STATUS OF THE KARNER BLUE BUTTERFLY,
LYCAEIDES MELISSA SAMUELIS NABOKOV,
IN MINNESOTA 1990

David L. Cuthrell

RR1, Box 714
Early, Iowa 50535

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Abstract: A status survey for the Karner Blue butterfly (Lycaeides melissa samuelis) was conducted during the late spring and summer of 1990. This butterfly, which appears to be declining across much of its range, is proposed for federal listing and status reports in the midwest are lacking.

The Karner Blue overwinters as ova laid on or very near wild lupine (Lupinus perennis) by second brood females (Dirig and Cryan, 1975; Lawrence and Cook 1989). The eggs hatch in early spring and the larvae feed on the lupine leaves for about three weeks (Dirig, 1988; Schweitzer 1989). Just before pupating the larvae moves off the plant among the litter (Dirig, 1988). Typically the first brood adult flight period is from late May to mid-June (Schweitzer, 1989). In Minnesota the second adult flight period is from late July to mid-August (personal observation; Minnesota DNR Natural Heritage Database, 1990). Adults on the average live for only 5 days (Schweitzer, 1989; Fried, 1987). Adult females usually oviposit on the lupine plant itself or very near the plant on grass or sedge blades, or in the duff (Cryan and Dirig, 1978; Schweitzer, 1989). Thus, no stage in the butterflies life cycle would be highly resistant to fire.

The goals of this survey were to: (1) identify known locations or probable locations of large populations of wild lupine (Lupinus perennis), the Karner Blue butterfly’s exclusive host plant, (2) survey these identified sites to confirm the presence of the host plant and to search the site for the Karner Blue butterfly, and (3) to provide baseline data on the status of the butterfly and it’s host plant in Minnesota.

The survey was conducted in two phases. The first phase consisted of analyzing aerial photos, soil maps, and topographical maps to identify habitat suitable for lupine, and conducting field work in search of the plant and possible first brood butterflies. The second phase included rechecking sites that contained lupine for second brood adult Karner Blue butterflies.

Although this survey found populations of lupine in each study area, it was less common in Minnesota than had been believed. Large populations of the plant were found within the Whitewater Wildlife Management Area, (WMA) in Winona County, the Himlie Sand Barrens site in Fillmore County, Sherburne National Wildlife Refuge in Sherburne County, and within the St. Croix Wild River State Park in Chisago County.

Fourteen sites out of 50 contained lupine; of those sites many populations are in a precarious state. Fire suppression appears to be the main reason that suitable habitat is limited in the oak barrens region. It is the author’s opinion that wild lupine should be listed as a species of "special concern" in Minnesota.

There were two historical records of the Karner Blue butterfly in Minnesota. The insect had not been found at either of these sites since 1984 and was believed to be extirpated from the state; however, a population was found within the Whitewater WMA in Winona County during this 1990 survey. Because the Karner Blue butterfly was found at only two locations, both within one WMA, it should be listed as an "endangered" species in Minnesota. An estimate of the population size was beyond the scope of this study. This should, however, be a top priority in future Minnesota studies on the Karner Blue. It is essential to understand the total habitat requirements of the butterfly in order to manage the area in such a way as to insure the survival of the species.
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INTRODUCTION

This report is intended to provide baseline information on the status of the Karner Blue butterfly (KB), *Lycaeides melissa samuelis* (Nabokov), in Minnesota. This butterfly, which appears to be declining across much of its range (Lawrence and Cook, 1989; Stewart and Ricci, 1988), is also proposed for federal listing and status reports in the Midwest are lacking (Zaremba unpublished, 1990). Although the KB was probably never common throughout Minnesota, fire suppression, development, and other human disturbances have destroyed much of the butterfly's natural habitat. In Minnesota the historic habitat was sandy barrens and oak sand savannas in close association to its foodplant, wild blue lupine, *Lupinus perennis*, (Coffin and Pfanmuller, 1988). There are two sites that contain lupine and at one time supported a KB population. One site is found within Whitewater Wildlife Management Area in Winona County and the other is in Anoka County within the Cedar Creek Natural History Area. The last reported sightings of the butterfly at these sites, prior to this year's survey, were 2 June 1983, and 12 August, 1984 respectively.

The following life cycle information is gathered from a variety of sources and is augmented with my own observations during 1990. Table 1 is a diagramatic representation of the Karner Blue's life cycle derived by the author. It is intended to give you a general picture of the butterfly's life cycle.

The Karner Blue overwinters as ova laid on or very near wild lupine (*Lupinus perennis*) by second brood females (Dirig and Cryan, 1975; Lawrence and Cook 1989). The eggs hatch in early spring and the larvae feed on the lupine leaves for about three weeks (Dirig, 1988; Schweitzer 1989). Just before pupating the larvae moves off the plant among the litter (Dirig, 1988). Typically the first brood adult flight period is from late May to mid-June (Schweitzer, 1989). In Minnesota the second adult flight period is from late July to mid-August (personal observation; Minnesota DNR Natural Heritage Database, 1990). Adults on the average live for only 5 days (Schweitzer, 1989; Fried, 1987). Adult females usually oviposit on the lupine plant itself or very near the plant on grass or sedge blades, or in the duff (Cryan and Dirig, 1978; Schweitzer, 1989; authors personal observation). Thus, no stage in the butterfly's life cycle would be highly resistant to fire.

Table 1. The general life cycle of the Karner Blue Butterfly in Minnesota.

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(The Karner blue overwinters in the egg stage, Nov.- Feb.)
METHODS

An intensive survey for the Karner blue butterfly in Minnesota was conducted by the principal surveyor, David L. Cuthrell, during the spring and summer of 1990. The survey consisted of two phases:

Phase One:

The first phase of the survey consisted of identifying locations or probable locations of the KB’s host plant, wild blue lupine (*Lupinus perennis*). Three study regions (Figure 2) were chosen based on the following criteria: 1.) historical KB records in Minnesota and Wisconsin; 2.) historic lupine records (see Appendix I); and 3.) consultation with DNR staff.

Southeast: This study area was limited to Wabasha, Olmsted, Winona, Fillmore, and Houston counties in the extreme southeast corner of the state. The area is found within the Paleozoic Plateau region and contains many scattered pockets of sandy, river terrace sites which are potential habitats of the lupine. A total of 27 sites were identified from aerial photo interpretation, soil surveys, historic plant and KB records, and discussions with DNR staff, including the Heritage Program Botanist, Parks Regional Resource Managers, and Area Wildlife Managers.

Anoka Sand Plain: This study area included the four counties (Anoka, Sherburne, Isanti, Chisago) which were thought to contain a number of lupine populations. A total of 20 sites were selected for field survey work. These sites were based on herbarium collection records, interviews with members of Minnesota DNR’s County Biological Survey staff, and the one historic KB record.

St. Croix River Valley: The survey of this area included Wild River State Park and St. Croix State Park, two parks located along the St. Croix river. It was hoped that a large population of the KB be found in these areas owing to their close proximity to the Wisconsin KB populations. Four additional sites were identified in this study area.

Field Survey for Lupine/First Brood KB

From 22 May to 19 June 1990, fifty sites were field surveyed for the presence of Lupine. Field notes were taken and included such information as: date, weather, approximate numbers of clumps, stems, and flowering stems, acreage with lupine, associated plant species, and management concerns (Fig. 3). All sites surveyed were marked on topographic maps, with the presence of lupine noted. Sites that contained lupine were then resurveyed during phase two for KBs.

Plant species that made up the majority of the plants at the site were listed to help one get a feel for habitat type. No attempt was made to systematically survey the vegetation of the sites. The botanical nomenclature follows Mohlenbrock (1986).
Figure 2. The three study regions chosen: The Southeast, the Anoka Sand Plain, and the St. Croix River Valley.
Figure 3. Field Form used during phase one.

MINNESOTA KARNER BLUE SURVEY FORM 1990

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Time</th>
<th>County</th>
<th>Weather</th>
<th>Karner Blues</th>
<th>Lupine</th>
<th>Associate species</th>
<th>Nectaring plants</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Present: Yes</td>
<td>Number of individuals</td>
<td>Little bluestem</td>
<td>NJ tea</td>
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<td>No</td>
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Management concerns:
- Succession
- Road maintenance
- Agriculture
- Insecticide use
- Development
- Herbicide use
- ORV use
- Browsing

Notes:
- Road maintenance
- Insecticide use
- Herbicide use
- Browsing
Numerous other butterfly and skipper species were also noted at each site. The author attempted to net and identify every "different" butterfly seen at each site. Again the searches were at random. All butterflies listed were netted and field identified. The more difficult species to identify, and some of the unusual species were retained by the author and keyed out using a variety of sources (Scott, 1986; Shull, 1987; Pyle, 1981; McCabe and Post, 1977). The voucher specimens are currently in the author's private collection and will eventually be deposited in the University of Minnesota entomology collection. The butterfly nomenclature follows that of Miller and Brown (1981).

During this part of the survey, records were also kept on observations of two other butterfly species of concern that use lupine as a larval host: the Dusky Wing (Erynnis persius) and the Frosted Elfin (Incisalia irus).

**Phase Two:**

The second phase consisted of resurveying, at various times in the butterfly's second brood flight period, areas where lupine populations were found during phase one. Owing to lack of information on the exact flight times of the KB in Minnesota, however, the second phase was started in mid-July and ended on 20 August 1990. In order to insure that the KB would be encountered on one of the visits to the area, these dates were selected so as to encompass the actual flight period.

Field Survey for Karner Blue Butterflies

From 9 July to 20 August 1990, thirteen sites were resurveyed for populations of the Karner Blue butterfly. Two techniques were used to search for the KB and other associated butterflies. One involved a random search of the entire area for butterflies, with stops at nectar sources and sunny areas where the author felt the insects would most likely be found. The second technique used transects spaced approximately 1-2 meters apart, through areas of lupine. In both techniques the presence of the Karner Blues were noted on topographic maps and associated butterflies noted. The date, time, number, and sex of the Karner Blues were also noted.

**RESULTS and DISCUSSION**

I. Lupine

Of the 50 sites surveyed for wild blue lupine (L. perennis) only 14 were found to contain the plant. Furthermore, most of these populations are in a precarious state due to fire suppression, development, agriculture, silviculture, or other reasons. Because of these findings, it is the author's opinion that L. perennis should be designated as a listed species in the state of Minnesota. At the very least, it should be considered a candidate for "special concern" status. However, the author feels it could be listed as "threatened" in Minnesota following further survey work.
II. The Dusky Wing and the Frosted Elfin.

The Frosted Elfin was not seen during the entire survey. It should be noted, however, that the adult flight period for the butterfly is from mid-March to May (Scott, 1986) and as field work did not begin until 22 May 1990, it is likely the flight period was over. In any case further field work at the appropriate time of the year is needed.

The adult Dusky Wing (*Erynnis persius*) is known to fly from May to mid-June in the eastern U.S. (Scott, 1986). One adult was found at the Whitewater WMA in Winona County on 1 June 1990. Further survey work for this species within the Whitewater WMA is needed.

III. The Karner Blue

No first brood adult butterflies were seen in any of the sites that contained lupine. During the second brood flight period, two sites were found to contain the Karner Blue. However, both of these sites are within the Whitewater Wildlife Management Area in Winona County. A total of 38 KB butterflies were observed in the area from late July to mid-August. Since the main focus of this study was to survey for the presence or absence of the butterfly, actual sightings were recorded but there were no attempts to estimate the actual population size. The distribution and dates observed are listed in Appendix III. It is the author's opinion that the Karner blue butterfly be listed as Endangered in Minnesota based on these findings.

In May, two males of either the KB or the Melissa Blue *Lycaeides melissa melissa* (the males of the two taxa are next to impossible to tell apart), were seen at the Tuohy Sand Savanna in Fillmore County. Although no lupine was found in the area, further survey work was needed to confirm which butterfly subspecies was present. On 10 July, approximately 15-20 Melissa blues were seen at the savanna. A female and male voucher specimen were collected. This is a significant find due to the butterfly's new range extension in eastern Minnesota, and it's possible range overlap with the KB. Tuohy Sand Savanna is located approximately 30 miles to the southwest of the Whitewater WMA sites that contain the KB.

Results by County:

An overview of the survey is presented below. The site name is followed by Township, Range and Section information, Appendix II Map number, and ownership information. A single asterisk (*) before the site name indicates the presence of wild lupine at the site, two asterisks (**) indicate an historic KB site, and three asterisks (***) indicate an existing KB site. Also included for each site is a list of associated butterfly species, a list of associated plant species, and field notes. The abbreviations under associated plant species include "P" for plant species present, "F" for plant flowering, and "U" for butterflies seen using plant as a nectar source.
HOUSTON COUNTY

This county in the extreme SE corner of the state contains several pockets of sandy soils along the Root River. Many of these areas have become quite forested due to fire suppression in recent years. There are two plant records for this county, however, only one population of lupine was found (the Hokah site), as the other site is presently being used to raise turkeys and from the road it looks as if they have destroyed the natural habitat of the area (the historic plant site 7 miles west of Houston).

HOUSTON # 1: 104N 06W NWNE32
Owner: Paul and Sharon Wheaton

Date: 22 May 1990 Time: 10:50 - 11:50am
Weather: Mostly sunny, 63 degrees F, no winds
Butterfly Species Observed:

1. Polites themistocles Tawny-edged skipper
2. Colias philodice Common sulphur
3. Lycaena phlaeas American copper
4. Everes comyntas Eastern tailed blue
5. Charidryas gorgone Gorgone crescentspot

Notes: This old field, with some native species returning, contains no lupine and is presently being used as pastureland.

HOUSTON # 2: 104N 07W NE28: NW27
Owner: State Forest

Date: 22 May 1990 Time: 12:30 - 2:35pm
Weather: Sunny, 65 degrees F, light N breeze
Butterfly Species Observed:

1. Erynnis brizo Sleepy duskywing
2. E. juvenalis Juvenal's duskywing
3. Amblyscirtes vialis Roadside skipper
4. Colias philodice Common sulphur
5. C. eurytheme Orange sulphur
6. Lycaena phlaeas American copper
7. Charidryas gorgone Gorgone crescentspot
8. Polygonia comma Comma
9. Vanessa cardui Painted Lady

Date: 24 May 1990 Time: 2:00 - 4:30pm
Weather: Partly cloudy, 70 degrees F, light N breeze.
Butterfly Species Observed:

1. Erynnis icelus Dreamy duskywing
2. Euchloe olympia Olympia white
3. Lycaena phlaeas American copper
4. Everes comyntas Eastern tailed blue
5. Charidryas gorgone Gorgone crescentspot
6. Vanessa cardui Painted lady
7. V. atalanta Red admiral
Date: 09 July 1990             Time: 10:30 - 12:30pm
Weather: M. cloudy, 75 degrees F, NW winds 5 mph.
Butterfly Species Observed:

1. Epargyreus clarus                Silver-spotted skipper
2. Erynnis baptisiae               Wild indigo duskywing
3. Wallengrenia egeremet           Northern broken dash
4. Atrytone delaware               Delaware skipper
5. Euphyes ruricola                Dun skipper
6. Pyrisitia lisa                   Little yellow
7. Harkenclenus titus              Coral hairstreak
8. Everes comyntas                 Eastern tailed blue
9. Leptotes marina                 Marine blue
10. Speyeria cybele                Great spangled fritillary
11. Phycoides tharos/morpheus      Pearly crescentspot
12. Polygonia comma                 Comma
13. Nymphalis antiopa              Mourning cloak
14. Vanessa cardui                  Painted lady
15. Y. atalanta                     Red admiral
16. Asterocampa celtis              Hackberry butterfly
17. Encodia anchedon                Pearly eye
18. Cercyonis pegala               Wood nymph
19. Danaus plexippus               Monarch

Notes: This area contains a good quality sand barrens that contains many native plant species, but not lupine. Many tiger beetles (Cicindelidae) were seen here also, during both visits.

ANDERSON BARRENS & BLUFF PRAIRIE: 103N 06W NWNW9         (Map III)
Owner: Sherman and Judith Anderson

Date: 23 May 1990             Time: 9:00 - 10:15am
Weather: Mostly cloudy, 59 degrees F, slight breeze, rain later.
Butterfly Species Observed:

1. Vanessa cardui                  Painted lady
2. Y. atalanta                     Red admiral

Notes: This sand barrens area is quite small and is thick with various grasses but has a low forb diversity. It also had a low diversity of butterflies, but this could have been due more to the cool, cloudy weather. No lupine was seen.

* HOKAH: 103N 05W SWNE2            (Map IV)
Owner: Arnet Farms, Phone: 894-4441

Date: 31 May 1990             Time: 3:30-4:18pm
Weather: Sunny, 78 degrees F, winds SE 10-20mph.
Lupine:
Approximate number of clumps: 2000
Approximate number of stems: 20,000
Approximate number of flowering stalks: 15,000
Acreage with lupine: approx. 1
Associated plant species:

Yellow hawkweed (Hieracium pratense) (P), Frostweed (Helenium canadense) (P), Columbine (Aquilegia canadensis) (F), False Indigo (Amorpha sp.) (F), Wild blue phlox (Phlox sp.) (F), Pin Oak (Quercus ellipsoidalis) (P), Black-eyed susan (Rudbeckia hirta) (P), Lead plant (Amorpha canescens) (P), Daisy fleabane (Erigeron annuus) (P), Dotted horsemint (Monarda punctata) (P), White sweet clover (Melilotus alba) (P), Big bluestem (Andropogon gerardii) (P), Blazingstar (Liatris aspera) (P).

Butterfly Species Observed:

1. *Everes comyntas* | Eastern tailed blue
2. *Charidryas gorgone* | Gorgone crescentspot

Date: 09 July 1990       Time: 8:53 - 10:03am
Weather: Scattered clouds, 68 degrees F, no winds.

Butterfly Species Observed:

1. *Epargyreus clarus* | Silver-spotted skipper
2. *Polites thesippus* | Tawny-edged skipper
3. *Wallengrenia egeremet* | Northern broken dash
4. *Pyristia lisa* | Little yellow
5. *Satyrium edwardsii* | Edward's hairstreak
6. *Speyeria cybele* | Great spangled fritillary
7. *Euphydryas phaeton* | Baltimore checkerspot
8. *Vanessa cardui* | Painted lady
9. *V. atalanta* | Red admiral
10. *Asterocampa celtis* | Hackberry butterfly
11. *Enodia anthedon* | Pearly eye

Date: 01 August 1990      Time: 9:30 - 11:15am
Weather: Mostly sunny, 63 degrees F, no wind.

Butterfly Species Observed:

1. *Epargyreus clarus* | Silver-spotted skipper
2. *Amblyscirtes vialis* | Roadside skipper
3. *Artogea rapae* | Cabbage white
4. *Everes comyntas* | Eastern tailed blue
5. *Celastrina ladon* | Spring azure
6. *Speyeria cybele* | Great spangled fritillary
7. *Polygonia comma* | Comma
8. *Basilarchia arthemis* | Red-spotted purple
9. *Cercyonis pegala* | Wood nymph
10. *Danaus plexippus* | Monarch

Date: 05 August 1990      Time: 4:15 - 5:15pm
Weather: Mostly sunny, 69 degrees F, NE winds 10-20 mph.

Butterfly Species Observed:

1. *Epargyreus clarus* | Silver-spotted skipper
2. *Amblyscirtes vialis* | Roadside skipper
3. *Artogea rapae* | Cabbage white
4. *Celastrina ladon*  
   Spring azure

5. *Danaus plexippus*  
   Monarch

Notes:  A nice population of lupine was found at this site on a SE facing slope and scattered throughout openings in this mixed woods. To the S, W, and E of the site is a mixed forest. To the N are some planted pines and the highway 16 road ditch.

The main threat to this area is succession. It appears that it has been several years since the last fire in the area. This is private land, thus contact with the landowner and some sort of management plan should be implemented to protect the lupine population.

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**FILLMORE COUNTY**

This county is very similar to Houston County. The Root River Valley contains many terraces with the right soil types for lupine. Here again, however, many of these areas are overgrown with various tree species. One site, the Himlie Sand Barrens, did contain a fairly large population of lupine (site discovered in July so it was hard to estimate size). This site is on private land and needs protecting. There are three herbarium records for lupine in Fillmore County (Appendix IV), but all three are probably describing the same locality - the Himlie Sand Barrens site described below.

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**RUSHFORD EAST 1:** 104N 08W NWSE24  
*Map V*

Owner: Stanley Hoiland

Date: 23 May 1990  
Time: 11:52 - 12:30pm

Weather: Partly cloudy, 68 degrees F, slight W breeze.

Butterfly Species Observed:

1. *Everes comyntas*  
   Eastern tailed blue

2. *Vanessa virginiensis*  
   American painted lady

Notes: This site is an area of open and brushy sand barrens that has been disturbed. The open area is an old field and the brushy area has probably been used as pasture, although it appears to be in a more natural condition. The area just east and north of the house is of highest quality. No lupine was found here and few butterflies were noted. Some junk has also been dumped in the area.

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**RUSHFORD EAST 2:** 104N 08W S 1/2 NW24  
*Map V*

Owner: State Forest Land

Date: 23 May 1990  
Time: 11:00 - 11:30am

Weather: Mostly cloudy, 66 degrees F, light W breeze.

Butterfly Species Observed:

1. *Charidryas gorgone*  
   Gorgone crescentspot

2. *Vanessa atalanta*  
   Red admiral

Notes: This sandy hillside along highway 16 east of Rushford has become overgrown with eastern red cedar. The site is state forest land and contained no lupine and few butterflies.
HIMLIE SAND BARRENS: 104N 08W SW21 (Map VI)

Owner: Wally Himlie, Phone: 864-7483 (Himlie Construction)

Date: 09 July 1990 Time: 3:10 - 5:00pm
Weather: Mostly cloudy, 81 degrees F, light sprinkles.
Lupine:
Approximate number of clumps: 4,000
Approximate number of stems: 40,000
Approximate number of flowering stalks: past prime flowering
Acreage with lupine: approximately 4 or 5
Associated plant species:

Goat's rue (Tephrosia virginiana)(F), Big bluestem (Andropogon gerardii)(P), Blazingstar (Liatris aspera)(P), Pin oak (Quercus ellipsoidalis)(P), Spiderwort (Tradescantia sp.)(F), Dotted mint (Monarda punctata)(F).

Butterfly Species Observed:

1. Thorybes bathyllus Southern cloudywing
2. Colias philodice Common sulfur
3. Everes comynas Eastern tailed blue
4. Speveria cybele Great spangled fritillary
5. Phyciodes tharos/morpheus Pearly crescentspot
6. Polygonia comma Comma
7. Nymphalis antiopa Mourning cloak
8. Vanessa cardui Painted lady
9. V. atalanta Red admiral
10. Asterocampa celtis Hackberry butterfly
11. Cercyonis pegala Wood nymph

Date: 01 August 1990 Time: 12:20 - 4:00pm
Weather: Partly cloudy, 75 degrees F, SW winds 5-15 mph.
Butterfly Species Observed:

1. Epargyreus clarus Silver-spotted skipper
2. Amblyscirtes vialis Roadside skipper
3. Artogeia rapae Cabbage white
4. Colias eurytheme Orange sulphur
5. Lycaena phlaeas American copper
6. Satyrion caryaevorum Hickory hairstreak
7. Everes comynas Eastern tailed blue
8. Speveria cybele Great spangled fritillary
9. Phyciodes tharos/morpheus Pearly crescentspot
10. Polygonia progne Gray comma
11. Vanessa atalanta Red admiral
12. Basilarchia arthemis Red-spotted purple
13. Asterocampa celtis Hackberry butterfly
14. Cercyonis pegala Wood nymph
15. Danaus plexippus Monarch

Date: 05 August 1990 Time: 1:55 - 3:55pm
Weather: Partly cloudy, 66 degrees F, NE winds 10-20 mph.
Butterfly Species Observed:

1. Epargyreus clarus  
2. Amblyscirtes vialis  
3. Artogeia rapae  
4. Colias philodice  
5. Erynnis comynatas  
6. Polyommatus vialis  
7. Vanessa atalanta  
8. Basilarchia arthemis  
9. Danaus plexippus

Silver-spotted skipper
Roadside skipper
Cabbage white
Common sulphur
Eastern tailed blue
Gray comma
Red admiral
Red-spotted purple
Monarch

Notes: This area was first surveyed in July, so it is hard to estimate the size of the lupine population. Many plants were found; enough, in fact, that the author believes they would be capable of supporting a KB population. Lupine is found in the open sand barrens and is also scattered throughout the brushy sand barrens. The largest concentration of lupine is on a south to southwest facing slope in association with big bluestem (Andropogon gerardii), goat's rue (Tephrosia virginiana), and blazingstar (Liatris aspera). Again, the greatest threat to the area is succession to woody species. The site is privately owned and landowner contact is recommended. The site is also next to state forest land and could possibly be acquired as an extension to the state forest.

PETESON NORTH: 104N 08W NWSE18
(Map VI)
Owner: State Forest Land

Date: 23 May 1990  Time: 2:44 - 3:40pm
Weather: Partly cloudy, 72 degrees F, light west breeze.
Butterfly Species Observed:

1. Erynnis martialis
2. Vanessa cardui
3. V. atalanta

Mottled duskywing
Painted lady
Red admiral

Notes: Again no lupine was found at this site as the woody vegetation is quite thick. Cedar (Juniperus virginiana) and sumac (Rhus sp.) have choked out most of the herbaceous vegetation. The site is found within state forest land.

MATTSON SAND BARRENS AND PRAIRIE: 104N 11W NESW9
(Map VI)
Owner: O. & C. Mattson

Date: 24 May 1990  Time: 11:56 - 1:15pm
Weather: Partly cloudy, 70 degrees F, W winds 5-10 mph.
Butterfly Species Observed:

1. Polites themistocles
2. Atrytonopsis hianna
3. Amblyscirtes vialis
4. Charidryas gorgone

Tawny-edged skipper
Dusted skipper
Roadside skipper
Gorgone crescentspot
Date: 10 July 1990  
Time: 9:23 - 10:34am
Weather: Some clouds, 75 degrees F, no wind.
Butterfly Species Observed:

1. **Thorybes bathyllus**  
   Southern cloudywing
2. **Polites origenes**  
   Crossline skipper
3. **Euphyes ruricola**  
   Dun skipper
4. **Colias eurytheme**  
   Orange sulphur
5. **Pyrisitia lisa**  
   Little yellow
6. **Harkenclenus titus**  
   Coral hairstreak
7. **Euptoieta claudia**  
   Variegated fritillary
8. **Cercyonis pegala**  
   Wood nymph
9. **Danaus plexippus**  
   Monarch

Notes: This site contains a nice goat prairie with such plants as little bluestem (*Schizachyrium scoparium*), purple prairie clover (*Petalostemum pupureum*), compass plant (*Silphium laciniatum*), lead plant (*Amorpha canescens*), puccoon (*Lithospermum sp.*), and porcupine grass (*Stipa spartea*). The prairie supports healthy skipper populations of *Polites themistocles*, *P. origenes*, *Atrytonopsis hianna*, *Amblyscirtes vialis* and *Euphyes ruricola*, and should be checked for *Hesperia ottoe*. The actual sand barrens area is quite small. A powerline runs east-west just to the north of the barrens. No lupine was found here. No fire or grazing evidence was seen on the prairie or barrens.

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TUOHY SAND SAVANNA: 104N 11W NE9  
(Map VII)

Owner: F. Tuohy

Date: 30 May 1990  
Time: 3:00 - 5:00pm
Weather: Sunny, 72 degrees F, no breeze.
Butterfly Species Observed:

1. **Pholisora catullus**  
   Common sootywing
2. **Glaucopsyche lygdamus**  
   Silvery blue
3. **Lycaeides melissa melissa**  
   Melissa or Orange-bordered blue
4. **Danaus plexippus**  
   Monarch

Date: 10 July 1990  
Time: 11:20 - 1:00pm
Weather: Sunny to partly cloudy, 75 degrees F, no wind.
Butterfly Species Observed:

1. **Polites origenes**  
   Crossline skipper
2. **Atrytone delaware**  
   Delaware skipper
3. **Euphyes ruricola**  
   Dun skipper
4. **Pyrisitia lisa**  
   Little yellow
5. **Gaeides xanthoides**  
   Great grey copper
6. **Harkenclenus titus**  
   Coral hairstreak
7. **Satyrium edwardsii**  
   Edward’s hairstreak
8. **Everes comyntas**  
   Eastern tailed blue
9. **Lycaeides melissa melissa**  
   Melissa or Orange-bordered blue
10. **Speyeria cybele**  
    Great spangled fritillary
11. **S. aphrodite**  
    Aphrodite
12. **Vanessa atalanta**  
    Red admiral
13. Junonia coenia
14. Enodia anthedon
15. Cervconis pegala
16. Danaus plexippus

Buckeye
Pearly eye
Wood nymph
Monarch

Notes: The Tuohy Sand Savanna contains a dry oak savanna area with some old field and prairie areas. Some plants found here include: leadplant (Amorpha canescens), coneflower (Ratibida pinnata), purple prairie clover (Petalostemum pupureum), goat’s rue (Tephrosia virginiana), and spiderwort (Tradescantia sp.). This site in northern Fillmore county contains a population of the KB’s subspecies, the Melissa Blue, Lycaeides melissa melissa. This find is significant as it represents an eastern range extension in Minnesota for the species. Two males were observed on 30 May 1990 and 15-20 adults were seen on 10 July 1990. Voucher specimens were taken from each trip.

OLMSTED COUNTY:

RAILROAD EAST OF ROCHESTER: 106N 13W N1/2 13  (Map VIII)
Owner: Undetermined

Date: 30 May 1990  Time: 11:30 - 12:30pm
Butterfly Species Observed:

1. Colias eurytheme  Orange sulphur
2. Everes comyntas  Eastern tailed blue
3. Danaus plexippus  Monarch

Notes: This area was checked following a tip on a potential site for lupine. No lupine was found along the railroad in this sand-prairie-like habitat. The author searched along the railroad track from county road 11 to the motorcycle shop. Some damage from motorcycles and other off-road vehicles was noted. Weeds have invaded many areas along the tracks.

CHESTER WOODS: 106N 13W N1/2 13  (Map VIII)
Owner: Olmsted County

Date: 30 May 1990  Time: 12:15 - 1:45pm
Weather: Mostly sunny, 75 degrees F, SE winds 10-15 mph.
Butterfly Species Observed:

1. Polites themistocles  Tawny-edged skipper
2. Erynnis juvenalis  Juvenal’s duskywing
3. Euphyes ruricola  Dun skipper
4. Lycaena phlaeas  American copper
5. Everes comyntas  Eastern tailed blue
6. Vanessa cardui  Painted lady
7. Ceryconis pegala  Wood nymph

Notes: This undeveloped county park is being used as an illegal dumpsite and off-road vehicle track but contains some good sand
savanna habitat. Burn management in the area would greatly benefit the herbaceous understory. Few butterflies and no lupine were found in the area.

WINONA COUNTY:

O.L. KIPP STATE PARK: 106N 05W W26
Owner: State Park Land

Date: 01 June 1990 Time: 10:00 - 1:45pm
Weather: Sunny, 75 degrees F, S winds 10-20 mph.
Butterfly Species Observed:

1. Thorybes pylades
2. Pholisora catullus
3. Poanes hobomok
4. Atrytonopsis hianna
5. Amblascirtes vialis
6. Pterourus glaucus
7. Everes comynas
8. Charidryas gorgone
9. Phyciodes tharos/morpheus
10. Vanessa cardui
11. Y. atalanta
12. Cercyonis pegala
13. Danaus plexippus

Northern cloudywing
Common sootywing
Hobomok skipper
Dusted skipper
Roadside skipper
Tiger swallowtail
Eastern tailed blue
Gorgone crescentspot
Pearly crescentspot
Painted lady
Red admiral
Wood nymph
Monarch

Notes: This site contains a goat prairie on the steep south to southwest facing slope and a small bur oak savanna occurs at the top of the bluff. No lupine was found in the survey area.

SCHUELER SAND BARRENS: 105N 08W SE33
Owner: Elmer Schueler, Phone: 864-2122

Date: 04 June 1990 Time: 1:00 - 4:00pm
Weather: Mostly sunny, 75 degrees F, SE winds 5-10 mph.
Butterfly Species Observed:

1. Erynnis juvenalis
2. Poanes hobomok
3. Euphyes ruricola
4. Amblascirtes vialis
5. Charidryas gorgone
6. Vanessa cardui
7. Megisto cymela
8. Danaus plexippus

Juvenal’s duskywing
Hobomok skipper
Dun skipper
Roadside skipper
Gorgone crescentspot
Painted lady
Little wood satyr
Monarch

Notes: This is a top quality black oak (Quercus veluntina) and jack pine (Pinus banksiana) sand barrens area. Further survey work may be necessary in this area to confirm the absence of lupine and the KB. Protection of this site is recommended. It is privately owned and after talking to the landowner no immediate threats appear to endanger the site.
*** WHITENWATER HISTORIC SITE: 108N 10W Sec: 14 (Map XI)
Owner: State Wildlife Management Area

Date: 01 June 1990 Time: 3:00 - 4:17pm
Weather: Sunny, 81 degrees F, winds S 10-20 mph.
Lupine:
Approximate number of clumps: 25,000
Approximate number of stems: 250,000
Approximate number of flowering stalks: 100,000
Acreage with lupine: 5
Associated plant species:
Columbine (*Aquilegian canadensis*) (F), Phlox (*Phlox sp.*) (U),
Hoary puccoon (*Lithospermum canescens*) (F), Butterfly weed
(*Asclepias tuberosa*) (P), Dotted mint (*Monarda punctata*) (P),
Goat’s rue (*Tephrosia virginiana*) (F), Prairie coneflower
(*Ratibida pinnata*) (P), Purple prairie clover (*Petalostemum
cupureum*) (P), White prairie clover (*P. candidum*) (P), Big
bluestem (*Andropogon gerardii*) (P), fame flower (*Talinum
rugospermum*) (P), Sand milkweed (*Asclepias amplexicaulis*) (P), Bur
oak (*Quercus marocarpa*) (P), Black oak (*Q. velutina*) (P), Jack
Pine (*Pinus banksiana*) (P).
Butterfly Species Observed:
1. *Poanes hobomok*  Hobomok skipper
2. *Erynnis juvenalis*  Juvenal’s duskywing
3. *Erynnis persius*  Persius duskywing
4. *Amblyscirtes vialis*  Roadside skipper
5. *Polygona comma*  Comma
6. *Metis cymela*  Little wood satyr
7. *Danaus plexippus*  Monarch

Date: 02 June 1990 Time: 9:30 - 12:00 noon
Weather: Cloudy, 75 degrees F, SW winds 10-25 mph, some light
rain, heavy rain about 11:50am.
Butterfly Species Observed: none

Date: 11 July 1990 Time: 8:30 - 1:00pm
Weather: Cloudy with few times of full sun, 75 degrees F, light
rain later.
Butterfly Species Observed:
1. *Epargyreus clarus*  Silver-spotted skipper
2. *Thorybes bathyllus*  Southern cloudywing
3. *Polites origines*  Crossline skipper
4. *Atrystone delaware*  Delaware skipper
5. *Colias philodice*  Common sulphur
6. *Pyristia lisa*  Little yellow
7. *Lycaena phlaeas*  American copper
8. *Harkencialus titus*  Coral hairstreak
9. *Satyrium Edwardsii*  Edward’s hairstreak
10. *Everes comyntas*  Eastern tailed blue
11. *Speyeria cybele*  Great spangled fritillary
12. Polygonia comma  
13. Nymphalis antiopa  
14. Vanessa atalanta  
15. Asterocampa celtis  
16. A. clyton  
17. Enodia anthedon  
18. Cercyonis pegala  
19. Danaus plexippus  

Comma  
Mourning cloak  
Red admiral  
Hackberry butterfly  
Tawny emperor  
Pearly eye  
Wood nymph  
Monarch  

Date: 30 July 1990  
Time: 12:30 - 5:30pm  
Weather: Partly cloudy, 78 degrees F, SW winds 5 mph.  
Butterfly Species Observed:  

1. Epargyreus clarus  
2. Erynnis baptisiae  
3. Polites origines  
4. Wallengrenia egeremet  
5. Atrytone delaware  
6. Colias eurytheme  
7. Lycaena phlaeas  
8. Harkenclenus titus  
9. Celastrina ladon  
10. Lycaenides melissa samuelis  
11. Speyeria cybele  
12. Phyciodes tharos/morpheus  
13. Polygonia progne  
14. Vanessa atalanta  
15. Asterocampa celtis  
16. Cercyonis pegala  
17. Danaus plexippus  

Silver-spotted skipper  
Wild indigo duskywing  
Crossline skipper  
Northern broken dash  
Delaware skipper  
Orange sulphur  
American copper  
Coral hairstreak  
Spring azure  
KARNER BLUE  
Great spangled fritillary  
Pearly crescentspot  
Gray comma  
Red admiral  
Hackberry butterfly  
Wood nymph  
Monarch  

Date: 06 August 1990  
Time: 12:20 - 5:20pm  
Weather: Partly cloudy, 76 degrees F, NW winds 5-15 mph.  
Butterfly Species Observed:  

1. Epargyreus clarus  
2. Erynnis baptisiae  
3. Ancyloxypha numitor  
4. Polites themistocles  
5. Amblyscirtes vialis  
6. Heraclides cresphontes  
7. Artogeia rapae  
8. Colias eurytheme  
9. C. eurytheme  
10. Lycaena phlaeas  
11. Strymon melinus  
12. Everes comyntas  
13. Lycaenides melissa samuelis  
14. Speyeria cybele  
15. S. aphrodite  
16. Phyciodes tharos/morpheus  
17. Polygonia comma  
18. P. progne  
19. Vanessa cardui  

Silver-spotted skipper  
Wild indigo duskywing  
Least skipper  
Tawny-edged skipper  
Roadside skipper  
Giant swallowtail  
Cabbage white  
Common sulphur  
Orange sulphur  
American copper  
Gray hairstreak  
Eastern tailed copper  
KARNER BLUE  
Great spangled fritillary  
Aphrodite  
Pearly crescentspot  
Comma  
Gray comma  
Painted lady
20. **Vanessa atalanta**  
Red admiral

21. **Basilarchia arthemis**  
Red-spotted purple

22. **Asterocampa celtis**  
Hackberry butterfly

23. **Enodia anthedon**  
Pearly eye

24. **Cercyonis pegala**  
Wood nymph

25. **Danaus plexippus**  
Monarch

Date: 16 August 1990  
Time: 12:20 - 4:15pm

Weather: Partly cloudy, 85 degrees F, SW winds 5-20 mph.

Butterfly Species Observed:

1. **Ancyloxypha numitor**  
Least skipperling

2. **Hesperia leonardus**  
Leonardus skipper

3. **Papilio polyxenes**  
Black swallowtail

4. **Heracleides cresphontes**  
Giant swallowtail

5. **Artogeia rapae**  
Cabbage white

6. **Colias philodice**  
Common sulphur

7. **C. eurytheme**  
Orange sulphur

8. **Satyrium caravorum**  
Hickory hairstreak

9. **Everes comyntas**  
Eastern tailed blue

10. **Lycaescies melissa samuelis**  
KARNER BLUE

11. **Speyeria cybele**  
Great spangled fritillary

12. **Phyciodes tharos/morpheus**  
Pearly crescentspot

13. **Polygonia comma**  
Comma

14. **Vanessa atalanta**  
Red admiral

15. **Junonia coenia**  
Buckeye

16. **Basilarchia arthemis**  
Red-spotted purple

17. **Danaus plexippus**  
Monarch

Notes: Oak sand savannas and sand prairies occur on sandy terraces throughout the area, and these habitats contain several rare plants and animals. Some plants include sand milkweed (*Asclepias amplexicaulis*), goat’s rue (*Tephrosia virginiana*), fame flower (*Talinum rugospermum*), and probably one of the largest stands of lupine (*Lupinus perennis*) left in the state. In addition to the Karner Blue, the site contains the state threatened Ottoe Skipper (*Hesperia ottoe*).

***WHITEWATER WMA 23: 108N 10W SE23 NE26 (Map XII)***

Owner: State Wildlife Management Area

Date: 05 June 1990  
Time: 1:00 - 5:00pm

Weather: Cloudy, 65 degrees F, S winds 5-15 mph.

Lupine:

Approximate number of clumps: 10,000

Approximate number of stems: 60,000

Approximate number of flowering stalks: 40,000

Acreage with lupine: 5

Associated plant species:

Big bluestem (*Andropogon gerardii*) (P), Porcupine grass (*Stipa spartea*) (P), Blazingstar (*Liatris aspera*) (P), Butterfly weed (*Asclepias tuberosa*) (F), Dotted mint (*Monarda punctata*) (F), Goat’s rue (*Tephrosia virginiana*) (P), Prairie coneflower
(Ratibida pinnata) (P), Purple prairie clover (Petalostemum pupureum) (F), White prairie clover (P. candidum) (F), Daisy fleabane (Erigeron annuus) (F), Puccoon (Lithospermum sp.) (P), Phlox (Phlox sp.) (P), Jack Pine (Pinus banksiana) (P), Black Oak (Quercus velutina) (P), Northern pin oak (Quercus ellipsoidalis) (P).

Butterfly Species Observed:

1. Megisto cymela                     Little wood satyr
2. Danaus plexippus                  Monarch

Date: 12 July 1990  Time: 9:23 - 3:15pm
Weather: Partly sunny, 65 degrees F, NW winds 10-20 mph.

Butterfly Species Observed:

1. Epargyreus clarus                  Silver-spotted skipper
2. Thorybes bathyllus                 Southern cloudywing
3. Atrytone delaware                  Delaware skipper
4. Pontia protodice                   Checkered white
5. Artogeia rapae                     Cabbage white
6. Colias philodice                   Common sulphur
7. C. eurytheme                       Orange sulphur
8. Lycaena phlaeas                    American copper
9. Harkenclenus titus                 Coral hairstreak
10. Satyrion edwardsii               Edward's hairstreak
11. Everes comyntas                   Eastern tailed blue
12. Speyeria cybele                   Great spangled fritillary
13. Charidryas gorgone                Gorgone crescentspot
14. Phyciodes tharos/morpheus        Pearly crescentspot
15. Polygonia comma                   Comma
16. P. progne                        Gray comma
17. Vanessa cardui                    Painted lady
18. V. atalanta                       Red admiral
19. Asterocampa celtis                Hackberry butterfly
20. A. clyton                         Tawny emperor
21. Enodia anthedon                   Pearly eye
22. Cercyonis pegala                  Wood nymph
23. Danaus plexippus                 Monarch

Date: 31 July 1990  Time: 9:30 - 3:30pm
Weather: Mostly sunny, 65-77 degrees F, no breeze.

Butterfly Species Observed:

1. Epargyreus clarus                  Silver-spotted skipper
2. Erynnis baptisiae                  Wild indigo duskywing
3. Ancyloxypha numitor                Least skipperling
4. Polites origines                   Crossline skipper
5. Atrytone delaware                  Delaware skipper
6. Euphyes ruricola                   Dun skipper
7. Amblyscirtes vialis               Roadside skipper
8. Papilio polyxenes                  Black swallowtail
9. Heraclides cresphontes            Giant swallowtail
10. Pterourus glaucus                 Tiger swallowtail
11. **Artogeia rapae**  
12. **Colias eurytheme**  
13. **Harkencenus titus**  
14. **Satyrium caryaeorum**  
15. **Everes comyntas**  
16. **Lycaenides melissa samuelis**  
17. **Spevera cybele**  
18. **Phyciodes tharos/morpheus**  
19. **Polygonia interrogationis**  
20. P. *comma*  
21. P. *progne*  
22. **Vanessa cardui**  
23. **Junonia coenia**  
24. **Basilarchia arthemis**  
25. B. *archippus*  
26. **Asterocampa celtis**  
27. **Enodia anthedon**  
28. **Cercyonis pegala**  
29. **Danaus plexippus**

**Cabbage white**  
**Orange sulphur**  
**Coral hairstreak**  
**Hickory hairstreak**  
**Eastern tailed blue**  
**KARNER BLUE**  
**Great spangled fritillary**  
**Pearly crescentspot**  
**Question mark**  
**Comma**  
**Gray comma**  
**Painted lady**  
**Buckeye**  
**Red-spotted purple**  
**Viceroy**  
**Hackberry butterfly**  
**Pearly eye**  
**Wood nymph**  
**Monarch**

**Date:** 07 August 1990  
**Time:** 9:40 - 3:00pm  
**Weather:** Sunny, 65-78 degrees F, light N breeze.

**Butterfly Species Observed:**

1. **Epargyreus clarus**  
2. **Ancyloxypha numitor**  
3. **Atrytone delaware**  
4. **Amblyscirtes vialis**  
5. **Heraclides cresphontes**  
6. **Artogeia rapae**  
7. **Colias philodice**  
8. **Everes comyntas**  
9. **Lycaenides melissa samuelis**  
10. **Spevera cybele**  
11. **Phyciodes tharos/morpheus**  
12. **Polygonia progne**  
13. **Vanessa cardui**  
14. **Junonia coenia**  
15. **Basilarchia arthemis**  
16. **Asterocampa celtis**  
17. **Cercyonis pegala**  
18. **Danaus plexippus**

**Silver-spotted skipper**  
**Least skipperling**  
**Delaware skipper**  
**Roadside skipper**  
**Giant swallowtail**  
**Cabbage white**  
**Common sulphur**  
**Eastern tailed blue**  
**KARNER BLUE**  
**Great spangled fritillary**  
**Pearly crescentspot**  
**Gray comma**  
**Painted lady**  
**Buckeye**  
**Red-spotted purple**  
**Hackberry butterfly**  
**Wood nymph**  
**Monarch**

**Date:** 17 August 1990  
**Time:** 12:20 - 4:00pm  
**Weather:** Mostly cloudy, 75 degrees F, t-storms later.

**Butterfly Species Observed:**

1. **Ancyloxypha numitor**  
2. **Hesperia leonardus**  
3. **Heraclides cresphontes**  
4. **Artogeia rapae**  
5. **Colias philodice**  
6. **C. eurytheme**  
7. **Everes comyntas**  

**Least skipperling**  
**Leonardus skipper**  
**Giant swallowtail**  
**Cabbage white**  
**Common sulphur**  
**Orange sulphur**  
**Eastern tailed blue**
8. *Lycaeides melissa samuelis*  
   **KARNER BLUE**
9. *Speyeria cybele*  
   Great spangled fritillary
10. *Polyogonia progne*  
   Gray comma
11. *Vanessa atalanta*  
   Red admiral
12. *Basilarchia arthemis*  
   Red-spotted purple
13. *B. archippus*  
   Viceroy
14. *Danaus plexippus*  
   Monarch

Notes: This site south of the historic site is very similar in appearance to the historic site. This sand savanna area contains many of the same lepidoptera, and many of the same plants as mentioned before. The KB was found here along an old trail and scattered throughout the open savanna area. For more specific KB distribution data within the Whitewater WMA, see Appendix II.

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**WHITETE WATER WMA 22: 108N 10W NENW22** (Map XIII)
Owner: State Wildlife Management Area

Date: 02 June 1990  
Time: 8:30 - 9:25am
Weather: Cloudy, cool 60 degrees F, SW winds 10-20 mph.
Butterfly Species Observed:

1. *Lycaena phlaeas*  
   American copper
2. *Vanessa cardui*  
   Painted lady
3. *Cercyonis pegala*  
   Wood nymph

Notes: This sandy site southwest of the historic site, and west of Miller Pool, looked worthy of checking out. It contained no lupine however and few butterflies on 2 June 1990.

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**WABASHA COUNTY:**

* WHITETE WATER WMA 31: 109N 09W S1/2 31 (Map XIV)
Owner: State Wildlife Management Area

Date: 05 June 1990  
Time: 9:00 - 11:30am
Weather: Cloudy, light rain, 65 degrees F, no breeze.
Lupine:
Approximate number of clumps: 500
Approximate number of stems: 4000
Approximate number of flowering stalks: 1000
Acreage with lupine: scattered throughout 5
Associated plant species:
Jack pine (*Pinus banksiana*) (P), Black oak (*Quercus velutina*) (P), Big bluestem (*Andropogon gerardii*) (P), Puccoon (*Lithospermum sp.*) (P).
Butterfly Species Observed:

1. *Megisto cymela*  
   Little wood satyr

Date: 13 July 1990  
Time: 9:00 - 3:00pm
Weather: Mostly sunny, 75-80 degrees F, SW winds 10-20 mph.
Butterfly Species Observed:

1. **Epargyreus clarus**
   - Silver-spotted skipper
2. **Atrystone delaware**
   - Delaware skipper
3. **Artogeia rapae**
   - Cabbage white
4. **Colias philodice**
   - Common sulphur
5. **Harkenclenus titus**
   - Coral hairstreak
6. **Satyrium edwardsii**
   - Edward's hairstreak
7. **Everes comyntas**
   - Eastern tailed blue
8. **Speyeria cybele**
   - Great spangled fritillary
9. **Charidryas gorgone**
   - Gorgone crescentspot
10. **Polygonia comma**
    - Comma
11. **Nymphalis antiopa**
    - Mourning cloak
12. **Vanessa atalanta**
    - Red admiral
13. **Asterocampa celtis**
    - Hackberry butterfly
14. **A. clyton**
    - Tawny emperor
15. **Cercyonis pegala**
    - Wood nymph
16. **Danaus plexippus**
    - Monarch

**Notes:**
- Although this site contains lupine, no KBs were seen here in 1990. This area is again very similar to the historic site except that canopy is a little more closed and the site is not as large.

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KELLOGG-WEAVER DUNES: 109N 09W NES
Owner: State Scientific and Natural Area

Date: 03 June 1990
Time: 9:30 - 10:00am
Weather: Cloudy, raining and cold, 40 degrees F.
Butterfly Species Observed: none seen

**Notes:** This large sand dune complex along the Mississippi River was surveyed by the author, on a cool June day. No lupine was seen within the sand prairie habitat, which also includes such scattered trees as northern pin oak (*Quercus ellipsoidalis*), bur oak (*Q. marocarpa*), and jack pine (*Pinus banksiana*).
NORTH WEaver: 109N 09W SW6

Owner: Undetermined

Date: 03 June 1990  Time: 11:00 - 12:00 noon
Weather: Rainy, cold, 40 degrees F, NW winds 5-15 mph.
Butterfly Species Observed: none seen

Notes: This private site south of Kellog-Weaver Dunes contained much of the same dune and sand prairie type vegetation. The search for lupine here turned up negative as well. No butterfly species were observed at the site.

ZUMBRO BOTTOMS: 110N 11W SW27 & N27

Owner: State Forest Land

Date: 06 June 1990  Time: 9:00 - 12:15pm
Butterfly Species Observed:

1. Poanes hobomok  Hobomok skipper
2. Artogeia rapae  Cabbage white
3. Lycaena phlaeas  American copper
4. Vanessa cardui  Painted lady
5. Cercyonis pegala  Red admiral

Notes: A small sand terrace just east of the Zumbro Bottoms State Forest main assembly area looked like potential lupine habitat. The area contained no lupine, and evidence of heavy ATV traffic was noted on the exposed sandy regions. A second sand terrace within Zumbro Bottoms S.F. (Section 27) was also surveyed. No lupine was found here either.

PETERSON LAKE WEST: 110N 10W E12 (Map XVIII)

Owner: Many small plots

Date: 06 June 1990  Time: 1:15 - 2:00pm
Butterfly Species Observed:

1. Artogeia rapae  Cabbage white
2. Colias philodice  Common sulphur
3. Lycaena phlaeas  American copper
4. Danaus plexippus  Monarch

Notes: This sand prairie area has been degraded due to housing and development. Small sand prairie remnants remain in the area although no lupine and few lepidoptera were seen.

JARRETT EAST: 109N 13W NWNW24 (Map XIX)

Owner: Undetermined

Date: 07 June 1990  Time: 9:00 - 9:30am
Weather: Sunny, 70 degrees F, no breeze.
Butterfly Species Observed:

1. **Pholisora catullus**  
   Common sootywing

Notes: This little sand terrace between highway 11 and the Zumbro River contained no lupine. The site contained porcupine grass (*Stipa spartea*), big bluestem (*Andropogon gerardii*), and little bluestem (*Schizachyrium scoparium*) but few forbs.

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**JARRETT WEST**: 109N 13W NESW22  
*Note: Map XIX*

Owner: State Forest Land

Date: 07 June 1990  
Time: 9:40 - 10:45am

Weather: Sunny, 70 degrees F, no wind.

Butterfly Species Observed:

1. **Pholisora catullus**  
2. **Poanes hobomok**  
3. **Everes comyntas**  
4. **Vanessa virginiensis**  
5. **Megisto cymela**  
6. **Danaus plexippus**

   Common sootywing  
   Hobomok skipper  
   Eastern tailed blue  
   American painted lady  
   Little wood satyr  
   Monarch

Notes: Another sandy river terrace (mostly planted to pines), contained some native vegetation. Leadplant (*Amorpha canescens*), compass plant (*Silphium laciniatum*), phlox (*Phlox sp.*), porcupine grass (*Stipa spartea*), and big bluestem (*Andropogon gerardii*) graced this hillside. Sandy areas contained many tiger beetles (*Cicindelidae*) and the 6-lined racerunner lizard (*Cnemidophorus sexlineatus*).

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**ZUMBRO FALLS**: 109N 14W SWNW1 & SENE2  
*Note: Map XX*

Owner: Undetermined

Date: 07 June 1990  
Time: 12:00 - 1:00pm

Weather: Sunny, 75 degrees F, light S breeze.

Butterfly Species Observed:

1. **Pholisora catullus**  
2. **Polites themistocles**  
3. **Poanes hobomok**  
4. **Artogeia rapae**  
5. **Everes comyntas**

   Common sootywing  
   Tawny-edged skipper  
   Hobomok skipper  
   Cabbage white  
   Eastern tailed blue

Notes: This site contained a sandy river terrace north of the Zumbro River. No lupine seen. A goat or bluff prairie was found at the top of the bluff. Grazing and succession are the two main threats to this site.
ANOKA COUNTY:

**HELEN ALLISON SAVANNA: 033N 14W SWNW1 & NNE2** (Map XXI)
Owner: The Nature Conservancy

Date: 28 May 1990 Time: 10:30 - 12:00 noon
Weather: Mostly sunny, 73 degrees F, no wind.
Butterfly Species Observed:

1. Euchloe olympia  
   Olympia white
2. Colias philodice  
   Common sulphur
3. Clossiana bellona  
   Meadow fritillary

Notes: This TNC tract is an excellent example of oak sand savanna once found throughout the Anoka Sand Plains region. Sand prairie vegetation supporting scattered bur oak and northern pin oaks occurs here. Over 200 plants have been recorded here, although lupine is not one of them. The west end contains old field vegetation as it was formerly cultivated.

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**CEDAR CREEK HISTORICAL SITE: 034N 23W SWNW23** (Map XXI)
Owner: University of Minnesota

Date: 28 May 1990 Time: 1:12 - 1:50pm
Weather: Sunny, 78 degrees F, no breeze.

Lupine:
Approximate number of clumps: 1,500 but widely scattered.
Approximate number of stems: 8,000
Approximate number of flowering stalks: just beginning to flower.
Acreage with lupine: 1
Associated plant species:

Big bluestem (Andropogon gerardii)(P), Puccoon (Lithospermum sp.) (P), Bird's foot violet (Viola pedata)(P), Bur oak (Quercus marocarpa)(P), Butterfly weed (Asclepias tuberosa)(P), New Jersey tea (Ceanothus americanus)(P), Hazel (Corylus sp.)(P).

Butterfly Species Observed: none noted

Date: 18 July 1990 Time: 3:35 - 4:05pm
Weather: Sunny, 88 degrees F, no wind.
Butterfly Species Observed:

1. Arytone delaware  
   Delaware skipper
2. Euphyes ruricola  
   Dun skipper
3. Satyrium edwardsii  
   Edward's hairstreak
4. Everes comyntas  
   Eastern tailed blue
5. Speyeria aphrodite  
   Aphrodite
6. Phyciodes tharos/morpheus  
   Pearly crescentspot
7. Cercyonis pegala  
   Wood nymph
8. Danaus plexippus  
   Monarch
Date: 22 July 1990
Time: 12:40 - 1:45pm
Weather: Partly cloudy, 72 degrees F, NW winds 10-20.
Butterfly Species Observed:

1. Atrytone delaware
   Delaware skipper
2. Euphyes ruricola
   Dun skipper
3. Colias eurytheme
   Orange sulphur
4. Satyrium edwardsii
   Edward’s hairstreak
5. Satyrium calanus
   Banded hairstreak
6. Cercyonis pegala
   Wood nymph
7. Danaus plexippus
   Monarch

Date: 24 July 1990
Time: 11:30 - 1:30pm
Weather: Sunny, 78 degrees F, S winds 5-15 mph.
Butterfly Species Observed:

1. Atrytone delaware
   Delaware skipper
2. Euphyes ruricola
   Dun skipper
3. Pterourus glaucus
   Tiger swallowtail
4. Harkenclenus titus
   Coral hairstreak
5. Satyrium edwardsii
   Edward’s hairstreak
6. S. calanus
   Banded hairstreak
7. Speyeria aphrodite
   Aphrodite
8. Cercyonis pegala
   Wood nymph
9. Danaus plexippus
   Monarch

Date: 08 August 1990
Time: 12:35 - 1:45pm
Weather: Sunny, 72 degrees F, SW winds 10-25 mph.
Butterfly Species Observed:

1. Ancyloxypha numitor
   Least skipperling
2. Artogeia rapae
   Cabbage white
3. Colias eurytheme
   Orange sulphur
4. Phyciodes tharos/morpheus
   Pearly crescentspot
5. Danaus plexippus
   Monarch

Date: 13 August 1990
Time: 12:30 - 2:35pm
Weather: Mostly sunny, 75 degrees F, S breeze 5-10 mph.
Butterfly Species Observed:

1. Artogeia rapae
   Cabbage white
2. Colias eurytheme
   Orange sulphur
3. Satyrium caryaevorum
   Hickory hairstreak
4. Everes comyntas
   Eastern tailed blue
5. Polygonia comma
   Comma
6. Basilarchia arthemis
   White admiral
7. B. archippus
   Viceroy
8. Cercyonis pegala
   Wood nymph
9. Danaus plexippus
   Monarch

Notes: This site is found within the 5,750 acre Cedar Creek Natural History Area, owned by the University of Minnesota. In 1975 the KB was discovered in this small area of former bur oak sand savanna, where some openings in the canopy persist. Road
maintenance during the winter of 1976-77 killed much of the lupine along the road margins. In addition, the open areas now have a strong sumac (Rhus sp.) and hazel (Corylus sp.) canopy due to long interburn intervals (Minnesota DNR Natural Heritage Database). The KB has not been seen here since R. Dana sighted one male on 12 August 1984. No KBs were seen in 1990 during the survey and most likely they have been extirpated from the site.

* CARLOS AVERY WMA: 033N 23W NENW29  (Map XXII)

Owner: State Wildlife Management Area

Date: 28 May 1990        Time: 2:00 - 2:30pm
Weather: Sunny, 78 degrees F, no breeze.
Lupine:
Approximate number of clumps: 20
Approximate number of stems: 1,600
Approximate number of flowering stalks: 500
Acreage with lupine: < 1
Associated plant species:
Hoary puccoon (Lithospermum canescens)(F), Hazel (Corylus sp.) (P), White prairie clover (Petalostemum candidum)(P), Phlox (Phlox sp.)(F), Daisy fleabane (Erigeron annuus)(P), White sweet clover (Melilotus alba)(P).

Butterfly species observed:

1. **Euchloe olympia**  Olympia white
2. **Colias philodice**  Common sulphur

Date: 13 June 1990        Time: 4:30 - 5:00pm
Weather: Sunny, 85 degrees F, SW winds 10-20 mph.
Butterfly Species Observed:

1. **Lycaena phlaeas**  American copper
2. **Carterocephalus palaemon**  Arctic skipperling

Date: 18 July 1990        Time: 4:20 - 4:40pm
Weather: Sunny, 88 degrees F, no wind.
Butterfly Species Observed:

1. **Pterourus glaucus**  Tiger swallowtail
2. **Pontia protodice**  Checkered white
3. **Colias eurytheme**  Orange sulphur
4. **Harkenclenus titus**  Coral hairstreak
5. **Vanessa cardui**  Painted lady
6. **Cercyonis pegala**  Wood nymph

Date: 24 July 1990        Time: 10:25 - 10:25am
Weather: Sunny, 77 degrees F, light S breeze.
Butterfly Species Observed: none noted

Date: 08 August 1990        Time: 11:15 - 11:40am
Weather: Sunny, 72 degrees F, WSW winds 10-20 mph.
Butterfly Species Observed: none observed

Notes: A small population of lupine was discovered along a road margin in a powerline clearing. The site is very small and no KBs were seen during the flight periods.

* COON LAKE: 033N 22W NWNE30 (Map XXIII)
Owner: Undetermined

A very small patch of lupine was found in a road ditch along highway 17. Approximately 200 stems and 20 clumps were noted. Since the site was so small and isolated, it was not revisited during the KB's second flight period. Concerns include road maintenance, herbicide use, and possible mowing of ditch by landowners.

SNA NORTH OF CARLOS AVERY: 033N 22W NW19 (Map XXIII)
Owner: State Wildlife Management Area

Date: 29 May 1990
Time: 8:00 - 10:00am
Weather: Sunny, 58 degrees F, N winds 5-10 mph.
Butterfly Species Observed:

1. Poanes hobomok
2. Lycaena phlaeas
   Hobomok skipper
   American copper

Notes: This sand prairie and sand savanna-like habitat was surveyed for lupine and the KB on 29 May 1990. No lupine was recorded at this site.

BUNKER HILLS: 032N 24W SW36 & E35 (Map XXIV)
Owner: Anoka County Park

BUNKER HILLS PRAIRIE: 32N 24W NE36 (Map XXIV)
Owner: B. & L. Johnson

Date: 12 June 1990
Time: 9:00 - 12:00 noon
Weather: Sunny, 75-80 degrees F, SW breeze 5 mph.
Butterfly Species Observed:

1. Euphves ruricola
2. Colias philodice
3. Lycaena phlaeas
4. Everes comyntas
5. Vanessa cardui
6. Danaus plexippus
   Dun skipper
   Common sulphur
   American copper
   Eastern tailed blue
   Painted lady
   Monarch

Notes: These two sites were surveyed for lupine on 12 June 1990. The areas consisted of sand prairie and sand savanna habitat. Some lupine has been planted within the Anoka County Recreation Area (conversation with park manager), but no naturally occurring native lupine was seen at either site. In addition few butterflies were observed. The Bunker Hills Prairie is under private ownership and was once pastured. It does however have a high forb diversity with Penstemon grandiflorus, P. gracilis, and
Penstemon grandiflorus, P. gracilis, and Liatris sp. among others. There are no obvious threats to the site as current owners are interested in regeneration of the area (Minnesota DNR Natural Heritage Database 1990).

ISANTI COUNTY:

ATHENS STATE WILDLIFE MANAGEMENT AREA: 034N 23W SW5 (Map XXV)
Owner: State Wildlife Management Area

Date: 13 June 1990  Time: 3:15 - 3:45pm
Weather: Few scattered clouds, 75 degrees, WSW winds 10-20 mph.
Butterfly Species Observed:

1. Pholisora catullus  Common sootywing
2. Colias philodice  Common sulphur
3. C. eurytheme  Orange sulphur

Notes: This old field area contains some native plants but no lupine and very few lepidopteran species were noted here.

MARGET LAKE WILDLIFE AREA: 034N 24W NE3 & SE34 (Map XXVI)
Owner: State Wildlife Management Area

Date: 14 June 1990  Time: 9:45 - 10:45am
Weather: Sunny, 77 degrees F, no wind.
Butterfly Species Observed:

1. Pterourus glaucus  Tiger Swallowtail
2. Pontia protodice  Checkered white
3. Megisto cymela  Little wood satyr
4. Coenonympha inornata  Prairie ringlet
5. Danaus plexippus  Monarch

Notes: This site contains a nice but small remnant sand prairie area in the NE corner of section 3. Big bluestem (Andropogon gerardii), porcupine grass (Stipa spartea), and some forbs still persist on the Zimmerman sands that make up the area.

SPECTACLE LAKE: 036N 25N NE35 (Map XXVII)
Owner: State Wildlife Management Area

Date: 13 June 1990  Time: 1:55 - 2:50pm
Weather: Partly cloudy, 82 degrees F, S winds 15 mph.
Butterfly Species Observed:

1. Thorybes pylades  Northern cloudywing
2. Poanes hobomok  Hobomok skipper
3. Carterocephalus palaemon  Arctic skipperling

Notes: Due to a 1942 record for lupine in the area, this site was surveyed. A possible overgrown savanna and adjacent old field were searched. No lupine was seen.
*CEDAR CREEK NORTH: 034N 23W SESE21 (Map XXI)*
Owner: University of Minnesota

Date: 29 May 1990       Time: 10:00 - 11:00am
Weather: Sunny, 60 degrees F, N wind 5-10 mph.
Lupine:
Approximate number of clumps: 50
Approximate number of stems: 500
Approximate number of flowering stalks: Not flowering yet.
Acreage with lupine: < 1
Associated plant species:
Northern pin oak (*Quercus ellipsoidalis*) (P), Big bluestem (*Andropogon gerardii*) (P), Puccoon (*Lithospermum sp.*) (F), Butterfly weed (*Asclepias tuberosa*) (P).

Butterfly Species Observed: none recorded.

Date: 19 July 1990       Time: 1:30 - 2:00pm
Weather: Thin high clouds, 78 degrees F, no breeze.
Butterfly Species Observed:
1. *Euphyes ruricola* Dun skipper
2. *Artogeia rapae* Cabbage white
3. *Satyrium edwardsii* Edward's hairstreak
4. *Polygonia comma* Comma
5. *Basilarchia arthemis* White admiral
6. *Cercyonis pegala* Wood nymph
7. *Danaus plexippus* Monarch

Date: 24 July 1990       Time: 1:50 - 2:25pm
Weather: Sunny, 82 degrees F, S wind 5-10 mph.
Butterfly Species Observed:
1. *Euphyes ruricola* Dun skipper
2. *Colias philodice* Common sulphur
3. *Cercyonis pegala* Wood nymph
4. *Danaus plexippus* Monarch

Date: 8 August 1990      Time: 12:45 - 2:00pm
Weather: Sunny, 72 degrees F, SW winds 10-20 mph.
Butterfly Species Observed:
1. *Colias philodice* Common sulphur
2. *Everes comyntas* Eastern tailed blue
3. *Danaus plexippus* Monarch

Notes: This is another site found within the Cedar Creek Natural History Area. A small patch of lupine (approx. 50 clumps) occurs along and grading into a mixed woods. An old field and a sand prairie also occur near the site. By 29 May, most of the healthy lupine had been browsed off, most likely by deer. No KBs were encountered during the four visits to the area. Threats to the lupine include browsing and succession.
* NORTH ROAD CORNERS: 034N 23W NESE22 (Map XXI)

Owner: University of Minnesota

Date: 28 May 1990 Time: 12:13 - 1:00pm
Weather: Sunny, 75 degrees F, no breeze.
Lupine:
Approximate number of clumps: 1,000
Approximate number of stems: 12,000
Approximate number of flowering stalks: 7,000
Acreage with lupine: < 1
Associated plant species: Big and little bluestem (Andropogon gerardii, Schizachyrium scoparium)(P), White prairie clover (Petalostemum candidum)(P), Sweet clover (Melilotus alba)(P), Daisy fleabane (Erigeron annuus)(P), Common milkweed (Asclepias syriaca)(P), Butterfly weed (Asclepias tuberosa)(P), Puccoon (Lithospermum sp.)(F), and Raspberry (Rubus sp.)(P).

Butterfly Species Observed:

1. Colias philodice Common sulphur
2. Euphyes comynas Eastern tailed blue
3. Glaucopsyche lygdamus Silvery blue

Date: 14 June 1990 Time: 8:45 - 9:05am
Weather: Sunny, 76 degrees F, no wind.
Butterfly Species Observed: none recorded.

Date: 18 July 1990 Time: 3:05 - 3:30pm
Weather: Sunny, 88 degrees F, light S breeze.
Butterfly Species Observed:

1. Polites mystic Long dash
2. Euphyes ruricola Dun skipper
3. Colias eurytheme Orange sulphur
4. Harkenclenus titus Coral hairstreak
5. Junonia coenia Buckeye
6. Danaus plexippus Monarch

Date: 22 July 1990 Time: 1:50 - 2:15pm
Weather: Partly sunny, 72 degrees F, WNW winds 10-20 mph.
Butterfly Species Observed:

1. Colias eurytheme Orange sulphur
2. Danaus plexippus Monarch

Date: 24 July 1990 Time: 10:45 - 11:30am
Weather: Sunny, 78 degrees F, S winds 5-10 mph.
Butterfly Species Observed:

1. Pterourus glaucus Tiger swallowtail
2. Artogeia rapae Cabbage white
3. Harkenclenus titus Coral hairstreak
4. *Everes comyntas*  
Eastern tailed blue

5. *Basilarchia archippus*  
Viceroy

6. *Enodia anthedon*  
Pearly eye

7. *Cercyonis pegala*  
Wood nymph

8. *Danaus plexippus*  
Monarch

Date: 08 August 1990  
Time: 11:50 - 12:30pm

Weather: Sunny, 72 degrees F, WSW winds 10-20 mph.

Butterfly Species Observed:

1. *Artogeia rapae*  
Cabbage white

2. *Colias philodice*  
Common sulphur

3. *Danaus plexippus*  
Monarch

Notes: A population of approximately 1000 clumps of lupine occurs at this site which is essentially no more than a triangular road ditch area between highway 22 and a gravel road. To the west is sand prairie habitat of the Cedar Creek Natural History Area, which contains many of the lepidopteran nectar sources for this site.

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**SHERBURN COUNTY:**

* SHERBANE NATIONAL WILDLIFE REFUGE: 035N 28W NE22 (Map XXVIII)

Owner: National Wildlife Refuge

Date: 12 June 1990  
Time: 2:02 - 4:15pm

Weather: Sunny, hot and humid, 90 degrees F, no wind.

Lupine:
- Approximate number of clumps: 25
- Approximate number of stems: 250
- Approximate number of flowering stalks: 150
- Acreage with lupine: 1

Associated plant species:
- Northern pin oak (*Quercus ellipsoidalis*) (P)
- Bur oak (*Quercus marocarpa*) (P)
- Porcupine grass (*Stipa spartea*) (P)
- Big bluestem (*Andropogon gerardii*) (P)
- Puccoon (*Lithospermum sp.*) (F)
- Spiderwort (*Tradesantia sp.*) (F)
- Purple prairie clover (*Petalostemum pupureum*) (P)
- Butterfly weed (*Asclepias tuberosa*) (P)

Butterfly Species Observed:

1. *Thorybes pylades*  
Northern cloudywing

2. *Phyciodes tharos/morpheus*  
Pearly crescentspot

3. *Nymphalis antiopa*  
Mourning cloak

4. *Vanessa cardui*  
Painted lady

5. *Megisto cymela*  
Little wood satyr

6. *Danaus plexippus*  
Monarch

Date: 19 July 1990  
Time: 10:00 - 11:30am

Weather: Mostly sunny, 75 degrees F, N winds 5-15 mph.
Butterfly Species Observed:

1. **Euphyes ruricola**  
   - Dun skipper
2. **Pterourus glaucus**  
   - Tiger swallowtail
3. **Colias eurytheme**  
   - Orange sulphur
4. **Harkencenus titus**  
   - Coral hairstreak
5. **Satyrium edwardsii**  
   - Edward's hairstreak
6. **Speveria aphrodite**  
   - Aphrodite
7. **Phyciodes tharos/morpheus**  
   - Pearly crescentspot
8. **Basilarchia arthemis**  
   - White admiral
9. **Enodia anthedon**  
   - Pearly eye
10. **Cercyonis pegala**  
    - Wood nymph
11. **Danaus plexippus**  
    - Monarch

**Notes:** An overgrown bur (**Quercus marocarpa**) and northern pin oak (**Q. ellipsoidalis**) sand savanna make up most of this site. Small openings occur within the savanna and it is here where lupine is found. Although the KB was not found here a total of 15 other species were seen in 1990. Burn management has been started in the area and should benefit the establishment of herbaceous plant growth.

* SANTIAGO OAK SAVANNA RNA: 035N 28W SW23 & SE24  (Map XXVIII)

Owner: National Wildlife Refuge

**Notes:** An overgrown bur (**Quercus marocarpa**) and northern pin oak (**Q. ellipsoidalis**) sand savanna make up most of this site. Small openings occur within the savanna and it is here where lupine is found. Although the KB was not found here a total of 15 other species were seen in 1990. Burn management has been started in the area and should benefit the establishment of herbaceous plant growth.

* SANTIAGO OAK SAVANNA RNA: 035N 28W SW23 & SE24  (Map XXVIII)

Owner: National Wildlife Refuge
Butterfly Species Observed:

1. Thorybes pylades  
2. Poanes hobomok  
3. Basilarchia arthemis  
4. Megisto cymela  
5. Coenonympha inornata  
6. Danaus plexippus  
   Northern cloudywing  
   Hobomok skipper  
   White admiral  
   Little wood satyr  
   Prairie ringlet  
   Monarch

Date: 18 July 1990  
Time: 9:30 - 2:45pm  
Weather: Sunny, 80 degrees F, no wind.

Butterfly Species Observed:

1. Atrytone delaware  
2. Euphyes ruricola  
3. Pontia protodice  
4. Artogeia rapae  
5. Colias philodice  
6. C. eurytheme  
7. Harkenclenus titus  
8. Satyrium edwardsii  
9. Speveria aphrodite  
10. Charidryas nycteis  
11. Enodia anthedon  
12. Ceryconis pegala  
13. Danaus plexippus  
   Delaware skipper  
   Dun skipper  
   Checkered white  
   Cabbage white  
   Common sulphur  
   Orange sulphur  
   Coral hairstreak  
   Edward’s hairstreak  
   Aphrodite  
   Silvery crescentspot  
   Pearly eye  
   Wood nymph  
   Monarch

Date: 25 July 1990  
Time: 10:00 - 1:05pm  
Weather: Rain ending about 8:45, cloudy, 68 degrees F, SE winds 5-15 mph, rain at 1:00 also.

Butterfly Species Observed:

1. Euphyes ruricola  
2. Pontia protodice  
3. Colias philodice  
4. Speveria aphrodite  
5. Basilarchia archippus  
6. Satyrides eurydice  
7. Cercyonis pegala  
8. Danaus plexippus  
   Dun skipper  
   Checkered white  
   Common sulphur  
   Aphrodite  
   Viceroy  
   Eyed brown  
   Wood nymph  
   Monarch

Date: 09 August 1990  
Time: 11:00 - 3:00pm  
Weather: Mostly sunny, 79 degrees F, very light SW breeze.

Butterfly Species Observed:

1. Ancyloxypha numitor  
2. Artogeia rapae  
3. Colias philodice  
4. C. eurytheme  
5. Satyrium carvaevorum  
6. Everes comyntas  
7. Speveria aphrodite  
8. Vanessa cardui  
   Least skipperling  
   Cabbage white  
   Common sulphur  
   Orange sulphur  
   Hickory hairstreak  
   Eastern tailed blue  
   Aphrodite  
   Painted lady
9. Basilarchia arthemis  
10. B. archippus  
11. Cercyonis pegala  
12. Danaus plexippus  

Red-spotted purple  
Viceroy  
Wood nymph  
Monarch

Notes: A large population of lupine is found within this mixed oak savanna. However, past grazing and fire suppression have degraded the site. Fire management has begun and should continue in this area. No KBs were seen in the summer of 1990. A similar survey was conducted in this area by S. Mueller (1985). A total of 23 species were observed in 1990 on four visits to the site.

* ELK RIVER DUNES: 035N 26W E18 & SW17  
Owner: St. Louis Park Sportsmen Club; Bob Zimmerman, President  
Phone: 612-537-3896

Date: 12 June 1990  
Time: 11:45 - 12:15pm  
Weather: Rain ending 11:30, sunny, very humid 80+ degrees F.

Lupine:  
Approximate number of clumps: 25  
Approximate number of stems: 300  
Approximate number of flowering stalks: 125  
Acreage with lupine: < 1  
Associated plant species:

Northern pin oak (Quercus ellipsoidalis)(P), Bur oak (Quercus marocarpa)(P), Needle grass (Stipa comata)(P), Prairie sunflower (Helianthus rigidus)(P).

Butterfly Species Observed: none recorded

Date: 15 June 1990  
Time: 6:30 - 8:15am  
Weather: Partly sunny, 60 degrees F, calm.

Butterfly Species Observed:

1. Thorybes pylades  
2. Megisto cymela  
3. Danaus plexippus  

Northern cloudywing  
Little wood satyr  
Monarch

Date: 22 July 1990  
Time: 8:00 - 9:30am  
Weather: Mostly sunny, 65 degrees F, NW winds 5-10 mph.

Butterfly Species Observed:

1. Euphyes ruricola  
2. Colias philodice  
3. Satyrium calanus  
4. Cercyonis pegala  
5. Danaus plexippus  

Dun skipper  
Common sulphur  
Banded hairstreak  
Wood nymph  
Monarch

Notes: A small population of lupine occurs in an oak savanna on a large sand dune complex known as the Elk River Sand Dunes. The site is owned by the St. Louis Park Sportsmen Club and contains excellent examples of steep dune topography of the Anoka Sand
Plain. No KBs were seen at the site. This site also contains the state endangered Uncas skipper, *Hesperia uncas*, although it was not seen by the author in 1990. The area should be protected.

**CONKLIN SAVANNA: 035N 29W S1/2 NW11**

Owner: Roger Conklin

Date: 15 June 1990 Time: 11:40 - 12:15pm
Weather: Light rain, 72 degrees F, no wind.
Butterfly Species Observed: none observed.

Notes: The Conklin Savanna contains 60 acres of dry, bur oak savanna with a good variety of native grasses (mainly porcupine (*Stipa spartea*) and little bluestem (*Schizachyrium scoparium*). Forb diversity is fairly good but the site contains no lupine. No butterflies were observed on 15 June due to the light rain throughout the day.

**BOYD LAKE SAVANNA: 035N 29W SESE13**

Owner: Leonard Graning

Date: 15 June 1990 Time: 12:20 - 1:00pm
Weather: Light rain, 75 degrees F, no wind.
Butterfly Species Observed: none observed.

Notes: This private site contains a small sandy oak savanna on the west side of Boyd Lake. Porcupine grass (*Stipa spartea*) is the most dominant grass in the area. No lupine was seen. Due to the rain no butterflies were seen.

**ORROCK 9 WEST: 030N 27W S 1/2 10**

Owner: National Wildlife Refuge

Date: 16 June 1990 Time: 12:45 - 2:15pm
Weather: Cloudy with intermittent showers, 75 degrees F, calm.
Butterfly Species Observed: none observed.

Notes: No lupine was found in this portion of the Sherburne National Wildlife Refuge. The rain also prevented any butterflies from flying on the survey date. The area consists of mixed oak sand savanna and sand prairie areas. Burn management has begun in the area but it has a long way to go to restore it’s natural character.

**THOMPSON LAKE SAVANNA: 033N 28W SE11 & NNE14**

Owner: Non-Profit organization

Date: 16 June 1990 Time: 1:00 - 2:30pm
Weather: Cloudy, rain, 75 degrees F, calm.
Butterfly Species Observed: none observed.

Notes: This overgrown bur (*Quercus marocarpa*) and pin oak (*Q. ellipsoidalis*) savanna contained no lupine and few native forbs. Due to the rain no butterflies were observed.
PINE COUNTY:

ST. CROIX STATE PARK: 040N 18W NW1 & 041N 17W SE31  (Map XXXIII)
Owner: State Park

Date: 17 June 1990    Time: 10:00 - 2:00pm
Weather: Cloudy, 70 degrees F, rain showers, SW winds 5-10 mph.
Butterfly Species Observed:

1. Thorybes pylades   Northern cloudywing
2. Poanes hobomok    Hobomok skipper
3. Pterourus glaucus  Tiger swallowtail
4. Euptoieta claudia Variegated fritillary
5. Phyciodes tharos/morpheus Pearly crescentspot
6. Polygonia comma    Comma
7. Basilarchia arthemis White admiral
8. Megisto cymela     Little wood satyr
9. Cercyonis pegala   Wood nymph
10. Danaus plexippus  Monarch

Notes: The St. Croix State Park was surveyed for lupine because of its close proximity to the Wisconsin KB populations (essentially just across the St. Croix River). Due to fire suppression, however, there are very few areas within the park that contain suitable habitat for lupine or the KB. There is a strong canopy and very little Zimmerman Sand. No lupine was found in the park, thus a second trip was not warranted.

HISTORIC PLANT SITE: 038N 20W N 1/4 23  (Map XXXIV)
Owner: Undetermined

Date: 17 June 1990    Time: 3:49 - 4:45pm
Weather: Cloudy, 70 degrees F, SW wind 10-25 mph, off and on showers.
Butterfly Species Observed: none recorded.

Notes: This area is the only historic site for lupine in Pine county and it has most likely been destroyed by a combination of road work and succession. The author searched extensively for lupine along highway 70 and in adjacent openings in the woods. No lupine was seen. Due to the rain no butterflies were seen.

ST. CROIX STATE FOREST: 041N 16W S 1/4 13 & NE7  (Map XXXV)
Owner: State Forest Land

Date: 19 June 1990    Time: 9:00 - 4:00pm
Weather: Sunny, 80 degrees F, slight N breeze.
Butterfly Species Observed:

1. Epargyreus clarus  Silver-spotted skipper
2. Poanes hobomok    Hobomok skipper
3. Pterourus glaucus  Tiger swallowtail
4. Colias philodice   Common sulphur
5. Eryes comyntas    Eastern tailed blue
6. *Speyeria cybele*  
   Great spangled fritillary
7. *Polygonia comma*  
   Comma
8. *Danaus plexippus*  
   Monarch

---

**CHENGWATANA STATE FOREST:**  39N 19W SW18,SW31&20W SE36  (Map XXXVI)

Owner: State Forest Land

Date: 18 June 1990  
   Time: 1:00 - 5:00pm

Weather: Mostly sunny, 80 degrees F, calm.

Butterfly Species Observed:

1. *Epargyreus clarus*  
   Silver-spotted skipper
2. *Euphyes ruricola*  
   Dun skipper
3. *Colias philodice*  
   Eastern tailed blue
4. *Everes comyntas*  
   Great spangled fritillary
5. *Speyeria cybele*  
   Pearly crescentspot
6. *Phyciodes tharos/morpheus*  
   Gray comma
7. *Polygania progne*  
   Red-spotted purple
8. *Basilarchia arthemis*  
   Wood nymph

Notes: No lupine was found in these two state forest units, along the St. Croix River in Pine County. Fire supression appears to be the limiting factor here. Very few sandy openings exist in the two forest areas surveyed. Since lupine was not found, no other trips to the area were warranted.

---

**CHISAGO COUNTY:**

* WILD RIVER STATE PARK:  035N 19W 17  (Map XXXVII)

Owner: State Park

Date: 13 June 1990  
   Time: 9:30 - 11:20am

Weather: Sunny, 75 degrees F, W winds 5-10 increasing to 15-20 mph.

Lupine:
   Approximate number of clumps: 1,340
   Approximate number of stems: 13,000
   Approximate number of flowering stalks: 7,000
   Acreage with lupine: 5

Associated plant species:
   Bur oak (*Quercus marocarpa*) (P), Northern pin oak (*Quercus ellipsoidalis*) (P), Big and little bluestem (*Andropogon gerardii*, *Schizachyrium scoparium*) (P), Butterfly weed (*Asclepias tuberosa*) (F), Puccoon (*Lithospermum sp.*) (F), Yellow hawkweed (*Hieracium pratense*) (F), Daisy fleabane (*Erigeron annuus*) (F), Blue vervain (*Verbena hastata*) (P), Blazing star (*Liatris aspera*) (P).

Butterfly Species Observed:

1. *Epargyreus clarus*  
   Silver-spotted skipper
2. *Thorybes pylades*  
   Northern cloudywing
<table>
<thead>
<tr>
<th>Butterfly Species Observed:</th>
</tr>
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<tbody>
<tr>
<td>1. Epargyreus clarus</td>
</tr>
<tr>
<td>2. Atrytone delaware</td>
</tr>
<tr>
<td>3. Euphyes ruricola</td>
</tr>
<tr>
<td>4. Colias philodice</td>
</tr>
<tr>
<td>5. C. eurytheme</td>
</tr>
<tr>
<td>6. Harkenclenus titus</td>
</tr>
<tr>
<td>7. Satyrium edwardsii</td>
</tr>
<tr>
<td>8. Celastrina ladon</td>
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<tr>
<td>9. Speyeria cybele</td>
</tr>
<tr>
<td>10. S. aphrodite</td>
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<tr>
<td>11. Charidryas gorgone</td>
</tr>
<tr>
<td>12. Phyciodes morpheus (pascoensis)</td>
</tr>
<tr>
<td>13. C. nycteis</td>
</tr>
<tr>
<td>14. Polygonia comma</td>
</tr>
<tr>
<td>15. P. progne</td>
</tr>
<tr>
<td>16. Nymphalis antiopa</td>
</tr>
<tr>
<td>17. Vanessa atalanta</td>
</tr>
<tr>
<td>18. Asterocampa celtis</td>
</tr>
<tr>
<td>19. A. clyton</td>
</tr>
<tr>
<td>20. Cercyonis pegala</td>
</tr>
<tr>
<td>21. Danaus plexippus</td>
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**Date:** 17 July 1990  **Time:** 9:00 - 2:30pm
**Weather:** Rain earlier, mostly sunny, 75- 80 degrees F, SW winds 10-20 mph.

<table>
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<tr>
<td>3. Hesperia sassacus</td>
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<tr>
<td>4. Poanes hobomok</td>
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<td>5. Carterocephalus palaemon</td>
</tr>
<tr>
<td>6. Pterourus glaucus</td>
</tr>
<tr>
<td>7. Phyciodes tharos/morpheus</td>
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<tr>
<td>8. Vanessa cardui</td>
</tr>
<tr>
<td>9. Megisto cymela</td>
</tr>
<tr>
<td>10. Danaus plexippus</td>
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</tbody>
</table>

**Butterfly Species Observed:                  |
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<tr>
<td>20. Cercyonis pegala</td>
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<tr>
<td>21. Danaus plexippus</td>
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**Date:** 23 July 1990  **Time:** 9:00 - 10:00am & 1:30 - 4:30 pm
**Weather:** Sunny 65-78 degrees F, light SW winds.

<table>
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<tr>
<th>Butterfly Species Observed:</th>
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<tbody>
<tr>
<td>1. Epargyreus clarus</td>
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<tr>
<td>2. Atrytone delaware</td>
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<td>3. Euphyes ruricola</td>
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<td>5. C. eurytheme</td>
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<td>6. Lycaena phlaeas</td>
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<td>7. Harkenclenus titus</td>
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<tr>
<td>12. Megisto cymela</td>
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<td>10. Polygonia progne</td>
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<td>12. Megisto cymela</td>
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<tr>
<td>13. Cercyonis pegala</td>
</tr>
<tr>
<td>14. Danaus plexippus</td>
</tr>
</tbody>
</table>

Indian skipper  
Hobomok skipper  
Arctic skipperling  
Tiger swallowtail  
Pearly crescentspot  
Painted lady  
Wood nymph  
Monarch  
Silver-spotted skipper  
Delaware skipper  
Dun skipper  
Common sulphur  
Orange sulphur  
Coral hairstreak  
Edward's hairstreak  
Spring azure  
Great spangled fritillary  
Aphrodite  
Gorgone crescentspot  
Orange crescent  
American copper  
Coral hairstreak  
Aphrodite  
Silvery crescentspot  
Gray comma  
Pearly eye  
Little wood satyr  
Wood nymph  
Monarch
Butterfly Species Observed:

1. **Euphyes ruricola**
   - Dun skipper

2. **Artogeia rapae**
   - Cabbage white

3. **Colias philodice**
   - Common sulphur

4. **Satyrium caryaevorum**
   - Hickory hairstreak

5. **Speyeria cybele**
   - Great spangled fritillary

6. **Vanessa atalanta**
   - Red admiral

7. **Junonia coenia**
   - Buckeye

8. **Basilarchia arthemis**
   - Red-spotted purple

9. **E. archippus**
   - Viceroy

10. **Asterocampa celtis**
    - Hackberry butterfly

11. **Enodia anthedon**
    - Pearly eye

12. **Cercyonis pegala**
    - Wood nymph

13. **Danaus plexippus**
    - Monarch

---

**Date:** 14 August 1990  
**Time:** 11:30 - 2:35pm  
**Weather:** Sunny, 75-85 degrees F, SW winds 5-10 mph.

Butterfly Species Observed:

1. **Euphyes ruricola**
   - Dun skipper

2. **Papilio polyxenes**
   - Black swallowtail

3. **Artogeia rapae**
   - Cabbage white

4. **Colias philodice**
   - Common sulphur

5. **C. eurytheme**
   - Orange sulphur

6. **Speyeria cybele**
   - Great spangled fritillary

7. **Polygonia progne**
   - Gray comma

8. **Vanessa atalanta**
   - Red admiral

9. **Basilarchia arthemis**
   - Red-spotted purple

10. **E. archippus**
    - Viceroy

11. **Cercyonis pegala**
    - Wood nymph

12. **Danaus plexippus**
    - Monarch

Notes: This state park located along the St. Croix River contains a large population of lupine in section 17 along the park road, along an old railroad grade, and in openings in the woods. No KBs were seen in five visits to the site. A total of 36 other butterfly species were observed however. The park should have some sort of management plan designed specifically for the plant to ensure its survival in the area. Specific concerns include road maintenance and succession. The population of lupine along the RR grade west of the park road is in need of burn management or hand clearing as soon as possible. If management could sustain or enhance the current lupine populations, then reintroduction of the KB in this area could be a possibility. There is a good variety of nectar sources in the area for the butterfly. This and the fact that just across the river in Wisconsin a population of the KB has been found in recent years, adds to the support for reintroduction of the KB here.
WILD RIVER SUNRISE AREA: 036N 20W SESE32 & S33 (Map XXXVIII)

Owner: State Park

Date: 18 June 1990 Time: 9:00 - 12:30pm
Weather: Mostly cloudy, 70 degrees F, calm.

Butterfly Species Observed:

1. Epargyreus clarus  Silver-spotted skipper
2. Poanes hobomok Hobomok skipper
3. Feniseca tarquinius Harvestor butterfly
4. Megisto cymela Little wood satyr
5. Danaus plexippus Monarch

Notes: This site contains an overgrown oak savanna in section 33 which contains some native vegetation. No lupine was seen in the area. Few lepidoptera were observed due to the weather.
Areas Needing Further Work

Although the author tried his best to survey all likely areas for lupine and the Karner Blue, there are still areas within the state that may harbor populations of the two species. Reports of lupine within Carlos Avery WMA in Chisago County, the Uncas Dunes SNA in Sherburne County, and the McKnight Prairie in Goodhue County should be checked out in the future. In addition, a population assessment, biogeographical and habitat requirement study of the KB within the Whitewater Wildlife Management Area should be top priority, and undertaken as soon as possible. The findings would then help in making management decisions to help ensure the survival of a unique species of butterfly in Minnesota.

ACKNOWLEDGEMENTS

This project was funded by the U.S. Fish and Wildlife Department, The Minnesota Nature Conservancy, and the Nongame Wildlife Program of the Minnesota Department of Natural Resources. I wish to thank Robert Dana for his help in getting me up to speed on the Karner Blue biology, Dennis Schlicht for verifying some butterfly identifications, Welby Smith for his help on lupine phenology, Robert Dirig for sending me the herbarium records of Minnesota lupine, Richard Baker for his invaluable help with this project, and the many people who gave me leads on possible habitats for the lupine and/or Karner Blue butterfly.


## Appendix I. Historic Records for *Lupinus perennis*, Minnesota

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>DATE COLLECTED</th>
<th>LOCATION</th>
<th>HERBARIUM</th>
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<tbody>
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<td>Houston*</td>
<td>June 17, 1966</td>
<td>7 mi.W. Houston</td>
<td>WISC, UMN</td>
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<td>Houston*</td>
<td>July 7, 1981</td>
<td>103N 05W Sec: 2</td>
<td>UMN</td>
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<tr>
<td>Fillmore*</td>
<td>June 22, 1915</td>
<td>near Rushford</td>
<td>UMN</td>
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<td>Fillmore*</td>
<td>June 23, 1982</td>
<td>104N 08W Sec: 21</td>
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<tr>
<td>Southern</td>
<td>1887</td>
<td>Southern counties</td>
<td>F</td>
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<tr>
<td>Chisago</td>
<td>July 1892</td>
<td>Chisago County</td>
<td>UMN</td>
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<td>Chisago*</td>
<td>July 26, 1980</td>
<td>Wild River SP</td>
<td>UMN</td>
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<tr>
<td>Sherburne*</td>
<td>July 26, 1980</td>
<td>Santiago SNA</td>
<td>UMN</td>
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<td>Sherburne*</td>
<td>July 10, 1981</td>
<td>Elk River Dunes</td>
<td>UMN</td>
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<tr>
<td>Anoka*</td>
<td>May 1918</td>
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<td>UMN</td>
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<td>Anoka*</td>
<td>Aug. 9, 1961</td>
<td>Cedar Creek NHA</td>
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<td>Anoka</td>
<td>June 26, 1935</td>
<td>near Rice Lake</td>
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<td>Anoka*</td>
<td>July 18, 1960</td>
<td>Cedar Creek bridge</td>
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<td>Winona</td>
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<td>Ramsey</td>
<td>May 1895</td>
<td>MacCubbin's Lake</td>
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<td>Ramsey</td>
<td>May ?? 22</td>
<td>Roselawn</td>
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<td>Wabasha</td>
<td>May ?? 30</td>
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<td>June 8, 1882</td>
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<td>June 11, 1942</td>
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<td>Morrison</td>
<td>July 24, 1945</td>
<td>Darling</td>
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<td>Benton</td>
<td>May 25, 1977</td>
<td>037N 31W Sec: 13</td>
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<td>Pine*</td>
<td>May 24, 1941</td>
<td>Rock T. Sec: 23</td>
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<td>Crow Wing</td>
<td>June 28, 1935</td>
<td>near Brainerd</td>
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<td>Hennepin</td>
<td>Aug. 1890</td>
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<td>June 1891</td>
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<td>Aug. 1889</td>
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<td>Pigeon River</td>
<td>Aug. 1928</td>
<td>Pigeon River Co.</td>
<td>WISC</td>
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<td>? Marini Mills</td>
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* = Field checked Spring and/or summer 1990, by the author.

Herbarium abbreviations key:

- **UMN** = University of Minnesota
- **WISC** = University of Wisconsin
- **F** = Field Museum, Chicago.
- **US** = Smithsonian, Washington D.C.
- **BKL** = Brooklyn Botanical Garden, New York City

The above information was taken from photocopies of herbarium labels sent to the author by Robert Dirig, assistant curator of the L.H. Bailey Hortorium, Cornell University. Mr. Dirig is presently studying phenology of lupine with special reference to New York and the Karner Blue butterfly.
Appendix II. Topographic maps of areas surveyed in Minnesota, 1990.

Appendix II contains maps of all sites visited during the survey this year. The map legends consist of the Map number, County name, Quad. name, Township, Range, and Site labels (A-?). Delineated areas are areas that were surveyed for lupine and the KB. Lupine populations are represented by dots or dotted lines. These dots give a general picture as to the distribution of lupine within the area, and should not be taken as representing actual numbers or clumps of lupine. The dotted lines delineate areas that contain lupine.
Map II
HOUSTON Co.
Rushford East, Quad.
T104N R7W
Site: Houston 2
Map V
FILLMORE Co.
Rushford, East, Quad.
T104N R8W
Sites: A) Rushford East #1
B) Rushford East #2
Map VI
FILLMORE Co.
Rushford, West, Quad.
T104N R8W
Sites: A) Himlie S. Barrens
     B) Mattson S. Barrens
     C) Peterson North
Map XXXV
PINE Co.
Danbury West, Quad.
T41N R16W
Site: St. Croix State Forest
Site: Chengwatana State Forest
Appendix III. The Karner blue at Whitewater WMA, Winona County Minnesota, 1990.

▲ = male Karner blue
● = female Karner blue
JULY 30, 1990

6 - males, 1 - female
AUGUST 6, 1990

4 - males, 1 - female
AUGUST 16, 1990

1 - male, 1 - female
AUGUST 17, 1990

6 - males, 3 - females
Appendix IV. The following is a list of butterfly species recorded in the 10 counties included in the Karner Blue survey. The number in front of the scientific name is that of Miller and Brown, 1981.
## COUNTY LIST

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<tr>
<td>217</td>
<td>Euphyes ruricola</td>
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<tr>
<td>393</td>
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<td>417</td>
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<td>Satyrium caryaevorum</td>
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<tr>
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<tr>
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<tr>
<td>664</td>
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### CHISAGO COUNTY:

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<td><strong>Butterfly</strong></td>
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<tr>
<td>Polygonia progne</td>
<td>Gray comma</td>
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<td>Nymphalis antiopa</td>
<td>Mourning cloak</td>
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<td>Red admiral</td>
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**Fillmore County:**

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651 Vanessa cardui  
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653 Vanessa atalanta  
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656 Junonia coenia  
       Buckeye
663b Basilarchia a. astyanax  
       Red spotted purple
698 Asterocampa celtis  
       Hackberry butterfly
710 Enodia anthedon  
       Pearly eye
732 Cercyonis pegala  
       Wood nymph
760 Danaus plexippus  
       Monarch

HOUSTON COUNTY:

007 Epargyreus clarus  
       Silver-spotted skipper
083 Erynnis icelus  
       Dreamy duskywing
084 Erynnis brizo  
       Sleepy duskywing
085 Erynnis juvenalis  
       Juvenal's duskywing
097 Erynnis baptisiae  
       Wild indigo duskywing
179 Polites themistocles  
       Tawny-edged skipper
185 Wallengrenia egeremet  
       Northern broken dash
189 Atrytone delaware  
       Delaware skipper
217 Euphyes ruricola  
       Dun skipper
245 Amblyscirtes vialis  
       Roadside skipper
338 Artogeia rapae  
       Cabbage white
344 Euchloe olympia  
       Olympia white
351 Colias philodice  
       Common sulphur
352 Colias eurytheme  
       Orange sulphur
383 Pyristia lisa  
       Little yellow
393 Lycaena phlaeas  
       American copper
417 Harkencleonus titus  
       Coral hairstreak
423 Satyrium edwardsii  
       Edward's hairstreak
498 Leptotes marina  
       Marine blue
503 Everes comyntas  
       Eastern tailed blue
505 Celastrina ladon  
       Spring azure
565 Speyeria cybele  
       Great spangled fritillary
605 Charidryas gorgone  
       Gorgone crescentspot
623 Phyciodes tharos/morpheus  
       Pearly crescentspot
635 Euphydryas phaeton  
       Baltimore checkerspot
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       Comma butterfly
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       Mourning cloak
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       Painted lady
653 Vanessa atalanta  
       Red admiral
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       Red spotted purple
698 Asterocampa celtis  
       Hackberry butterfly
710 Enodia anthedon  
       Pearly eye
732 Cercyonis pegala  
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760 Danaus plexippus  
       Monarch
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### OLMSTEAD COUNTY:

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<td>217</td>
<td>Euphyes ruricola</td>
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<td>Eastern tailed blue</td>
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<tr>
<td>Pine County</td>
<td>Sherburne County</td>
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<tr>
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<td>732 Cercyonis pegala</td>
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**WINONA COUNTY:**

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Appendix V. The following information is a list of all voucher specimens collected by the author during the Karner Blue survey 1990. All specimens will eventually be deposited in the University of Minnesota Entomology Collection.
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<th>DATE</th>
<th>MEMO</th>
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Voucher Specimens in Private Collection

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**KEY**

- = male
- = female
I = two specimens

**LOCATION KEY:**

WR = National Wildlife Refuge
MA = Wildlife Management Area
P = State Park
C = County
P = Prairie
S = Savanna
Chatfield, Quad.
T104N R11W
Sites: Tuohy S. Savanna

Map VII
FILLMORE Co.
Chatfield, Quad.
T104N R11W
Sites: Tuohy S. Savanna
Map VIII
OLMSTED Co.
Chester, Marion, Quads.
T106N R13W
Sites: A) RR. E. of Rochester
      B) Chester Woods
Map IX

WINONA Co.
Pickwick, Quad.
T106N R5W
Site: O.L. Kipp S.P.
Map XI
WINONA Co.
Weaver, Quad.
T108N R10W
Site: Historic Whitewater
Map XIV
WABASHA Co.
Weaver, Quad.
T108N R10W
Site: Whitewater 31
Map XV
WABASHA Co.
Alma, Quad.
T109N RSW
Site: Kellog-Weaver

SCALE 1:24,000
Map XVII
WABASHA Co.
Wabasha South, Quad.
T110N R11W
Site: Zumbro Bottoms
Map XVIII
WABASHA Co.
Alma, Quad.
T110N R10W
Site: Peterson Lake W.
Map XIX

WARASHA Co.
Millville, Quad.
T109N R13W
Sites: A) Jarrett East
      B) Jarrett West
Map XXI
ANOKA & ISANTI Co.
Isanti, Quad.
T33&34N R24W
Sites: A) Hellen Allison
B) Cedar Creek Historic
C) North Road Corners
D) Cedar Creek North
Map XXIII
ANOKA Co.
Coon Lake Beach, Quad.
Linwood, Quad.
T33N R22W
Sites: A) SMA N. of Carlos Avery
B) Coon Lake
Map XXIV
ANOKA Co.
Coon Rapids, Quad.
T32N R24W
Sites: A) Bunker Hills
B) Bunker Hills Prairie
Map XXVII
ISANTI Co.
Wyanett, Quad.
T36N R25W
Site: Spectacle Lake
Map XXVIII
SHERBURNE Co.
Santiago, Quad.
T35N R28W
Sites: A) Santiago Savanna
      B) Sherburne NWR
Map XXX
SHERBURNNE Co.
Duellm, Quad.
T35N R29W
Sites: A) Conklin Savanna
B) Boyd Lake Savanna
Map XXXI
SHERBURN Co.
Orrock, Quad.
T30N R27W
Site: Orrock 9 West