A GUIDE TO CONDUCTING MONITORING

FOR THE WISCONSIN KARNER BLUE BUTTERFLY

HABITAT CONSERVATION PLAN

Revision Date: April 4, 2011

Updated May 25, 2010
Updated December 12, 2009 by D. Lentz
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

TABLE OF CONTENTS

I. INTRODUCTION

II. INFORMATION SOURCES: CONTACTS AND WEBSITES

III. GUIDELINES & PROTOCOLS FOR MONITORING

A. MONITORING GUIDELINE

B. LEVEL 1 PROTOCOL: LUPINE PRESENCE OR ABSENCE MONITORING

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 Karner Blue HCP Coordinator Wisconsin DNR, FR/4 101 S. Webster St., Box 7921 Madison, WI 53707-7921 Phone: (608) 261-6451 Email: David.Lentz@Wisconsin.gov	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 U.S. Fish and Wildlife Service Green Bay Field Office 2661 Scott Tower Dr. New Franken, WI 54229 Phone: (920) 866-1732 Email: cathy_carnes@fws.gov	E.S.A. regulatory issues incidental take Karner blue butterfly information
Darcy Kind WDNR Conservation Biologist (608) 267-9789 Darcy.Kind@Wisconsin.gov	private landowner issues (non-HCP partners) Landowner Incentive Program (LIP)
Greg Hamilton U.S. Fish & Wildlife Service – Private Lands (608) 221-1206 x11 Greg_Hamilton@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/

Karner Blue Butterfly Emergence Model
http://dnr.wi.gov/forestry/karner/emergence.htm

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/eek/critter/insect/karner.htm

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-x.

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.
[The current High Potential Range map can be found on the WDNR's Karner Blue HCP webpage at http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf or by contacting the HCP Coordinator.]

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 a 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 High Potential Range - Regulatory Range" map *http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf*

	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).

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

- 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

Pattern of Lupine Distribution

- Continuum from 1-4: 1 - 2 - 3 - 4

scattered uniform

patches throughout

The area of lupine coverage should be estimated. It is important to know if lupine is abundant in a one acre area versus a 10 acre area.

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: **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:

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).

<u>When to Survey</u>

- 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 60^0F
- when temperatures are between 60^0F and 70^0F, conduct surveys only under mostly sunny skies with calm to light wind
- when temperatures are above 70^0F, 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"*

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:

4. The site is within the High Potential Range (HPR) (see Karner Blue HPR map http://dnr.wi.gov/forestry/karner/pdf/rangemap.pdf).

5. The site meets the definition of potential habitat. Potential habitat includes sites on dry, sandy soils that could potentially support Karner blue butterfly habitat.

6. The site is on lands included by an HCP partner in their Species and Habitat Conservation Agreement or Implementing Agreement.

7. 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 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

Pattern of Lupine Distribution

- Continuum from 1-4: 1 - 2 - 3 - 4

1			4
scattered patches			uniform throughout

The area of lupine coverage should be estimated. It is important to know if lupine is abundant in a one acre area versus a 10 acre area.

Assessing Nectar Plant Availability

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"*