlimited. If the Partner does not have authority to authorize access to the land identified in the notice to be monitored during the compliance monitoring the Partner shall immediately notify the DNR of such lack of authority and the limited use it has in the land identified. Documents of title or interest in the land identified shall be provided to the DNR upon its request. A copy of any final report, map or other record prepared by the DNR on the results of its going upon the land identified or reviewing the records shall be provided to the Partner within thirty (30) days of the DNR access and review.

Notification under this Paragraph shall be in writing, facsimile, or telephone to *(Include organization name, contact person's name and title, full mailing address including street, road or RFD number, telephone and facsimile numbers and email address):*

[INSERT NAME and TITLE OF CONTACT PERSON, COMPLETE MAILING AND STREET ADDRESS, TELEPHONE AND FACSIMILE NUMBERS AND EMAIL ADDRESS HERE.]

-
- (2) The notice provision in Subparagraph A.(1), shall not apply when the DNR or representatives of the FWS considers that pending or ongoing activities of the Partner, or person authorized by the Partner, based on concerns or complaints made known to them, may adversely affect KBB occupied sites in a manner inconsistent with the Agreement, or result in damage to or destruction of KBB occupied habitat or that may jeopardize the Permit.
- B. Any refusal of access authorized in Subparagraphs (1) or (2) shall be considered a breach of this Agreement and subject the Partner to all remedies available to the DNR under this Agreement or at law,
- C. The FWS may accompany the auditor when auditing or monitoring under this Agreement or the HCP.
- D. In addition to authority granted elsewhere in this Agreement, the FWS may enter the Lands Included or where permission by others with an ownership interest has been granted and access the records of the Partner required for the purpose of overseeing the Permit and activities under it or required by this Agreement.
- E. Nothing in this Agreement, including this section, shall abrogate the authority of the Secretary of the Interior, through the FWS, to fulfill his or her responsibility in the

administration and enforcement of the Endangered Species Act (ESA), 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17.

9. ANNUAL REPORT.

- A. The Partner shall submit an annual report no later than March 1 following the calendar year which is the subject of the report. Each report shall be consistent with the required conditions of the Permit, the HCP and its guidelines and processes in effect for the reporting period, and this Agreement.

10. REMEDIES.

- A. The Partner agrees that this Agreement and authorization under the Permit does not apply to conduct resulting in the take of a KBB that does not strictly conform to the requirements of this Agreement or the HCP, and in such a situation the landowner will be acting without a Permit or authority to take a KBB and shall be subject to all provisions, remedies and penalties of the ESA, 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17, 29.415, Wis. Stats., the Wisconsin Endangered Species ACT (WESA) and ch. NR 27, Wis. Adm.Code.
- B. (1) Upon a breach or violation of this Agreement, as determined by the DNR, and in addition to any remedies provided or pursued under paragraphs 10.a., the DNR may revoke this Agreement and the authorization under it after considering recommendations of the HCP IOC. The Landowner and the FWS shall be notified of an alleged breach or violation by the Partner.

The DNR will notify the FWS of any violation of the Permit, HCP, or Agreement. Such notification shall be made in writing within five (5) calendar days of discovery of the violation, to the address listed below. Notification will include the name of the Party(ies) and individual(s) involved, the nature of the suspected violation, time period when the suspected violation occurred and the specific location(s) of the suspected violation.

**2661 Scott Tower Drive
New Franken, WI 54229
Telephone: (920) 866-1717
Fax: (920) 866-1710
Field Supervisor
U.S. Fish and Wildlife Service**

- B. (2) The Partner shall be provided an opportunity to present information to the DNR and the IOC on an alleged violation and what an appropriate remedy should be prior to the DNR's determination on whether a breach or violation occurred and the appropriate remedy. Information shall be presented to the DNR and the IOC by the Partner within thirty (30) days of notice of an alleged violation of this Agreement to the Partner.
- B. (3) If the DNR, after consideration of recommendations of the IOC, determines that action by the Partner may be taken that is reasonable and consistent with ensuring the conservation of the species and its habitat without the application of other remedies in this paragraph, it shall

not seek additional remedies on the condition that the Partner completes the remedial action within a time considered reasonable by the DNR.

- C. The DNR retains all further remedies in law or equity, which it may apply to a breach or violation of this Agreement. Enforcement or other remedies available to the FWS under the ESA shall not be abridged or affected by any decision of the DNR under this paragraph.
- D. It is understood that unintentional violations of this Agreement may occur, and that the Partners may be required to act in emergency situations that do not allow them to follow all commitments in this Agreement. Should such a situation arise, it is expected that a Partner will report such an activity consistent with the HCP and the HCP Emergency Guideline, detailing the damage, if any, to KBB habitat and such action the Partner intends to take to cure or mitigate any damage to KBB or its habitat. The DNR agrees to consider the circumstances and the Partner's offer to cure or mitigate in any decision it may make regarding appropriate remedial or enforcement action necessary under this Agreement.

11. TERMINATION.

This Agreement or its applicability to any land under it may be terminated by the Partner upon sixty (60) days written notice to the DNR and upon the occurrence of one of the following:

- A. The Lands Included or management rights are transferred to another by land contract, fee title, easement, or otherwise;
- B. The KBB is no longer protected by the ESA, (i.e. is delisted) or the KBB is downlisted to threatened and take activities of the Partner is allowed per a 4.d. rule.
- C. The Partner ceases to exist, in fact or by law.
- D. Other reasons for termination mutually agreed upon as reasonable by the Partner and the DNR, with advice of the IOC, provided that appropriate conservation and/or compensation has occurred for the take of occupied KBB habitat. It is the responsibility of the Partners to demonstrate to DNR that conservation has occurred prior to termination.

12. AMENDMENT.

This Agreement shall constitute the entire agreement of the parties and any previous communications or agreements are hereby superseded and no modifications of this Agreement or waiver of its terms and conditions shall be effective unless made specifically in writing and mutually agreed upon and signed by both parties.

13. CONTRACTING PARTIES.

In this Agreement, the DNR and the Partner include their respective officers, employees, agents, directors, partners, representatives, successors, heirs, members and servants.

14. STATUS OF PARTIES.

The Partner shall not be considered as an agent, contractor or an employee of the DNR for any purpose, including workers compensation. The DNR agrees that the Partner has sole control of the activities and work conducted on the lands of or under the control of the Partner. The DNR only reserves the right of ingress and egress to the lands and facilities, consistent with paragraph 8, to inspect the lands and records of the Partner, as provided herein, to assure compliance with this Agreement.

15. ASSIGNMENT

In the event the Partner sells, transfers or otherwise divests itself of all Lands Included or management rights to a subsequent owner and no longer has assets at risk due to the listing of the KBB, the Partner may relinquish and assign this Agreement or performance under it that subsequent owner (Assignee) with the consent of the DNR. Consent to assign shall be conditioned upon the Assignee's agreement in writing to comply with all the terms of this Agreement following discussion with the DNR to assure a full understanding of the requirements of the Agreement. The FWS shall be notified of any assignment and shall issue a Certificate of Inclusion covering the Assignee.

16. TRANSFER

In the event that the Partner sells, transfers or otherwise divests itself of some portion of the Lands Included or management rights, but still has a portion of the Lands Included, management rights or assets at risk due to the listing of the KBB, and the Partner chooses to remain a signatory Partner, assignment of any incidental take authorization under this Agreement and the Permit may be transferred to a subsequent owner of the Lands Included or management rights (Transferee) if the Transferee enters into, agrees to and files with the DNR a SHCA, which is acceptable to the DNR. Following review and recommendation by the IOC, the SHCA may be signed. The FWS will be notified of the transfer and approved SHCA and shall issue a Certificate covering the Transferee. Unlike the complete transfer and assignment of an SHCA to an Assignee, incidental take authorization is not afforded to the Transferee until a SHCA unique to the Transferee is approved by the IOC and DNR and a Certificate is issued by the FWS.

The Partner agrees to notify the DNR of any transaction involving Lands Included, management rights, or assets relating to land within the High Potential Range, which may pertain to this Agreement, and coverage under the Permit. Notification of transfers can be made at any time, but must be included prior to any activity which would result in incidental take of KBB in order for incidental take authority to be valid. Incidental take is not authorized on newly acquired land until the transfer is reported to the DNR and added to the Partner's Lands Included.

17. MODIFICATION/ADAPTIVE MANAGEMENT.

The Partner agrees to modify responsibilities and duties under this Agreement consistent with the review and adaptive management process established in the HCP unless otherwise stated in this Agreement.

18. FUNDING COMMITMENTS.

The Partner commits to completing its conservation strategies and other obligations as provided in this Agreement, whether accomplished by employees, agents, contractors or cooperators.

[LIST OTHER FUNDING COMMITMENTS HERE.]

19. LIABILITY FOR AGENTS, ETC.

It is recognized that the Partner often conducts its land management or use activities through an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser. The Partner has and accepts the obligation to require, normally through written agreement or communication, that activities be conducted in a manner consistent with this Agreement, the HCP and the Permit. Take incidental to otherwise lawful activities by these persons or entities is authorized by the Permit so long as such activity and incidental take resulting from it is authorized by the Partner consistent with this Agreement, the HCP and the Permit. A violation of any authorization which includes procedures and activities for KBB conservation the Partner is required to follow or conduct, consistent with this Agreement, the HCP, and the Permit, by an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, shall not result in the suspension, revocation, or termination of the Permit or the authorization to the Partner under this Agreement, the HCP and the Permit; nor shall it affect other benefits, rights, or privileges under this Agreement, the HCP or the Permit, except as to that agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, who is and will be subject to the provisions of the ESA, including remedies for its violation when acting inconsistent with the authorization from this Partner, this Agreement, the HCP and the Permit. The obligation to demonstrate that the Partner adequately communicated procedures and requirements of this Agreement, the HCP and the Permit to the agent, lessee, licensee, contractor, permittee, right-of way grantee, or purchaser is on the Partner, and cannot be waived by the DNR.

20. DATA SHARING

- A. Data provided by the DNR and which constitutes Natural Heritage Inventory data (NHI) may not be used for any purpose other than development of the SHCA or conducting of activities under the Permit. It may not be released or made available to any other person, agency or organization for any purpose unless agreed to in writing by the DNR. Documents or data containing NHI information is included in this restriction.
- B. Data provided to the DNR is subject to Wisconsin's Public Records Law, Ch. 19, Wis. Stats., and subject to that law regarding requests for it. Under s.23.27 (3), Wis. Stats., NHI information is considered confidential and release or use of it is controlled by the Department and administrative rules adopted to administer the NHI program.

21. ARTICLES OF PARTNERSHIP

The partner agrees to enter into and comply with the AOP, which are attached to and made part of this Agreement.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

DATE _____

BY _____

Paul DeLong
Division Administrator of
Forestry, Wisconsin DNR

AND

DATE _____

BY _____

Laurie Osterndorf
Division Administrator of
Land, Wisconsin DNR

[INSERT PARTNER'S ENTITY NAME]

DATE _____ BY _____

(Partner signatory's name/title)

DATE _____ BY _____

(Partner signatory's name/title)

APPENDIX A
LANDS INCLUDED

[LIST LANDS FOR WHICH PARTNER WISHES INCIDENTAL TAKE COVERAGE.
INCLUDE MAP(S) INDICATING LOCATION OF THESE LANDS, WHICH ARE
SUFFICIENTLY SPECIFIC TO PROVIDE USFWS OR DNR ENOUGH INFORMATION

FOR AUDITING AND ENFORCEMENT PURPOSES. NECESSARY MAP CHARACTERISTICS INCLUDE, PARTNER NAME, TOWN, RANGE, SECTION, AND COUNTY INFORMATION AND CARDINAL MARKER.]

APPENDIX B

PARTNER SPECIFIC MANAGEMENT GUIDELINES AND PROTOCOLS

[LIST AND ATTACH HERE ALL MANAGEMENT PROCEDURES, CONSERVATION MEASURES, AND MONITORING PROCEDURES NOT COVERED BY STANDARD HCP MANAGEMENT GUIDELINES AND PROTOCOLS THAT PARTNER WISHES TO APPLY WHEN PERFORMING ACTIVITIES LISTED IN 4.A. ON LANDS LISTED IN APPENDIX A.]

Limited Partner Conservation Agreement Template

WISCONSIN KARNER BLUE BUTTERFLY

HABITAT CONSERVATION PLAN

SPECIES AND HABITAT CONSERVATION AGREEMENT

LIMITED PARTNER

THIS SPECIES AND HABITAT CONSERVATION AGREEMENT (Agreement) is entered into by and between the State of Wisconsin Department of Natural Resources (DNR) and _____, (Partner) for the purpose of implementing the Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan (HCP) and authorizing the incidental take of the Karner blue butterfly (Kbb) in the State of Wisconsin consistent with and during the period of the Incidental Take Permit (Permit) issued by the U.S. Fish and Wildlife Service (FWS).

WHEREAS, the DNR holds a Permit issued by the United States Department of the Interior, Fish and Wildlife Service (FWS) based upon the Habitat Conservation Plan, Species and Habitat Conservation Agreements (SHCA) with the Partners and Implementing Agreement submitted to the FWS with the application for a Permit;

WHEREAS, the statewide KBB conservation program relies on the inter-relationship of SHCAs, a HCP and an Incidental Take Permit (Permit) to form and direct the KBB conservation plan, as well as clarify commitments and obligations of landowners and land users in this effort;

WHEREAS, the Permit from the FWS authorizes the incidental take of the KBB subject to implementation of conservation measures and compliance with procedures, terms and conditions of this Agreement, the HCP and the Permit, by Partners entering into SHCAs with the DNR; and

WHEREAS, the Partner plans to engage in activities that may result in the incidental take of the KBB and agrees to implement conservation measures consistent with the HCP and the Permit on lands under its control and to the extent of the Partner's control to avoid, minimize or mitigate the take of such species as further provided herein.

IT IS HEREBY AGREED by the DNR and the Partner (Parties), based upon the mutual terms and conditions herein, that this Agreement shall constitute the Partner's commitment and agreement to undertake conservation measures for the KBB upon issuance of a Certificate of Inclusion (Certificate). The parties further agree this Certificate is conditioned on the premise that the Agreement shall be consistent with the HCP and conditions of the Permit.

1. DEFINITIONS.

For purposes of this Agreement, the following definitions apply:

- A. "Certificate of Inclusion" (Certificate) is a document issued by the DNR as authorized by the FWS, which, thereby, includes the person or entity it is issued to under the provisions of the Permit and authorizes incidental take consistent with the HCP, the Permit and this Conservation Agreement.
- B. "Implementing Agreement" is a legal contract entered into between the DNR and the FWS that: (1) identifies the responsibilities of all participants to the HCP; (2) legally binds the DNR to their obligations; and (3) is signed by the DNR.
- C. "Incidental take" is the take of a species incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity.
- D. "Incidental Take Permit" (Permit) is a permit issued by the FWS under the authority of Section 10(a)(1)(B) of the Endangered Species Act to authorize the incidental take of a species listed as endangered or threatened under that Act.
- E. "Intentional Take" means the purposeful take of a species not incidental to an otherwise lawful activity e.g. collecting.
- F. "Partner", defined as "Limited Partners" within the HCP, means a person, agency or organization that is engaged in a limited suite of management activities, such as predefined best management practices, on a local level, typically resulting in short term take and subsequently, favorable habitat conditions. Examples include, but are not limited to, county highway departments, townships and municipalities,

2. PERIOD OF AGREEMENT.

The period of this Agreement shall be from its execution and the issuance of a Certificate authorizing incidental take consistent with this Agreement, during the period of the Permit, unless terminated in accordance with paragraph 11 or amended in accordance with paragraph 12.

3. LANDS SUBJECT TO AGREEMENT.

The lands subject to this Agreement include approximately acres and are more particularly described in Appendix A (Lands Included), which is attached to and made part of this Agreement, and all future ownership (including, but not limited to, easements and temporary work spaces) within the high potential range of the KBB, subject to the notification and reporting processes, and implementation of conservation practices consistent with this Agreement, the HCP and the Permit

4. ACTIVITIES/INCIDENTAL TAKE AUTHORIZED/PUBLIC OUTREACH AND EDUCATION/ INFORMATION

- A. **ACTIVITIES.** The following specified land management or land use activities, in addition to any other activity covered by an HCP guideline, protocol or management direction, may be engaged in on the Lands Included in accordance with this Agreement, and the incidental

take of KBB is authorized, if the activities are conducted consistent with the HCP, HCP standard guidelines and protocols, the Permit, this Agreement and any changes and improvements made with HCP participation processes which amend these documents; and other protocols or management directions attached to, and made part of this Agreement as Appendix B. Standard HCP guidelines and protocols are published and made available on the HCP webpage; any other protocols and management directions defined by the Partner will be listed and attached to Appendix B:

[LIST MANAGEMENT ACTIVITIES PARTNER WISHES TO ENGAGE IN HERE. Select from examples listed below.]

Highway or road right of way maintenance, including:

- (1) Mowing,
- (2) Brushing (including tree pruning and hazard tree removal),
- (3) Use of pesticides to control vegetation,
- (4) Shoulder maintenance and grooming,
- (5) Snowplowing.

Certain highway or road and road right of way construction, (may be subject to project plan or activity review and approval by WDNR and USFWS), including:

- (1) Ditch maintenance and construction,
- (2) Shoulder construction,
- (3) Road and road right of way construction,
- (4) Other construction, which may impact occupied Karner blue butterfly habitat.

B. INTENTIONAL TAKE. The Partner agrees not to engage in the intentional take of the KBB, as defined in Paragraph 1.E., and agrees that the entering into of this Agreement does not authorize the intentional take of such species.

C. PUBLIC OUTREACH AND EDUCATION. The Partner agrees to respond to questions by the public regarding their activities relating to KBB conservation and provide information on the KBB program when opportunities arise, e.g. budget deliberations, planning or information meetings, etc.

D. INFORMATION. Partner agrees to provide updated guidelines and protocols to those officers, employees, agents or contractors responsible for implementing this agreement.

5. SURVEYS.

The Partner agrees to conduct surveys for wild lupine (*Lupinus perennis*) consistent with the HCP and the survey protocols described in the HCP User's Guide (accessed on the DNR's KBB HCP website or otherwise provided by the DNR), on lands identified in Appendix A or lands the DNR is notified of through the process provided in this Agreement and approves as being subject to it, and maintain written records of all surveys, including:

- a. identification and qualifications of the person conducting the survey,
- b. the results of the survey as to habitat and occurrences observed, and

c. the written records shall be maintained by the Partner during the period of and retained for five years following termination of the Agreement, at the following facility:

(Include Organization Name, contact person, full mailing address, including street, road or RFD number, telephone number and email address):

6. MONITORING.

The Partner agrees to monitor and maintain written records regarding the effects of land management and use practices and activities, consistent with the Plan, on the lands subject to this Agreement, as identified in Appendix A during the period of this Agreement. Written records will be maintained, including, but not limited to:

- a. the location and dates of management activities on Kbb occupied (if known) lupine habitat,
- b. the conservation strategy/protocol applied, and
- c. written records will be retained for five years following termination of the Agreement, at the following facility:

(Include Organization Name, contact person, full mailing address, including street, road or RFD number, telephone number and email address):

7. DNR AND FWS INGRESS AND EGRESS.

A. COMPLIANCE MONITORING.

(1) During the period of this Agreement, the DNR may audit and monitor the activities and records of the Partner. Except as provided in A.(2), auditing and monitoring shall be preceded by reasonable notice, not to be less than 24 hours, and shall be conducted in the presence of a representative of the Partner, if the representative is available at the noticed time and date, or other time agreed upon by the Partner and auditing personnel. Access to the property involved, to the extent of the Partner's authority, is authorized. Access to the lands subject to this Agreement and records required by it, or the HCP, shall be for the purpose of assuring compliance with this Agreement and the HCP, and be unlimited. If the Partner does not have authority to authorize access to the land identified in the notice to be monitored or audited, or during the audit, the Partner shall immediately notify the DNR of such lack of authority and the limited use it has in the property. Documents of title or interest in the property shall be provided to the DNR upon its request.

A copy of any final report, map or other record prepared by the DNR on the results of its going upon the land or reviewing the records shall be provided to the Partner within thirty (30) days of the DNR access and review.

Notification under this Paragraph shall be in writing, facsimile, or telephone to:

(Include Organization Name, contact person, full mailing address, including street, road or RFD number, telephone number and email address):

(2) The notice provision in Subparagraph A.(1), shall not apply when the DNR or representatives of the FWS considers that pending or ongoing activities of the Partner, or person authorized by the Partner, based on concerns or complaints made known to them, may adversely affect Kbb occupied sites in a manner inconsistent with this Agreement, or result in damage to or destruction of Kbb occupied habitat or that may jeopardize the Permit.

- B.** Any refusal of access authorized in Subparagraphs (1) or (2) shall be considered a breach of this Agreement and subject the Partner to all remedies available to the DNR under this Agreement or at law, as well as loss of KBB incidental take authorization provided by the FWS through use of this Agreement.
- C.** The FWS may accompany the DNR when auditing or monitoring under this Agreement or the HCP.
- D.** In addition to authority granted elsewhere in this Agreement, the FWS may enter the lands subject to this Agreement, which are owned by the Partner or where permission by others with an ownership interest has been granted and access the records of the Partner required for the purpose of overseeing the Permit and activities under it or required by this Agreement.
- E.** Nothing in this Agreement, including this section, shall abrogate the authority of the Secretary of the Interior, through the FWS, to fulfill his (her) responsibility in the administration and enforcement of the Endangered Species Act (ESA), 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17.

8. ANNUAL REPORT.

The Partner shall submit an annual report no later than March 1 following the calendar year, which is the subject of the report which shall be on a form provided by the DNR and fully and accurately completed by the Partner with all attachments requested by the DNR, which may include maps, surveys, records, or other information.

9. ASSIGNMENT.

The Partner may not assign this Agreement or performance under it to another without the consent of the DNR. Consent to assign shall be conditioned upon the assignee's Agreement in writing to comply with all the terms of this Agreement following discussion with the DNR to assure a full understanding of the requirements of the Agreement. The FWS shall be notified of any assignment.

10. REMEDIES.

- A.** The Partner agrees that this Agreement and authorization under the Permit does not apply to conduct resulting in the take of a Kbb that does not strictly conform to the requirements of this Agreement or the HCP, and in such a situation the Partner shall be acting without a Permit or authority to take a Kbb and shall be subject to all provisions, remedies and penalties of the Endangered Species Act (ESA), 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17, 29.415, Wis. Stats., the

Wisconsin Endangered Species Act (WESA) and ch. NR 27, Wis. Adm.Code.

- B.** (1) Upon a breach or violation of this Agreement, as determined by the DNR, and in addition to any remedies provided or pursued under paragraph 10.A., the DNR may revoke this Agreement and the authorization under it after considering recommendations of the HCP Partners' Implementation and Oversight Committee. The DNR shall notify the Partner and the FWS of an alleged breach or violation.

The DNR shall notify the FWS of any violation of the Permit, HCP or this Agreement. Such notification shall be in writing within five (5) calendar days of discovery of the violation and to the address listed below. Notification shall include the name of the Party(ies) and individual(s) involved, the nature of the suspected violation, time period when the suspected violation occurred and the specific location(s) of the suspected violation.

**Field Supervisor
U.S. Fish and Wildlife Service
2661 Scott Tower Drive
New Franken, WI 54229
Telephone: (920) 866-1717**

Fax: (920) 866-1710

- (2) The Partner shall be provided an opportunity to present information to the DNR and the HCP Partners' Implementation Oversight Committee on an alleged violation and what an appropriate remedy should be prior to the DNR's determination on whether a breach or violation occurred and the appropriate remedy. Information shall be presented to the DNR and the HCP Partners' Implementation Oversight Committee by the Partner within thirty (30) days of notice of an alleged violation of this Agreement to the Partner.
- (3) If the DNR, after consideration of recommendations of the HCP Partners' Implementation Oversight Committee, determines that action by the Partner may be taken that is reasonable and consistent with ensuring the conservation of the species and its habitat without the application of other remedies in this paragraph, it shall not seek additional remedies on the condition that the Partner completes the remedial action within a time considered reasonable by the DNR.
- C.** The DNR retains all further remedies in law or equity, which it may apply to a breach or violation of this Agreement. Enforcement or other remedies available to the FWS under the ESA shall not be abridged or affected by any decision of the DNR under this paragraph.
- D.** It is understood that unintentional violations of this Agreement may occur, and that the Partner may be required to act in emergency situations that do not allow them to follow all commitments in this Agreement. Should such a situation arise, it is expected that a Partner shall report such an activity consistent with the HCP and the HCP Emergency Guideline, detailing the damage, if any, to Kbb habitat and such action the Partner intends to take to cure or mitigate any damage to KBB or its habitat. The Department agrees to consider the circumstances and the Partner's offer to cure or mitigate in any decision it may make regarding appropriate remedial or enforcement action necessary under this Agreement.

11. TERMINATION.

This agreement or its applicability to any land under it may be terminated by the Partner upon sixty (60) days written notice to the DNR and upon the occurrence of one of the following:

- A. The land or management right over it is transferred to another by land contract, fee title, easement, or otherwise;
- B. The KBB is no longer protected by the ESA, (i.e. is delisted) or the KBB is down listed to threatened and take activities of the Partner is allowed per a 4.d. rule.
- C. The Partner ceases to exist, in fact or by law.
- D. Other reasons for termination mutually agreed upon as reasonable by the Partner and the DNR, with advice of the HCP Partners' Implementation Oversight Committee, provided that appropriate conservation and/or compensation has occurred for the take of occupied Kbb habitat. It is the responsibility of the Partner to demonstrate to DNR that conservation has occurred prior to termination.

12. AMENDMENT.

This Agreement shall constitute the entire agreement of the Parties and any previous communications or agreements are hereby superseded and no modifications of this Agreement or waiver of its terms and conditions shall be effective unless made specifically in writing and mutually agreed upon and signed by both Parties.

13. CONTRACTING PARTIES.

In this Agreement, the DNR and the Partner include their respective officers, employees, agents, directors, partners, representatives, successors, heirs, members and servants.

14. STATUS OF PARTIES.

The Partner shall not be considered as an agent, contractor or an employee of the DNR for any purpose, including workers compensation. The DNR agrees that the Partner has sole control of the activities and work conducted on the lands of or under the control of the Partner. The DNR only reserves the right of ingress and egress to the lands and facilities, consistent with paragraph 7, to inspect the lands and records of the Partner, as provided herein, to assure compliance with this Agreement.

15. TRANSFER.

The Partner agrees to notify the DNR of any transaction involving Lands Included, management rights, or assets relating to land, which may pertain to this Agreement, and coverage under the Permit. Notification of transfers can be made at any time, but must be

included prior to any activity, which would result in incidental take of Kbb in order for incidental take authority to be valid. Incidental take is not authorized on newly acquired land until the transfer is reported to the DNR and added to the Partner's SHCA Appendix A (lands included).

16. MODIFICATION/ADAPTIVE MANAGEMENT.

The Partner agrees to modify responsibilities and duties under this Agreement consistent with the review and adaptive management process established in the HCP.

17. FUNDING COMMITMENTS.

The Partner commits to completing its conservation strategies and other obligations as provided in this Agreement, whether accomplished by employees, agents, contractors or cooperators.

18. LIABILITY FOR AGENTS, ETC.

It is recognized that the Partner often conducts its land management or use activities through an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser. The Partner has and accepts the obligation to require, normally through written agreement or communication, that activities be conducted in a manner consistent with this Agreement, the HCP and the Permit. Take incidental to otherwise lawful activities by these persons or entities is authorized by the Permit so long as such activity and incidental take resulting from it is authorized by the Partner consistent with this Agreement, the HCP and the Permit. A violation of any authorization, which includes procedures and activities for KBB conservation the Partner is required to follow or conduct, consistent with this Agreement, the HCP and the Permit, by an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, shall not result in the suspension, revocation, or termination of the Permit or the authorization to the Partner under this Agreement, the HCP and the Permit; nor shall it affect other benefits, rights, or privileges under this Agreement, the HCP or the Permit, except as to that agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, who is and shall be subject to the provisions of the ESA, including remedies for its violation when acting inconsistent with the authorization from this Partner, this Agreement, the HCP and the Permit. The obligation to demonstrate that the Partner adequately communicated procedures and requirements of this Agreement, the HCP and the Permit to the agent, lessee, licensee, contractor, permittee, right-of way grantee, or purchaser is on the Partner, and cannot be waived by the DNR.

19. DATA SHARING

- A. Data provided by the DNR and which constitutes Natural Heritage Inventory data (NHI) may not be used for any purpose other than development of the SHCA or conducting of activities under the Permit. It may not be released or made available to any other person, agency or organization for any purpose unless agreed to in writing by the DNR. Documents or data containing NHI information is included in this restriction.

- B. Data provided to the DNR is subject to Wisconsin's Public Records Law, Ch. 19, Wis. Stats., and subject to that law regarding requests for it. Under s.23.27 (3), Wis. Stats., NHI information is considered confidential and release or use of it is controlled by the Department and administrative rules adopted to administer the NHI program.

20. NOTIFICATION

Partner agrees to notify the Department of any change in the responsible agent, employee, officer or representative responsible for implementing this agreement.

**STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

DATE _____

BY _____

Paul DeLong
Division Administrator of
Forestry, Wisconsin DNR

AND

DATE _____

BY _____

Laurie Osterndorf
Division Administrator of
Land, Wisconsin DNR

[PARTNER NAME below line]

DATE _____

BY _____

(Print name/title below line)

DATE _____

BY _____

(Print name/title below line)

APPENDIX A

PARTNER LANDS INCLUDED

Partner lands included are those road ROWs that the partner has management responsibility for, and which are highlighted on the attached map.

The lands subject to this agreement include roads and highways, and the rights-of- ways (ROW) of which the ROWs are approximately:

_____ feet, meters (*circle one or delete other*) wide on each of two sides, and

_____ feet, meters, miles (*circle one or delete other*) in length.

<p>Total Acres Included for Incidental Take Coverage = _____ ACRES</p>

<u>Acreage Calculator:</u>	
1 meter = 3.2808 feet	_____ meters x 3.2808 = _____ feet
1 mile = 5,280 feet	_____ miles x 5,280 feet = _____ feet
1 acre = 43,560 square feet	_____ ft. wide x _____ ft. long = _____ sq. ft.
_____ sq. ft. divided by 43,560 sq. ft. = _____ acres (include in block above)	

Attach county or township map with roads partner manages marked with a highlighter. Map will contain:

- County name
- Township name(s)
- Town & Range
- Cardinal marker
- Distance scale (and/or section lines)

APPENDIX B

PARTNER SPECIFIC MANAGEMENT GUIDELINES AND PROTOCOLS

[LIST AND ATTACH HERE ALL MANAGEMENT PROCEDURES, CONSERVATION MEASURES, AND MONITORING PROCEDURES NOT COVERED BY STANDARD HCP]

MANAGEMENT GUIDELINES AND PROTOCOLS THAT PARTNER WISHES TO APPLY WHEN PERFORMING ACTIVITIES LISTED IN 4.A. ON LANDS LISTED IN APPENDIX A.]

SHCA Amendment Template & Example

**AMENDMENT
TO
SPECIES AND HABITAT CONSERVATION AGREEMENT (SHCA)**

THIS AMENDMENT is entered into by and between the Wisconsin Department of Natural Resources (DNR) and [redacted] (Partner) for the purpose of amending, where applicable, the SHCA, entered into by the parties on or about [redacted], 19 [redacted] for the purpose of implementation of the statewide Karner blue butterfly (KBB) conservation strategy as further described in the applicable agreements, the Habitat Conservation Plan (HCP) and the Incidental Take Permit (ITP), and all previous modifications and amendments to them. That SHCA is attached to and made part of this agreement.

WHEREAS, an ITP, with associated HCP, AOPs and SHCAs, were issued or agreed upon to direct implementation of a statewide KBB conservation plan consistent with the federal Endangered Species Act (ESA). The Term of the Permit was 10 years, with an option to extend, from the date of its issuance, which was September 27, 1999;

WHEREAS, the Partners, with the DNR and technical assistance of the U.S. Fish and Wildlife Service (FWS), has been successfully implemented to the benefit of the Kbb and its habitat, the Partners, and the State of Wisconsin;

WHEREAS, the Partners and DNR, consistent with the HCP and ITP, have committed to implement the KBB conservation plan under an adaptive management approach,

WHEREAS, the Partners, with the DNR, have requested to extend the Permit consistent with the HCP, ITP and Agreements, as modified subsequent to the issuance of the original ITP, and consistent with further modifications as described herein and consistent with an adaptive management approach;

THIS AMENDMENT modifies all previous agreements between the Partners and the DNR for the purpose of implementing the statewide KBB conservation program into the future consistent with changes to all agreements and documents deemed necessary for the purposes of adaptive management and conservation of the species. This amendment provides that the Partner and DNR agree:

- 1. *As to the “Period of Agreement”, This SHCA shall be effective until and unless terminated consistent with its provisions. (Amends Paragraph I.)*

2. *The “lands included” Appendix A. are modified or adjusted as follows: [redacted] x acres as represented on the attached map.*
3. *The “Activities” are modified or adjusted as follows:
The following specified land management or land use activities may be engaged in on the Lands Included in accordance with this Agreement, and the incidental take of KBB is authorized, if the activities are conducted consistent with the HCP, HCP standard guidelines and protocols, the Permit, this Agreement and any changes and improvements made with HCP participation processes and consistent with the AOP, which amend these documents; and other protocols or management directions attached to, and made part of this Agreement as Appendix B. (Standard HCP guidelines and protocols are published and made available on the HCP webpage; any other protocols and management directions defined by the partner will be listed and attached to Appendix B). Appendix B is adjusted or modified as follows: [redacted].
(Amends Paragraph 3.A)*
4. *As to “outreach and education”, We will seek out opportunities to provide outreach and education with a priority emphasis on helping to support conservation and recovery of the Karner blue butterfly in the Biological Recovery Zones (BRZ).
(Amends Paragraph 3.C)*
5. *As to “Surveying” and “Monitoring”, Surveying and Monitoring shall be conducted consistent with protocols authorized or required as provided in the HCP and user guides in effect at the time of the surveying or monitoring activity unless otherwise stated. Surveying and Monitoring are modified or adjusted as follows: [redacted].
(Amends Paragraphs [redacted] and [redacted] respectively)*
6. *“Annual reports” shall be submitted as required by the conditions of the ITP and consistent with the HCP and its guidelines and processes in effect for the reporting period. (Amends Paragraph 8)*
7. *“Assignments” pertain to rights and privileges of the Partner. “Transfers” pertain to the transfer of ownership of the land, be it in fee-title or easement. (Clarifies Paragraphs [redacted] and [redacted])*
8. *As to “Funding”, The Partner commits to completing its conservation strategies and other obligations as provided in this Agreement, whether accomplished by employees, agents, contractors or cooperators.*
9. *Data provided by the DNR under this KBB Habitat Conservation Plan program and which constitutes “Natural Heritage Inventory” (NHI) data, normally addressing the Kbb or other species addressed in the information which may share Kbb habitat, may not be used for any purpose other than development of the SHCA or conducting of activities under the ITP. It may not be released or made available to any other person, agency or organization for any purpose unless agreed to in writing by the DNR. Documents or data containing NHI information is included in this restriction.*

Data provided to the DNR is subject to Wisconsin's Public Records Law, Ch. 19, Wis. Stats., and subject to that law regarding requests or its disclosure.

10. The Partner agrees to enter into and comply with the Articles of Partnership, which are attached to and made part of this agreement.

**STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

DATE _____

BY _____

Paul DeLong
Division Administrator of
Forestry, Wisconsin DNR

AND

DATE _____

BY _____

Laurie Osterdorf
Division Administrator of
Land, Wisconsin DNR

[PARTNER NAME below line]

DATE _____

BY _____

(Print name/title below line)

DATE _____

BY _____

(Print name/title below line)

**Karner Blue Butterfly HCP
Strategic Communication Plan**

Introduction

Executive Summary

The Karner Blue Butterfly Habitat Conservation Plan (HCP) has been focused heavily on two valuable processes; Outreach and Education and Adaptive Management. This strategic communication plan is designed to take advantage of these key processes and move the HCP forward by focusing on the following objectives:

- Meet the outreach and education requirements of the HCP, Incidental Take Permit, Implementing Agreement, and support partner Species and Habitat Conservation Agreement commitments
- Provide informational resources to interested landowners and other voluntary, non-partner entities within Wisconsin and to the public at large
- Focus priority outreach and education efforts on those areas that are strategically important to the recovery goals of the Karner blue in Wisconsin
- Provide program and technical information to all HCP partners and interested parties
- Receive and retrieve data and other information regarding the Karner blue program in an efficient manner
- Educate state and federal policy makers and regulators about the Karner blue program needs and experience in WI and the status and activities of the HCP partnership
- Spread awareness about the success of the HCP and the lessons learned throughout the development and implementation of this program to academics, policy makers, conservationists, resource professionals, and others
- Continue to provide expert advice, assistance, and information to the general public, students and other resource professionals interested in the Karner blue butterfly, barrens ecosystems and the voluntary conservation approach of the HCP partnership

Background

The Wisconsin Department of Natural Resources coordinated an effort on behalf of many public and private landowners to develop a landscape scale, multi-partner Habitat Conservation Plan for the Karner blue butterfly. This was an innovative approach in more than one way, but especially in the inclusion of a “Voluntary Category” of property owners that would receive permit coverage for incidental takes of the Karner blue, with no additional regulatory requirements.

This innovative approach was predicated on the massive conservation work that the HCP partners agreed to and also a proactive outreach and education program. As quoted from the HCP “a nonregulatory approach, substantial public outreach, education and assistance programs will be included to **foster partnerships** and **encourage conservation efforts** on a **voluntary basis**” (emphasis added)

This approach was anticipated to remove the fear of regulation by property owners and encourage proactive conservation and stewardship on these lands. This assumption was accurate and has proved to be immensely successful. In the first 8 years of the HCP, many thousands of landowners, citizens and students have learned about the Karner blue, its habitat and ways to conserve and restore the imperiled habitat that the Karner blue needs.

The HCP also made the realization that the partners would learn much through implementing the permit and encouraged adaptive management. This adaptive management has fostered efficiency and focus on behalf of the partners, and as detailed in the Situational Analysis, this Strategic Communication Plan helps to support that focus to the larger goals of Karner blue conservation and ultimately recovery.

Situational Analysis

Issue: Outreach and Education should be focused on those areas that provide the greatest conservation benefit

Focus of O&E was recognized in the HCP when the ACEs and SPAs were created. The focus on these areas will transition to be defined by the Biological Recovery Zones. The Communication Strategy should be adjusted as well.

Issue: Resources are scarce

A broad brush approach to O&E around the state has been effective at fostering an understanding of the Karner and its habitat. However, this general approach to O&E has not satisfied some specific HCP goals. This general approach to O&E can become an extra workload for partners with little added conservation value. Systems and processes used to collect, distribute and store information can be made more efficient.

Issue: Efficiencies should be identified, duplication of effort minimized and collaborative efforts sought.

As resources are scarce it is imperative to utilize the available resources to the greatest extent possible. This requires coordination and creativity on behalf of the partners to leverage the existing O&E infrastructure and identify new individuals, organizations and outlets to help support and communicate the message.

Issue: Clear direction and support should be provided to partners

Commitments vary with partners. O&E has been broadly implemented, often on demand and when opportunities became available rather than by design.

Issue: New tools are available

Web based O&E has reduced workload and improved access to information. The use of web based communication can continue to improve quality and efficiency of the O&E and other information provided to partners, landowners, regulators, and the public at large. These tools can also help to make the administration of the program by DNR and compliance with the ITP by all partners more efficient.

Issue: Adaptive Management

The HCP partners have taken the time to assess and adjust many aspects of the program. In addition, the DNR is taking steps to make the administration of the permit as efficient as possible.

Communication Plan Components

HCP Partner Component

Goal: Provide HCP partner's relevant and timely information about the HCP, ITP and related issues.

Objectives:

- Inform HCP partners about relevant HCP information
- Provide relevant technical information and resources
- Provide efficient method for partner communication to WDNR
- Promote information sharing between partners
- Provide training, outreach and education support and other items as needed.

Communication Targets:

- Implementation Oversight Committee
- HCP Partners
- Potential Partners

Tools:

- Website
- E-mail
- Newsletter
- IOC and partnership meetings

Process:

- Assess all HCP partner information needs
- Develop website to provide access to all necessary information
- Develop training and orientation modules for partner staff to access
- Encourage partner collaboration through meetings and networking
- Evaluate database and reporting improvement options and make recommendations to HCP Coordinator and IOC

Voluntary Landowner Component

Goal: Encourage conservation by private landowners in the voluntary category through assistance, education and targeted outreach.

Objectives:

- Focus outreach to private landowners in those areas that are strategically important to the recovery goals of the Karner blue. i.e. Biological Recovery Zones
- Provide access to technical information and assistance regarding Karner blue habitat conservation and restoration
- Respond quickly to inquiries
- Offer the opportunity to become involve in conservation efforts for the Karner blue

Communication Targets:

- Landowners and land users located within Biologic Recovery Zones
- Landowners and land users within the High Potential Range
- Other landowners and land users within Wisconsin
- General Public

Tools:

- Website
- Personal contact by partners
- Partner O&E materials
- DNR O&E materials

Process:

- Develop web site to enhance outreach and education to land owners
- Gain feedback, improvement, information and suggestions by land owners and others experienced in working with land owners on Karner blue issues
- Provide assistance to the Wisconsin Karner Blue Recovery program as needed to develop communication and outreach and education strategies

Policy Makers

Goal: Educate policy makers at the state and federal level about the WI Karner blue program to influence future policy decisions with regards to endangered species conservation.

Objectives:

- Inform state legislators about the program, landowner responsibilities, Partner accomplishments and program needs
- Inform federal legislators about the success and lessons learned from implementing this unique approach to endangered species conservation

Targets:

- Local elected officials
- State elected officials
- Federal elected officials
- Appointed agency staff
- Regional agency staff

Tools:

- Partners through trade organizations
- Direct mailings, issue briefs and papers
- One-on-one meetings
- Invitations to HCP celebration events

Process:

- Actively monitor state (not only WI) and federal initiatives, discussions and debates regarding endangered species conservation and especially Endangered Species Act.
- Actively monitor any court proceedings or judgments with regards to the Endangered Species Act
- Develop and provide policy briefs to policy makers

Regulator

Goal: Inform state and federal regulators about the Karner blue program, the reality of partnering success, regulatory process within the Karner blue program to ensure efficiencies with overlap between the HCP and other programs, and to provide a template for innovative, incentive based conservation approach.

Objectives:

- Provide clear descriptions of relevant HCP processes that involve administration of the ITP and relationship of Partner responsibilities under the ITP with other regulatory process (e.g. USACOE, DNR permits etc.)
- Provide assistance to other regulatory departments and agencies on collaboration, cooperation and meaningful regulatory process
- Communicate a new regulatory paradigm that involves partnering and trust

Targets:

- FWS
- USACOE
- DNR
- Other states
- PSC

Tools:

- Presentations at conferences, meetings, and other venues
- Working sessions
- Papers
- One-on-one conversations

Process:

- Assess regulatory agency education needs for Karner blue
- Develop briefings and other tools as needed
- Provide opportunities to inform regulatory agencies about the Karner blue approach through lessons learned presentations, participation in various department and agency meetings

Media

Goal: Inform local and national media of the success of the Kbb program in WI

Objectives:

- Increase national awareness of Kbb HCP (especially the voluntary strategy) and its implications for endangered species management
- Sustain support for the Kbb program within the State of Wisconsin
- Promote the conservation done by all partners
- Promote the conservation approach taken under this HCP
- Provide an additional vehicle to get “good news” about the HCP get to landowners
- Promote public support for conservation and especially recovery efforts for this endangered species

Targets:

- CBS Sunday Morning
- USA Today
- E Magazine
- Gannet Outdoors Report
- Local Newspapers
- Local TV News
- Conservation Magazines

Tools:

- Web
- Press Release

Process:

- Working with DNR media staff, develop a list of media contacts/outlets, state and nationally
- Determine best time and strategy for issuing a press release to various media outlets

General

Goal: Provide access to information about the WI KBB HCP program and encourage _____

Objectives:

- Provide information about the history, innovations and development process of the HCP to academic researchers.
- Encourage understanding of the lessons learned to date by the partnership to NGOs and other states involved with rare species and ecosystem conservation.

Targets:

- NGOs
- General public
- Other states
- Academics

Tools:

- Web site

Process:

- Develop materials that help to tell the story of the Karner blue program in Wisconsin
- Publish educational material regarding the program on the web site including reports completed by academics or conservation organizations
- Provide an on-line resource to access FWS, DNR and other publications regarding the Karner blue and the HCP

Tools

Communication Tools Matrix

Component	Communication Tool								
	Web	e-mail	Newslett er	Direct Mail	One-on- One	Press Release	Organiza tions	Specific O&E materials	Presentat ions
HCP Partners	●	●	●	●	●			●	●
Landowners	●					●		●	
Legislators	●			●	●	●	●		●
Regulators	●				●				●
Media	●					●			
General	●					●			

Web: This tool is the DNR Karner website, <http://dnr.wi.gov/forestry/karner/>. This is a great venue for mass communications and can provide the broadest audience with the information that they need, whenever they access. This tool can also be used to communicate relevant information to the HCP Partners and provide access to the necessary forms, documents, templates and other materials they need to comply with the HCP requirements. The web can be the primary mechanism used to meet HCP O&E requirements.

E-mail: E-mail is used to make announcements to a broad audience, and transfer information to a selected group. E-mail distribution lists have been created and used for a variety of purposes.

Newsletter: Newsletters are published and sent or e-mailed to those on the distribution lists at regular intervals throughout the year. The information is diverse as is the audience.

Direct mail: Direct mail is sent postage paid, to the individuals mailing address. Direct mail can include a variety of information or be used to transfer specific printed materials, O&E resources or other items.

One-on-One: One-on-one meetings are especially effective at fostering understanding and building trust about an issue. These meetings are useful in exchanging ideas and brainstorming.

Press Release: Press Releases are issued directly to the media with contact information for a follow-up. This communication tool usually needs to go through various process steps to be released, as it is 'official'.

Organizations: Trade organizations or those representing various entities are useful in providing a national or regional viewpoint, and can also be a good path for getting information to a larger audience, especially policy makers.

Specific O&E Materials: These are designed specifically for an audience or a purpose, e.g. DNR Wildcards

Presentations: Presentations are usually given at trade shows or conferences and can reach a good size audience.

Key Constituents

The primary constituents for this strategic communication plan are the HCP Partners and land owners located within or around biological recovery zones.

The HCP partners need to have a clear understanding of the program, their responsibilities, and access to relevant information, training, O&E materials, and the forms, documents, and other materials that are necessary for compliance.

O&E directed to private landowners is now focused on those areas that are strategically important for recovery of the Kbb in WI. Specific needs will be drawn from the Recovery O&E strategy and utilized by HCP Partners to focus O&E activities. Focusing O&E resources on these areas is the most efficient use of HCP Partner efforts. O&E to other private landowners and interested parties will be primarily through the Kbb website.

Communications to other key constituents is specifically addressed in the implementation plan below.

Key Messages

- Private landowner requirements
- HCP Partners success
- Lessons learned
- Conservation not regulation
- Partnership and collaboration, not command and control
- HCP partner responsibilities

Implementation

The implementation plan is comprised of a section describing the actions needed for each of the plan components detailed in Section II above. These actions are then put into an overall schedule for implementation

HCP Partners

- Develop Orientation training package for new partners or new partner employees
- Develop HCP Users Guide training
- Consult with IOC or Communication Team and receive guidance on Strategic Communications Plan
- Consult with IOC or Communication Team on updates to Kbb website and information needs
- Provide access to all O&E materials via Kbb website
- Provide access to Guidelines and Protocols via Kbb website
- Provide access to training materials via Kbb website
- Provide access to necessary HCP forms via Kbb website
- Assist HCP Partners as needed with targeted Kbb information (e.g. trade orgs, landowners, lobbyists, management)
- Update HCP distribution lists and mechanisms
- Clarify O&E requirements under HCP and SHCAs as necessary, e.g. SPA and ACE requirements change to BRZ

Landowners

- Assist WI Kbb Recovery Program with development and implementation of O&E strategy
- Provide O&E materials to public via Kbb website
- Update website to provide easy access to Kbb and Habitat identification and management information
- Update website to provide access to other relevant Kbb information
- Update website to include clear communication of landowner responsibilities (e.g. gypsy moth, construction, etc.)

Policy Makers

- Monitor relevant legislative and judicial proceedings
- Provide Briefings
- Develop white papers

Regulators

- Assess education needs

Media

- Develop Media list

- Develop press release strategy and needs

General

Schedule

General task description	S 07	O 07	N 07	D 07	J 08	F 08	M 08	A 08	M 08	J 08	J 08	A 08	S 08	O 08	N 08	D 08
Finalize Communication Plan and any necessary HCP updates																
Develop Training and Orientation modules																
Update Karner blue website																
Update HCP distribution system																
Implement Policy Maker communication process																
Implement Regulator communication process																
Implement Media Communication process																
Review and revise HCP Strategic Communication Plan																

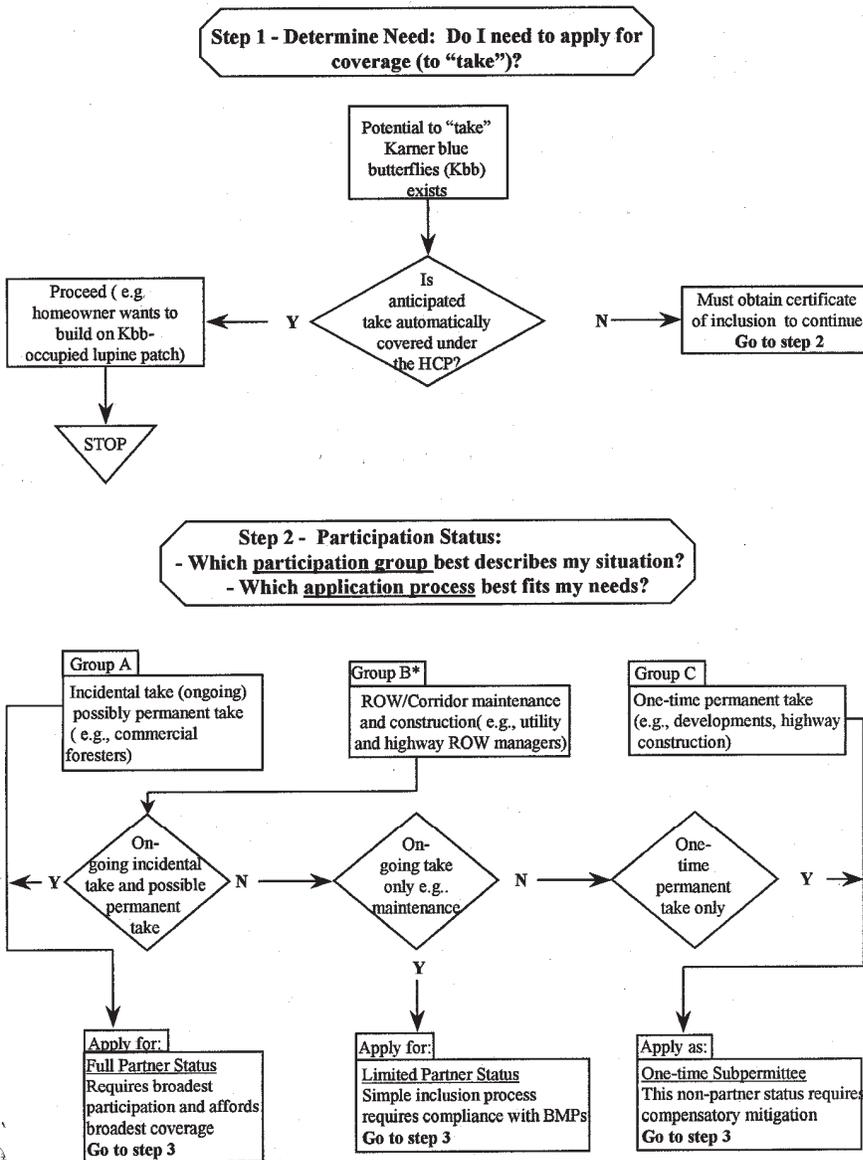
Resource Needs

- 10-20 hrs/week of DNR LTE
- Assistance from DNR Forestry for Website design and maintenance
- Assistance from DNR forestry for training and orientation module development
- Assistance from DNR Forestry attorney for legislative and judicial monitoring
- Assistance from DNR BER and FWS Partners for Wildlife program in reviewing and providing expertise in land owner outreach actions
- IOC time for review and guidance

Appendices

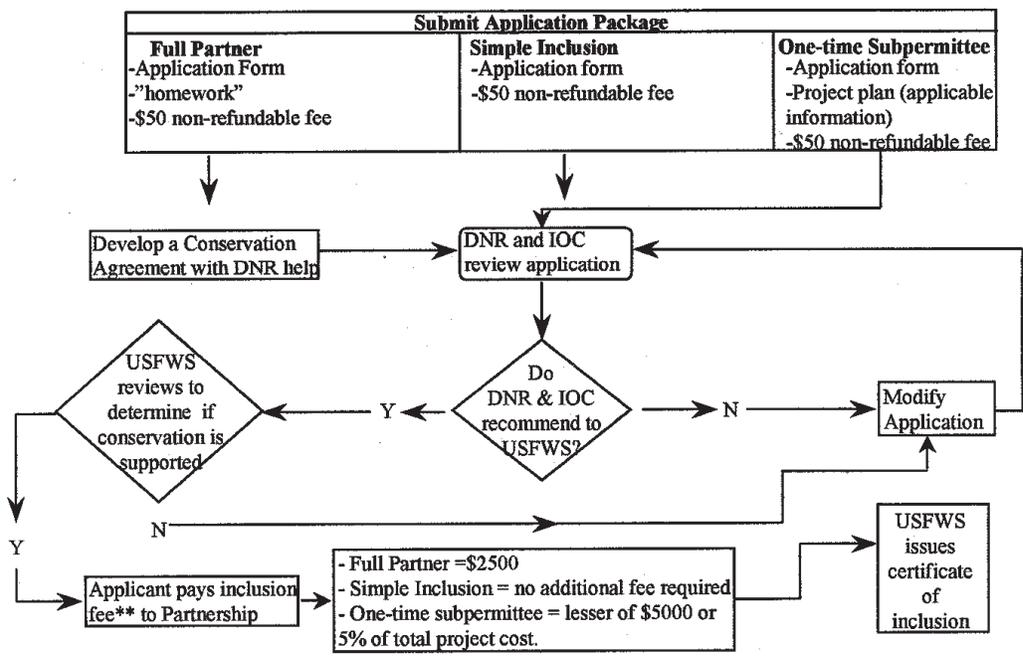
- Appendix A: O&E Resource List

Figure x.x Flow Chart for Determining Options for ITP Coverage



* Option: Applicant may select combination of simple inclusion and mitigate one-time permanent take. Consult with DNR.

Step 3 - The Application Process:



**APPLICATION for CONSIDERATION for INCLUSION in the
WISCONSIN STATEWIDE KARNER BLUE BUTTERFLY HCP**

When complete, submit this application to Attn: Karner Blue HCP Coordinator, FR/4,
Wisconsin DNR, 101 S. Webster St., Box 7921, Madison, WI 53707-7921

(This is an informational questionnaire, and will be used by WDNR to assess applicant's intentions and assist in processing a conservation agreement and request for inclusion under USFWS Permit TE010064)

Applicant Information:

Organization Name _____

Mailing Address _____

1st Contact Person _____ Title _____

Phone Number () - Fax Number () -

2nd Contact Person _____ Title _____

Phone Number () - Fax Number () -

Check all that apply:

- Full partner status Limited partner status One-time project.
 Governmental unit Non-governmental organization

Complete fully and to the best of your ability.

THIS APPLICATION SHALL NOT BE CONSIDERED COMPLETE AND ACTED
UPON UNTIL ALL INFORMATION IN IT, AND AS OTHERWISE REQUESTED BY
THE DEPARTMENT OF NATURAL RESOURCES IS PROVIDED.

Non-refundable Application fee (\$50): (This fee does not apply to governmental units or transfers from existing partners.)

2. Land ownership by acreage and description (the more specific the better e.g. quarter-quarter section, town, range.)

Note: For road ROWs enter number of miles of ROW and the total average width of vegetation on both sides of road.

2. Land use activities or land management practices you engage in or desire to engage in:
3. If the land involved is forest land, please describe type of vegetation and age class.

4. Describe the extent of land occupied by the Karner Blue butterfly and, to the best of your ability, the number of butterflies (if known).
 - a. What is the occupied site or sites used for currently?
 - b. Are there any natural or managed corridors adjacent to the occupied site that are or might be used for dispersal purposes?
 - c. What is the history of Karner Blue butterflies on the property, to the best of your knowledge? acreage, numbers.
5. What conservation measures are you willing to apply to your land to receive authorization to incidentally take Karner blue butterflies?
For how long?
6. What monitoring capability do you currently have to monitor the species and habitat on your property?
 - a. What monitoring are you willing to conduct?
7. Are you willing to allow the Department of Natural Resources, or its designees, access to your land to assure compliance with any authorization to incidentally take Karner blue butterflies?
8. Are you willing to submit periodic reports to the Department of Natural Resources regarding the status of Karner blue butterflies and habitat on your property?
9. What type of records do you currently keep respecting your land use and management activities? Are you willing to keep records in the form and of the type described in the information attached?
10. Other information you would like considered along with this application:

As and in the capacity of the applicant, I hereby commit to and agree to comply with the plans and conservation efforts contained in this application and submitted for the purpose of obtaining coverage under the Permit issued to the Department of Natural Resources for the incidental take of the Karner blue butterfly in the State of Wisconsin. I also agree to comply fully with any restrictions or conditions included in any Certificate of Inclusion issued to me by the Wisconsin DNR under Permit No. TE010064 as a result of this application for consideration as a partner in this HCP where applicable.

The information above is accurately and correctly stated to the best of my knowledge.

Print or type name of person filling out application

APPENDIX A

Partner Lands Included

Partner lands included are those road ROWs that the partner has management responsibility for, and which are highlighted on the attached map.

The lands subject to this agreement include roads and highways, and the rights-of- ways (ROW) of which the ROWs are approximately:

_____ feet, meters (*circle one or delete other*) wide on each of two sides, and

_____ feet, meters, miles (*circle one or delete other*) in length.

Total Acres Included for Incidental Take Coverage = _____ ACRES

<u>Acreage Calculator:</u> 1 meter = 3.2808 feet _____ meters x 3.2808 = _____ feet 1 mile = 5,280 feet _____ miles x 5,280 feet = _____ feet 1 acre = 43,560 square feet _____ ft. wide x _____ ft. long = _____ sq. ft. _____ sq. ft. divided by 43,560 sq. ft. = _____ acres (include in block above)
--

Attach county or township map with roads partner manages marked with a highlighter. Map will contain:

- County name
- Township name(s)
- Town & Range
- Cardinal marker
- Distance scale (and/or section lines)

**AMENDMENT
TO
SPECIES AND HABITAT CONSERVATION AGREEMENT (SHCA)**

THIS AMENDMENT is entered into by and between the Wisconsin Department of Natural Resources (DNR) and _____ (Partner) for the purpose of amending, where applicable, the SHCA, entered into by the parties on or about _____, 19____ for the purpose of implementation of the statewide Karner blue butterfly (KBB) conservation strategy as further described in the applicable agreements, the Habitat Conservation Plan (HCP) and the Incidental Take Permit (ITP), and all previous modifications and amendments to them. That SHCA is attached to and made part of this agreement.

WHEREAS, an ITP, with associated HCP, AOPs and SHCAs, were issued or agreed upon to direct implementation of a statewide KBB conservation plan consistent with the federal Endangered Species Act (ESA). The Term of the Permit was 10 years, with an option to extend, from the date of its issuance, which was September 27, 1999;

WHEREAS, the Partners, with the DNR and technical assistance of the U.S. Fish and Wildlife Service (FWS), has been successfully implemented to the benefit of the Kbb and its habitat, the Partners, and the State of Wisconsin;

WHEREAS, the Partners and DNR, consistent with the HCP and ITP, have committed to implement the KBB conservation plan under an adaptive management approach,

WHEREAS, the Partners, with the DNR, have requested to extend the Permit consistent with the HCP, ITP and Agreements, as modified subsequent to the issuance of the original ITP, and consistent with further modifications as described herein and consistent with an adaptive management approach;

THIS AMENDMENT modifies all previous agreements between the Partners and the DNR for the purpose of implementing the statewide KBB conservation program into the future consistent with changes to all agreements and documents deemed necessary for the purposes of adaptive management and conservation of the species. This amendment provides that the Partner and DNR agree:

11. *As to the “Period of Agreement”, This SHCA shall be effective until and unless terminated consistent with its provisions. (Amends Paragraph 1.)*
12. *The “lands included” Appendix A. are modified or adjusted as follows: ___ x acres as represented on the attached map.*
13. *The “Activities” are modified or adjusted as follows:
The following specified land management or land use activities may be engaged in on the Lands Included in accordance with this Agreement, and the incidental take of KBB is authorized, if the activities are conducted consistent with the HCP, HCP standard guidelines and protocols, the Permit, this Agreement and any changes and improvements made with HCP participation processes and consistent with the AOP, which amend these documents; and other protocols or management directions attached to, and made part of this Agreement as Appendix B. (Standard HCP guidelines and protocols are published and made available on the HCP webpage; any other protocols and management directions defined by the partner will be listed and attached to Appendix B). Appendix B is adjusted or modified as follows: _____.
(Amends Paragraph 3.A)*
14. *As to “outreach and education”, We will seek out opportunities to provide outreach and education with a priority emphasis on helping to support conservation and recovery of the Karner blue butterfly in the Biological Recovery Zones (BRZ).
(Amends Paragraph 3.C)*

15. *As to “Surveying” and “Monitoring”,* Surveying and Monitoring shall be conducted consistent with protocols authorized or required as provided in the HCP and user guides in effect at the time of the surveying or monitoring activity unless otherwise stated. Surveying and Monitoring are modified or adjusted as follows: [redacted] (Amends Paragraphs [redacted] and [redacted] respectively)
16. “Annual reports” shall be submitted as required by the conditions of the ITP and consistent with the HCP and its guidelines and processes in effect for the reporting period. (Amends Paragraph 8)
17. “Assignments” pertain to rights and privileges of the Partner. “Transfers” pertain to the transfer of ownership of the land, be it in fee-title or easement. (Clarifies Paragraphs [redacted] and [redacted])
18. *As to “Funding”,* The Partner commits to completing its conservation strategies and other obligations as provided in this Agreement, whether accomplished by employees, agents, contractors or cooperators.
19. Data provided by the DNR under this KBB Habitat Conservation Plan program and which constitutes “Natural Heritage Inventory” (NHI) data, normally addressing the Kbb or other species addressed in the information which may share Kbb habitat, may not be used for any purpose other than development of the SHCA or conducting of activities under the ITP. It may not be released or made available to any other person, agency or organization for any purpose unless agreed to in writing by the DNR. Documents or data containing NHI information is included in this restriction.

Data provided to the DNR is subject to Wisconsin’s Public Records Law, Ch. 19, Wis. Stats., and subject to that law regarding requests or its disclosure.
20. The Partner agrees to enter into and comply with the Articles of Partnership, which are attached to and made part of this agreement.

**STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

DATE _____

BY _____

Paul DeLong
Division Administrator of
Forestry, Wisconsin DNR

AND

DATE _____

BY _____

Laurie Osterndorf
Division Administrator of
Land, Wisconsin DNR

[PARTNER NAME below line]

DATE _____

BY _____

(Print name/title below line)

DATE _____

BY _____

(Print name/title below line)

**WISCONSIN KARNER BLUE BUTTERFLY
HABITAT CONSERVATION PLAN**

SPECIES AND HABITAT CONSERVATION AGREEMENT

FULL PARTNER

THIS SPECIES AND HABITAT CONSERVATION AGREEMENT (Agreement) is entered into by and between the State of Wisconsin Department of Natural Resources (DNR) and _____ () for the purpose of implementing the Habitat Conservation Plan (HCP) and authorizing the incidental take of the Karner blue butterfly (KBB) in the State of Wisconsin consistent with and during the period of an Incidental Take Permit (Permit) issued by the U.S. Fish and Wildlife Service (FWS).

WHEREAS, the DNR holds a Permit issued by the United States Department of the Interior, Fish and Wildlife Service (FWS) based upon the Habitat Conservation Plan, Species and Habitat Conservation Agreements (SHCA) with the Partners and Implementing Agreement submitted to the FWS with the application for a Permit;

WHEREAS, the statewide KBB conservation program relies on the inter-relationship of SHCAs, a HCP and an Incidental Take Permit (Permit) to form and direct the KBB conservation plan, as well as clarify commitments and obligations of landowners and land users in this effort;

WHEREAS, the Permit from the FWS authorizes the incidental take of the KBB subject to implementation of conservation measures and compliance with procedures, terms and conditions of this Agreement, the HCP and the Permit, by Partners entering into SHCAs with the DNR; and

WHEREAS, the Partner plans to engage in activities that may result in the incidental take of the KBB and is willing to implement conservation measures consistent with the HCP and the Permit on lands under and to the extent of the Partner's control to avoid, minimize or mitigate the take of such species as further provided herein.

IT IS HEREBY AGREED by the parties, based upon the mutual terms and conditions herein, that this Agreement shall constitute the Partner's commitment and agreement to undertake conservation measures for the KBB upon issuance of a Certificate of Inclusion (Certificate). The parties further agree this Certificate is conditioned on the premise that the Agreement shall be consistent with the HCP and conditions of the Permit.

1. DEFINITIONS.

For purposes of this Agreement, the following definitions apply:

- A. "Certificate of Inclusion" (Certificate) is a document issued by the DNR as authorized by the FWS, which, thereby, includes the person or entity it is issued to under the provisions of the Permit and authorizes incidental take consistent with the HCP, the Permit and this Conservation Agreement.
- B. "Implementing Agreement" is a legal contract entered into between the DNR and the FWS that: (1) identifies the responsibilities of all participants to the HCP; (2) legally binds the DNR to their obligations; and (3) is signed by the DNR.
- C. "Incidental take" is the take of a species incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity.
- D. "Incidental take permit" (Permit) is a permit issued by the FWS under the authority of Section 10(a)(1)(B) of the Endangered Species Act to authorize the incidental take of a species listed as endangered or threatened under that Act.
- E. "Intentional take" means the purposeful take of a species not incidental to an otherwise lawful activity e.g. collecting.
- F. "Partner", consistent with the HCP Articles of Partnership (AOP) and determined as a Partner by HCP Implementation Oversight Committee (IOC) assigned this task, is a person, agency or organization that:
 - 1. Enters into and agrees to the HCP and AOP; and
 - 2. Has an ownership interest i.e. fee title or easement in land with existing or potential KBB habitat; or
 - 3. Has economic assets at risk as a result of the listing of the KBB as endangered; or
 - 4. Has a role in implementing the HCP e.g. ASCS, municipalities.

2. PERIOD OF AGREEMENT.

The period of this Agreement shall be from its execution and the issuance of a Certificate authorizing incidental take consistent with this Agreement, during the period of the Permit, unless terminated in accordance with paragraph 11 or amended in accordance with paragraph 12.

3. LANDS SUBJECT TO AGREEMENT.

The lands subject to this Agreement include approximately [REDACTED] acres and are more particularly described in Appendix A (Lands Included) which is attached to and made part of this Agreement, and all future ownership (including, but not limited to, easements and temporary work spaces) within the high potential range of the KBB, subject to the notification and reporting processes, and implementation of conservation practices consistent with this Agreement, the HCP and the Permit.

4. ACTIVITIES/INCIDENTAL TAKE AUTHORIZED/PUBLIC OUTREACH AND EDUCATION/CONSERVATION EFFORTS.

A. ACTIVITIES. The following specified land management or land use activities, in addition to any other activity covered by an HCP guideline, protocol or management direction, may be engaged in on the Lands Included in accordance with this Agreement, and the incidental take of KBB is authorized, if the activities are conducted consistent with the HCP, HCP standard guidelines and protocols, the Permit, this Agreement and any changes and improvements made with HCP participation processes and consistent with the AOP, which amend these documents; and other protocols or management directions attached to, and made part of this Agreement as Appendix B. Standard HCP guidelines and protocols are published and made available on the HCP webpage; any other protocols and management directions defined by the partner will be listed and attached to Appendix B:

[LIST MANAGEMENT ACTIVITIES PARTNER WISHES TO ENGAGE IN HERE.]

B. INTENTIONAL TAKE. The Partner agrees not to engage in the intentional take of the KBB and agree that the entering into of this Agreement does not authorize the intentional take of such species.

C. PUBLIC OUTREACH AND EDUCATION. The Partner agrees to engage in the following public outreach and education activities for the purpose of conserving the KBB consistent with the HCP and Permit:

[LIST O&E ACTIVITIES PARTNER COMMITS TO ENGAGE IN HERE.]

D. CONSERVATION EFFORTS FOR THE KBB. Other than as described elsewhere in this clause, the Partner intends to engage in the following conservation efforts and practices:

[LIST OTHER CONSERVATION ACTIVITIES PARTNER IS WILLING TO COMMIT TO HERE.]

5. OTHER SPECIES.

In addition to those efforts identified in this Agreement for the KBB, the Partner intends to implement the following conservation measures or programs related to the following species:

[LIST OTHER SPECIES OR INSERT "N/A" (Not Applicable) OR "NONE" HERE.]

6. SURVEYS.

The Partner agrees to conduct surveys for the KBB and other species identified in paragraph 5 and their habitat consistent with the HCP, on Lands Included, prior to engaging in or conducting a management or land use activity or practice. Written records of all surveys, including identification and qualifications of the person conducting the survey, the results of the survey as to habitat and occurrences observed, and the conservation strategy to be applied to respond to the findings of the survey, shall be maintained by the Partner during the period of and retained for five years following termination of the Agreement, at the following facility (*Include organization name, contact person's name and title, full mailing address including street, road or RFD number, telephone and facsimile numbers and email address*):

[INSERT NAME and TITLE OF CONTACT PERSON, COMPLETE MAILING AND STREET ADDRESS, TELEPHONE AND FACSIMILE NUMBERS AND EMAIL ADDRESS HERE.]

7. MONITORING.

The Partner agrees to monitor and maintain written records regarding the effects of land management and use practices and activities on KBB and KBB habitat, consistent with the HCP, on Lands Included, during the period of this Agreement and retain them for five years following termination of the Agreement, at the following facility (*Include organization name, contact person's name and title, full mailing address including street, road or RFD number, telephone and facsimile numbers and email address*):

[INSERT NAME and TITLE OF CONTACT PERSON, COMPLETE MAILING AND STREET ADDRESS, TELEPHONE AND FACSIMILE NUMBERS AND EMAIL ADDRESS HERE.]

8. DNR AND FWS INGRESS AND EGRESS.

A. COMPLIANCE MONITORING.

- (1) During the period of this Agreement, the DNR may conduct compliance monitoring of the activities and records of the Partner. Except as provided in Subparagraph A.(2), compliance monitoring shall be preceded by reasonable notice, not to be less than 24 hours, and shall be conducted in the presence of a representative of the Partner, if the representative is available at the noticed time and date, or other time agreed upon by the Partner and auditing personnel. Access to the property involved, to the extent of the Partner's authority, is authorized. Access to Lands Included and records required by this Agreement, or the HCP, shall be for the purpose of assuring compliance with this Agreement and the HCP, and be unlimited. If the Partner does not have authority to authorize access to the land identified in the notice to be monitored during the compliance monitoring the Partner shall immediately notify the

DNR of such lack of authority and the limited use it has in the land identified. Documents of title or interest in the land identified shall be provided to the DNR upon its request. A copy of any final report, map or other record prepared by the DNR on the results of its going upon the land identified or reviewing the records shall be provided to the Partner within thirty (30) days of the DNR access and review.

Notification under this Paragraph shall be in writing, facsimile, or telephone to (*Include organization name, contact person's name and title, full mailing address including street, road or RFD number, telephone and facsimile numbers and email address*):

[INSERT NAME and TITLE OF CONTACT PERSON, COMPLETE MAILING AND STREET ADDRESS, TELEPHONE AND FACSIMILE NUMBERS AND EMAIL ADDRESS HERE.]

- (2) The notice provision in Subparagraph A.(1), shall not apply when the DNR or representatives of the FWS considers that pending or ongoing activities of the Partner, or person authorized by the Partner, based on concerns or complaints made known to them, may adversely affect KBB occupied sites in a manner inconsistent with the Agreement, or result in damage to or destruction of KBB occupied habitat or that may jeopardize the Permit.
- B.** Any refusal of access authorized in Subparagraphs (1) or (2) shall be considered a breach of this Agreement and subject the Partner to all remedies available to the DNR under this Agreement or at law,
- C.** The FWS may accompany the auditor when auditing or monitoring under this Agreement or the HCP.
- D.** In addition to authority granted elsewhere in this Agreement, the FWS may enter the Lands Included or where permission by others with an ownership interest has been granted and access the records of the Partner required for the purpose of overseeing the Permit and activities under it or required by this Agreement.
- E.** Nothing in this Agreement, including this section, shall abrogate the authority of the Secretary of the Interior, through the FWS, to fulfill his or her responsibility in the administration and enforcement of the Endangered Species Act (ESA), 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17.

9. ANNUAL REPORT.

- A.** The Partner shall submit an annual report no later than March 1 following the calendar year which is the subject of the report. Each report shall be consistent with the required conditions of the Permit, the HCP and its guidelines and processes in effect for the reporting period, and this Agreement.

10. REMEDIES.

- A. The Partner agrees that this Agreement and authorization under the Permit does not apply to conduct resulting in the take of a KBB that does not strictly conform to the requirements of this Agreement or the HCP, and in such a situation the landowner will be acting without a Permit or authority to take a KBB and shall be subject to all provisions, remedies and penalties of the ESA, 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17, 29.415, Wis. Stats., the Wisconsin Endangered Species ACT (WESA) and ch. NR 27, Wis. Adm.Code.
- B. (1) Upon a breach or violation of this Agreement, as determined by the DNR, and in addition to any remedies provided or pursued under paragraphs 10.a., the DNR may revoke this Agreement and the authorization under it after considering recommendations of the HCP IOC. The Landowner and the FWS shall be notified of an alleged breach or violation by the Partner.

The DNR will notify the FWS of any violation of the Permit, HCP, or Agreement. Such notification shall be made in writing within five (5) calendar days of discovery of the violation, to the address listed below. Notification will include the name of the Party(ies) and individual(s) involved, the nature of the suspected violation, time period when the suspected violation occurred and the specific location(s) of the suspected violation.

**2661 Scott Tower Drive
New Franken, WI 54229
Telephone: (920) 866-1717
Fax: (920) 866-1710
Field Supervisor
U.S. Fish and Wildlife Service**

- B. (2) The Partner shall be provided an opportunity to present information to the DNR and the IOC on an alleged violation and what an appropriate remedy should be prior to the DNR's determination on whether a breach or violation occurred and the appropriate remedy. Information shall be presented to the DNR and the IOC by the Partner within thirty (30) days of notice of an alleged violation of this Agreement to the Partner.
- B. (3) If the DNR, after consideration of recommendations of the IOC, determines that action by the Partner may be taken that is reasonable and consistent with ensuring the conservation of the species and its habitat without the application of other remedies in this paragraph, it shall not seek additional remedies on the condition that the Partner completes the remedial action within a time considered reasonable by the DNR.
- C. The DNR retains all further remedies in law or equity, which it may apply to a breach or violation of this Agreement. Enforcement or other remedies available to the FWS under the ESA shall not be abridged or affected by any decision of the DNR under this paragraph.
- D. It is understood that unintentional violations of this Agreement may occur, and that the Partners may be required to act in emergency situations that do not allow them to follow all commitments in this Agreement. Should such a situation arise, it is expected that a Partner will report such an activity consistent with the HCP and the HCP Emergency Guideline, detailing the damage, if any, to KBB habitat and such action the Partner intends to take to

cure or mitigate any damage to KBB or its habitat. The DNR agrees to consider the circumstances and the Partner's offer to cure or mitigate in any decision it may make regarding appropriate remedial or enforcement action necessary under this Agreement.

11. TERMINATION.

This Agreement or its applicability to any land under it may be terminated by the Partner upon sixty (60) days written notice to the DNR and upon the occurrence of one of the following:

- E.** The Lands Included or management rights are transferred to another by land contract, fee title, easement, or otherwise;
- F.** The KBB is no longer protected by the ESA, (i.e. is delisted) or the KBB is downlisted to threatened and take activities of the Partner is allowed per a 4.d. rule.
- G.** The Partner ceases to exist, in fact or by law.
- H.** Other reasons for termination mutually agreed upon as reasonable by the Partner and the DNR, with advice of the IOC, provided that appropriate conservation and/or compensation has occurred for the take of occupied KBB habitat. It is the responsibility of the Partners to demonstrate to DNR that conservation has occurred prior to termination.

12. AMENDMENT.

This Agreement shall constitute the entire agreement of the parties and any previous communications or agreements are hereby superseded and no modifications of this Agreement or waiver of its terms and conditions shall be effective unless made specifically in writing and mutually agreed upon and signed by both parties.

13. CONTRACTING PARTIES.

In this Agreement, the DNR and the Partner include their respective officers, employees, agents, directors, partners, representatives, successors, heirs, members and servants.

14. STATUS OF PARTIES.

The Partner shall not be considered as an agent, contractor or an employee of the DNR for any purpose, including workers compensation. The DNR agrees that the Partner has sole control of the activities and work conducted on the lands of or under the control of the Partner. The DNR only reserves the right of ingress and egress to the lands and facilities, consistent with paragraph 8, to inspect the lands and records of the Partner, as provided herein, to assure compliance with this Agreement.

15. ASSIGNMENT

In the event the Partner sells, transfers or otherwise divests itself of all Lands Included or management rights to a subsequent owner and no longer has assets at risk due to the listing of

the KBB, the Partner may relinquish and assign this Agreement or performance under it that subsequent owner (Assignee) with the consent of the DNR. Consent to assign shall be conditioned upon the Assignee's agreement in writing to comply with all the terms of this Agreement following discussion with the DNR to assure a full understanding of the requirements of the Agreement. The FWS shall be notified of any assignment and shall issue a Certificate of Inclusion covering the Assignee.

16. TRANSFER

In the event that the Partner sells, transfers or otherwise divests itself of some portion of the Lands Included or management rights, but still has a portion of the Lands Included, management rights or assets at risk due to the listing of the KBB, and the Partner chooses to remain a signatory Partner, assignment of any incidental take authorization under this Agreement and the Permit may be transferred to a subsequent owner of the Lands Included or management rights (Transferee) if the Transferee enters into, agrees to and files with the DNR a SHCA, which is acceptable to the DNR. Following review and recommendation by the IOC, the SHCA may be signed. The FWS will be notified of the transfer and approved SHCA and shall issue a Certificate covering the Transferee. Unlike the complete transfer and assignment of an SHCA to an Assignee, incidental take authorization is not afforded to the Transferee until a SHCA unique to the Transferee is approved by the IOC and DNR and a Certificate is issued by the FWS.

The Partner agrees to notify the DNR of any transaction involving Lands Included, management rights, or assets relating to land within the High Potential Range, which may pertain to this Agreement, and coverage under the Permit. Notification of transfers can be made at any time, but must be included prior to any activity which would result in incidental take of KBB in order for incidental take authority to be valid. Incidental take is not authorized on newly acquired land until the transfer is reported to the DNR and added to the Partner's Lands Included.

17. MODIFICATION/ADAPTIVE MANAGEMENT.

The Partner agrees to modify responsibilities and duties under this Agreement consistent with the review and adaptive management process established in the HCP unless otherwise stated in this Agreement.

18. FUNDING COMMITMENTS.

The Partner commits to completing its conservation strategies and other obligations as provided in this Agreement, whether accomplished by employees, agents, contractors or cooperators.

[LIST OTHER FUNDING COMMITMENTS HERE.]

19. LIABILITY FOR AGENTS, ETC.

It is recognized that the Partner often conducts its land management or use activities through an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser. The

Partner has and accepts the obligation to require, normally through written agreement or communication, that activities be conducted in a manner consistent with this Agreement, the HCP and the Permit. Take incidental to otherwise lawful activities by these persons or entities is authorized by the Permit so long as such activity and incidental take resulting from it is authorized by the Partner consistent with this Agreement, the HCP and the Permit. A violation of any authorization which includes procedures and activities for KBB conservation the Partner is required to follow or conduct, consistent with this Agreement, the HCP, and the Permit, by an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, shall not result in the suspension, revocation, or termination of the Permit or the authorization to the Partner under this Agreement, the HCP and the Permit; nor shall it affect other benefits, rights, or privileges under this Agreement, the HCP or the Permit, except as to that agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, who is and will be subject to the provisions of the ESA, including remedies for its violation when acting inconsistent with the authorization from this Partner, this Agreement, the HCP and the Permit. The obligation to demonstrate that the Partner adequately communicated procedures and requirements of this Agreement, the HCP and the Permit to the agent, lessee, licensee, contractor, permittee, right-of way grantee, or purchaser is on the Partner, and cannot be waived by the DNR.

20. DATA SHARING

- C. Data provided by the DNR and which constitutes Natural Heritage Inventory data (NHI) may not be used for any purpose other than development of the SHCA or conducting of activities under the Permit. It may not be released or made available to any other person, agency or organization for any purpose unless agreed to in writing by the DNR. Documents or data containing NHI information is included in this restriction.
- D. Data provided to the DNR is subject to Wisconsin's Public Records Law, Ch. 19, Wis. Stats., and subject to that law regarding requests for it. Under s.23.27 (3), Wis. Stats., NHI information is considered confidential and release or use of it is controlled by the Department and administrative rules adopted to administer the NHI program.

21. ARTICLES OF PARTNERSHIP

The partner agrees to enter into and comply with the AOP, which are attached to and made part of this Agreement.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

DATE _____

BY _____

Paul DeLong
Division Administrator of
Forestry, Wisconsin DNR

AND

DATE _____

BY _____

Laurie Osterndorf
Division Administrator of
Land, Wisconsin DNR

[INSERT PARTNER'S ENTITY NAME]

DATE _____ BY _____

(Partner signatory's name/title)

DATE _____ BY _____

(Partner signatory's name/title)

APPENDIX A

LANDS INCLUDED

[LIST LANDS FOR WHICH PARTNER WISHES INCIDENTAL TAKE COVERAGE. INCLUDE MAP(S) INDICATING LOCATION OF THESE LANDS, WHICH ARE SUFFICIENTLY SPECIFIC TO PROVIDE USFWS OR DNR ENOUGH INFORMATION FOR AUDITING AND ENFORCEMENT PURPOSES. NECESSARY MAP CHARACTERISTICS INCLUDE, PARTNER NAME, TOWN, RANGE, SECTION, AND COUNTY INFORMATION AND CARDINAL MARKER.]

APPENDIX B

PARTNER SPECIFIC MANAGEMENT GUIDELINES AND PROTOCOLS

[LIST AND ATTACH HERE ALL MANAGEMENT PROCEDURES, CONSERVATION MEASURES, AND MONITORING PROCEDURES NOT COVERED BY STANDARD HCP MANAGEMENT GUIDELINES AND PROTOCOLS THAT PARTNER WISHES TO APPLY WHEN PERFORMING ACTIVITIES LISTED IN 4.A. ON LANDS LISTED IN APPENDIX A.]

WISCONSIN KARNER BLUE BUTTERFLY

HABITAT CONSERVATION PLAN

SPECIES AND HABITAT CONSERVATION AGREEMENT

LIMITED PARTNER

THIS SPECIES AND HABITAT CONSERVATION AGREEMENT (Agreement) is entered into by and between the State of Wisconsin Department of Natural Resources (DNR) and _____, (Partner) for the purpose of implementing the Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan (HCP) and authorizing the incidental take of the Karner blue butterfly (Kbb) in the State of Wisconsin consistent with and during the period of the Incidental Take Permit (Permit) issued by the U.S. Fish and Wildlife Service (FWS).

WHEREAS, the DNR holds a Permit issued by the United States Department of the Interior, Fish and Wildlife Service (FWS) based upon the Habitat Conservation Plan, Species and Habitat Conservation Agreements (SHCA) with the Partners and Implementing Agreement submitted to the FWS with the application for a Permit;

WHEREAS, the statewide KBB conservation program relies on the inter-relationship of SHCAs, a HCP and an Incidental Take Permit (Permit) to form and direct the KBB conservation plan, as well as clarify commitments and obligations of landowners and land users in this effort;

WHEREAS, the Permit from the FWS authorizes the incidental take of the KBB subject to implementation of conservation measures and compliance with procedures, terms and conditions of this Agreement, the HCP and the Permit, by Partners entering into SHCAs with the DNR; and

WHEREAS, the Partner plans to engage in activities that may result in the incidental take of the KBB and agrees to implement conservation measures consistent with the HCP and the Permit on lands under its control and to the extent of the Partner's control to avoid, minimize or mitigate the take of such species as further provided herein.

IT IS HEREBY AGREED by the DNR and the Partner (Parties), based upon the mutual terms and conditions herein, that this Agreement shall constitute the Partner's commitment and agreement to undertake conservation measures for the KBB upon issuance of a Certificate of Inclusion (Certificate). The parties further agree this Certificate is conditioned on the premise that the Agreement shall be consistent with the HCP and conditions of the Permit.

1. DEFINITIONS.

For purposes of this Agreement, the following definitions apply:

- G.** "Certificate of Inclusion" (Certificate) is a document issued by the DNR as authorized by the FWS, which, thereby, includes the person or entity it is issued to under the provisions of the Permit and authorizes incidental take consistent with the HCP, the Permit and this Conservation Agreement.
- H.** "Implementing Agreement" is a legal contract entered into between the DNR and the FWS that: (1) identifies the responsibilities of all participants to the HCP; (2) legally binds the DNR to their obligations; and (3) is signed by the DNR.
- I.** "Incidental take" is the take of a species incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity.
- J.** "Incidental Take Permit" (Permit) is a permit issued by the FWS under the authority of Section 10(a)(1)(B) of the Endangered Species Act to authorize the incidental take of a species listed as endangered or threatened under that Act.
- K.** "Intentional Take" means the purposeful take of a species not incidental to an otherwise lawful activity e.g. collecting.
- L.** "Partner", defined as "Limited Partners" within the HCP, means a person, agency or organization that is engaged in a limited suite of management activities, such as predefined best management practices, on a local level, typically resulting in short term take and subsequently, favorable habitat conditions. Examples include, but are not limited to, county highway departments, townships and municipalities,

2. PERIOD OF AGREEMENT.

The period of this Agreement shall be from its execution and the issuance of a Certificate authorizing incidental take consistent with this Agreement, during the period of the Permit, unless terminated in accordance with paragraph 11 or amended in accordance with paragraph 12.

3. LANDS SUBJECT TO AGREEMENT.

The lands subject to this Agreement include approximately acres and are more particularly described in Appendix A (Lands Included), which is attached to and made part of this Agreement, and all future ownership (including, but not limited to, easements and temporary work spaces) within the high potential range of the KBB, subject to the notification and reporting processes, and implementation of conservation practices consistent with this Agreement, the HCP and the Permit

4. ACTIVITIES/INCIDENTAL TAKE AUTHORIZED/PUBLIC OUTREACH AND EDUCATION/ INFORMATION

A. ACTIVITIES. The following specified land management or land use activities, in addition to any other activity covered by an HCP guideline, protocol or management direction, may be engaged in on the Lands Included in accordance with this Agreement, and the incidental take of KBB is authorized, if the activities are conducted consistent with the HCP, HCP standard guidelines and protocols, the Permit, this Agreement and any changes and improvements made with HCP participation processes which amend these documents; and other protocols or management directions attached to, and made part of this Agreement as Appendix B. Standard HCP guidelines and protocols are published and made available on the HCP webpage; any other protocols and management directions defined by the Partner will be listed and attached to Appendix B:

[LIST MANAGEMENT ACTIVITIES PARTNER WISHES TO ENGAGE IN HERE. Select from examples listed below.]

Highway or road right of way maintenance, including:

- (1) Mowing,
- (2) Brushing (including tree pruning and hazard tree removal),
- (3) Use of pesticides to control vegetation,
- (4) Shoulder maintenance and grooming,
- (5) Snowplowing.

Certain highway or road and road right of way construction, (may be subject to project plan or activity review and approval by WDNR and USFWS), including:

- (1) Ditch maintenance and construction,
- (2) Shoulder construction,
- (3) Road and road right of way construction,
- (4) Other construction, which may impact occupied Karner blue butterfly habitat.

B. INTENTIONAL TAKE. The Partner agrees not to engage in the intentional take of the KBB, as defined in Paragraph 1.E., and agrees that the entering into of this Agreement does not authorize the intentional take of such species.

C. PUBLIC OUTREACH AND EDUCATION. The Partner agrees to respond to questions by the public regarding their activities relating to KBB conservation and provide information on the KBB program when opportunities arise, e.g. budget deliberations, planning or information meetings, etc.

D. INFORMATION. Partner agrees to provide updated guidelines and protocols to those officers, employees, agents or contractors responsible for implementing this agreement.

5. SURVEYS.

The Partner agrees to conduct surveys for wild lupine (*Lupinus perennis*) consistent with the HCP and the survey protocols described in the HCP User's Guide (accessed

on the DNR's KBB HCP website or otherwise provided by the DNR), on lands identified in Appendix A or lands the DNR is notified of through the process provided in this Agreement and approves as being subject to it, and maintain written records of all surveys, including:

- a. identification and qualifications of the person conducting the survey,
- b. the results of the survey as to habitat and occurrences observed, and
- c. the written records shall be maintained by the Partner during the period of and retained for five years following termination of the Agreement, at the following facility:

(Include Organization Name, contact person, full mailing address, including street, road or RFD number, telephone number and email address):

6. MONITORING.

The Partner agrees to monitor and maintain written records regarding the effects of land management and use practices and activities, consistent with the Plan, on the lands subject to this Agreement, as identified in Appendix A during the period of this Agreement. Written records will be maintained, including, but not limited to:

- a. the location and dates of management activities on Kbb occupied (if known) lupine habitat,
- b. the conservation strategy/protocol applied, and
- c. written records will be retained for five years following termination of the Agreement, at the following facility:

(Include Organization Name, contact person, full mailing address, including street, road or RFD number, telephone number and email address):

7. DNR AND FWS INGRESS AND EGRESS.

A. COMPLIANCE MONITORING.

(1) During the period of this Agreement, the DNR may audit and monitor the activities and records of the Partner. Except as provided in A.(2), auditing and monitoring shall be preceded by reasonable notice, not to be less than 24 hours, and shall be conducted in the presence of a representative of the Partner, if the representative is available at the noticed time and date, or other time agreed upon by the Partner and auditing personnel. Access to the property involved, to the extent of the Partner's authority, is authorized. Access to the lands subject to this Agreement and records required by it, or the HCP, shall be for the purpose of assuring compliance with this Agreement and the HCP, and be unlimited. If the Partner does

not have authority to authorize access to the land identified in the notice to be monitored or audited, or during the audit, the Partner shall immediately notify the DNR of such lack of authority and the limited use it has in the property. Documents of title or interest in the property shall be provided to the DNR upon its request.

A copy of any final report, map or other record prepared by the DNR on the results of its going upon the land or reviewing the records shall be provided to the Partner within thirty (30) days of the DNR access and review.

Notification under this Paragraph shall be in writing, facsimile, or telephone to:

(Include Organization Name, contact person, full mailing address, including street, road or RFD number, telephone number and email address):

(2) The notice provision in Subparagraph A. (1), shall not apply when the DNR or representatives of the FWS considers that pending or ongoing activities of the Partner, or person authorized by the Partner, based on concerns or complaints made known to them, may adversely affect Kbb occupied sites in a manner inconsistent with this Agreement, or result in damage to or destruction of Kbb occupied habitat or that may jeopardize the Permit.

- F.** Any refusal of access authorized in Subparagraphs (1) or (2) shall be considered a breach of this Agreement and subject the Partner to all remedies available to the DNR under this Agreement or at law, as well as loss of KBB incidental take authorization provided by the FWS through use of this Agreement.
- G.** The FWS may accompany the DNR when auditing or monitoring under this Agreement or the HCP.
- H.** In addition to authority granted elsewhere in this Agreement, the FWS may enter the lands subject to this Agreement, which are owned by the Partner or where permission by others with an ownership interest has been granted and access the records of the Partner required for the purpose of overseeing the Permit and activities under it or required by this Agreement.
- I.** Nothing in this Agreement, including this section, shall abrogate the authority of the Secretary of the Interior, through the FWS, to fulfill his (her) responsibility in the administration and enforcement of the Endangered Species Act (ESA), 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17.

8. ANNUAL REPORT.

The Partner shall submit an annual report no later than March 1 following the calendar year, which is the subject of the report which shall be on a form provided by the DNR and fully and accurately completed by the Partner with all attachments requested by the DNR, which may include maps, surveys, records, or other information.

9. ASSIGNMENT.

The Partner may not assign this Agreement or performance under it to another without the consent of the DNR. Consent to assign shall be conditioned upon the assignee's Agreement in writing to comply with all the terms of this Agreement following discussion with the DNR to assure a full understanding of the requirements of the Agreement. The FWS shall be notified of any assignment.

10. REMEDIES.

- E. The Partner agrees that this Agreement and authorization under the Permit does not apply to conduct resulting in the take of a Kbb that does not strictly conform to the requirements of this Agreement or the HCP, and in such a situation the Partner shall be acting without a Permit or authority to take a Kbb and shall be subject to all provisions, remedies and penalties of the Endangered Species Act (ESA), 16 USC 1531 et seq. and all implementing regulations including but not limited to 50 CFR Parts 13 and 17, 29.415, Wis. Stats., the Wisconsin Endangered Species Act (WESA) and ch. NR 27, Wis. Adm.Code.
- F. (1) Upon a breach or violation of this Agreement, as determined by the DNR, and in addition to any remedies provided or pursued under paragraph 10.A., the DNR may revoke this Agreement and the authorization under it after considering recommendations of the HCP Partners' Implementation and Oversight Committee. The DNR shall notify the Partner and the FWS of an alleged breach or violation.

The DNR shall notify the FWS of any violation of the Permit, HCP or this Agreement. Such notification shall be in writing within five (5) calendar days of discovery of the violation and to the address listed below. Notification shall include the name of the Party(ies) and individual(s) involved the nature of the suspected violation, time period when the suspected violation occurred and the specific location of the suspected violation.

**Field Supervisor
U.S. Fish and Wildlife Service
2661 Scott Tower Drive
New Franken, WI 54229
Telephone: (920) 866-1717**

Fax: (920) 866-1710

- (2) The Partner shall be provided an opportunity to present information to the DNR and the HCP Partners' Implementation Oversight Committee on an alleged violation and what an appropriate remedy should be prior to the DNR's determination on whether a breach or violation occurred and the appropriate remedy. Information shall be presented to the DNR and the HCP Partners' Implementation Oversight

Committee by the Partner within thirty (30) days of notice of an alleged violation of this Agreement to the Partner.

(3) If the DNR, after consideration of recommendations of the HCP Partners' Implementation Oversight Committee, determines that action by the Partner may be taken that is reasonable and consistent with ensuring the conservation of the species and its habitat without the application of other remedies in this paragraph, it shall not seek additional remedies on the condition that the Partner completes the remedial action within a time considered reasonable by the DNR.

- G.** The DNR retains all further remedies in law or equity, which it may apply to a breach or violation of this Agreement. Enforcement or other remedies available to the FWS under the ESA shall not be abridged or affected by any decision of the DNR under this paragraph.
- H.** It is understood that unintentional violations of this Agreement may occur, and that the Partner may be required to act in emergency situations that do not allow them to follow all commitments in this Agreement. Should such a situation arise, it is expected that a Partner shall report such an activity consistent with the HCP and the HCP Emergency Guideline, detailing the damage, if any, to Kbb habitat and such action the Partner intends to take to cure or mitigate any damage to KBB or its habitat. The Department agrees to consider the circumstances and the Partner's offer to cure or mitigate in any decision it may make regarding appropriate remedial or enforcement action necessary under this Agreement.

11. TERMINATION.

This agreement or its applicability to any land under it may be terminated by the Partner upon sixty (60) days written notice to the DNR and upon the occurrence of one of the following:

- E.** The land or management right over it is transferred to another by land contract, fee title, easement, or otherwise;
- F.** The KBB is no longer protected by the ESA, (i.e. is delisted) or the KBB is down listed to threatened and take activities of the Partner is allowed per a 4.d. rule.
- G.** The Partner ceases to exist, in fact or by law.
- H.** Other reasons for termination mutually agreed upon as reasonable by the Partner and the DNR, with advice of the HCP Partners' Implementation Oversight Committee, provided that appropriate conservation and/or compensation has occurred for the take of occupied Kbb habitat. It is the responsibility of the Partner to demonstrate to DNR that conservation has occurred prior to termination.

12. AMENDMENT.

This Agreement shall constitute the entire agreement of the Parties and any previous communications or agreements are hereby superseded and no modifications of this Agreement or waiver of its terms and conditions shall be effective unless made specifically in writing and mutually agreed upon and signed by both Parties.

13. CONTRACTING PARTIES.

In this Agreement, the DNR and the Partner include their respective officers, employees, agents, directors, partners, representatives, successors, heirs, members and servants.

14. STATUS OF PARTIES.

The Partner shall not be considered as an agent, contractor or an employee of the DNR for any purpose, including workers compensation. The DNR agrees that the Partner has sole control of the activities and work conducted on the lands of or under the control of the Partner. The DNR only reserves the right of ingress and egress to the lands and facilities, consistent with paragraph 7, to inspect the lands and records of the Partner, as provided herein, to assure compliance with this Agreement.

15. TRANSFER.

The Partner agrees to notify the DNR of any transaction involving Lands Included, management rights, or assets relating to land, which may pertain to this Agreement, and coverage under the Permit. Notification of transfers can be made at any time, but must be included prior to any activity, which would result in incidental take of Kbb in order for incidental take authority to be valid. Incidental take is not authorized on newly acquired land until the transfer is reported to the DNR and added to the Partner's SHCA Appendix A (lands included).

16. MODIFICATION/ADAPTIVE MANAGEMENT.

The Partner agrees to modify responsibilities and duties under this Agreement consistent with the review and adaptive management process established in the HCP.

17. FUNDING COMMITMENTS.

The Partner commits to completing its conservation strategies and other obligations as provided in this Agreement, whether accomplished by employees, agents, contractors or cooperators.

18. LIABILITY FOR AGENTS, ETC.

It is recognized that the Partner often conducts its land management or use activities

through an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser. The Partner has and accepts the obligation to require, normally through written agreement or communication, that activities be conducted in a manner consistent with this Agreement, the HCP and the Permit. Take incidental to otherwise lawful activities by these persons or entities is authorized by the Permit so long as such activity and incidental take resulting from it is authorized by the Partner consistent with this Agreement, the HCP and the Permit. A violation of any authorization, which includes procedures and activities for KBB conservation the Partner is required to follow or conduct, consistent with this Agreement, the HCP and the Permit, by an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, shall not result in the suspension, revocation, or termination of the Permit or the authorization to the Partner under this Agreement, the HCP and the Permit; nor shall it affect other benefits, rights, or privileges under this Agreement, the HCP or the Permit, except as to that agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, who is and shall be subject to the provisions of the ESA, including remedies for its violation when acting inconsistent with the authorization from this Partner, this Agreement, the HCP and the Permit. The obligation to demonstrate that the Partner adequately communicated procedures and requirements of this Agreement, the HCP and the Permit to the agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser is on the Partner, and cannot be waived by the DNR.

19. DATA SHARING

- Data provided by the DNR and which constitutes Natural Heritage Inventory data (NHI) may not be used for any purpose other than development of the SHCA or conducting of activities under the Permit. It may not be released or made available to any other person, agency or organization for any purpose unless agreed to in writing by the DNR. Documents or data containing NHI information is included in this restriction.
- Data provided to the DNR is subject to Wisconsin's Public Records Law, Ch. 19, Wis. Stats., and subject to that law regarding requests for it. Under s.23.27 (3), Wis. Stats., NHI information is considered confidential and release or use of it is controlled by the Department and administrative rules adopted to administer the NHI program.

20. NOTIFICATION

Partner agrees to notify the Department of any change in the responsible agent, employee, officer or representative responsible for implementing this agreement.

**STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

DATE _____

BY _____

Paul DeLong
Division Administrator of
Forestry, Wisconsin DNR

AND

DATE _____

BY _____

Laurie Osterndorf
Division Administrator of
Land, Wisconsin DNR

[PARTNER NAME below line]

DATE _____

BY _____

(Print name/title below line)

DATE _____

BY _____

(Print name/title below line)

APPENDIX A

PARTNER LANDS INCLUDED

Partner lands included are those road ROWs that the partner has management responsibility for, and which are highlighted on the attached map.

The lands subject to this agreement include roads and highways, and the rights-of- ways (ROW) of which the ROWs are approximately:

_____ feet, meters (*circle one or delete other*) wide on each of two sides, and

_____ feet, meters, miles (*circle one or delete other*) in length.

Total Acres Included for Incidental Take Coverage
= ACRES

Acreage Calculator:

1 meter = 3.2808 feet	_____ meters x 3.2808 = _____ feet
1 mile = 5,280 feet	_____ miles x 5,280 feet = _____ feet
1 acre = 43,560 square feet	_____ ft. wide x _____ ft. long = _____ sq. ft.

_____ sq. ft. divided by 43,560 sq. ft. = _____ acres (include in block above)

Attach county or township map with roads partner manages marked with a highlighter. Map will contain:

- County name
- Township name(s)

- **Town & Range**
- **Cardinal marker**
- **Distance scale (and/or section lines)**

APPENDIX B

PARTNER SPECIFIC MANAGEMENT GUIDELINES AND PROTOCOLS

[LIST AND ATTACH HERE ALL MANAGEMENT PROCEDURES, CONSERVATION MEASURES, AND MONITORING PROCEDURES NOT COVERED BY STANDARD HCP MANAGEMENT GUIDELINES AND PROTOCOLS THAT PARTNER WISHES TO APPLY WHEN PERFORMING ACTIVITIES LISTED IN 4.A. ON LANDS LISTED IN APPENDIX A.]

KBB HCP Partners User Guide



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	Title: KBB HCP Users Guide	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

This User's Guide is intended for Karner Blue Butterfly (KBB) HCP partners and their staff for the purpose of providing a simple, user-friendly approach to assist in decision making about routine management and maintenance activities that take place within the KBB High Potential Range (HPR). The User's Guide is comprised of two main sections: the guidelines and the protocols. Guidelines are designed to be general and describe the kinds of activities that an entity group may conduct or that are frequently used in a specific type of land management. Protocols are specific and provide the detailed conservation measures for how partners should implement an activity.

The guidance provided here after is intended to be applied for use within the KBB HPR and should not be considered a substitute for other management protocols outside of this range. This User's Guide applies to any Corridor, Construction, Conservation, Forestry, Recreation, Emergency, or Limited Partner management guideline and the associated management protocols. The attached flow chart provides a step-wise process that will help you determine the appropriate type of management to be conducted and the conditions under which certain management protocols may be used.

	Title: KBB HCP Users Guide	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

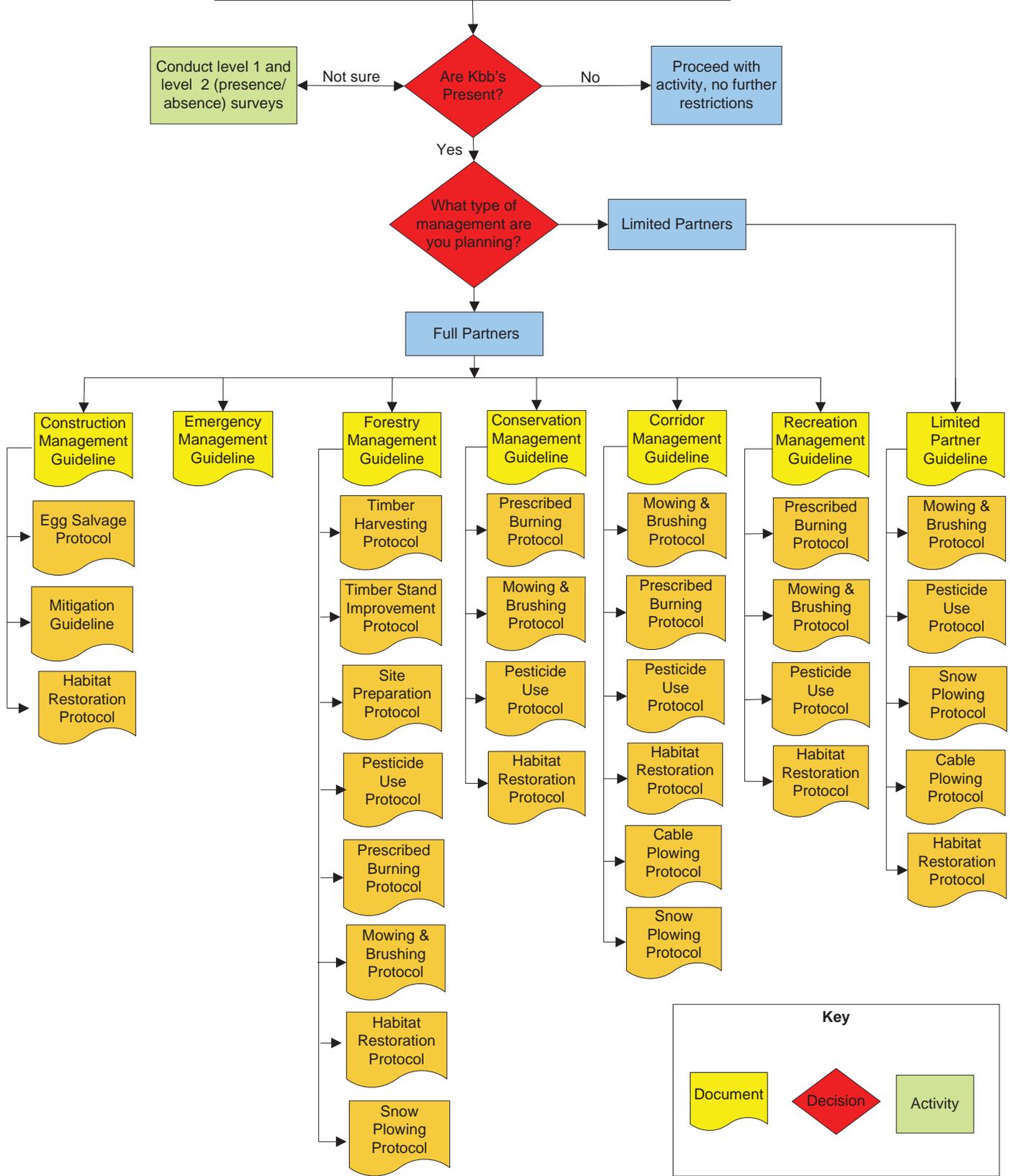
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The guidance provided here after is intended to be applied for use within the KBB HPR and should not be considered a substitute for other management protocols outside of this range. This User's Guide applies to any Corridor, Construction, Conservation, Forestry, Recreation, Emergency, or Limited Partner management guideline and the associated management protocols. The attached flow chart provides a step-wise process that will help you determine the appropriate type of management to be conducted and the conditions under which certain management protocols may be used.

II. HCP Users Guide Flow Chart



HCP User's Guide



III. Guidelines



	Title: Conservation Management Guideline	
	Date: September 6, 2007	Revision: 01

I. Scope and Applicability

Conservation management activities will be conducted with consideration for the Karner blue butterfly (Kbb) and in a manner that will allow for continued beneficial disturbance management within the High Potential Range of the Kbb.

This guideline applies to all conservation management activities that may occur within the High Potential Range of the Kbb. Conservation management activities include: routine, planned, and maintenance actions that may occur on State Wildlife & Fishery Areas, State Natural Areas (SNA's), or other partner owned lands of similar type (*see III. Specific Activities below*).

This guideline does not apply to construction activities, emergency situations, forestry management practices, and recreational management or corridor management practices. These activities are addressed as separate guidelines, each with protocols that are specific to them.

II. General Requirements

- a. Pre-management surveys will be conducted prior to conducting management activities unless specifically detailed in a management protocol, emergency situations or in a specific conservation agreement (DNR's Implementing Agreement (IA) or other partner's Species and Habitat Conservation Agreement (SHCA)).
- b. Kbb and Kbb habitat surveys will be conducted following approved HCP monitoring guidelines and protocols.
- c. When Kbb are present, conservation measures described in approved HCP management guidelines and protocols will be followed.
- d. In addition partners are required to follow any specific provisions in their conservation agreements (SHCAs or IA).

III. Specific Activities

See Conservation Management flow chart for process depiction

- a. If burning activities are to be used for conservation management the Burning Protocol will be implemented.
- b. If mowing, brushing, or hand cutting, is to be used, the Mowing and Brushing Protocol will be implemented.

- c. If pesticides are to be applied for corridor management, the Pesticide Protocol will be implemented.
- d. If chemicals are to be used, either as a site preparation or release measure for desirable woody vegetation, see the Pesticide Protocol for proper implementation
- e. When creating or restoring habitat, follow the Restoration Protocol.
- f. For routine maintenance and construction activities that would result in short term take of occupied Kbb habitat that would temporarily remove all vegetation, but will be replaced within 5 years, follow the Construction Management Guideline.
- g. For construction or other activities that result in permanent take of occupied Kbb habitat, consult with DNR's HCP Coordinator as soon as possible to determine appropriate course of action.

IV. Referenced Documents

Manual of Control Techniques Recommended for Ecologically Invasive Plant Species Occurring in Karner Blue Butterfly Habitat (Larsen, et al January 2000)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (March 2000)

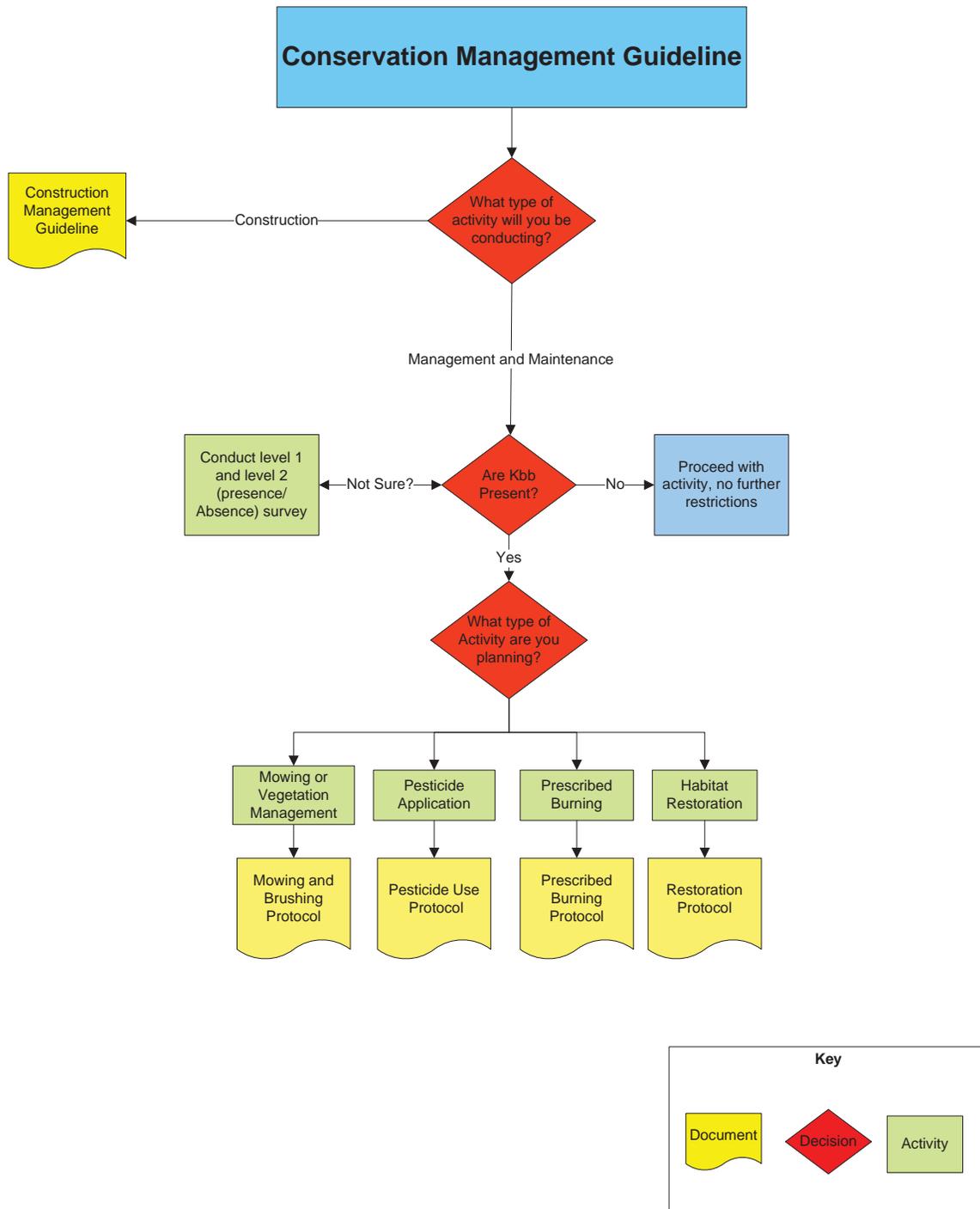
Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Prescribed Burning Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Mowing and Brushing Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Pesticide Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Restoration Protocol. (2006)

Conservation Management Flow Chart



	Title: Construction, Maintenance, Repair and Management Guideline (aka Construction Guideline)	
	Date: May 7, 2010	Revision: 01

I. Scope and Applicability

Construction activities implemented by HCP partners will be conducted with consideration for the Karner blue butterfly (Kbb) within the High Potential Range of the Kbb.

This guideline applies to routine maintenance, repair and construction activities that may occur within the High Potential Range of the Kbb. Construction is any action that involves grading, building, excavation, or other heavy disturbance activity and generally includes the short-term or permanent removal of vegetation from a site so that it can be used for building roads, structures, storage areas, parking lots, pipelines, power lines, or other commercial or infrastructure-related facilities and uses. It should be understood that construction activities on sites occupied by Kbb may result either in short-term removal of habitat or in permanent take if the occupied Kbb habitat can not be avoided through selective routing or siting of projects. Minor construction projects such as routine maintenance and repair are those activities required to prolong the life of existing facilities through scheduled maintenance and repair.

This guideline does not apply to forest management activities, vegetative corridor management practices, recreational management activities, conservation management practices, or to emergency situations. These activities are addressed as separate guidelines, each with protocols that are specific to them.

Note: *This guideline only applies to HCP Partners. Those entities not enrolled as a Partner in the Wisconsin Statewide KBB Habitat Conservation Plan (HCP) need to contact the U.S. Fish and Wildlife Service (920) 866-1717 to determine permit needs prior to conducting any activities in occupied Kbb habitat.*

II. General Requirements

- a. Conduct pre-management surveys in lupine areas within the High Potential Range to determine if and where Kbb occur.
- b. Avoid construction activities to the greatest extent practicable in Kbb occupied habitat.
- c. Minimize the amount of Kbb occupied habitat that will be impacted by construction activities.

- d. For routine maintenance, repairs or construction activities that would result in the short-term removal or destruction of Kbb occupied habitat (short-term take), which will be replaced within 5 years following the activity, pre-construction approvals may be required (refer to the section III below for specific direction).
- e. For construction or other activities that result in permanent take of Kbb occupied habitat, consult with DNR's HCP Coordinator as soon as possible to determine appropriate course of action.
- f. In the event that habitat replacement or restoration is a required mitigation, the current, approved HCP Habitat Restoration Protocol will be followed unless otherwise stated or waived.
- g. In the event that Kbb egg salvage is a required mitigation, the current, approved Karner Blue Butterfly Egg Salvage Protocol will be followed unless otherwise stated or waived.

III. Specific Activities and Requirements

[Refer to Construction Guideline flow chart on page 5 for a process depiction.]

- a. Determine if project area is within the current Kbb High Potential Range (HPR) in WI (Refer to HPR map). If project area is not in HPR, stop here and proceed with project. There are no further restrictions. If project area is within HPR, continue.
- b. Determine if Kbb potential habitat is present:
Is there a valid Level 1 lupine presence/absence survey performed within the last 5 years? If not, perform Level 1 surveys.
If a minimum amount of lupine habitat is not present, retain surveys and proceed with the project. Stop here, otherwise continue.
- c. Determine if Kbb are present:
If lupine is present, is there a valid Level 2 Kbb Presence/Absence survey within the last 5 years? If not, perform Level 2 surveys.
If Kbb are not present, retain surveys and proceed with the project and stop here; otherwise continue.
- d. If Kbb are present, determine if the Kbb occupied habitat can be avoided.
If the Kbb occupied habitat can be avoided, document your findings and decision logic. Take measures to assure the Kbb occupied habitat will be avoided, proceed with the project and stop here. If Kbb occupied habitat can not be avoided continue.
- e. If Kbb occupied habitat can **not** be avoided, determine if the impacts to Kbb occupied habitat will result in **permanent take** of **short-term take** (*See IV. Definitions*).
- f. *If project would result in **permanent take** consult with the DNR and FWS as soon as possible to decide on the best alternative form of compensatory*

mitigation, e.g. mitigation on site, an alternate site in same subpopulation, a recovery property, or an alternate type of mitigation i.e. cash compensation by acreage cost formula to be used for recovery purposes. Stop here until type of mitigation is decided.

- g. If project would result in **short-term take**, determine if anticipated impacts are major or minor. (*See IV. Definitions for major construction project and minor construction project*).
- h. If the project would result in short-term take with **major impacts** (also **permanent take**) the project is a **major construction project**. For major construction projects, such as new construction activities, significant construction associated with existing facilities or permanent take, HCP Partners are required to prepare and submit a **Habitat Replacement Plan** to the DNR and FWS for review and **pre-approval prior to beginning** any activities related to the project, which would result incidental take. Pre-approval by DNR and FWS is required for permanent take and major construction projects in order to assess the risk of the proposed action.
- i. For **minor construction projects**, such as routine maintenance and repair of existing facilities e.g. ditch repairs, utility pole replacements, culvert replacements, pipeline repairs, sign replacements (see list in VI. Definitions below), **pre-approval by DNR and FWS is not required**.

IMPORTANT: For minor construction projects, HCP Partners must meet the requirements detailed in the *Minor Construction Project Protocol*.

IMPORTANT -- Permit coverage for Temporary Work Space: In order to receive incidental take authority under the permit for Temporary Work Space, whether it is for a major or minor construction project, it is **not** necessary to amend a partner's Species and Habitat Conservation Agreement (Appendix A. Lands Included). For major construction projects, incidental take coverage for Temporary Work Space can be requested by inclusion in the Habitat Replacement Plan. For minor construction projects, a habitat replacement plan and pre-approval are still not required, but the DNR's HCP Coordinator must be notified of temporary work space where project impacts would result in incidental take prior to any activities resulting in take. (*Refer to the Habitat Replacement Plan Template for Major Construction Projects and the Habitat Restoration Protocol.*)

IV. Definitions

Kbb Occupied Habitat – Kbb occupied habitat is defined as areas of wild lupine that support Karner blue butterflies.

Major Construction Project – Major construction projects are those activities that will impact **greater** than 1/3 of the lupine in one Kbb occupied lupine area that is separated from other lupine areas by greater than 500 meters (a different subpopulation), and involve disturbance of occupied lupine that will be replaced or restored within five years (short-term take), **OR** projects that involve any amount of permanent take.

Minor Construction Project – Minor construction projects are those activities that will impact **less than 1/3 of the lupine** in one Kbb occupied lupine area that is separated from other lupine areas by greater than 500 meters (a different subpopulation). Projects that have been defined as minor include but are not limited to the following provided that the above criterion is met:

- Pipe/cable installation
- Repair of existing pipeline facilities
- Utility pole replacement or new pole installation
- Stump removal
- Fence and sign installation and repair
- Underground potholing for repair
- Culvert improvement or repair
- Ditch repairs
- Sign replacement
- Guardrail replacement

Permanent Take – is an impact to Karner blue butterfly occupied habitat, through land management or land use activities that does not allow for the restoration and reoccupation of the site for a minimum of five years.

Short-Term Take – is an impact to Karner blue butterfly occupied habitat, which results from land management or land use activities that cause habitat disturbance, which will be restored or replaced within five years of the disturbance. Short term take is conducted following approved conservation measures in the HCP in a manner to avoid and/or minimize harm to the Kbb (e.g. through appropriate timing of activities selective routing and siting of projects, etc.) and maintain, enhance, and/or restore Kbb habitat.

Temporary Work Space -- Temporary work spaces are rarely used, short term easements to accommodate the need for additional space during the duration of a construction project, most commonly utility or road construction. Partners such as utilities managers and WDOT seek short-term easements from adjacent landowners to be used as staging or work areas to unload and stage construction project materials and equipment, and sometimes for extra work space (elbow room).

V. Reference Documents

Construction Management Flow Chart

**Karner Blue Butterfly HCP
Management Guideline**

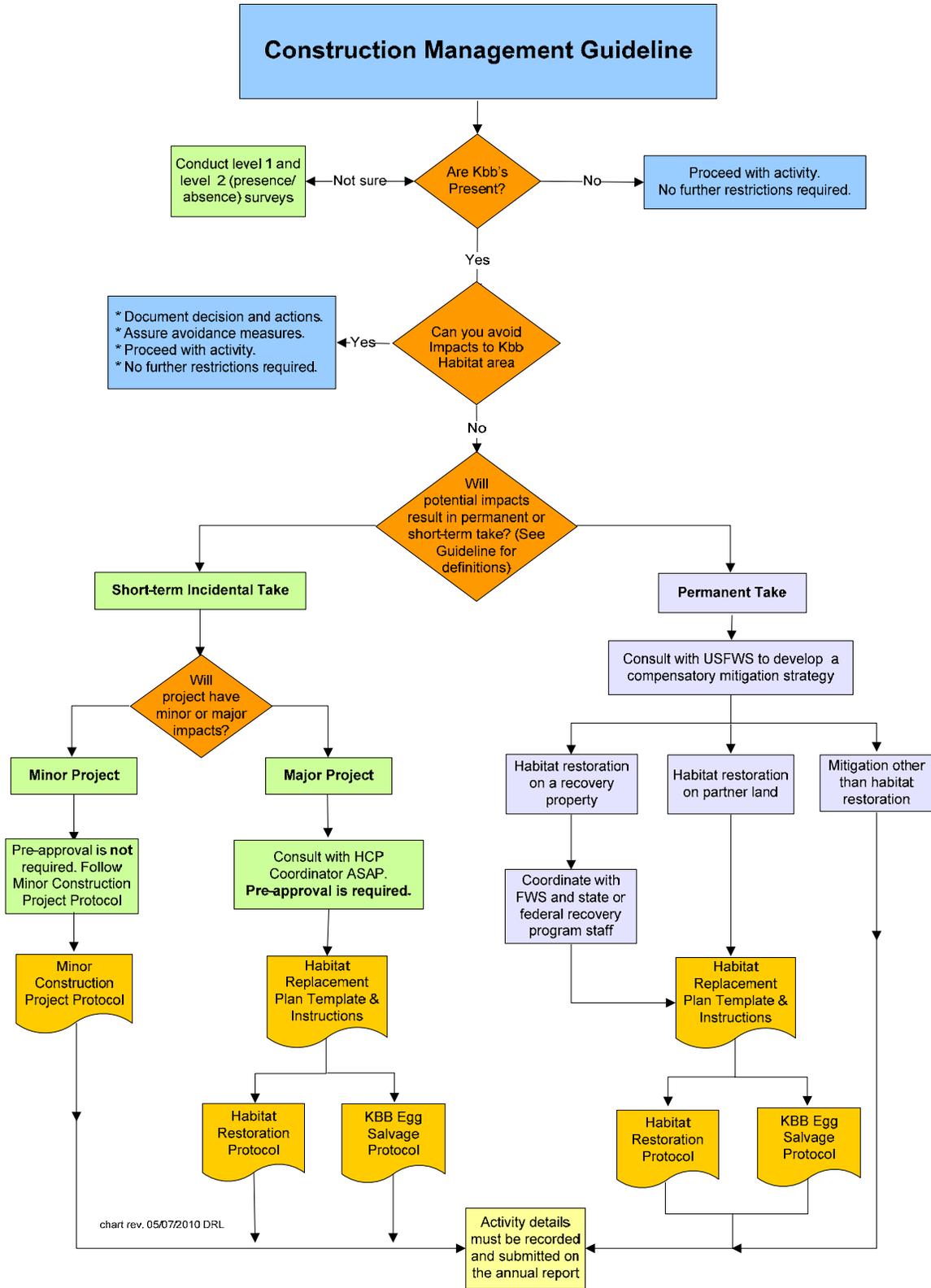
Habitat Replacement Plan Template for Major Construction Projects

Habitat Restoration Protocol

Karner Blue Butterfly Egg Salvage Protocol

Minor Construction Project Protocol

Karner Blue Butterfly HCP Management Guideline



**Karner Blue Butterfly HCP
Management Protocol**

	Title: Minor Construction Project Protocol	
	Date: May 7, 2010	Revision: 01

I. Purpose and Applicability

This protocol is for use by Wisconsin Karner Blue Butterfly Habitat Conservation (HCP) Plan partners when conducting Minor construction projects as defined under the HCP Construction Guideline.

***Note:** This guideline only applies to HCP Partners. Those entities not enrolled as a Partner in the Wisconsin Statewide KBB Habitat Conservation Plan (HCP) need to contact the U.S. Fish and Wildlife Service (920) 866-1717 to determine permit needs prior to conducting any activities in occupied Kbb habitat.*

Please provide the documentation as appropriate to show conformance to these requirements. This documentation will be determined by and specific to each partner and project. The documentation shall be retained by the partner for the duration of the permit.

II. Conservation Measures

Minor Project Requirements:

1. Determine the Presence/Absence of Kbb and the extent of Kbb occupied lupine.
 - a. This determination must be made using the Level 1/Level 2 survey methodology. If Kbb are not present, there are no further requirements for minor projects. Retain surveys.

2. To the extent practicable, implement avoidance and then minimization techniques in Kbb occupied lupine habitat.
 - a. Evaluate and document potential project alternatives considered that would avoid impacts to Kbb occupied lupine habitat, e.g. routing and staging area alternatives that avoid Kbb occupied habitat areas; alternative methods, i.e. tunneling instead of trenching.
 - b. If impacts to the occupied lupine habitat cannot be avoided, evaluate and document measures that can be taken to minimize impacts to the occupied lupine habitat, e.g. minimize driving and parking equipment and staging materials on Kbb occupied lupine patches as much as is practicable.

3. Habitat restoration may not be necessary for many minor construction projects where the habitat area impacted is expected to regenerate naturally.
 - a. If impacts to Kbb occupied lupine habitat are such that natural regeneration of lupine is not expected (e.g., topsoil has been removed and cannot be replaced, and/or the plants have been significantly disturbed), the partner should replace or restore the impacted lupine area. At a minimum, partners should seed the disturbed area with a seed mix consisting of lupine and at least three first and three second flight nectar plants. If the

Karner Blue Butterfly HCP Management Protocol

partner chooses to restore the impact area to a higher quality habitat, refer to the Kbb Habitat Restoration Protocol for enhancement options and restoration advice.

- b. For ditch repair projects where lupine and other species may not be appropriate to the goals of the project (e.g. soil stabilization) it is not required to include lupine in the seed mix. If Kbb habitat restoration is not chosen, document and retain the reasoning for your decision.
4. If the impact area is restored to Kbb habitat, the project area should be surveyed annually in the growing season(s) following planting to determine if habitat restoration/replacement is successful.
 - a. If the habitat restoration/replacement is not successful, remedial actions should be taken such as reseeding areas that are devoid of vegetation or where some seeded species were unsuccessful. Continue to monitor and perform remedial work for up to 5 years or until the habitat is successfully restored, whichever comes first. If restoration is not successful within 5 years, document known or suspected reason(s).
5. Report the project progress, results and any associated monitoring on the annual report.
 - a. Upon successful habitat replacement, post-project monitoring and reporting are no longer necessary.
6. The partner is required to submit a project report on annual report and to retain records related to the above requirements for the life of the permit.

III. Definitions

Kbb Occupied Habitat: Kbb occupied habitat is defined as areas of wild lupine that support Karner blue butterflies.

Minor Construction Project – Minor construction projects are those activities that will impact less than 1/3 of the lupine in one occupied lupine area that is separated from other lupine areas by greater than 500 meters (a separate subpopulation). Minor projects are anticipated to result in a small amount of area disturbed. Projects that have been defined as minor include but are not limited to the following provided that the above criterion is met:

- Pipe/cable installation
- Repair of existing pipeline facilities
- Utility pole replacement or new pole installation
- Stump removal
- Fence and sign installation and repair
- Underground potholing for repair
- Culvert improvement or repair
- Ditch repairs
- Sign replacement
- Guardrail replacement

	Title: Corridor Management Guideline	
	Date: September 6, 2007	Revision: 01

I. Scope and Applicability

Corridor management activities will be conducted with consideration of the Karner blue butterfly (Kbb) and in a manner that will allow for continued beneficial disturbance management within the High Potential Range of the Kbb.

This guideline is applicable to all corridor management activities that may occur within the High Potential Range of the Kbb. Corridor management activities include routine, planned, and maintenance activities that may occur on utility rights-of-way, roadsides, logging roads, recreation trails and other linear features.

This guideline does not apply to construction activities, emergency situations, forestry management practices, and recreational management or conservation management practices.

II. General Requirements

- a. Pre-management surveys will be conducted prior to conducting management activities unless specifically detailed in a management protocol, emergency situations or in a specific conservation agreement (DNR's Implementing Agreement (IA) or other partner's Species and Habitat Conservation Agreement (SHCA)).
- b. Kbb and Kbb habitat surveys will be conducted following approved HCP monitoring guidelines and protocols.
- c. When Kbb are present, conservation measures described in approved HCP management guidelines and protocols will be followed.
- d. In addition, partners are required to follow any specific provisions in their conservation agreements (SHCAs or IA).

III. Specific Activities

See Corridor Management flow chart for process depiction

- a. If burning activities are to be used for corridor management the Burning Protocol will be implemented.
- b. If mowing, brushing, or hand cutting, is to be used, the Mowing and Brushing Protocol will be implemented.
- c. If cable plowing will be used the Cable Plowing Protocol will be implemented.
- d. If pesticides are to be applied for corridor management, the Pesticide Protocol will be implemented.

- e. If plowing snow on corridors the Snow Plowing Protocol will be implemented.
- f. If doing recreation trail or woods trail maintenance including grading, bulldozing, ditching, widening, re-routing of trails, etc., refer to Construction Management Guideline.
- g. For facility and equipment inspections the following is applicable:
 - i. All lupine areas will be avoided to the greatest extent practicable.
 - ii. Pre-management surveys are **not required**.
- h. For routine maintenance and construction activities that would result in *short term take* of occupied Kbb habitat that would *temporarily* remove all vegetation, but will be replaced within 5 years, follow the Construction Management Guideline.
- i. For construction or other activities that result in *permanent take* of occupied Kbb habitat, consult with DNR's HCP Coordinator as soon as possible to determine appropriate course of action.

IV. Referenced Documents

Manual of Control Techniques Recommended for Ecologically Invasive Plant Species Occurring in Karner Blue Butterfly Habitat (Larsen, et al January 2000)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (March 2000)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Prescribed Burning Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Mowing and Brushing Protocol. (2006)

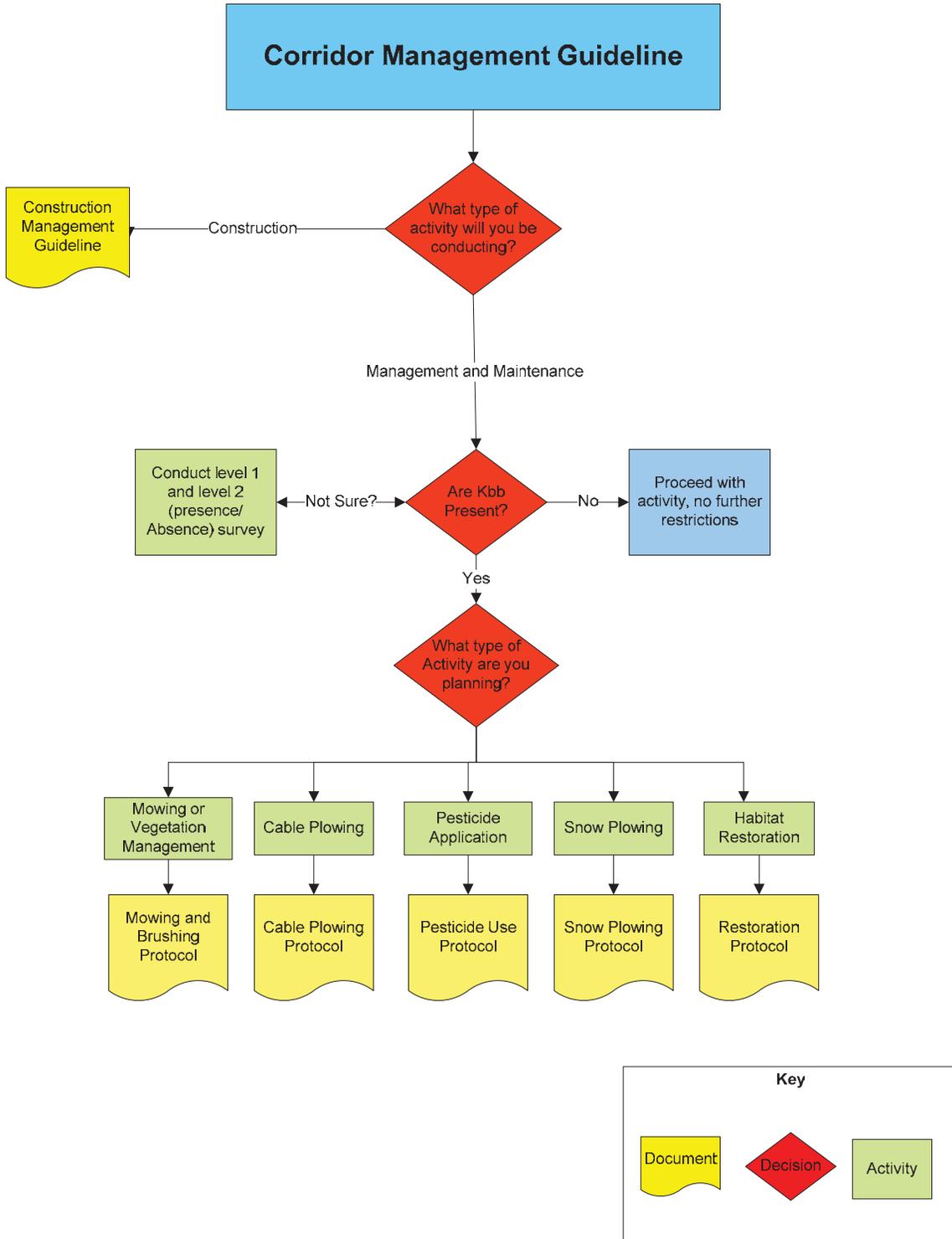
Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Pesticide Use Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Habitat Restoration Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Snow Plowing Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Cable Plowing Protocol. (2006)

Corridor Management Flow Chart



	Title: Forest Management Guideline	
	Date: September 6, 2007	Revision: 01

I. Scope and Applicability

Forest management activities will be conducted with consideration for the Karner blue butterfly Kbb and in a manner that will allow for continued beneficial disturbance management within the High Potential Range of the Kbb.

This guideline applies to all forest management activities that may occur within the High Potential Range of the Kbb. Forest management activities include planned vegetative manipulation practices that are conducted on lands owned or managed by HCP partners in the “shifting mosaic” and “management to feature and enhance” categories of participation in the HCP. More specifically, it includes most timber harvesting, site preparation and timber stand improvement activities that are routinely used to ensure healthy and productive forests from the time of stand establishment through the final harvest of mature timber.

This guideline does not apply to construction activities, emergency situations, corridor management practices, recreational management, or conservation management practices.

II. General Requirements

- a. Pre-management surveys will be conducted prior to conducting forest management activities unless specifically detailed in a management protocol, in emergency situations, or in a specific conservation agreement (DNR’s Implementing Agreement (IA) or other partner’s Species and Habitat Conservation Agreement (SHCA)).
- b. Kbb and Kbb habitat surveys will be conducted following approved HCP monitoring guidelines and protocols.
- c. When Kbb are present, conservation measures described in approved HCP management guidelines and protocols will be followed.
- d. In addition partners are required to follow any specific provisions in their conservation agreements (SHCAs or IA).

III. Specific Activities

See Forestry Management Guideline flow chart for process depiction

- a. If burning activities are to be used for forest management refer to the Burning Protocol.
- b. If mowing, brushing, or hand cutting, is to be used, refer to the Mowing and Brushing Protocol.

Karner Blue Butterfly HCP Management Guideline

- c. If pesticides are to be applied for forest management purposes, refer to the Pesticide Use Protocol.
- d. When plowing snow on corridors refer to the Snow Plowing Protocol.
- e. For intermediate stand management activities including but not limited to weeding, thinning, improvement cutting, sanitation cutting, release treatments and pruning, refer to the Timber Stand Improvement Protocol.
- f. For general access to forest stands to conduct inspections, to collect data and information, to establish forest management activities, or for other non-disturbance management purposes, the following is applicable:
 - i. Avoid travel through lupine areas to the extent practicable.
 - ii. Pre-management surveys are **not required**
- g. For routine maintenance and construction activities, e.g. new access roads, or improvement of existing roads that would result in *short term take* of occupied Kbb habitat that would *temporarily* remove or destroy all vegetation, but will be replaced within 5 years, follow the Construction Management Guideline.
- h. For construction or other activities that result in *permanent take* of occupied Kbb habitat, consult with DNR's HCP Coordinator as soon as possible to determine appropriate course of action.
- i. For emergency situations that require immediate management action such as forest fire suppression activities or salvage cutting of damaged timber from windstorms, forest fires, flooding or insect and disease epidemics, refer to the Emergency Guideline.

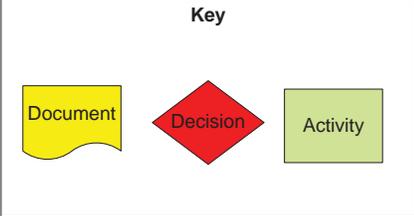
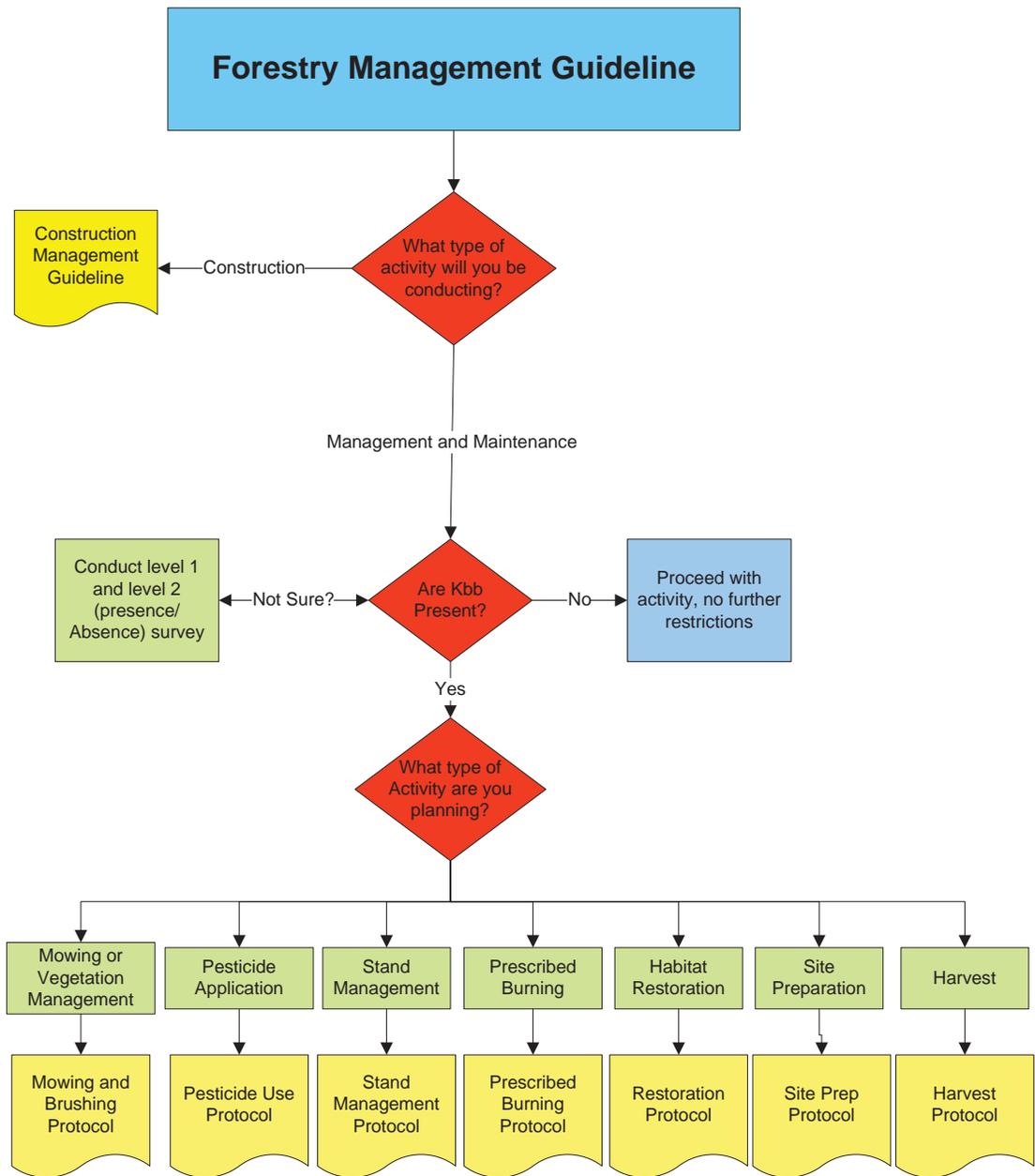
IV. Reference Documents

Manual of Control Techniques Recommended for Ecologically Invasive Plant Species Occurring in Karner Blue Butterfly Habitat (Larsen, et al January 2000)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (*March, 2000*)

Wisconsin DNR Silviculture Handbook 2431.5

Forestry Management Flow Chart



	Title: Recreation Management Guideline	
	Date: September 6, 2007	Revision: 01

I. Scope and Applicability

Recreation management activities will be conducted with consideration for the Karner blue butterfly (Kbb) and in a manner that will allow for continued beneficial disturbance management within the High Probability Range of the Kbb.

This guideline is applicable to all recreation management activities that may occur within the high probability range of the Kbb. recreation management activities include routine, planned, and maintenance activities that may occur on State Parks, Forests, Wildlife and Fishery Areas or other properties maintained for recreational purposes.

This guideline does not apply to construction activities, emergency situations, forestry management practices, and conservation management or corridor management practices. These activities are addressed as separate guidelines, each with protocols that are specific to them.

II. General Recommendations/Requirements

- a. Avoid conducting activities in lupine areas within the high probability range known to be occupied by Kbb's or areas where the presence of KBB is unknown.
- b. Pre-management surveys will be conducted prior to conducting conservation management activities unless specifically detailed in a Management Protocol, emergency situations or in a specific Species and Habitat Conservation Agreement.
- c. Post-management surveys for lupine and Kbb presence/absence will be conducted. For survey methodology and requirements see KBB Survey Protocol.
- d. Compensatory mitigation is not required for conservation management activities. See the Mitigation Protocol for more information.

III. Specific Activities

See Recreation Management flow chart for process depiction

- a. If burning activities are to be used for conservation management the Burning Protocol will be implemented.
- b. If mowing, brushing, or hand cutting, is to be used, the Mowing and Brushing Protocol will be implemented.

- c.* If pesticides are to be applied for corridor management, the Pesticide Protocol will be implemented.
- d.* If chemicals are to be used, either as a site preparation or release measure for desirable woody vegetation, see the Pesticide Protocol for proper implementation
- e.* For routine maintenance activities that may involve short-term or temporary-take, consult with DNR to determine appropriate actions.

IV. Referenced Documents

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (March 2000)

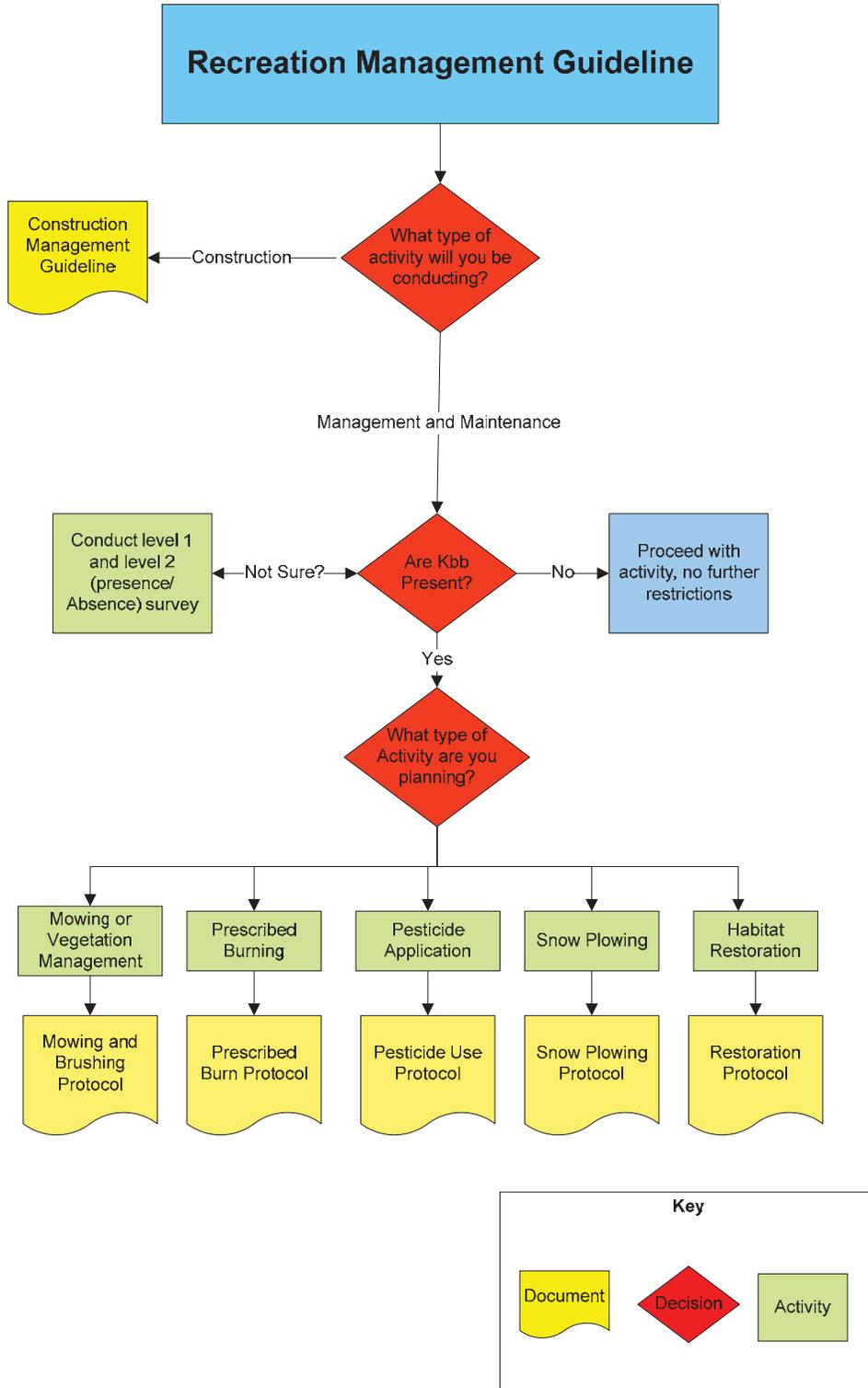
Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Prescribed Burning Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Mowing and Brushing Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Pesticide Use Protocol. (2006)

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan Habitat Restoration Protocol. (2006)

Recreation Management Flow Chart



	Title: Emergency Guideline	
	Date: September 6, 2007	Revision: 01

I. Scope and Applicability

Partners in the Karner blue Butterfly (Kbb) Habitat Conservation Plan may be required to respond to emergency situations in areas of that are known to be occupied by Kbb or areas where the presence of Kbb is unknown.

This guideline applies only to emergency situations with the High Potential Range for the Kbb in Wisconsin.

II. General Recommendations/Requirements

- a. In an emergency situation, repairs to infrastructure and safety of the public and work crews will take precedence.
- b. Avoid lupine areas within the High Potential Range that are known to be occupied by Kbb or areas where the presence of Kbb is unknown, to the extent that these areas are known during an emergency response or identified to the greatest extent practicable.
- c. Permanent take of Kbb occupied habitat resulting from emergency response will be recorded on the annual report for the year in which the emergency response situation occurred.

III. Specific Activities

- a. Incidental take of Kbb due to emergency response is authorized by the Incidental Take Permit. If the emergency response results in take that is not permanent, no further action is required.
- b. If emergency situation results in extreme damage to or complete removal of Kbb occupied habitat the partner will replace the habitat within 5 years (refer to the Restoration Protocol).
- c. If emergency situation results in permanent take of occupied Kbb habitat consult with the DNR's HCP Coordinator.

IV. Reference Documents

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (*March, 2000*)

IV. Protocols, Management



	Title: Mowing and Brushing Protocol	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

This protocol is intended to avoid and minimize take of the Karner blue butterfly (Kbb) that is incidental to mowing and brushing activities. This protocol applies to sites known to be occupied by Kbb, and to lupine sites within the KBB High Potential Range where Kbb presence or absence is unknown.

II. Conservation Measures

Mowing

- a. To avoid take
 - i. Do not mow in lupine areas that are known to be occupied by Kbb, or in lupine areas where the presence of Kbb is unknown. When mowing on extensive sites with scattered Kbb populations, avoid those lupine areas that are occupied by Kbb.
 - ii. Mow in winter over frozen ground and snow cover at a blade height of at least 6 inches above ground unless the senesced herbaceous vegetation containing lupine is under the snow layer and only the target, woody vegetation protrudes above the snow. In this case mowing down to the snow level is acceptable.
 - iii. Mow between September 1 and April 15 with a side-mounted sickle bar or rotary mower where the tractor is operated from the roadside or outside the occupied habitat.

- b. To minimize take and promote Karner blue butterfly and habitat
 - i. Mow lupine areas where Kbb occur only between September 1 and April 1 (**required**).
 - ii. If practicable, avoid mowing until October 1 or the first hard frost to allow late-season flowering plants to set seed for reproduction. For added benefit to Kbb, apply this measure to nectar areas within 200 meters of the lupine area.
 - iii. Do not mow lupine areas where Kbb occur more than once per year. (**required**)
 - iv. Avoid mowing annually those lupine areas where Kbb occur unless safety considerations require it. Three to five years between mowing treatments is preferred.
 - v. Set blade height at a minimum of 6 inches (8 inches is better) above the ground to minimize impacts to Kbb eggs. This mowing

practice reduces egg mortality and leaves the lower stems of lupine plants where eggs are laid at the site of new perennial lupine plant available for newly hatching larva. The blade height may be lowered to 4 inches if needed to simulate fire or grazing, or to reduce litter or thatch buildup.

- vi. Let clipped vegetation lay where it falls when mowing in lupine areas where Kbb occur. The clippings may contain KBB eggs. **(required)**
- vii. Use light-weight or low-ground pressure equipment when possible to minimize impact on vegetation and KBB eggs.

Tree and Brush Removal

- c. To avoid take
 - i. Do not cut or mow brush and trees in lupine areas that are known to be occupied by KBB, or in lupine areas where Kbb presence is not known.
 - ii. When cutting brush and trees on extensive sites with scattered KBB populations, avoid those lupine sites that are occupied.
- d. To minimize take and promote KBB habitat when doing tree and brush removal
 - i. From September 1 to April 15 (preferred operating period)
 1. Restrict brushing with heavy equipment, e.g. brush hogs, flail choppers, and hydroaxes, etc. to this time period. **(required)**
 2. To the greatest extent practicable, restrict brushing with heavy equipment, e.g. brush hogs to the winter when the ground is frozen and/or covered with snow (preferably at least 3-4 inches) to decrease egg mortality.
 3. Tree and brush cutting or mowing on occupied sites during this time period should be done with hand tools or hand-operated power tools (chain or brush saw) if at all possible.
 4. Avoid trampling lupine plants or dragging brush across occupied sites or piling brush on occupied sites.
 5. If brush is to be chipped, spread the chips so that lupine plants are not covered.
 6. For brushing with rotary mowers, choppers, or flail choppers, the minimum cutting/chopping height should be 6 inches (8 inches is better).
 7. Brushing from July through early August may be considered for occasional use to control woody vegetation. Do not brush the entire occupied lupine areas, or isolated occupied sites during this period.
 8. For all brushing activities:

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- Avoid driving transport equipment and operating mowing equipment in major lupine and nectar areas to the greatest extent practicable.
- ii. Anytime throughout the Year
 1. Trimming by hand may occur at any time.
 2. Avoid dragging brush through lupine patches.
 3. Avoid trampling or other impacts to lupine to the greatest extent practicable.
 4. Avoid operating and parking vehicles and heavy equipment in lupine areas to the greatest extent practicable.
 - e. In Emergency Situations
 - i. Avoid lupine areas to the greatest extent practicable.
 - ii. If Kbb presence/absence was unknown at the time of the emergency activity, perform post-management surveys for lupine and KBB presence/absence in the following flight season.

III. Reference Documents

Forest Management Guidelines (Lane) 1997
Wildlife Management Guidelines for the Karner Blue Butterfly (WDNR) May, 1998
The Strategic Management Plan for Linear Corridors in Areas Inhabited by the Karner Blue Butterfly (Weaver Boos Consultants, Inc.)
Karner Blue Butterfly Habitat Conservation Plan, March, 2000

**Karner Blue Butterfly HCP
Management Protocol**

	Title: Habitat Restoration Protocol	
	Date: Reserved	Revision: 00

Under Development

	Title: Prescribed Burning Protocol	
	Date: April 4, 2007	Revision: 01

I. Purpose and Applicability

This protocol is intended to avoid and minimize take of the Karner blue butterfly (Kbb) that is incidental to prescribed burning activities. This protocol applies to sites known to be occupied by Kbb, and to lupine sites within the Kbb High Potential Range (HPR) where Kbb presence is not known. Managers implementing this protocol should incorporate their knowledge of Kbb occurrences, lupine distribution and metapopulation function when conducting prescribed burns. Managers are also encouraged to incorporate their own personal knowledge and expertise to the greatest extent practicable when planning prescribed burns. If prescribed burning is conducted for the purpose of recovering or improving Kbb populations or their habitat, then prescribed burning is allowed:

If the protocol outlined below is not feasible, or multiple listed species occur in a management unit please contact the Division of Forestry, Karner Blue Butterfly (KBB) Habitat Conservation Plan (HCP) Program at 608-261-6451. Staff from the Karner Blue HCP Program will work with DNR research staff, and species experts to develop an acceptable protocol for a specific site.

II. Conservation Measures: Required

- a.** Avoid take (no permit required)
 - i.** Do not burn lupine areas that are known to be occupied by Kbb, or lupine areas where the presence of Kbb is unknown.
 - ii.** When burning on extensive sites with scattered Kbb populations, avoid those lupine areas that are occupied.

b. Minimizing take and promoting Kbb habitat

- 1. If the management area is part of a large-scale barrens landscape, occupied lands are under single ownership, metapopulation management is occurring, and corridors connect occupied areas,

OR

- 2. If the management area is part of a large-scale barrens landscape, occupied lands are under multiple ownership, corridors connect occupied areas, and a signed management agreement(s) has been made between all parties,

OR

3. If the management area is not part of a large-scale barrens landscape, but habitat is comprised of high quality vegetation, and a refugia has been established for two consecutive years,

AND

- a. Burning occurs in the Spring or Fall,

then entire burn units may be burned,
 - i. As long as 2/3 of the lupine area within the metapopulation management area remains unburned for two consecutive years and refugia are located within dispersal distance of the burned area.
 - ii. There are no ITP issues for other species. If ITP issues exist, contact the BER for assistance developing an alternative protocol.
 - b. Burning occurs in early to mid-Summer (*see definition*),

then follow all requirements associated with Spring and Fall burning under *1a.* above with the addition of,
 - i. 1/3 of the unit supporting nectar species remains unburned.
4. If habitat is comprised of high quality remnant vegetation, but less than 2/3 of the lupine has remained unburned for two consecutive years,

AND

- a. burning occurs in either the Spring or Fall,

then up to 1/3 of the lupine area may be burned as long as,
 - i. existing unburned lupine and the balance of previously burned lupine equals 2/3 of total lupine patch remains unburned for at least two consecutive growing seasons and refugia are located within dispersal distance of burned area.
 - ii. There are no ITP issues for other species. If so, contact the BER for assistance developing an alternative protocol.
- b. burning occurs in early to mid-Summer (*see definition*),

then follow steps outlined under *4a.* (above) with the addition of,

- i. 1/3 of the unit supporting nectar species remains unburned.

5. If the habitat is highly degraded or is a restoration,

AND

lupine is present,

then up to 3/4 of the lupine area may be burned as long as

- i. 1/4 of the lupine area remains unburned for at least two consecutive growing seasons and refugia are located within dispersal distance of burned area.
- ii. There are no ITP issues for other species. If ITP issues exist, contact the BER for assistance developing an alternative protocol.

Recommendations – to supplement Conservation Measures

- A. **Burn units:** The number and/or size of burn units should be site specific and depend largely on what is practical for the specific property conditions. Under most circumstances, preexisting burn units are dictated by natural boundaries such as roads, ditches, dikes, and flowages. Subdividing existing units into subunits is not recommended, as it is often impossible due to numerous wetlands within sites, cost, and the potential for establishment of invasive species. When developing new burn units, managers should use their professional judgment to decide when to use natural breaks and when to develop mowed, blacklined, or rotovated breaks.
- B. **Burn Planning:** Entire populations of Kbb's should never be burned at one time. Under circumstances in which an entire property can be considered a contiguous block of Kbb habitat, entire burn units or 33% of the lupine on the property can be burned in any given year.

When burn units are isolated and Kbb are incapable of dispersing to the site, unburned refugia (2/3 of lupine area) should be left within or excluded from the burn unit. Maintaining refugia will promote greater Kbb population survival and facilitate post-burn Kbb recolonization throughout the burn unit. The refugia may also be burned but over a longer timeframe, should be divided into more subunits, and have a Fire Return Interval (FRI) of 5-6 years. In lieu of more frequent fires at such isolated sites, consider use of mechanical management.

- C. Rotation: FRI's should be based on habitat management needs not on a fixed schedule. Factors such as habitat type, site condition, and site history, and the presence of invasive species should be considered when determining how often a site should be burned. Generally, occupied Kbb sites are burned once every 4-5 years, however, given the unpredictable nature of the variables described above, it is likely that no two burn units will have the same FRI.

Unsuitable Kbb Community/Habitat types i.e., wetlands, forest stands with $\geq 75\%$ canopy cover, and old fields, in which Kbb are unlikely to occur should not influence FRI's for Kbb occupied sites and may be burned at the land managers discretion to achieve the desired management objectives.

Site condition pertains to the successional changes of habitat as a result of the absence of land management activities leading to woody species encroachment and/or the presence of invasive species. Land managers that encounter these conditions may feel it necessary to conduct repeated annual burning (can be combined with brushing and herbiciding) to suppress woody plant encroachment and control the invasive species (*refer to protocols in II. 5a.*). Managers should be given the flexibility to use their professional experience to conduct intensive management practices to restore degraded areas. Once the desired goals are met, less intensive management practices can be implemented to maintain and perpetuate Kbb populations.

Highly disturbed areas that are/have been restored or mitigated may also require the flexible, intensive burn management as described above. Early restorations are often dominated by weed species and frequent burning is essential in promoting the establishment of native species.

[Rebuilding the population for Kbb appears to take at least 2 years post-fire, under favorable weather conditions. Population buildup for other invertebrate species that complete only 1 generation per year presumably will take longer.]

[Caution: Delay burning if populations decline severely due to weather or other factors (wildfires, flood, etc.)] Burn first the most degraded habitats supporting the fewest Kbb, as habitat needs permit.

- D. Burn Frequency: The optimal burn frequency per burn unit, with respect to the Kbb, is no greater than once every 4 years, to allow populations ample time to recover through recolonization from adjacent refugia. Burn frequencies of once every 5-10 years are preferred, unless woody succession or exotic invasion poses a more serious threat.

If sites are being burned more frequently than 4 years, consider alternatives such as mowing, brushing, and herbiciding. When feasible explore possibilities for excluding lupine areas which support the most Kbb from burns (e.g., by burning around them). Maintain refugia within units through appropriate mechanical

and/or herbicide management that leave significant portions of the population within a unit unharmed.

- E. Firebreaks: Utilize existing artificial or natural breaks such as trails, wetlands, or roads, as much as possible. If natural breaks cannot be used, mowed breaks are less intrusive and can be highly effective.

Avoid creating mineral breaks. While lupine may readily colonize the bare soil, so may other aggressive exotics. If mineral breaks are necessary to protect human safety, use rotovated or disked breaks rather than fire-plowed breaks. If construction of a mineral break destroys occupied Kbb habitat, refer to the *Construction Guideline*. Caution must be used to avoid spreading seeds of weedy plants via equipment.

- F. Monitor for potential invasion of aggressive exotic plants such as spotted knapweed or leafy spurge, and remove such invaders as soon as detected. Contact the WI DNR's Karner Blue Butterfly HCP Program, 608/266-6451 to receive a copy of the "Invasive Species Control Manual" for more information on control of weedy invaders. Be sure to follow pesticide use guidelines specific to the Karner blue butterfly. Pesticide Use Guidelines may be obtained from the Division of Forestry, Karner Blue Butterfly HCP Program (608) 266-1327.

- G. Type of Burn: If possible, conduct burns at varying intensity levels. Less intense burns may be more likely to result in fire skips resulting in patchy burns. The mosaic of burned and unburned areas throughout burn units expedites Kbb recovery throughout the site and is compatible with overall needs of the habitat. Kbb recolonization may also be promoted if large unburned lupine/barrens openings are left along the perimeter or corners of burn units.

- H. Timing of Burns: Fire is known to have different effects depending on when it occurs. To avoid selectively favoring some community components over others by repeated application of fire during the same time of year, vary the timing of prescribed burns to the extent weather permits.

II. Definitions/Background

Early to mid-Summer – pertains to growing-season burning and the timeframe beginning after June 21st through August 15th.

Contiguous – "Contiguous" Kbb breeding habitat is the total extent of an area supporting wild lupine and nectar plants (even if patchy and scattered) that is occupied by the Kbb and uninterrupted by obvious barriers to adult butterfly dispersal (usually dense forest). Presume adults to be quite capable of dispersing at least 300 meters over open areas of suitable habitat, and so include such areas as "contiguous" (refer also to *dispersal distance* below)

Dispersal Corridor – A pathway in the landscape (e.g., roads and trails) that Kbb can follow during their dispersal from one area of suitable habitat to another. A dispersal corridor may include unoccupied suitable habitat. Dispersal corridors might be useful for connecting habitat sites that are separated by unsuitable habitat. Characteristics that might improve suitability as a dispersal corridor include: a linear aspect, dominated by grasses, substantial number of flowering nectar plants, essentially canopy-free at least down the middle, having a dense wall of trees or shrubs along the sides, and being sunny for a significant part of the day. Presence of lupine in corridors is not essential, but is highly recommended (KBB Recovery Plan, Appendix A).

Dispersal Distance – The distance a Kbb can traverse when moving from one area of suitable habitat to another. Generally, adults are quite capable of dispersing at least 300 meters over open areas. However, Kbb dispersal distances vary depending on the nature of the landscape. In general, the more open the landscape, the greater the dispersal distance. For a more detailed discussion on dispersal distance refer to the Kbb Recovery Plan, Appendix G (http://ecos.fws.gov/docs/recovery_plans/2003/030919.pdf).

Fire Return Interval (FRI) – The timeframe in which prescribed fire is returned to a landscape/unit that has been burned in the past.

Fixed Return Interval – As it relates to prescribed fire, A FRI (above) that occurs at a predetermined period of years. For example, a land manager may choose to burn a site once every three years regardless of whether the site requires a burn at this frequency. NOT RECOMMENDED!

Incidental Take – Take of a federally-listed species which occurs incidental to and is not the purpose of, the carrying out of an otherwise lawful activity.

Incidental Take Permit (ITP) – A permit issued by the USFWS, under Section 10 (a) (1) (B) of the ESA as amended in 1973, which allows the incidental take of an endangered species.

Unit – A defined management area (e.g., burn unit) incorporating a portion of or an entire occupied Kbb site.

Metapopulation – a population of populations; each individual population within a metapopulation is referred to as a local population or sub population.

Metapopulation Management – The management of large-scale properties or barrens landscapes that supports Kbb subpopulations. Metapopulation management requires that a conscious effort be made to coordinate management efforts on the landscape to ensure the perpetuation of the metapopulation and that those Kbb subpopulations are within dispersal distance of other Kbb subpopulations.

Take – As described by the Endangered Species Act, take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such activity.

Recolonization – The emigration of Kbb's from refugia to suitable habitat where populations have been reduced due to management activities or that are unoccupied.

Refugia – For larger landscape scale metapopulation management areas (composed of multiple management units), refugia are Kbb occupied unburned lupine area(s) that are adjacent to or within dispersal distance of the burned areas (*see dispersal distance definition*). Refugia must remain unburned for at least two growing seasons following a management activity to help facilitate Kbb repopulation of the burn unit.

Site – A spatially explicit, relatively homogeneous portion of land characterized by specific physical and chemical properties that affect ecosystem functions, and where a more or less homogeneous vegetative type may be expected to develop or persist.

Subpopulation (local population) – A self-reproducing population of Kbb's that is associated with a site / area (KBB Recovery Plan).

II. Reference Documents

Wisconsin Statewide Karner Blue Butterfly, Habitat Conservation Plan and Environmental Impact Statement. 2000. Wisconsin Department of Natural Resources, Madison, Wisconsin. 377pp.

Wildlife Management Guidelines for the Karner Blue Butterfly (DNR) May, 1998

The Strategic Management Plan for Linear Corridors in Areas Inhabited by the Karner Blue Butterfly (Weaver Boos Consultants, Inc.)

Forest Management Guidelines (Cynthia Lane) February, 1997

U.S. Fish and Wildlife Service. 2003. Final Recovery Plan for the Karner Blue Butterfly (*Lycaeides melissa samuelis*). U. S. Fish and Wildlife Service, Fort Snelling, Minnesota. 273 pp.

**Karner Blue Butterfly HCP
Management Protocol**

	Title: Pesticide Use Protocol	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

This protocol is intended to avoid and minimize take of the Karner blue butterfly (Kbb) that is incidental to pesticide use activities. This protocol applies to sites within the Kbb High Potential Range known to be occupied by Kbb, and to lupine sites where Kbb presence or absence is not known.

II. Conservation Measures

- a. Avoid take (no permit required)
 - i. Do not apply pesticides on lupine patches that are known to be occupied by Kbb, or in lupine areas where the presence of Kbb is unknown.
 - ii. When applying pesticides on extensive sites with scattered Kbb populations, avoid those lupine sites that are occupied.

- b. Pesticide Use

REQUIRED ACTIONS:

Site management and herbicide application should be practiced in accordance with HCP strategies or with Partner species and habitat conservation agreements (SHCAs). Users should follow ***all pesticide label directions*** (even if differ from the requirements below) and warnings and Wisconsin Pesticide Law (ATCP 29 and others), with special care to avoid off-target applications and drift, runoff, leaching, and dripping. Apply under wind directions as detailed below. **See also the product recommendations on the attached table A.**

PRE-MANAGEMENT CONSIDERATIONS:

Conduct lupine and Kbb pre-management surveys as prescribed in the HCP or Partner SHCAs. Mark or document observed populations and patches of lupine and Kbb's.

MONITORING/REPORTING REQUIREMENTS:

Document lupine/Kbb survey results; pesticide use, dosage and timing, application methods, and buffer widths (if applicable); and weather at the time of application (temperature, wind speed, and wind direction) for reporting purposes and for future use in adaptive management.

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<p>Inside Kbb habitat, active season: (April 15 – August 31**)</p> <p>1. Make spot applications only (on basal bark, cut stems, and foliage) with hand-operated equipment only, using only pesticide-certified, or pesticide-experienced personnel, or personnel under the direction of a pesticide-certified supervisor. The operator shall be trained to identify Kbb's and lupine and must avoid trampling lupine plants. Heavy equipment shall not be used inside the habitat.</p>	<p>Inside Kbb habitat, non-active season: (September 1** - April 14)</p> <p><i>PREFERRED TREATMENT TIMING</i></p> <p>1. Make aerial applications as needed. 2. Make spot and ground applications using only pesticide certified, or pesticide experienced personnel, or personnel under the direction of a pesticide certified supervisor.</p>
<p>Near Kbb habitat, active season: (April 15 – August 31**)</p> <p>1. Make aerial applications <u>only</u> when the <u>wind is not blowing towards</u> the habitat, <u>and</u> allow the following non-chemical buffers*: 66 feet (20 meters) between the occupied site and the treatment site. The non-chemical buffer* width may be reduced where an adequate barrier to Kbb dispersal exists such as a forested area, or a tree/hedgerow at least 33 feet high x 33 feet wide (10 meters x 10 meters) between the occupied habitat and the treatment area.</p> <p>2. Make wick and other ground equipment applications <u>only when the wind is not blowing towards</u> the habitat <u>and</u> allow a 6 foot (2 meter) non-chemical buffer between the habitat and the treatment area.</p> <p>3. <u>Avoid</u> broadcast applications <u>within the distance likely to carry the chemical to</u> the closest edge of <u>the occupied habitat when the wind is blowing towards</u> the occupied habitat. Use a lateral drift table, found in training manuals for commercial pesticide applicators, to calculate this distance. For example, applying 100 micron droplets from 100 feet during a 10 mph wind requires a non-chemical buffer* of 1460 feet (445 meters) next to the occupied habitat. At a wind speed of 3 mph, the same situation would require a non-chemical buffer of 440 feet(134 meters). The use of drift-control products and methods may allow calculation of a smaller buffer*. All calculations must be done by a certified applicator and the rationale for any substantial adjustments documented.</p> <p>4. Make spot applications with hand-held equipment as needed. Check label for possible wind restrictions.</p>	<p>Near Kbb habitat, non-active season: (September 1** - April 14)</p> <p><i>PREFERRED TREATMENT TIMING</i></p> <p>1. Make aerial, ground and spot applications during this time if possible. Minimize impact to nearby nectar plants where possible.</p> <p>* Non-chemical buffers: Use larger buffers than given above if required on the product label.</p> <p>** Timing: Applications may be made anytime after August 15 if mature lupines have senesced and the Kbb second flight period has passed. For flight information call Karner Blue Hotline 1-877-4KARNER (52-7637).</p>

RECOMMENDED ACTIONS:

Implementation of these guidelines will further protect the Kbb from potential pesticide injury.

- Choose the management methods and the herbicides that allow for a maximum stand of lupine and Kbb nectaring plants over time while controlling the undesired species.
- Use Integrated Vegetation Management and non-pesticide alternatives (e.g. mowing, controlled grazing, etc) where feasible.

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- Develop initial test plots for the use of planned herbicides away from Kbb occupied sites.
- Initiate seed collecting for replacement.
- Reseed lupine, nectar plants, and other native species if these species are accidentally destroyed during site management.
- Replace ecologically invasive non-native vegetation with appropriate native vegetation such as lupine and nectar plants after treating a site.
- Consider monitoring the groundwater if using soil mobile products on a large scale.
- In key areas, or when the effect of herbicide use is uncertain, minimize lupine mortality by leaving some areas untreated.
- Near Kbb occupied habitat throughout the year, leave a 660 foot (200 meter) buffer between the habitat and the treatment area in addition to the requirement that application be made only when the wind is blowing from the habitat towards the treatment area. The 200 meter buffer will protect nectar plants growing within habitat areas used by Kbb's. The majority of butterflies range up to 200 meters from their home lupine patch.

Herbicides used (or likely to be used) in Karner blue butterfly-occupied habitat: see Attachment A.

Use of Fungicides, Insecticides, etc. Pesticide application plans for fungicides and insecticides must be submitted to the Wisconsin Department of Agriculture, Trade and Consumer Protection, the Wisconsin Department of Natural Resources, and the U.S. Fish and Wildlife Service for review and approval. Use of *Bacillus thuringiensis var.kurstaki* (B.t.k.) shall be as outlined in Chapter II. H, Volume 1 of the HCP, p.178.

* Use larger buffers if the product label requires ** Applications may be made anytime after August 15 if mature lupines have senesced **and** the second Kbb flight period has passed .

Note: In all situations (i.e. IN or NEAR Kbb habitat and all other situations in Wisconsin), and according to Wisconsin Pesticide Law (ATCP 29), pesticide certification is required if you make pesticide applications “for hire” or if you use an “RUP” (restricted use) pesticide (pesticide label statement – refer to label). If you have questions regarding pesticide use, call DATCP at 608-224-4548.

Attachment A: Herbicides used (or likely to be used) in or near Karner blue butterfly-occupied habitat

Kbb-HCP Pesticide Guidance Ad Hoc Committee: Dick Berry, Gary Birch, Dave Hall, Kit Hart, Ursula Petersen - coordinator, Shawn Puzen, Tim Wilder. Reviews by HCP Partners, UW-Agron. and USFWS.

Karner Blue Butterfly HCP Management Protocol

Note 1: These herbicides must be used according to their label and as noted in the “Requirements” section in this Pesticide Use Guidance.

Note 2: Herbicides, by product name or active ingredient, not found in this table, must be approved by DATCP, DNR, and FWS prior to use.

Product (active ingredient)	Concerns	Benefits and recommendations
Accord (glyphosate)	NON-SELECTIVE	Use after mature lupine senescence.
Accord/Garlon	NONSELECTIVE	Does not appear to impact lupine and Kbb after senescence. May remove heavy sedge and woody vegetation (Sucoff). May affect Kbb eggs. Use after senescence and seed maturity. Controls clover. Avoid use.
Arsenal (imazapyr)	Moderate to HIGH SOIL MOBILITY and HALF-LIFE; NONSELECTIVE	Use timing as a conservation tool.
Escort (metsulfuron methyl)	MODERATE MOBILITY; NON-SELECTIVE;	
Garlon 3a (triclopyr amine)	HIGH SOIL MOBILITY	Spare clovers and alfalfa, not vetch. Takes Canada thistle, not other noxious weeds. Use minimum amount; may be better for lupine habitat than Garlon 4 but consider the soil mobility aspect on non-target vegetation
Garlon 4 (triclopyr ester)	TOXIC TO AQUATICS	Spare weedy grasses, nutsedge. Takes Canada thistle and clovers, not alfalfa or vetch. Use for spot application.
Karmex (diuron)	MOD. MOBILITY; LONG HALF LIFE; NONSELECTIVE	Avoid drift and runoff to adjacent land. Use minimum necessary.
Oust (sulfometuron methyl)	Low to MODERATE SOIL MOBILITY	Kills sedges, grasses. Spare legumes, probably including lupines, also composites, others. Probably ok for broadcasting in lupine sites. Reseed associates if necessary.
Plateau (imazapic)	LONG-LIVED; HIGH SOIL MOBILITY IN SAND; COOL SEASON GRASS INJURY	Spare some warm season grasses, legumes, selected composites. Controls leafy spurge, Canada thistle. Use minimally, only spot application if possible.
Rodeo (glyphosate)	NON-SELECTIVE	Labeled for aquatic sites.
Roundup (glyphosate)	NON-SELECTIVE	See Accord.
Solution (2,4-D)	BROADLEAF WEEDS	Low drift formulation. Spare grasses. Contain within rail bed and 8’ to each side of track center.
Tordon (picloram)	HIGHLY MOBILE IN SANDY SOILS; LONG-LIVED	Controls noxious species. Spare grasses. Use only for leafy spurge, minimally, only by spot application. Monitor adjacent vegetation.
Transline (clopyralid)	HIGH SOIL MOBILITY; LONG-LIVED; KILLS LEGUMES, COMPOSITES; TOXIC TO BEES	Spare cool-season grasses. Use alternatives if possible. Monitor sites for lupine and Kbb. Use sparingly and only for Canada Thistle, Spotted Knapweed.
Vantage (sethoxydim)	VERY SOLUBLE	Relatively short-lived. Spare legumes and composites.
Velpar (hexazinone)	Moderate to LONG HALF-LIFE, HIGHLY SOLUBLE, KILLS LARCH, SOME GRASSES	Spare some legumes. Pine release treatments. Avoid broadcast applications in known habitat.

III. Referenced Documents

ATCP 29. Pesticide Use and Control. Agriculture, Trade and Consumer Protection. Register, May 1998, No. 509; www.legis.state.wi.us/rsb/code/atcp/atcp.html.

DATCP's Endangered Species Habitat Program
<http://www.datcp.state.wi.us/arm/environment/plants/endangered-species/guidelines.jsp>

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Nekoosa Papers Inc. Integrating Conservation of the KBB into Industrial Forest Management.

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Product Label Information.

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Weaver-Boos Consultants, Inc. The Strategic Management Plan for Linear Corridors in Areas Inhabited by the Karner Blue Butterfly (*Lycaeides melissa samuelis* Nabokov). Prepared for the Linear Corridor Partners Wisconsin HCP Team.

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**Karner Blue Butterfly HCP
Management Protocol**

Company, The Nature Conservancy, Northwestern Wisconsin Electric Company, Polk-Burnett Electric Cooperative, Thilmany Division - International Paper Company, The Timber Company/Georgia Pacific/Nekoosa Papers, Washburn County, Wausau-Mosinee Paper Corporation, Wisconsin Department of Agriculture, Trade and Consumer Protection, Wisconsin Department of Transportation, Wisconsin Gas Company, Wisconsin Public Service Corporation, Wisconsin River Power Company, and Wood County.

	Title: Timber Harvesting Protocol	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

This protocol is intended to avoid and minimize take of the Karner blue butterfly (Kbb) that is incidental to timber harvesting activities. This protocol applies to sites known to be occupied by Kbb, and to lupine sites within the Kbb High Potential Range where Kbb presence is not known.

II. Conservation Measures

- a.** To avoid take do not operate in lupine areas that are known to be occupied by Kbb or in lupine areas where Kbb presence is not known, to the greatest extent practicable.
- b.** To minimize take follow these measures to the greatest extent practicable.
 - i.** Conduct pre-management surveys on pre-planned timber harvest sites. (Required)
 - ii.** Do not concentrate slash piles on Kbb-occupied lupine sites. Slash should be dispersed, not piled.
 - iii.** Leave scattered occupied sites undisturbed as refugia for existing Kbb populations whenever practicable.
 - iv.** Leave scattered pockets of trees to provide shaded resting areas for Kbb on occupied sites.
 - v.** Timber harvesting activities on private residential and non-regulated properties are exempt from this protocol.
 - vi.** Post management surveys are needed only if the partner has agreed to participate in cause-effect surveys, or if it is required as part of the partner's SHCA. Refer to the Monitoring Protocol for specific information.

III. Special Activities

- 1. For construction and abandonment of access roads, trails, and landings associated with timber harvesting refer to the Construction Guideline.
- 2. For emergency salvage cutting or sanitation cutting operations resulting from forest fires, windstorms, or other natural disasters, refer to the Emergency Guideline.

IV. Background

“Tree harvesting operations that remove canopy and disturb soil can have beneficial effects on lupine and Karner blue. ...In general, many of the methods for removing and suppressing tree and shrub canopy can have a net positive effect on lupine and the Karner blue and should be timed and carried out in ways that minimize harm to the butterfly and its food resources (lupine and nectar plants).” (Karner Blue Butterfly Recovery Plan, September 2003).

“Based on the timber type and management goal or objective, a forest land manager may apply a variety of harvesting methods. The variables of the land, vegetation type, goals of land/forest management, and opportunities to 1) minimize adverse effects on the occupied habitat and species, and 2) promote habitat continuation or enhancement vary greatly with each stand. ...In addition, forest partners intend to apply harvesting strategies to land currently not occupied but having the potential for occupation because of the proximity to occupied habitat which serves to replace habitat lost through active management or natural loss, even though they have no legal obligation to mitigate or replace habitat lost naturally (e.g. succession of competing vegetation).” (Karner Blue Butterfly Habitat Conservation Plan, Appendix F. March 2000).

V. Reference Documents

Karner Blue Butterfly Habitat Conservation Plan, Appendix F. *March 2000.*

Karner Blue Butterfly Recovery Plan, (*September 2003*).

Karner Blue Butterfly Conservation Protocols For Forest Management By HCP Partners, Appendix F. *Zastrow et al. April 27, 1998.*

Wisconsin DNR Silviculture Handbook 2431.5

	Title: Mechanical Site Preparation Protocol	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

This protocol is intended to avoid or minimize take of the Karner blue butterfly (Kbb) incidental to mechanical site preparation activities. This protocol applies to sites that are occupied by Kbb, and to lupine sites within the Kbb High Potential Range where Kbb presence is not known.

II. Conservation Measures

- a. To Avoid Take
 - i. Avoid conducting activities on lupine sites within the High Potential Range that are occupied by Kbb.
 - ii. Avoid lupine sites where the presence of Kbb is unknown.

- b. To Minimize Take
 - i. Conduct Pre-management surveys.
 - ii. Implement Site preparation activities so that equipment disturbs Kbb-occupied habitat to the minimum extent practicable.
 - iii. If Kbb is present, establish scattered refugia to maintain the population. Include enough nectar plant areas to sustain the population until disturbed portions of the site can provide viable habitat.
 - iv. Post-management surveys are needed only if the partner has agreed to participate in cause-effect surveys, or if it is required as part of the partner's SHCA. Refer to the Monitoring Protocol for specific information.

III. Specific Activities

- a. When using chemicals for site preparation, refer to the Pesticide Use Protocol.

- b. When combining chemical and mechanical site preparation practices, refer both to this protocol and to the Pesticide Use Protocol. Adjust the timing of the practice accordingly.

- c. When using prescribed fire for site preparation, refer to the Prescribed Burning Protocol.

- d. If not satisfied with habitat conditions after treatment, refer to the Restoration Protocol.

IV. Description and Levels of Disturbance

Mechanical site preparation prepares a designated area of land for artificial or natural regeneration by using hand tools or power tools and implements to alter vegetative competition, expose mineral soil, and reduce logging residue and other woody debris. The extent of disturbance on the site has more effect on Kbb habitat than the intensity of the disturbance (see definitions below). Low disturbance site preparation applications affect less than 30 percent of the site. Medium disturbance applications affect 30 to 70 percent of the site. High disturbance applications affect more than 70 percent of the site.

A. Low Disturbance Practices

Since a low percentage of the surface area is affected by these applications, the floristic composition of vegetation immediately following site preparation is expected to be very similar to that preceding the activity, although vegetative height and biomass may be reduced. Examples of equipment that produces low disturbance include the following:

- Scalping with hand tools (shovel or mattock)
- Roller chopper – single drum
- Brush disk – single disk, one pass
- Patch scarifier

B. Medium Disturbance Practices

With medium levels of disturbance the effects on vegetation for the site will be more pronounced. Up to 70 percent of the site may require vegetative recolonization, which may differ from the original vegetative composition. Less than 30 percent of the site is expected to maintain the original vegetative composition. Equipment used in medium disturbance practices includes the following:

- Disk trencher
- Root rake – stumps and slash only
- Furrowing Plow – with undisturbed space between furrows
- Disk – tandem disk, one pass
- Roller chopper – tandem drum, one pass

C. High Disturbance Practices

These practices involve extensive removal of surface vegetation over most (>70%) of the site, drastically changing the structure and composition of the vegetation. Early successional species are expected to revegetate the site, primarily from seed origin. Late successional species may be able to recolonize the site through sprouting if viable roots are still present in the soil. Equipment used in high disturbance practices includes the following:

Furrowing Plow – berms of adjacent furrows touch or overlap

Root rake – removal of stumps and roots over the entire site

Roller chopper – tandem drum, multiple passes

Disk – tandem disk – multiple passes

Bulldozer – removal of stumps and brush with a straight blade.

VI. Reference Documents

Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (*March, 2000*)

Karner Blue Butterfly Conservation Protocols For Forest Management By HCP Partners, Appendix F. *Zastrow et al. April 27, 1998.*

	Title: Timber Stand Improvement Protocol	
	Date: September 6, 2007	Revision: 01

I. Purpose and Applicability

This protocol is intended for use by HCP partners with forest management responsibilities. The purpose is to avoid and minimize take of the Karner blue butterfly (Kbb) incidental to timber stand improvement (TSI) activities that occur after the stand has achieved crown closure but prior to the final harvest. This protocol applies to sites within the Kbb High Potential Range where Kbb presence is known, and to lupine sites within the Kbb High Potential Range where Kbb presence or absence is not known.

II. Conservation Measures

a. Initial Assessment

- i.** For initial stand assessment and for setting up the treatment area, avoid driving or walking across lupine patches to the greatest extent practicable. Pre-management surveys are not required for initial assessment of the stand.
- ii.** Identify openings within the stand and on the perimeter of the stand that might support lupine, nectar plants, and Kbb.
- iii.** Conduct pre-management surveys on openings identified in initial assessment to determine if lupine and Kbb populations exist. Refer to the Monitoring Protocol for specific information.
- iv.** If Kbb-occupied lupine patches are found, follow the appropriate course of action (Avoid Take or Minimize Take) below.
- v.** If Kbb is not present on the site there are no restrictions or requirements.

- b.** To avoid take do not conduct TSI activities on sites within the forest stand where Kbb presence is known, or on lupine sites where Kbb presence or absence is not known.

- c. To minimize take follow the steps listed below.
 - i. Set up the treatment area up to minimize the amount of occupied habitat that is impacted to the greatest extent practicable.
 - ii. If access roads, trails, or landing areas are to be used without any improvement or maintenance disturbance, avoid lupine to the greatest extent practicable. Otherwise, see Special Activities, below.
 - iii. TSI treatments on private residential and non-regulated properties are exempt from this protocol.
 - iv. Post management surveys are needed only if the partner has agreed to participate in cause-effect surveys, or if it is required as part of the partner's SHCA. Refer to the Monitoring Protocol for specific information.

III. Special Activities

- 1) For construction and improvement of roads, trails, and landings, refer to the Construction Guideline.
- 2) For mowing or clearing brush from roads, trails, and landings, refer to the Mowing and Brushing Protocol.
- 3) For intermediate stand treatments that are commercial thinning operations, refer to the Timber Harvesting Protocol.
- 4) For the use of pesticides to control vegetation or insects during the intermediate stand stage, refer to the Pesticide Use Protocol.
- 5) For soil and vegetation disturbance activities prior to the final harvest to promote advance regeneration on the forest floor, refer to the Site Preparation Protocol

IV. Background

The Karner Blue Butterfly Habitat Conservation Plan recognizes that forest stands from establishment to approximately 15 year of age are potential habitat for Kbb, given suitable soil and other habitat conditions. After 15 years most fully-stocked forest stands have developed sufficient crown closure to significantly reduce the frequency of shade-intolerant vegetation, including lupine and nectar plants needed to sustain Kbb populations. From the point of crown closure in a sapling stand until the final harvest of the stand, the persistence of suitable habitat for Kbb is unlikely.

During the period of tree growth and development, the late sapling stage until maturity, intermediate treatments are often used to enhance stand composition, structure, growth, health, quality, and the production of specific benefits desired by the landowner or property manager. These tend to be non-commercial treatments, and are commonly known as timber stand improvement, or TSI. TSI practices include, thinning and improvement cuts, salvage cuts, sanitation cuts, tree release treatments, and pruning.

With full crown closure the presence of lupine and nectar plants sufficient to support Kbb is unlikely. However, natural openings are common within intermediate-aged stands, as well as on the perimeters of those stands. It is possible that lupine, nectar plants, and Kbb, could persist in those openings, and on the perimeter of those stands. Therefore, an initial stand assessment is necessary to identify potential lupine and Kbb sites both within the stand and around the stand.

VI. Reference Documents

Karner Blue Butterfly Habitat Conservation Plan, Appendix F. *March 2000.*

Karner Blue Butterfly Conservation Protocols for Forest Management by HCP Partners, Appendix F. *Zastrow et al. April 27, 1998.*

Wisconsin DNR Silviculture Handbook 2431.5

	Title: Cable Plowing Protocol	
	Date: June 27, 2006	Revision: 02

I. Purpose and Applicability

This protocol is intended to avoid and minimize take of the Karner blue butterfly (Kbb) that is incidental to cable plowing activities. This protocol applies to sites known to be occupied by Kbb, and to lupine sites within the KBB High Potential Range where Kbb presence or absence is not known.

Note: Cable plowing activities on private residential and business property is exempt from this protocol. (See additional discussion in part III below.)

II. Conservation Measures

a. Avoid Take

- i.* Lupine areas that are known to be occupied by Kbb, or in areas where the presence of the Kbb is likely to occur (e.g., in lupine patches near occupied habitat) will be avoided to the greatest extent practicable (In the event that complete avoidance is not possible or practicable, refer to b.ii below).

b. Minimize Take

- i.* Pre-management surveys for lupine and Kbb presence or absence will be done on pre-planned cable plowing sites whenever practicable.
- ii.* Cable plowing will be done so that the minimum amount of occupied habitat is impacted by the tractor or plow. Measures that can be taken to minimize and avoid harm include clearly marking the boundaries of lupine areas with flagging or other means, avoiding the more dense lupine areas with the cable plow, and operating and parking transport vehicles and equipment in areas that do not support lupine.
- iii.* If pre-management surveys were not able to be conducted, post-management surveys for lupine and Kbb presence/absence will be conducted no later than the following flight season.

c. Emergency

- i.* In emergency situations lupine areas will be avoided to the greatest extent practicable.
- ii.* Post-management surveys for lupine and Kbb presence/absence will be conducted no later than the following flight season.

III. Definitions/Background

a. Cable Plowing

Cable plows are commonly used by electrical utilities for installing underground electrical distribution cables along rights-of-way and to homes and businesses between transformers and electrical meters.

b. Note on Applicability:

- i. *If initiated by the HCP partner: When a HCP partner is installing cable on a project they initiate, e.g., cable replacement projects, or new installations, the partner will implement the conservation measures noted above.*
- ii. *If requested by a private landowner in the HCP's voluntary category: Residential and business underground cable installations occur almost exclusively on privately owned land and are installed under a contractual arrangement with the utility. When a HCP partner is installing underground cable under contract with (and at the request of) a private landowner who meets the criteria to be included in the "voluntary participation category" and is therefore exempt from these requirements, then the partner is not required to apply these guidelines. It is still recommended that avoidance or measures to minimize impacts are taken when lupine habitat is known or site is suspected to be occupied by KBB. The HCP partner can consider this as an opportunity to extend outreach and educate the landowner. (Refer to HCP Chapter 2.F. to determine if a private landowner is in the "voluntary category". If at all unsure, contact the HCP Coordinator).*
- iii. *If requested by a private landowner in the HCP's regulated category: For all other non-voluntary (regulated) landowners, i.e. residential and commercial developers requesting installation, the landowner or developer is responsible to consult with the U.S. Fish and Wildlife Service if any of their project development activities (e.g., roads, buildings, electrical service, etc.) could result in the take of the Kbb. To the extent practicable, the HCP partner will advise the contracting private landowner (developer) as early as possible in the planning phase whether their project site supports (if known), or has a likelihood to support Kbb. The HCP partner may further advise the developer that if project activities could result in take of the butterflies that the U.S. Fish and Wildlife Service should be consulted. Projects that may result in take of the Kbb shall not*

proceed in occupied Kbb habitat without a permit that covers that take.

c. Recommendations & Suggestions When Approaching Developers and Other Regulated Entities:

When advising developers of their potential to take Kbbs, use whatever tools and data that are available and reasonably reflect the potential for Kbb presence and that will appropriately caution the developer of their risk of unauthorized take. Possible tools could be: (a) surveys at nearby sites, (b) observed presence of wild lupine on or near the cable insertion site, (c) the KBB Probability Model, (d) your suspicions based on Kbb ecology, i.e. dispersal distance from other known sites (Kbbs are known to disperse about 2 miles over open landscapes), etc.

Be mindful that as an HCP partner you do not speak on behalf of the FWS or with any regulatory authority, in fact or implied. Advise your client/customer (e.g. the developer) in the spirit of sound and responsible business practices and customer concern, while demonstrating your own company's concern for the welfare of the Karner blue butterfly and for "doing the right thing". If appropriate, suggest that the developer contact the USFWS-Green Bay Field Office for permitting options and information or the DNR's HCP Coordinator for additional HCP information.

IV. Referenced Documents

(reserved)

	Title: Snowplowing Protocol	
	Date: August 29, 2006	Revision: 01

I. Purpose and Applicability

This protocol is intended to avoid and minimize take of the Karner blue butterfly (Kbb) that is incidental to snow plowing activities, specifically “winging operations” along road rights-of-way. Winging operations (the manipulation of snow beyond highway shoulders) should define the shoulder pivot point.

Important: This protocol applies to sites within the KBB High Potential Range known to be occupied by Kbb, and to lupine sites where Kbb presence or absence is unknown.

II. Conservation Measures

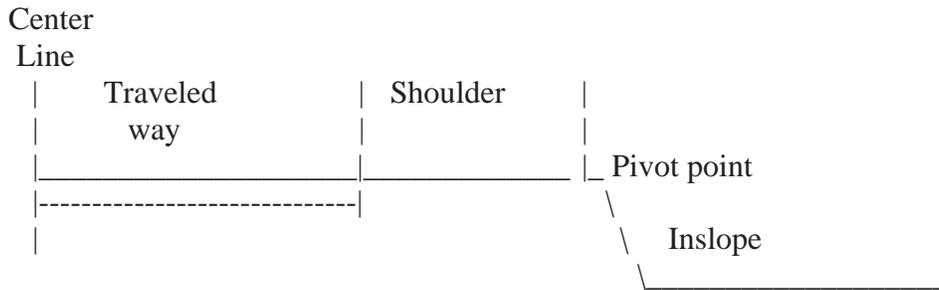
- 1) To avoid take
 - i. Do not wing plow beyond the traveled way.
 - ii. When wing plowing beyond the traveled way, do so at a sufficient height to avoid displacing shoulder gravel onto the sodded (vegetated/duff) area on the right-of way and to avoid damage to the sod (vegetation/duff) under the snow.
- 2) To minimize take and of Karner blue butterfly and habitat
 - i. When wing plowing beyond the traveled way, take care to not displace shoulder gravel onto the sodded (vegetated) area or cause damage to the sod (vegetation) under the snow. It is understood that all ROW surfaces are not completely level and smooth. If it is not practicable to raise the wing plow high enough to assure complete avoidance of all contact with the gravel and sod, and some impacts result, minimize disturbance to the greatest extent practicable.

III. Definitions/Background

Snowplowing/snow removal: For the purpose of this protocol snowplowing and snow removal includes the use of plows, blades and wing plows mounted on front end loaders, graders and other mechanized equipment to wing, bench and otherwise remove snow from the traveled way and road shoulder.

Definition and diagram of terms used:

Traveled Way	lane, driving surface
Shoulder	paved or unpaved portion of the roadtop – able to accommodate vehicles between traveled way and inslope
Pivot Point	transition area between shoulder and inslope
Inslope	non-drivable bank between shoulder and ditch bottom
ROW	The land over which a public road legally passes, normally described in terms of distance from the centerline of the road.



IV. Referenced Documents

- 1) State Highway Maintenance Manual, Exhibit 32.10 Storm Cleanup Winging and Benching, Effective January 1, 2001.

**Karner Blue Butterfly HCP
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	Title: Egg Salvage Protocol	
	Date: Reserved	Revision: 00

Under Development

**Karner Blue Butterfly HCP
Management Protocol**

	Title: Mitigation Guideline	
	Date: Reserved	Revision: 00

Under Development

IV. Protocols, Management



**A GUIDE TO CONDUCTING MONITORING
FOR THE WISCONSIN KARNER BLUE BUTTERFLY
HABITAT CONSERVATION PLAN**

Revision Date: May 18, 2009



Updated May 18, 2009 by D. Lentz
Updated May 22, 2008 by D. Lentz
Updated and reformatted May 23, 2007 by D. Lentz
Updated May 23, 2006 by D. Lentz
Updated May 10, 2005 by D. Lentz and R. Hess
Updated May 11, 2004 by D. Lentz
Updated May 15, 2003 by Y. Hernandez
Updated May 20, 2002 by S. Carter
Wisconsin Karner Blue Butterfly Habitat Conservation Plan
Previously updated January 18, 1999 by the Effectiveness Monitoring Subteam

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C. LEVEL 2 PROTOCOL: KBB PRESENCE OR ABSENCE MONITORING

D. CAUSE AND EFFECT (C-E) LEVEL 1 MONITORING PROTOCOL

I. INTRODUCTION

In 2005-06 a KBB probability model was developed that predicts the likely locations of the Karner blue butterfly in Wisconsin. This model formed the basis for an adaptive management effort to reassess the overall monitoring strategy during the winter of 2004 and spring of 2005. In 2006 the focus of monitoring was provisionally changed while the monitoring strategy, especially the sampling strategy was being refined and a final, streamlined set of guidelines and protocols were being developed and ultimately put in place in 2008. Earlier versions of the HCP monitoring guidance was wholly contained under this title as a single, continuous document. The monitoring guidance has been reorganized into individual guidelines and protocols effective beginning in 2007. The survey methods for Levels 1 and 2 have not significantly changed; only their formatting. Relative abundance surveys are no longer required, so the Level 3 protocol has been removed.

II. INFORMATION SOURCES

Contacts

David R. Lentz
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HCP project management
Coordinates monitoring training
To submit annual reports and monitoring surveys
To Report Kbb element occurrences
almost anything to do with HCP

Cathy Carnes
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E.S.A. regulatory issues
incidental take
Karner blue butterfly information

Darcy Kind
WDNR
Conservation Biologist
(608) 267-9789
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private landowner issues (non-HCP partners)
Landowner Incentive Program (LIP)

Mike Engel
U.S. Fish & Wildlife Service – Private Lands
(608) 221-1206 x21
Mike_Engel@fws.gov

private landowner issues (non-HCP partners)
habitat restoration consulting and funding

WEBSITES

Karner Blue Butterfly HCP

<http://www.dnr.state.wi.us/org/land/forestry/karner/>

Conservation and Monitoring Protocols and Guidelines

<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>

Good photos

http://dnr.wi.gov/org/land/er/invertebrates/butterflies_moths/barrens.asp

General Information

<http://www.wisconsinbutterflies.org/butterflies/species/154>

For Kids

<http://www.dnr.state.wi.us/org/caer/ce/ee/critter/insect/karner.htm>

	Title: Cause & Effect (C-E) Monitoring Protocol (Level 1)	
	Date: December 12, 2009	Revision: 03

I. Scope and Applicability

The following protocol is a version of the standard Level 1 Lupine Presence or Absence Monitoring Protocol, which has been modified specifically to study the Cause and Effect relationships of HCP partner's management activities on Karner blue butterfly habitat or areas of potential habitat on HCP Partners' land included under the federal Incidental Take Permit TE 010064-5.

The basic protocol is taken from the original Wildlife Management Guidelines for the Karner Blue Butterfly, Appendix II, Wisconsin DNR Karner Blue Technical Team as revised with information from the Biological sub-team (A.K.A. BioTeam) of the Wisconsin Statewide Habitat Conservation Plan for the Karner Blue Butterfly, May, 1998 Revision. The original protocol was developed by the HCP Monitoring sub-team in 1993. In 2005 the monitoring form was modified to include parameters for assessing the results of habitat reclamation following activities that result in complete habitat removal and other habitat restoration. This protocol has been reformatted from "*A Guide to Conducting Monitoring for the Wisconsin Karner Blue Butterfly Habitat Conservation Plan*" (prior to 2007) and made consistent with HCP streamlining strategies developed in 2006-2007. The most up to date revision can always be found in the Habitat Conservation Plan User's Guide on the DNR webpage (<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>).

Purpose: To assess the vegetative response related to a variety of important habitat components of the Karner blue butterfly (*Lycaeides melissa samuelis*), including wild lupine (*Lupinus perennis*), which result from selected management activities and conservation measures in order to inform the adaptive management process. C-E studies can be selected to (1) validate the anticipated and desired affects of a management practice or conservation measure, (2) study a new or proposed management activity or conservation measure, and (3) study multiple conservation measures for an activity to compare the results and improve the efficiencies of the activity and/or effectiveness of the conservation measure.

Forms: A standardized *Level 1: Habitat Response to Management: Management Cause and Effect (C-E) Monitoring form* is used for recording all Level 1 C-E monitoring information. A blank form can be copied from the DNR's Karner Blue webpage. Always use the current form as forms may change as a result of adaptive management.

II. Protocol

Where to Survey

A site is eligible for a C-E study if it meets the following criteria:

1. The site is within the High Potential Range (HPR) (see Karner Blue HPR map <http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf>).
2. The site meets the definition of potential habitat. Potential habitat includes sites on dry, sandy soils that could potentially support Karner blue butterfly habitat.
3. The site is on lands included by an HCP partner in their Species and Habitat Conservation Agreement or Implementing Agreement.
4. The site should support the objectives and design of the management activity or conservation measure(s) being studied.

When to Survey

- BEFORE (pre-management survey) and AFTER (post-management survey) the management activity and/or conservation measure being studied is applied
- Each pre-management and each post-management survey must be performed in both Kbb flight periods to reflect early and late flowering nectar plants and other conditions
- In places where lupine flowers early (sunny areas), survey from late May to mid-June (for first flight period visits)
- In places where lupine flowers rarely or not at all (usually more shaded areas), surveys can be conducted from late May through July.
- Open and sunny places should be surveyed earlier in the season because lupine flowers and senesces earlier there
- Areas with more shading and canopy cover can be surveyed later because lupine flowers and senesces later in these locations (except during hot and droughty summers).
- Lupine surveys should not be conducted after July 31st.

How to Survey

Surveys for lupine can be conducted in a number of ways. The following are suggested methods to use. The method you choose will normally depend upon the resources available (number of personnel), and the size and landscape characteristics of the area to

**Karner Blue Butterfly HCP
C-E Monitoring Protocol -Level 1**

Estimate the collective availability of all nectar plants, which will be available in each Kbb flight period, e.g.:

General availability of nectar plants during **1st flight period** (*First flight periods are generally late May- June*):

- ① Abundant - (50% or more coverage of nectar area)
- ② Common - (25-50% coverage)
- ③ Scarce - (<25% coverage)

General availability of nectar plants during 2nd flight period (*Second flight periods are generally mid-July to mid-August*):

- ① Abundant - (50% or more coverage of nectar area)
- ② Common - (25-50% coverage)
- ③ Scarce - (<25% coverage)

III. Definitions

- **High Potential Range:** The high potential range is the region of the state containing all documented occurrences of the Karner blue butterfly, and extending 5 miles beyond documented Kbb occurrences to include areas with similar habitat, soils, and climate where the Karner blue butterfly is most likely to occur based on the Kbb probability model developed in 2006-2007. (See Karner Blue HPR map <http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf>).

IV. Referenced Documents

- Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (March 2000)
- Karner Blue Habitat Conservation Plan User's Guide (<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>)
- Karner Blue High Potential Range Map in Wisconsin "Karner Blue Butterfly Habitat Conservation Plan Regulatory Range, September 15, 2007"

	Title: Lupine Presence or Absence Monitoring Protocol (Level 1)	
	Date: December 12, 2009	Revision: 03

I. Scope and Applicability

The following protocol is intended to determine the viable presence or absence of wild lupine (*Lupinus perennis*), the only known host plant of the Karner blue butterfly (*Lycaeides melissa samuelis*) larvae on HCP Partners' land included under the federal Incidental Take Permit TE 010064-5.

The following protocol is taken from the original Wildlife Management Guidelines for the Karner Blue Butterfly, Appendix II, Wisconsin DNR Karner Blue Technical Team as revised with information from the Biological sub-team (A.K.A. BioTeam) of the Wisconsin Statewide Habitat Conservation Plan for the Karner Blue Butterfly, May, 1998 Revision. The original protocol was developed by the HCP Monitoring sub-team in 1993. In 2005 the monitoring form was modified to include parameters for assessing the results of habitat reclamation following activities that result in complete habitat removal and other habitat restoration. This protocol has been reformatted from "A Guide to Conducting Monitoring for the Wisconsin Karner Blue Butterfly Habitat Conservation Plan" (prior to 2007) and made consistent with HCP streamlining strategies developed in 2006-2007. The most up to date revision can always be found in the Habitat Conservation Plan User's Guide on the DNR webpage (<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>).

Purpose: To find and map wild lupine (*Lupinus perennis*) patches to expedite future Karner blue butterfly (*Lycaeides melissa samuelis*) surveys.

Forms: A standardized *Level 1: Lupine Presence/Absence survey form* is used for recording all Level 1 monitoring information. A blank form can be copied from the DNR's Karner Blue webpage. Always use the current form as forms may change as a result of adaptive management.

II. Protocol

Where to Survey

A site is eligible for sampling presence of habitat if it meets the following criteria:

1. The site is within the High Potential Range (HPR) of the Karner blue butterfly (see Karner Blue HPR map <http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf>).

Karner Blue Butterfly HCP Monitoring Protocol – Level 1

2. The site meets the definition of potential habitat. Potential habitat includes sites on dry, sandy soils with dominant overstory vegetation of an age and/or character that could support Karner blue butterfly habitat.
3. The site is on lands included by an HCP partner in their Species and Habitat Conservation Agreement or Implementing Agreement.

Additional information describing sites eligible for Level 1 monitoring:

- Sites include forest stands and upland openings or existing corridors.
- If forested, the site supports trees 0-15 years of age. Exception: If forested and less than 15 years of age, dense stems of a regenerating stand may cause crown closure at an early age precluding the site from consideration for sampling.
- If non-forested, the site may be an upland opening or existing corridor such as a fuel break or woods road.

Since partners with larger holdings will not likely be able to survey all of their lands because of logistical constraints, the following information describes areas that should be considered of low potential/priority for Level 1 surveys, but are still theoretically considered valid sites if they meet the three criteria listed above:

- Wetlands or other areas flooded for most of the growing season
- Forests with dense canopy (>75%), which could be determined by aerial photo interpretation of forest stands with a continuous canopy >75%, categorized as pole or saw timber sized stands having 3-prime density class (lupine may occur here, especially if the area is adjacent to a lupine patch, but it may not flower and therefore may be difficult to detect)
- Sites on non-sandy soils
- Cultivated or otherwise developed areas supporting no native vegetation

When to Survey

- In places where lupine flowers early (sunny areas), survey from late May to mid-June
- In places where lupine flowers rarely or not at all (usually more shaded areas), surveys can be conducted from late May through July
- Open and sunny places should be surveyed earlier in the season because lupine flowers and senesces earlier there

Karner Blue Butterfly HCP Monitoring Protocol – Level 1

- Areas with more shading and canopy cover can be surveyed later because lupine flowers and senesces later in these locations (except during hot and droughty summers)
- Lupine surveys should not be conducted after July 31st.

How to Survey

Surveys for lupine can be conducted in a number of ways. The following are suggested methods to use. The method you choose will normally depend upon the resources available (number of personnel), and the size and landscape characteristics of the area to be surveyed.

OPTION 1: Surveyors walk a site spaced such that all areas between the surveyors can be seen by at least one surveyor. Thus, each surveyor walks a "strip transect," (also called straight-line transect) so named because a strip or corridor of habitat is surveyed by each surveyor. The distance between surveyors will depend upon visibility of lupine (flowering or not), density of vegetation, and the slope of the site.

OPTION 2: Surveyors walk a site spaced a pre-determined distance apart (e.g. 50 feet, 100 feet, etc). Each surveyor will be conducting a strip transect. Depending upon the distance between surveyors and density of vegetation, not all areas will be observed by a surveyor (i.e. only a percentage of the site will be surveyed). The distance between surveyors will depend upon the size of area to be surveyed and the time available.

OPTION 3: Random Walk Survey for a specified time (e.g. 5 minutes) that produces a description of what was found and the estimated % coverage of habitat.

Important: To minimize harm to Kbb, avoid trampling lupine to the greatest extent practicable. Kbb may be present in any or all life forms.

Mapping Lupine Patches

Boundaries of lupine patches should be mapped as accurately as possible. This will assist future KBB surveyors at the site.

When mapping lupine, it may be useful to characterize each site by relative abundance and pattern of lupine distribution. Options for such characterization are listed below:

Relative Abundance estimate

- Dominant: the dominant ground layer vegetation
- Locally Abundant: abundant in patches
- Infrequent: infrequently encountered
- Rare: very few plants seen

	Title: Kbb Presence or Absence Monitoring Protocol (Level 2)	
	Date: December 12, 2009	Revision: 03

I. Scope and Applicability

The following protocol is intended to determine if the Karner blue butterfly (*Lycaeides melissa samuelis*) is present on HCP Partners' land included under the federal Incidental Take Permit TE 010064-5. A determination of absence does not mean that Karner blue butterflies are absolutely not there. Kbb may be present at such low levels not to be observable under this protocol. This protocol is acceptable to the FWS and is approved under the federal Incidental Take Permit TE 010064-5.

The following protocol is originally taken from Wildlife Management Guidelines for the Karner Blue Butterfly, Appendix III, Wisconsin DNR Karner Blue Technical Team as revised with information from the Biological sub-team (A.K.A. BioTeam) of the Wisconsin Statewide Habitat Conservation Plan for the Karner Blue Butterfly, May, 1998 Revision and January, 1999 Revision. The protocol was originally developed by the HCP Monitoring sub-team for the 1995 field season. This protocol has been reformatted from "A Guide to Conducting Monitoring for the Wisconsin Karner Blue Butterfly Habitat Conservation Plan" (prior to 2007) and made consistent with HCP streamlining strategies developed in 2006-2007. The most up to date revision can always be found in the Habitat Conservation Plan User's Guide on the DNR webpage (<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>).

Purpose: To determine if Karner blue butterflies (Kbb) occupy a particular habitat area (lupine and surrounding nectar plants). The following are **suggested minimum requirements** for conducting Karner blue butterfly (*Lycaeides melissa samuelis*) presence or absence surveys. For the purpose of this survey, **absence** means that no Kbb were detected at a particular site. It is not a 100% guarantee that Kbb do not exist at the site.

Forms: A standardized *Level 2: Karner Blue Butterfly Presence/Absence* form is used for recording all Level 2 monitoring information. A blank form can be copied from the DNR's Karner Blue webpage. Always use the current form as forms may change as a result of adaptive management.

II. Protocol

Where to Survey

A site is eligible for Level 2 monitoring if it meets the following criteria:

Karner Blue Butterfly HCP Monitoring Protocol – Level 2

1. The site meets the criteria listed for Level I Monitoring:
 - The site is within the High Potential Range (HPR) of the Karner blue butterfly (see Karner Blue HPR map <http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf>).
 - The site meets the definition of potential habitat. Potential habitat includes sites on dry, sandy soils with dominant overstory vegetation of an age and/or character that could support Karner blue butterfly habitat.
 - The site is on lands included by an HCP partner in their Species and Habitat Conservation Agreement or Implementing Agreement (see *Level 1 – Lupine Presence and Absence Monitoring Protocol* for additional information describing sites eligible for Level 1 monitoring), and
2. The presence of lupine has been confirmed on the site within the last five years using the Level I Monitoring Protocol, and
3. The site has at least 25 lupine plants or clumps of lupine, at a density of 50 lupine plants per acre (or 25 lupine plants per 200 m of linear distance for linear sites).

When to Survey

- Surveys for Karner blue butterflies can be conducted during both the first and second Karner blue butterfly flight periods. The first flight period normally begins in late May and ends in mid to late June. The second flight period normally begins in mid July and ends in mid to late August.
- Timing of flight periods can vary by as much as 2-3 weeks from year to year and from site to site.
- The length of flight periods may also vary from year to year (two to five weeks in length).
- If resources do not allow you to conduct surveys during both flights, priority should be placed on conducting surveys during the second flight period (see “Determination of NO KBB” listed below).
- Only one survey is needed if you detect Kbb during the first survey. If you do not detect Kbb during the first survey, you should conduct a second survey. If you do not detect Kbb during the second survey, you should conduct a third survey. **IMPORTANT:** The second and third surveys must be conducted during the second flight period. Surveys during the second flight period should be spaced so that there is at least a 3 day interval between site visits.
- Conduct surveys during optimal time and weather conditions as listed below:
 - between 8:00 a.m. and 6:00 p.m.
 - when temperatures are above 60°F
 - when temperatures are between 60°F and 70°F, conduct surveys only

Karner Blue Butterfly HCP Monitoring Protocol – Level 2

- under mostly sunny skies with calm to light wind
- when temperatures are above 70°F, there are no restrictions on cloud cover
- when winds are 18 mph or less
- Do not survey under drizzly or rainy conditions.

How to Survey

- Individuals conducting surveys must attend training in survey techniques and identifying Kbb offered by the Wisconsin DNR (see Monitoring Guideline, “Training”).
- The Kbb habitat area (lupine and associated nectar species) should be identified ahead of time when possible.
- If a site is being surveyed for Level 2 Monitoring only, the surveyor(s) should walk the entire habitat area at a leisurely pace until all likely locations of Kbb concentration areas are surveyed OR surveyors may cover the area by walking transects to look for the butterflies. The purpose of the survey is fulfilled when at least one Kbb is observed (during either the first or second flight period).
- Butterflies observed outside the site boundary that can be positively identified as Karners from within the site should be counted for that site.

Important: *To minimize harm to Kbb, avoid trampling lupine to the greatest extent practicable. Kbb may be present in any or all life forms.*

Intensity of Survey

Approximately 10 minutes of effort per survey are recommended for each acre of habitat (i.e. lupine patches and important nectar plants within 50 meters of the lupine patch) to determine Kbb presence/absence. If a Kbb is quickly spotted, it is not necessary to spend 10 minutes per acre of habitat. Surveying for a longer period of time is encouraged (but not mandatory) if Kbb are not found during the first 10 minutes of survey effort per acre of habitat.

Determination of No KBB

The determination that no Kbb are present at a site can be made once you have surveyed the site (without documenting any Kbb) three times during one year. No more than one of the surveys may have been conducted during the first flight period. Surveys should be spaced so that there is a 3-7 day interval between surveys. Again, once one Kbb is observed, the purpose of the survey is fulfilled and additional surveys are not required.

General Information

The "Determination of No KBB" is based primarily on surveys during the second flight period, since Kbb numbers are usually greater during this flight period.

Kbb flight periods vary within the year from site to site depending on the site's phenology (i.e. "fast" sites and "slow" sites). Flight periods normally occur earlier on sunny, open sites and later on shady sites. Spacing of the surveys is necessary to ensure that at least

one survey is conducted during the peak of the main (second) flight period. A 3-7 day range is used because the duration and amount of suitable survey weather varies among years.

The Karner Blue Butterfly Emergence Model is used to determine when Karner blue adults may be present. Land managers familiar with the sites to be surveyed should consider variations between sites in the area to decide which sites may be “fast” or “slow”, and plan survey work accordingly. (For Kbb emergence predictions see <http://dnr.wi.gov/forestry/karner/emergence.htm>.)

III. Definitions

- High Potential Range: The high potential range is the region of the state containing all documented occurrences of the Karner blue butterfly, and extending 5 miles beyond documented occurrences to include areas with similar habitat, soils, and climate where the Karner blue butterfly is most likely to occur based on the Kbb probability model developed in 2006-2007. (See Karner Blue HPR map <http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf>).

IV. Referenced Documents

- Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, Appendix F. (March 2000)
- Karner Blue Habitat Conservation Plan User’s Guide (<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>)
- Karner Blue High Potential Range Map in Wisconsin “*Karner Blue Butterfly Habitat Conservation Plan Regulatory Range, September 15, 2007*”

	Title: Monitoring Guideline	
	Date: May 22, 2008	Revision: 02

I. Scope and Applicability

Monitoring is a critical component of adaptive management in the statewide Wisconsin Karner Blue Butterfly HCP. This guideline outlines and describes the monitoring strategy and monitoring activities performed by HCP Partners on HCP Partners' land included under the federal Incidental Take Permit TE 010064-4.

Monitoring activities will always be conducted with consideration for the Karner blue butterfly (Kbb) and in a manner that will allow for continued beneficial disturbance management within the High Potential Range of the Kbb.

Monitoring will be used to determine both the success of the partners in meeting their individual conservation agreement goals and of the HCP at meeting its statewide conservation goals.

This guideline applies to all monitoring activities that may occur within the High Potential Range of the Kbb in Wisconsin. Monitoring activities include monitoring required as a condition of the permit to assess the affects of conservation measures applied in concert with partners' management and maintenance activities that routinely occur on State Wildlife & Fishery Areas, State Forests, State Natural Areas, road right-of-ways, utility and gas corridors and other partner owned lands of similar type. Conservation measures for these activities are addressed in separate guidelines, each with protocols that are specific to them.

This guideline does **not** apply to Recovery Monitoring. A monitoring tool to estimate population sizes, called Distance Sampling is currently being used for Recovery Monitoring and is addressed elsewhere.

II. The HCP and Adaptive Management

The HCP applies adaptive management to address conservation within the context of a working landscape. This adaptive management approach offers partners in the HCP the flexibility needed to meet their respective goals. Monitoring is essential to the HCP adaptive management process, and ultimately to document the need for the dynamic landscape necessary to maintain viable populations of Karner blue butterflies.

III. Objectives of Monitoring

The purpose of monitoring is to provide an economical and biologically sound means of detecting (1) the presence of Karner blue butterfly (Kbb) habitat and (2) the presence of Kbb occupied sites. The results of these surveys allow HCP partners to determine if and where Kbb are present and inform them when to apply conservation measures included in HCP management protocols. Information collected through monitoring will also be used to assess the efficacy of the HCP and to inform adaptive management decisions. Cause and Effect Monitoring will assess the affects of management activities on Kbb, Kbb populations and Kbb habitat, which will be used to direct continuous improvement of conservation measures in HCP management protocols.

IV. Components of Monitoring

Level 1 Monitoring: Sampling for the presence of habitat. For habitat surveys, the presence or absence of wild lupine is determined and its abundance broadly quantified (see Lupine Presence/Absence Monitoring Protocol - Level 1). On sites where the presence of habitat has been established, lupine surveys need to be repeated after several years in response to habitat changes brought about by disturbance management activities or natural succession.

Level 2 Monitoring: Sampling for the presence of the Karner blue butterfly. Sites where lupine is present are subsequently surveyed to determine the presence or absence of Karner blue butterflies (see Karner Blue Butterfly Presence/Absence Monitoring Protocol – Level 2).

Cause and Effect (C-E) Level 1 Monitoring: To assess the vegetative response related to a variety of important habitat components of the Karner blue butterfly (*Lycaeides melissa samuelis*), including wild lupine (*Lupinus perennis*), which result from selected management activities and conservation measures in order to inform the adaptive management process. C-E studies can be selected to (1) validate the anticipated and desired affects of a management practice or conservation measure, (2) study a new or proposed management activity or conservation measure, or (3) study multiple conservation measures for an activity to compare the results and improve the efficiencies of the activity and/or effectiveness of the conservation measure.

Habitat Evaluation

Further habitat evaluation beyond the elements required for Levels 1 and 2 monitoring is not generally a required component of the monitoring program. Exceptions are:

- When required to assess the success of habitat reclamation as part of a construction project,
- When required to demonstrate the success of mitigation plan following permanent take.
- Whenever useful to inform adaptive management decisions, i.e. to assess habitat alterations as a result of management or as a component of research.

V. Training

All persons collecting field data for monitoring under the WI KBB HCP must have attended a training session offered by the Wisconsin DNR. Depending on partners' needs, one or more training sessions are held each spring, during the first Karner blue butterfly flight period (late May-early June). The training covers survey protocol procedures, lupine and Karner blue butterfly identification, issues of variability in habitat, habitat elements, Karner blue butterfly behavior, etc. It is mandatory for previously certified field personnel to undergo refresher training at least once every 5 years.

VI. General Requirements and Recommendations

Required:

- a. Those who perform monitoring for WI KBB HCP purposes and under the authority of the associated Incidental Take Permit will successfully complete a monitoring training session provided by the DNR's HCP program and taught by qualified, authorized trainers.
- b. Certification to perform monitoring protocols under the permit is valid for 5 years after which time a refresher course will be required.
- c. Kbb and Kbb habitat surveys will be conducted following approved HCP monitoring protocols.
- d. In addition partners are required to follow any specific provisions in their conservation agreements (SHCAs or IA).

Recommended:

- e. It is recommended that non-required surveying at the discretion of the partner follow HCP approved protocols and documentation procedures.

VII. Specific Activities

- a. If surveying for the presence or absence of Kbb habitat, follow the Level 1 - Lupine Presence/Absence Monitoring Protocol.
- b. If surveying for the presence or absence of the Karner blue butterfly, follow the Level 2 - KBB Presence/Absence Monitoring Protocol.
- c. If surveying to assess the Cause & Effect relationship of HCP management activities, follow the C-E Level 1 Monitoring Protocol.

VIII. Definitions

- **Adaptive management:** For the WI Karner Blue HCP, adaptive management is defined as a formal, structured approach to dealing with uncertainty in natural resources management, using the experience of management and the results of research as an on-going feedback loop for continuous improvement. Adaptive

approaches to management recognize that the answers to all management questions are not known and that the information necessary to formulate answers is often unavailable. Adaptive management also includes, by definition, a commitment to change management practices when determined appropriate.

- **High Potential Range:** The high potential range is the region of the state containing all documented occurrences of the Karner blue butterfly, and extending 5 miles beyond documented occurrences to include areas with similar habitat, soils, and climate where the Karner blue butterfly is most likely to occur based on the Kbb probability model developed in 2006-2007.

IX. Referenced Documents

- Karner Blue Habitat Conservation Plan User's Guide (<http://dnr.wi.gov/forestry/karner/hcp-userguide.htm>)
- Karner Blue High Potential Range Map in Wisconsin "Karner Blue Butterfly Habitat Conservation Plan Regulatory Range, *September 15, 2007*"

Glossary

Broadcast Seeder: An implement for applying seed to the surface of a planting site. It consists of a hopper to hold the seed. Beneath the hopper is rotating disk. Seed is metered onto the rotating disk, which throws the seed in a circular pattern away from the device. Small broadcast seeders can be carried by a person and powered by a hand crank. Larger seeders are normally mounted on the rear of an ATV, tractor, or a pickup truck and powered by electricity or by a power take-off shaft.

Brush Disk: A heavy duty implement with circular, concave steel cutters mounted in series on a rotating shaft and pulled across the site by a prime mover. The discs cut into the sod and turn it over, exposing mineral soil. Disks can have one or two gangs (shafts with mounted disks).

Brush Hog: A heavy duty rotary mower, usually pulled behind a rubber tired tractor, and capable of chopping large diameter brush and saplings up to several inches in diameter at ground level.

Bulldozer: A prime mover fitted with a front-mounted steel blade that can be raised or lowered. It is used to push or excavate dirt, stumps, rocks, trees, and other items or materials.

Cable Plowing: Cable plows are commonly used by electrical utilities for installing underground electrical distribution cables along rights-of-way and to homes and businesses between transformers and electrical meters.

Conservative Forbs: Prairie or barrens wildflowers that are indicative of high quality plant communities. These species are some of the first to disappear in the absence of natural processes, i.e., fire or heavy disturbances such as grazing or cultivating.

Construction: Any action that involves grading, building, excavation, or other heavy disturbance activity.

Contiguous: "Contiguous" Karner blue breeding habitat is the total extent of an area supporting wild lupine (even if patchy and scattered) that is occupied by the Karner blue and uninterrupted by obvious barriers to adult butterfly dispersal (usually dense forest). Presume adults to be quite capable of dispersing at least 300 meters over open areas of suitable habitat, and so include such areas as "contiguous".

Disk Trencher: An implement consisting of two large diameter concave, toothed steel disks mounted on opposite sides at the rear of a prime mover. As the prime mover proceeds across the site, the disks gouge the soil surface and create a continuous shallow furrow of mineral soil.

Dispersal Corridor: A pathway in the landscape that Karner blue butterflies follow during their movement from one area of suitable habitat to another. A dispersal corridor may include unoccupied suitable habitat. Dispersal corridors might be useful for connecting habitat sites that are separated by unsuitable habitat. Characteristics that might improve suitability as a dispersal corridor include: a linear aspect, dominated by grasses, substantial number of flowering nectar plants, essentially canopy-free at least down the middle, having a dense wall of trees or shrubs along the sides, and being sunny for a significant part of the day. Presence of lupine in corridors is not essential, but is highly recommended (KBB Recovery Plan).

Dispersal Distance: A pathway of no longer than 350 meters that Karner blue butterflies can traverse when dispersing from one area of suitable habitat to another.

Early to mid-Summer: Pertains to growing-season burning and the timeframe beginning after June 21st through August 15th.

Emergency Response: Any action taken to remedy a facility or property emergency situation, or other unforeseen occurrence.

Extent of Site Disturbance: The amount of the surface area (in percent) of the site that is impacted by a site preparation activity.

Final harvest: A final cutting trees from a forest stand that extracts salable trees.

Fire Return Interval (FRI): The timeframe in which prescribed fire is returned to a landscape/unit that has been burned in the past.

Fixed Return Interval: As it relates to prescribed fire, A FRI (above) that occurs at a predetermined period of years. For example, a land manager may choose to burn a site once every three years regardless of whether the site requires a burn at this frequency.

Flail Chopper: An implement mounted on the front of a prime mover with a horizontal spinning drum. Attached to the drum are hardened steel cutting hammers that shred woody debris upon contact.

Fuel Loading: A buildup of fuels, especially easily ignited, fast-burning fuels.

Furrowing Plow: An implement mounted to the front or rear of a tractor that can be raised or lowered to control plowing depth. The plow is V-shaped and rolls sod, roots and debris to both sides as it moves through the ground, leaving an exposed strip of mineral soil.

Harvesting: The process of gathering a timber crop. It includes felling, skidding/forwarding, on-site processing, and removal of products from the site.

High Potential Range: Land in High Probability Range that is within 5 miles of known Kbb occurrences. Also known as the regulatory range.

High Probability Range: Lands in the KBB Probability Model that fall into 50% and greater probability classes.

Hydroaxe: A very heavy duty rotary mower mounted on the front of a rubber-tired prime mover and powered by a hydraulic motor. Hydroaxe is a brand name of the Pettibone Corporation.

Improvement Cutting: The removal of less desirable trees of any species in a stand of poles or larger trees, primarily to improve composition and quality.

Incidental Take: Take of a federally-listed species which occurs incidental to, and is not the purpose of, otherwise legal activities.

Incidental Take Permit (ITP): A permit issued by the USFWS, under Section 10 of the ESA, which allows the incidental take of an endangered species.

Intensity of site disturbance: The level of impact to vegetation at the point of disturbance. (Virtually all site preparation practices have a high level of impact, in that vegetation is removed and mineral soil is exposed at the point of application).

Intermediate Treatment: Any treatment or tending designed to enhance growth, quality, vigor, and composition of the stand after establishment of regeneration and prior to final harvest.

Metapopulation: A population of subpopulations; each individual population within a metapopulation is referred to as a local population.

Metapopulation Management: The management of large-scale properties or barrens landscapes that supports Kbb populations. Metapopulation management requires that a conscious effort be made to coordinate management efforts on the landscape to ensure the perpetuation of the metapopulation and are within dispersal distance of other Kbb subpopulations.

Mowing and Brushing: For the purpose of this protocol mowing and brushing includes the use of mowers, trimmers, choppers, and other mechanized equipment or hand tools to control woody vegetation, forbs and grasses as a vegetation management practice.

No-till Drill: A heavy duty seed drill that exerts downward force on the seeding disks, allowing penetration through sod, corn stubble, and other debris on the

ground. These drills are normally used after herbicide applications to eliminate grasses and unwanted forbs from competing with the planting. Several makes of no-till drills are modified to accept “fluffy” prairie and barrens seeds. Currently those makes are Truax, Tye, and certain models of Brillion no-till drills.

Patch Scarifier: A forestry implement that, when pulled across the landscape, gouges out patches of sod at periodic intervals, exposing mineral soil. These patches can be used as micro-sites for planting or seeding of trees or other vegetative species.

Permanent take: An impact to Karner blue butterfly habitat, through land management or land use activities, that precludes Karner blue butterfly occupation. Such long-term impact involves taking that does not allow for the restoration and reoccupation of the site for a minimum of five years. Activities or projects that may fall within the definition of permanent take include, but are not limited to:

- Construction of roadways or parking lots
- Construction of buildings or structures and associated facilities
- Other construction or development projects that cover or replace the habitat in a permanent manner (at least five years), such as an airport or a flowage; and
- Commercial or residential developments. [Note: This category does not include a permanent or second home or structure that are owned or built by the owner for his or her own use. This provision applies only to those housing developments approved after the date of permit issuance.]

Pesticide Application: For the purpose of this protocol pesticide application includes the use of any Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) approved chemical used to control both woody and herbaceous vegetation as a vegetative maintenance practice. Pesticides can be applied with hand held sprayers, or boom sprayers mounted on any type of vehicle.

Pruning: The removal, close to the branch collar or flush with the stem, of side branches and multiple leaders from a standing tree.

Prime Mover: A motorized tractor with either steel tracks or rubber tires.

Recolonization: The emigration of Kbb’s from refugia to suitable habitat where populations have been reduced due to management activities or that are unoccupied.

Refugia: Kbb occupied, unburned lupine (2/3 of total lupine on site) that is adjacent to or within 350 meters (\leq 200 meters is preferable) of the burn unit (see dispersal distance).

Release: A treatment designed to free young trees (not past the sapling stage) from undesirable, usually overtopping, competing vegetation.

Roller Chopper: A large diameter steel drum with horizontal steel blades set perpendicular to the circumference of the drum and parallel to each other. The drum is mounted within a steel frame and is pulled across the site by a motorized prime mover. As the drum rolls along the ground, the steel blades cut into the sod and chop brush and woody debris lying on the surface. Roller choppers often have a tandem arrangement, with two chopper drums mounted within the frame for more effective chopping in a single pass.

Root Rake: A front-mounted implement that attaches to a prime mover. The implement consists of a horizontal steel bar that can be raised and lowered. It is fitted with vertical teeth that can be lowered into the ground to “root out” stumps and brush. It can also be pushed along the surface to collect woody debris for deposit in piles.

Salvage Cutting: The removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost.

Sanitation Cutting: The removal of trees to improve stand health by stopping or reducing the actual or anticipated spread of insects or diseases.

Seed Drill: A farm implement that is towed behind a tractor. It consists of one or more wide bins to hold seed. A metering system drops seeds into tubes that lead to paired sets of discs spaced closely together beneath the seed bins. The disks penetrate the soil and open a slit into which the seeds drop. The slit in the soil closes behind the disks covering the seed.

Short-Term Incidental Take: An impact to occupied Karner blue butterfly habitat resulting from land management or land use activities, which provides habitat disturbance that renews declining habitat and/or creates new habitat to replace habitat lost to succession or as a result of management activity. Short-term take is conducted following approved conservation measures in the HCP in a manner to avoid and/or minimize harm to the Kbb (e.g. through appropriate timing of activities, selective routing and siting of projects, etc) and maintain, enhance, and/or restore Kbb Habitat.

Old Definition: Short-term take is an impact to occupied Karner blue butterfly habitat resulting from land management or land use activities, which provides habitat disturbance that renews declining habitat and/or creates new habitat to replace habitat lost to succession or as a result of a management activity. Short-term take is conducted following approved conservation measures in the HCP in a manner to avoid and/or minimize harm to the KBB (e.g. through appropriate timing of activities, selective routing and siting of projects, etc.) and maintain, enhance, and/or restore KBB habitat. Such short-term impacts allow Kbb survival or the restoration and reoccupation of the site within five years.

Site: A spatially explicit, relatively homogeneous portion of land characterized by specific physical and chemical properties that affect ecosystem functions, and where a more or less homogeneous vegetative type may be expected to develop or persist.

Site Preparation: Hand or mechanized manipulation of a site, designed to enhance the success of regeneration. Treatments may include bedding, burning, chemical spraying, chopping, disking, raking, and scarifying and are designed to modify the soil, litter, or vegetation and to create microclimate conditions conducive to the establishment and growth of desired species.

Subpopulation (local population): A self-reproducing population of Karner blue that is associated with a site / area (KBB Recovery Plan).

Thinning: A cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality.

Timber Harvest: The process of gathering a timber crop. It includes felling, skidding/forwarding, on-site-processing, and removal of products from the site.

Timber Stand Improvement (TSI): For the purposes of this user's guide TSI means a non-commercial intermediate treatment made to improve stand composition, structure, condition, health and/or growth.

Take: To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage.

Unit: A defined management area incorporating a portion of or the entire property of an occupied Kbb site.

Weeding: A release treatment in stands not past the sapling stage that eliminates or suppresses undesirable vegetation (including shrubs and herbs) regardless of crown position.

VII. Referenced Documents



Wisconsin Karner Blue Butterfly Habitat Conservation Plan

Appendix F: Glossary of Terms and Acronyms

This glossary is intended to clarify technical terms and acronyms and provide a context in which words with unclear or multiple connotations are used.

Adaptive management: A formal, structured approach to dealing with uncertainty in natural resource management, using the experience of management as an ongoing, continually improving process; the underlying operating principle of the Wisconsin Statewide Karner blue Butterfly Habitat Conservation Plan.

Articles of Partnership: Partners' goals and operating rules and procedures. All Full HCP Partners agree to follow the Articles.

Audit (compliance): independent evaluation of various aspects of partner performance under their legally-binding conservation agreements.

Autecology: the ecology of a species or of individual organisms in relation to the environment. (see also "synecology")

Barrens: areas of sandy soil that are dominated by grasses, low shrubs, and small trees, and are subject to frequent disturbance. In general, the barrens community takes the form of pine barrens in northern and central Wisconsin and oak barrens in southern and west-central Wisconsin. Bracken grasslands are also part of the barrens community.

Biological opinion: a document which includes: (1) the opinion of the USFWS as to whether or not a federal action is likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat; (2) a summary of the information on which the opinion was based; and (3) a detailed discussion of the effects of the action on listed species or designated critical habitat.

Biological Recovery Zone: Biological Recovery Zones (BRZ's) are areas including and around recovery properties (all) which constitute and/or support the same metapopulation on and around the recovery property. This can include areas of known or high probability habitat such as dispersal corridors, living corridors, open habitat and forested land that has a Kbb probability class equal to or greater than 50% and that are spatially located and could likely support viable habitat associated with the recovery property metapopulation.

Biotope: a region with uniform environmental conditions, as well as populations of plants and animals.

Bivoltine: a species that completes two generations per year.

Compensatory mitigation: a form of mitigation in which impacts are compensated for by replacing or providing substitute resources or environments; land banking a particular habitat type; one of four conservation strategies being applied in the statewide HCP.

Canopy: the coverage of branches and foliage formed collectively by the crowns of trees or shrubs.

Canopy cover: the proportion of overstory (trees) or understory (shrubs) canopy that blocks out sunlight.

Cause and Effect Monitoring (C-E): Used to assess the effects of a management activity

Changed circumstances: changes in circumstances affecting a species covered by an HCP and ITP that can be reasonably anticipated by the plan developers during plan development and negotiation. (see also "unforeseen circumstances")

Congressional Federal Register (CFR): the official publication and proceedings of the United States Congress.

Conservation agreement: legally-binding contract between the DNR and HCP partners outlining lands and activities included in the Karner blue butterfly conservation effort, public outreach and education efforts partners agree to implement, partner monitoring, reporting, and auditing responsibilities, the period for which the agreement binds the partners, and partner obligations to modify land management practices through adaptive management. Conservation agreements form the basis of the DNR's application for a statewide incidental take permit; also called a "species and habitat conservation agreement."

DATCP: the Wisconsin Department of Agriculture, Trade and Consumer Protection, a state agency; an HCP partner.

Dispersal: both the movement of individuals between and within habitat sites.

Dispersal corridor: a corridor of open canopy through woodlands, connecting areas of suitable habitat and/or subpopulations.

Disturbance: activities, such as burning, mowing, or tree harvesting, that interrupt natural plant

succession and allow for early successional species to persist or colonize an area.

DNR: the Wisconsin Department of Natural Resources, a state agency; an HCP partner and the lead applicant for an incidental take permit.

Driftless Area: a region that includes southwestern Wisconsin, and immediately adjacent parts of Illinois, Iowa, and Minnesota. Continental ice sheets during the Pleistocene Epoch surrounded this area, but did not cover it.

Easement: a right, such as a right-of-way, to make use of the real property of another.

Ecosystem: a biotic community and its abiotic environment, considered together as a unit. Ecosystems are characterized by energy flow that leads to trophic structure and material cycling (exchange of matter between living and nonliving parts); short for ecological system.

Ecosystem management: a system to assess, conserve, protect, and restore the composition, structure, and function of ecosystems, to ensure their sustainability across a range of temporal and spatial scales and to provide desired ecological conditions, economic products, and social benefits; a management philosophy adopted by the DNR.

Element occurrence (EO): a discrete record of occupation as tracked by the DNR's Natural Heritage Inventory database; some occurrences may be combined into single populations or metapopulations pending further research on dispersal and behavior.

Endangered species: under federal law, any species or subspecies which is in danger of extinction throughout all or a significant portion of its range; under Wisconsin law, any species whose continued existence as a viable component of the state's wild animals or plants is determined by the DNR to be in jeopardy on the basis of scientific evidence.

Endangered Species Act (ESA): law enacted by the U.S. Congress in 1973 to protect plant and animal species that are in danger of, or threatened with, extinction.

Environmental assessment (EA): a public document that briefly provides evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; a document prepared to comply with the Wisconsin Environmental Policy Act.

Environmental impact statement (EIS): a public document that provides an analysis of potential impacts of actions which potentially significantly affect the human environment; a document required by Section 102(2)(C) of the National Environmental Policy Act or by the Wisconsin Environmental Policy Act.

Exotic species: flora or fauna that are imported or not naturally occurring in a particular region, such as Wisconsin.

Extirpation: the elimination of a species from a particular area.

Federally-listed species: a plant or animal species listed as endangered or threatened by the USFWS under the federal ESA.

Forest land: an area of which at least one acre in size and contains at least ten percent tree cover.

Fragmentation: the breaking up of large and continuous ecosystems, communities, and habitats into smaller areas surrounded by altered or disturbed land or aquatic substrate.

Full Partner: land owners and managers that enter into an SHCA that do not meet the criteria for being a Limited Partner or the Voluntary (unregulated) Category.

Geographic information system (GIS): a system of computer hardware and software that can input, manipulate, and analyze large amounts of geographically referenced data to support decision making processes.

Habitat conservation plan (HCP): a formal plan, prepared pursuant to Section 10 of the federal Endangered Species Act, that specifies what the effects of landowner activities are likely to have on listed species, the measures that will be taken to minimize and mitigate these effects, the funding available to implement the measures, the alternatives that the applicant considered and reasons why such alternatives were not implemented, and any other measures the USFWS may require; Chapters I and II of this document.

Harass: an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

Harm: an act which actually kills or injures wildlife.

HCP: habitat conservation plan; a plan prepared under Section 10(a) of the Endangered Species Act. (see "habitat conservation plan")

Herbicide: a chemical use to control unwanted plants.

High potential range (HPR): the region of Wisconsin containing all Karner blue butterfly

documented element occurrences and extending beyond the documented range to include areas with similar habitat, soils, and climate, where the Karner blue butterfly is most likely to occur.

Implementing agreement (IA): legally-binding agreement between the USFWS and the applicant for an incidental take permit under Section 10(a) of the Endangered Species Act; in this conservation effort, an agreement between the USFWS and the DNR.

Implementation Oversight Committee (IOC): a subset of HCP partners and non-partner cooperators which primarily exists to represent the partners' interests during the permit period; an institutional structure that advises the DNR, makes decisions on behalf of the partners, actively plans and provides services, and makes HCP-related recommendations to the partnership and the DNR.

Incidental take: take of a federally-listed species which occurs incidental to, and is not the purpose of, other legal activities.

Incidental take permit (ITP): a permit issued by the USFWS, under Section 10 of the ESA, which allows the incidental take of an endangered species.

Incidental take statement (ITS): an authorization by the USFWS to a federal agency for a determined amount of take of a federally-listed species.

Inclusion: the process, outlined in the HCP, of obtaining Incidental Take Permit coverage.

Intentional take: an activity which results in the take of a federally-listed species which is not incidental to other legal activities (i.e. a violation of Section 9 of the ESA).

Known habitat: those areas that have been surveyed and in which wild lupine has been found in an abundance which can support Karner blue butterflies.

Known-occupied habitat: an area that currently supports Karner blue butterflies in association with wild lupine.

Land conversion: the change of land from rural or low intensity uses to urban or high intensity uses, such as agricultural land developed for a subdivision.

Landscape: an area composed of adjacent and interacting ecosystems that are related because of geology, land forms, soils, climate, biota, and human influences.

Landscape planning: planning at the landscape scale to allow for analysis and improvement of management activities that sustain ecosystem capability and achieve ecosystem management

objectives.

Larvae: the wingless, early stage of a newly hatched insect before undergoing metamorphosis; caterpillar.

Limited Partner: County Highway Departments and townships engaging in road ROW management activities that become HCP Partners by signing a SHCA.

Local population: a group of individuals living in the same habitat patch, a continuous area of resources specific to the species surrounded by unsuitable habitat.

Management with consideration: a level of conservation focus in which the biological goal is for Karner blue butterfly habitat gains to equal or exceed losses occurring through natural succession or otherwise.

Management to feature and enhance: a level of conservation focus in which the biological goal is for Karner blue butterfly habitat gains to equal or exceed losses. Additional measures are taken, however, to promote viable Karner blue butterfly populations despite potential economic costs.

Metapopulation: a population of populations; each individual population within a metapopulation is referred to as a local population. Several metapopulation models have been suggested (e.g., Boorman and Levitt 1973, Gilpin and Hanski 1991, Thomas 1995)

Mitigation: methods of reducing adverse impacts of a project by: (1) limiting the degree or magnitude of the action and its implementation; (2) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (3) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or (4) compensating for the impact by replacing or providing substitute resources or environments.

Morphology: the form and structure of an organism or any of its parts.

National Hierarchical Framework of Ecological Units: an information system defining the landscape as ecological units with particular physical and biological components.

Natural Heritage Inventory (NHI): an integrated system of computer databases, maps, and manual files that document the historical and current occurrence of rare plants, animals, and natural communities in Wisconsin. The Natural Heritage Inventory is maintained by the DNR's Bureau of Endangered Resources.

National Environmental Policy Act (NEPA): a federal law, enacted by the U.S. Congress in

1969, which establishes the nation's environmental policy, sets goals, and provides means for carrying out the policy. (PL 91-190, 42 USC 4321-4347 [January 1, 1970] as amended by PL 94-52 [July 3, 1975], and PL 94-83 [August 9, 1975]).

Native species: flora or fauna naturally occurring in a particular region, such as Wisconsin.

Natural Resource Conservation Service (NRCS): the Federal agency that works in partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources.

Nongame species: any species of wild animal not classified as a game fish, game animal, game bird, or furbearing animal in s. 29.01, *Wis. Stats.* Nongame animals include a wide variety of protected and unprotected species.

Nonpoint source pollution: pollution occurring in which the sources cannot be traced to a single point such as a discharge pipe. Nonpoint water pollution sources include soil erosion from farmland, forestry, and construction sites, chemicals from urban streets, and nutrients from storage piles and barnyards.

Nonvoluntary coverage: non-partner landowners and land users involved in activities and in locations that may significantly affect the Karner blue butterfly are required to obtain coverage for their actions by acquiring a Certificate of Inclusion as either a single project or as a partner.

"No Surprises" rule: USFWS rule, titled "Habitat Conservation Plan Assurances" and dated February 23, 1998 (CFR 63(35):8859-8873), intended to provide economic and regulatory certainty for non-federal property owners with approved and properly implemented HCPs in the event of "unforeseen circumstances." (see also "changed circumstances" and "unforeseen circumstances")

One-time Permittee: non-partners who do not manage land and only seek incidental take authority for permanent take for a single project.

Overstory: the layer of vegetation in the woodland setting that consists of the tree cover.

Participant: any parties desiring involvement in the Wisconsin Statewide Karner Blue Butterfly HCP process, but not wishing to be partners.

Partner: a landowner or user desiring to be included into the Karner blue butterfly conservation strategy for the term of the ITP; more than likely, a landowner or user intending to engage in various uses or activities over time on larger land holdings (e.g., large forest owner or entity engaged in right-of-way construction or maintenance). A partner is responsible to abide by the

HCP Articles of Partnership, enter into a conservation agreement with the DNR, and perform duties and responsibilities as required of other partners.

Partner group: a subdivision of the general partnership of this HCP in which those included have similar characteristics, such as land management practices or conservation strategies (e.g., forest industry, utilities, etc.).

Partnership: the public and private entities involved in the application to renew the incidental take permit, as well as future entities applying for and obtaining partner status.

Permanency of Habitat (POH): Permanency of Habitat is a category of management strategies whereby a habitat site receives periodic disturbance on a short enough rotation schedule that the site is maintained at a successional stage where it is continuously in a state of viable habitat for Kbb. Management strategies include savanna/barrens management, roadside and utility corridor right-of-way maintenance, recreational trail maintenance, etc.

Permanent take: an impact to Karner blue butterfly habitat, through land management or land use activities, that precludes Karner blue butterfly occupation of the site for a minimum of five years. Such long-term impact involves taking that does not allow for the restoration and reoccupation of the site for a minimum of five years. Activities or projects that may fall within the definition of permanent take include, but are not limited to:

- construction of roadways and parking lots;
- construction of buildings or structures and associated facilities;
- other construction or development projects that cover or replace the habitat in a permanent manner (at least 5 years), such as an airport or a flowage; and
- residential housing developments. [Note: This category does not include a permanent or second home and associated structures that are owned or built by the owner for his or her own use. This provision applies only to those housing developments approved after the date of permit issuance.]

Pesticide: a chemical used to control unwanted insects or plants.

Potential range/habitat: habitat that will meet certain biotic and abiotic conditions to support wild lupine at any point in time, but not currently doing so.

Pupae: the inactive stage of metamorphosis of many insects, following the larval stage and preceding the adult form.

Recovery: activities, under the provisions of Section 4 of the ESA, engaged in with the intent of recovering a population of an endangered or threatened species.

Recovery plan: a plan developed under Section 4 of the ESA for the conservation and recovery of a federally-listed species; a federal responsibility.

Right-of-way (ROW): the strip of land over which facilities such as highways, railroads, or power lines are built that is usually a leased right of passage over the property of another.

Roundwood: logs, bolts, and other round sections cut from trees (including chips from roundwood).

Sampling: the process of selecting a set of elements to estimate the characteristics of a population.

Sand prairie: a community consisting of xeric prairie vegetation that is dominated by sandy soils.

Savanna: a community that was historically part of a larger ecotone complex bordered by the prairies of the west and the deciduous forests of the east. This ecotone was a mosaic of plant community types that represented a continuum from prairie to forest. Savannas were the communities in the middle of this continuum. Characteristically, savannas have less than fifty percent crown cover.

Saw logs: the central stem between the stump and the top portion of a tree; saw logs are harvested for industrial roundwood products.

Senescent: a plant at the stage from maturity to dormancy or death.

Shifting mosaic (SM): a land management strategy where, for this HCP, habitat patches appropriate for the Karner blue butterfly are shifted across the broader landscape to allow for colonization from older patches as they are lost to natural succession. Land management activities would plan disturbance patterns in accordance with this concept.

Silviculture: the theory and practice of controlling the establishment, composition, growth, and quality of forest stands in order to achieve management objectives.

Short-term take: is an impact to occupied Karner blue butterfly habitat resulting from land management or land use activities, which results in habitat disturbance that renews declining habitat and/or restores habitat to replace habitat lost to succession or as a result of a land use activity. Short-term take is conducted following approved conservation measures in the HCP in a manner to avoid and/or minimize harm to the KBB (e.g. through appropriate timing of activities, selective routing and siting of projects, etc.) and maintain, enhance, and/or restore KBB habitat.

Such short-term impacts allow Kbb survival and/or the restoration and reoccupation of the site within five years. Activities or projects that may fall within the definition of short-term take include, but are not limited to:

- mowing of roadside rights-of-way
- repairing roadside ditches to restore proper drainage
- roadside ROW improvements
- brush removal along utility corridors
- forest management practices
- conservation management, e.g. mowing and brushing for wildlife management, herbicide applications, prescribed burning, etc.
- pipeline and road construction, electrical and cable installations, and other construction and development projects that DO NOT cover or replace the habitat in a permanent manner (see definition of permanent take) and allow for habitat restoration and Kbb re-occupation within 5 years.

Single project permittee (aka one-time permittee): a landowner or user confronted with the presence of Karner blue butterflies regarding a project, but not expecting to address the issue on a long-term basis or on other lands or regarding other activities (e.g., development of a commercial establishment).

Special concern species: species that appear to be threatened because they are uncommon, restricted to unique or highly specialized habitat, or vulnerable to loss for various reasons; a classification used by the DNR for management purposes, but which is not defined in state statute or administrative code and therefore has no regulatory significance.

Species and habitat conservation agreement (SHCA): A legally-binding agreement between the Wisconsin DNR and an HCP partner outlining the specific conservation strategies which the partner will undertake as a condition of the statewide incidental take permit coverage. Referred to in this HCP as a conservation agreement. (see also "conservation agreement")

Spring flight: the first and smaller of the two Karner blue butterfly flight periods in Wisconsin. Karner blue butterfly eggs overwinter and hatch in the spring; adults emerge in late spring to early summer (between May and late June).

State-listed species: a plant or animal species listed as endangered and threatened by the Wisconsin DNR under the state endangered species laws.

Succession: progressive changes in species composition, organic structure, and energy flow of a natural community over time.

Summer flight: the second and larger of the two Karner blue butterfly flight periods in Wisconsin, occurring between early July and mid-August.

Synecology: the study of the environmental interrelationships among communities or organisms. (see also "autecology")

Take: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.

Tension zone: the most pronounced environmental gradient in Wisconsin; located in a narrow band that runs from northwestern to southeastern Wisconsin. Many species of plants and animals reach the limit of their ranges in this zone. Although climate is a major reason for the tension zone, soil type and other factors also play a role.

Threatened species: under federal law, any species or subspecies which is likely within the foreseeable future to become endangered throughout all or a significant portion of its range; under Wisconsin law, any species which appears likely, within the foreseeable future, on the basis of scientific evidence to become endangered.

Timberland: forest lands capable of growing at least 20 cubic feet of commercial wood per year.

Understory: vegetative growth under the canopy layer on a woodland site.

Unforeseen circumstances: changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by the plan developers, at the time of the HCP's negotiation and development, and that result in a substantial and adverse change in the status of the covered species; generally, catastrophic events of unprecedented nature. (see also "No Surprises" rule and "changed circumstances")

U.S.D.A.: the United States Department of Agriculture, a federal agency

USFWS: the United States Fish and Wildlife Service, a federal agency; agency with responsibility for implementing and enforcing provisions of the Endangered Species Act.

U.S.G.S.: the United States Geological Survey, a federal agency.

Viable population (VP): a population that is of sufficient size and distribution to be able to persist for a long period of time in the face of demographic variations, random events that influence the genetic composition of the population, and fluctuations in environmental conditions, including catastrophic events.

Vehicle miles of travel (VMT): a measure of traffic and highway use; the total number of miles travelled in one year

Voluntary coverage: those non-partner landowners that are not required to obtain a Certificate of Inclusion and are covered in the Wisconsin Statewide Karner Blue Butterfly HCP and ITP without further process.

Watershed: the land area that drains into an individual lake or river.

Wisconsin Environmental Policy Act (WEPA): a state law designed to encourage environmentally sensitive decision making by state agencies (s. 1.12, *Wis. Stats.*). This law describes Wisconsin environmental policy and requires state agencies to consider the environmental effects of their proposed action to the extent possible under their other statutory authorities.

Wis. Adm. Code: Wisconsin Administrative Code; a compilation of rules made by state agencies having rule-making authority; a component of Wisconsin state law.

Wis. Stats.: Wisconsin Statutes; Wisconsin's state laws.

Appendix H: Consultation Letters and Responses

The table contains an inventory of the agency consultation letters and responses that are provided in this appendix.

Agency	Date sent to Agency	Date of Response
USFWS: Re: Threatened and Endangered Species and Wetlands	February 29, 2012	May 9, 2012
WDNR Endangered Species Request	August 27, 2012	October 8, 2012
WDNR Re: Concurrence on impacts to state-listed T&E / Summary of Project Site Visit	November 30, 2012	November 30, 2012
Wisconsin Historical Society (Phase I)	November 26, 2012	January 17, 2013
Wisconsin Historical Society (Phase II)	June 24, 2013	June 28, 2013
USDA NRCS Re: Prime Farmland and Soils	October 9, 2012	December 27, 2012
DATCP Re: Agricultural Impact Statement	October 9, 2012	October 11, 2012
USACE Re: Wetland Discharges (Phase I)	May 10, 2013	June 21, 2013

The table below provides a cross-reference of the attachments included with each agency letter. The attachments listed below are provided at the end of this appendix.

Attachment	USFWS Re: T&E ¹ Species and Wetlands	WDNR Endangered Species Review Request	WDNR Re: Concurrence on impacts to state-listed T&E ¹	Wisconsin Historical Society	USDA NRCS Re: Prime Farmland and Soils	DATCP Re: Agricultural Impact Statement
Aerial Base Map		✓			✓	✓
Water Resources		✓				
Wetland Indicator Soil (Hydric Soils)		✓				
Topographic Map		✓				
Prime Farmland Map					✓	✓
Land Cover					✓	✓
Sheet maps showing Project Route ²		✓				
Photo Log		✓				

¹T&E: Threatened and Endangered

² Sheet maps provided to WDNR can be viewed in Appendix A

USFWS Coordination re: Threatened and Endangered Species and Wetlands



February 29, 2012

Pete Fasbender
Supervisor
Fish and Wildlife Service
Wisconsin Field Office
2661 Scott Tower Drive
New Franken, WI 54229

Dear Mr. Fasbender:

SUBJECT: Rebuild of 76 miles of an existing 69 kV Transmission Line in Central Wisconsin

Dairyland Power Cooperative is in the process of preparing an environmental assessment (EA) for the Rural Utilities Service for rebuilding 76 miles of 69 kV transmission line in Trempealeau, Jackson, Eau Claire, and Clark Counties, in central Wisconsin. These facilities will serve customers Riverland, Eau Claire, Clark and Taylor Electric Cooperatives. Dairyland proposes to build the project in three phases from 2012-2015.

Dairyland requests your office to review the proposed projects for possible impacts to 100-year flood plains, wetlands, and other important natural resources that occur within the project area. We have included an environmental screening report with the maps of the project area. We request a list of any listed or proposed threatened or endangered species and designated or proposed critical habitat that may be present. Please provide any recommendations you may have to mitigate or avoid these impacts.

Enclosed is a project description and maps showing the location of the existing transmission line. If you need further information or wish to discuss this project, please contact me at (608) 787-1432 or email me at cat@dairynet.com.

Sincerely,

DAIRYLAND POWER COOPERATIVE

Chuck Thompson
Mgr. Siting & Regulatory Affairs

CAT:msc

Attachments

H:\My Documents\word\Letters\Forest FWS.doc

A Touchstone Energy® Cooperative



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Green Bay ES Field Office
2661 Scott Tower Drive
New Franken, Wisconsin 54229-9565
Telephone 920/866-1717
FAX 920/866-1710

May 9, 2012

Mr. Chuck Thompson
Dairyland Power Cooperative
2300 East Ave. S.
P.O. Box 817
La Crosse, Wisconsin 54602-0817

re: Rebuild of 76 miles of existing 69 kV
Transmission Line
Various Sites
Central Wisconsin

Dear Mr. Thompson:

The U.S. Fish and Wildlife Service (Service) has received your letter dated February 29, 2012, requesting comments on the subject project. The project involves the replacement of 76 miles of an existing 69 kV Transmission line located at various sites in Central Wisconsin. We have reviewed the information provided in your letter and our comments follow.

Federally-Listed Species, Proposed and Candidate Species, and Critical Habitat

A portion of the proposed project is within the high potential range of the Karner blue butterfly (*Lycaeides melissa samuelis*), a federally-listed endangered species in Wisconsin. Additionally, there are known occurrences of the butterfly within the project area. Habitat for the Karner blue butterfly includes dry sandy prairie, oak savanna, and jack pine areas; it can also be found in dry sandy open scrub-shrub or forested habitats along roadways and utility rights-of-ways, and in forest openings. For more information on the Karner blue you can go to the following websites: <http://dnr.wi.gov/forestry/karner/> and <http://www.fws.gov/midwest/Endangered/insects/kbb/index.html>.

As recommended, surveys for wild lupine (*Lupinus perennis*), the host plant of the Karner blue butterfly, were conducted within the project area. In those areas where lupine was found, surveys were conducted for the presence of the Karner blue butterfly. There were several locations along the N-3 route where occurrence of the Karner blue was confirmed. However, you have committed to following designated protocols in rebuilding the existing line, which includes construction of the new line during the winter and limiting vehicles parking to the road (in areas where the Karner blue butterfly and/or associated habitat is present). If this protocol is followed, we would not expect impact to the Karner blue butterfly or their associated habitat.

Wetlands and Streams

We note that the project area may include wetlands. In refining and selecting project alternatives, efforts should be made to select an alternative that does not adversely impact wetlands. If no other alternative is feasible and it is clearly demonstrated that project construction resulting in wetland disturbance or loss cannot be avoided, a wetland mitigation plan should be developed that identifies measures proposed to minimize adverse impacts and replace lost wetland habitat values and other wetland functions and values. Any project that impacts wetlands or waterways, including seasonally ephemeral and intermittent streams, should include design features such as culverts to retain hydrological connection between areas fragmented by the project.

We appreciate the opportunity to respond. Questions pertaining to these comments can be directed to Ms. Jill Utrup 920-866-1734.

Sincerely,

Betsy M. Galbraith
For
Peter J. Fasbender
Field Supervisor

WDNR Endangered Species Review Request



August 27, 2012

Shari Koslowsky
Office of Energy
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707

Re: Dairyland Power Cooperative Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild Project

On behalf of Dairyland Power Cooperative (DPC), Tetra Tech requests a Voluntary Expedited Endangered Resources Review for the proposed Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild Project (Project) in Clark, Eau Claire, Jackson, and Trempealeau counties, Wisconsin.

Project Description

Dairyland Power Cooperative (DPC) is proposing to construct the Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild Project (Project). The Project consists of rebuilding approximately 58 miles of existing 69-kilovolt (kV) transmission line between the Strum Tap in Trempealeau County and Lublin Substation in Clark County. The proposed Project would also cross through Jackson and Eau Claire counties. DPC is proposing to rebuild the 58-mile-long transmission line between the Strum Tap and Lublin Substation within the existing 80-foot transmission right-of-way (ROW). The rebuild of the N-3 transmission line is needed so that DPC can continue to provide reliable service to the area.

DPC is proposing to request financing from Rural Utilities Service (RUS) to fund the proposed Project. An Environmental Analysis (EA) is being prepared to analyze potential impacts to the natural and human environments associated with the Project in order to comply with the National Environmental Policy Act of 1969 (NEPA) and 7 Code of Federal Regulations (CFR) Part 1794. In addition, DPC will follow U.S. Department of Agriculture/U.S. Department of Interior guidelines in "Environmental Criteria for Electric Transmission System" for substations, switching stations, and utility line and cable projects to the extent applicable and practicable.

The location of the proposed Project is shown on Figure 1 and Table 1-1 lists the townships, ranges, and sections crossed by the Project.

**Table 1-1:
Project Location**

State	County	Township	Range	Sections
Wisconsin	Trempealeau	24N	7W	19, 20, 17, 16, 15, 14, 13, 12
Wisconsin	Jackson	24N	6W	7, 8, 5
Wisconsin	Eau Claire	25N	6W	31, 30, 29, 28, 27, 26, 25, 24
Wisconsin	Eau Claire	25N	5W	19, 18, 7, 8, 9, 10, 3, 6, 5, 4
Wisconsin	Eau Claire	26N	5W	34, 27, 23, 24

**Table 1-1:
Project Location**

State	County	Township	Range	Sections
Wisconsin	Clark	26N	4W	19, 20, 17, 16, 15, 10, 11, 12, 1
Wisconsin	Clark	27N	4W	36, 25, 24
Wisconsin	Clark	27N	3W	19, 18, 7, 6
Wisconsin	Clark	28N	3W	31, 32, 33, 34, 27, 28, 21, 16, 15, 10, 9, 4,
Wisconsin	Clark	29N	3W	34, 33, 28, 27, 22, 21, 16, 9, 4, 3, 2, 1

Although the Project will be located within the existing 80-foot transmission line ROW, individual transmission structures will not be replaced in the existing structure. The new transmission structures will either be constructed adjacent to the existing structures or will be relocated depending on engineering and environmental factors including soil conditions, slope, maximum span length between transmission structures, and terrain. Once the new transmission line is in operation, DPC will remove the existing structures and will recontour and revegetate the disturbed areas to pre-construction conditions.

DPC is proposing to replace the existing single-pole wood transmission line structures with new single pole wood structures that would be approximately 60-80 feet tall with a span of approximately 300-400 feet. Approximately 140 single pole transmission structures would be constructed and would result in approximately 1,680 square feet of permanent impacts (up to 12 square feet per structure). Existing and new access roads will be used for construction and future inspections and maintenance. It is anticipated that all access roads will be permanent, so that structures can be accessed for inspections and maintenance if problems arise during operation.

Construction of the proposed Project is scheduled to take place in two phases. Construction will be phased to avoid impact to sensitive resources including threatened and endangered species and wetlands. Construction of the proposed Project is scheduled to take place in two phases: Phase I (between Strum Tap and Willard Tap) will be constructed between June 2012 and winter/spring 2013 and Phase II (Between Willard Tap and Lublin Substation) will be constructed between June 2013 and winter/spring 2014. The in-service date for the proposed Project is spring 2014. Construction will be phased to avoid impact to sensitive resources including threatened and endangered species, surface waters, and wetlands.

Landcover

National Land Cover Database was used to determine land use (see attached form), and this data was confirmed during an early August 2012 visit to the proposed Project route. The land use of the proposed route can be generally described in three segments. The northern third of the proposed Project route was observed to be located primarily adjacent to existing roadways in agricultural fields. The middle third of the proposed Project route was observed to be located primarily along existing roadways within County

forest land. Significant portions of the southern third of the proposed Project route were observed to run cross-county through agricultural fields.

Wetland Identification

Based on preliminary analysis, the proposed Project route includes several river crossings and a number of stream crossings with associated hydric soils (see the attached wetland indicator soils map and water resources map). Within the next several weeks, Tetra Tech plans is currently conducting a desktop analysis and field reconnaissance to further identify wetlands that would be crossed by the proposed Project. The desktop analysis will focus primarily on a review of the National Land Cover Database (NLCD 2006), the USFWS National Wetland Inventory (NWI), and the Wisconsin Wetland Inventory (WWI). All appropriate permits related to wetlands will be obtained prior to construction.

VEER Request

Habitat suitability assessments for rare species and natural communities have not yet been completed for the Project. DPC is currently coordinating with the U.S. Army Corps of Engineers to determine requirements under Section 404 of the Clean Water Act and will coordinate with the Wisconsin Department of Natural Resources to determine requirements under NR216 of the Wisconsin State Statutes.

Enclosed is a completed VEER review request form, the required attachments, photographs of the Project area, and Project resource maps (Figures 1 through 4) and sheetmaps showing the proposed route and alternative route segment.

If you have any questions or require additional information please do not hesitate to call or send an email.

Sincerely,



Carly Rowe

Project Manager, Environmental Planner

Office: (618) 343-2319

carly.collins@tetrattech.com

Attachments (7)

1. VEER review request form
2. Figure 1, Aerial Map of the Project Route
3. Figure 2, Water Resources Map
4. Figure 3, Topographic Map
5. Figure 4, Hydric Soils
6. Sheetmaps showing Project route
7. Photographs of Project area

Voluntary Expedited Endangered Resources (VEER) Reviews are a voluntary service offered to customers in a guaranteed turnaround time of 7 working days. You may still use the regular Endangered Resources (ER) Review Request process established in NR 29, Wis. Adm. Code, at a lower cost. The turnaround time for regular ER Reviews varies depending on workload and staffing.

Notice: A VEER Review of a proposed land development, management, planning, or similar type of project will provide the requester with information from Wisconsin's Natural Heritage Inventory (NHI) database and other sources on rare plants and animals, high quality natural communities, and other endangered resources that may be impacted by the proposed project. The VEER Review will also include specific recommendations to help projects comply with Wisconsin's Endangered Species Law (s. 29.604, Wis. Stats.) and other laws and regulations protecting endangered resources. Personal information collected will be used for administrative purposes and may also be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.)

Instructions: Before completing this form, please read the information on Page 3 regarding VEER Review service availability, processing, and fees. The following materials are required to process this request. Send all materials to the address above.

- Completed, signed form
- Map(s) delineating the project area, preferably a topographic map and digital orthophoto (aerial photo)
- Photographs that clearly show the project area, including natural features and vegetation present on site
- Additional relevant information and reports (e.g., detailed project and habitat descriptions, wetland delineation, site plans)
- Minimum fee due upon application, which covers up to three hours of time to complete the VEER Review. Make checks payable to the ER Review Program. Upon completion of the VEER Review, the requester will be invoiced for any additional time (in excess of the initial three hours) required to complete the VEER Review (see Page 3).

Section 1: Requester Information (VEER Review, correspondence and invoice will be sent to this person)

Name Carly Rowe		Organization Tetra Tech (consultant to Dairyland Power Cooperative)	
Mailing Address 1634 Eastport Plaza Drive		City Collinsville	State ZIP Code IL 62234
Telephone Number (618) 343-2319	FAX Number (618) 345-1281	Email Address carly.rowe@tetratech.com	
Preferred contact method: <input checked="" type="radio"/> Email <input type="radio"/> FAX			

Section 2: Landowner Information (if different than Section 1)

Name Chuck Thompson		Organization Dairyland Power Cooperative	
Mailing Address 3200 East Ave. S., P.O. Box 817		City La Crosse	State ZIP Code WI 54602
Telephone Number (608) 788-4000	FAX Number (608) 787-1241	Email Address cat@dairynet.com	

Section 3: Project Information

Project Name Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild	Project Address (if applicable) NA
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Project Types: Residential Commercial Industrial Other: Utility

Please see information on page 3 regarding projects that are not eligible for VEER Review service.

Start Date (on-site disturbance) Phase I: June 2013-Winter/Spring 2014	End Date (on-site disturbance) Phase II: June 2014-Winter/Spring 2015	Total Acreage see attached letter
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County: Eau Claire City Town Village of: Multiple, see attached letter

Township	Range	Direction	Section	Quarter Section	Quarter-Quarter Section	Additional Comments on TRS Location (attach additional information if necessary)
N		<input type="checkbox"/> E <input type="checkbox"/> W		<input type="checkbox"/> NW <input type="checkbox"/> NE <input type="checkbox"/> SW <input type="checkbox"/> SE	<input type="checkbox"/> NW <input type="checkbox"/> NE <input type="checkbox"/> SW <input type="checkbox"/> SE	Multiple, see attached letter
N		<input type="checkbox"/> E <input type="checkbox"/> W		<input type="checkbox"/> NW <input type="checkbox"/> NE <input type="checkbox"/> SW <input type="checkbox"/> SE	<input type="checkbox"/> NW <input type="checkbox"/> NE <input type="checkbox"/> SW <input type="checkbox"/> SE	

Provide a detailed description of the proposed project and associated disturbance, including acres to be disturbed. Attach additional pages as needed.

See attached letter

Voluntary Expedited Endangered Resources Review Request

Form 1700-047E (R 2/11)

Page 2 of 3

Section 3: Project Information, *continued*

Provide a detailed description of the habitat types and current land use within the project area (e.g., 50% in active agriculture-currently corn, 20% floodplain forest, 15% industrial area, 10% hardwood swamp dominated by black ash, 5% fallow field - in active agriculture until one year ago). Attach additional pages as needed.

National Land Cover Database was used to determine land use and this data will be confirmed during a field reconnaissance in early August. The Project route would cross approximately 50 percent developed land cover (identified as such due to proximity to road ROW), 20 percent cropland, 16 percent deciduous forest, 3 percent hay/pasture, 3 percent evergreen forest, 2 percent woody wetlands, 2 percent mixed forest, 1 percent herbaceous, 1 percent emergent herbaceous wetlands, and 1 percent shrub/scrub.

List all wetlands and waterbodies (e.g., rivers, intermittent streams, lakes, marshes) within one mile of the project area. List any known or suspected impacts of the proposed project to these wetlands and waterbodies. Indicate the location(s) of any point source discharge(s) into wetlands or waterbodies.

Pea Creek, Horse Creek, King Creek, Black Creek, Thompson Valley Creek, Black Creek, South Fork Buffalo River, Hay Creek, Surveyor Creek, Travis Creek, Diamond Valley Creek, Bridge Creek, Iron Run, North Fork Buffalo River, South Fork Eau Claire River, and other small, unnamed creeks occur within one mile of the Project area. Preliminary analysis shows that areas of hydric soils and Wisconsin Wetland Inventory wetlands occur within the transmission line right of way. Tetra Tech will further identify wetlands and waterbodies in upcoming desktop analysis and field reconnaissance.

List any reports that have been prepared to describe habitat that may be impacted by the proposed project (e.g., wetland delineation, habitat assessments, and rare species surveys). Attach copies if available.

No reports have been completed to date.

List any other project reports or correspondence concerning endangered resources. Include endangered resources reviews conducted by this or another agency (list log # and/or date issued) for this or a different phase of or alternative to the proposed project. Attach copies if available.

Dairyland Power Cooperative has sent a coordination letter to the U.S. Fish and Wildlife Service.

Section 4: Related Permits, Licenses or Regulatory Approvals

Permit, License or Approval	Issuing Agency, Program or Municipality	Contact Person	Status
See attached letter			<input type="checkbox"/> will be applying for <input type="checkbox"/> have applied for <input type="checkbox"/> have received
			<input type="checkbox"/> will be applying for <input type="checkbox"/> have applied for <input type="checkbox"/> have received
			<input type="checkbox"/> will be applying for <input type="checkbox"/> have applied for <input type="checkbox"/> have received

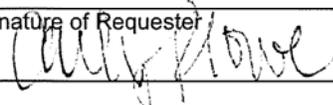
Section 5: Certification by Requester

I am the owner or authorized representative of the owner of the property for which I am requesting a Voluntary Expedited Endangered Resources (VEER) Review. To the best of my knowledge, the information I have provided is complete and accurate.

I understand that the requested VEER Review may contain NHI data and information (including specific locations of endangered resources) which are considered sensitive and are not subject to Wisconsin's Open Records Law (per s. 23.27, Wis. Stats.). I agree to use the information contained in the VEER Review solely for planning and implementation of the proposed project. As such, I agree to share information contained in the VEER Review only with individuals who need this information to carry out specific roles in planning and implementation of the proposed project. I agree to not reproduce or disseminate the VEER Review or the specific locations of endangered resources contained in the VEER Review to any other parties or individuals without prior written permission from the Bureau of Endangered Resources. (Please contact the Endangered Resources Review Program at 608-264-6057 if you have any questions about sharing information contained in the VEER Review.)

I have read and understand the information on Page 3 regarding VEER Review service availability, processing, and fees. I understand that the submitted project may not be eligible for a VEER Review, and that the DNR will contact me within 2 working days to inform me if a VEER Review can be completed for this project.

I am submitting with this form the minimum fee for the first 3 hours of staff time required to process this request. I also agree to pay, within 30 days of receipt of an invoice, the amount indicated on the invoice which covers any additional time (in excess of the initial three hours) required to complete the VEER Review.

Signature of Requester 	Date Signed 8/21/12	Name of Requester (Please Print) Carly Rowe
---	------------------------	--



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor
Cathy Stepp, Secretary

101 S. Webster St.
Box 7921
Madison, Wisconsin 53707-7921
Telephone 608-266-2621
FAX 608-267-3579
TTY 608-267-6897

October 8, 2012

Carly Rowe
Tetra Tech
1634 Easport Plaza Drive
Collinsville, IL 62234

SUBJECT: Endangered Resources Review (ERR Log # 12-643)
DPC – N3 Strum to Lublin

Dear Ms. Rowe,

The Bureau of Endangered Resources has reviewed the proposed project described in the Endangered Resources (ER) Review Request dated August 28, 2012. The ER Review for this proposed project is attached. Please keep in mind that the ER Review does not exempt the project from the requirements of state and federal endangered species laws. Rather, it is to be used as additional information to ensure that the project complies with both state and federal endangered species regulations. Additional consultation with the Department of Natural Resources (DNR) and/or US Fish and Wildlife Service may be necessary if follow-up actions are indicated.

The ER Review itself is divided into five sections: A) Location and brief description of the proposed project, B) Endangered resources recorded from within the project area and/or surrounding area, C) Follow-up actions, including those that need to be taken to comply with state and federal endangered species laws, D) Next steps, and E) Information about endangered resource protection.

This ER Review may contain [Natural Heritage Inventory data](#), including specific locations of endangered resources, which are considered sensitive and are not subject to Wisconsin's Open Records Law. As a result, please remember that the information contained in this ER Review may be shared only with individuals who need this information in order to carry out specific roles in the planning and implementation of the proposed project. Specific locations of endangered resources may not be released or reproduced in any publicly disseminated documents. To improve coordination regarding endangered resources issues for the proposed project, a copy of this ER Review will also be provided to individuals and DNR staff who may be involved in permitting, licensing, or approval of the proposed project.

The attached ER Review is for informational purposes and only addresses endangered resources issues. This ER Review does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.

Please contact me at (608) 261-4382 or via email at shari.koslowsky@wisconsin.gov if you have any questions about this ER Review.

Sincerely,

SENT BY E-MAIL

Shari Koslowsky
Utility and Energy Reviewer - BER

Enc: 12-643_uttn
cc: Cheryl Laatsch, OE-CO
Terry Donovan, Stormwater, Water Resources Engineer-CO
Chuck Thompson, DPC

12-643_uttn

**Endangered Resource Review for the Proposed DPC N3 69 kV Line, Strum to Lublin
(ERR Log # 12-643)**

Section A. Location and brief description of the proposed project

Based on information provided by in the ER Review Request form and attached materials, the proposed project consists of the following:

Rebuild of the N3 69 kV transmission line in the segment from the Strum Tap in Trempealeau County, through Eau Claire County to the Lublin Substation in Clark County. This segment of the rebuild is 58 miles long and the work will remain in the 80 foot ROW, except for access. The project is scheduled for completion from June 2013 to spring of 2015. The work consists of the removal and replacement of structures and reestablishment of the line along the entire Strum to Lublin segment (i.e., it is not a partial rebuild). The map provided in your submittal does not indicate access routes or the exact location of structures. Because of this lack of information and the protracted schedule, the follow-up actions described in Section C of this review are not as specific as they should be and present contingencies that may necessitate your contacting me to update or revise them prior to construction.

Details related to project location, design, and timing of disturbance are important for determining both the endangered resources that may be impacted by the project and any necessary follow-up actions. Please contact the ER Review Program whenever project plans change or new details become available to confirm if results of this ER Review are still valid.

Section B. Endangered resources recorded from within the project area and/or surrounding area

The attached tables identify Natural Heritage Inventory (NHI) occurrences for rare plant and animal species and natural communities within 2 miles of the line.

Natural Communities

Descriptions of the natural community occurrences listed on the attached tables may be found at: <http://www.dnr.state.wi.us/org/land/er/communities/>. The proximity of your project to the natural communities and natural resource areas listed below are an indicator to consider whether species that prefer these habitats may be present in the area impacted by your project.

- Alder thicket
- Central poor fen
- Emergent marsh
- Pine Barrens
- Northern sedge meadow
- Northern wet forest
- Southern sedge meadow
- Open bog
- Stream--fast, hard, cold

The project crosses or is adjacent to the following resource areas:

- [REDACTED]
- [REDACTED]
- [REDACTED]

Animals

Water Shrew (*Sorex palustris*), a state Special Concern mammal. This species is found in marshes, bogs, and cold, small streams with cover along the banks.

Prairie Vole (*Microtus ochrogaster*), a state Special Concern mammal. This species is found in dry grassy areas along fence lines and in open fields; sandy prairies and slopes, especially if weed or grass grown; abandoned farm fields; seldom in sparsely wooded areas. Preferred habitat seems to be native prairie sod, of which there is little left in the State. It avoids marshes and wet places. Semi-colonial, this species breeds throughout the year with a peak in July, August and September.

Wood turtles (*Glyptemys insculpta*), a Threatened species in Wisconsin, prefer clean rivers and streams with moderate to fast flows and adjacent riparian wetlands and upland deciduous forests. This species often forages in open wet meadows or in shrub-carr habitats dominated by speckled alder. They overwinter in streams and rivers in deep holes or undercut banks where there is enough water flow to prevent freezing. This semi-terrestrial species tends to stay within about 300 meters of rivers and streams but exceptions certainly occur, especially within the driftless area of southwestern and western Wisconsin. This species becomes active in spring as soon as the ice is gone and air temperatures reach around 50 degrees in March or April. They can remain active into mid-October. This species nests in sand or gravel, usually very close to the water, although it is known to nest along sand and gravel roads or in abandoned gravel pits some distance from water.

Blanding's turtles (*Emydoidea blandingii*) are listed as a Threatened species in Wisconsin. They utilize a wide variety of aquatic habitats including deep and shallow marshes, shallow bays of lakes and impoundments where areas of dense emergent and submergent vegetation exists, sluggish streams, oxbows and other backwaters of rivers, drainage ditches (usually where wetlands have been drained), and sedge meadows and wet meadows adjacent to these habitats. This species is semi-terrestrial and individuals may spend a good deal of time on land. They often move between a variety of wetland types during the active season, which can extend from early March to mid-October. They overwinter in standing water that is typically more than 3 feet in deep and with a deep organic substrate but will also use both warm and cold-water streams and rivers where they can avoid freezing. Nesting occurs from about mid-May through June depending on spring temperatures. They strongly prefer to nest in sandy soils and may travel well over a mile to find suitable soils.

Dusted skipper (*Atrytonopsis hianna*), a State Special Concern butterfly, has been found in dry, open sandy areas, dry prairie, pine barrens. Its host plants are Big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparius*). This species is univoltine with adults in flight from late May to early June in Wisconsin when few other skippers are present. Fully grown caterpillars hibernate and pupate in a sealed case 1-3 inches above the ground at the base of the host plant.

Persius dusky wing (*Erynnis persius*), a State Special Concern butterfly, has been found in pine/oak barrens and sand barrens. In the midwest, its host plant is wild lupine (*Lupinus perennis*). This is a univoltine species, with the flight period from mid May to early June. Eggs are laid singly under leaves. Larvae live and eventually hibernate in solitary nests on the plant. Pupation occurs the following spring.

Sand snaketail (*Ophiogomphus smithi*), a State Special Concern dragonfly, has been found in small to medium clean, fast-flowing sandy warm streams. The flight period extends from late May through mid June.

Bald Eagle (*Haliaeetus leucocephalus*), a bird listed as Special Concern in Wisconsin and Federally protected by the Bald & Golden Eagle Protection Act, prefers large trees in isolated areas in proximity to large areas of surface water, large complexes of deciduous forest, coniferous forest, wetland, and shrub communities. Large lakes and rivers with nearby tall pine trees are preferred for nesting.

Elktoe (*Alasmodonta marginata*), a State Special Concern mussel, is found in various-sized streams with flowing water, sand, gravel or rock substrates that are stable. The known host fishes include widespread species including redhorse, sucker species and rockbass.

Salamander mussel (*Simpsonaias ambigua*), a mussel presently listed as a Federal Species of Concern and Threatened in Wisconsin. In Wisconsin, this species is only found in mud, silt or sand substrates beneath medium to large-sized flat rocks and undercut ledges, where its host, the mudpuppy frequents. It occurs in both the [REDACTED] It can be very abundant locally, but extremely rare otherwise.

Karner Blue Federal High Potential Range

Fish and Buffalo River. The following special concern fish species are found in [REDACTED]

- *Etheostoma asprigene*, Mud Darter
- *Notropis texanus*, Weed Shiner
- *Opsopoeodus emiliae*, Pugnose Minnow

Plants

Missouri Rock-cress (*Arabis missouriensis*), a State Special Concern plant, is found in soil pockets on acidic cliffs, as well as in pine forests on sterile sand and gravel outwash plains. Blooming occurs late May through late June; fruiting occurs late June through late July. The optimal identification period for this species is late May through late June.

For additional information on the rare species, high-quality natural communities, and other endangered resources listed above, please visit our [Biodiversity](#) page.

Section C. Follow-up actions

If your project changes (e.g., a change in location, size, design, disturbance footprint and timing, or construction sequence), please call the ER Review Program to confirm if these results are still valid.

Actions that need to be taken to comply with state and/or federal endangered species laws:

[REDACTED] Your submittal indicates that there are several waterway crossings. Listed below are the waterways and wetlands associated with these species and the options for measures to avoid impacts. Please respond with an indication of which measures will be applied to this project by location so that we may complete verification as necessary during construction or assist you with any changes as the project progresses.

Wood turtle. [REDACTED]

No work within the waterway or adjacent shoreline at any time of year.

Complete work within 200 feet of the waterway from October 16 to March 7; or for work during the active period within 200 feet of the waterway, but outside the adjacent shoreline, install exclusion fence prior to March 7 using protocols in the attached document. The fencing plan and locations should be submitted to me for concurrence prior to installation.

Additional habitat assessment may be completed during appropriate conditions and time of year to exclude areas from these requirements.

Blanding's turtle. [REDACTED]

Work may be performed in non-overwintering habitat (i.e., uplands and wetlands that are not inundated) from October 16 to March 7.

Install exclusion fencing for work within small wetland areas prior to March 7. The fencing plan and locations should be submitted to me for concurrence prior to installation.

No work within 900 feet of wetlands in suitable nesting habitat (sandy or gravelly, well-drained soils in open or semi-open canopy) from May 20 to October 15.

Additional habitat assessment may be completed during appropriate conditions and time of year to exclude areas from these requirements.

Salamander mussel. [REDACTED]

Actions recommended to help conserve Wisconsin's rare species and high-quality natural communities:

Karner blue butterfly. As a partner of the Wisconsin Statewide KBB HCP, Dairyland Power Cooperative, must follow specific management protocols developed for HCP partners. Surveys for lupine and KBB were recently completed for the project segment. Please provide a summary of any applicable management actions and locations where they will be applied to your project under the HCP.

bald eagle. This project is in the central part of the state and so I recommend applying the avoidance period from February 15 - July 1. The setback for activities near active bald eagle nests begins at 660 feet, but depends on visibility and other activities near the nest. Please see also the National bald eagle management guidelines for specific conditions and to determine if you may need a permit or contact me for further assistance. I have attached some 2011 eagle information, but data for 2012 are not available.

Special concern fish. Avoid disturbance within 50 feet of the [REDACTED] from mid-May to the end of July during the spawning season for special concern fish species. Although this is a voluntary action, based on the rare species evaluation, this waterway has important fisheries habitat and therefore, I also recommend that extreme care be taken to implement the most conservative erosion control measures, avoid the use of herbicides within 50 feet of the waterway and hand clear vegetation within the ROW.

Water shrew. [REDACTED]

Prairie vole. [REDACTED]

Special concern mussels. [REDACTED]

Remember that although these actions are not required by state or federal endangered species laws, they may be required by other laws, permits, granting programs, or policies of this or another agency. Examples include the federal Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, State Natural Areas law, DNR Chapter 30 Wetland and Waterway permits, DNR Stormwater permits, and Forest Certification.

Section D. Next Steps

1) Evaluate whether the **'Brief description of the proposed project'** is still accurate. All recommendations in this ER Review are based on the information supplied in the ER Review Request. If the proposed project has changed, please contact the ER Review Program to determine if the information in this ER Review is still valid.

2) Determine whether the project can incorporate and implement the **'Follow-up actions'** identified above:

'Actions that need to be taken to comply with state and/or federal endangered species laws' represent the Department's best available guidance for complying with state and federal endangered species laws based on the project information that you provided and the endangered resources information and data available to us. If the proposed project has not changed from the description that you provided us and you are able to implement all of the 'Actions that need to be taken to comply with state and/or federal endangered species laws', your project should comply with state and federal endangered species laws. Please remember that if a violation occurs, the person responsible for the taking is the liable party. Generally this is the landowner or project proponent. For questions or concerns about individual responsibilities related to Wisconsin's Endangered Species Law, please contact the ER Review Program.

If the project is unable to incorporate and implement one or more of the 'Actions that need to be taken to comply with state and/or federal endangered species laws' identified above, the project may potentially violate one or more of these laws. Please contact the ER Review Program immediately to assist in identifying potential options that may allow the project to proceed in compliance with state and federal endangered species laws.

'Actions recommended to help conserve Wisconsin's rare species and high-quality natural communities' may be required by another law, a policy of this or another Department, agency or program; or as part of another permitting, approval or granting process. Please make sure to carefully read all permits and approvals for the project to determine whether these or other measures may be required. Even if these actions are not required by another program or entity for the proposed project to proceed, the Department strongly encourages the implementation of these conservation measures on a voluntary basis to help prevent future listings and protect Wisconsin's biodiversity for future generations.

3) *Include only if federal species found in search:* If federally-protected species or habitats are involved and the project involves federal funds, technical assistance or authorization (e.g., permit) and there are likely to be any impacts (positive or negative) to them, consultation with USFWS will need to occur prior to the project being able to proceed. If no federal funding, assistance or authorization is involved with the project and there are likely to be adverse impacts to the species, contact the [USFWS Green Bay Field office](#) at 920-866-1717 for further information and guidance.

Section E. Endangered resource protections:

Species listed as Threatened or Endangered under Wisconsin's Endangered Species Law ([s. 29.604, Wis. Stats.](#)):

- State-listed animals (vertebrate and invertebrate) are protected on all lands and waters of the state
- State-listed plants are protected on public lands and on lands that the person does not own or lease, except in the course of forestry, agriculture or utility actions ([s. 29.604, Wis. Stats.](#)).

Species protected by the [Federal Endangered Species Act of 1973 as amended](#), including those federally-listed as Endangered or Threatened, those Proposed for federal listing, and their Proposed or Designated Critical habitats:

- Federally-protected animals are protected on all lands.

- Federally-protected plants are protected on federal lands and in the course of projects that include federal funding. They are also protected on other lands if they are removed, cut, dug up or damaged in knowing violation of any law or regulation of any state or in violation of a criminal trespass law.

Special Concern species, high-quality examples of natural communities (sometimes called High Conservation Value areas), and unique natural features (e.g., caves and animal aggregation sites) are not legally protected by state or federal endangered species laws. However, other laws, policies (e.g., related to Forest Certification or master planning), or granting/permitting processes may require or strongly encourage protection of these resources. The main purpose of the Special Concern classification is to focus attention on species about which some problem of abundance or distribution is suspected before they become endangered or threatened.

State Natural Areas (SNAs) protect outstanding examples of Wisconsin's native landscape of natural communities, and significant geological formations. Endangered species are often found within SNAs. SNAs are protected by law from any use that is inconsistent with or injurious to their natural values ([S. 23.28, Wis. Stats.](#)).

Thank you for helping to protect Wisconsin's endangered resources! Please contact the ER Review Program if you have any questions about this ER Review.



November 30, 2012

Ms. Shari Koslowsky
Bureau of Endangered Resources
Wisconsin Department of Natural Resources
101 South Webster Street
Box 7921
Madison, Wisconsin 53707-7921

Subject: Summary of October 11, 2012 Project Visit
DPC – N3 Strum to Lublin

Dear Ms. Koslowsky:

Tetra Tech has prepared this letter to summarize your October 11, 2012 visit to the proposed Dairyland Power Cooperative (DPC) N3 Strum to Lublin transmission line project location. The visit served as follow-up to your October 8, 2012 letter, which detailed the results of the Endangered Resources (ER) Review for the proposed project. The ER Review specified actions that need to be taken to comply with state and/or federal endangered species laws. These actions included measures to avoid impacts to the wood turtle and the Blanding’s turtle, which are both present in the project area.

According to the ER Review, wood turtle occurs in Black Creek and Bridge Creek and their perennial tributaries, and Blanding’s turtle occurs in the S. Fork Eau Claire River, Hay Creek, Cameron Creek, Pea Creek, Scott Creek, Sterling Creek, and adjacent wetlands. During the site visit, proposed crossings of these waterways were visited and potential habitat for the two turtles was evaluated. Additional waterways without prior wood turtle or Blanding’s turtle records were also evaluated during the site visit. Table 1 summarizes the DNR’s recommendations or requirements to avoid impacts to the wood turtle and/or Blanding’s turtle that were communicated during the site visit.

Table 1. Summary of October 11, 2012 Waterway Crossing Evaluation

Table with 2 columns: Waterway Crossing and Finding. The table contains four rows of data, with the first column being redacted with a black box.

Waterway Crossing ¹	Finding
[REDACTED]	No concerns; no waterway crossing observed in mapped location.
[REDACTED]	The DNR recommends that DPC complete work within 200 feet of the waterway from October 16 to March 7; or for work during the active period within 200 feet of the waterway, but outside of the adjacent shoreline, use a combination of monitoring and exclusion fencing prior to March 7 using DNR protocol.
[REDACTED]	No concerns due to winter construction.
[REDACTED]	The DNR recommends that DPC complete work within 200 feet of the waterway from October 16 to March 7; or for work during the active period within 200 feet of the waterway, but outside of the adjacent shoreline, use a combination of monitoring and exclusion fencing prior to March 7 using DNR protocol.
[REDACTED]	The DNR recommends that DPC complete work within 200 feet of the waterway from October 16 to March 7; or for work during the active period within 200 feet of the waterway, but outside of the adjacent shoreline, use a combination of monitoring and exclusion fencing prior to March 7 using DNR protocol.
[REDACTED]	No concerns, inadequate hydrology.
[REDACTED]	No concerns, inadequate hydrology.
[REDACTED]	No concerns; dry creek bed observed.
[REDACTED]	Pole location north of waterway crossing will likely be located in an agricultural field; however, the pole location south of the waterway crossing may be located in riparian habitat. Complete work within 200 feet of the waterway from October 16 to March 7; or for active work during the active period within 200 feet of the waterway and in riparian habitat, but outside of the adjacent shoreline, install exclusion fence prior to March 7 using DNR protocol.
[REDACTED]	No concerns due to narrow riparian and wetland corridor and limited habitat.

¹ Sheet number indicates the field sheet map on which the crossings are depicted. Field sheet maps were provided to the DNR during the site visit.

Overall, Tetra Tech believes that no long-term impacts to existing habitat for threatened or endangered species is expected to result from construction of the proposed Project because the proposed Project is a rebuild of an existing transmission line within the same right-of-way (ROW) and transmission structures will be replaced at or near their existing positions. Table 2 describes the potential for impacts to the resources of concern to the WDNR-BER. Please note that Table 2 does not include those state-listed species for which no habitat was identified along the proposed ROW during field reconnaissance.

Table 2. State-Listed Species and Potential for Project Impact

Species	Status	Impact Probability Comments
Blanding's and wood turtles	Threatened	Low. Construction will occur during the inactive season where possible, and other protective measures will be applied as needed in coordination with the WDNR.
Fish and mussels	Various	Negligible. Waterways will be spanned.
Water shrew	Special Concern	Negligible. Waterways will be spanned.
Prairie vole	Special Concern	Negligible. This species may be present in habitat overlapping with the Karner blue butterfly. Measures to minimize ground disturbance in Karner blue butterfly habitat areas will also reduce impacts to prairie voles.
Persius dusky wing	Special Concern	Negligible. This species may be present in habitat overlapping with the Karner blue butterfly. Measures to minimize ground disturbance in Karner blue butterfly habitat areas will also reduce impacts to persius dusky wing.
Sand snaketail	Special Concern	Negligible. Waterways will be spanned.
Bald Eagle	Special Concern	Low. Protective measures can be applied as needed.

Tetra Tech understands that the DNR's recommendations or requirements for the project may change as more details concerning the project layout and construction schedule become available. However, we would appreciate your concurrence with the findings in the tables above. If you have any questions or concerns, please contact either Kate Schindler at (612) 643-2240 or Carly Rowe at (618) 343-2319.

Sincerely,



Kate Schindler
Biologist

Enclosures: Requested photo of Buffalo River crossing (sheet 2)



Davidson, Lori

To: Davidson, Lori
Subject: RE: Memo summarizing October 11th Site Visit

From: Koslowsky, Shari - DNR [<mailto:Shari.Koslowsky@Wisconsin.gov>]
Sent: Friday, November 30, 2012 1:38 PM
To: Schindler, Kate
Cc: Rowe, Carly; Thompson, Chuck DPC
Subject: RE: Memo summarizing October 11th Site Visit

Yes, this looks fine.

From: Schindler, Kate [<mailto:Kathleen.Schindler@tetrattech.com>]
Sent: Thursday, November 29, 2012 8:32 AM
To: Koslowsky, Shari - DNR
Cc: Rowe, Carly; Thompson, Chuck DPC
Subject: RE: Memo summarizing October 11th Site Visit

Hi Shari,

Please find attached the updated letter that reflects your recommended changes to the last version sent on October 29. I also added a short table that summarizes the overall anticipated effects to state-listed species. Would you please look over this document and indicate whether you concur?

Please let me or Carly know if you have any questions or concerns. I hope this finds you well and you had a pleasant Thanksgiving holiday!

Thank you,

Kate Schindler | Biologist

Direct: [612.643.2240](tel:612.643.2240) | Main: [612.643.2200](tel:612.643.2200) | Fax: [612.643.2201](tel:612.643.2201)

Wisconsin Historical Society

REQUEST FOR SHPO COMMENT AND CONSULTATION ON A FEDERAL UNDERTAKING

Submit one copy with each undertaking for which our comment is requested. Please print or type. Return to:
Wisconsin Historical Society, Division of Historic Preservation, Office of Preservation Planning, 816 State Street, Madison, WI 53706
Please Check All Boxes and Include All of the Following Information, as Applicable. **RECEIVED**

JAN 16 2013

DIV HIST PRES

I. GENERAL INFORMATION

- This is a new submittal.
- This is supplemental information relating to Case #: _____, and title: _____
- This project is being undertaken pursuant to the terms and conditions of a programmatic or other interagency agreement. The title of the agreement is _____

- a. Federal Agency Jurisdiction (Agency providing funds, assistance, license, permit): Rural Utilities Service
- b. Federal Agency Contact Person: Laura Dean Phone: 202-720-9634
- c. Project Contact Person: Chuck Thompson Phone: 608-787-1432
- d. Return Address: Dairyland Power Cooperative, 3200 East Ave South, La Crosse WI Zip Code: 54602
- e. Email Address: cat@dairynet.com
- f. Project Name: N-3 Strum-Willard Tap
- g. Project Street Address: _____
- h. County: Eau Claire, Trempealeau, Jackson, Clark City: _____ Zip Code: _____
- i. Project Location: Township 24 North, Range 7 West, Sections 12, 13, 14, 15, 16, 17, and 20
Township 24 North, Range 6 West, Sections 5, 7, and 8
Township 25 North, Range 6 West, Sections 24, 25, 26, 27, 28, 29, 30, 31, and 32
Township 25 North, Range 5 West, Sections 3, 5, 6, 7, 8, 9, 10, 18, and 19
Township 26 North, Range 5 West, Sections 23, 24, 27, and 34
Township 26 North, Range 4 West, Sections 10, 11, 12, 15, 16, 17, 19, and 20
- j. Project Narrative Description—Attach Information as Necessary.
- k. Area of Potential Effect (APE). Attach Copy of U.S.G.S. 7.5 Minute Topographic Quadrangle showing APE.

II. IDENTIFICATION OF HISTORIC PROPERTIES

- Historic Properties are located within the project APE per 36 CFR 800.4. Attach supporting materials.
- Historic Properties are not located within the project APE per 36 CFR 800.4. Attach supporting materials.

III. FINDINGS

- No historic properties will be affected (i.e., none is present or there are historic properties present but the project will have no effect upon them). Attach necessary documentation, as described at 36 CFR 800.11.
- The proposed undertaking will have no adverse effect on one or more historic properties located within the project APE under 36 CFR 800.5. Attach necessary documentation, as described at 36 CFR 800.11.
- The proposed undertaking will result in an adverse effect to one or more historic properties and the applicant, or other federally authorized representative, will consult with the SHPO and other consulting parties to resolve the adverse effect per 36 CFR 800.6. Attach supporting documentation as described at 36 CFR 800.11 with a proposed plan to resolve adverse effect(s).

Authorized Signature: Chuck Thompson Date: November 26, 2012

Type or print name: Chuck Thompson

RECEIVED

2

JAN 16 2013

13-0032/VA

pg 2/2

IV. STATE HISTORIC PRESERVATION OFFICE COMMENTS

DIV HIST PRES

Agree with the finding in section III above.

Object to the finding for reasons indicated in attached letter.

Cannot review until information is sent as follows: _____

Authorized Signature: Shannon Bentley

Date: 1/17/13

HP-05-07 (8/15/03)

REQUEST FOR SHPO COMMENT AND CONSULTATION ON A FEDERAL UNDERTAKING Pg 1/2

Submit one copy with each undertaking for which our comment is requested. Please print or type. Return to: Wisconsin Historical Society, Division of Historic Preservation, Office of Preservation Planning, 816 State Street, Madison, WI 53706
Please Check All Boxes and Include All of the Following Information, as Applicable.

RECEIVED

JUN 26 2013

DIV HIST PRES

I. GENERAL INFORMATION

- This is a new submittal.
- This is supplemental information relating to Case #: 13-0032/VA, and title: N-3 Rebuild Strum-Willard
- This project is being undertaken pursuant to the terms and conditions of a programmatic or other interagency agreement. The title of the agreement is _____
- a. Federal Agency Jurisdiction (Agency providing funds, assistance, license, permit): Rural Utilities Service
- b. Federal Agency Contact Person: Laura Dean Phone: 202-720-9634
- c. Project Contact Person: Chuck Thompson Phone: 608-787-1432
- d. Return Address: Dairyland Power Cooperative, 3200 E. Ave. S., La Crosse WI Zip Code: 54602
- e. Email Address: cat@dairynet.com
- f. Project Name: N-3 Rebuild. Willard Tap to Lublin Tap
- g. Project Street Address: _____
- h. County: _____ City: _____ Zip Code: _____
- i. Project Location: Township 26 North, Range 4 West, Sections 1 and 12
Township 27 North, Range 4 West, Sections 24, 25, and 36
Township 27 North, Range 3 West, Sections 6, 7, 18, and 19
Township 28 North, Range 3 West, Sections 4, 9, 10, 16, 21, 27, 28, 31, 32, 33, 34
Township 29 North, Range 3 West, Sections 2, 3, 4, 9, 16, 21, 22, 27, 28, 33
- j. Project Narrative Description—Attach Information as Necessary.
- k. Area of Potential Effect (APE). Attach Copy of U.S.G.S. 7.5 Minute Topographic Quadrangle showing APE.

II. IDENTIFICATION OF HISTORIC PROPERTIES

- Historic Properties are located within the project APE per 36 CFR 800.4. Attach supporting materials.
- Historic Properties are not located within the project APE per 36 CFR 800.4. Attach supporting materials.

III. FINDINGS

- No historic properties will be affected (i.e., none is present or there are historic properties present but the project will have no effect upon them). Attach necessary documentation, as described at 36 CFR 800.11.
- The proposed undertaking will have no adverse effect on one or more historic properties located within the project APE under 36 CFR 800.5. Attach necessary documentation, as described at 36 CFR 800.11.
- The proposed undertaking will result in an adverse effect to one or more historic properties and the applicant, or other federally authorized representative, will consult with the SHPO and other consulting parties to resolve the adverse effect per 36 CFR 800.6. Attach supporting documentation as described at 36 CFR 800.11 with a proposed plan to resolve adverse effect(s).

Authorized Signature: Chuck Thompson Date: 6/24/13

Type or print name: Chuck Thompson

RECEIVED

JUN 26 2013 13-0032/VA

DIV HIST PRES Ag 2/2

IV. STATE HISTORIC PRESERVATION OFFICE COMMENTS

- Agree with the finding in section III above.
- Object to the finding for reasons indicated in attached letter.
- Cannot review until information is sent as follows: _____

Authorized Signature: Shannon Bailey

Date: 6/28/13
HP-05-07 (8/15/03)

USDA NRCS Coordination re: Prime Farmland and Soils



October 9, 2012

Tim Miland, NW Area Resource Soil Scientist
USDA, NRCS
1304 N. Hillcrest Parkway
Altoona, WI 45720

Regarding: Dairyland Power Cooperative Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild Project

On behalf of Dairyland Power Cooperative (DPC), Tetra Tech is requesting comments from the National Resource Conservation Service (NRCS) regarding possible effects of the proposed Strum Tap to Lublin (N-3) 69kV Transmission Line Project (Project) on prime farmland.

DPC is requesting financial assistance from Rural Utilities Service (RUS) to fund the proposed Project and in order to comply with the National Environmental Policy Act of 1969 and 7 Code of Federal Regulations Part 1794 an Environmental Analysis (EA) is being prepared to analyze potential impacts to the natural and human environments associated with the proposed Project.

Project Description

The proposed Project consists of rebuilding approximately 58 miles of existing 69kV transmission line between the Strum Tap in Trempealeau County and Lublin Substation in Clark County. The proposed Project would be rebuilt within the existing 60-foot transmission right-of-way (ROW); however, DPC is proposing to widen the existing ROW to 80 feet which is DPC's current standard ROW width for 69kV transmission lines. The rebuild of the N-3 transmission line is needed so that DPC can continue to provide reliable service to the area.

Construction of the proposed Project is scheduled to take place in two phases. Phase I includes construction of the transmission line from Strum Tap to Willard Tap between June 2012 and August 2013. Phase II includes construction of the transmission line from Willard Tap to Lublin Substation between August 2014 and July 2015.

The location of the proposed Project is shown on Figure 1 and Table 1 lists the townships, ranges, and sections crossed by the proposed Project.

Table 1:
Project Location

State	County	Township	Range	Sections
Wisconsin	Trempealeau	24N	7W	19, 20, 17, 16, 15, 14, 13, 12
Wisconsin	Jackson	24N	6W	7, 8, 5
Wisconsin	Eau Claire	25N	6W	31, 30, 29, 28, 27, 26, 25, 24
Wisconsin	Eau Claire	25N	5W	19, 18, 7, 8, 9, 10, 3, 6, 5, 4

Table 1:
 Project Location

State	County	Township	Range	Sections
Wisconsin	Eau Claire	26N	5W	34, 27, 23, 24
Wisconsin	Clark	26N	4W	19, 20, 17, 16, 15, 10, 11, 12, 1
Wisconsin	Clark	27N	4W	36, 25, 24
Wisconsin	Clark	27N	3W	19, 18, 7, 6
Wisconsin	Clark	28N	3W	31, 32, 33, 34, 27, 28, 21, 16, 15, 10, 9, 4, 3
Wisconsin	Clark	29N	3W	34, 33, 28, 27, 22, 21, 16, 9, 4, 3, 2, 1

DPC is proposing to replace the existing single-pole wood transmission line structures with new single-pole wood structures that would be approximately 60-80 feet tall with a span of approximately 300-400 feet between structures. Approximately 1,020 single-pole transmission structures would be constructed and would result in approximately 12,250 square feet (approximately 0.3 acre) of permanent impacts (up to 12 square feet per structure). Permanent effects associated with construction would be limited to the footprint of the transmission structures and limited construction of permanent access roads. Although final engineering of the transmission line has not been completed, DPC anticipates that up to 273 structures may be placed in prime farmland, resulting in approximately 3,273 square feet (less than one acre) of permanent disturbance. This approximation is based on the centerline crossing approximately 15.5 miles of prime farmland with a span of approximately 300 feet in between structures. Individual transmission structures would not be replaced in the exact same location as the existing structures. The new transmission structures would either be constructed adjacent to the existing structures or would be relocated depending on engineering and environmental factors including soil conditions, slope, span length between transmission structures, and terrain. Once the new transmission line is in operation, DPC will remove the existing structures and will recontour and revegetate the disturbed areas to pre-construction conditions.

Existing and new access roads, the majority of which will be temporary, will be used for construction and future inspections and maintenance. Up to four temporary laydown areas (each approximately five acres in size) will be used during construction. The land for the temporary laydown areas will be leased from landowners and will be located adjacent to DPC-owned substations. Upon completion of construction, DPC will revegetate the disturbed areas to pre-construction conditions.

The EA will analyze potential impacts resulting from construction, operation, and maintenance of the transmission line. DPC requests your office provide comment regarding the possible impacts related to the proposed Project on resources in the area. Please provide any comments on the proposed Project or recommendations to mitigate or avoid potential impacts. For your reference, please find attached Project resource maps showing the proposed location and (Figure 1 – Project Vicinity, Figure 2 –Prime Farmland, Figure 3 – Land Cover).

Tim Miland
USDA, NRCS
Page 3 of 3

We would appreciate a response within 30 days. Responses can be submitted to Carly Rowe by email to carly.rowe@tetrattech.com or by mail to Carly Rowe, Tetra Tech, 1634 Eastport Plaza Drive, Collinsville, IL 62234.

Sincerely,

Carly Rowe
Project Manager
618.343.2319

Attachments

Figure 1: Project Area Map
Figure 2: Prime Farmland Map
Figure 3: Land Cover Map

December 27th, 2012

Carly Rowe
Tetra Tech EC/Energy Services
1634 East Port Plaza Drive
Collinsville, IL 62234

RE: Dairyland Power Cooperative N-3 Transmission Line Rebuild

Dear Carly:

The Natural Resources Conservation Service (NRCS) staff has reviewed the 2012-2015 work plan with respect to requirements of the Farmland Protection Policy Act (FPPA).

Because the proposed lines are located on existing right of ways and/or none of the proposed construction will irreversibly convert > 1 acre of prime or important farmland to non-agricultural use, provisions of the FPPA do not apply and submission of a Farmland Conversion Impact Rating (form AD-1006) is not required.

Thank you for the opportunity to comment on this proposed project. If you have any questions or future projects in need of review please feel free to contact me.

Sincerely,



Tim Miland
Area Resource Soil Scientist
USDA-NRCS

DATCP re: Agricultural Impact Statement

Davidson, Lori

From: Nauth, Peter L - DATCP <Peter.Nauth@Wisconsin.gov>
Sent: Thursday, October 11, 2012 1:24 PM
To: Rowe, Carly
Cc: Thompson, Chuck DPC
Subject: RE: Strum-Lublin 69kV Transmission Line Rebuild Project

Carly:

Thanks for the information on the Strum-Lublin rebuild project. A 69kV project is an exception in the statute requiring the preparation of an Agricultural Impact Statement.

The statutory requirement (ch. 32.035, (2) Wis Stats.) for the preparation of an AIS only applies to high voltage transmission lines, which are defined as those power lines that are 100 kV or greater. Consequently, an AIS will not be prepared for this project.

However, I encourage you to continue working with the farmland owners to minimize the impacts to their farm operations.

Call with any questions.

Peter Nauth
Agricultural Impact Program
608.224.4650
Peter.Nauth@Wisconsin.gov

From: Rowe, Carly [mailto:Carly.Rowe@tetrattech.com]
Sent: Tuesday, October 09, 2012 11:00 AM
To: Nauth, Peter L - DATCP
Cc: Thompson, Chuck DPC
Subject: Strum-Lublin 69kV Transmission Line Rebuild Project

Peter,

On behalf of Dairyland Power Cooperative, Tetra Tech is submitting the following Project description and Project maps (attached) to inform you of the proposed Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild Project. We are hoping to determine if an AIS is required so that we can include this determination in the environmental assessment currently being prepared. If an AIS is required, a completed AI Notification form will be provided to support your effort. Thank you for your time.

Project Summary

Dairyland Power Cooperative (DPC) is requesting financial assistance from Rural Utilities Service (RUS) to fund the proposed Strum Tap to Lublin (N-3) 69kV Transmission Line Rebuild Project (Project) and in order to comply with the National Environmental Policy Act of 1969 and 7 Code of Federal Regulations Part 1794 an Environmental Analysis (EA) is being prepared to analyze potential impacts to the natural and human environments associated with the proposed Project.

The proposed Project consists of rebuilding approximately 58 miles of existing 69-kilovolt (kV) transmission line between the Strum Tap in Trempealeau County and Lublin Substation in Clark County (Figure 1). The proposed Project would also cross through Jackson and Eau Claire counties.

DPC is proposing to rebuild the 58-mile-long transmission line between Strum Tap and Lublin Substation within the existing 60-foot transmission right-of-way (ROW); however, DPC is proposing to widen the existing ROW to 80 feet which is DPC's current standard ROW width for 69kV transmission lines. The new structures would be approximately 60-80 feet tall with a span of approximately 300-400 feet, resulting in approximately 13 to 17 structures per mile. Construction of the proposed Project is scheduled to take place in two phases. Phase I includes construction of the transmission line from Strum Tap to Willard Tap and would be constructed between June 2012 and August 2013. Phase II includes construction of the transmission line from Willard Tap to Lublin Substation, and would be constructed between August 2014 and July 2015.

The rebuild of the N-3 transmission line is needed so that DPC can continue to provide reliable service to the area. The DPC-owned N-3 transmission line is part of a larger load-serving system, which consists of several transmission lines that are reaching the end of their useful life with increased maintenance costs, high exposure miles, line overloads and low voltages. The N-3 transmission line was constructed in 1950 and is reaching the end of its service life. The transmission line needs to be rebuilt to address the age and degraded condition of the transmission structures and conductors. DPC is proposing to replace the existing single-pole wood transmission structures with new single-pole wood transmission structures.

Figures 1, 2, and 3, which are attached to this email, provide an overview of the project location (Figure 1) and prime farmland and farmland of statewide importance crossed by the proposed Project (Figure 2). Figure 3 provides an overview of land cover crossed by the proposed Project.

Anticipated Impacts to Agricultural Properties

DPC is working with each landowner to minimize impacts and disruption to their agricultural operations in terms of construction timing and access. Existing and new access, the majority of which will be temporary, will be used for construction and future inspections and maintenance. Access is generally restricted to existing farm roads, unless these operations do not exist or other options are preferred by the landowner. In some cases minor blading or addition of gravel is used on these existing farm roads where steep grades or unstable soils exist. If access cannot be gained via local roads or farm roads DPC would utilize overland travel to the extent feasible to access each structure location. Up to four temporary laydown areas (each approximately five acres in size) will be used during construction. The land for the temporary laydown areas will be leased and will be located adjacent to DPC-owned substations. DPC will compensate landowners for crop damage resulting from construction. Permanent impacts to farmlands will be limited to the footprint of the new transmission structures and minimal permanent access roads. DPC will remove and reclaim all of the old transmission line structures and will revegetate all temporary disturbance areas to pre-construction conditions.

Please feel free to contact me if you have any questions or would like to discuss the proposed Project.

Sincerely,
Carly Rowe
Project Manager

Carly Rowe | Environmental Planner
Direct: 618.343.2319 Cell: 303.520.0043
carly.rowe@tetrattech.com

Please note new email address

Tetra Tech EC | Energy Services
1634 Eastport Plaza Drive | Collinsville, IL 62234 www.tetrattech.com

USACE re: Impacts to Wetlands



DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL MN 55101-1678

REPLY TO
ATTENTION OF

Operations
Regulatory (2013-02241-NJC)

JUN 21 2013

Dairyland Power Cooperative
Mr. Kurt Childs, Director of Real Estate
3200 East Avenue South
La Crosse, Wisconsin 54602

Dear Mr. Childs:

We have completed our review of your permit application to discharge fill material into 0.02 acres of wetlands for the purpose of rebuilding the Strum-Willard N-3 69kV Transmission Line in Clark, Eau Claire, Jackson and Trempealeau Counties. Additionally, the project will result in the temporary impact of 2.79 acres of wetlands. Temporary impact areas will be seeded with the approved seed mix. The specific project impact locations can be found on the enclosed table (Impact location table 2013-02241-NJC Page 1 of 2 through Page 2 of 2. The project site spans Clark, Eau Claire, Jackson and Trempealeau Counties in Wisconsin.

This work is authorized by category 2.a.9 (utility line discharges) of Department of the Army General Permit (GP-002-WI) **PROVIDED THE ENCLOSED CONDITIONS ARE FOLLOWED AND YOU OBTAIN CONFIRMATION THAT SECTION 401 WATER QUALITY CERTIFICATION HAS BEEN GRANTED OR WAIVED FOR THE PROJECT** from the Wisconsin Department of Natural Resources (WDNR). Your project **IS NOT** authorized by this **General Permit** until you obtain this confirmation of water quality certification from the WDNR.

If your project will require off-site fill material that is **not** obtained from a licensed commercial facility, you must notify us at least five working days before start of work. A cultural resources survey may be required if a licensed commercial facility is not used.

This General Permit is valid until May 31, 2016, unless reissued, or revoked. The time limit for completing the work described above ends on that date. It is the permittee's responsibility to remain informed of changes to the General Permit program. If this authorized work is not undertaken within the above time period, or the project specifications have changed, our office must be contacted to determine the need for further approval or re-verification.

It is your responsibility to ensure that the work complies with the terms of this letter and the enclosures **AND TO OBTAIN ALL REQUIRED STATE AND LOCAL PERMITS AND APPROVALS BEFORE YOU PROCEED WITH YOUR PROJECT.**

A preliminary jurisdictional determination (JD) has been prepared for the site of your project. The preliminary JD is not appealable. If you wish, you may request an approved JD

(which may be appealed), by contacting the Corps representative identified in the final paragraph of this letter. You also may provide new information for further consideration by the Corps to reevaluate the JD. If this JD is acceptable, please sign and date both copies of the Preliminary Jurisdictional Determination form and return one copy to the address below within 15 days from the date of this letter.

U.S. Army Corps of Engineers
St. Paul District
180 5th Street East, Suite 700
St. Paul, Minnesota 55101-1678
Attn: Nathan Campbell

If you have any questions, contact Nathan Campbell in our St. Paul office at (651) 290-5324. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely,


(for) Tamara E. Cameron
Chief, Regulatory Branch

Copy furnished to (with attachments):
Nick Schaff – WDNR (Nicholas.schaff@wisconsin.gov)
Carly Rowe – Tetra Tech Inc. (carly.rowe@tetrattech.com)

GP-002-WI CONDITIONS

GENERAL INFORMATION

Persons proposing to do work should note that, in ALL cases, GP-002-WI requires that adverse impacts on water and wetland resources be avoided and minimized to the maximum extent practicable. Also, activities that would adversely affect federal endangered plant or animal species or certain cultural or archaeological resources, or that would impair reserved Native American tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights, are not eligible for authorization under GP-002-WI.

Department of the Army Permit General Conditions:

1. GP-002-WI expires on May 31, 2016. Unless otherwise specified in the St. Paul District's letter confirming your project complies with the requirements of this GP, the time limit for completing work ends upon the expiration date of GP-002-WI. If you find that you require additional time to complete authorized activities, submit your time extension request to this office for consideration at least three months before the expiration date is reached.
2. You must maintain the activity authorized by GP-002-WI in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity. Should you wish to cease to maintain an activity authorized by the reporting GP (2.a), or abandon it without a good faith transfer; you must obtain a modification of the authorization from this office, which may require restoration of the area. If you wish to transfer responsibility for completion or maintenance of the project to another, please contact this office so we may provide you with the necessary documentation to transfer the authorization.
3. If you discover any previously unknown historic or archaeological remains while accomplishing any activity authorized by GP-002-WI, you must immediately stop work and notify this office of what you have found. The St. Paul District will initiate the federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. You must allow representatives from this office and the WDNR to inspect the proposed project site and the authorized activity at any time deemed necessary to ensure that it is

being or has been accomplished in accordance with the terms and conditions of GP-002-WI.

5. If a conditioned water quality certification has been issued for your project by the WDNR, you must comply with the conditions specified in the certification as special conditions to this permit.
6. You must also comply with the other GP-002-WI terms and conditions specified below as well as any project specific conditions imposed by the St. Paul District.

Further Information:

1. Congressional Authorities: Authorization to undertake the activities described above is pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), **only**. Work that also requires authorization under Section 10 of the Rivers and Harbors Act must be authorized separately through other GPs or individual permits.
2. Limits of this Authorization:
 - a. GP-002-WI does not obviate the need to obtain other federal, state, or local authorizations required by law.
 - b. GP-002-WI does not grant any property rights or exclusive privileges.
 - c. GP-002-WI does not authorize any injury to the property or rights of others.
 - d. GP-002-WI does not authorize interference with any existing or proposed federal project.
3. Limits of Federal Liability. In authorizing work, the Federal Government does not assume any liability, including for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data. The determination by this office that an activity is not contrary to the public interest will be made in reliance on the information provided by the applicant.

5. **Reevaluation of Decision.** This office may reevaluate its decision on an authorization at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

- a. The applicant fails to comply with the terms and conditions of this general permit.
- b. The information provided by the applicant in support of the permit application proves to have been false, incomplete, or inaccurate (see 4 above).
- c. Significant new information surfaces which this office did not consider in reaching the original public interest decision. A reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring the permittee to comply with the terms and conditions of the permit and for the initiation of legal action where appropriate.

6. This office may also reevaluate its decision to issue GP-002-WI at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following: significant new information surfaces which this office did not consider in reaching the original public interest decision. Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7.

GP-002-WI STANDARD CONDITIONS

1. Discretionary Authority.
The Corps retains discretionary authority to require a standard individual permit review of any activity eligible for authorization under GP-002-WI based on concern for the aquatic environment.
2. Federal Trust Responsibility to Indian Tribes.
Projects the Corps finds to have potential to affect tribal interests will be coordinated with the appropriate Indian Tribal governments. The Tribe's views and the federal trust responsibility will be considered in the Corps evaluation. Based on treaty rights, no activity or its operation may impair reserved treaty rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
3. Form and Confirmation of Authorization.

GP-002-WI CONDITIONS

Every GP-002-WI authorization that requires submission of an application will be confirmed in writing by the Corps. Any confirmation issued may include required special conditions.

4. Grandfather Provision.

Activities that were determined to be non-reporting under GP-002-WI prior to May 31, 2011 AND that had commenced prior to that date shall be completed no later than April 16, 2013. Reporting activities previously confirmed by our office in writing as authorized under GP-002-WI (expiration dates April 16, 2011 or May 31, 2011), continue to be authorized under the terms of the Corps project verification letter.

5. Case-by-Case Conditions.

The authorized activity must comply with any special conditions that may have been added by the Corps or by a state, tribe, or the United States Environmental Protection Agency in its Section 401 Water Quality Certification or consistency determination under the Coastal Zone Management Act. Such conditions will be specifically identified in any Corps authorization.

6. Avoidance and Minimization.

Discharges of dredged or fill material into waters of the United States must be avoided and minimized to the maximum extent practicable).

7. State Water quality Certification and Coastal Zone Management (CZM) Consistency Determination.

Some GP-002-WI authorizations may not be valid unless and until the WDNR has confirmed that the activity complies with state water quality certification and/or CZM consistency determination is obtained from or waived by the Wisconsin Coastal Management Program. If such a condition applies, it will be noted in the Corps authorization letter for the project. Refer to conditions 27 and 28 at the end of this document.

8. Proper Maintenance.

Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

9. Erosion and Siltation Controls.

Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark must be permanently stabilized at the earliest practicable date. Work should be done in

accordance with state-approved published practices.

Upon completion of earthwork operations, all exposed slopes, fills, and disturbed areas must be given sufficient protection by appropriate means such as landscaping, or planting and maintaining vegetative cover, to prevent subsequent erosion. Cofferdams shall be constructed and maintained so as to prevent erosion into the water. If earthen material is used for cofferdam construction, sheet piling, riprap or a synthetic cover must be used to prevent dam erosion. All non-biodegradable erosion controls must be removed within two weeks of site stabilization unless otherwise conditioned in the Corps project confirmation letter.

10. Removal of Temporary Fills.

Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation. The timeframe for completing this removal shall be:

- a. Not later than the timeframe stipulated in the activity description (unless extended in writing by our office);
- b. Not later than the timeframe stipulated in our office's confirmation letter; or
- c. Not longer than two weeks from the date the temporary fill was placed in waters of the United States (condition c. applies only if a timeframe is not otherwise established by applying a. or b. above).

11. Federal Threatened and Endangered Species.

GP-002-WI does not affect the Corps responsibility to insure that all Section 404 authorizations comply with Section 7 of the Federal Endangered Species Act (see Standard Condition 27a.x.(a) below for information regarding compliance with Chapter 29.604 Wisconsin State Statute).

a. No activity is authorized which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA) or which is likely to destroy or adversely modify the critical habitat of such species. Permittees shall notify the Corps if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the Corps that the requirements of the ESA have been satisfied and that the activity is authorized.

b. Authorization of an activity under GP-002-WI does not authorize the take of a threatened or endangered species as defined under the federal ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with

incidental take provisions, etc.) from the United States Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal takes of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the United States Fish and Wildlife Service and National Marine Fisheries Service, WDNR or their world-wide web pages on the internet.

12. Historic Properties, Cultural Resources.

GP-002-WI does not affect the Corps responsibility to insure that all Section 404 authorizations comply with Section 106 of the National Historic Preservation Act (NHPA). No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places (NRHP) is authorized, until the Corps has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must include notification to the Corps in the permit application if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the NRHP, and shall not begin the activity until notified by the Corps that the requirements of the NHPA have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the NRHP. If cultural, archaeological, or historical resources are unearthed during activities authorized by this permit, work must be stopped immediately and the State Historic Preservation Office must be contacted for further instruction.

13. Spawning Areas.

Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

14. Obstruction of High Flows.

To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

15. Adverse Effects from Impoundments.

If the discharge creates an impoundment of water, adverse effects on the aquatic system due to the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

16. Waterfowl Breeding Areas.

GP-002-WI CONDITIONS

Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

17. Navigation.

No activity may cause more than a minimal adverse effect on navigation.

18. Aquatic Life Movements.

No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

19. Equipment.

Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

20. Water Quality Standards.

All work or discharges to a watercourse resulting from permitted construction activities, particularly hydraulic dredging, must meet applicable federal, state, and local water quality and effluent standards on a continuing basis.

21. Preventive Measures.

Measures must be adopted to prevent potential pollutants from entering the watercourse. Construction materials and debris, including fuels, oil, and other liquid substances, will not be stored in the construction area in a way that allows them to enter the watercourse as a result of spillage, natural runoff, or flooding.

22. Disposal Sites.

If dredged or excavated material is placed on an upland disposal site (above the ordinary high-water mark), the site must be securely diked or contained by an acceptable method that prevents the return of potentially polluting materials to the watercourse by surface runoff or by leaching. Construction of containment areas, whether bulkhead or upland disposal site, must be complete prior to the placement of any dredged material.

23. Suitable Fill Material.

All fill (including riprap), if authorized under this permit, must consist of suitable material (e.g. no trash, debris, car bodies, asphalt, etc.) free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act). In addition, rock or fill material used for activities dependent upon this permit and obtained by excavation must either be obtained from existing quarries or, if a new borrow site is opened up to obtain fill material, the State Historic Preservation Office (SHPO) must be notified prior to the use of the new site. Evidence of this consultation with the SHPO will be forwarded to the Corps.

24. Water Intakes/Activities.

An investigation must be made to identify water intakes or other activities that may be affected by suspended solids and turbidity increases caused by work in the watercourse. Sufficient notice must be given to the owners of property where the activities would take place to allow them to prepare for any changes in water quality.

25. Spill Contingency Plan.

A contingency plan must be formulated that would be effective in the event of a spill. This requirement is particularly applicable in operations involving the handling of petroleum products. If a spill of any potential pollutant should occur, it is the responsibility of the permittee to remove such material, to minimize any contamination resulting from this spill, and to immediately notify the state Emergency Management Duty Officer at 1-800-943-0003 and the National Response Center at telephone number 1-800-424-8802.

26. Other Permit Requirements.

No Corps GP-002-WI authorization eliminates the need for other local, state or Federal authorizations, including but not limited to National Pollutant Discharge Elimination System (NPDES) or State Disposal System (SDS) permits.

27. State Section 401 Certification Conditions and Limitations (dated April 28, 2011):

a. GENERAL CONDITIONS:

- i. The applicant shall allow the WDNR reasonable entry and access to the discharge site to inspect the proposed discharge for compliance with this certification and applicable laws and to inspect permitted discharges for compliance with this certification and applicable laws.
- ii. Once wetland work commences, all wetland construction activities must be continuous (on a daily basis) until the project is completed and the site is stabilized.
- iii. The removal of vegetative cover and exposure of bare ground must be restricted to the minimum amount mulching, sodding, diversion of surface runoff, installation of straw bales or silt screens, construction of settling basins, or similar methods as soon as possible after removal of the original ground cover as described in the Wisconsin Construction Site Handbook (BMP's).
- iv. This permit has been issued with the understanding that any construction equipment used is the right size to do the job, and can be brought to and removed from the project's site without unreasonable harm to vegetative cover or fish or wildlife habitat.
- v. Final site stabilization requires the re-establishment of native vegetation and must not

contain any exotic species.

vi. Flush all other equipment with hot water of 105° F. to 110° F. for a period of 30 minutes or hot water of 140° F. for a period of 5 minutes; or, instead of flushing equipment, leave the equipment in a sunny location so that it dries completely (at least five full days).

vii. Inspect all equipment surfaces, scrape off any attached mussels, remove any aquatic plant materials (fragments, stems, leaves, or roots), and dispose of removed mussels and plants in a garbage can prior to leaving the water access area.

viii. You must ensure that all equipment used for the project has been adequately decontaminated for zebra mussels prior to being used in other waters of the state. All equipment that comes in contact with infested waters including, but not limited to, tracked vehicles, barges, boats, turbidity curtain, sheet pile, and pumps must be thoroughly disinfected.

ix. If any conditions of this certification are found to be invalid or unenforceable, certification for all activities to which that condition applies is denied.

x. The following activities are not eligible for certification under this water quality certification action for GP-002-WI:

(a) Activities likely to jeopardize the continued existence of a state designated threatened or endangered species or a species proposed for such designation or which is likely to destroy or adversely modify the habitat of such species.

(b) Activities that result in adverse impacts to fishery spawning habitat or adversely affect avifauna breeding areas or substantially disrupt the movement of those species that normally migrate from open water to upland or vice versa (i.e. amphibians, reptiles and mammals).

(c) Activities detrimental to waters of the state, including wetlands, that would adversely affect designated areas of special natural resource interest as defined in NR 103.04, Wis. Adm. Code.

(d) Activities, individually or cumulatively, detrimental to waters of the state, including wetlands, that would further the substantial degradation of designated impaired waters of the state.

xi. Applicants seeking authorization under this regional general permit (except the non-reporting general permit) shall complete a Joint State/Federal Permit Application and submit two copies of each to the appropriate local COE office and the local WDNR Water Management Permit Intake Specialist. Applications for water quality certification must be complete as determined by the WDNR. Please note an application fee is required for state water quality certification activities identified under Section II below.

GP-002-WI CONDITIONS

b. WATER QUALITY CERTIFICATION:

i. The WDNR grants water quality certification for the Non-Reporting GP subject to compliance with all applicable conditions in GP-002-WI and compliance with conditions 3.b.27(a)i. through xi. above.

ii. The WDNR grants water quality certification for projects that satisfy all applicable conditions of GP-002-WI under the Reporting GP subject to the General Conditions above, and:

iii. The applicant receives written confirmation from the department that their proposed activity(s) is consistent with the requirements of NR 299 Water Quality Certification, Wis. Adm. Code, and the Department confirms that the applicant has adequately demonstrated that no other practicable alternative exists which would not adversely impact wetlands and would not result in other significant adverse environmental consequences and the Department confirms that the activity is consistent with the requirements of NR 103.08, Wis. Adm. Code.

iv. Certification for Hydropower Projects under this General Permit is conditionally approved when the applicant has received State Individual Water Quality Certification under the FERC regulatory process.

NOTE: If additional information is needed, or if heavy snow or ice cover prevents WDNR from completing their review, the normal processing time for confirming activities eligible for authorization under this certification may be extended (by written notice from WDNR to the applicant).

c. NOTICE OF APPEAL RIGHTS:

If you believe that you have a right to challenge this decision, you should know that Wisconsin Statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

To request a contested case hearing pursuant to section 227.42, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources.

This determination becomes final in accordance with the provisions of NR 299.05(7), Wisconsin Administrative Code, and is judicially reviewable when final. For judicial review of a decision pursuant to Sections 227.52 and 227.53, Wisconsin Statutes, you

have 30 days after the decision becomes final to file your petition with the appropriate circuit court and to serve the petition on the Secretary of the Department of Natural Resources. The petition must name the Department of Natural Resources as the respondent.

Reasonable accommodation, including the provision of informational material in an alternative format, will be provided for qualified individuals with disabilities upon request. This notice is provided pursuant to section 227.48(2), Stats.

28. Wisconsin Coastal Management Program (WCMP) Conditions.

The WCMP's Federal consistency determination for GP-002-WI provides that no GP-002-WI authorization for an activity taking place in coastal wetlands identified as ridge and swale complexes and/or wetlands adjacent to the Mink River (Door County), and the Kakagon and Bad Rivers (Ashland County) will be valid unless and until a Federal consistency determination is granted or waived by the WCMP. This requirement therefore is incorporated as a permit condition of GP-002-WI. Applicants will be notified of this condition in the Corps's GP reporting authorization for projects in these areas.

Dairyland Power Cooperative, Strum-Willard N-3 69kV Transmission Line Rebuild Project, Eau Claire, Jackson and Trempealeau Counties, Wisconsin

WDNR Wetland Individual Permit - Attachment C

Feature ID ¹	Resource Description ²	Designated Waters		Permanent Impacts Resulting from Structure Installation ⁴						Temporary Impacts Resulting from Construction Matting		Notes	Location							Map Page
		Trout Stream	Other	# of Poles	Structure Footprint (sq. ft)	Structure Footprint (acres)	Structure Numbers	Structure Type ⁵	Number of Existing Structures to be Removed	Matting for Construction Access ⁶ (sq. ft)	Matting for Construction Access ⁶ (acres)		County	Town/ Village/ City	QQ	Q	Sect.	T,R (E, W)	Wisconsin State Planar Coordinates (NAD 83)	
006D	Seasonally Flooded Basin-South Fork Buffalo River	Class III	ASNRI/PNW							304.0	0.007	Pole Outside of wetland	Trempealeau	Sumner	SW	NW	14	24N 7W	44.56054, -91.20562	5
009D	Seasonally Flooded Basin			2	24	0.0006	363, 362	Wood	1	320.0	0.007		Trempealeau	Sumner	Center	Center	14	24N 7W	44.561042, -91.196567	5
011D	South Fork of the Buffalo River	Class II	ASNRI/PNW							1820.5	0.042		Trempealeau	Sumner	SE	NE	14	24N 7W	44.560986, -91.189069	6
015D	Seasonally Flooded Basin									1702.9	0.039		Trempealeau	Sumner	SW	NE	13	24N 7W	44.563813, -91.175113	6
012D1	Seasonally Flooded Basin			1	12	0.0003	380	Wood	1	1225.3	0.028		Trempealeau	Sumner	SW	NE	13	24N 7W	44.564624, -91.173450	7
017D	Seasonally Flooded Basin							Wood	1			Removal of Existing Structure	Jackson	Garfield	SW	SW	7	24N 6W	44.568202, -91.162316	7
018D	Seasonally Flooded Basin			2	24	0.0006	395, 394		1	2157.0	0.050		Jackson	Garfield	SE	SW	7	24N 6W	44.568209, -91.159297	7
020									1			Removal of Existing Structure	Jackson	Garfield	SE	NE	7	24N 6W	44.575399, -91.145896	9
028	Seasonally Flooded Basin			2	24	0.0006	445, 446	Wood	1	320.0	0.007		Eau Claire	Bridge Creek	NW	SW	32	25N 6W	44.602540, -91.144682	11
030	Seasonally Flooded Basin			1	12	0.0003	448	Wood		160.0	0.004		Eau Claire	Bridge Creek	SW	NW	32	25N 6W	44.604798, -91.144620	11
031D	Fresh Wet Meadow Intermittent Stream			1	12	0.0003	453	Wood	1	160.0	0.004		Eau Claire	Bridge Creek	NE	NE	31	25N 6W	44.609140, -91.145009	12
032D	Shallow Marsh-Thompson Valley Creek	Class II	ASNRI/PNW	1	12	0.0003	465	Wood	2	160.0	0.004		Eau Claire	Bridge Creek	SE	NE	30	25N 6W	44.619885, -91.144941	13
035	Seasonally Flooded Basin-Intermittent Drainage			1	12	0.0003	483		1	5257.8	0.121		Eau Claire	Bridge Creek	NE	NE	29	25N 6W	44.621820, -91.125740	14
039D	Shallow Marsh									1839.0	0.042		Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.621742, -91.078869	16
040										1944.4	0.045		Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.62168, -91.080451	16
041D	Seasonally Flooded Basin			2	24	0.0006	530, 529	Wood	1	2367.8	0.054	Pole 530 Within 10 ft of wetland	Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.621828, -91.076666	16
043	Seasonally Flooded Basin-Hay Creek	Class I	ASNRI/PNW	1	12	0.0003	535	Wood	1	160.0	0.004		Eau Claire	Bridge Creek	NW	NE	26	25N 6W	44.622164, -91.071391	16

Dairyland Power Cooperative, Strum-Willard N-3 69kV Transmission Line Rebuild Project, Eau Claire, Jackson and Trempealeau Counties, Wisconsin
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		Trout Stream	Other	# of Poles	Structure Footprint (sq. ft)	Structure Footprint (acres)	Structure Numbers	Structure Type ⁵	Number of Existing Structures to be Removed	Matting for Construction Access ⁶ (sq. ft)		Matting for Construction Access ⁶ (acres)	County	Town/ Village/ City	QQ	Q	Sect.	T,R (E, W)		Wisconsin State Planar Coordinates (NAD 83)
051D	Fresh Wet Meadow-Travis Creek	Class II	ASNRI/PNW	4	48	0.0011	571, 572 573 574	Wood	4	7811.0	0.179		Eau Claire	Bridge Creek	NE	NE	24	25N 6W	44.639788, -91.043685	18-19
053D	Seasonally Flooded Basin			1	12	0.0003	577	Wood	1	3240.8	0.074		Eau Claire	Fairchild	SW	SW	18	25N 5W	44.641941, -91.039980	19
055										633.3	0.015		Eau Claire	Fairchild	NE	SW	17	25N 5W	44.644713, -91.036236	19
056D	Fresh Wet Meadow-Bridge Creek	Class III-Connects to a PRF	ASNRI/PNW	2	24	0.0006	582, 583	Wood	2	4589.0	0.105		Eau Claire	Fairchild	NE	SW	18	25N 5W	44.64589, -91.034631	19
058D1	Seasonally Flooded Basin			1	12	0.0003	5	Wood	1	744.2	0.017		Eau Claire	Fairchild	SE	NW	18	25N 5W	44.650305, -91.033500	20
058D2	Seasonally Flooded Basin								1			Removal of Existing Structure	Eau Claire	Fairchild	NE	NW	18	25N 5W	44.653638, -91.033602	20
058D3	Seasonally Flooded Basin			1	12	0.0003	10	Wood	1	160.0	0.004		Eau Claire	Fairchild	SE	SW	18	25N 5W	44.654859, -91.033582	20
059D2	Shallow Marsh								1			Removal of Existing Structure	Eau Claire	Fairchild	SW	NE	7	25N 5W	44.662422, -91.033299	21
060D	Seasonally Flooded Basin			2	24	0.0006	24, 25	Wood	2	320.0	0.007		Eau Claire	Fairchild	NW	NE	7	25N 5W	44.667810, -91.033270	22
065D1	Seasonally Flooded Basin			1	12	0.0003	31	Wood				Structure within 10 ft of wetland	Eau Claire	Fairchild	SW	SE	6	25N 5W	44.669074, -91.028454	22
066										882.3	0.020		Eau Claire	Fairchild	SW	SE	5	25N 5W	44.669057, -91.021506	22
067D	Shallow Marsh			2	24	0.0006	38, 39	Wood	1	1186.0	0.027		Eau Claire	Fairchild	SW	SE	5	25N 5W	44.669039, -91.019110	22
072D1	Seasonally Flooded Basin			1	12	0.0003	51	Wood	1	377.8	0.009		Eau Claire	Fairchild	SW	SW	4	25N 5W	44.668504, -91.002395	23
072D2	Shallow Marsh			3	36	0.0008	53, 54, 55	Wood	3	8785.6	0.202		Eau Claire	Fairchild	NW	NW	9	25N 5W	44.668471, -90.999246	23
074D	Seasonally Flooded Basin-Black Creek	Class III	ASNRI/PNW	1	12	0.0003	60	Wood	1	2493.7	0.057		Eau Claire	Fairchild	NW	NE	9	25N 5W	44.668486, -90.990737	24
077D	Shrub Swamp			1	12	0.0003	70	Wood	1	2669.3	0.061		Eau Claire	Fairchild	NW	NE	10	25N 5W	44.668562, -90.978475	24
078D1	Shallow Marsh			1	12	0.0003	80	Wood	1	1293.4	0.030		Eau Claire	Fairchild	NE	NE	10	25N 5W	44.668588, -90.964919	25
078D2	Shrub Swamp-Pea Creek		Endangered, Threatened or Stream of Special Concern	2	24	0.0006	84, 85	Wood	2	4925.5	0.113		Eau Claire	Fairchild	SE	SE	3	25N 5W	44.670721, -90.962660	25
080D	Seasonally Flooded Basin								1			Removal of Existing Structure	Eau Claire	Fairchild	SE	NE	3	25N 5W	44.676526, -90.962590	26

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

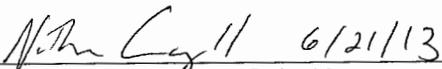
This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office	St. Paul District	File/ORM #	2013-02241-NJC	PJD Date:	Jun 21, 2013
State	TN	City/County	Clark, Eau Claire, Jackson and Trempealeau	Name/Address of Person Requesting PJD	Dairyland Power Cooperative Mr. Kurt Childs, Director of Real Estate 3200 East Avenue South La Crosse, Wisconsin 54602
Nearest Waterbody:	unnamed wetland			Location: TRS, Lat/Long or UTM:	see enclosed table
Identify (Estimate) Amount of Waters in the Review Area:			Name of Any Water Bodies on the Site Identified as Section 10 Waters:		
Non-Wetland Waters:		Stream Flow:		Tidal:	
linear ft	width	acres		Non-Tidal:	
Wetlands:	2.81	acre(s)	Cowardin Class:	Palustrine, emergent	
			<input type="checkbox"/> Office (Desk) Determination <input type="checkbox"/> Field Determination: Date of Field Trip: _____		

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: _____
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - Office concurs with data sheets/delineation report.
 - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps _____
- Corps navigable waters' study: _____
- U.S. Geological Survey Hydrologic Atlas:
 - USGS NHD data.
 - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite quad name: _____
- USDA Natural Resources Conservation Service Soil Survey. Citation: _____
- National wetlands inventory map(s). Cite name: _____
- State/Local wetland inventory map(s): _____
- FEMA/FIRM maps: _____
- 100-year Floodplain Elevation is: _____
- Photographs:
 - Aerial (Name & Date): _____
 - Other (Name & Date): _____
- Previous determination(s). File no. and date of response letter: _____
- Other information (please specify): _____

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.


 Signature and Date of Regulatory Project Manager
 (REQUIRED)

 Signature and Date of Person Requesting Preliminary JD
 (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

**Dairyland Power Cooperative, Strum-Willard N-3 69kV Transmission Line Rebuild Project, Eau Claire, Jackson and Trempealeau Counties, Wisconsin
WDNR Wetland Individual Permit - Attachment C**

Feature ID ¹	Resource Description ²	Designated Waters		Permanent Impacts Resulting from Structure Installation ⁴						Temporary Impacts Resulting from Construction Matting		Notes	Location							Map Page
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006D	Seasonally Flooded Basin-South Fork Buffalo River	Class III	ASNRI/PNW							304.0	0.007	Pole Outside of wetland	Trempealeau	Sumner	SW	NW	14	24N 7W	44.56054, -91.20562	5
009D	Seasonally Flooded Basin			2	24	0.0006	363, 362	Wood	1	320.0	0.007		Trempealeau	Sumner	Center	Center	14	24N 7W	44.561042, -91.196567	5
011D	South Fork of the Buffalo River	Class II	ASNRI/PNW							1820.5	0.042		Trempealeau	Sumner	SE	NE	14	24N 7W	44.560986, -91.189059	6
015D	Seasonally Flooded Basin									1702.9	0.039		Trempealeau	Sumner	SW	NE	13	24N 7W	44.563813, -91.175113	6
012D1	Seasonally Flooded Basin			1	12	0.0003	380	Wood	1	1225.3	0.028		Trempealeau	Sumner	SW	NE	13	24N 7W	44.564624, -91.173450	7
017D	Seasonally Flooded Basin							Wood	1			Removal of Existing Structure	Jackson	Garfield	SW	SW	7	24N 6W	44.568202, -91.167316	7
018D	Seasonally Flooded Basin			2	24	0.0006	395, 394		1	2157.0	0.050		Jackson	Garfield	SE	SW	7	24N 6W	44.568209, -91.159297	7
020									1			Removal of Existing Structure	Jackson	Garfield	SE	NE	7	24N 6W	44.575399, -91.145896	9
028	Seasonally Flooded Basin			2	24	0.0006	445, 446	Wood	1	320.0	0.007		Eau Claire	Bridge Creek	NW	SW	32	25N 6W	44.602540, -91.144682	11
030	Seasonally Flooded Basin			1	12	0.0003	448	Wood		160.0	0.004		Eau Claire	Bridge Creek	SW	NW	32	25N 6W	44.604798, -91.144620	11
031D	Fresh Wet Meadow-Intermittent Stream			1	12	0.0003	453	Wood	1	160.0	0.004		Eau Claire	Bridge Creek	NE	NE	31	25N 6W	44.609140, -91.145009	12
032D	Shallow Marsh-Thompson Valley Creek	Class II	ASNRI/PNW	1	12	0.0003	465	Wood	2	160.0	0.004		Eau Claire	Bridge Creek	SE	NE	30	25N 6W	44.619885, -91.144941	13
035	Seasonally Flooded Basin-Intermittent Drainage			1	12	0.0003	483		1	5257.8	0.121		Eau Claire	Bridge Creek	NE	NE	29	25N 6W	44.621820, -91.125740	14
039D	Shallow Marsh									1839.0	0.042		Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.621742, -91.078869	16
040										1944.4	0.045		Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.62168, -91.080451	16
041D	Seasonally Flooded Basin			2	24	0.0006	530, 529	Wood	1	2367.8	0.054	Pole S30 Within 10 ft of wetland	Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.621828, -91.076666	16
043	Seasonally Flooded Basin-Hay Creek	Class I	ASNRI/PNW	1	12	0.0003	535	Wood	1	160.0	0.004		Eau Claire	Bridge Creek	NW	NE	26	25N 6W	44.622164, -91.071391	16

Dairyland Power Cooperative, Strum-Willard N-3 69kV Transmission Line Rebuild Project, Eau Claire, Jackson and Trempealeau Counties, Wisconsin
 WDNR Wetland Individual Permit - Attachment C

Feature ID ¹	Resource Description ²	Designated Waters		Permanent Impacts Resulting from Structure Installation ⁴					Temporary Impacts Resulting from Construction Matting		Notes	Location						Map Page		
		Trout Stream	Other	# of Poles	Structure Footprint (sq. ft)	Structure Footprint (acres)	Structure Numbers	Structure Type ⁵	Number of Existing Structures to be Removed	Matting for Construction Access ⁶ (sq. ft)		Matting for Construction Access ⁶ (acres)	County	Town/ Village/ City	QQ	Q	Sect.		T,R (E, W)	Wisconsin State Planar Coordinates (NAD 83)
051D	Fresh Wet Meadow-Travis Creek	Class II	ASNRI/PNW	4	48	0.0011	571, 572	Wood	4	7811.0	0.179		Eau Claire	Bridge Creek	NE	NE	24	25N 6W	44.639288, -91.043685	18-19
							Fairchild							NW	NW	19	25N 5W			
							Fairchild							SW	SW	18	25N 5W			
053D	Seasonally Flooded Basin			1	12	0.0003	577	Wood	1	3240.8	0.074		Eau Claire	Fairchild	SW	SW	18	25N 5W	44.641941, -91.039980	19
055										633.3	0.015		Eau Claire	Fairchild	NE	SW	17	25N 5W	44.644713, -91.036236	19
056D	Fresh Wet Meadow-Bridge Creek	Class III-Connects to a PRF	ASNRI/PNW	2	24	0.0006	582, 583	Wood	2	4589.0	0.105		Eau Claire	Fairchild	NE	SW	18	25N 5W	44.64589, -91.034631	19
058D1	Seasonally Flooded Basin			1	12	0.0003	5	Wood	1	744.2	0.017		Eau Claire	Fairchild	SE	NW	18	25N 5W	44.650305, -91.033500	20
058D2	Seasonally Flooded Basin								1			Removal of Existing Structure	Eau Claire	Fairchild	NE	NW	18	25N 5W	44.653638, -91.033602	20
058D3	Seasonally Flooded Basin			1	12	0.0003	10	Wood	1	160.0	0.004		Eau Claire	Fairchild	SE	SW	18	25N 5W	44.654859, -91.033582	20
059D2	Shallow Marsh								1			Removal of Existing Structure	Eau Claire	Fairchild	SW	NE	7	25N 5W	44.662422, -91.033299	21
060D	Seasonally Flooded Basin			2	24	0.0006	24, 25	Wood	2	320.0	0.007		Eau Claire	Fairchild	NW	NE	7	25N 5W	44.667810, -91.033270	22
065D1	Seasonally Flooded Basin			1	12	0.0003	31	Wood				Structure within 10 ft of wetland	Eau Claire	Fairchild	SW	SE	6	25N 5W	44.669074, -91.028454	22
066										882.3	0.020		Eau Claire	Fairchild	SW	SE	5	25N 5W	44.669057, -91.021506	22
067D	Shallow Marsh			2	24	0.0006	38, 39	Wood	1	1186.0	0.027		Eau Claire	Fairchild	SW	SE	5	25N 5W	44.669039, -91.019110	22
072D1	Seasonally Flooded Basin			1	12	0.0003	51	Wood	1	377.8	0.009		Eau Claire	Fairchild	SW	SW	4	25N 5W	44.668504, -91.002395	23
072D2	Shallow Marsh			3	36	0.0008	53, 54, 55	Wood	3	8785.6	0.202		Eau Claire	Fairchild	NW	NW	9	25N 5W	44.668471, -90.999246	23
074D	Seasonally Flooded Basin-Black Creek	Class III	ASNRI/PNW	1	12	0.0003	60	Wood	1	2493.7	0.057		Eau Claire	Fairchild	NW	NE	9	25N 5W	44.668486, -90.990737	24
077D	Shrub Swamp			1	12	0.0003	70	Wood	1	2669.3	0.061		Eau Claire	Fairchild	NW	NE	10	25N 5W	44.668562, -90.978475	24
078D1	Shallow Marsh			1	12	0.0003	80	Wood	1	1293.4	0.030		Eau Claire	Fairchild	NE	NE	10	25N 5W	44.668588, -90.964919	25
078D2	Shrub Swamp-Pea Creek		Endangered, Threatened or Stream of Special Concern	2	24	0.0006	84, 85	Wood	2	4925.5	0.113		Eau Claire	Fairchild	SE	SE	3	25N 5W	44.670721, -90.962690	25
080D	Seasonally Flooded Basin								1			Removal of Existing Structure	Eau Claire	Fairchild	SE	NE	3	25N 5W	44.676526, -90.962590	26

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office	St. Paul District	File/ORM #	2013-02241-NJC	PJD Date:	Jun 21, 2013
State	TN	City/County	Clark, Eau Claire, Jackson and Trempealeau	Name/Address of Person Requesting PJD	Dairyland Power Cooperative Mr. Kurt Childs, Director of Real Estate 3200 East Avenue South La Crosse, Wisconsin 54602
Nearest Waterbody:	unnamed wetland				
Location: TRS, LatLong or UTM:	see enclosed table				
Identify (Estimate) Amount of Waters in the Review Area:	Name of Any Water Bodies on the Site Identified as Section 10 Waters:		Tidal: _____ Non-Tidal: _____		
Non-Wetland Waters:	Stream Flow:				
_____ linear ft _____ width _____ acres	_____				
Wetlands:	2.81 acre(s)	Cowardin Class:	Palustrine, emergent		
			<input type="checkbox"/> Office (Desk) Determination <input type="checkbox"/> Field Determination: _____ Date of Field Trip: _____		

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: _____
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - Office concurs with data sheets/delineation report.
 - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps _____
- Corps navigable waters' study: _____
- U.S. Geological Survey Hydrologic Atlas:
 - USGS NHD data.
 - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite quad name: _____
- USDA Natural Resources Conservation Service Soil Survey. Citation: _____
- National wetlands inventory map(s). Cite name: _____
- State/Local wetland inventory map(s): _____
- FEMA/FIRM maps: _____
- 100-year Floodplain Elevation is: _____
- Photographs: Aerial (Name & Date): _____
 Other (Name & Date): _____
- Previous determination(s). File no. and date of response letter: _____
- Other information (please specify): _____

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Alvin Cayll 6/21/13
 Signature and Date of Regulatory Project Manager
 (REQUIRED)

 Signature and Date of Person Requesting Preliminary JD
 (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

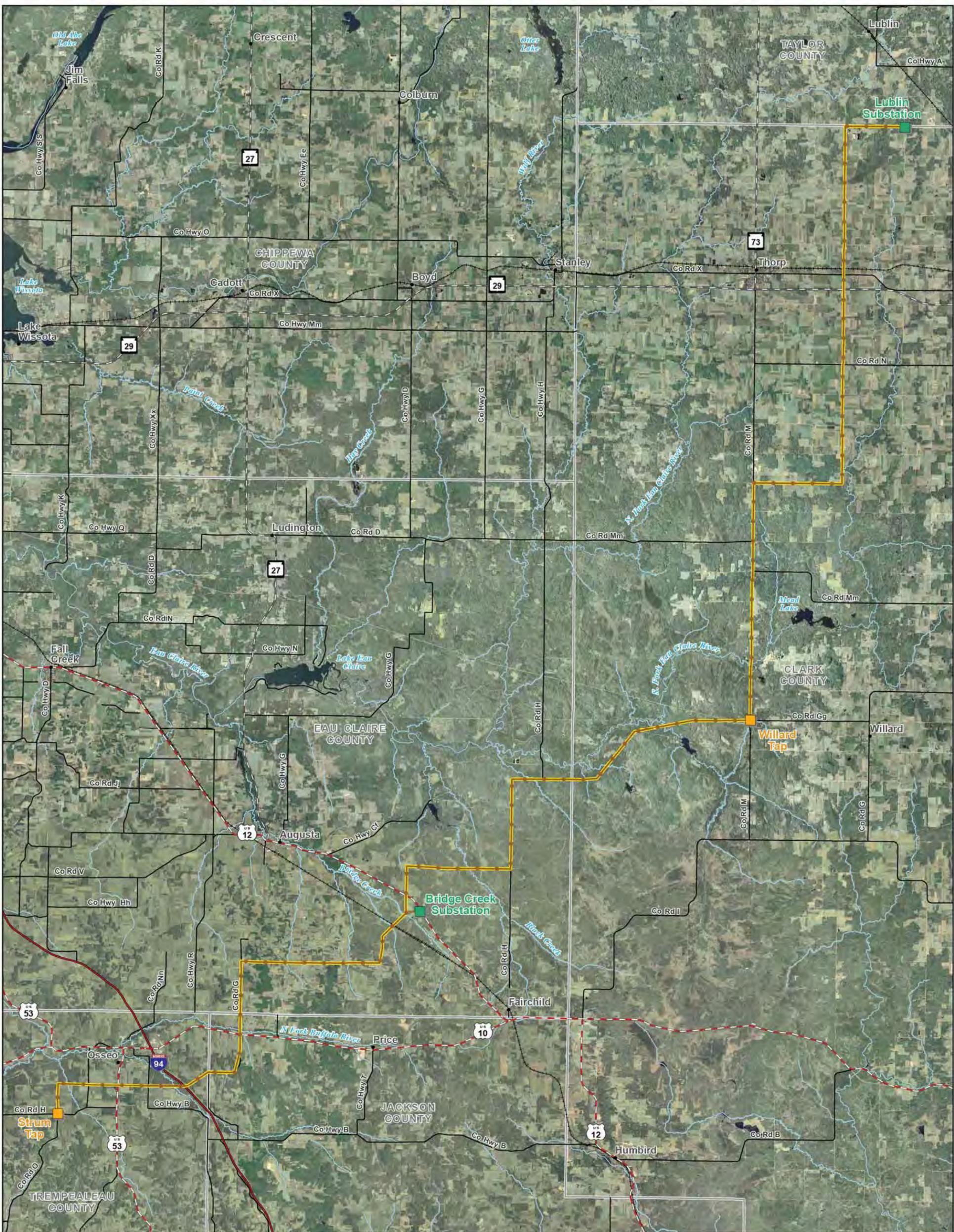
Dairyland Power Cooperative, Strum-Willard N-3 69kV Transmission Line Rebuild Project, Eau Claire, Jackson and Trempealeau Counties, Wisconsin
 WDNR Wetland Individual Permit - Attachment C

Feature ID ¹	Resource Description ²	Designated Waters		Permanent Impacts Resulting from Structure Installation ⁴					Temporary Impacts Resulting from Construction Matting		Notes	Location							Map Page	
		Trout Stream	Other	# of Poles	Structure Footprint (sq. ft)	Structure Footprint (acres)	Structure Numbers	Structure Type ⁵	Number of Existing Structures to be Removed	Matting for Construction Access ⁶ (sq. ft)		Matting for Construction Access ⁶ (acres)	County	Town/ Village/ City	QQ	Q	Sect.	T,R (E, W)		Wisconsin State Planar Coordinates (NAD 83)
006D	Seasonally Flooded Basin-South Fork Buffalo River	Class III	ASNRI/PNW							304.0	0.007	Pole Outside of wetland	Trempealeau	Sumner	SW	NW	14	24N 7W	44.56054, -91.20562	5
009D	Seasonally Flooded Basin			2	24	0.0006	363, 362	Wood	1	320.0	0.007		Trempealeau	Sumner	Center	Center	14	24N 7W	44.561042, -91.196567	5
011D	South Fork of the Buffalo River	Class II	ASNRI/PNW							1820.5	0.042		Trempealeau	Sumner	SE	NE	14	24N 7W	44.560986, -91.189069	6
015D	Seasonally Flooded Basin									1702.9	0.039		Trempealeau	Sumner	SW	NE	13	24N 7W	44.563813, -91.175113	6
012D1	Seasonally Flooded Basin			1	12	0.0003	380	Wood	1	1225.3	0.028		Trempealeau	Sumner	SW	NE	13	24N 7W	44.564624, -91.173450	7
017D	Seasonally Flooded Basin							Wood	1			Removal of Existing Structure	Jackson	Garfield	SW	SW	7	24N 6W	44.568202, -91.162316	7
018D	Seasonally Flooded Basin			2	24	0.0006	395, 394		1	2157.0	0.050		Jackson	Garfield	SE	SW	7	24N 6W	44.568209, -91.159297	7
020									1			Removal of Existing Structure	Jackson	Garfield	SE	NE	7	24N 6W	44.575399, -91.145896	9
028	Seasonally Flooded Basin			2	24	0.0006	445, 446	Wood	1	320.0	0.007		Eau Claire	Bridge Creek	NW	SW	32	25N 6W	44.602540, -91.144682	11
030	Seasonally Flooded Basin			1	12	0.0003	448	Wood		160.0	0.004		Eau Claire	Bridge Creek	SW	NW	32	25N 6W	44.604798, -91.144620	11
031D	Fresh Wet Meadow-Intermittent Stream			1	12	0.0003	453	Wood	1	160.0	0.004		Eau Claire	Bridge Creek	NE	NE	31	25N 6W	44.609140, -91.145009	12
032D	Shallow Marsh-Thompson Valley Creek	Class II	ASNRI/PNW	1	12	0.0003	465	Wood	2	160.0	0.004		Eau Claire	Bridge Creek	SE	NE	30	25N 6W	44.619885, -91.144941	13
035	Seasonally Flooded Basin-Intermittent Drainage			1	12	0.0003	483		1	5257.8	0.121		Eau Claire	Bridge Creek	NE	NE	29	25N 6W	44.621820, -91.125740	14
039D	Shallow Marsh									1839.0	0.042		Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.621742, -91.078869	16
040										1944.4	0.045		Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.62168, -91.080451	16
041D	Seasonally Flooded Basin			2	24	0.0006	530, 529	Wood	1	2367.8	0.054	Pole 530 Within 10 ft of wetland	Eau Claire	Bridge Creek	NE	NW	26	25N 6W	44.621828, -91.076666	16
043	Seasonally Flooded Basin-Hay Creek	Class I	ASNRI/PNW	1	12	0.0003	535	Wood	1	160.0	0.004		Eau Claire	Bridge Creek	NW	NE	26	25N 6W	44.622154, -91.071391	16

Dairyland Power Cooperative, Strum-Willard N-3 69kV Transmission Line Rebuild Project, Eau Claire, Jackson and Trempealeau Counties, Wisconsin
 WDNR Wetland Individual Permit - Attachment C

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		Trout Stream	Other	# of Poles	Structure Footprint (sq. ft)	Structure Footprint (acres)	Structure Numbers	Structure Type ⁵	Number of Existing Structures to be Removed	Matting for Construction Access ⁶ (sq. ft)		Matting for Construction Access ⁶ (acres)	County	Town/ Village/ City	QQ	Q	Sect.		T,R (E, W)	Wisconsin State Planar Coordinates (NAD 83)		
051D	Fresh Wet Meadow-Travis Creek	Class II	ASNRI/PNW	4	48	0.0011	571, 572 573 574	Wood	4	7811.0	0.179		Eau Claire	Bridge Creek	NE	NE	24	25N 6W	44.639288, -91.043685	18-19		
053D	Seasonally Flooded Basin			1	12	0.0003	577	Wood	1	3240.8	0.074		Eau Claire	Fairchild	SW	SW	18	25N 5W			44.641941, -91.039980	19
055										633.3	0.015		Eau Claire	Fairchild	NE	SW	17	25N 5W			44.644713, -91.036236	19
056D	Fresh Wet Meadow-Bridge Creek	Class III-Connects to a PRF	ASNRI/PNW	2	24	0.0006	582, 583	Wood	2	4589.0	0.105		Eau Claire	Fairchild	NE	SW	18	25N 5W	44.64588, -91.034631	19		
058D1	Seasonally Flooded Basin			1	12	0.0003	5	Wood	1	744.2	0.017		Eau Claire	Fairchild	SE	NW	18	25N 5W	44.650305, -91.035500	20		
058D2	Seasonally Flooded Basin								1			Removal of Existing Structure	Eau Claire	Fairchild	NE	NW	18	25N 5W	44.653638, -91.033602	20		
058D3	Seasonally Flooded Basin			1	12	0.0003	10	Wood	1	160.0	0.004		Eau Claire	Fairchild	SE	SW	18	25N 5W	44.654859, -91.033582	20		
059D2	Shallow Marsh								1			Removal of Existing Structure	Eau Claire	Fairchild	SW	NE	7	25N 5W	44.662422, -91.033299	21		
060D	Seasonally Flooded Basin			2	24	0.0006	24, 25	Wood	2	320.0	0.007		Eau Claire	Fairchild	NW	NE	7	25N 5W	44.667810, -91.033270	22		
065D1	Seasonally Flooded Basin			1	12	0.0003	31	Wood				Structure within 10 ft of wetland	Eau Claire	Fairchild	SW	SE	6	25N 5W	44.669074, -91.028454	22		
066										882.3	0.020		Eau Claire	Fairchild	SW	SE	5	25N 5W	44.669057, -91.021506	22		
067D	Shallow Marsh			2	24	0.0006	38, 39	Wood	1	1186.0	0.027		Eau Claire	Fairchild	SW	SE	5	25N 5W	44.669039, -91.019110	22		
072D1	Seasonally Flooded Basin			1	12	0.0003	51	Wood	1	377.8	0.009		Eau Claire	Fairchild	SW	SW	4	25N 5W	44.668504, -91.002395	23		
072D2	Shallow Marsh			3	36	0.0008	53, 54, 55	Wood	3	8785.6	0.202		Eau Claire	Fairchild	NW	NW	9	25N 5W	44.668471, -90.999246	23		
074D	Seasonally Flooded Basin-Black Creek	Class III	ASNRI/PNW	1	12	0.0003	60	Wood	1	2493.7	0.057		Eau Claire	Fairchild	NW	NE	9	25N 5W	44.668486, -90.990737	24		
077D	Shrub Swamp			1	12	0.0003	70	Wood	1	2669.3	0.061		Eau Claire	Fairchild	NW	NE	10	25N 5W	44.668562, -90.978475	24		
078D1	Shallow Marsh			1	12	0.0003	80	Wood	1	1293.4	0.030		Eau Claire	Fairchild	NE	NE	10	25N 5W	44.668588, -90.964919	25		
078D2	Shrub Swamp-Pea Creek		Endangered, Threatened or Stream of Special Concern	2	24	0.0006	84, 85	Wood	2	4925.5	0.113		Eau Claire	Fairchild	SE	SE	3	25N 5W	44.670721, -90.962660	25		
080D	Seasonally Flooded Basin								1			Removal of Existing Structure	Eau Claire	Fairchild	SE	NE	3	25N 5W	44.676526, -90.962590	26		

Coordination Letter Attachments



STRUM - LUBLIN 69kV(N-3) TRANSMISSION LINE REBUILD

Project Area

Legend

- | | |
|--|--|
| Strum - Lublin
69kV (N-3) Transmission Line | Hydrology
Perennial Stream |
| Existing Utilities
Substation
Tap
69kV Transmission Line | Transportation
Interstate Highway
U.S. Highway
State Highway
County Highway
Railroad |

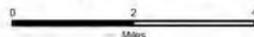
**DAIRYLAND POWER
COOPERATIVE**



TETRA TECH, INC.



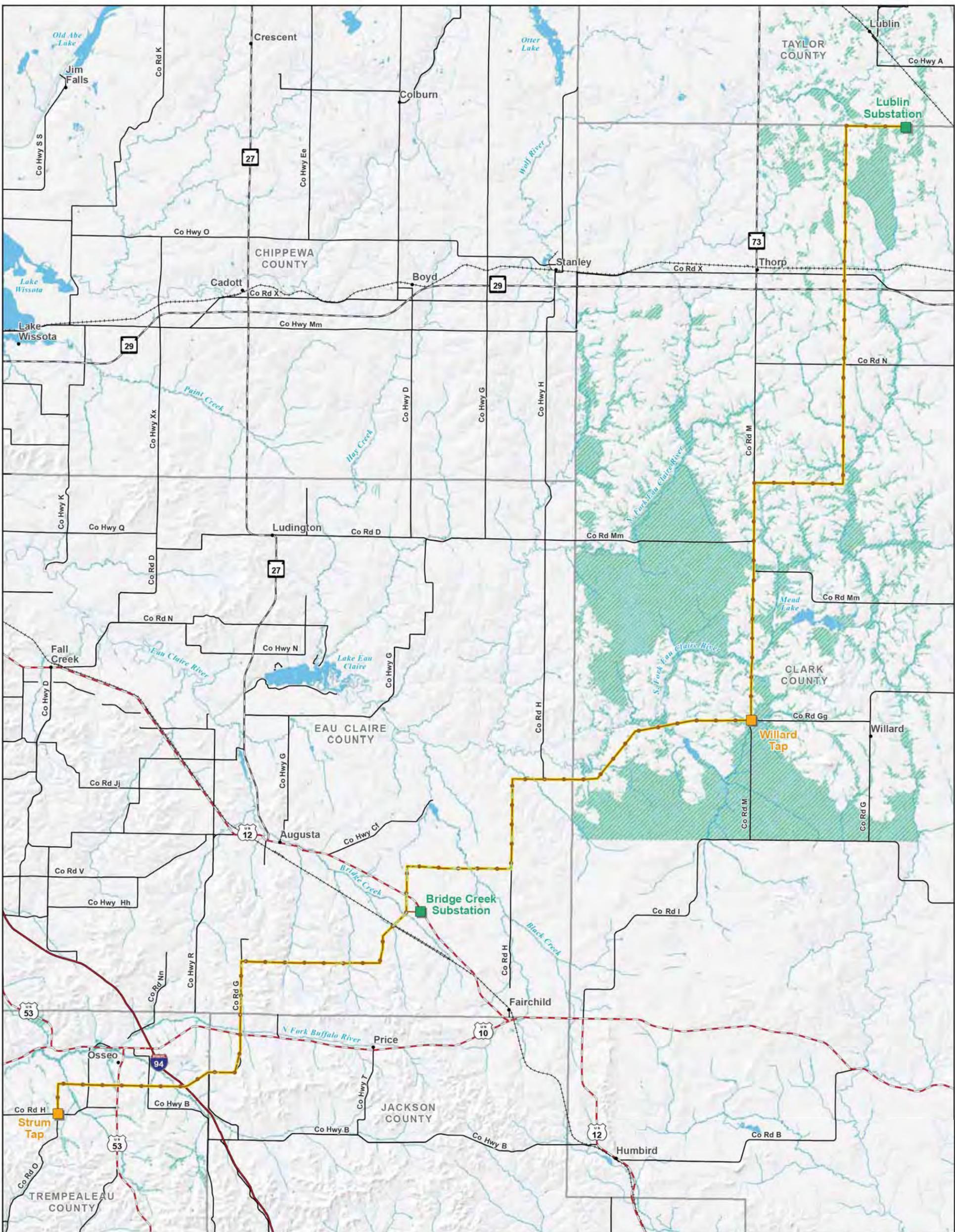
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(when printed at 22" X 34")



Source: WINGE P.F. (GIS, ESRI, NAD (2011))
Name: Transm. Area
Revised: 10/4/2012



Path: P:\1602_DPC_Strum_to_Lublin\GISLayouts\Resource_Maps\Project_Area.mxd



STRUM - LUBLIN 69kV(N-3) TRANSMISSION LINE REBUILD

Surface Water

- Legend**
- Strum - Lublin 69kV (N-3) Transmission Line
 - Existing Utilities Substation
 - Existing Utilities Tap
 - Existing Utilities 69kV Transmission Line
 - Hydrology Lake, Pond, or Reservoir
 - Hydrology Perennial Stream
 - Hydrology Intermittent Stream
 - Hydrology WWI Welland

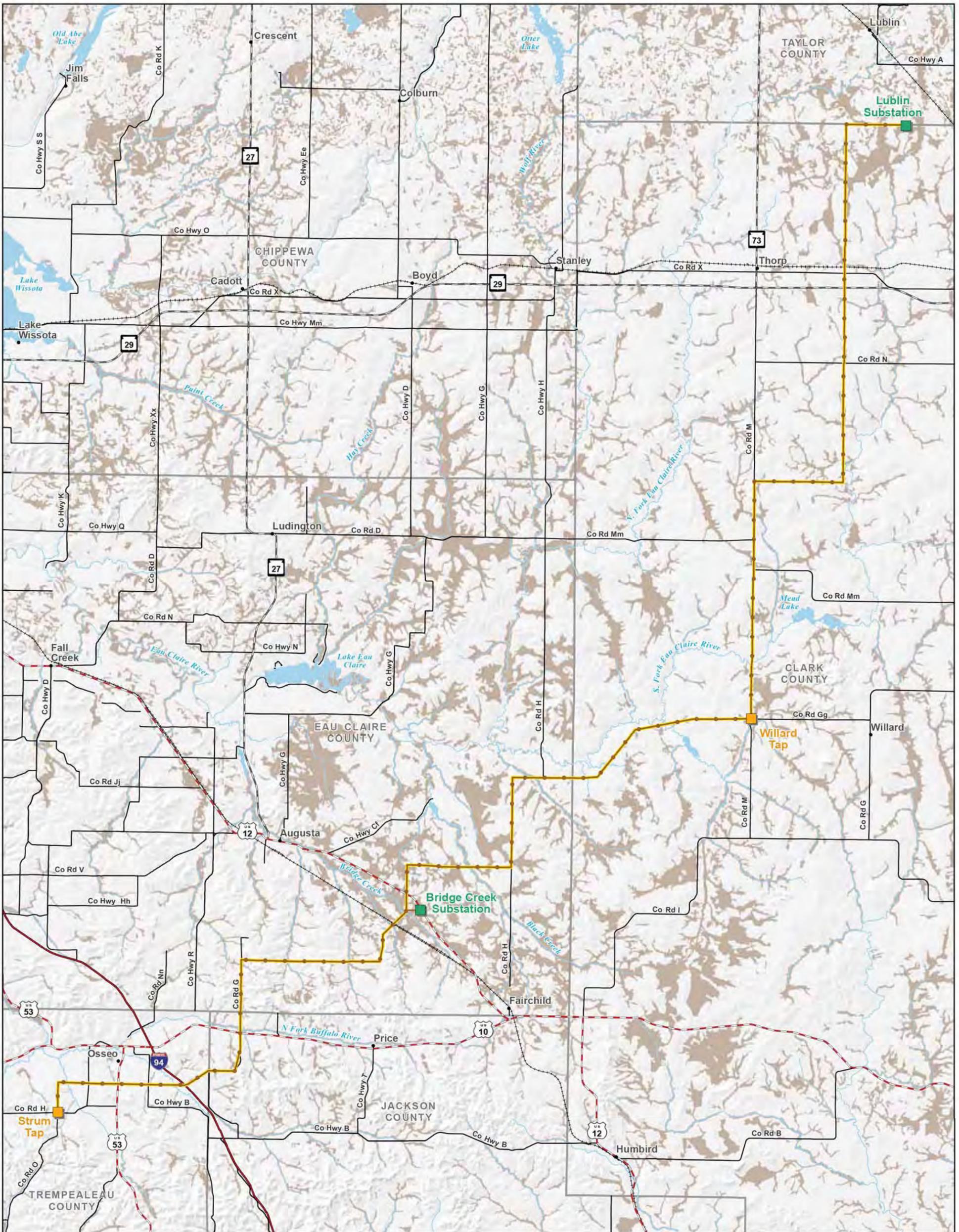


Scale 1:96,000 1 inch equals 8,000 feet (when printed at 22" X 34")

0 2 4 Miles

Source: WDNR, BTS, NHD, USGS, ESRI
Name: Surface Water
Revised: 8/24/2012





STRUM - LUBLIN 69KV (N-3) TRANSMISSION LINE REBUILD

Hydric Soils

Legend

- | | |
|---|--|
|  Strum - Lublin
69KV (N-3) Transmission Line |  Lake or Pond |
|  Substation |  Perennial Stream |
|  Tap |  Hydric Soil |
|  69KV Transmission Line | |



TETRA TECH, INC.



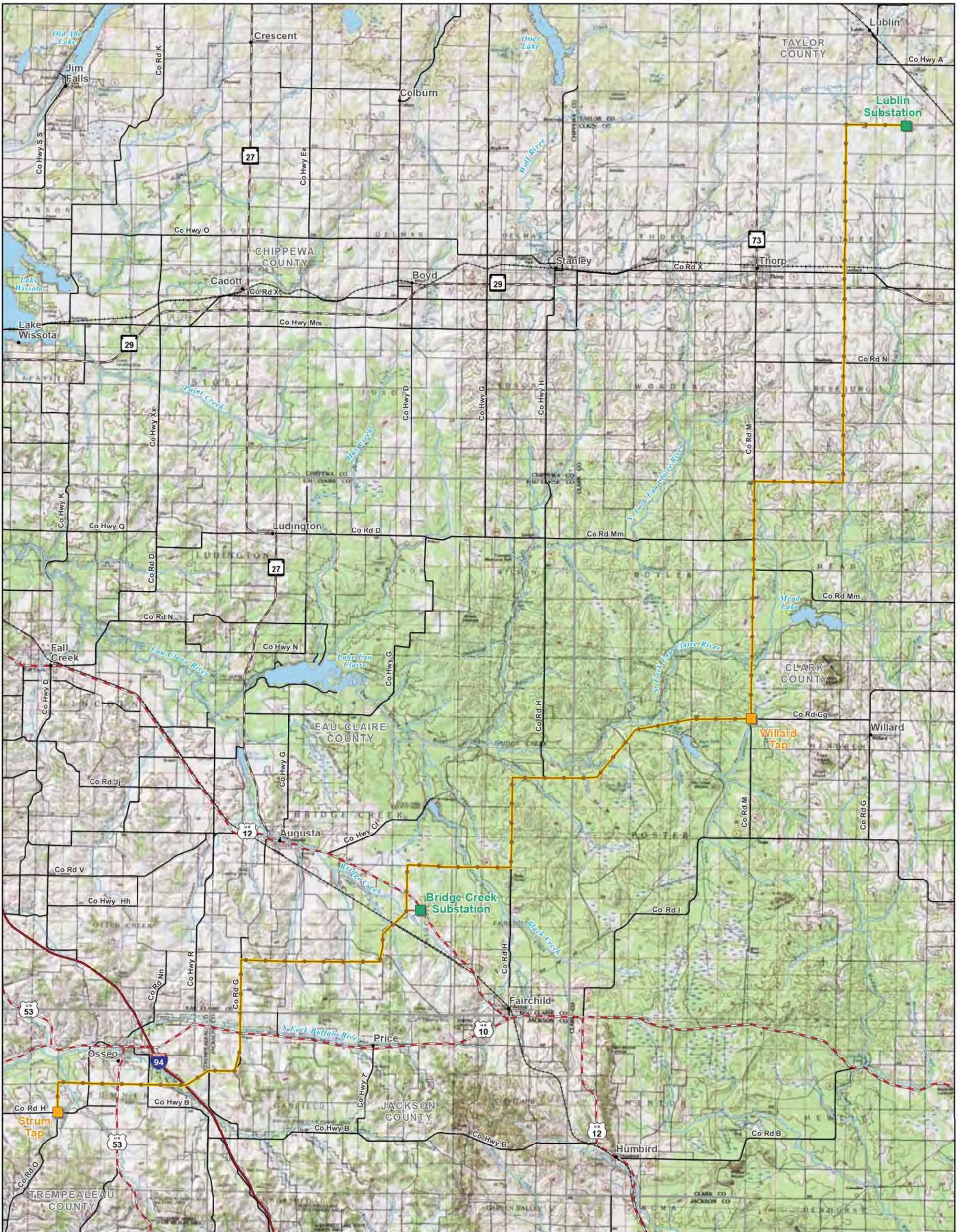
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(when printed at 22" X 34")



Source: NRCS, WDNR, BTS, NHD, USGS, ESRI
Name: Hydric Soils
Revised: 9/23/2012



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STRUM - LUBLIN 69kV(N-3) TRANSMISSION LINE REBUILD

USGS Topographic Map

Legend

Strum - Lublin
69kV (N-3) Transmission Line

Existing Utilities

Substation
 Tap
 69kV Transmission Line

Hydrology

Lake or Pond
 Perennial Stream

Transportation

Interstate Highway
 U.S. Highway
 State Highway
 County Highway
 Railroad

**DAIRYLAND POWER
COOPERATIVE**



TETRA TECH, INC.



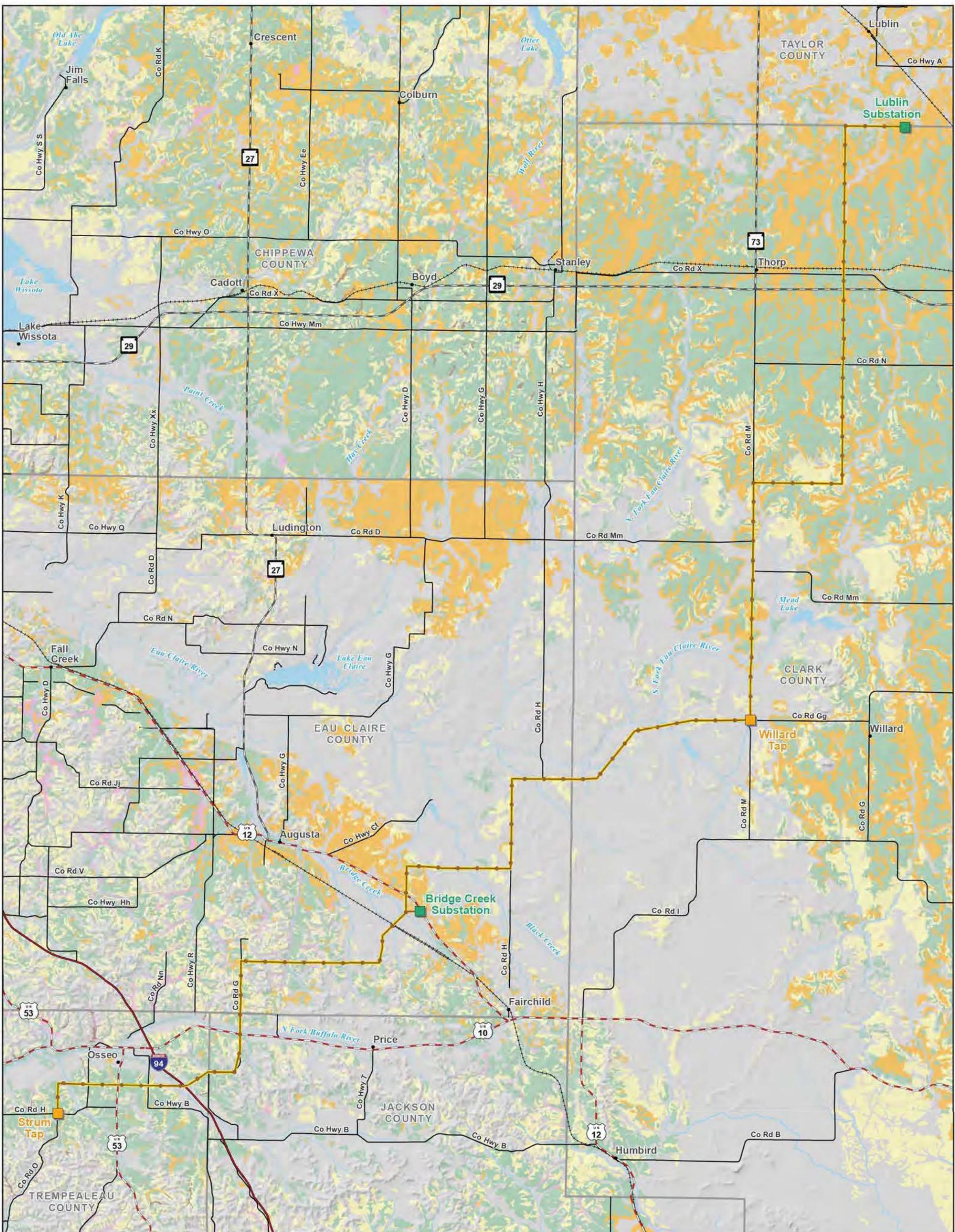
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(when printed at 22" X 34")



Source: WGNB, BTS, NHD, USGS, ESRI
Name: USGS_Topo
Revised: 8/23/2012



Path: P:\602_DPC_Strum_to_Lublin\GISLayouts\Resource_Maps\USGS_Topo.mxd



STRUM - LUBLIN 69kV(N-3) TRANSMISSION LINE REBUILD

Prime Farmland

Legend

- Strum - Lublin 69kV (N-3) Transmission Line
- Substation
- Tap
- 69kV Transmission Line

Prime Farmland

- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland
- Prime farmland if drained
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if protected from flooding or not frequently flooded during the growing season

Hydrology

- Lake or Pond
- Perennial Stream

**DAIRYLAND POWER
COOPERATIVE**



TETRA TECH, INC.

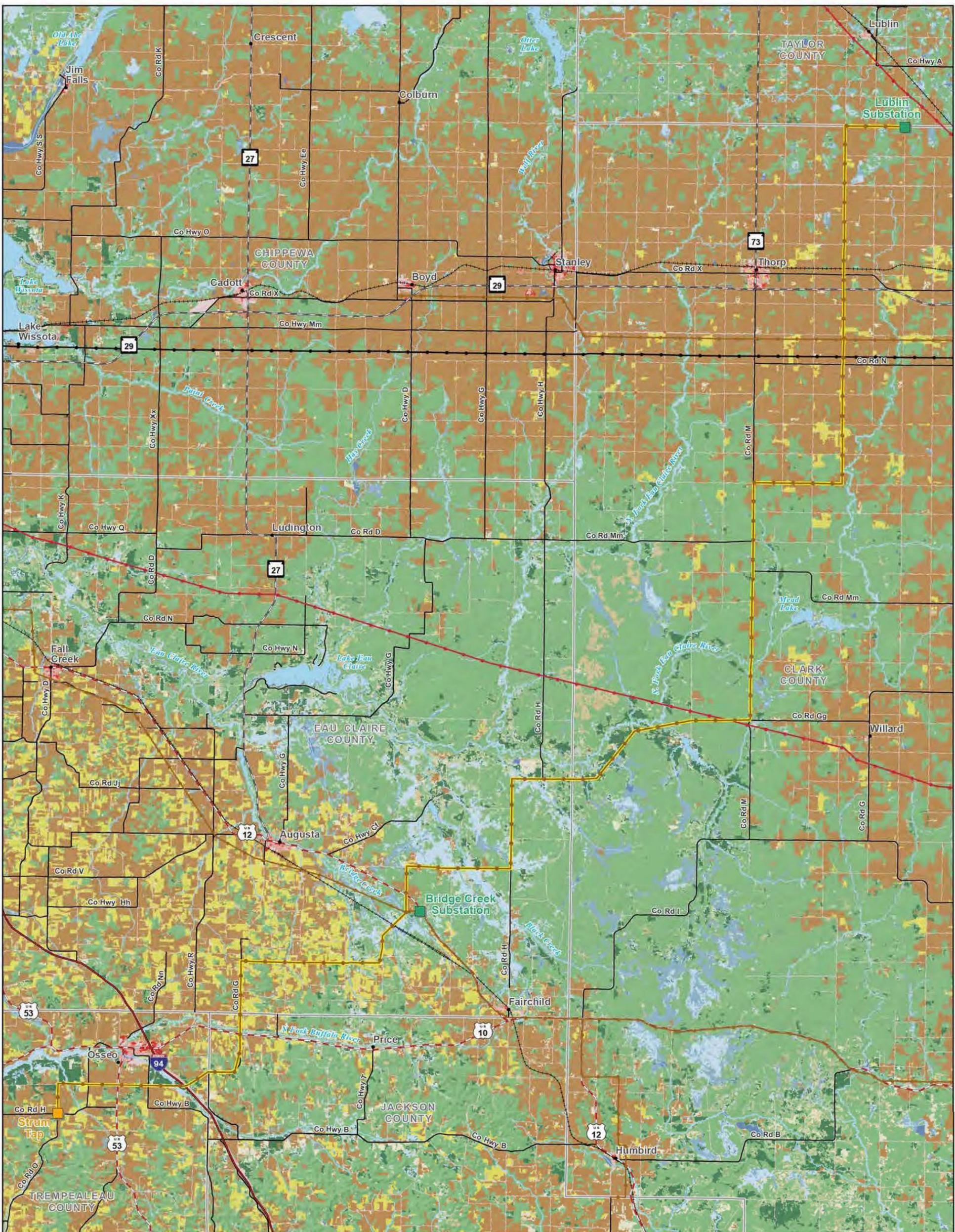


Scale 1:96,000
1 inch equals 8,000 feet
(when printed at 22" X 34")

0 2 4
Miles

Source: WPA, D19, NWI, USGS, ESRI
Name: Prime Farmland
Revised: 02/2012





STRUM - LUBLIN 69KV (N-3) TRANSMISSION LINE REBUILD

Land Cover

Legend

Strum - Lublin
69KV (N-3) Transmission Line

Existing Utilities

Substation
Tap
69kV Transmission Line
115kV Transmission Line
345kV Transmission Line

Land Cover

Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Deciduous Forest
Evergreen Forest

Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands

Hydrology

Perennial Stream

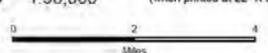
DAIRYLAND POWER
COOPERATIVE



TETRA TECH EC, INC.



Scale 1:96,000 1 inch equals 8,000 feet
(when printed at 22" X 34")



Source: WINE, D19, IHO, USGS, ESRI, NLCD
Name: Land Cover
Revised: 7/2020



Path: P:\4602_DPC_Strum_to_Lublin\GIS\Layouts\Resource_Maps\Land_Cover.mxd



Photo 1. View from Starks Road looking north at the Project ROW along the east side of County Road M.



Photo 2. View from Starks Road looking south at the Project ROW along the east side of County Road M.



Photo 3. View from Stump Road looking west at the Project ROW along the south side of County Road M.



Photo 4. View from Kempton Road approximately 0.7 mile north of County Road RR looking northeast at the Project ROW.



Photo 5. View of switch structures on the southwest corner of County Line Road and Sterling Avenue near Lublin Substation.

Appendix I: Newspaper Advertisement and Legal Notice



NOTICE OF AVAILABILITY

Proposed Strum-Lublin 69kV Transmission Line Rebuild Project ENVIRONMENTAL ASSESSMENT

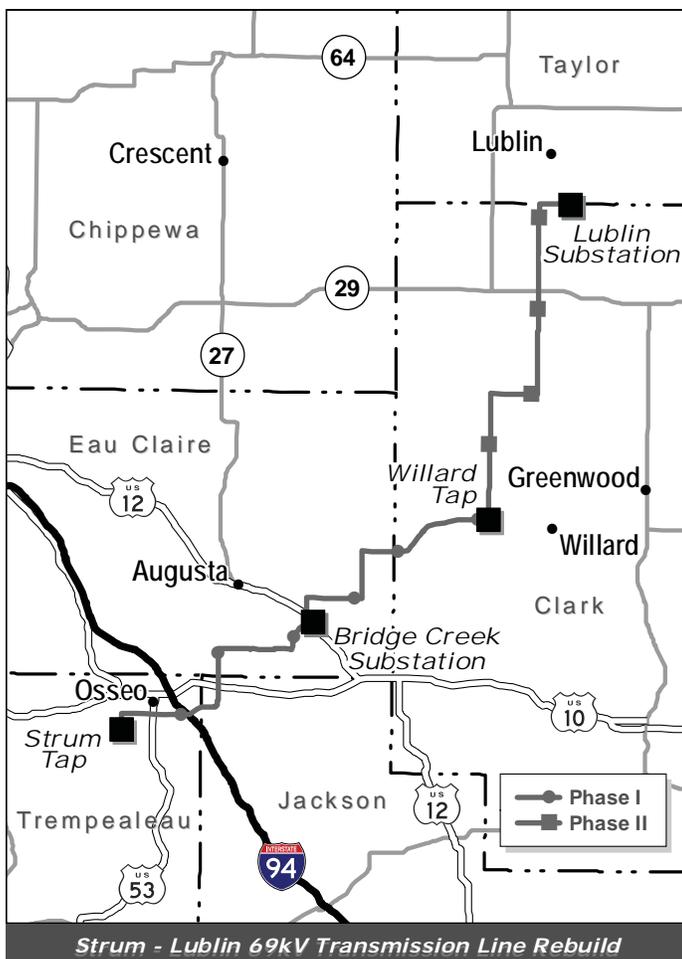
The U.S. Department of Agriculture (USDA)–Rural Utilities Service (RUS) announces the availability of an Environmental Assessment (EA) which was prepared to meet RUS responsibilities under the National Environmental Policy Act (NEPA) and 7 CFR 1794 related to providing financial assistance to Dairyland Power Cooperative (DPC) for the proposed Strum-Lublin 69kV Transmission Line Rebuild Project (Project). The EA addresses potential impacts associated with the construction and operation of the proposed action and the no action alternative.

The proposed Project consists of replacing structures and upgrading conductor along approximately 58 miles of DPC's existing 76 mile 69kV single-circuit transmission line (referred to as N-3) in Trempealeau, Jackson, Eau Claire, and Clark counties. The proposed Project would be constructed within the existing 60 foot right-of-way (ROW); however, the ROW will be widened to 80 feet (10 feet on either side of the existing ROW) in order to meet DPC's current standard ROW width for 69kV transmission lines. The proposed Project is needed so that DPC can continue to provide reliable electric service to the area. Originally constructed in 1950, the transmission line is reaching the end of its service life with increased maintenance costs, high exposure miles, line overloads and low voltages. The location of the proposed Project is shown on the map below.

Construction of the proposed Project is scheduled to take place in two phases: Phase I will begin in the fall of 2013 and Phase II will begin in the summer of 2014 (see map below for phasing).

The new single wood pole structures that will be used to replace the existing 69kV transmission line will be approximately 60 to 80 feet tall and have a span of approximately 300-400 feet between structures. Access to the structures would be temporary overland access crossing existing or new easements using entrances from local roads, field roads, and private driveways (where permitted by the landowner). Three temporary clear span bridges are proposed to access structures located on either side of a stream or river in heavily vegetated areas where access is limited. Permanent effects associated with construction would be limited to the footprint of the transmission structures and it is anticipated that the proposed Project will result in approximately 0.3 acre of permanent impact.

The transmission line, as proposed, will be located within wetlands and 100-year floodplains. Construction of the proposed transmission line will result in up to 384 square feet of permanent disturbance within 100-year floodplains and up to 1,632 square feet of permanent disturbance within wetlands. DPC has considered a variety of alternatives for the project, including taking no action. DPC believes that there is no practicable alternative that will avoid locating transmission structures in wetlands and 100-year floodplains.



AVAILABILITY: The EA can be reviewed at, or obtained from, Dairyland Power Cooperative, 3200 East Avenue South, La Crosse, WI 54602, Clark Electric Cooperative 124 N. Main St., Greenwood, Wisconsin 54437, Eau Claire Energy Cooperative, 8214 US Highway 12, Fall Creek, WI 54742, Riverland Energy Cooperative (Arcadia Office), N28988 State Road 93, Arcadia, WI 54612, or from the Engineering and Environmental Staff, USDA–RUS, 1400 Independence Avenue, SW, Stop 1571 Room 2244, Washington, D.C. 20250. The EA will be available electronically for review at: <http://www.rurdev.usda.gov/UWP-ea.htm>.

PLEASE SUBMIT COMMENTS TO: Emily Orlor, Environmental Protection Specialist, Engineering and Environmental Staff, USDA–RUS, 1400 Independence Avenue, SW, Stop 1571, Room 2244, Washington, D.C. 20250. Comments can also be submitted via email to: emily.orlor@wdc.usda.gov.

For project-specific questions, please contact: Chuck Thompson (DPC), 608-787-1432, or send questions to: cat@dairynet.com.

COMMENT PERIOD: USDA–RUS is requesting comments on the proposed action. Comments on the EA should be received in writing within 30 days of the publication date of this notice to ensure that USDA–RUS, prior to making its environmental impact determination, considers them. The deadline for submitting comments to the USDA-RUS regarding the EA is August 26, 2013, at the addresses provided in this notice.

UNITED STATES DEPARTMENT OF AGRICULTURE

Rural Utilities Service

AGENCY: USDA, Rural Utilities Service

ACTION: Notice of Availability of an Environmental Assessment

The U.S. Department of Agriculture (USDA)–Rural Utilities Service (RUS) announces the availability of an Environmental Assessment (EA) which was prepared to meet RUS responsibilities under the National Environmental Policy Act (NEPA) and 7 CFR 1794 related to providing financial assistance to Dairyland Power Cooperative (DPC) for the proposed Strum-Lublin 69kV Transmission Line Rebuild Project (Project). The EA addresses potential impacts associated with the construction and operation of the proposed action and the no action alternative.

The proposed Project consists of replacing structures and upgrading conductor along approximately 58 miles of DPC's existing 76-mile 69kV single-circuit transmission line (referred to as N-3) in Trempealeau, Jackson, Eau Claire, and Clark counties. The proposed Project would be constructed within the existing 60 foot right-of-way (ROW); however, the ROW will be widened to 80 feet (10 feet on either side of the existing ROW) in order to meet DPC's current standard ROW width for 69kV transmission lines. The proposed Project is needed so that DPC can continue to provide reliable electric service to the area. Originally constructed in 1950, the transmission line is reaching the end of its service life with increased maintenance costs, high exposure miles, line overloads and low voltages. The proposed Project is located in Sections 12, 13, 14, 15, 16, 17, 19, and 20 of Township 24 North and Range 7W; Sections 5, 7, and 8 of Township 24 North and Range 6 West; Sections 24, 25, 26, 227, 28, 29, 30, and 31 of Township 25 North and Range 5 West; Sections 3, 4, 5, 6, 7, 8, 9, 18, and 19 of Township 25 North and Range 5 West; Sections 23, 24, 27, and 34 of Township 26 North and 5 West; Sections 1, 10, 11, 12, 15, 16, 17, 19, and 20 of Township 26 North and 4 West; Sections 24, 25, and 36 of Township 27 North and Range 4 West; Sections 6, 7, 18, and 19 of Township 27 North and 3 West; Sections 3, 4, 9, 10, 15, 16, 21, 27, 28, 31, 32, 33, and 34 of Township 28 North and Range 3 West; and Sections 1, 2, 3, 4, 16, 21, 22, 27, 28, 33, and 34. Construction of the proposed Project is scheduled to take in two phases, Phase I will begin in the fall of 2013 and Phase II will begin in the summer 2014.

The new single wood pole structures that will be used to replace the existing 69kV transmission line will be approximately 60 to 80 feet tall and have a span of approximately 300-400 feet between structures. Access to the structures would be temporary overland access crossing existing or new easements using entrances from local roads, field roads, and private driveways (where permitted by the landowner). Three temporary clear span bridges are proposed to access structures located on either side of a stream or river in heavily vegetated areas where access is limited. Permanent effects associated with construction would be limited to the footprint of the transmission structures and it is anticipated that the proposed Project will result in approximately 0.3 acre of permanent impact.

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COMMENT PERIOD: USDA–RUS is requesting substantive comments on the proposed action. Comments on the EA should be received in writing within 30 days of the publication date of this notice to ensure that USDA–RUS, prior to making its environmental impact determination, considers them. The deadline for submitting comments to the USDA-RUS regarding the EA is August 26, 2013, at the address provided in this notice.

At the end of the comment period, USDA–RUS will issue a decision document for the proposed action. A notice announcing the decision document will be published in local newspapers. Any final action by USDA–RUS related to the proposed action will be subject to, and contingent upon, compliance with all relevant federal, state, and local environmental laws and regulations and completion of the environmental review requirements as prescribed in the USDA–RUS Environmental Policies and Procedures (7 CFR Part 1794).

PLEASE SUBMIT COMMENTS TO: Emily Orlor, Environmental Protection Specialist, Engineering and Environmental Staff, USDA–RUS, 1400 Independence Avenue, SW, Stop 1571, Room 2244, Washington, D.C. 20250. Comments can also be submitted via email to: emily.orlor@wdc.usda.gov.

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