Chapter 2: Statewide Karner Blue Butterfly Habitat Conservation Plan (HCP)

C. Land Conservation Strategies

This part of Chapter II identifies acreages and land management measures contributed by the HCP partners to benefit the Karner blue butterfly while maintaining a variety of land uses, including social and economic uses. This part is divided into the following five sections:

- Measuring Conservation in this HCP
- Acreages Included in the HCP and Categories of Management
- Partner Groups
- Broad Conservation Strategies
- Land Management Activities

As outlined in this part, direct land management efforts represent a significant portion of the Wisconsin Karner blue butterfly habitat conservation efforts. These conservation efforts will routinely enhance habitat and are not directly related to management on occupied habitat. These management efforts constitute significant costs contributed by the HCP partners. Additional activities will also be necessary for the success of the HCP. For example, many partners will help maintain a broad state distribution of Karner blue butterflies through public outreach and education efforts which encourage participation in butterfly conservation. These additional activities, including training of field workers, contributions to the federal recovery process, and funding or conducting research are described in Part F of this chapter (pages 127-152).

1. Measuring Conservation in this HCP

Insect conservation efforts are based on different premises than traditional vertebrate conservation efforts. The Karner blue butterfly, like most insect species, has adapted to survive by producing relatively large numbers of eggs and large populations, with short individual lifespans and frequent generation turnovers. Most of the Karner blue butterfly's life is spent in the egg and larval stages. Natural mortality rates during these immature life stages are much greater than mortality rates observed for vertebrate animals. The survival strategy of the Karner blue butterfly centers on the success of overall populations rather than individual organisms. To accommodate this strategy, a focus on habitat conservation and the success of populations -- rather than individuals -- is key to butterfly preservation (Scott 1986). Accordingly, the emphasis of this HCP moves away from the traditional measuring of the take of individual specimens of a

listed species and toward managing for conservation of habitat and large populations.

The long-term viability of Karner blue butterfly populations depends on habitat disturbance. Without periodic disturbance, natural woody succession shades out wild lupine and nectar plants and can passively eliminate Karner blue butterfly populations. Creation of new habitat to replace habitat lost to succession is therefore necessary. This reality underscores the need for managing landscapes for a dynamic, shifting mosaic of populations. Fortunately, *many* land management activities, such as those used in forest management and utility right-of-way maintenance, provide such disturbances.

In situations like this, take is best measured in the context of the overall balance of habitat loss to habitat gain and temporary population declines to enduring population viability. It is not possible, in a defensible manner, to accurately express the take of individual Karner blue butterflies resulting from land management activities. Locations and numbers of individuals, particularly in the larval and egg stages, are usually unknown. Furthermore, similar activities can produce variable mortality rates. Although management activities may result in some mortality, the absence of short-term disturbance would result in greater long-term losses. Consequently, a more meaningful conservation measure is the impact to *habitat that precludes Karner blue butterfly occupation in the foreseeable future*. Examples of this "permanent" take include paving or flooding currently existing occupied habitat. For lands included in this HCP, partner conservation measures will be expressed in terms of the expected positive outcomes rather than levels of take. *At this time, no partners are anticipating activities that would result in permanent take.* Activities are planned by some partners (e.g., flowage construction, road development, etc.) that could result in the take of Karner blue butterflies if the potentially affected area was occupied. At this time, records of occurrence do not exist for these potential development areas. If a partner decides to move forward with any of these activities, surveys in the affected areas will occur prior to the activity. If the potentially affected areas are found to be occupied, avoidance of the occupied area will be encouraged. If the occupied areas cannot be avoided and permanent take is anticipated, a mitigation plan, which must be approved by the DNR and the USFWS, will be developed. *Mitigation is required for all permanent take.* Partners are encouraged to begin coordinating with the DNR and the USFWS as early as possible and prior to the permanent take to insure plans meet with agency approval. In cases where executed plans do not meet with the approval of the DNR and USFWS, remediation work by the partner will be required. Permanent take by certain categories of non-partner landowners will be accounted for through implementation of the landowner participation plan outlined elsewhere in this chapter (see Part F, pages 129-140).

2. Acreages Included in the HCP and Categories of Management

Table 2.11 (pages 65-66) identifies total partner acreage included in the HCP. This acreage is a

subset of the total acreage partners own and manage (264,916 of 2.03 million acres). To be listed in Table 2.11, the acres needed to be: capable of supporting the Karner blue butterfly now or in the future (i.e., within high-potential range and on appropriate sandy soils) and chosen by the individual partners for inclusion.

Each conservation agreement identifies the "included" acreage of each partner that will be subject to conservation efforts. Although some partners include in this category all of their ownership, whether in the high potential range or not, most of this acreage is that which is capable of supporting the Karner blue butterfly, primarily because of sandy soils, within the high potential range. The majority of the partners have committed in their conservation agreements that they will add acreage to this category if found to be occupied or have the high potential to become occupied. Acreage added to this category will be included in annual reports, as requested by the DNR. Maps of included acreage will be updated as needed.

The ITP will cover all partner-owned and managed lands in the state (a total of 2,031,773 acres), as well as all acreage included in the private and public voluntary status under the Landowner Inclusion Strategy (see Part F in this chapter for details of the landowner participation plan, pages 129-140). The general distribution of partner lands is depicted in Figure 1.2 (page 10). Landowners who are not currently partners, but are in a category needing a certificate of inclusion -- as a partner or otherwise -- for coverage, must complete an application process to obtain a certificate of inclusion for ITP coverage (see pages 171-172).

Partners intend to manage the acreage identified for inclusion in the HCP with some level of positive consideration for the Karner blue butterfly. Management levels to benefit the Karner blue butterfly will vary across partner activities and economic goals. Although these conservation efforts fall along a continuum, there are two distinct levels of focus:

- management *with consideration for* the Karner blue butterfly and its habitat, and

- management *to feature, protect or enhance* the Karner blue butterfly and its habitat.

These levels of focus are discussed below and are differentiated through examples of management activities in Table 2.12 (page 67). Some activities can be assigned to either management category, depending on their differing aims. In addition to identifying total acreage commitments, Table 2.11 (pages 65-66) breaks partner acreages included in the HCP into categories according to the level of conservation. Individual commitments are discussed further in each partner's conservation agreement.

Management with Consideration for the Karner Blue Butterfly and its Habitat. This management category represents lands owned or managed by partners on which consideration for the Karner blue butterfly and its habitat will be incorporated into routine land management activities. Acreage in this category may include an entire, dynamic landscape with only portions

occupied by the Karner blue butterfly at any given time. Although consideration measures will vary according to the land, activity and partner, *the long-term biological goal of this strategy is for butterfly habitat gains to equal or exceed losses occurring through natural succession or otherwise*.

Land management activities for HCP acres in this category will primarily reflect the individual goals of the partner. However, the land manager will continue operations with consideration for the Karner blue butterfly. The first step of consideration for the butterfly is to ascertain its presence or absence on or near areas of planned activity. If an area is or could potentially be occupied, the landowner may incorporate considerations to allow for or encourage habitat viability. Individual commitments to management with consideration are discussed further in each partner's conservation agreement.

Management to Feature, Protect or Enhance the Karner Blue Butterfly and its Habitat. This management category represents lands that are owned or managed by partners on which one of the primary management goals is to feature Karner blue butterfly habitat or the broader barrens community that includes it. This may be accomplished through habitat management, enhancement, or restoration activities that promote wild blue lupine, nectaring plants, microhabitat, or habitat heterogeneity for the Karner blue butterfly. As with the management with consideration level, *these lands are managed with the biological goal and expectation that Karner blue habitat gains will equal or exceed losses. Additional measures are taken, however, to promote viable Karner blue butterfly populations despite potential economic costs.*

Table 2.11. Acreage Included in the HCP by Partner (as Identified by Individual Partners)

Partners	Acreages Included in HCP		
	Mgmt. with Consideration	Mgmt. to Feature, Protect, & Enhance	Total
Forest Industry			
Consolidated Papers, Inc.	8,154		8,154
Georgia-Pacific Corp.	19,077		19,077
Johnson Timber Co.	944		944
Mosinee Paper Corp.	1,600		1,600
Wisconsin River Power Co.	23,976		23,976
County Forests			
Burnett County	27,808		27,808
Clark County	1,956		1,956
Eau Claire County	22,320	730	23,050
Jackson County	28,900	6,100	35,000
Juneau County	21,822	18	21,840
Monroe County	3,000		3,000
Washburn County	1,005		1,005
Wood County	3,874		3,874
Wisconsin State Agencies			
DNR	33,983	29,706.5	63,689.5
DOT	4,000		4,000

Table continues on next page.

Table 2.11. Acreage Included in the HCP by Partner, Cont.

Partners	Acreages Included in HCP		
	Mgmt. with Consideration	Mgmt. to Feature, Protect, & Enhance	Total
Utility Managers			
Alliant	3,000		3,000
ANR Pipeline Co.	10,470		10,470
Lakehead Pipe Line Co.	1,085		1,085
Northern States Power Co.	6,067	20	6,087
NW Wis. Electric Co.	1,500		1,500
Polk-Burnett Electric Coop	1,043		1,043
Wisconsin Gas Co.	673		673
Wisconsin Public Service Corp.	934		934
Conservation Organizations			
The Nature Conservancy		1,150	1,150
TOTAL ACRES INCLUDED IN HCP:			264,915.5
Other Partners	**Acreages Not Applicable**		
DATCP Thilmany Wisconsin Paper Council			

The figures shown in Table 2.11 (above) reflect partner lands known to be suitable to support Karner blue butterfly populations. Additional acreages owned by individual partners may become included in the HCP at a later date, if information supports the suitability of those lands to maintain Karner blue butterflies.

Table 2.12. Examples of Activities Included in Each Management Category
(*Note:* Specific options may not be employed by all partners.)

Management with Consideration for the Karner Blue Butterfly and its Habitat	Management to Protect or Enhance the Karner Blue Butterfly and its Habitat
Biological Goal: Habitat gains equal or exceed losses and continue to provide habitat	**Biological Goal:** Habitat gains equal or exceed losses and continue providing habitat, but also extra steps to promote/maintain higher Karner populations, sacrificing some economic return
➢ Pre-management presence/absence surveys	➢ Follow Karner blue butterfly wildlife management guidelines for prescribed fire or mechanical management (Appendix F)
➢ Training of staff for Karner blue butterfly and lupine presence/absence	➢ Manage for habitat heterogeneity
➢ Alter timing of disturbance (mowing, harvest, herbicide applications, etc.)	➢ Stock timber stands less densely
➢ Limit or cease application of some pesticides	➢ Create and maintain dispersal corridors to promote subpopulation connection
➢ Managing forest types to maintain short lived, intolerant species; i.e. jack pine vs. red pine or white pine	➢ Monitor effects of management on Karner blue butterfly and associated habitat
➢ Maintain pine forest types with seed bed preparation, commercial harvest and natural regeneration from on site seed sources	➢ Barrens restoration or conversion work (from forest)
➢ Leave a scattered distribution of large diameter oak or long lived conifers to provide scattered shade across Karner blue butterfly habitats	➢ Participate in research projects related to population viability, habitat quality
➢ Incorporate forest stand inventory attributes to indicate lupine and/or Karner blue butterfly occurrence which will assist GIS planning and shifting mosaic scheduling	➢ Participate in Karner Blue Butterfly Recovery Plan
➢ Avoid building new access roads or recreational trails through high Karner blue butterfly occupied habitat	➢ Planting lupine, nectar plants in new openings if necessary
➢ Continue updating lupine occurrence map for partner lands. Refine association between Forest Habitat Type Classification System and wild lupine occurrence	➢ Re-introduction or introduction of Karner blue butterflies
➢ Use patch scarification rather than furrowing when establishing jack pine plantations	➢ Create or maintain long-term barrens habitat
➢ Develop forest management - Karner blue butterfly habitat discussion sites for public information tours that periodically visit the property.	
➢ Presence/absence surveys as possible	

Recovery-related Acreage. Some of the partners, such as the DNR, will be involved in federal recovery efforts for the Karner blue butterfly. In these instances, partner acreages committed to

federal recovery may be the same as those intended for Management to Protect or Enhance or for Management with Consideration of the Karner blue butterfly or its habitat. See Part F of this Chapter (pages 147-151) and Chapter VI (page 335) for more information on federal recovery efforts in Wisconsin.

3. Partner Groups

For planning and evaluation purposes, the HCP partners are grouped into seven categories based on the similarities in history and long-term management goals. These groups are briefly discussed below and include:

- Forest Industry
- County Forests
- State (DNR) Lands
- Utilities
- Conservation Organizations
- Transportation
- Other Partners

Forest Industry. Members of this partner group manage land for forest products. Most of these partners have manufacturing facilities in the state which require a continuous source of wood fiber. Lands owned and managed by the companies provide a portion of this raw material.

During the 1920s and 1930s much of the land within the documented range of the Karner blue butterfly was cleared and farmed. These farms had relatively infertile soils and soon became unproductive agricultural land. Eventually, counties acquired these farms as tax delinquent property. Many of these properties were in turn purchased by the forest industry. These purchases included not only the abandoned agricultural fields, but areas of vegetation that were native to the sandy soils. The former farm fields were suitable for the production of several pine species. Following acquisition, the forest industry planted many of these acres with red and jack pine (*Pinus resinosa* and *P. banksiana*, respectively). To protect this investment, fire prevention and suppression activities were initiated. The areas of native vegetation, primarily mixed with scrub oak (*Quercus ellipsoidalis* and *Q. velutina*) and jack pine, were harvested and replanted with various pine species for timber production.

Today, much of this pine is being intensively managed as plantations or natural stands. The presence of the Karner blue butterflies on many of these lands suggests that some forest

management activities may be conducive to lupine habitat. In addition, continuous harvesting and replanting of timber creates a landscape mosaic of successional habitats.

County Forests. The County Forest program began in 1927 following passage of the County Forest Crop Law which authorized counties to create county forests. Under the current County Forest Law, 28 counties own approximately 2.25 million acres. Eight of these counties are HCP partners. County forest lands included in this HCP are depicted in Fig. 3.2 (page 201).

County forests serve multiple purposes. Timber production, public recreation, wildlife and water quality protection all co-exist through mixed use management. The Karner blue butterfly occupies some county forest lands, giving continued opportunities to affirm the wildlife protection aspect of multiple use.

State (DNR) Lands. Wisconsin recognized the need many years ago to protect, manage and provide for public use of its natural resources. Since 1876, Wisconsin has been acquiring land to meet state conservation and recreation goals. As of July 1, 1996, holdings amounted to more than 1.2 million acres. Properties owned by the State of Wisconsin carry many designations, including Wildlife Management Areas, Fisheries Management Areas, Southern and Northern State Forests, State Recreation Areas, Wild Rivers and Riverways, State Parks, State Trails and State Natural Areas. The primary purposes and, consequently, the property management plans vary considerably among the different designations. Property management plans generally specify long-term goals with short-term objectives, as well as management activities to achieve the goals and objectives. Typically, the plans will identify a broad range of issues, such as: (1) needs for outdoor recreation and conservation education; (2) protection of forest production, native biological diversity, aquatic and terrestrial wildlife, and soil and water quality; and (3) preservation of natural features including unique geological, scenic, historic and archeological sites. The DNR continues to acquire, manage and conserve land according to statutory mandates and legislative programs.

Nineteen of the properties owned or managed by the DNR are occupied by Karner blue butterflies. These butterfly populations occupy a total of approximately 3,300 acres of lupine habitat. Although eight other DNR properties have the potential to support Karner blue butterfly populations, they are not known to be occupied.

The DNR intends to manage in excess of 63,000 acres of sandy soils either with consideration for or to feature the Karner blue butterfly and has included these lands in the HCP. The Karner blue butterfly is one of many considerations that must be integrated into the anagement of state lands. The success of these management efforts is measured in the ability of future generations to enjoy the same quality of environmental and recreational opportunities available today.

Utilities. This partner group manages easements for the construction and maintenance of: (1) overhead electrical transmission lines, and (2) underground electrical, gas and oil lines. Some of the transmission line corridors or rights-of-way (ROWs) have been in place since the early 1900s. Over the years, ROWs have been managed to reduce the growth of woody vegetation. For both

overhead and underground lines, a clear ROW provides line access and reduces the likelihood of woody growth disrupting the line. In a few cases, the partner owns the ROW for its utility line, but ROWs are predominantly easements from private landowners. These private landowners may have management issues separate from the utility company.

Utility lines cross several regions which previously included barrens and prairie ecosystems. Tree planting, farming and fire control have significantly reduced these habitats. Land management for corridor maintenance often benefits lupine and other shade-intolerant grassland species. Typical management includes mowing for short-term control of woody vegetation, or herbicide use for selective long-term control.

In some cases, utility ROWs are some of the few remaining areas that contain native prairie habitats. While surrounding land use may be managed for forest production or other uses, utility lines have maintained linear remnants of open wild lupine habitat. Many utilities have adjusted their management techniques to reduce impacts on sites of known quality prairie. For instance, many utilities clear corridors when vegetation is dormant in the fall or winter seasons.

Conservation Organizations. The Nature Conservancy is an international conservation organization dedicated to the preservation of biological diversity. Founded in 1950, The Nature Conservancy has chapters in fifty states and active conservation programs in several foreign countries. The field office of the Wisconsin Chapter is located in Madison. The formal mission of the organization is "to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and water they need to survive."

In Wisconsin, the Conservancy owns or manages 23,686.41 acres at 55 sites. Following acquisition, lands are managed to promote their natural features and rare species. In addition, other methods have been undertaken to achieve the mission of The Nature Conservancy, including the purchase of development rights, negotiating informal agreements with landowners, education and collaboration.

Several Nature Conservancy preserves are located within the Karner blue butterfly's documented range. While the butterfly is not known to occur on any of these sites, The Nature Conservancy is restoring and managing one site, Quincy Bluff, to promote Karner blue habitat. With USFWS approval, The Nature Conservancy is interested in reintroducing the Karner blue butterfly into this managed habitat.

Transportation. The Wisconsin Department of Transportation (DOT) is responsible for providing quality facilities and services for a variety of modes of transportation. Wisconsin's major investment is in the State Trunk Highway System, which began in 1918. Today, this system encompasses 130,000 acres of right-of-way (ROW). Depending on the type of road, remaining roadsides in ROW corridors range from twenty feet or less along the older highways to

over 100 feet along some sections of interstate highways and other freeways. Medians provide additional vegetation, with widths generally varying between 40 and 60 feet wide.

State highway roadsides protect the highway facility by providing proper drainage and safe areas for errant or disabled vehicles. Roadsides sometimes accommodate utilities such as overhead or underground communication and power lines. Rest areas, waysides, scenic overlooks, historical markers and similar tourist amenities are also considered part of the highway roadside.

Following construction, ROW management usually begins by re-establishing vegetation. This vegetative cover is usually a mix of Eurasian grasses and legumes. The DOT, however, has used native grasses to a limited extent and is increasingly interested in using them where appropriate. Roadsides are maintained by limited mowing and occasional cutting of woody plants to provide a clear zone for errant vehicles, to maintain adequate sight distance and to allow sun exposure for snow and ice removal. Unlike utility corridors, most state trunk highway ROWs are owned by the DOT.

Other Partners. The Wisconsin Paper Council is the trade association representing the pulp, paper and allied industry in the state. Headquartered in Neenah, the Council represents its members in public affairs and relations, and serves as a paper industry information center. The Paper Council includes 29 regular members which are pulp and paper product producers, two converter members, and 112 associate members which are goods and services suppliers.

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) is also a partner. The DATCP's Bureau of Agrichemical Management conducts an endangered species program designed to protect federally listed plants and animals from pesticide exposure. Providing species information and protection guidelines, this program negotiates pesticide management plans with landowners and managers in areas where listed species occur. The DATCP's endangered species program is supported by the U.S. EPA and the USFWS. The DATCP plays a key role in the landowner inclusion strategy discussed in Part F of this chapter (page 138). The DATCP is co-sponsoring, along with several forest industry partners, research to test the impacts of herbicides on Karner blue butterfly habitat and eggs.

4. Broad Conservation Strategies

The HCP partners have worked on the land, managing the natural resources for many years. Respective land management goals have been shaped by certain values, as well as available amenities and commodities. Partners have developed strategies to allow for these benefits while integrating considerations for Karner blue butterfly habitat conservation. Such strategies have evolved from the observation and study of past management that was seemingly beneficial to the Karner blue butterfly.

Partners identified the following broad strategies as possible options for conserving and fostering the Karner blue butterfly:

- management for long-term habitat,
- management for a shifting mosaic of habitat,
- management for dispersal corridors, and
- compensatory mitigation strategies.

Each of these strategies is discussed below. Partners have chosen to apply one, several, or all of these strategies to their respective lands. Table 2.13 (pages 78-79) indicates the conservation strategies selected by each partner. The integration of the strategy with the various land management activities is further detailed in each partner's conservation agreement.

Management for Long-Term Habitat. For partners who have so chosen, some lands will be designated for the long-term maintenance of Karner blue butterfly habitat. In this context, long-term is defined as a period extending beyond the successional timeframe in which a site provides suitable Karner blue habitat following disturbance. The most common long-term habitat strategy will be barrens community restoration and management (as on several DNR properties). Areas not qualifying as barrens community, such as lupine habitat along road and utility corridors, may also be managed on a long-term basis through periodic mowing. Ongoing disturbance maintains an early successional community and is most often accomplished through fire or mowing rotation intervals of three to ten years, although evidence suggests longer rotations (e.g., 20-50 years) may provide excellent Karner blue butterfly habitat in many cases (e.g., in areas with very poor soils or areas affected by oak wilt). While mortalities within the local Karner blue butterfly population may occur in recently burned or mowed areas, reoccupation from surviving patches or adjoining populations may occur within one or two Karner blue butterfly generations.

Consistent with the HCP and their individual conservation agreements, partners who are not outlining a specific plan for long-term habitat (including a timeline for implementation) in their conservation agreements at this time, but have selected this strategy, will provide such a plan with their first annual report.

Management for a Shifting Mosaic of Habitat. For partners who have so chosen, a "shifting

mosaic" management strategy will be used to maintain Karner blue butterfly habitat in a diverse patchwork of forested stands in a slowly changing distribution over time across the landscape. Unless other intentions are described in the individual conservation agreements, the "shifting mosaic" is a land management strategy whereby suitable habitat patches are created by routine land management practices conducted by the partners across their landscape. This patchwork of Karner blue butterfly habitats allows the opportunity for colonization of newly created habitat from nearby maturing patches with declining Karner blue butterfly habitat due to succession. Under this strategy, allowing land management activities with consideration for Karner blue butterflies to continue will maintain the disturbance pattern that has historically provided the rich mosaic of habitats where Karner blue butterflies exist today. In addition, the shifting mosaic strategy incorporates conservation measures by partners to insure the maintenance of Karner blue butterflies on the forested landscape (see individual partners' conservation agreements and the "Karner Blue Butterfly Conservation Protocols for Forest Management by HCP Partners" included in Appendix F).

The methods used to plan these disturbance patterns, or shifting mosaic across the landscape, already exist in the form of a land and vegetation inventory system operated by each partner. The planning and implementation of the shifting mosaic strategy will rely heavily on this same system. In other words, this conservation strategy builds on existing planned management activities.

This inventory system, commonly referred to as a land operations inventory, a continuous forest inventory, or a forest stand reconnaissance inventory system provides the format to keep an account of both the spatial locations and the physical and vegetative attributes for each land unit in the partner's ownership. Years of field measurements and site evaluations have been invested to collect and organize the information to build this inventory. In earlier years, the inventory system provided basic information on forest species and composition, stand age and quality, stocking levels, soils, access, recommended silvicultural treatments and other information needed by forest managers to plan activities. Most, if not all, partners now rely on computer technology to store, manipulate and retrieve attribute data for each land unit. Some partners operate geographic information system (GIS) technology which links digital maps to inventory data for each land unit. Both systems provide the information base for decision-making.

This inventory has been used for many years by the forest partners to meet their needs for scheduling and managing the timing and spatial arrangement of activities on their lands. The timing and spatial arrangement of harvest, forest regeneration, road construction, recreational trail layout, wildlife habitat development, fire breaks and other practices have been important considerations for land managers. This information base allows each partner to know how

many acres are involved, where the sites are located and when each site is expected to receive a treatment. Similarly, timing, location and size are also key considerations for maintaining Karner blue butterfly habitat.

As land management becomes more complex and inventory systems continue to evolve, additional biological and physical data have been added to the inventory system to help refine decisions on land management prescriptions. Considerations for aesthetics, disease and insect problems, water quality, recreational uses, wildlife habitats, access control, adjoining land uses, endangered species protection, wild fire suppression, size of harvest areas, sustainable land use, and others are now routinely included when prescribing land management activities for each site. Because the various forest partners have a variety of land capabilities and land management goals, the various considerations receive varying levels of emphasis. This fact leads to even greater diversity across the state. The common element is that this inventory system has been used by the forest partners to plan for and to successfully produce the mosaic of forest stands that exists today. Consideration of Karner blue butterfly habitat is another factor that the partners have pledged to include as land management planning occurs on their respective lands.

The current mosaic includes forest stands with different species, age classes, stocking levels, height diversity, access corridors and acreage that have been deliberately manipulated by the partners. There exists a great mix of young, recently regenerated forest stands, stands of intermediate age and mature stands approaching final harvest. Some forest types have relatively short rotation schedules (i.e. 50 years or less) while other types will be managed for rotations at least twice as long. Included within the mosaic are stands that offer no potential for Karner blue butterfly habitat, such as wetlands, as well as other areas that will provide long term habitats such as road corridors, log landings and fuel breaks.

Figure 3.5 (page 206) displays this type of forest inventory information, which is in a GIS format, linked with the actual locations of Karner blue butterfly occurrences on the Black River State Forest. The Karner blue butterfly sites are marked with an asterisk. These documented Karner blue butterfly occurrences indicate that the Karner blue butterfly is recently present and using known habitat. These individual Karner blue butterfly sites have historically been disturbed and, at present, the wide variety of established forest vegetation is dynamically changing, growing and aging. If left to natural succession, eventually wild lupine and other disturbance-dependent plant species, which are critical habitat components, will be replaced. The shifting mosaic strategy recognizes the natural aging process of habitat and allows for the timely, planned disturbance of the forest. In Figure 3.5, (page 206) the forest compartment inventory has been queried to identify the age class distribution of jack pines. The age class information has been organized to display the mature 40 year old (and older) age class, the medium aged 16-40 year old age class, and the young 0-15 year old age class. Generally speaking, the younger 0-15 year old age class represents the most recent disturbance in the forest. These areas provide the best opportunity for wild lupine to establish for a period of time and provide habitat for the Karner blue butterfly. The

medium aged 16-40 year stands are becoming older, and forest trees are gradually developing a closed canopy that discriminates against the shade-intolerant understory plants. The mature, 40+ year old stands represent areas where harvests will likely be planned in the near future and will provide management opportunities for consideration of the Karner blue butterfly. Planning these harvests near existing Karner blue butterfly locations that are found in maturing stands is one example of how forest managers can shift the location of Karner blue butterfly habitat over time. Also, in this example some of the larger roads are shown which can provide corridors for Karner blue butterfly movements.

The land management practices conducted under this system have consistently produced Karner blue butterfly habitat well before the Karner blue butterfly was federally-listed. When the forest partners harvested timber on their lands within the range of the Karner blue butterfly, they set back natural succession and allowed vegetation compatible with Karner blue butterfly habitat to reoccupy the harvested site. On industrial lands, and to some degree on county lands, this rotation of harvests produces income that supports land management activities on a land base that is relatively secure and is not routinely subject to development pressures for other uses. When this inventory system is applied by each partner with management with consideration strategies under terms of the ITP, a shifting mosaic of Karner blue butterfly habitat will be maintained across lands managed by the forest partners. This shifting mosaic has produced Karner blue butterfly habitat that remains compatible with the needs of the butterfly as well as the forest partner.

Most often these inventories "schedule" the harvest of mature stands by year as the stand grows into older, mature stands. On a property basis, the annual allowable sustainable harvest of forestland and/or timber volume is determined by summarizing the acreages and/or volumes of mature stands and then adjusting the figures to average the total acreage over the rotation cycles for the particular cover types. On an annual basis through normal work planning, opportunities to harvest timber and manage land in a manner that will benefit Karner blue butterfly habitat may arise. These opportunities may result from habitat or Karner blue butterflies on a site or in proximity to the planned activity. Depending on the age and quality of existing Karner blue butterfly habitat and the availability of mature forest stands near known Karner blue habitat, disturbance -- such as a timber harvest -- can be planned for stands adjacent, or in close proximity, to the existing habitat. As the existing known habitat ages, a variety of plant species may compete for the available moisture and nutrients, and without disturbance, gradually erode the quality of the habitat for the Karner blue butterfly. By disturbing areas adjacent, or in proximity, to the existing habitat, replacement habitat may develop thereby offering additional opportunities for occupation from the existing habitat. The acreage of the habitat will not be reduced and hopefully, will be increased.

Likewise, the planned location of more permanent type openings such as log landings can be strategically incorporated into timber harvests to provide increased habitat potential. Based on the observations and experiences of land managers, such landings have provided excellent habitat

patches that are occupied by the Karner blue butterflies. Linking landings with roads or trails, which can be designed into a timber sale or management activity, will provide potential corridors of habitat and a dispersal network for the Karner blue butterfly.

The goal of sustaining a no net loss of habitat under the HCP, consistent with the Articles of Partnership, is integrated into the sustainable forestry approach embraced by all forest partners. However, it is imperative to understand that it may be impossible to anticipate the benefits available or that may arise during the course of scheduled activities.

An example of the shifting mosaic approach presented itself on the Black River State Forest. An active 1997 timber sale involved Karner blue butterfly habitat that is occupied. Since the DNR does not yet have the authorization to incidentally take the Karner blue butterfly, the site is marked and the logger may not enter the site or remove timber from the site. By cutting timber adjacent to and establishing a landing near the occupied site, it is expected that as the existing site vegetation succeeds and likely loses its habitat value for the Karner blue butterfly, that the new, strategically located open areas resulting from the planned disturbance will provide habitat and the butterflies will disperse to that new nearby habitat. This pattern of providing areas for habitat establishment and dispersal will continue as opportunities arise. With an ITP, such occupied sites can be enhanced by removing the timber in addition to providing more potential habitat resulting from the logging activity.

Management for Dispersal Corridors (including non-landowning partners). For partners who have chosen, some lands will aid in providing corridors or areas for Karner blue butterfly dispersal (as further specified in partner conservation agreements). These lands may be managed under terms of written easements rather than fee title ownership, as with many utility company rights-of-way. In these areas, partners will carefully plan the timing of management practices such as mowing, cutting and chemical applications to promote healthy Karner blue butterfly habitat and populations. Where known Karner blue butterfly populations exist, partners who are land managers (and not the landowner) would work closely with individual landowners, as appropriate, to promote and protect habitat in these areas.

Compensatory Mitigation Strategies. For partners who have chosen, some acres of land will be managed for the Karner blue butterfly to mitigate negative land management activities (as outlined in individual partner conservation agreements). In cases where an unanticipated permanent take is likely to occur, the partner is expected to notify the DNR and develop mitigation strategies consistent with the no net loss of habitat commitment in the Articles of Partnership. This direct mitigation could be chosen by a partner to compensate for a predicted or actual loss of occupied Karner blue butterfly habitat. Mitigation can include habitat that has been restored or created, or land acquisition for Karner blue butterfly habitat restoration and occupation. Activities could range from sowing or planting of wild lupine to land banking of restored and occupied butterfly habitat. Mitigation measures must be approved by the DNR and the USFWS.

Table 2.13. Statewide Conservation Strategies for Partners' Land Included in HCP

Partners	Management with Consideration				Management to Feature, Protect or Enhance			
	Long-term Habitat	Shifting Mosaic	Corridors	Compensatory Mitigation	Long-term Habitat	Shifting Mosaic	Corridors	Compensatory Mitigation
Alliant		*	*	*				
ANR Pipeline		*	*	*				
Burnett County Forest		*						
Clark County Forest	*	*						
Consolidated Papers, Inc.		*						
Eau Claire County Forest	*	*			710			
Georgia-Pacific Corp.		*						
Jackson County Forest	*	*			600	5,500		
Johnson Timber Corp.		*						
Juneau County Forest		*			200			
Lakehead Pipe Line Co.		*	*	*				
Monroe County Forest		*						
Mosinee Paper Co.		*						

Table 2.13. Statewide Conservation Strategies, Cont.

Partners	Management with Consideration				Management to Feature, Protect or Enhance			
	Long-term Habitat	Shifting Mosaic	Corridors	Compensatory Mitigation	Long-term Habitat	Shifting Mosaic	Corridors	Compensatory Mitigation
Northern States Power Co.		*	*	*	20			
NW Wisconsin Electric Co.			*					
Polk-Burnett Electric Coop.			*					
The Nature Conservancy	*	*			1,150			
Washburn County Forest		*						
Wisconsin DNR	*	*	*		21,912.5	7,724	69	
Wisconsin DOT	*		*	*				
Wisconsin Gas Co.		*	*	*	673			
Wisconsin Public Service		*	*	*				
Wood County Forest		*						

5. Land Management Activities

Partner groups often have similar long-term management goals. Many of the activities employed to achieve these goals could have an impact on the Karner blue butterfly or its habitat. Although specific application of land management activities may differ between partners, there are commonalities in their relationship to the Karner blue butterfly. Table 2.14 (pages 93-94) identifies the primary land management activities by partner group that are typical of normal operations. Each of the activities is discussed briefly below. These include:

- forest management,
- barrens, prairie and savanna management,
- recreational management,
- transportation management, and
- utility ROW management.

The HCP Partnership developed a number of modifications to current land management practices intended to benefit the Karner blue butterfly. These recommendations are based upon the best scientific and applied knowledge available. New knowledge acquired through management experience, monitoring and research will be used in the adaptive management process.

As it pertains to the partners, the ITP will provide for the incidental take of the Karner blue butterfly, if the activity resulting in the take is conducted consistent with conservation measures, guidelines, or protocols included in the applicable conservation agreement, the DNR's Implementing Agreement with the USFWS, or is consistent with the HCP. Some partners have outlined specific conservation measures in their conservation agreements. Other partners have agreed to follow the guidelines included in this chapter and Appendix F. Others will do a mix of what is in the HCP (Chapter II and Appendix F) and their own approach. All commitments, however, are clearly stated in the partners' individual conservation agreements, especially if they intend to manage differently than what is outlined in the HCP.

Because of the dynamic and evolving nature of the conservation effort -- with the often-changing science and conclusions based on partner experience and research -- it is anticipated that protocols and guidelines developed and included in the HCP and individual conservation agreements may need modification. New guidelines, protocols, or conservation measures may also be developed during the permit period. New or modified guidelines, protocols, or conservation measures will need approval by the DNR and the USFWS before being implemented. Review and approval may result from periodic meetings as scheduled.

a) Forest Management

A number of partner groups will be involved in forest management activities. These include the forest products industry, county forests, some utilities and the DNR. Forest management includes a variety of activities, such as:

a) timber harvesting,
b) stand improvement,
c) forest road construction and openings management, and
d) forest regeneration, including site preparation and maintenance.

All forestry partners will follow the "Karner Blue Butterfly Conservation Protocols for Forest Management by HCP Partners" included in Appendix F and implementing various conservation measures for the Karner blue butterfly and/or its habitat per this HCP and their individual signed conservation agreements.

Consistent with the coverage and protections afforded partners in the ITP and their individual conservation agreements for acts of contractors, conservation strategies -- when applicable -- will routinely be included in timber sale contracts. If employees harvest or manage timber, they will be directed to apply appropriate conservation strategies.

Timber Harvesting. In general, the management of forests with consideration for the Karner blue butterfly should neither negatively impact timber production, nor negatively influence the butterfly. There are many different types of logging systems, ranging from mostly manual methods to very mechanized operations. Mechanized operations which utilize whole-tree or pole skidding will likely result in more site scarification than will shortwood skidders. Opportunities for habitat continuation and enhancement or occupation by Karner blue butterflies are offered in and by the timber sale design, and location or management of landing and decking areas. In addition, as part of harvest activities, flagged areas for protection will be avoided or can be enhanced through the harvest of timber competing with Karner blue butterfly habitat.

Stand Improvement. Stand improvement techniques are conducted typically to improve the forest composition of a stand or to improve the growth and quality characteristics of eventual crop trees within a stand. Pesticides, including herbicides and insecticides are important tools for stand improvement and, if used carefully, can incorporate considerations for the Karner blue butterfly. Herbicides are a fairly common tool used in stand improvement activities.

An integral part of this HCP effort is research on the use of herbicides and their potential effects on Karner blue butterflies and their habitat. Guidance addressing herbicide types and timing of applications in places where herbicides may likely affect occupied sites, or potential habitat, has been proposed (see Appendix F). Partners are committing to use of these

guidelines in their individual conservation agreements or are developing similar guidelines of

their own. The guidance in Appendix F will be modified, based on research results and experience; changes to the guidance will be communicated to all partners.

Prescribed Burning. Prescribed burning is used in forest management for site regeneration, to reduce logging debris, to maintain low-vegetation fuel breaks, and to control some forest pests. Because of weather conditions, broadcast burning is not common, however, it is common to burn brush piles following harvest. Prescribed burning is more thoroughly described in the Barrens, Prairie and Savanna Management discussion.

Forest Road Construction and Openings Management. Forest roads are generally constructed to allow vehicle access for harvesting, regeneration and the future tending of new stands of trees. Because of the sandy soils associated with sites where Karner blue butterflies occur, roads in these areas are generally constructed without ditches or gravel (resulting in roads which are narrow and less frequently maintained than those in wetter areas). Because these sandy roads have good natural water drainage, there is little need to maintain these roads with graders or through vegetation control using herbicide applications or mowing.

As with landing or decking areas, the partners will design forest roads considering opportunities for habitat maintenance and enhancement. Forest roads may also result in Karner blue butterfly occupation through clearing of land (e.g., for fuel breaks) or development of dispersal corridors. In addition, some partners may choose to plant these areas with lupine seed or, as needed, provide other long-term management measures such as periodic mowing or other maintenance.

Forest Regeneration. Regeneration is the act of establishing a new stand of trees following harvest. The timber harvest system is carefully selected in order to facilitate regeneration of a new stand of trees. Site preparation methods are chosen that complement the harvest activity to optimize forest regeneration. Regeneration methods are usually grouped as "natural" or "artificial".

> **Site Preparation.** The objective of site preparation is to reduce competing vegetation, expose mineral soil and reduce logging residues. The impact of site preparation on understory vegetation will be determined primarily by three factors: (1) direct effects on mortality, (2) soil disturbance, and (3) overstory canopy development. These factors are in turn influenced by the method, severity, and season of application (Utzig and Walmsley 1989). In the first few years following site preparation, early successional species are often favored (Swindel, *et al.* 1983). However as succession progresses, the overstory is favored and tree growth results in canopy closure. Microclimate can be affected by slash treatment, soils and degree of organic matter removal. The extent and severity of soil disturbance varies widely with the type of equipment used. Generally, the amount of disturbance can be correlated to the amount of bare mineral soil exposed with scarification. Roller chopping with a single drum, complete land clearing, shearing and patch scarification result in a low extent of exposed surface

scarification. A moderate extent of soil scarification could be expected with furrowing with a seed bomb, power disc trenching, roller chopping with a tandem drum, bulldozing the entire site with a root rake and pre-sale dozing (or pre-cut blading). Methods that would result in a high extent of disturbance could include brush disking and bulldozing to remove brush and roots with a straight blade. The amount of soil disturbance resulting from each method can vary significantly depending upon the skill and responsibility of the operator. Site preparation is typically conducted when the ground is dry.

General examples of conservation measures taken by partners during site preparation to minimize harm to the Karner blue butterfly are included in Appendix F. Specific examples are included in some partners' conservation agreements.

Artificial Regeneration. Land managers artificially regenerate a forest stand by establishing the new trees either by direct seeding or by planting seedlings. Direct seeding can be done by aerial or ground methods and seedlings can be planted by machine or by hand. Two common species, jack pine and red pine, are typically planted as seedlings to provide the most reliable means of regeneration and the best control over stand density and spacing. Generally, greater soil disturbance will occur with machine planting than with hand planting, encouraging growth of lupine and nectaring plants. The arrangement of planted trees can be manipulated to enhance understory vegetation. Seeding either by aerial or ground application does not give as much control over stocking of new seedlings as compared with planted stock.

Artificial regeneration measures -- such as the use of scarification equipment, plantings, or herbicides -- must, where Karner blue butterflies are present, include consideration of timing (e.g., after lupine or nectar plants have flowered and set seed) and extent of disturbance.

Natural Regeneration. Natural regeneration is dependent on a variety of factors, including the species composition, climatic conditions and competition from other herbaceous and woody species. Natural regeneration may be used for jack pine if there are stands with at least ten seed trees per acre with serotinous cones (Benzie 1977b). As with seeding in artificial regeneration, natural seeding provides for little control over the stocking rate compared to planting a new stand with seedlings. The results of natural regeneration are much less predictable than those of artificial regeneration. Optimal soil and seed conditions often result in overstocked stands of seedlings. Overstocking results in quick crown closure and severe competition with lupine and nectaring plants. Poor site conditions, in years in which there is a poor seed crop, results in low tree stocking rates and less competition for lupine and nectar plants.

Guidance for forest management is contained in the "Forest Management Guidelines for Karner Blue Butterflies" available from the USFWS's Green Bay Field Office (also see Appendix F). These guidelines will be used by several forestry partners as specified in their individual conservation agreements. Guidance and information will continue to benefit from the substantial

work done to summarize what is known or speculated about forestry impacts on the Karner blue butterfly.

b) Barrens, Prairie and Savanna Management

Several partners identified restoration or maintenance of native barrens habitat as an important land management goal. In this context, barrens includes the range of possibilities from nearly treeless sand prairie to oak/pine savanna to shadier oak/pine woodland -- all on dry, sandy soils. For some lands, the goal may be specifically to optimize Karner blue butterfly populations. For other lands, the goal may be to manage for a larger barrens ecosystem.

Barrens management tools include prescribed fire, mechanical management (such as timber cutting, tree-girdling and brush-hogging), selective herbicide treatment, native plant propagation, or grazing. A number of these activities are briefly described below. The design and implementation of a management regime must be tailored to a given site, taking into account site size, context within the landscape, available equipment and personnel, naturally occurring defoliation by insects or disease, weather and a variety of other factors.

Many plants and animals native to disturbance-adapted communities, like barrens, depend on the ability to either survive the disturbance at some level or to recolonize from nearby undisturbed areas. Many sites are so dry that they require only very infrequent disturbance. Some partners, such as the DNR, have chosen to use the DNR's "Wildlife Management Guidelines for the Karner Blue Butterfly" (see Appendix F) for detailed guidelines on design and application of these various tools.

Prescribed Burning. Prescribed fire is currently the most widely used tool for barrens management. Fire has varying effects, depending on the nature of the vegetation, the timing and intensity of the burn, the weather and a variety of other factors. Managers using fire are generally advised to avoid mineral firebreaks. Although wild lupine will readily colonize these areas, so might aggressive exotic plants such as spotted knapweed (*Centaurea maculosa*) and leafy spurge (*Euphorbia esula*). If mineral breaks are necessary, rotovated or disked breaks are preferred to fire-plowed breaks.

Mechanical Management. Mowing, tree or brush-cutting, girdling, brush-hogging and site scarification (via rotovating, disking or bulldozing) are commonly used mechanical tools for barrens restoration and maintenance. Often, these practices are combined with prescribed fire to better simulate the historical interactions between animal herbivory and wildfire. Tree cutting or girdling is often a necessary first step when converting woodland to a more open barrens condition.

Prescribed mechanical management will result in greater or lesser site disturbance depending on the successional stage and timing of the treated area (e.g., amount of woody competition, heavy sedge mat, etc.). Mechanical management will be done in the least intrusive manner possible in Karner blue butterfly-occupied areas (e.g., hand cutting and girdling where possible and appropriate), and to the maximum extent possible when Karner blue butterflies are in the egg stage (September to mid-April, and preferably during winter). To the maximum extent possible, mechanical management using bulldozing or other heavy equipment will be done in the winter when the ground is frozen. Where possible and consistent with the prescribed management objectives, brush control and tree cutting activities should be done in a manner that preserves some shaded nursery areas preferred by female Karner blue butterflies.

Herbicide Treatment. The most common uses of herbicides in barrens management are stump-treatment or wick application to the foliage of woody shrubs. Herbicide application can be much more effective than fire or mechanical cutting alone in controlling trees and shrubs that resprout such as red oaks (*Quercus ellipsoidalis* and *Q. velutina*), hazel (*Corylus* spp.) and aspen (*Populus* spp.). Herbicides may also be necessary to control aggressive herbaceous species such as leafy spurge (*Euphorbia esula*), quack grass (*Agropyron repens*) and spotted knapweed (*Centaurea maculosa*). If used properly, spot-herbicide applications can have minimal impact to the Karner blue butterfly and its habitat. Partners using herbicides to control vegetation will follow the guidelines included in Appendix F, or as otherwise specified in their conservation agreements.

Native Plant Propagation. Introduction of native plant species often is a part of barrens restoration and enhancement. Sites targeted to support the Karner blue butterfly may not provide sufficient wild lupine, which can quite easily be seeded. In other cases, occupied areas may require enhancement with additional nectaring plants or tall prairie grasses to favor the Karner blue butterfly. Optimally, one would design a seed mixture that includes several of the Karner blue butterfly's preferred nectar sources, and would provide several different types of flowers at any given time. Flowering will vary for given plants from year to year, depending on weather, management and other factors. Such diversity will help provide for differences in Karner blue butterfly flight times from year to year.

Partners who have chosen to propagate native plants will obtain introduced plant material from a local source or from the Wisconsin State Prairie Seed Farm through the DNR. The site of seed origin will be documented. If seed or other material is collected from an occupied Karner blue butterfly site, trampling will be minimized and plant material will be checked for Karner blue butterfly eggs or larvae and other rare lupine obligates such as the frosted elfin butterfly (*Incisalia irus*). If present, these immature life stages will be left on site.

As a general rule, no more than ten to 25 percent of available seed will be harvested from a site in order to ensure continued reproduction. Guidelines for wild lupine propagation can be obtained from the DNR's Bureau of Endangered Resources. General propagation and planting guidelines for native prairie and barrens species are also available from the Bureau of Endangered Resources or from many native plant nurseries. The DNR will provide coordination for seed collection (see "Related Conservation Measures," page 147).

Grazing. Some landowners may wish to consider moderate grazing as a barrens-management tool. Historically, herds of native bison and elk undoubtedly played an integral role in maintaining prairies and savannas, along with burrowing animals and native insects and diseases that damage or destroy trees. At DNR's Sandhill State Wildlife Area, the opportunity exists to study how bison herds impact barrens communities.

While native grazers would be preferable because of their feeding habits, some researchers believe domestic grazers such as sheep, goats, or even cattle might be used, if they are rotated across a site and graze a given area only for occasional, brief periods thus simulating natural grazing by roaming herds.

c) Recreational Management

Many of the HCP partners manage lands used by the public for recreation. Management of these recreational activities can be broken into four categories: (a) intensive development and maintenance, (b) less intensive development and maintenance, (c) maintenance, and (d) public use.

Intensive Development and Maintenance. Intensive construction includes such activities as building development, creation of flowages and laying of pavement or gravel for roads, parking lots, etc. No partners have proposed or anticipated this type of development and maintenance in areas known to be occupied by the Karner blue butterfly, however, such development could occur during the permit period. An acceptable conservation protocol for these types of activities would include the following. Prior to development of recreational facilities, on included lands, the landowner will conduct a pre-management survey to determine if the site is occupied, consistent with the HCP and the partner's conservation agreement. If development of the facility

will result in permanent take: (1) the occupied habitat may be avoided, or (2) if a permanent take occurs, the partner will inform the DNR and the USFWS and prepare a mitigation plan for their approval.

Less Intensive Development and Maintenance. Less intensive activities include development and maintenance of campground, picnic, boat access, trail and similar facilities. Trails bordered by lupine and/or nectaring plants can serve as Karner blue butterfly habitat and dispersal corridors. Such areas occur throughout many of the partners' properties. Maintenance of these trails (e.g., carefully timed brushing or mowing) can enhance population dynamics across landscapes and promote population connectivity and colonization of new openings. Bridle trails are not recommended in quality native habitats, due to many potential problems, including erosion and introduction of aggressive plants through manure. Activities of this type that are planned or anticipated by partners are outlined in individual partner's conservation agreements. Otherwise, an acceptable conservation protocol would include the following. Prior to development of recreational facilities, on included lands, the landowner will conduct a pre-management survey to determine if the site is occupied, consistent with the HCP and the partner's conservation agreement. If development of the facility will result in permanent take: (1) the occupied habitat may be avoided, or (2) if use of occupied habitat is unavoidable, the partner will inform the DNR and the USFWS and prepare a mitigation plan for their approval.

Maintenance. A variety of maintenance activities, ranging from mowing picnic areas to spreading fresh gravel on hiking trails, occur on some partners lands. These activities will generally occur in already unoccupied/developed areas. Special or extensive activities of this type that are planned or anticipated by partners are outlined in individual partner conservation agreements. Otherwise, as an acceptable conservation protocol, maintenance on occupied habitat may be conducted if consistent with the HCP (including the guidelines included in Appendix F) or the partner's individual conservation agreement. Other protocols or guidelines may be developed and approved by the DNR and USFWS. In addition, landowners are encouraged to apply management that will create or enhance Karner blue butterfly habitat and occupation opportunities.

Public Use. A variety of public uses, ranging from hiking and bird watching to mountain biking and hunting, occur on some partner lands. Human traffic through occupied areas may result in some incidental take through inadvertent trampling. Heavy traffic through occupied habitat will be avoided through trail design and property management to avoid any serious impacts to Karner blue butterfly populations. Commitments regarding conservation efforts relating to public use are outlined in individual partner conservation agreements. Otherwise, as an acceptable conservation protocol for occupied habitat, the landowner will take reasonable action to discourage or prohibit use of the occupied habitat, including:

a) closing the occupied habitat to public use,

b) planned avoidance of the occupied habitat by design of trails or access which directs users by or around the habitat (or elimination of voluntary trails), or
c) other vegetative or use management efforts that seek to reduce or eliminate public use of the occupied habitat.

All management should be applied in a manner that does not specifically identify the habitat as Karner blue butterfly occupied habitat, unless it will serve as an educational component and the intent is to identify the area to provide education and the promotion of conservation efforts, while taking reasonable precautions to protect the habitat area.

d) Transportation Management

The Wisconsin DOT is currently the only partner involved in transportation management. County and town highway departments in the Karner blue high potential habitat area will, in the future, be required to follow mowing and maintenance guidelines, unless otherwise specified in a conservation agreement or authorized by a certificate of inclusion.

Road Development. Prior to road construction, lupine, nectar source colonies and native barrens communities will be identified and mapped. If sites are determined to have high potential for lupine and/or Karner blue butterfly occurrence, presence or absence will be verified on site. When field surveys indicate that a Karner blue butterfly population occurs along or immediately adjacent to a right-of-way, one of several specific conservation strategies will be implemented, including:

- ☞ avoidance of occupied habitat,
- ☞ minimizing disturbance,
- ☞ creating habitat along newly constructed roadsides, or
- ☞ as otherwise provided in individual conservation agreements.

These activities will be detailed in the partners' annual reports. Even if the Karner blue butterfly is not present, habitat may still be created incidental to this development.

Road Maintenance. Similar to the development of ROWs, the maintenance of ROWs may require minor disturbance of existing Karner blue butterfly or lupine habitat. These disturbances will be consistent with mowing and maintenance guidelines provided to partners in the HCP, unless otherwise provided for in individual partners' conservation agreement.

Vegetation Control. Vegetation control is important for safety and for improving viewsheds along highways. Control measures usually rely on mechanical mowing, for which guidelines have been developed (Appendix F). Occasionally, herbicides are also used to control weed invasions. Techniques for the application of herbicides can vary from the simple method of hand-held applicators that allow treating a single tree, shrub, or stump individually or with larger tanks or vehicle units that allow foliage treatment of large areas at once. These applications can also be of low-volume or high-volume type. Herbicides that are applied to the foliage must be applied during the growing season (May through September), while a basal bark-stump treatment may be applied anytime during the year. Herbicide rotations can be up to several years between treatments.

There is some control with the mowing program by setting the cutting heads to leave a minimum of six inches of vegetation above ground after cutting. Eight inches will be possible when new equipment is phased in. For safety reasons, mowing must occur within fifteen feet of the shoulder or to the bottom of the ditch, whichever is less. Mowing beyond fifteen feet of the shoulder can occur on a two to five year rotation. Mowing beyond fifteen feet of the shoulder currently occurs from July 15 to April but will change as a result of the HCP and will occur only during October through March on selected highways.[5]

Where appropriate, prescribed burning can be used to control vegetation and enhance prairie species. The practicality of prescribed burning for ROW maintenance is limited, particularly by the resulting smoke hazard to traffic and potential nuisance to adjacent property owners.

e) Utility ROW Management

The majority of ROWs included in the HCP are not partner owned, but are managed under easement. Management, therefore, may be subject to landowner approval. Utility ROW management maintains an open canopy through mowing and removal of woody vegetation. Disturbance caused by utility line construction may enhance the habitat for lupine and benefit the Karner blue butterfly in the long-term. Utility partners will implement conservation measures as outlined in their individual conservation agreements. Several partners have chosen to follow the guidelines included in the report by Weaver Boos Consultants (1996).

Construction of Transmission Lines. Utility transmission line construction is considered less detrimental to Karner blue butterfly habitat (in that there is minimal disturbance of the soil), when compared to pipeline construction activities. In new construction, an effort will be made to route around any Karner blue butterflies and lupine habitat areas.

Prior to starting overhead transmission line construction, lupine and nectar source colonies will be identified and mapped. If sites are determined to have high potential for occurrence of lupine and/or Karner blue butterflies, on-site verification will be required for a determination of

presence or absence. When field surveys indicate that a Karner blue population occurs in or immediately adjacent to a right-of-way, specific conservation strategies will be implemented and reported in annual reports, unless otherwise provided for in individual partners' conservation agreements. Strategies will be the same as those listed for the construction of new pipelines and underground transmission lines.

Maintenance and Repair of Overhead and Underground Transmission Lines. It may be necessary to disturb existing Karner blue butterfly or lupine habitat to facilitate line maintenance. These minor disturbances may enhance the growth of lupine and nectar plants and may indirectly benefit the Karner blue butterfly population. The utility partners will assure staff or contractors are trained to identify the species and habitat. These partners will also schedule maintenance of lines in known occupied sites during the fall and winter months to reduce adverse impacts. Maintenance and repair of overhead and underground transmission lines will follow the same procedures as for new pipeline and underground transmission line construction. However, emergencies resulting from storm damage and line tangling sometimes occur. In these cases, partners will follow the guidelines to the greatest extent practicable.

Construction of New Pipelines and Underground Transmission Lines. Pipeline and underground transmission line corridor construction sites are usually less than 100 feet wide and remain in a state of partial or complete defoliation for only a short period of time (3-4 months, on average). Conservation measures for minimizing impacts to Karner habitat include:

- Clearly marking the boundaries of known lupine and Karner blue butterfly populations occurring adjacent to the right-of way and instructing construction personnel in the location and avoidance of these areas;

- To the extent possible, minimizing the size of the work area to reduce negative impacts on the surrounding habitat and still retain a safe work space in accordance with Occupational Safety and Health Administration standards;

- Restricting the movement of machinery and materials to a limited area that minimizes negative effects on the surrounding habitat while maintaining a safe work space;

- Stockpiling soils in areas without Karner blue butterflies (when feasible);

- Monitoring for invasive plant species and controlling these species as necessary and appropriate; and

- Maintenance of occupied areas through appropriate management strategies.

Since construction requires the complete clearing and excavation of the right-of-way, it is

understood that all vegetation occurring in the area will be completely removed for a period of time. This could result in the incidental take of Karner blue butterflies occurring on lupine along the corridor route. One or more of the partner's broad conservation strategies will be implemented to compensate for this loss.

Two possible alternatives that utility partners will consider for a new corridor are: (1) to re-route the corridor to the extent possible to avoid any Karner blue butterflies found during preliminary siting of the project, and (2) to bore pipelines underneath the surface, if feasible. If all Karner blue butterfly populations cannot be avoided, then site-specific reclamation options will be reviewed by the partner and the DNR. The actual reclamation option(s) will vary depending on site-specific conditions such as the amount of habitat impacted and the estimated size of the resident Karner blue butterfly population. Reclamation plans require approval by the DNR and the USFWS; partners are encouraged to coordinate with the DNR and the USFWS for guidance on development of their reclamation plans early in the planning process.

Construction supervisors will be provided with copies of plans associated with the protection and restoration of occupied Karner blue butterfly habitat. In addition, appropriate supervision will be provided at construction sites to ensure construction personnel are informed of the location and conservation measures associated with occupied Karner blue butterfly habitat, and that the conservation measures and/or mitigation identified for those sites are implemented.

Maintenance and Repair of Pipelines and Underground Transmission Lines. Pipeline and underground transmission line repair and maintenance activities in Karner blue butterfly habitat will follow procedures for new pipeline construction as outlined above under the "Construction of New Pipelines and Underground Transmission Lines." Movement of vehicles off service roads will be contained to the minimum necessary for safe and effective inspection and repair. Karner blue butterfly habitat (lupine and dense nectar plant colonies) will be marked with coded signs or otherwise identified to aid workers in the identification and avoidance of these areas. If excessive disturbance occurs, measures will be taken to restore the site consistent with the partner's conservation agreement. Emergency operations occasionally result from excavators damaging a pipe or line. In such an event, procedures include accessing the site via truck, exposing the area of the break and preforming the repair and remedial activities associated with a leak. In these cases, activities will follow the guidelines to the greatest extent possible.

Vegetation Control. As with road ROWs, this process is done with two major tools: herbicides and mechanical methods. See "Vegetation Control" section under Transportation Management (page 89) for a description of these methods. Some partners may also use prescribed fire consistent with the Wildlife Management Guidelines contained in Appendix F.

Most of the electric utility partners use herbicide applications that treat each individual tree or stump. While it is preferable to use herbicides during the growing season, there is the potential to use certain herbicides year-round. The herbicide guidelines included in Appendix F will be used by ROW partners unless otherwise stated in their individual conservation agreements.

Mechanical control measures include mowing and hand cutting. The size of the mowers can vary, but are generally of the size that can mow an area ranging from six to eight feet. Larger equipment is used when there is substantial woody growth, such as a new ROW or a ROW that has been neglected for many years. Mowing can be done throughout the year, but is most effective during the growing season. In areas where utilities will manage for Karner blue butterflies, mowing can be conducted in late fall. It has been suggested that mower heights should be at least six to preferably eight inches high. While this practice may be used, this measure may not be used by some utilities due to safety concerns. Leaving stumps at a level higher than ground poses a risk to persons who use the ROWs for recreational activities. Utilities with a concern regarding this issue may avoid the use of mowing, follow the mowing with hand cutting of the stumps and/or conduct additional research to determine the impact of the lower mower heights for ROW vegetation management on Karner blue butterflies. ROW partners will implement mowing guidelines as presented in Part C of Appendix F.

Table 2.14. Land Management Activities Affecting the Karner Blue Butterfly by Partner Group

Land Management Activities	Partner Groups					
	Forest Industry	County Forests	DNR	Conservation Organizations	Utilities	Trans DOT
Forest Management						
Timber harvesting	♦	♦	♦		♦	
Stand improvement	♦	♦	♦		♦	
Prescribed burning		♦	♦		♦	
Forest roads	♦	♦	♦		♦	
Forest regeneration	♦	♦	♦		♦	
Barrens, Prairie and Savanna Management						
Prescribed burning		♦	♦	♦	♦	♦
Mechanical management		♦	♦	♦	♦	♦
Herbicide treatment		♦	♦	♦	♦	♦
Native plant propagation		♦	♦	♦	♦	♦
Grazing			♦	♦		
Recreational Management						
Intensive development and maintenance		♦	♦			
Less intensive development and maintenance		♦	♦	♦		
Maintenance		♦	♦	♦		
Public use	♦	♦	♦	♦		

Table continues on next page.

Table 2.14. Land Management Activities by Partner Group, Cont.

Land Management Activities	Partner Groups					
	Forest Industry	County Forests	DNR	Conservation Organizations	Utilities	Trans DOT
Transportation Management						
Road development						◆
Road maintenance						◆
Vegetation control					◆	◆
Utility Right-of-Way Management						
Construction of transmission lines					◆	
Maintenance of overhead and underground transmission lines					◆	
Vegetation control					◆	◆
Construction of new pipelines and underground transmission lines					◆	
Maintenance of pipelines and underground transmission lines					◆	

Table 2.15. Land Management Activities to Achieve Conservation Strategies

Land Management Activities	Conservation Strategies		
	Long-term Habitat	Shifting Mosaic	Dispersal Corridors
Forest Management			
Timber harvesting	♦	♦	
Stand improvement	♦	♦	
Prescribed burning	♦	♦	♦
Forest roads		♦	♦
Forest regeneration		♦	
Barrens, Prairie and Savanna Management			
Prescribed burning	♦	♦	♦
Mechanical management	♦	♦	♦
Herbicide treatment	♦	♦	♦
Native plant propagation	♦	♦	♦
Grazing	♦	♦	
Recreational Management			
Intensive development and maintenance			♦
Less intensive development and maintenance	♦	♦	♦
Maintenance	♦	♦	♦
Public use	♦	♦	♦

Table continues on next page.

Table 2.15. Land Management Activities to Achieve Conservation Strategies, Cont.

Land Management Activities	Conservation Strategies		
	Long-term Habitat	Shifting Mosaic	Dispersal Corridors
Transportation Management			
Road development			♦
Road maintenance	♦		♦
Vegetation control	♦		♦
Utility Right-of-Way Management			
Construction of transmission lines			♦
Maintenance of overhead and underground transmission lines	♦		♦
Vegetation Control	♦		♦
Construction of new pipelines and underground transmission lines			♦
Maintenance of pipelines and underground transmission lines	♦		♦
Other Land Management	♦	♦	♦