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Additional Surveys for the Dakota Skipper [*Hesperia dacotae* (Skinner, 1911)] at Big Stone National Wildlife Refuge and Prairie Waterfowl Production Area, Minnesota

June, July 2000

Submitted to

Minnesota Department of
Natural Resources

Natural Heritage and
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By
Dennis R. Skadsen
Natural History Investigations

1 April 2001

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2000 Flight Period

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Minnesota Department of Natural Resources
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Abstract

Surveys were conducted to locate populations of *Hesperia dacotae* during the species 2000 flight period on the Big Stone National Wildlife Refuge and Prairie Waterfowl Production Area located in western Minnesota. Due to an apparent early hatch the flight period was coming to an end when surveys began on 28 June 2000. One male Dakota skipper was captured and four others were observed on the Prairie Waterfowl Production Area on 28 June 2000, and one female was observed at this site on 5 July 2000. One female Dakota skipper was captured on Big Stone NWR management unit 1A on 6 July 2000. All specimens were showing considerable wing wear at the time they were captured.

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Introduction

Surveys to locate populations of the Dakota skipper *(Hesperia dacotae)* were conducted during the 2000 flight period on the Big Stone National Wildlife Refuge and Prairie Waterfowl Production Area situated in Big Stone and Lac Qui Parle Counties of west central Minnesota. Surveys were conducted by the author through an agreement with and guidance from the Minnesota Dept. of Natural Resources. Funding for this project was provided by the U.S. Fish and Wildlife Service.

This study continues survey work which began in 1999. The surveys goal was to determine the current status of a population of *Hesperia dacotae* on the Big Stone National Wildlife Refuge in Lac Qui Parle County, and survey all native tallgrass prairie on the Big Stone National Wildlife Refuge and the Prairie Waterfowl Production Area for the presence or absence of other Dakota skipper populations. This paper will document 2000 survey results.

Study Areas and Methods

Study Area

The habitat requirements of *Hesperia dacotae* are well documented in South Dakota by Royer & Marrone (1992), and in Minnesota by Dana & Huber (in Coffin and Pfannmuller 1988). The Dakota skipper is a prairie obligate species requiring undisturbed native prairie. The Dakota skipper inhabits the following prairie types; Little Bluestem-Porcupine Grass Dry-Mesic Hill Prairie, Northern Mesic Tallgrass Prairie, and Northern Wet-Mesic Tallgrass Prairie. One of the keys to identifying native prairie with the potential of supporting *Hesperia dacotae* populations is the presence of *Echinacea angustifolia.* The year 2000 surveys focused on specific management units of the Big Stone Wildlife Refuge identified by Skadsen (1999b) as having the above characteristics. These are management units 1A, 1B, 2, 5A and 16. In addition to these sites, surveys were to be conducted on the Prairie Waterfowl Production Area located northeast of Ortonville, MN in Big Stone Co.

Methods

Surveys were to start no earlier than 10:00 am on days with clear or partly cloudy skies. Ideal wind speeds are those under 10 mph. A total of three surveys averaging three hours per survey were to be conducted for each of the five refuge management units. A total of three surveys averaging 4-5 hours per survey were to be conducted on the Prairie Waterfowl Production Area. Surveys were conducted by moving slowly though the habitat most likely to host *Hesperia dacotae*, focusing on areas where *Echinacea angustifolia*, one of the species chief nectar sources, occurred. Skippers were located and captured for identification throughout the potential habitat. If the presence of *Hesperia dacotae* was confirmed, notes were taken on the sites precise location, general population abundance, effort, field conditions, biological features including grasses, forbs, prairie type and quality, and noticeable threats to the habitat and species survival.

Only one voucher specimen of a male *Hesperia dacotae* was to be collected, and only from sites where the species had not been previously taken. Voucher specimens were also to be collected for *Atrytone arogos iowa*, *Hesperia comma assiniboia*, *Hesperia ottoe*, *Oarisma powesheik*, and *Speyeria idalia* if possible. Voucher specimens are to be deposited in the University of Minnesota's entomology collection in St. Paul. A special permit allowing the taking of Minnesota endangered and threatened species for research and education was issued to the author. All other lepidoptera observed were noted during the surveys.

Common and scientific names of butterflies used in this report follow Miller (1992) and are listed in Appendix B. Common and scientific names of vascular plants used in this report follow Van Bruggen (1976) and are also listed in Appendix B. Descriptions of plant communities used in this report are from Leoschke (1997).

Abundance descriptions used in this report follow those used by Royer & Marrone (1992). Numbers indicate individuals encountered per visit.

Rare (<3)
Uncommon (3-8)
Common (9-14)
Abundant (>14)

Survey Results

Surveys for Dakota skippers on the Big Stone National Wildlife Refuge began, 28 June 2000, and were concluded, 12 July 2000. A total of 5 1/2 days were spent in the field; 28, 29, June, and 5, 6, 12 July. One day, July 11 was shortened due to afternoon thunderstorms. Three days during the flight period were unsuitable for surveying due to precipitation, overcast conditions, temperature, or winds in excess of 15 mph. These dates were 1, 4, 7 July. Surveys were conducted between the hours of 10:00 am and 4:00 pm. A total of 17.5 hours were spent in the field surveying, and a total of 13 hours travel time to and from survey sites.

The reported flight period for this species, based on observations in South Dakota, is 22 June through July 14 (Skadsen 1999a). McCabe (1981) states the life span of adult *Hesperia dacotae* as approximately 14 to 28 days. Due to a late contract date of 26 June 2000, surveys did not begin until 28 June. On 28 June 2000, both male and female Dakota skippers observed at Hartford Beach State Park located along the south shore of Big Stone Lake in Roberts Co., South Dakota, had considerable wing wear. This South Dakota site is located approximately fifteen miles west of Big Stone City, SD. Based on the condition of these specimens the flight period may well have begun as early as the middle of June and was coming to an end.

On 28 June 2000, one male Dakota skipper was captured and released at Prairie Waterfowl Production Area, Big Stone Co., MN. Four additional males were observed but not collected for voucher specimens due to their condition. No female Dakota skippers were collected or observed on this date. A second survey was conducted at this site on 5 July 2000. On this date a single female Dakota skipper was collected. The specimen was not gravid and had considerable wing wear. No other Dakota skippers were collected or observed on this date.

On 6 July 2000, a single female Dakota skipper was collected from Unit 1A of the Big Stone National Wildlife Refuge, Lac Qui Parle Co., MN. This non gravid female could barely fly due to considerable wing wear. The specimen was collected near Site 2 where a male was collected in 1999.

Hesperia dacotae was not collected or observed on Big Stone National Wildlife Refuge management units 2, 5A or 16. A complete list of all butterflies observed by management units is given in Appendix A.

Because of the late start date, and the fact the flight had come to an end by the first week of July, only two surveys per site were conducted. All management units located on Big Stone National Wildlife Refuge are small enough to be completely surveyed under three hours.

Discussion

Unit 1A

This is the unit where R. Dana found a population of *Hesperia dacotae* in 1988. On 29 June 1999, the author observed eight males and one female Dakota skipper on this unit. The skippers were observed on two separate hillsides separated by a reclaimed gravel pit, Figure 1. These sites were approximately 503 meters apart, and both located on north facing slopes.

During the 1999 survey, Site 1 was in poor condition. The dominant forbs were *Meliotus albus* and *Meliotus officinalis*, native forbs and grasses were sparse and diversity poor. In 2000, *Meliotus* was less common, however forb and grass diversity had not improved. *Euphorbia podperae* appeared to have increased, and *Echinacea angustifolia* had decreased. In 1999, four male Dakota skippers were observed, and one female and one male Dakota skipper were collected from this site. No Dakota skippers were seen at this site during the 2000 survey.

In 1999, Site 2 had a good diversity and growth of native forbs and grasses. *Meliotus albus* and *Meliotus officinalis* were present but restricted to hilltops and bottoms. The western third of Unit 1A was burned during the Spring of 2000. The burn area included a portion of Site 2 where two male Dakota skippers were observed and one male collected during the 1999 study. Forb and grass density and diversity had greatly improved following the Spring 2000 burn, especially *Echinacea angustifolia*. No Dakota skippers were observed during the first survey conducted on July 29, 2000. A single non gravid female Dakota Skipper was collected on the burned portion of Site 2 on 6 July 2000. This specimen could barely fly due to extreme wing wear. This was the only Dakota skipper observed on Unit 1A during the 2000 survey. A total of 2.0 hours were spent surveying Unit 1A on 29 June 2000, and 3.0 hours were spent surveying Unit 1A on 6 July 2000.

The legal description for Site 2 is as follows;
Lac Qui Parle County, W 1/2 NE 1/4 Section 28, T121N, R46W Yellowbank Township
Lat. 45° 15' 56" N, Long. 96° 26' 35" W, elevation 1020'

Nineteen species of butterflies were observed on Unit 1A in 2000 compared to fourteen in 1999. The increased diversity of species could be a result of increased forb diversity and abundance, a result of the partial controlled spring burn on the western third of this unit. Like the 1999 surveys, *Oarisma powesheik* and *Speyeria idalia* were rare during the two 2000 surveys.

Unit 1B

Unit 1B is located in the NW 1/4 Section 34, T121N R46W, Yellowbank Township, Lac Qui Parle Co. This unit has all the characteristics of good Dakota skipper habitat, a good diversity of native forbs and grasses including a good population of *Echinacea angustifolia*. The entire site was burned in May 2000 and both native forbs and grasses responded favorably.

Both 1999 and 2000 surveys failed to find Dakota skippers on this unit. In 1999, 29 species of butterflies were observed on Unit 1B, however only twelve species were observed during the 2000 survey. The controlled burn of the entire upland portion of this unit may be one reason for the decline in species observed during 2000 surveys. Only one *Oarisma powesheik* and seven *Speyeria idalia* were observed on this unit during the 1.5 hour survey on 29 June 2000, and the 1.5 hour survey on 11 July 2000. Only two *Oarisma powesheik* were observed during the 1999 surveys.

Unit 2

Unit 2 is located in the NE 1/4 Section 3, T120N R46W, and SW 1/4 SW 1/4 Section 35, T121N R46W of Yellowbank Township, Lac Qui Parle Co. In 1999, the west end of Unit 2 had characteristic Dakota skipper habitat, with a good diversity of native forbs and grasses including abundant *Echinacea angustifolia.* However, during the 2000 survey the entire unit was covered with a heavy growth of *Meliotus albus* and *offcinalis*. This growth was covering the native vegetation, much like that observed on Unit 1A in 1999. This unit was burned in 1994, and the spring of 1999. Apparently, *Meliotus* growth responds the year following a burn. No Dakota

skippers were observed on this site in 1999 or during the 2000 survey. In 1999, a total of seventeen species of butterflies were observed on Unit 2 including *Speyeria idalia* and *Oarisma poweshiek*. During the 1.0 hour survey on 29 July 2000, only five species of lepidotera were observed including four *Oarisma powesheik* confined to a small patch of native vegetation. No further surveys were conducted on this unit due to its vegetative condition.

Native grasses and forbs responded favorably following a spring burn on Big Stone NWR Unit 1B.

Unit 5A

Unit 5A is located in the S 1/2 NE 1/4 of Section 7, T120N R45W Agassiz Township, Lac Qui Parle Co. The condition of native prairie on this unit was considered fair during both the 1999 and 2000 surveys. Native forbs and grasses (mainly *Stipa spartea)* were abundant, with the exception of *Echinacea angustifolia. Amorpha canescens* is the dominate forb. Only ten species of butterflies were recorded on this unit in 1999 including *Oarisma powesheik* and *Speyeria idalia* which were common. This unit was surveyed for 1.0 hours on 29 June 2000, and 1.0 hours on12 July 2000. Thirteen species were observed during the 2000 surveys with *Speyeria idalia* being the only target species found to be common, a total of seven were observed. *Oarisma powesheik* was again considerably rare, only four were observed during the 2000 surveys. No changes in management of this unit were noted.

Unit 16

Only a few acres located on the far western end of management Unit 16 has habitat conducive to *Hesperia dacotae*. This area was surveyed on 29 June 2000 during the first survey of Unit 1B. Species observed are included with Unit 1B observations.

Prairie Waterfowl Production Area

Prairie Waterfowl Production Area - Figure 2, is located in Big Stone County, Section 36, T122N, R46W. The majority of this WPA was lacked the type of habitat suitable for *Hesperia dacotae*. Very few of the forbs associated with this butterfly were observed, especially *Echinacea angustifolia*, the species chief nectar source, and *Zigadenus elegans*. Some areas on the units southwest corner were apparently cropped at one time and attempts are being made to replant the area back to native warm season grasses. One small 3-4 acre patch of native prairie on private land bordering the WPAs western edge in Section 35 supported a surprisingly large population of *Oarisma poweshiek*. I estimated over one hundred *Oarisma powesheik* at the time of the survey. This small acreage, apparently hayed late summer or early fall, had a diverse and abundant population of native forbs and a good stand of *Andropogon scoparius*. Unfortunately, this small site is isolated from the other pieces of native prairie that would support endemic prairie butterflies. Diversity and abundance of native forbs and grasses increased along the WPAs northern edge where the slope increased towards Long Tom Lake. This was the only area on the WPA where native forbs and grasses were abundant. *Echinacea angustifolia*, *Lilium philadelphicum* and *Stipa spartea* were observed in this area of fair to good Little Bluestem-Porcupine Grass Dry-Mesic Hill Prairie. Partial burns and fall haying should be conducted on Prairie WPA to improve native forb and grass density.

On 28 June 2000, one male Dakota skipper was captured, and four others were observed during the 4.0 hour survey. During the second 2.5 hour survey on 5 July 2000, a single non gravid worn female was observed. This was the only Dakota skipper observed during the second survey of Prairie WPA which concentrated solely on the units north end. Both *Oarisma powesheik* and *Speyeria idalia* were abundant on the production areas north end. A total of fifteen species of butterflies were observed at the Prairie Waterfowl Production Area.

The legal description for the area where Dakota skippers were collected and observed is as follows:

Big Stone Township, W ½ of the SE ¼, Section 36, T122N, R46W.

Recommendations for Further Surveys

Future surveys for *Hesperia dacotae* should begin by June 15. The 2000 flight period was very early based on the condition of Dakota skippers observed during this study. Dakota skippers observed on 28 June were already showing considerably wing wear. Due to the late start date, the 2000 flight was apparently missed on Unit 1A. Earlier surveys should be conducted to better ascertain the status of Dakota skipper populations on Prairie Waterfowl Production Area.

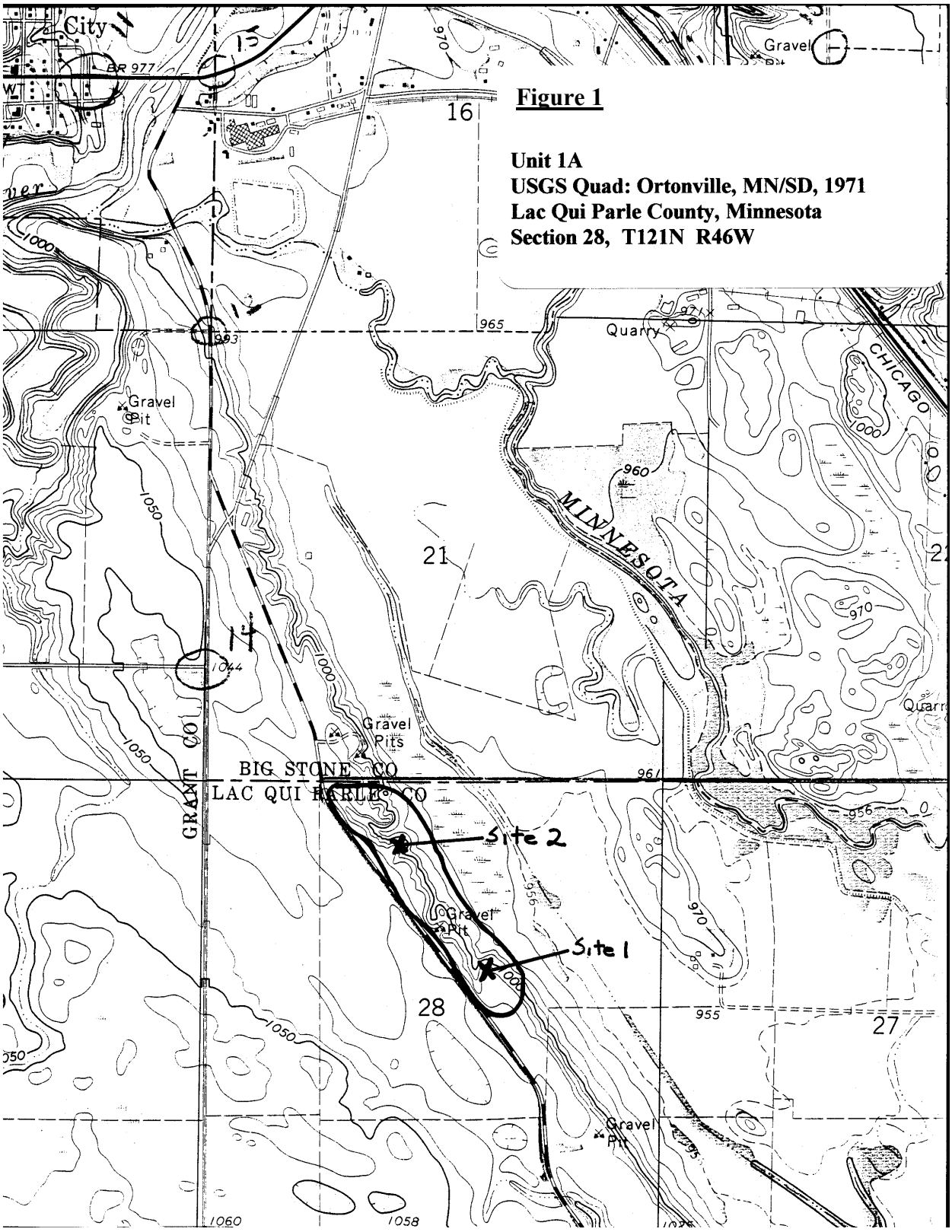

Figure 1

Unit 1A
USGS Quad: Ortonville, MN/SD, 1971
Lac Qui Parle County, Minnesota
Section 28, T121N R46W

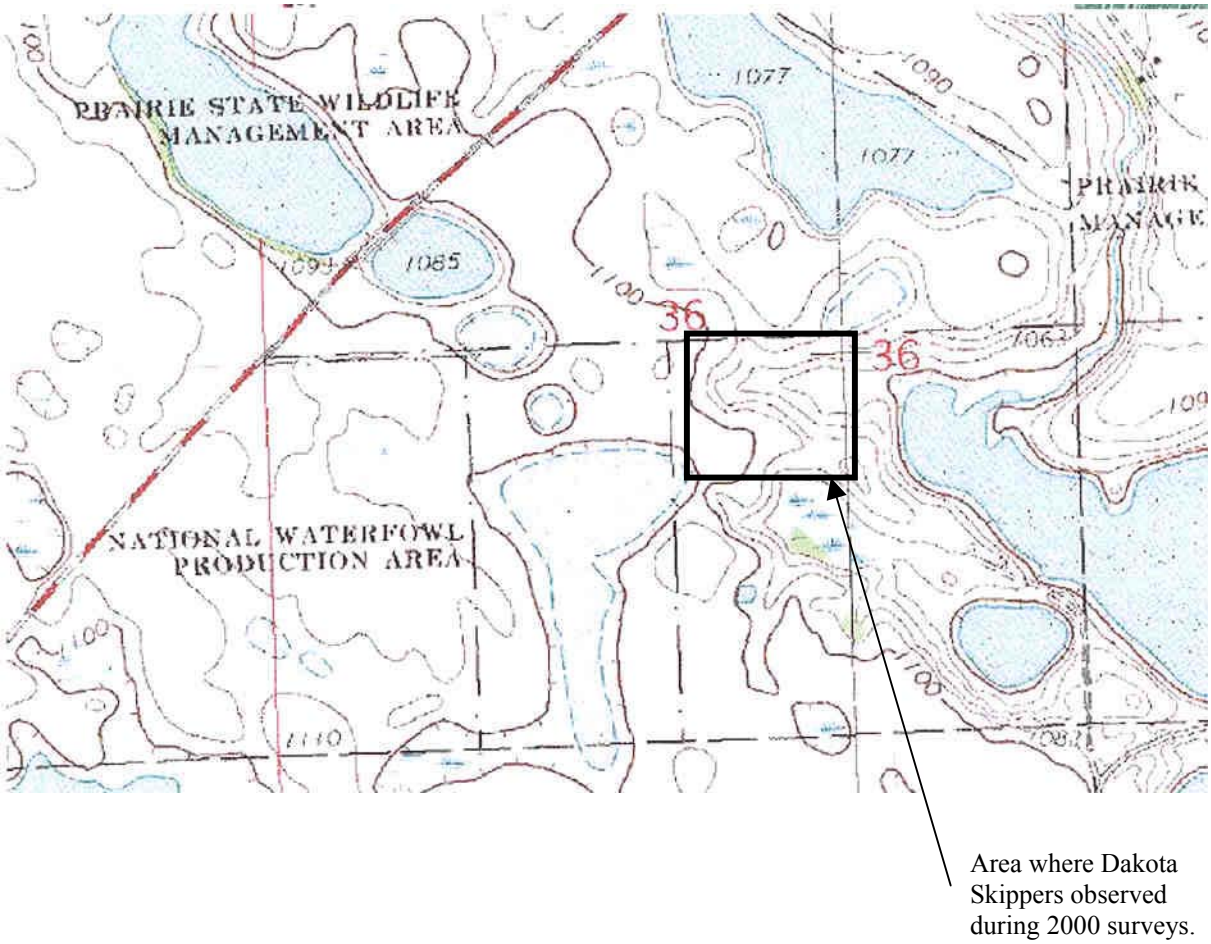

Figure 2 – Prairie Waterfowl Production Area

Pollard Transect Station UTM's

Stations for Pollard Surveys were marked using GPS equipment on September 16, 2000 with the help of Bridget Olson, Biologist for the Big Stone National Wildlife Refuge. The transects are located on Units 1A, 1B and 5A. Due to the vegetative condition of Unit 2, no transects were set during this study. Each station has a UTM coordinate, and transect legs are straight lines between each station. Where possible stations are tied to a rock, post or tree. These transects bisect typical Dakota skipper habitat. At the request of refuge personnel, no permanent markers were used to locate these stations in the field. Before Pollard Surveys are run, the surveyor should relocate these stations using the UTM coordinates and temporarily mark their locations with 18" flags that can be removed once surveys are completed.

Unit 1A

Station 0 – Start
0700356E 5015847N
Elev. 316 m

Station 1
0700398E 5015798N
Elev. 310 m

Station 2
0700506E 5015789N
Elev. 310 m

Station 3
0700552E 5015671N
Elev. 316 m

Station 4
0700583E 5015604N
Elev. 319 m

Station 5
0700675E 5015483N
Elev. 311 m

Station 6
0700808E 5015331N
Elev. 314 m

Station 7 – End
0700817E 5015381N
Elev. 308 m

Unit 1B

Station 1 – Start
0701402E 5014438N
Elev. 317 m

Station 2
0701533E 5014297N
Elev. 316 m

Station 3
0701566E 5014224N
Elev. 308 m

Station 4
0701633E 5014197N
Elev. 310 m

Station 5
0701689E 5014175N
Elev. 307 m

Station 6 – End
0701796E 5014184N
Elev. 310 m

Unit 5A

Station 1 – Start
0708935E 5010992N
Elev. 319 m

Station 2
0709252E 5010925N
Elev. 322 m

Station 3
0709259E 5010970N
Elev. 316 m

Station 4 - End
0709331E 5010913N
Elev. 323 m

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