	Title: **Cause & Effect (C-E) Monitoring Protocol (Level 1)**	
	Date: **December 12, 2009**	Revision: **03**

I. Scope and Applicability

The following protocol is a version of the standard Level 1 Lupine Presence or Absence Monitoring Protocol, which has been modified specifically to study the Cause and Effect relationships of HCP partner's management activities on Karner blue butterfly habitat or areas of potential habitat on HCP Partners' land included under the federal Incidental Take Permit TE 010064-5.

The basic protocol is taken from the original Wildlife Management Guidelines for the Karner Blue Butterfly, Appendix II, Wisconsin DNR Karner Blue Technical Team as revised with information from the Biological sub-team (A.K.A. BioTeam) of the Wisconsin Statewide Habitat Conservation Plan for the Karner Blue Butterfly, May, 1998 Revision. The original protocol was developed by the HCP Monitoring sub-team in 1993. In 2005 the monitoring form was modified to include parameters for assessing the results of habitat reclamation following activities that result in complete habitat removal and other habitat restoration. This protocol has been reformatted from "*A Guide to Conducting Monitoring for the Wisconsin Karner Blue Butterfly Habitat Conservation Plan" (prior to 2007)* and made consistent with HCP streamlining strategies developed in 2006-2007. The most up to date revision can always be found in the Habitat Conservation Plan User's Guide on the DNR webpage (http://dnr.wi.gov/forestry/karner/hcp-userguide.htm).

Purpose: To assess the vegetative response related to a variety of important habitat components of the Karner blue butterfly (*Lycaeides melissa samuelis*), including wild lupine (*Lupinus perennis*), which result from selected management activities and conservation measures in order to inform the adaptive management process. C-E studies can be selected to (1) validate the anticipated and desired affects of a management practice or conservation measure, (2) study a new or proposed management activity or conservation measure, and (3) study multiple conservation measures for an activity to compare the results and improve the efficiencies of the activity and/or effectiveness of the conservation measure.

Forms: A standardized *Level 1: Habitat Response to Management: Management Cause and Effect (C-E) Monitoring form* is used for recording all Level 1 C-E monitoring information. A blank form can be copied from the DNR's Karner Blue webpage. Always use the current form as forms may change as a result of adaptive management.

II. Protocol

Where to Survey

A site is eligible for a C-E study if it meets the following criteria:

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

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

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

4. The site should support the objectives and design of the management activity or conservation measure(s) being studied.

When to Survey

- BEFORE (pre-management survey) and AFTER (post-management survey) the management activity and/or conservation measure being studied is applied

- Each pre-management and each post-management survey must be performed in both Kbb flight periods to reflect early and late flowering nectar plants and other conditions

- In places where lupine flowers early (sunny areas), survey from late May to mid-June (for first flight period visits)

- In places where lupine flowers rarely or not at all (usually more shaded areas), surveys can be conducted from late May through July.

- Open and sunny places should be surveyed earlier in the season because lupine flowers and senesces earlier there

- Areas with more shading and canopy cover can be surveyed later because lupine flowers and senesces later in these locations (except during hot and droughty summers).

- Lupine surveys should not be conducted after July 31st.

How to Survey

Surveys for lupine can be conducted in a number of ways. The following are suggested methods to use. The method you choose will normally depend upon the resources available (number of personnel), and the size and landscape characteristics of the area to

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