DATE

Memorandum

To: Assistant Regional Director, FWS, Fort Snelling, MN

From: Field Supervisor, ES Field Office, Bloomington, IN (BFO)

Subject: Biological Opinion: Northern Indiana Public Service Company and Indiana-American Water Company. Request for an Incidental Take Permit for the Endangered Karner blue butterfly *(Lycaeides melissa samuelis)* in Lake and Porter Counties, Indiana

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed Northern Indiana Public Service Company (NIPSCO) and Indiana American Water Company (INAWC) Habitat Conservation Plan (HCP) located in Lake and Porter Counties, Indiana, and its effects on the Karner blue butterfly *(Lycaeides melissa samuelis)* in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). Formal consultation was begun on May 5, 2005, the date the Service received the completed application**.** The Service's proposed action is the issuance of an Incidental Take Permit under section 10(a)(1)(B) of the Act.

This biological opinion is based on information provided in NIPSCO and INAWC's Incidental Take Permit application (ITP) and HCP dated May 3, 2005, the National Environmental Policy Act (NEPA) low effect HCP determination, several field investigations conducted by Elizabeth McCloskey (Biologist, Northern Indiana Suboffice ES) or jointly between Mrs. McCloskey and various staff of NIPSCO; and conversations, emails and meetings with staff from NIPSCO and INAWC. A complete administrative record of this consultation is on file at the Northern Indiana Suboffice (NISO), Porter, Indiana.

Consultation History

In 1993, the U.S. Fish and Wildlife Service informed NIPSCO that the Karner blue butterfly had been listed as a Federally endangered species in December 1992 and that this species was present within the Miller right-of-way owned by the company in Gary, Indiana. In spring 1993, Service biologists surveyed remnant native habitats in Northwest Indiana for wild lupine (*Lupinus perennis*), the only known larval food plant of the Karner blue butterfly. They also searched for adult butterflies during the spring and summer flight periods. Miller Woods, a unit of the

Indiana Dunes National Lakeshore (INDU), was already known to support Karner blues, so it was not unexpected that the NIPSCO ROW through this black oak savanna also supports this species. NIPSCO thereupon ceased vegetation management activities in the Miller ROW that might result in take of the endangered butterfly.

On April 8, 1997, personnel of the Service and NIPSCO met to discuss options for maintaining the Miller ROW and other ROWs that might also contain the Karner blue butterfly. It was acknowledged that the Karners within the Miller ROW are part of the INDU Miller Woods metapopulation and the numbers within the ROW fluctuate along with the entire metapopulation, based upon weather conditions, wildfires, and other events beyond the control of NIPSCO. The Draft Safe Harbor Policy was discussed, as was the need for a baseline survey of the extent of wild lupine within the ROW, since it was determined that acres of lupine was the best way to measure response to habitat manipulation to improve Karner blue butterfly habitat under a Safe Harbor agreement.

On April 9, 1998, another meeting was held to discuss ROW management and the Karner blue butterfly, with personnel from the Service, NIPSCO, INDU, and a local land trust, the Shirley Heinze Environmental Fund (SHEF), in attendance. SHEF had recently purchased natural land adjacent to INDU and another NIPSCO ROW, Stagecoach Road; this SHEF property supported Karner blues and it was thought that the Stagecoach Road ROW may also support them. NIPSCO's integrated vegetation management program, involving mowing followed by herbicide applications to woody regrowth, was discussed. Service biologist Elizabeth McCloskey indicated she would survey both the Miller and Stagecoach Road ROWs for lupine and Karner blues and mark the extent of the lupine. The Habitat Conservation Plan (HCP) process was discussed with NIPSCO and they decided to utilize this process rather than a Safe Harbor Agreement.

On May 27, 29, and June 5, 1998, biologist McCloskey surveyed and marked lupine in the Stagecoach Road ROW. She also observed adult Karner blue butterflies at several locations within the ROW and provided information and photographs to NIPSCO, relating the data to numbered electric transmission towers.

Biologist McCloskey surveyed the Miller ROW on June 5 and 9, 1998, marking the extent of the lupine and noting the presence of Karner blue butterflies. Photographs and lupine and Karner information were provided to NIPSCO.

Subsequently, NIPSCO personnel identified lupine within a portion of their Aetna ROW, which is south of the Miller ROW, being separated from it by railroads and highways. They also observed several Karner blue butterflies. Therefore, NIPSCO decided to include the Miller, Aetna, and Stagecoach Road ROWs within their HCP.

The Service provided NIPSCO with information on preparing an HCP, including the 1996 HCP Handbook, and information on the biology of the Karner blue butterfly. However, staff changes at NIPSCO affected work on the HCP, so preparation of the HCP was delayed for several years. By letter of October 18, 2000, NIPSCO informed the Service's Bloomington Field Office of their intent to prepare an HCP to address the Karner blue butterfly on their Miller, Stagecoach Road, and Aetna rights-of-way and a black oak savanna at Miller.

Because the extent of lupine in the Miller and Stagecoach Road ROWs which was marked in 1998 could no longer be considered valid, NIPSCO contracted with J.F. New & Associates to redetermine the aerial coverage of lupine in spring 2002. The Aetna ROW was also included in this survey. Boundaries of the lupine were determined by GPS surveys and maps were produced. Notes on the abundance and distribution of lupine within the boundaries was provided, as was information on available nectaring plants during the late May survey period.

In the spring of 2002, Service staff observed lupine and Karner blue butterflies within a small powerline right-of-way at Ogden Dunes, Porter County. NIPSCO subsequently determined that it is not their property, just an easement, but that they have the responsibility to control the vegetation under the powerlines.

On October 7, 2002, the first draft of the HCP was provided to the Service for review and comment. Comments were provided by several Service staff.

On November 18, 2002, NIPSCO provided their revised draft of the HCP to the Service for review and comment. This incorporated comments on the October 7th draft. Comments by several Service staff were provided to NIPSCO.

It was determined that the Indiana-American Water Company (INAWC) is the owner of the right-of-way at Odgen Dunes and that they have a water pipeline within it. Therefore, on April 1, 2003, Biologist McCloskey sent an email to Mr. Ken Buczek of INAWC about the presence of Karner blue butterflies in the ROW. She informed him of NIPSCO's HCP and the need for INAWC to be involved in the process as the landowner, since NIPSCO's interest is an easement and not ownership. Mr. Buczek replied on April 8,2003 that INAWC is the landowner of this ROW and requested additional information.

The Service provided a letter and a fact sheet about HCPs to Mr. Buczek on April 22, 2003. We suggested that INAWC could partner with NIPSCO on their HCP if that was acceptable to both companies and recommended a meeting among the parties to discuss the matter. Subsequently, NIPSCO and INAWC staff met and determined that a joint HCP was feasible.

On August 1, 2003, a meeting and conference call was held among Service, NIPSCO, and INAWC staff to discuss the draft HCP and how to deal with the INAWC involvement with NIPSCO's document. It was determined that the black oak savanna mitigation proposal by NIPSCO also covers any activity by INAWC to repair their pipeline since the entire pipeline repair and ROW vegetation management activities are covered by the one document, regardless of land ownership. Wording to describe the lupine baseline, possible maximum impacts to that baseline if both the water and natural gas pipelines had to be repaired at the same time, and the mitigation savanna were agreed upon by the participants.
First and second brood surveys for adult Karner blue butterflies were conducted on the 3 NIPSCO ROWs during 2003, confirming their continued presence in all 3 areas.

In February 2004, a revised draft of the HCP, incorporating the INAWC ROW, was provided to the Service for review and comment.

In the spring of 2004, the extent of lupine within the 3 NIPSCO ROWs and the Ogden Dunes INAWC ROW were again measured to establish the final baseline acreage of 4.24 acres.

On May 3, 2005, the final HCP and permit application were submitted to the Service.

The Notice of Availability (NOA) of the final HCP and permit application was published in the Federal Register on July 19, 2005 (70 FR 137: 41424-41425).

The public comment period ended on August 18, 2005.

BIOLOGICAL OPINION

Description of the proposed action

The maintenance project addressed in the HCP pertains to 3 electric transmission line rights-of-way, 1 of which contains a natural gas pipeline, owned and operated by the Northern Indiana Public Service Company (NIPSCO) and 1 ROW owned by the Indiana-American Water Company (INAWC), which contains a potable water distribution pipeline and electrical powerlines maintained by NIPSCO. The 3 NIPSCO ROWs are Miller, Aetna, and Stagecoach Road, encompassing a total of 84 acres. The INAWC ROW contains 2 acres. Vegetation management is required under the electric powerlines to control tree and shrub growth which could interfere with the transmission lines. Additional activities that may take place during the life of a transmission line include tower maintenance and painting, insulator repair or replacement, static line maintenance, conductor replacement, and emergency work. Emergencies may include tower or line failure due to ice or wind storms and trees falling into conductors. NIPSCO is also proposing to install an internal communications fiber optic cable on the towers in the Miller ROW in 2005. Natural gas and/or water pipeline maintenance may consist of hydrostatic testing, valve replacement, and pipeline replacement in section or in total, and emergencies include gas or water pipeline rupture. These latter 2 activities require excavation to access the pipeline and heavy equipment operation to install new piping. The natural gas pipeline is within the Stagecoach Road ROW only.

NIPSCO has utilized Integrated Vegetation Management (IVM) techniques on these ROWs and proposes to continue to do so. This IVM plan includes mowing to reduce the height of woody stems followed by herbicide application the next year, with mowing occurring approximately every 6 years. In subsequent years, spot herbicide treatment is used to control woody species. Side trimming of adjacent trees is also required to protect the integrity of the electric circuit. Hand cutting of large trees using chain saws likely will be necessary in fall/winter of 2005 in the Miller ROW due to the lack of maintenance since 1993 and the large size of many of the oaks under the powerlines. The downed trees will be removed from the areas containing Karner blue butterfly habitat and will be chipped. Herbicide application on the regrowth of the hand cut and mowed vegetation will then occur in 2006.

The Karner blue butterfly is dependent on wild lupine (*Lupinus perennis*), its only known larval

food plant, and on nectar plants. These plants occur in savanna and barrens habitats typified by dry sandy soil. The 4 ROWs included in the HCP cross sand dunes that are or were savanna habitats; the Miller ROW also crosses interdunal wetlands. Lupine, nectar plants, and the butterfly can be eliminated through canopy closure (succession) and are benefitted by land management activities that maintain open-canopy habitats with some shade. This is the type of habitat which the NIPSCO IVM techniques will maintain. All routine and planned maintenance of the powerlines, towers, and pipelines will take place at times of the year when neither the larval nor adult stage of Karners are present (between September 1 and April 1), and all possible attempts will be made to avoid damage to lupine and nectar species. Mowing will take place after first frost and preferably when the ground is frozen to reduce rutting and possible damage to lupine and nectar plants. Vegetation management will focus on preserving and enhancing lupine and nectar species.

Within the 84 acres owned by NIPSCO, a total of 3.68 acres of lupine were found during the GPS mapping surveys in 2004. This constitutes the baseline habitat for the Karner blue butterfly within the NIPSCO ROWs. An additional 0.56 acres of lupine are present within the INAWC ROW. The baseline will establish the levels of wild lupine located in the plan area. At no time will the acreage of lupine fall below the established baseline level of 4.24 acres as a result of activities conducted or authorized by NIPSCO or INAWC. Since this plan focuses on habitat improvement, an increase in habitat would allow for temporary destruction of portions of the habitat without threatening the 2004 habitat baseline level.

As mitigation for any adverse effects on Karner blue butterfly habitat, NIPSCO will enhance a 12.85 acre woodland adjacent to the Miller ROW, and included within the 84 acre total NIPSCO lands in the plan, through the removal of dense brush and small black oak trees, thus returning this woodland to a native black oak savanna. Some lupine is present at scattered locations within this woodland, (0.342 of the 3.68 lupine total acreage), although Karners have not been observed, and both lupine and nectar species will be enhanced through the management of this site. Once lupine within this site covers an area of 4.24 acres, there will be no risk of falling below the baseline. It is estimated that between 7 and 8 acres of this 12.85-acre savanna can be successfully restored to lupine habitat as a minimum. In addition, lupine and nectar plants have been/will be planted in portions of the ROWs where they are now limited or not present, except for the wetlands in the Miller ROW, which do not support lupine or Karners. A total of about 30 acres of the approximate 60 acres of NIPSCO ROWs available for planting with lupine and nectar species contain powerlines but no pipelines (Aetna and Miller ROWs, discounting the wetlands at Miller). Even if only 20 percent of these 30 acres (6 acres) are restored to lupine (a very conservative estimate), they, along with the mitigation savanna, will ensure that even under the worst possible scenario - required replacement of both the natural gas pipeline and water pipeline simultaneously (which ROWs contain 1.03 acres of lupine as baseline) - a sufficient amount of lupine will exist in the plan area to ensure that the 2004 baseline level will not be reached.

The proposed action concerning the Service is the issuance of an ITP under section 10(a)(1)(B) of the Act for the activities addressed in the HCP. The purpose of this section 7 consultation is to ensure that any action authorized, funded, or carried out by the Federal government is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of that species.

Status of the Species

The only federally-listed species likely to be adversely affected by the proposed action is the Karner blue butterfly *(Lycaeides melissa samuelis).*

The Karner blue butterfly was listed as an endangered species on December 14, 1992 (57 FR 59236-59243). The species was listed because of habitat loss and modification throughout its entire range (USFWS 1992). Among the major causes of decline of this species leading to its listing as endangered are habitat fragmentation (which reduces and isolates habitat), fire suppression (which results in overgrowth of woody species), pesticides to control undesired insects, herbicide use on areas supporting plant species required by the butterfly, and excessive soil or vegetation disturbance. No critical habitat has been designated for this species.

Historically, the Karner blue occurred in a narrow geographic area that extended from eastern Minnesota, across portions of Iowa, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York, New Hampshire, Massachusetts, Maine, and the province of Ontario, Canada (USFWS 2003). Over the past 100 years, Karner blue populations have declined significantly throughout the species' range. It is now believed extirpated from Maine, Massachusetts, Pennsylvania, Iowa, Illinois and Ontario, Canada. Currently, populations of the Karner blue occur in 7 states: Minnesota, Wisconsin, Indiana, Michigan, Ohio, New York, and New Hampshire. In 1998 it was reintroduced to Ohio as part of a 5-year reintroduction program, and in 2000 it was reintroduced in New Hampshire, the same year the native population was lost in the wild. Wisconsin and Michigan have the largest numbers of local populations with the greatest numbers of individuals.

A recovery plan for the Karner blue butterfly was published in September 2003 (USFWS 2003). In general, the recovery strategy for this species is to perpetuate viable metapopulations of the Karner blue in the major ecological regions throughout its geographic range. Thirteen ecological regions are identified (called “recovery units” [RUs]), based on known variations in physiography, climate, and vegetation, and potential geographic genetic variation in Karner blue populations. There is one RU in Indiana, designated the Indiana Dunes RU. It includes the Indiana Dunes National Lakeshore and adjacent private lands containing the butterfly and various nature preserves and other lands in western Gary and eastern Hammond, Lake County, which support or can be restored to once again support the Karner blue butterfly.

Species Description

The Karner blue butterfly is a small, silvery member of the family Lycaenidae, the gossamer wing butterflies. The wingspan is about 1 inch. There are color and pattern differences between males and females of the species (Nabokov 1944). The dorsal side of the male fore wing is violet-silvery blue with a black margin and a white-fringed edge. The female dorsal fore wings range from dull violet to bright purplish-blue near the body and central portion of the wings, while the remainder of the wing ranges from light to dark gray-brown. Female hind wings have marginal orange crescents (lunules), which males lack. Ventral surfaces of the wings of both sexes are grayish-fawn to pearly-gray, with several rows of black spots on the inner portions and

a line of orange crescents and metallic spots near the margins. There are no tails on the hind wings of either males or females.

The eggs of Karner blues are very small, radially symmetrical, somewhat flattened, and pale greenish-white in color (Dirig 1994). Larvae are a pea-green color, pubescent, and dorsally flattened, with a brown-black to black head capsule (USFWS 2003). Older larvae have pale green to white lateral stripes and a dorsal dark green longitudinal stripe. In pre-pupal larvae the lateral stripes become less distinct and the color becomes a duller green. Pupae are bright green and smooth, changing to a light tan with hints of purple shortly before emergence.

Life History

The Karner blue butterfly is bivoltine, completing 2 generations per year. First (spring) brood larvae hatch from overwintered eggs in mid- to late April, depending on latitude and local weather conditions, and begin feeding on wild lupine (*Lupinus perennis*). Wild lupine is the only known larval food source for the Karner blue butterfly. The larvae pass through 4 instars (Savignano 1990), feeding for approximately 3 to 4 weeks before pupation in late May to early June. Feeding by first and second instar larvae results in tiny circular holes in lupine leaves, while older larvae eat all but the upper and lower epidermis, creating a characteristic window-pane appearance (Swengel 1995). Karner blues are known to pupate in leaf letter, on stems and twigs, and occasionally on lupine leaves (Dirig 1976, Cryan and Dirig 1978).

Pupation generally lasts 7 to 11 days, with adults emerging in late May through mid-June (Dirig 1976). The first-flight females lay their eggs primarily on lupine plants, often singly on leaves, petioles, stems, or occasionally on other plants or leaf litter close to lupine plants (USFWS 2003).

Second brood eggs hatch in 5 to 10 days, and larvae can be found feeding on wild lupine from early June through late July. Typically, a larva can survive on the leaves of a single large lupine stem, moving from leaf to leaf, often returning to leaves fed on during earlier instars, but it may move to other lupine stems as well (Lane 1999).

Second (summer) brood adults begin to appear in early to mid-July and can be present until mid-August, although individual life span is approximately 5 days (Bidwell 1995, Knutson *et al.* 1999). However, adults can live as long as 2 to 3 weeks (USFWS 2003). Flight dates can be affected by weather, such as temperature and moisture (*e.g.* cool wet spring, hot dry summer) (Knutson *et al.* 1999, USFWS 2003). Generally, there are many more adults in the second brood compared to the first brood, but the opposite can also occur (Schweitzer 1994, Knutson *et al.* 1999). The smaller first (spring) brood may be attributed to high overwinter mortality of eggs, the inability of larvae to find lupine in the spring, or greater oviposition success of the first flight females because of senescence of lupine by the time of the second brood (USFWS 2003).

Another aspect of the life history of Karner blues is attendance of the larvae by ants; pupae are also frequently tended by ants (USFWS 2003). Larvae tended by ants have a higher survival rate than those not tended by ants (Savignano 1990, 1994, Grundel *et al*. 1998a, Lane 1999), presumably because the ants provide some protection from the natural enemies of larvae. Grundel *et al*.'s (1998a) larval feeding study demonstrated that larvae tended by ants grow

relatively rapidly and gain weight more rapidly per amount of food eaten. Ants benefit from this relationship by using as food a liquid secreted from specialized glands on the larvae that contains carbohydrates and possibly amino acids (Savignano 1990). Tending levels for late instar larvae are close to 100 percent. During pupal survival studies, Lane (1999) observed 8 ant species associated with Karner blue pupae. Some species of ants appear to provide greater protection than other species.

Habitat Use and Requirements

Throughout it range the Karner blue butterfly was historically associated with landscapes composed of sandy soils which supported oak or oak-pine barrens and savanna ecosystems. It is now associated with remnant barrens and savannas, highway and powerline rights-of-way, gaps within forest stands, young forest stands, forest roads and trails, airports, and military camps that occur on the landscapes previously occupied by native barrens and savanna (USFWS 2003). Almost all of these contemporary habitats are described as having a broken or scattered tree canopy that varies within habitats from zero to between 50 and 80 percent cover, with grasses and forbs common in the openings. The habitats have lupine for larval feeding, nectar plants for adult feeding, critical microhabitats, and attendant ants. The stature and spacing of trees in native savanna is somewhat variable, reflecting differences in soils, topography, and climate (Nuzzo 1986), and the distribution of trees in contemporary habitats is similarly diverse. Soils are typically well-drained sandy types, which influences both plant growth and disturbance frequency. These conditions are generally wet enough to grow trees but dry enough to sustain periodic fires (Breining 1993). Topography is diverse and includes flat glacial lake beds, dune and swale, and steep, dissected hills (USFWS 2003).

Adults and larvae use a variety of subhabitats created by variation in tree canopy and shrub cover, topography, and soil moisture (Wiklund 1977). These behavior-specific habitats can be spatially separate and structurally different. It is important for butterflies to be able to move easily between subhabitat types, as optimal subhabitat types differ for adults and larvae. A highly variable microtopography creates a highly variable thermal environment, plant community, and canopy structure.

Adult Karner blues are commonly found in open-canopied areas. In western Wisconsin, Maxwell and Givnish (1994) collected data on the physical structure of habitat and cover estimates of selected vegetation, and found a positive correlation between adult Karner blue abundance and grass cover. Because the grass was used as adult roosting sites, they suggested that this indicated the importance of roosting sites for healthy populations of the species. Grundel *et al.* (1998b) showed that Karner blues exhibited behavioral separation of habitat use in relation to canopy cover. Males consistently used openings, especially large openings, implying that these areas served as primary mating and nectaring habitat. Males were more likely than females to spend time flying across these large openings, although the males spent most of their time resting on vegetation, not patrolling their habitat (Bidwell 1994, Scott 1975, 1982, Grundel *et al.* 1998b). Female Karner blues spread their time more evenly across canopy cover types, concentrating oviposition in moderately shaded areas, especially in the second brood (Lane 1993, 1994, 1999, Grundel *et al.* 1998b, Maxwell 1998).

Karner blue butterfly larvae feed exclusively on wild lupine. Lupine is an early successional

species adapted to survive on dry, relatively infertile soils. Even the seedlings have long taproots that allow the plant to reach soil moisture. It grows well in full sun or partial shade but has limited survival under total shade (Grigore and Tramer 1996). Available evidence suggests that lupine thrives on nitrogen-poor soils in partial- to open-canopied areas and is suppressed by shade; it may not be competitive with other plants on nitrogen-rich soils and phosphorus-poor soils (USFWS 2003). Several species of pines, oaks, and shrubby vegetation are adapted to the same soils and habitat as lupine (Nuzzo 1986, Haney and Apfelbaum 1990), and without disturbance these species will close the canopy, shading and suppressing lupine. Consequently, disturbances that reduce tree and shrub canopy cover are necessary for lupine to persist. Several disturbances are beneficial for renewing lupine habitat, including prescribed fire, mowing, and mechanical tree removal (USFWS 2003). Studies by Grigore and Tramer (1996) showed that burned lupine had more total plant biomass than unburned plants and more biomass in stems and leaves. Burned populations produced significantly more seed pods and set more seed than unburned populations, and also had taller and more numerous flowering stems, more leaves, and higher percent cover.

Larval feeding experiments at INDU indicated that growing conditions of wild lupine affect the growth rate of Karner blue larvae (Grundel *et al.* 1998a). Leaves from various aged plants, plants that were in flower or in seed, and plants grown in the sun or in shade were used to feed larvae from the time of hatching. It was found that larvae eating leaves of shade-grown lupines that had just gone to seed grew significantly faster than larvae feeding on similar sun-grown lupines. Lupines in seed are common during most of the second larval brood (Dirig 1994). However, in-the-field microclimate differences could modify these results (Grundel *et al.* 1998a). For example, cooler temperatures in the shade might cause slower larval growth. A second important finding by Grundel *et al.* (1998a) is that phenological age/condition of the lupine is a factor in larval growth and survival. In their study, larvae feeding on first-year plants (new seedlings) and senescent plants (lupine that had released all their seeds and exhibited significant deterioration of leaf tissue) grew slowly and had poorer survivorship. Oviposition on lupine in areas of intermediate canopy cover, where plants do not senesce as rapidly as in bright sunshine and drier conditions, therefore can be advantageous for Karner blues (Grundel *et al.* 1998b).

Adult Karner blues need adequate nectar resources and will utilize a wide variety of native and introduced flowering plants (Rabe 2001). Throughout their range, Karner blues have been observed to feed on flowers of 39 species of herbaceous plants and 9 species of woody plants during the spring brood and on flowers of 70 species of herbaceous plants and 2 species of woody plants during the summer brood (USFWS 2003). It is believed that availability of nectar plants may be a key factor in determining habitat suitability for Karner blues (Fried 1987). For example, Packer (1994) implicated the dearth of nectar sources as one of the causes of the extirpation of Karner blues from Ontario. However, other researches have not found a correlation between Karner blue populations and nectar sources (Herms 1996). Studies by Grundel *et al.* (2000) at INDU suggest that the Karner blue is opportunistic in selecting nectar plants, choosing species with the greatest total number of flowers or flowering heads. However, these studies also showed a preference for certain select nectar species, such as butterfly weed and horsemint, and nectar plants with yellow or white flowers, particularly sand coreopsis, sand cress, dewberry, and white sweet clover.

Literature on the historic distribution of the Karner blue butterfly suggests that this species occurred as shifting clusters of populations distributed across a vast fire-swept landscape covering thousands of acres (Schweitzer 1989). While fires resulted in localized extirpations, vegetative succession following these fires maintained suitable habitat patches and allowed rapid population expansion or repopulation. Therefore, populations of the Karner blue butterfly exist as dynamic collections of sub-populations that are interconnected by dispersal corridors, collectively making up a metapopulation (USFWS 2003). Metapopulations continually shift in distribution across the landscape as habitat patches change from suitable to unsuitable. Persistence of metapopulations is governed by the balance between extirpation of sub-populations and recolonization of unoccupied suitable habitat sites.

Environmental baseline

The plan area consists of approximately 86 acres within 3 NIPSCO-owned rights-of-way and 1 NIPSCO easement owned by INAWC. In 2004, a survey for lupine in these 4 areas found a total of 4.24 acres supporting this species.

The north/south Aetna ROW, located in Gary, Lake County, consists of 2 units separated by East 15th Avenue and totaling 14.8 acres. The north unit of 6.8 acres of undulating vegetated sand dunes was found to contain scattered lupine patches comprising 0.48 acres. The south unit consists of 8 acres of open sand dunes and patches of cottonwoods, but does not contain any lupine. Karner blue butterflies have been found in the north unit. This ROW is adjacent to industrial and residential lands.

The Miller ROW, also located in Gary and north of the Aetna ROW, consists of 3 north/south units separated by active railroad tracks. It is dune and swale topography, with wetlands intermixed with the dunes. This area covers 37.32 acres and includes a 12.85 acre savanna/wetland complex in the south unit that will be the mitigation area for the plan; this mitigation area contains 0.342 acres of lupine in several patches but does not currently support Karner blue butterflies. The remaining 9.8 acres of active ROW in the south unit contains 0.668 acres of lupine in scattered patches and supports Karner blues. The middle unit contains 8.25 acres, with 0.44 acres of lupine in 2 large and several small patches and supports Karner blue butterflies. The north unit covers 6.42 acres, of which 1.28 support lupine in 1 large patch and Karner blues. This ROW is adjacent to the Indiana Dunes National Lakeshore and its population of Karner blue butterflies; the middle segment of this ROW was burned by INDU personnel in spring 2005 under their Fire Management Plan, which underwent section 7 consultation in early 2005 (USFWS 2005).

The Stagecoach Road ROW is in Portage, Porter County, and consists of 3 east/west units of high dunes separated by farmland. The western unit is adjacent to a residential area, a privately owned nature preserve, and the Indiana Dunes National Lakeshore; the middle unit is adjacent to the INDU, residential lands, and cropland, while the eastern unit is adjacent to cropland and an old sand mine that is being converted to a marina and residential housing. The west unit of 14.7 acres has 0.27 acres of lupine in several small patches; the middle unit of 4.4 acres has 0.12 acres of lupine in 2 patches; and the eastern

unit of 12.8 acres has 0.08 acres of lupine. All 3 units had Karner blue butterflies present in 2004 in small numbers.

The Ogden Dunes ROW is within a low dune along the southwest side of the Ogden Dunes residential community and is adjacent to the Indiana Dunes National Lakeshore on the south and west. This 2 acre area has 0.56 acres of lupine and Karner blue butterflies.

There are currently no maintenance or management activities occurring with the ROWs other than the INDU prescribed burn in the middle unit of the Miller ROW, but management activities, including reduction of the oak canopy and brush, prescribed burning, and the seeding of lupine, have occurred within the 12.85 mitigation area. Past ROW maintenance, wild fires, or prescribed burns by the INDU are largely responsible for open conditions favoring lupine and Karner blues within the ROWs. Portions of the Miller ROW have become very overgrown and the woody vegetation is adversely affecting the extent of lupine.

Effects of the proposed action

The operation and maintenance, and possible construction, activities associated with NIPSCO's electric transmission lines and natural gas pipeline and INAWC's water pipeline may impact populations of the Karner blue butterfly. However, these impacts are considered to be minor because: 1) the currently occupied habitat of the listed species within the ROWs is very small (4.24 acres of occupied or potential habitat among the 86 acres covered by the plan); 2) maintenance and possible construction, except for emergency situations, will occur when larval and adult Karners will not be present (between September 1 and April 1); 3) the impacts to the habitat will be temporary; and 4) the vegetation management will reduce brush and tree cover which, if left in place, would eliminate Karner habitat through time. The Karner habitat covered by this plan is a very small fraction of the total Karner blue butterfly habitat available on the adjacent Indiana Dunes National Lakeshore, which contains the predominant habitat for the butterfly metapopulations in Indiana. Seasonal weather conditions, wildfires, and other stochastic events have a greater effect on the Karner blue butterfly in the plan area than will the activities covered by the plan.

Impacts to the soils and geology of the area are anticipated to be minor because negative impacts to the soil will be of short duration and will be greatly limited during routine maintenance. Mowing after first frost or during snow cover will limit chances for rutting. Soil disturbance will be greatest if any of the pipelines need to be repaired or replaced, but this will also be of limited duration, and appropriate erosion control methods will be utilized. Excavation for the pipelines would not exceed 10 feet in depth, so the underlying geology would not be impacted.

Although some take of Karner blue butterflies, likely as eggs, may occur due to the use of mowing machinery and other equipment or foot traffic within the rights-of-way, the vegetation management undertaken by the plan will provide the early succession habitat required by this species. Because the required habitat components of wild lupine and nectar plants in a largely open setting can be lost to succession, Karner blue butterfly persistence is dependent on disturbance and/or management to renew existing habitat or to create new habitats. The fire or mowing that is necessary to maintain Karner habitat can kill individuals of the species but

benefits the species as a whole by providing the required habitat components. The take of Karners under this HCP will be negligible in comparison with the habitat loss and possible total elimination of the species in the plan area if the plan is not implemented and the habitat is degraded. Despite the short-term incidental take of some individual butterflies, implementation of the plan is likely to increase the chances of Karner blue butterfly population viability over the long-term.

No critical habitat has been designated for the Karner blue butterfly, so no critical habitat will be affected by this HCP.

As mitigation for any adverse effects on Karner blue butterfly habitat, NIPSCO will enhance a 12.85 acre woodland adjacent to the Miller ROW, and included within the 84 acre total NIPSCO lands in the plan, through the removal of dense brush and small black oak trees, thus returning this woodland to a native black oak savanna. Some lupine is present at scattered locations within this woodland, although Karners have not been observed, and both lupine and nectar species will be enhanced through the management of this site. Once lupine within this site covers an area of 4.24 acres, there will be no risk of falling below the baseline. It is estimated that between 7 and 8 acres of this 12.85-acre savanna can be successfully restored to lupine habitat as a minimum. In addition, lupine and nectar plants have been/will be planted in portions of the ROWs where they are now limited or not present, except for the wetlands in the Miller ROW, which do not support lupine or Karners. A total of about 30 acres of the approximate 60 acres of NIPSCO ROWs available for planting with lupine and nectar species contain powerlines but no pipelines (Aetna and Miller ROWs, discounting the wetlands at Miller). Even if only 20 percent of these 30 acres (6 acres) are restored to lupine (a very conservative estimate), they, along with the mitigation savanna, will ensure that even under the worst possible scenario - required replacement of both the natural gas pipeline and water pipeline simultaneously (which ROWs contain 1.03 acres of lupine as baseline) - a sufficient amount of lupine will exist in the plan area to ensure that the 2004 baseline level will not be reached.

Although there may be a short-term decrease in the population at the site due to the proposed action, there should be a long-term increase in numbers of butterflies within the plan area resulting from the conservation actions. The lupine and nectaring species seeding program and restoration of the mitigation savanna will enhance the long-term suitability of these areas for occupation by the Karner blue butterfly, and increase the amount of butterfly habitat available within the Indiana Dunes Recovery Unit, as described in the Karner blue butterfly Recovery Plan (USFWS 2003). The seeding and site restoration activities are expected to result in greater numbers of lupine plants, as well as a more diverse assemblage of nectaring sources for the Karner blue butterfly than that presently found in the action area.

Cumulative effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions unrelated to the proposed action are not considered in this section because they will require separate consultation pursuant to section 7 of the Act. The Service is not aware of any additional state, local, or private actions that are reasonably certain to occur on the NIPSCO and INAWC

rights-of-way. However, land management activities that could affect the Karner blue butterfly may occur on the privately owned nature preserve adjacent to a portion of the Stagecoach Road ROW; the land trust which owns the land would be required to obtain necessary permits under section 10.

Conclusion

After reviewing the current status of the Karner blue butterfly, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the action, as proposed is not likely to jeopardize the continued existence of the species, and is not likely to destroy or adversely modify designated critical habitat. No critical habitat has been designated for this species, therefore, none will be affected.

The applicants have developed plans and placed conditions on land management and construction activities in order to reduce anticipated impact to the Karner blue butterfly. These conditions are specified in the this biological opinion and in the applicant's HCP and will be outlined in the authorizing incidental take permit. In the short term, Karner blue butterflies may be lost due to the land management and possible pipeline repair or replacement activities; however, based on implementation of the conservation measures, the long-term survival of the Karner blue butterfly in the area should be more assured.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns including breeding, feeding or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to and not the purpose of the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7 (o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The proposed NIPSCO and INAWC HCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. ***All conservation measures described in the proposed HCP, together with the terms and conditions described in the associated section 10(a)(1)(B) permit , are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR §402.14(i)***. Such terms and conditions are non-discretionary and must be undertaken for

the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittee fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed NIPSCO and INAWC HCP, associated reporting requirements, and provisions for disposition of dead or injured animals are as described in the HCP and its accompanying section 10(a)(1)(B) permits. In order to monitor the impact of the incidental take, NIPSCO and INAWC must report the progress of the action and its impact on the species to BFO and NISO as specified in this Incidental Take Statement.

Amount or extent of take

The Service anticipates incidental take of actual Karner blue butterflies will be difficult to detect because losses of individual Karner blues, because of their small size, are difficult to detect, and finding a dead or impaired specimen is unlikely, especially an egg or larvae. The majority of take is anticipated to be that of eggs, as most activities will be conducted in the spring, fall, or winter.

However, the level of take of this species associated with the ROW work can be anticipated by loss of lupine habitat, as lupine is essential to the existence of the butterfly (sole food plant of the Karner blue larvae). Vegetation management activities would affect the baseline of 4.24 acres of lupine, but it would not all be impacted in the same year. Since the Miller ROW is the most overgrown, it will be the first to be managed; individual tree clearing may be required for some of the oak trees because of their large size, but mowing will occur where feasible. The INAWC ROW may also need land management soon due to continuing tree growth, but the largest trees are present within the portion that does not support lupine. Vegetation management will not destroy lupine plants because the soil will not be excavated and the mowing and herbicide application will occur when lupine plant tissue is not present above ground; only repair or replacement of the natural gas or water pipelines would directly remove lupine. The maximum baseline lupine that would be removed by both pipeline projects is 1.03 acres.

The number of eggs and/or larvae taken due to these activities is difficult to ascertain but can be characterized as a short-term take. The effect of this take on the local Karner blue butterfly population is expected to be minimal and more than offset by the benefits derived from the mowing and management activities designed to maintain Karner blue habitat for the long-term.

Effect of the take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat. This non-jeopardy BO is based on implementation of the conservation measures for the Karner blue butterfly discussed in the Description of the Proposed Action and in the HCP.

This level of incidental take will not reduce habitat to the point that the resultant conservation status of the subpopulations in the action area will decline. Instead, an increase in suitable habitat is expected.

Reasonable and prudent measures

The Service believes that all conservation measures described in the proposed HCP are necessary and appropriate to minimize take of the Karner blue butterfly. As a reasonable and prudent measure, the Service, upon issuing the incidental take permit, will take the necessary steps to ensure that NIPSCO and INAWC complete the proposed conservation measures.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Service must ensure that the following terms and conditions, which include conservation measures and required monitoring and reporting, are carried out by NIPSCO and INAWC. These terms and conditions are non-discretionary.

The Service must ensure that the conservation measures and mitigation proposed in the HCP are fully implemented by NIPSCO and INAWC. The Service will, through enforceable terms and conditions within the incidental take permit, ensure that NIPSCO and INAWC are aware of their responsibilities and liabilities to fully implement the conservation measures and mitigation detailed in their HCP. The Service will participate in field reviews, as appropriate, to evaluate and verify permit compliance.

In order to monitor the impact of the incidental take, NIPSCO and INAWC must report the progress of the action and its impact on the species to the Bloomington Field Office and Northern Indiana Suboffice annually by January 31st each year for the duration of the ITP and HCP. This report shall including the following: 1) indicate what management activities have taken place during the year, including IVM activities, work within the mitigation savanna, and the planting of lupine and nectar plants/seeds within the ROWs; 2) the results of all monitoring activities for lupine and Karner blue butterflies; 3) any issues raised or problems encountered.

Reinitiation Notice

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action is authorized by law and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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