Butterfly Surveys in Southeastern North Dakota: 1997

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for
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Introduction and Methods

The goal of this study was to inventory butterflies and skippers on a number of wetland prairie sites in southeastern North Dakota, and pinpoint the location and abundance of the Dakota Skipper (Hesperia dacotae), Powesheik Skipper (Oarisma powesheik), Regal Fritillary (Speyeria idalia), and other rare butterflies. The sites inventoried are under the control of the U.S. Fish and Wildlife Service in three counties: Ransom, Richland, and Sargent. These surveys covered some sites previously inventoried (Orwig 1995, Orwig 1996), and some new sites.

Surveys in 1997 began on 29 June and concluded on 10 July. As in the 1993-1996 North Dakota surveys, survey technique entailed walking transects of sites and recording the presence of species by quarter section, and exact locations of rare species. As suggested by Brown (1972), edge areas between habitats were also surveyed. If sizable populations of Dakota Skippers were located, the habitat they occupied was to be mapped and population size estimated using techniques outlined by Pollard (1977), Thomas (1983), and Gall (1985), and standardized by Royer (1996). Presence in each section was confirmed by netting and releasing specimens, or occasionally by vouchering questionable specimens for later identification to species. Thirty-six specimens were vouchered this year. Voucher specimens will remain in the collection of the author. The author's reference collection will eventually be deposited in a public research collection.

This report will document the results of the survey, with sites grouped into 5 areas, and detail sightings of rare species. It will also make recommendations on management for sites with rare species. In each site species list, rare species are printed in boldface type. An appendix will show locations of rare butterfly sightings on 2 site maps. For sites covered in previous years, tables at the end of this report tally sightings from all years. Species names throughout this report follow Royer (1988), the standard reference for North Dakota.

Results and Discussion

Altogether, these 1997 surveys documented 1167 individuals of 30 species of butterfly in southeastern North Dakota. Four of the sightings, indicated by an *, are possible county records, pending determination by Ron Royer. Sites surveyed are grouped into five areas: Stacks Slough Waterfowl Production Area (Hartleben #1-3 and Aaser #1 & 2), Tewaukon National Wildlife Refuge (White Lake, Sprague Lake, A Pool, and Krause), Hankinson South (Gunness and Biggs Berndt), Crete (McCann/Magill/Isley, Palensky/Widmer, and McCabe's 1981 Oakes Site), and Kuehn WPA. Individual site records are listed below. All Phyciodes tharos and Phyciodes cocyta are lumped together under Phyciodes tharos, which most of them probably wer, because of the numbers of specimens sighted and my inexperience with this new species designation.

As in the 1996 surveys, the most significant finding in this survey is that four of the eight habitat-restricted butterfly and skipper species identified as rare in North and South Dakota (Royer and Marrone 1992a-d) are present on the prairies south of Stacks Slough Waterfowl Production Area. The Dakota Skipper was reconfirmed at one site where it was first discovered in 1995 and again observed in 1996 (Orwig 1995, Orwig 1996): Hartleben Prairie #3 (Stacks Slough WPA). In 1995 the Powesheik Skipper was documented from Hartleben Prairie #1 and #3, and 1996 surveys confirmed its presence at those sites and also at Hartleben #2 and another contiguous grassland tract. But in 1997, the Powesheik was found only at Hartleben #1, although Hartleben #3 was not rechecked during Powesheik flight time due to weather conditions. Four other sites which held Powesheik in 1996 (Aaser Prairie WPA, Tewaukon National Wildlife Refuge, Krause WPA, and Gunness WPA) failed to produce any in 1997. Two other species sighted in 1996 in the Stacks Slough WPA complex, the Regal Fritillary and the Broad-winged Skipper (Poanes viator), were not encountered again at Hartleben or Aaser Prairie WPA. The best new site for 1997 was the Biggs section of Biggs-Berndt WPA, a lush prairie which produced 11 Powesheiks and the most diverse prairie butterfly fauna observed on any North Dakota site visited during these surveys.

Weather conditions for 1997 were unlike any previous year of surveying. Although the legendary winter snowfall turned into record spring floods which devastated much of the Red River valley, the spring was fairly dry, and emergence for many summer butterfly species was not delayed as much as in 1995 and 1996. In 1997, however, the weather turned wet again throughout the survey period, with the exception of July 5-7, and was terrible for surveying. A series of fronts came through and stalled out, soaking again areas which had begun to recover. Many roads to or through the sites were inundated or otherwise impassable. I spent several days of valuable survey time helplessly trapped in my motel room by rainshowers, watching the Weather Channel.

Although negative results (not finding a particular species at a site on a particular day) are inconclusive, we do know that two of the targeted rare species should have been flying through most of the 1997 survey days. A male Dakota Skipper was flying near Montpelier, Stutsman County, ND, by June 28 (Royer, pers. comm.) and at Hartleben #3 on June 30. At sites surrounding Glacial Lakes State Park in central Minnesota (within 200 miles of the eastern sites), I observed numerous slightly-worn male and female Dakotas on July 13 and 14. Schlicht (pers. comm.) noted the emergence of Powesheik individuals in central Minnesota on July 1 and they were still common, if worn, around Glacial Lakes on July 13 and 14. Conditions for surveying at Hartleben #3, on the afternoon of June 30, were excellent, and I believe I would have found Powesheiks had they emerged by that date. The first Powesheiks I found in North Dakota, on July 8 at Biggs, were already somewhat worn. Although Regals were flying in northwestern Iowa

on June 26, the Regal Fritillary and Broad-winged Skipper may not have emerged in North Dakota until after surveys ended.

Although rare species were documented this year, none of the sites had both the numbers of rare species and the acreage to indicate a secure population.

The status of the Dakota Skipper on these sites is still quite insecure. Besides the small numbers at Hartleben (4 in 1995, 1 in 1996, 2 in 1997), the potential habitat there is very small, a single rise probably less than 15 acres in area. The continuing presence of the Dakota at McCabe's 1981 Oakes site, now reduced to less than 70 acres, shows that Dakota can persist for a length of time on a small site, although both the Oakes and Hartleben populations must be considered critically challenged. According to Royer's (pers. comm.) formula, Dakota density at Hartleben #3 is 2 per hour, while the density at McCabe's 1981 Oakes site is 1 per hour. On July 14, 1997, on a grazed prairie in Minnesota (near Glacial Ridge State Park), I observed more Dakota skippers during an hour than I have during three years of surveying over 2 dozen southeastern North Dakota sites. The Dakota density at these Minnesota sites was as high as 24 per hour.

The outlook for the other three rare species on Hartleben is less optimistic than it was last year, since numbers of the Powesheik are down and the other two species were not sighted in 1997. However, they may be viable long-term, since they have also been present over a mile away on Aaser Prairie WPA, and the intervening habitat is still grassland. Still, none of these populations is particularly strong.

The Hartleben-Aaser-Stacks Slough corridor has the potential to continue to support these four rare species. Royer (1996, pers. comm.) believes it may be the most significant remaining North Dakota butterfly habitat under Fish and Wildlife Service protection. The Service should continue its efforts to acquire the intervening grazing and hay land, or work with the present landowners to encourage good management practices.

Furthermore, the healthy populations of the Powesheik Skipper and other butterflies at Biggs-Berndt WPA indicate that it is good environment for prairie-restricted butterflies. The USF&WS should continue to investigate the complex of wet prairies south and west of Hankinson, North Dakota, and seek to maintain the habitat corridor that nearly links Hartleben and Biggs, through intermediate sites like Mud Lake, Lake Elsie, and Gunness WPA. It should also consider altering priorities at these sites so that ecosystem management is consistently pursued, even if it negatively affects game wildlife production.

Further surveys for the presence of these rare species in southeastern North Dakota are warranted. Good quality prairie sites, whatever the ownership, should be identified and surveyed. While the potential for more Dakota Skipper sites is not high, there may be more sites containing the Powesheik and Broad-winged Skippers and the Regal Fritillary, given the numbers of marshes and wet prairies still remaining in the three counties. Considering its contiguity to the Stacks Slough sites, the Hankinson unit of the Sheyenne National Grasslands should be surveyed. Additional sites are likely on the native prairies within the former Sisseton and Wahpeton Indian Reservation and other sites on the Prairie Coteau.

Considering the current condition of most of the Sheyenne National Grassland prairies, sites there are not likely to maintain populations of these rare butterflies much longer, although neighboring private lands such as Brown's Ranch still hold some hope. In

southeastern North Dakota, habitat loss due to overgrazing, succession, leafy spurge infestation, aerial herbicide treatments for leafy spurge, and conversion of grasslands to cultivation continues to reduce the acres which might support these native butterfly species.

Site Records
1. Stacks Slough WPA Complex, Richland County

A. Hartleben WPA Several days were spent surveying sites bordering Stacks Slough WPA. Stacks Slough WPA is north of State Hwy. 11 between Hankinson and Lidgerwood in Richland County. Hartleben Prairie #1-3 is in the W1/2 of the NW1/4 of Sec. 16 (Hartleben #1 & 2) and the S 1/2 of the NE 1/4 of Sec. 17 (Hartleben #3) T130N, R50W (Map #1). The area is a high-quality native prairie hayfield that floods frequently. The two areas with highest elevation are the best butterfly habitat: Sec. 16 north of the double railroad bed (Hartleben #1) and Hartleben #3. All three areas contain deathcamas, buckbrush, wood lily, and showy milkweed, while Hartleben #3 also has black-eyed susan, yarrow, prairie turnip, wild rose, leadplant, silverleaf scurfpea, horsetail, and larkspur. Hartleben #3 has white ladyslipper orchid, while Fish and Wildlife Service personnel have transplanted western prairie fringed orchid, from a prairie destroyed by a private landowner, into Hartleben #1. Both areas have some spurge problems, although the spurge is more widespread in Hartleben #1, around an area broken for alfalfa. It is also now spreading immediately southeast of this area. The site was surveyed three times: June 29, June 30, and July 10. Surveys on June 29 took place 3:30 to 4:30, in 100% overcast; nothing was flying. Surveys on June 30 took place 1:25 to 5:25; wind from the west 20 mph to calm, with high haze until 2:30 and then clear and warming, 72-81 degrees. Surveys on July 10 were made from 9:10 to 12:05; winds from the south 14-20 mph and increasing, 74-76 degrees, with high haze. See Map #1. Over the last three years, 26 species have been recorded from Hartleben #1-4 (Table #1).

Hartleben #1 30 June (1:25-3:00)

5	Polites mystic	Long Dash
13	Artogeia rapae	European Cabbage Butterfly
3	Colias philodice	Common Sulphur
1	Hyllolycaena hyllus	Bronze Copper
2	Epidemia helloides*	Purplish Copper
3	Clossiana selene	Silver-bordered Fritillary
1	Phyciodes tharos	Pearly Crescentspot
10	Danaus plexippus	Monarch

Hartleben #1 10 July (9:45-12:05)

6	**Oarisma powesheik**	**Powesheik Skipper**
1	Polites mystic	Long Dash
6	Colias philodice	Common Sulphur
1	Speyeria cybele	Great Spangled Fritillary
3	Speyeria sp.	Aphrodite or Great Spangled Fritillary
1	Clossiana selene	Silver-bordered Fritillary
2	Nymphalis antiopa	Mourning cloak
1	Satyrodes eurydice	Northern Eyed Brown
6	Cercyonis pegala	Common Wood Nymph
2	Danaus plexippus	Monarch

Hartleben #2 10 July (9:10-9:45)

1	Colias philodice	Common Sulphur
1	Satyrodes eurydice	Northern Eyed Brown

Most of this tract is under water or too wet to support any forbs for nectar.

Hartleben #3 30 June (3:00-5:25)

2	**Hesperia dacotae**	**Dakota Skipper**
2	Polites peckius	Peck's Skipper
1	Polites themistocles	Tawny-edged Skipper
7	Polites mystic	Long Dash
3	Colias philodice	Common Sulphur
2	Colias eurytheme	Orange Sulphur
1	Hyllolycaena hyllus	Bronze Copper
2	Epidemia helloides	Purplish Copper
1	Clossiana selene	Silver-bordered Fritillary
2	Coenonympha inornata	Inornate Ringlet
1	Danaus plexippus	Monarch

At 3:30, a single Dakota Skipper male was observed perching on hemp dogbane at the edge of the rise, where it was netted and vouchered. A single female was observed on the spine of the rise at 4:30. Because the species had been vouchered previously from this site, it was released. The coppers were also nectaring at hemp dogbane.

B. Aaser WPA Over the last three years, 21 species have been recorded from Aaser #1-2 (Table #2). The two halves of Aaser are very different.

Aaser #1 (N1/2 of the SE1/4 S12, T130N R51W) This site is an old prairie pasture on rocky dry glacial till, with several patches of leafy spurge and poison ivy. It has porcupine grass and a number of forbs: sage, pasture sage, larkspur, false gromwell, scarlet gaura, silverleaf scurfpea, yellow coneflower, and extensive patches of buckbrush. A survey of the site on 9 July, from 8:55 to 10:05 (30% overcast, 61 degrees, SSE winds 8 mph), yielded the following species:

2	Polites mystic	Long Dash
1	Artogeia rapae	European Cabbage Butterfly
1	Nymphalis antiopa	Mourning cloak
1	Vanessa atalanta	Red Admiral
12	Cercyonis pegala	Common Wood Nymph
3	Danaus plexippus	Monarch

Aaser #2 (S1/2 S7, T130N, R50W) Aaser #2 is very low, and some of those areas are inaccessible in wet years like 1995. This site has white prairie clover, prairie turnip, silverleaf scurfpea, wood lily, swamp milkweed, showy milkweed, and deathcamas. However, little was blooming during my visit. I surveyed this site on 9 July, from 10:25-1:05.

1	Polites mystic	Long Dash
1	Artogeia rapae	European Cabbage Butterfly
1	Colias philodice	Common Sulphur
1	Hyllolycaena hyllus	Bronze Copper
1	Epidemia helloides	Purplish Copper
1	Clossiana sp.	Silver-bordered or Meadow Fritillary
3	Phyciodes tharos	Pearly Crescentspot
1	Nymphalis antiopa	Mourning cloak
1	Satyrodes eurydice	Northern Eyed Brown

6	Cercyonis pegala	Common Wood Nymph
3	Danaus plexippus	Monarch

Management Recommendations for the Stacks Slough WPA Complex

Because this site harbors four rare species of butterflies, special management considerations should be followed. As always, the previous management history of the site should be documented; apparently late-season haying was the only management of Hartleben #1-3, and Aaser #2 in many years. McCabe (1981) has recommended late-season haying for Dakota Skipper sites. Moffat & McPhillips (1993) note that haying may have reduced populations of Dakota Skipper at some sites. The F&WS should continue its current practice of cutting back on the frequency of that haying and leaving at least six inches of stubble. For the Dakota Skipper rise at Hartleben #3, the haying regime could be reduced to haying only the north or south half of this rise in any particular year. Royer and Marrone (1992c) indicate that the Powesheik Skipper "appears to be resilient under some haying regimes."

The current efforts to convert the cropland owned by F&WS to prairie in Sections 9 and 16, T130N R50W, Brightwood Twp., is a good step. It should introduce more nectar sources to the site, particularly in upland grasslands situations which are so rare around Stacks Slough. The Dakota might eventually be able to spread to new prairie areas on Hartleben #1.

Questions of overall habitat size and barriers to dispersal are very important at this site. Because the two areas of Hartleben with good butterfly habitat (#1 & #3) are completely separated by inundated habitat, a path and two railroad beds, they must be treated as separate sites and managed individually. While Regals can obviously cross the railroad beds and wet areas without problems, the more restricted Powesheik and (and especially the Dakota) may not be able to. Schlicht found that butterflies were unable to cross chain link fences at Big Sand Mound in southeast Iowa, and seemed unable to cross a road at Glacial Lakes in Minnesota (pers. comm.). Research by Ehrlich and others on butterflies inhabiting serpentine barrens in California indicates that some habitat-restricted species are very sedentary and unlikely to move far. Yet the fact that the F&WS controls nearly 5 sections total of continuous habitat here gives this area special priority as a refugium with long-term potential to preserve these rare species. While the F&WS must be responsive to demands for multiple land uses, the presence of these four butterfly species and two orchid species should make preserving biodiversity the top management priority for Stacks Slough WPA.

Although encroachment by woody plants on these sites would be detrimental, fire is not recommended as a management tool for the Dakota Skipper (Royer & Marrone 1992b) generally, and should be weighed carefully on Hartleben #1, Hartleben #3, and Aaser #2, because of their small size and isolation. Historically prairie fire was used by pioneers and economic entomologists to control or destroy insect populations. Because of isolation from nearby prairie of significant quality, natural cycles of recolonization of a burned area by insects from the surrounding prairie no longer work; the populations will have to survive on site in spite of fire. The decision not to use fire at all on the rise where the Dakota still remains at Hartleben #3 is a sound one. There is no concern over woody succession on this ridge. Any isolated prairie should be divided into smaller management units if fire is used, and should be burned on an extreme long-term rotation. The practice of using patchy "fingering" fires on small portions of Hartleben #1 seems to have been beneficial. Historically, because of the surrounding wetlands, fire may not have been a

significant part of the natural ecosystem at Stacks Slough, except in years of drought. Aaser #1 and Hartleben #2 should also be subdivided if fire is used.

All three high-quality sites (Hartleben #1 & 3, Aaser #2) have small but significant leafy spurge infestation problems. These should be handled swiftly but very carefully by wick application of herbicide. The area of heaviest infestation in Hartleben #1, for example, is also the center of the Powesheik population. Blanket-spraying spurge management is likely to destroy the forbs which adults need for nectar sources without completely eradicating the problem. This may have been what happened under private control on Hartleben #4 and Prochnow. In mid-July of 1997, I surveyed extensive prairie areas near Chandler in southwestern Minnesota which had been aerial sprayed for thistles and were almost entirely devoid of any forbs (except an occasional thistle!). However, *if* the patches on Aaser #1 continue to spread, they will choke out a potentially very valuable habitat.

2. Tewaukon National Wildlife Refuge, Sargent County

A. Krause Waterfowl Production Area Krause WPA is on the northeast corner of Tewaukon National Wildlife Refuge in Sargent County (E1/2 of NE1/4 of Sec. 5 and NW1/4 of Sec. 4, T129N, R53W, Kingston Twp.), and includes most of Krause Slough. The site is a prairie pasture which has been heavily grazed in the past, but is being restored through fire and other management techniques. Prairie plants found on the site include buckbrush, scarlet gaura, silverleaf scurfpea, sage, prairie turnip, leadplant, larkspur, needleandthread, porcupine grass, hoary puccoon, locoweed, Canada anemone, buffalo bean, wild rose, false gromwell, yarrow, and purple coneflower. The site does have invasive brome, particularly in the SE1/4 of the NE 1/4 of S5. Other invasive species include alfalfa and thistle, particularly around the edges of the numerous potholes on the site. Leafy spurge infestation rate is low, at about 5%. In 1997, yellow sweet clover was a particular problem, possibly as a result of fire management. The staff at Tewaukon NWR have observed the **Regal Fritillary** at Krause WPA in past years, although it was not observed during my visits. Over the last three years, 18 species have been recorded from Krause WPA (Table #3). I surveyed both halves on 6 July (5% clouds, 74-79 degrees, winds N 5-10 mph).

Section 5 (1:45-3:55)

6	Polites mystic	Long Dash
4	Artogeia rapae	European Cabbage Butterfly
4	Colias philodice	Common Sulphur
1	Hyllolycaena hyllus	Bronze Copper
1	Vanessa atalanta	Red Admiral
1	Basilarchia archippus	Viceroy
6	Satyrodes eurydice	Northern Eyed Brown
7	Cercyonis pegala	Common Wood Nymph

Section 4 (3:55-5:35)

14	Polites mystic	Long Dash
2	Colias philodice	Common Sulphur
1	Hyllolycaena hyllus	Bronze Copper
1	Lycaeides melissa	Melissa Blue
1	Satyrodes eurydice	Northern Eyed Brown

8	Cercyonis pegala	Common Wood Nymph
3	Danaus plexippus	Monarch

The presence of two rare butterfly species (Oarisma powesheik and Speyeria idalia) on Krause WPA in 1996 makes it an important one. Yet neither was found in 1997.

B. White Lake, Tewaukon NWR (SW1/8 S34 and SE1/4 S35, T130N, R54W). This site has brome and alfalfa, but also wild rose, silverleaf scurfpea, buckbrush, sage, leadplant, purple coneflower, and Canada anemone. There was no spurge here except in the road ditch. I surveyed this site on 6 July (5% overcast, N wind 5 mph, 68-74 degrees). There was no sign of Oarisma powesheik, observed in 1996.

Section 34 (11:50-12:25)

5	Polites mystic	Long Dash
5	Artogeia rapae	European Cabbage Butterfly
5	Colias philodice	Common Sulphur
5	Colias eurytheme	Orange Sulphur
1	Euptoieta claudia	Variegated Fritillary
1	Phyciodes tharos	Pearly Crescentspot
18	Cercyonis pegala	Common Wood Nymph

Section 35 (12:25-1:25)

16	Polites mystic	Long Dash
5	Artogeia rapae	European Cabbage Butterfly
5	Colias philodice	Common Sulphur
4	Hyllolycaena hyllus	Bronze Copper
1	Glaucopsyche lygdamus	Silvery Blue
1	Lycaeides melissa	Melissa Blue
1	Phyciodes tharos	Pearly Crescentspot
5	Vanessa atalanta	Red Admiral
5	Basilarchia archippus	Viceroy
4	Satyrodes eurydice	Northern Eyed Brown
19	Cercyonis pegala	Common Wood Nymph
3	Danaus plexippus	Monarch

C. A Pool, Tewaukon NWR (Sprague Lake Unit) (NW1/4 S36, T130N, R55W; north bank of the Wild Rice River) This old pasture has brome and cockleburrs, but no leafy spurge. Prairie plants found on this site are buckbrush, sage, larkspur, Canada anemone, silverleaf scurfpea, wild rose, yarrow, and yellow coneflower. The following were observed on 5 July, from 2:50 to 5:40 (50% overcast, NW winds at 10-20 mph, 73 degrees):

3	Polites themistocles	Tawny-edged Skipper
16	Polites mystic	Long Dash
7	Artogeia rapae	European Cabbage Butterfly
3	Colias eurytheme	Orange Sulphur
1	Hyllolycaena hyllus	Bronze Copper
6	Vanessa atalanta	Red Admiral
1	Basilarchia archippus	Viceroy
1	Coenonympha inornata	Inornate Ringlet
8	Cercyonis pegala	Common Wood Nymph
8	Danaus plexippus	Monarch

D. South Sprague Lake, Tewaukon NWR (Sprague Lake Unit) (W1/2 S2 T129N R55W). This old pasture on bluffs above the lake is mostly brome, but has yellow coneflower, scarlet globemallow, yarrow, sage, hoary vervain, hemp dogbane, larkspur, wild rose, and Canada anemone. It also has thistles, crown vetch, smartweed, and about 5% leafy spurge. I surveyed it on 6 July, 9:25-11:10 (winds N8, 10% clouds, 60-64 degrees):

10	Polites mystic	Long Dash
1	Colias philodice	Common Sulphur
1	Hyllolycaena hyllus	Bronze Copper
1	Nymphalis antiopa	Mourning cloak
1	Vanessa atalanta	Red Admiral
3	Basilarchia archippus	Viceroy
13	Cercyonis pegala	Common Wood Nymph
2	Danaus plexippus	Monarch

Management Recommendations for the Tewaukon NWR Area

Over the last three years, 23 species have been recorded from Tewaukon National Wildlife Refuge (Table #4), including two rare species of butterflies, the Regal Fritillary and the Powesheik Skipper. Both were present at Krause WPA, and single individuals of each species have been found in other areas of the refuge at several miles distance. Further biological surveys should be done on refuge lands and on the adjoining state lands. The question remains whether these small numbers are surviving on site or migrating in from nearby prairies. Refuge personnel have the somewhat conflicting tasks of reviving degraded prairies and maintaining butterfly populations. But the amount of grassland which the Refuge protects--enough to sustain populations of these butterflies long term--makes the careful balancing of these priorities worth the effort.

3. Hankinson South, Richland County

A. Gunness Waterfowl Production Area

Gunness Waterfowl Production Area is four quarter sections 2 miles south of Hankinson. This site is overgrazed prairie with buckbrush and wood lily. It is a diverse habitat, with extensive sloughs and potholes, upland savanna, lake shore, and old field. Spurge infestation is 10%. There are a few stalks of deathcamas in a small prairie between the slough and a wooded spot in the SW1/4 of the SE1/4 of section 2. Over the last two years, 18 species have been recorded from Gunness WPA (Table #5), including one Powesheik Skipper in 1996. The Powesheik was on a slight slope next to the slough in the NE1/4 of section 2. No Powesheiks were sighted in 1997. I surveyed the middle of the site (E1/2 S2, T129N, R50W) on 9 July (1:50-4:00; 30% overcast, wind SE17, 77 degrees).

2	Polites peckius	Peck's Skipper
5	Polites mystic	Long Dash
1	Colias philodice	Common Sulphur
1	Satyrium acadica	Acadian Hairstreak
1	Strymon melinus*	Gray Hairstreak
2	Phyciodes tharos	Pearly Crescentspot
1	Nymphalis antiopa	Mourning cloak
3	Vanessa atalanta	Red Admiral
1	Satyrodes eurydice	Northern Eyed Brown

1	Cercyonis pegala	Common Wood Nymph
6	Danaus plexippus	Monarch

I surveyed the northern 1/4 (SE1/4 S35, T130N, R50W) on 9 July from 4:10-5:50. The site has invasive brome and leafy spurge (5%), and clumps of willows. This site is much better-looking prairie than that to the south, and contains porcupine grass, needleandthread, wild rose, sage, deathcamas, leadplant, wood lily, buckbrush, black-eyed susan, showy milkweed, silverleaf scurfpea, Canada anemone, yellow coneflower, and larkspur. Conditions were ideal for the survey (15% clouds, SSE wind 13, 77 degrees), but no rare butterflies were found.

1	Polites peckius	Peck's Skipper
4	Polites mystic	Long Dash
3	Colias philodice	Common Sulphur
1	Colias eurytheme	Orange Sulphur
1	Satyrium acadica	Acadian Hairstreak
8	Phyciodes tharos	Pearly Crescentspot
1	Nymphalis antiopa	Mourning cloak
3	Basilarchia archippus	Viceroy
3	Satyrodes eurydice	Northern Eyed Brown
2	Cercyonis pegala	Common Wood Nymph
2	Danaus plexippus	Monarch

B. Biggs/Berndt WPA SW1/4 S13, T129N, R50W
(8 July, 11:50-3:00, 3:30-5:05; 80-100% clouds, E wind 0-10, 62-71 degrees). This is a beautiful site, a small wet former hay meadow with good plants and butterflies. Besides willows, reeds and cattails, there is hemp dogbane, swamp milkweed, deathcamas, wood lily, Canada anemone, wild rose, purple prairie clover, and buckbrush, with wood lilies in the long-abandoned roadbed to the north. This roadbed is also prone to invasion by brome and spurge. This is a small site, but has strong potential as a butterfly refugia. The Service needs to manage this site and the others south of Hankinson primarily to support their unique ecosystems, and only secondarily for wildlife production. This group of butterflies is indicative of a rich fauna, and other rare species are likely. The powesheiks were sighted throughout the afternoon, nearly always singly, from 1:45 to 4:55. This site should be resurveyed extensively under better weather conditions.

1	Ancyloxypha numitor	Least Skipper
11	**Oarisma powesheik**	**Powesheik Skipper**
1	Polites peckius	Peck's Skipper
3	Polites themistocles	Tawny-edged Skipper
13	Polites mystic	Long Dash
1	Atrytone logan	Delaware Skipper
1	Artogeia rapae	European Cabbage Butterfly
3	Colias philodice	Common Sulphur
1	Euptoieta claudia	Variegated Fritillary
3	Speyeria cybele	Great Spangled Fritillary
3	Speyeria aphrodite	Aphrodite Fritillary
16	Speyeria sp.	Great Spangled or Aphrodite Fritillary
7	Clossiana selene	Silver-bordered Fritillary
6	Clossiana bellona	Meadow Fritillary
211	Phyciodes tharos	Pearly Crescentspot
2	Nymphalis antiopa	Mourning cloak
2	Vanessa atalanta	Red Admiral

3	Basilarchia archippus	Viceroy
6	Satyrodes eurydice	Northern Eyed Brown
15	Cercyonis pegala	Common Wood Nymph
7	Danaus plexippus	Monarch

4. Crete sites, Ransom and Sargent counties

A. McCann/Magill/Isley Waterfowl Production Area, Ransom County

McCann/Magill/Isley WPA is rocky glacial-till prairie around potholes in extreme southwestern Ransom County (N1/2 S32, T133N, R58W). This prairie has been overgrazed and overseeded with brome, but contains no leafy spurge. Prairie plants found include buckbrush, sage, pasture sage, Canada anemone, false gromwell, scarlet gaura, wild rose, leadplant, silverleaf scurfpea, showy milkweed, hemp dogbane, yellow coneflower, and wood lily. A large seep with cattails is in the northwest corner of this section, and a drainage ditch connects it with another marsh to the north. Blue darner dragonflies were particularly abundant: 10 random sweeps filled a net with 31 of them. Over the last two years, 15 species of butterflies have been recorded from McCann/Magill/Isley (Table #6). A survey on 4 July, 9:25-1:20 (60-73 degrees, winds N3, 60% high haze), yielded this list:

1	Polites themistocles	Tawny-edged Skipper
166	Polites mystic	Long Dash
5	Artogeia rapae	European Cabbage Butterfly
8	Colias eurytheme	Orange Sulphur
11	Hyllolycaena hyllus	Bronze Copper
2	Epidemia helloides	Purplish Copper
1	Glaucopsyche lygdamus	Silvery Blue
1	Lycaeides melissa	Melissa Blue
1	Phyciodes tharos	Pearly Crescentspot
8	Coenonympha inornata	Inornate Ringlet
6	Cercyonis pegala	Common Wood Nymph
1	Danaus plexippus	Monarch

B. Palensky/Widmer WPA, Sargent County

This is a complex of prairie potholes, pastures, and old fields in the extreme northwestern corner of Sargent County. This is a shrubby prairie, and was probably heavily grazed in the past. Prairie plants on the site include Canada anemone, buckbrush, wild rose, showy milkweed, leadplant, wood lily, buffalo berry, hemp dogbane, black-eyed susan, sage, scarlet gaura, and yarrow. Spurge coverage is 5%, and yellow sweet clover is somewhat of a problem. A survey on 3 July under poor conditions yielded no specimens. Conditions on 4 & 5 July were better, but no rare butterflies were seen, nor are any likely to be present. Because wet areas separated the halves of each section, it took a lot of circling to cover the whole site.

E1/2 S4, T132N, R58W (4 July, 1:40-4:00, 4:40-5:40; wind W5-10, 10% clouds, 74-75 degrees)

1	Ancyloxypha numitor	Least Skipper
25	Polites mystic	Long Dash
8	Artogeia rapae	European Cabbage Butterfly
3	Colias eurytheme	Orange Sulphur
2	Hyllolycaena hyllus	Bronze Copper
1	Lycaeides melissa	Melissa Blue

1	Speyeria cybele	Great Spangled Fritillary
15	Phyciodes tharos*	Pearly Crescentspot
1	Nymphalis antiopa	Mourning cloak
2	Vanessa atalanta	Red Admiral
2	Basilarchia archippus	Viceroy
7	Satyrodes eurydice	Northern Eyed Brown
5	Cercyonis pegala	Common Wood Nymph
16	Danaus plexippus	Monarch

W1/4 S3, T132N, R58W (5 July, 9:30-10:55, 11:10-11:50; 65-68 degrees, 5-50% clouds, winds WSW10 to NW 15

2	Polites mystic	Long Dash
6	Phyciodes tharos	Pearly Crescentspot
2	Nymphalis antiopa	Mourning cloak
3	Vanessa atalanta	Red Admiral
2	Basilarchia archippus	Viceroy
3	Cercyonis pegala	Common Wood Nymph
11	Danaus plexippus	Monarch

C. McCabe's 1981 Oakes Site (E1/2 SE1/4, T130N, R58W

This was not in the contract, but Ron Royer asked me to stop briefly at this site, where the Dakota Skipper was first observed in 1981 by T.L. McCabe. McCabe observed a large population on nearly 1.5 sections of flat, open prairie. In the intervening years, all but about 70 acres have been converted to incompatible uses. Plants found on the remaining hayed prairie include sage, wood lily, deathcamas, black-eyed susan, silverleaf scurfpea, leadplant, needleandthread, and a slight overseeding of alfalfa. The spurge infestation is 5%. The Dakota Skipper was observed nectaring on alfalfa at the north end of the prairie, near a ten-acre strip recently planted to sunflowers. The Service should make acquisition of this site a priority. At the very least, Service personnel should visit it to get an idea of ideal rare butterfly habitat for southeastern North Dakota. I visited the site on 5 July from 12:25-1:50 (68 degrees, winds NW15, 40-70% clouds):

1	**Hesperia dacotae**	**Dakota Skipper**
1	Polites peckius	Peck's Skipper
4	Polites themistocles	Tawny-edged Skipper
25	Polites mystic	Long Dash
1	Colias philodice	Common Sulphur
1	Colias eurytheme	Orange Sulphur
1	Euptoieta claudia*	Variegated Fritillary
2	Clossiana selene	Silver-bordered Fritillary
1	Vanessa cardui	Painted Lady
2	Cercyonis pegala	Common Wood Nymph
12	Danaus plexippus	Monarch

5. Kuehn WPA, Richland County

Kuehn Wildlife Production Area is two quarter sections 4 miles southeast of Lidgerwood (NE1/4 S32 and SE1/4 S29, T130N, R51W). Much of the former marsh area here was inundated, and the rocky glacial till prairie (with erratics) is degraded. Poison ivy is a problem in section 29. There are some prairie plants still remaining: yellow and purple coneflower, larkspur, wild rose, buckbrush, sage, leadplant, yarrow, silverleaf scurfpea, and needleandthread. Brome and alfalfa are common. Although conditions during the

survey were not ideal (7 July, 4:25-6:00; after a rain, winds SE9 to SSE15, 80% clouds, 63-68 degrees), this site is unlikely to harbor rare butterflies.

3	Polites mystic	Long Dash
2	Hyllolycaena hyllus	Bronze Copper
3	Vanessa atalanta	Red Admiral
20	Cercyonis pegala	Common Wood Nymph
2	Danaus plexippus	Monarch

Conclusion

Management issues will continue to get more complicated with the spread of leafy spurge and the great pressures put on North Dakota prairies by grazing. As more prairies in southeastern North Dakota are converted to farming, these pressures will only increase. Beyond these basic issues, there are still the complicated issues of the effects of fire management on prairie invertebrates such as rare butterflies.

These surveys give a good overview of a critical period in North Dakota history. Decisions made now in Bismarck and Washington will set the course for rare species like these butterflies. I do hope that future researchers will be able to continue studying these butterflies.

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Table 1
Butterflies Recorded at Hartleben Prairie 1-4, Hankinson, North Dakota, 1995-1997

Scientific Name	Common Name
Oarisma powesheik	Powesheik Skipper
Hesperia dacotae	Dakota Skipper
Polites peckius	Peck's Skipper
Polites themistocles	Tawny-edged Skipper
Polites mystic	Long Dash
Atrytone logan	Delaware Skipper
Poanes viator	Broad-winged Skipper
Papilio polyxenes	Black Swallowtail
Artogeia rapae	European Cabbage Butterfly
Colias philodice	Common Sulphur
Colias eurytheme	Orange Sulphur
Hyllolycaena hyllus	Bronze Copper
Epidemia helloides	Purplish Copper
Speyeria cybele	Great Spangled Fritillary
Speyeria idalia	Regal Fritillary
Clossiana selene	Silver-bordered Fritillary
Clossiana bellona	Meadow Fritillary
Phyciodes tharos	Pearly Crescentspot
Nymphalis antiopa	Mourning Cloak
Vanessa atalanta	Red Admiral
Basilarchia arthemis	White Admiral
Basilarchia archippus	Viceroy
Satyrodes eurydice	Northern Eyed Brown
Coenonympha inornata	Inornate Ringlet
Cercyonis pegala	Common Wood Nymph
Danaus plexippus	Monarch

Table 2
Butterflies Recorded at Aaser Prairie 1-2, Hankinson, North Dakota, 1995-1997

Scientific Name	Common Name
Oarisma powesheik	Powesheik Skipper
Polites themistocles	Tawny-edged Skipper
Polites mystic	Long Dash
Poanes viator	Broad-winged Skipper
Pontia protodice	Checkered White
Artogeia rapae	European Cabbage Butterfly
Colias philodice	Common Sulphur
Hyllolycaena hyllus	Bronze Copper
Epidemia helloides	Purplish Copper
Harkenclenus titus	Coral Hairstreak
Lycaeides melissa	Melissa Blue
Speyeria idalia	Regal Fritillary
Clossiana selene	Silver-bordered Fritillary
Clossiana bellona	Meadow Fritillary
Phyciodes tharos	Pearly Crescentspot
Nymphalis antiopa	Mourning cloak

Vanessa atalanta	Red Admiral
Satyrodes eurydice	Northern Eyed Brown
Coenonympha inornata	Inornate Ringlet
Cercyonis pegala	Common Wood Nymph
Danaus plexippus	Monarch

Table 3
Butterflies Recorded at Krause WPA, Cayuga, North Dakota, 1995-1997

Scientific Name	Common Name
Ancyloxypha numitor	Least Skipperling
Oarisma powesheik	Powesheik Skipper
Polites themistocles	Tawny-edged Skipper
Polites mystic	Long Dash
Artogeia rapae	European Cabbage Butterfly
Colias philodice	Common Sulphur
Hyllolycaena hyllus	Bronze Copper
Epidemia helloides	Purplish Copper
Glaucopsyche lygdamus	Silvery Blue
Lycaeides melissa	Melissa Blue
Speyeria idalia	Regal Fritillary
Nymphalis antiopa	Mourning Cloak
Vanessa atalanta	Red Admiral
Basilarchia archippus	Viceroy
Satyrodes eurydice	Northern Eyed Brown
Coenonympha inornata	Inornate Ringlet
Cercyonis pegala	Common Wood Nymph
Danaus plexippus	Monarch

Table 4
Butterflies Recorded at Tewaukon National Wildlife Refuge, Cayuga, North Dakota, 1995-1997 (Including Krause WPA)

Scientific Name	Common Name
Ancyloxypha numitor	Least Skipperling
Oarisma powesheik	Powesheik Skipper
Polites themistocles	Tawny-edged Skipper
Polites mystic	Long Dash
Atrytone logan	Delaware Skipper
Artogeia rapae	European Cabbage Butterfly
Colias philodice	Common Sulphur
Colias eurytheme	Orange Sulphur
Hyllolycaena hyllus	Bronze Copper
Epidemia helloides	Purplish Copper
Glaucopsyche lygdamus	Silvery Blue
Lycaeides melissa	Melissa Blue
Euptoieta claudia	Variegated Fritillary
Speyeria idalia	Regal Fritillary
Phyciodes tharos	Pearly Crescentspot
Nymphalis antiopa	Mourning Cloak

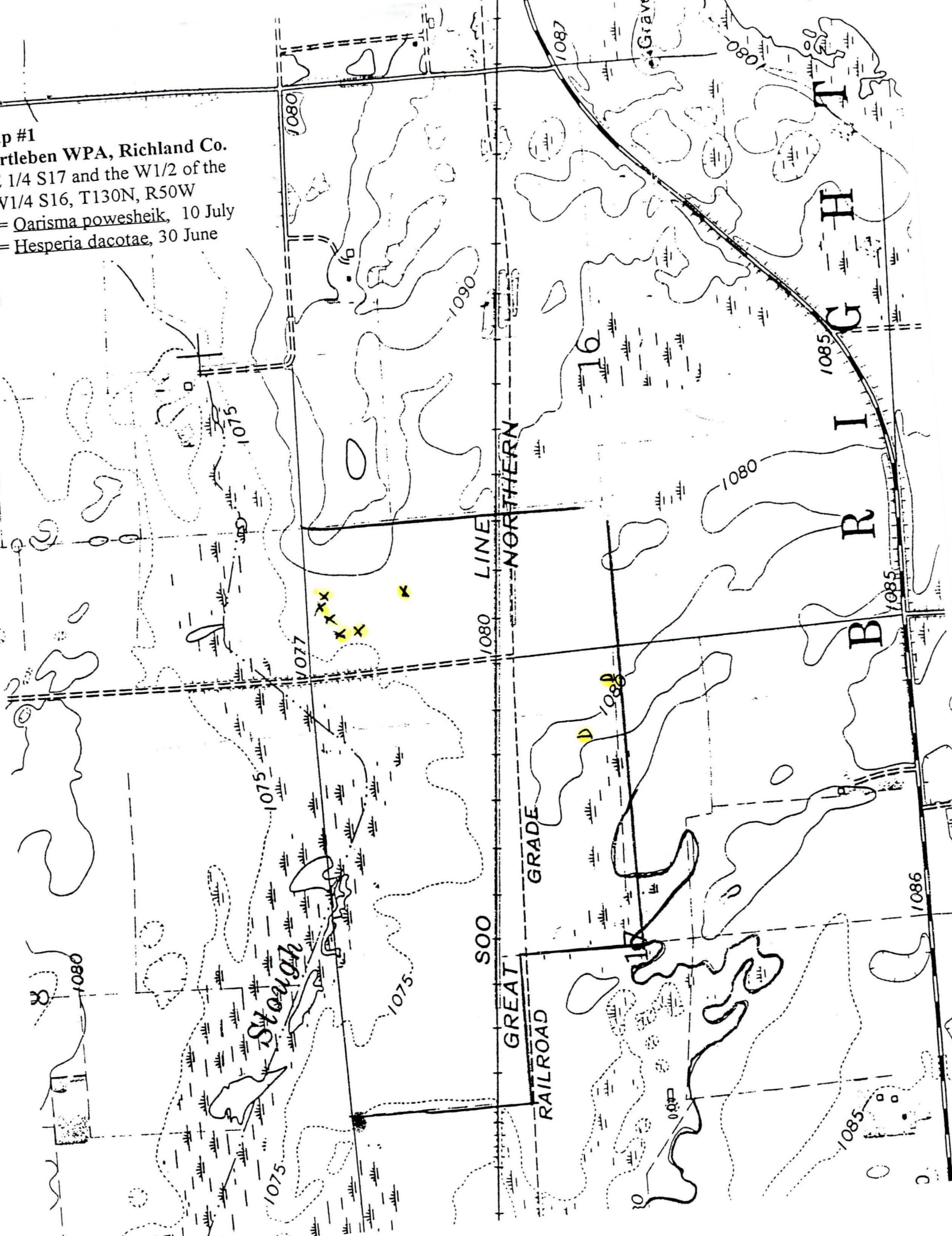
Vanessa atalanta	Red Admiral
Basilarchia arthemis	Red-spotted Purple
Basilarchia archippus	Viceroy
Satyrodes eurydice	Northern Eyed Brown
Coenonympha inornata	Inornate Ringlet
Cercyonis pegala	Common Wood Nymph
Danaus plexippus	Monarch

Table 5
Butterflies Recorded at Gunness WPA, 1996-1997

Scientific Name	Common Name
Oarisma powesheik	Powesheik Skipper
Polites peckius	Peck's Skipper
Polites themistocles	Tawny-edged Skipper
Polites mystic	Long Dash
Artogeia rapae	European Cabbage Butterfly
Colias philodice	Common Sulphur
Colias eurytheme	Orange Sulphur
Satyrium acadica	Acadian Hairstreak
Strymon melinus	Gray Hairstreak
Lycaeides melissa	Melissa Blue
Clossiana selene	Silver-bordered Fritillary
Phyciodes tharos	Pearly Crescentspot
Nymphalis antiopa	Mourning cloak
Vanessa atalanta	Red Admiral
Basilarchia archippus	Viceroy
Satyrodes eurydice	Northern Eyed Brown
Cercyonis pegala	Common Wood Nymph
Danaus plexippus	Monarch

Table 6
Butterflies Recorded at McCann/McGill/Isley WPA, 1996-1997

Scientific Name	Common Name
Polites themistocles	Tawny-edged Skipper
Polites mystic	Long Dash
Atrytone logan	Delaware Skipper
Artogeia rapae	European Cabbage Butterfly
Colias philodice	Common Sulphur
Colias eurytheme	Orange Sulphur
Hyllolycaena hyllus	Bronze Copper
Epidemia helloides	Purplish Copper
Glaucopsyche lygdamus	Silvery Blue
Lycaeides melissa	Melissa Blue
Phyciodes tharos	Pearly Crescentspot
Basilarchia archippus	Viceroy
Coenonympha inornata	Inornate Ringlet
Cercyonis pegala	Common Wood Nymph
Danaus plexippus	Monarch


p #1
rtleben WPA, Richland Co.
1/4 S17 and the W1/2 of the
V1/4 S16, T130N, R50W
= Oarisma powesheik, 10 July
= Hesperia dacotae, 30 June
BRIGHT
SOO LINE
GREAT NORTHERN
RAILROAD GRADE
Slough
1080
1085
1086
1087
1090
1075
1077
16
17


Map #2
Biggs/Berndt WPA, Richland Co.
SW1/4 S13, T129N, R50W
X = Oarisma powesheik