2024 Dakota Skipper (*Hesperia dacotae*) Survey Protocol

Male (left) and Female (right) Dakota Skippers. Photo Credits: Bob Dunlap, MN Department of Natural Resources.

U.S. FISH AND WILDLIFE SERVICE

Midwest and Mountain Prairie Regions

Minnesota-Wisconsin, North Dakota, and South Dakota Ecological Services Field Offices

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Introduction

The purpose of this protocol is to provide a standardized Dakota skipper (*Hesperia dacotae*) survey method to determine if the species is present at the site scale. While this protocol may be adapted for use in recovery efforts, the main purpose is to provide project proponents with guidance for pre-development siting due diligence. This protocol provides information to decide where surveys for the Dakota skipper may be warranted; standardized requirements to help ensure that survey methods are repeatable and reliable; and outlines how to report survey data to the U.S. Fish and Wildlife Service (Service). This protocol has been modified from previous editions to incorporate new information gathered from recent survey efforts (USFWS 2022).

Information obtained from following this protocol serves to ensure compliance with Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.) and to advance recovery goals of the Dakota skipper (USFWS 2021). This protocol can be used to monitor the species' abundance or population status and trends over extended timeframes or large spatial scales.

Background

Dakota Skipper Distribution: Deciding to Conduct a Survey

The Dakota skipper inhabits patches of remnant native prairie in the north-central United States and southern Canada. In the United States, the species occurs in portions of Minnesota, North Dakota, and South Dakota. The species is currently presumed to be extirpated from Illinois and Iowa (79 FR 63671:63748).

To determine if a survey is needed for a particular site, first define the proposed area that may be affected and then determine if suitable habitat is present. For the purposes of this protocol, the survey area is defined as a 250-500 meter buffer surrounding the area of potential effect (i.e. the disturbance area or action area). To determine if suitable habitat is present within a survey area, first query the Information for Planning and Consultation (IPaC) website, which provides the current species range map for the Dakota skipper under the ESA (Appendix A). The IPaC range map for the Dakota skipper was modeled using historic occurrence data from 2010-2020, land cover datasets (i.e. National Land Cover Database, Fields and Barnes 2019), and soil attributes (i.e. moisture, slope, and percent sand). The modeled output was then clipped to Hydrologic Unit Code (HUC) boundaries where the species has been previously observed. Dakota skipper observations used in this model were generalized, meaning that observations were accurate to the site scale, and did not represent precise individual observations. Therefore, the resulting model is intended for use at the landscape scale.

When IPaC indicates that Dakota skippers may be present on the landscape, another resource to help refine this precision at the site level is a habitat probability model developed by the Service's Habitat and Population Evaluation Team (HAPET) (Barnes et al, 2024) (Appendix A). Compared to the IPaC range map, this model provides a more precise estimation of the probability that Dakota skippers may be present on a particular site. This model was built using precise, individual Dakota skipper observations made during survey efforts from 2010-2021; this date range selects for habitat conditions currently represented in occupied sites, and avoids historic sites that may not be currently occupied. These observations were then related to a suite of ecological predictor variables, which provided a probability of occurrence at the landscape scale. This model does not replace IPaC range maps, but instead provides a finer resolution map to determine habitat suitability at the site scale, and how habitat on a particular site may be connected to habitat in the surrounding landscape.

While both the IPaC and HAPET models provide information at the desktop level, institutional

knowledge, traditional/indigenous knowledge, prior survey experience, and other anecdotal information should also be considered. If potentially suitable habitat is discovered, a field evaluation is needed to assess habitat characteristics at the site scale. Sites containing native prairie grassland and having features indicative of Dakota skipper habitat may harbor the species (79 FR 63672:63674-63675). Therefore, if IPaC indicates that the Dakota skipper may be present, and a site evaluation indicates that the vegetation may support the species (defined in Appendix A), the Dakota skipper may be present on the site, and occupancy surveys may be warranted. If surveys are warranted, contact the local Service Field Office to request site-specific approval prior to conducting surveys.

Occupancy Survey Methodology

Defining Suitable Habitat and Flight Period

Occupancy surveys must be conducted during the flight period in areas of suitable habitat for the Dakota skipper. Suitable habitat is defined as grassland habitat that contains suitable nectar sources and associated native bunchgrasses that are known to support this species, defined in detail in Appendix B. Modeled habitat across the range is shown in Appendix A. The flight period generally occurs between June 10th and July 25th and lasts approximately 13-19 days. However, it is important to note that the actual flight period varies from year to year based on the accumulated developmental degree days (the number of degree-days necessary for an organism to complete its development from one point in their life cycle to another)..

To ensure surveys are conducted during the flight period for the year in which the survey will take place, the following criteria are required prior to conducting surveys:

1. Documented emergence of Dakota skippers at a reference site where the species is known to consistently occur on an annual basis by the Service or biologist that holds a Recovery Permit for the species OR
2. Documented occurrence of other prairie butterfly species that correspond with the Dakota skipper flight. This requirement replaces previous guidance using primarily vegetation phenology, which has been shown as a coarse, and sometimes unreliable, method to determining the beginning of the flight stage.
    a. Species that emerge prior to the Dakota skipper flight include: Garita skipperling (*Oarisma garita*), Crossline skipper (*Polities origenes*), European skipper (*Thymelicus lineola*), long dash (*Polites mystic*), tawny- edged skipper (*P. themistocles*), Peck's skipper (*P. peckius*), silver-spotted skipper (*Epargyreus clarus*), and Uncas skipper (*Hesperia uncus*).
    b. Species that emerge concurrently with the Dakota skipper include: Wood nymph (*Cercyonis pegala*), Ottoe skipper (*Hesperia ottoe*), and dun skipper (*Euphyes vestris*).

Defining Favorable Environmental Conditions

When peak flight is established, conduct surveys when weather conditions are favorable for butterfly activity. Measurement of temperature and wind conditions in the field is essential as butterfly detection depends on optimal weather conditions. Therefore, using a weather station nearby the survey site would not provide an accurate surrogate for actual field measurements.

Favorable conditions are defined as weather conditions with:

- Average wind speed less than 19 miles per hour collected in the field by averaging speeds over a 30 second period measured at a height of 1.2-1.8 meters or corresponding to a Beaufort scale of 4 or less and;
- Temperatures greater than 70 degrees F when cloud cover is less than 50 percent OR temperatures greater than 80 degrees F when cloud cover is greater than 50 percent

Results from surveys conducted under environmental conditions that do not conform to the optimum climatic and phenological conditions, or time of day and other recommended methods described herein, may be considered unreliable.

Survey Area and Survey Effort

Conduct surveys by using a modified Pollard walk through all suitable habitat for the Dakota skipper:

- Survey routes may cover up to 5 m (16.4 ft) on each side of the observer.
- Survey routes should be roughly parallel to each other, spaced approximately 10 m (32.8 ft) apart, and within 5 m (16.4 ft) of the survey area boundary to ensure complete coverage of the habitat within the entire action area and buffer.
- Survey pace should average a rate of a maximum of 35 meters/minute. Additional time is encouraged in areas of high quality habitat (e.g., patches of abundant nectar sources) to increase the probability of a detection, with a recommended pace of 10 meters/minute.

Data Collection Requirements

During surveys, the following data must be reported:

- Date, start time, and end time of survey
- Temperature, wind speed, wind direction, and percent cloud cover at the start and end of each survey
- A photo or series of photos representing the suitable habitat present within the survey area.
- GPS Track logs showing survey routes for each biologist at the site
- The species and abundance (total number) of each individual butterfly observed during survey efforts
- If Dakota skippers are observed,
    - Record the time when the first individual was observed
    - Plot a GPS point for each individual Dakota skipper observed during surveys, indicating the sex of the individual when possible.
    - If multiple Dakota skippers are observed within a 3-meter area, one GPS point with the number of each sex observed would be sufficient.

Identification and Photographic Requirements

Dakota skippers, especially males, have similar markings compared to other prairie obligate species, especially when only the ventral wing is visible. Therefore, confirming identification of the Dakota skipper often requires views from both the dorsal and ventral side.

- Sightings of Dakota skippers in areas that have not previously been surveyed require photographs to confirm identification; photo requirements differ based on what sex was observed.
    - If a female Dakota skipper is observed, a dorsal or ventral photo is sufficient.
    - If only male Dakota skippers are observed, photograph the dorsal and ventral views of two individuals, if possible.
        - If only a single male is present, the area is assumed to be occupied, but additional surveys are recommended to confirm population status.
- Sightings of Dakota skippers on known sites where previous surveys have been conducted also require photographs to confirm identification. However, one photograph of the ventral view of a male or female is sufficient to confirm occupancy of the site.

Determining a Site to be Absent or Unoccupied

For the purposes herein*, unoccupied* is defined as "survey areas where Dakota skippers were not observed, but total survey effort was limited" (i.e., more surveys will be needed) whereas *absent* is defined as "the area lacks Dakota skipper detections after extensive survey efforts" (i.e., no more surveys will be needed for the foreseeable future). The threshold to determine a site absent, rather than unoccupied, depends on the surrounding habitat, survey efforts, and previous Dakota skipper observations.

To determine a site unoccupied, one of the following survey options should be utilized:

OPTION 1

- Conduct surveys over two (2) flight period seasons, for at least two (2) days per flight period, and each day separated by 48 hours.
    - *This recommendation controls for varying climate conditions from year to year.*

OPTION 2

- Conduct surveys within one (1) flight period season, for at least three (3) days within the flight period, each separated by 48 hours.
    - *Option 2 cannot be utilized if the National Weather Service has designated the action area as being in a severe drought status.*

The purpose of the 48-hour requirement, indicated in both above options, is to ensure surveys are conducted during the peak of flight. Surveys may be completed on consecutive days if evidence shows that efforts were conducted during peak flight.

OPTION 2a: No established populations of Dakota skippers within 1 km (0.6 mi)

When there are no established populations of Dakota skippers known within 1 km (0.6 mi) of the proposed action, all suitable Dakota skipper habitat must be evaluated within 250 m (820 ft) of the action area.

If suitable habitat extends outside the survey area, as seen in Figure 1: Suitable Habitat Patch C, the entirety of the patch must be surveyed. Do not clip suitable habitat boundaries to the extent of the buffered survey area. Figure 1: Suitable Habitat Patch D does not meet the threshold for surveying as it occurs entirely outside of the defined survey area.

Figure 1: Suitable Habitat Patch A is located behind a potential dispersal barrier and is almost entirely excluded from the defined survey area. In this instance, coordination with your local Service Field Office prior to surveying would be recommended to ensure inclusion or exclusion from survey efforts makes sense.

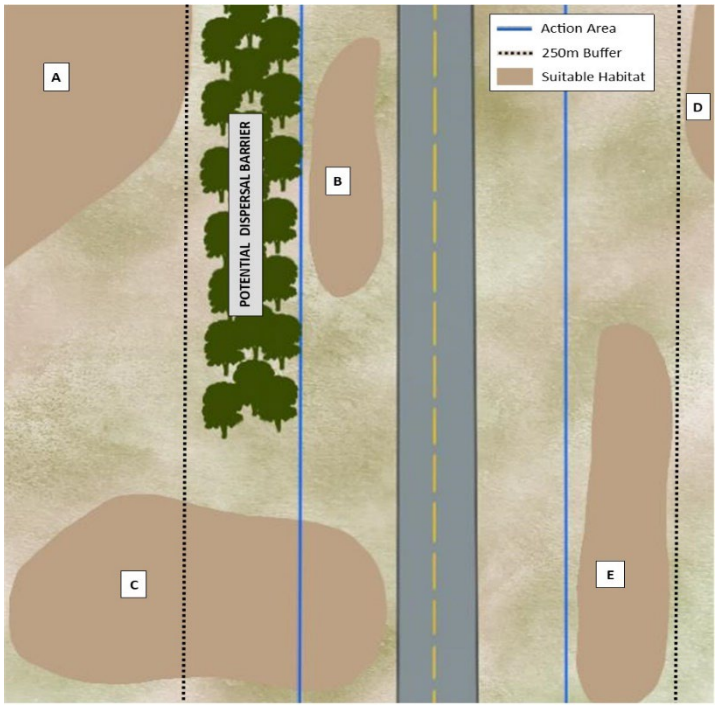

Figure 1*: Example linear project with an action area (blue line) not in a severe drought status and located more than 1 km (0.6 mi) from an established population of Dakota skippers. Qualifies for Option 2a which requires all suitable habitat (tan) be surveyed within a 250 m (820 ft) buffer (black dashed line) of the action area (blue line).*

OPTION 2b: Established populations of Dakota skippers within 1 km (0.6 mi)

When the proposed actions is within 1 km (0.6 mi) of an established population of Dakota skippers, the buffer distance must be increased to 500 m (0.3 mi) and all suitable habitat within surveyed.

If suitable habitat extends outside the defined survey area, as seen in Figure 2: Suitable Habitat Patch B & D, the entirety of the patch must be surveyed. Do not clip suitable habitat boundaries to the extent of the buffered survey area. Figure 2: Suitable Habitat Patch A does not meet the threshold for surveying as it occurs entirely outside of the defined survey area.

Figure 2: Suitable Habitat Patch C is located behind a potential dispersal barrier but is partially within the defined survey area. In this instance, coordination with your local Service Field Office prior to surveying would be recommended to ensure inclusion or exclusion from survey efforts makes sense.

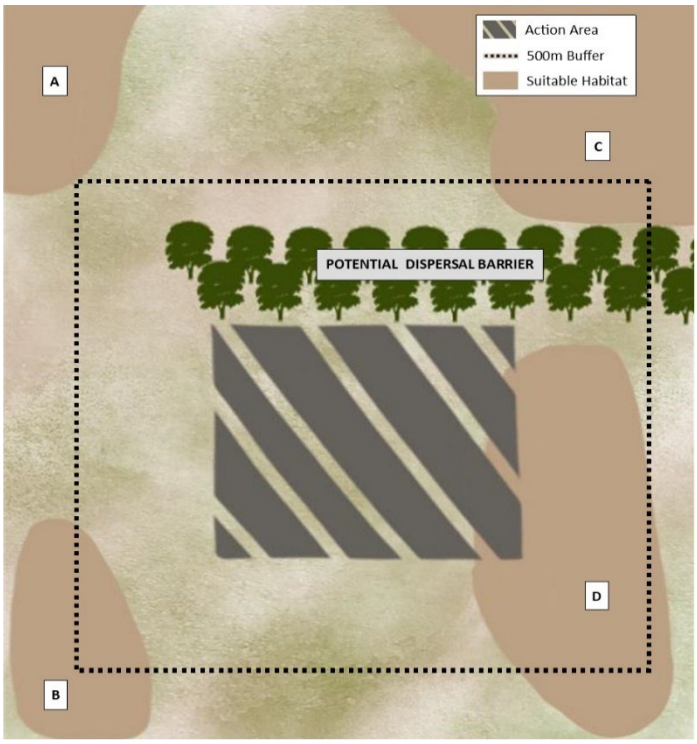

Figure 2*: Example non-linear project with an action area (gray) not in a severe drought status but is located within 1 km (0.6 mi) of an established population of Dakota skippers. Qualifies for Option 2b which requires all suitable habitat (tan) be surveyed within a 500 m (0.3 mi) buffer (black dashed line) of the action area (gray).*

Determining the Site Unoccupied

If Dakota skippers are not observed during two survey days each year for two years (Option 1) or three survey days in one year (Option 2), the species can be assumed to be unoccupied until the start of the next flight period, or early June of the following calendar year.

Determining the Site Absent

As previously discussed herein, the threshold to determine a site absent, rather than unoccupied, depends on the surrounding habitat, survey efforts, and previous Dakota skipper observations. Sites where Dakota skippers are determined to be absent would not warrant future surveys unless the status of the Dakota skipper changes in the surrounding area, that is if a Dakota skipper observation occurs nearby (~0.6 mi) the survey area. To determine if a site is absent, several thresholds must be met:

- If the suitable habitat being surveyed is isolated[1], the site can be considered absent if there are three flight period seasons surveyed, with at least two surveys per season that are separated by 48 hours (six total surveys), with no Dakota skipper observations made.
- If a total of seven surveys are completed at an isolated site during one flight period season, the area can be assumed to be absent (personal communication J. Petersen MNDNR). Evidence must be provided to show that surveys were conducted within the peak flight period and during favorable weather conditions.
    - Based on the average detection probability for Dakota skippers in Minnesota on a

[1] *Isolated sites are defined as being greater than 1 km from suitable Dakota skipper habitat in the surrounding region and greater than 1 km from a known Dakota skipper observation. A site may also be considered isolated if it is separated from other suitable habitat by dispersal barriers that would prevent migration into the survey area.*

relatively isolated site, seven surveys are required to achieve 90% probability of a surveyor detecting a Dakota skipper.

- If the survey site is located within 1 km from a known Dakota skipper observation, the site can be considered absent if there are a total of four flight period season surveys, with at least two surveys per season that are separated by 48 hours (eight total surveys), with no Dakota skipper observations.

If one or more Dakota skippers are detected at a site, the Service will assume the site is occupied for a minimum of two additional flight periods (three total, including the year when surveys determined Dakota skippers were present). Additional surveys before the three-year minimum occupancy period may be conducted, but if completed and negative (no detections), the results will not supersede the occupied status until three years have elapsed. This conservative approach accounts for the possibility of low detection rates for small populations.

Reporting Requirements

Survey reports must be provided to the Service by December 15 of that survey year along with a copy of the current Recovery Permit. The following information is required as part of permit reporting requirements for both positive and negative surveys:

- Shapefile, KMZ file, or spreadsheet showing coordinates of all Dakota skippers observed and track logs for each individual conducting surveys. Template shapefiles can be provided by request from local Service FO's.
    - Attributes for individual observations: Site Name, Observer Name, Survey Date, Start Time, End Time, Total Duration, DASK Count, DASK Sex.
    - Attributes for track logs: Site Name, Observer Name, Survey Date, Start Time, End Time, Total Duration, DASK Presence (Yes, No).
- Maps depicting the survey area, survey route(s), and extent of suitable Dakota skipper habitat at the survey site.
- Detailed weather conditions collected during each survey day.
- Photographic evidence of confirmed Dakota skippers observed.
- At least one representative photo of habitat at each survey site.
- General description of the suitable habitat characteristics present at the survey site, including the general vegetation composition.

Minimum Qualifications for Surveyors

Dakota skippers are not readily identified in the field without specialized training and experience. Therefore, agencies and others who want to determine if the species is present in an area must secure the assistance of individuals who are qualified to carry out scientifically credible identifications. A list of persons who have obtained a Dakota skipper Recovery Permit from the Service and who have agreed to release their contact information may be obtained from the local field office.

The Service assesses the qualifications of individuals pursuant to the following criteria:

1. Complete at least four (4) surveys over the course of one or more field seasons for the Dakota skipper accompanied by a permitted Dakota skipper surveyor. Evidence of Dakota skipper observations during these surveys must be documented to show proficiency in identification of this species.
2. Receive a letter of reference from the permitted surveyor.
3. Demonstrate the ability to identify other butterfly species that are associated with the Dakota skipper flight.

4. Demonstrate the ability to identify vegetation communities and species that are suitable habitat for this species.
5. Show evidence of report preparation for the Dakota skipper summarizing results and implications of the survey.

Conclusion

While this protocol provides standardized methods to complete occupancy surveys for the Dakota skipper, each project site may have unique characteristics that may make applying this protocol difficult. We strongly encourage project proponents to contact their local Ecological Services field office early in the planning process to discuss how this protocol could be applied to a particular project or survey area. Prior to conducting surveys, concurrence on survey methods from the local Ecological Services field office is required as part of the Service's survey permit.

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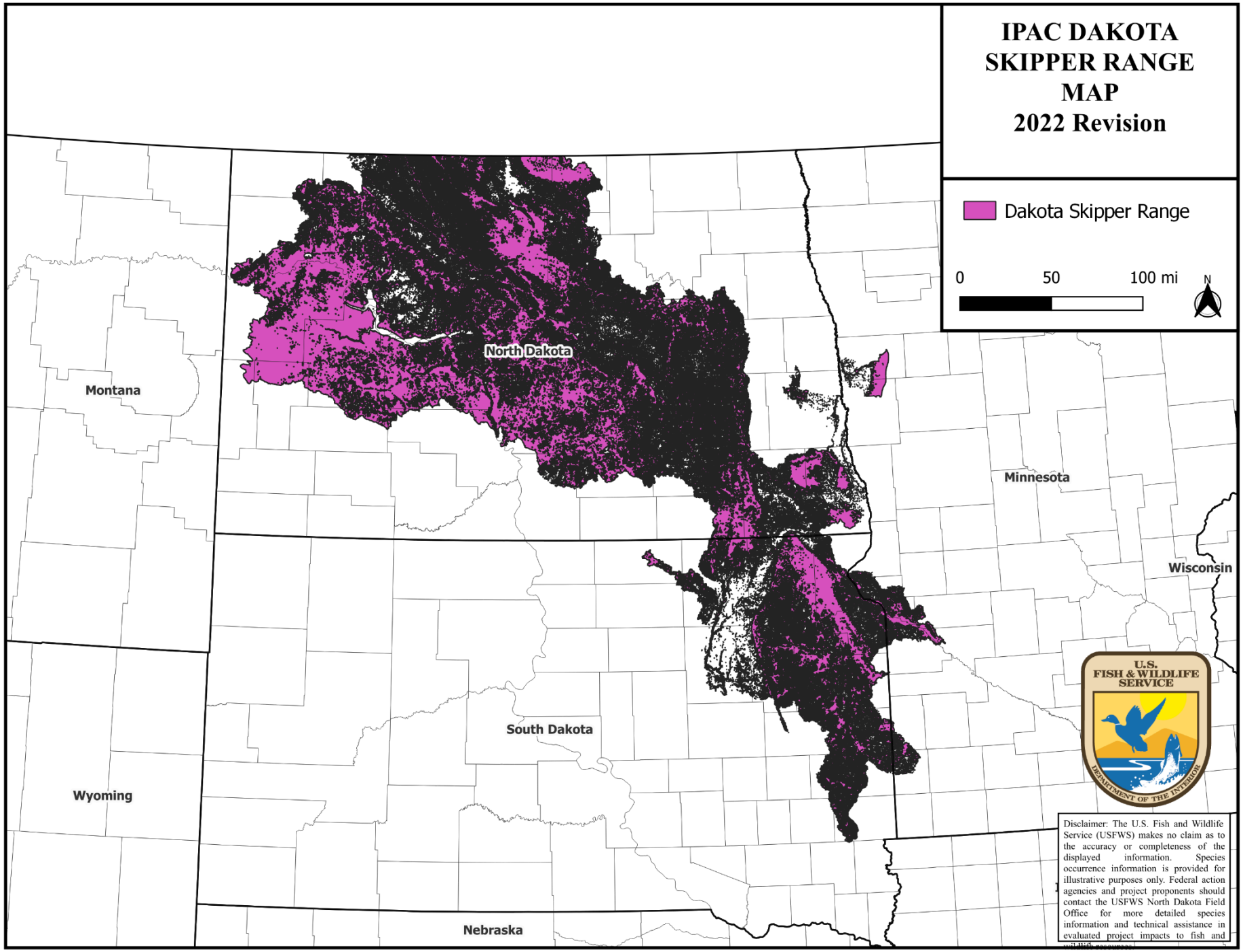
Appendix A – Range Maps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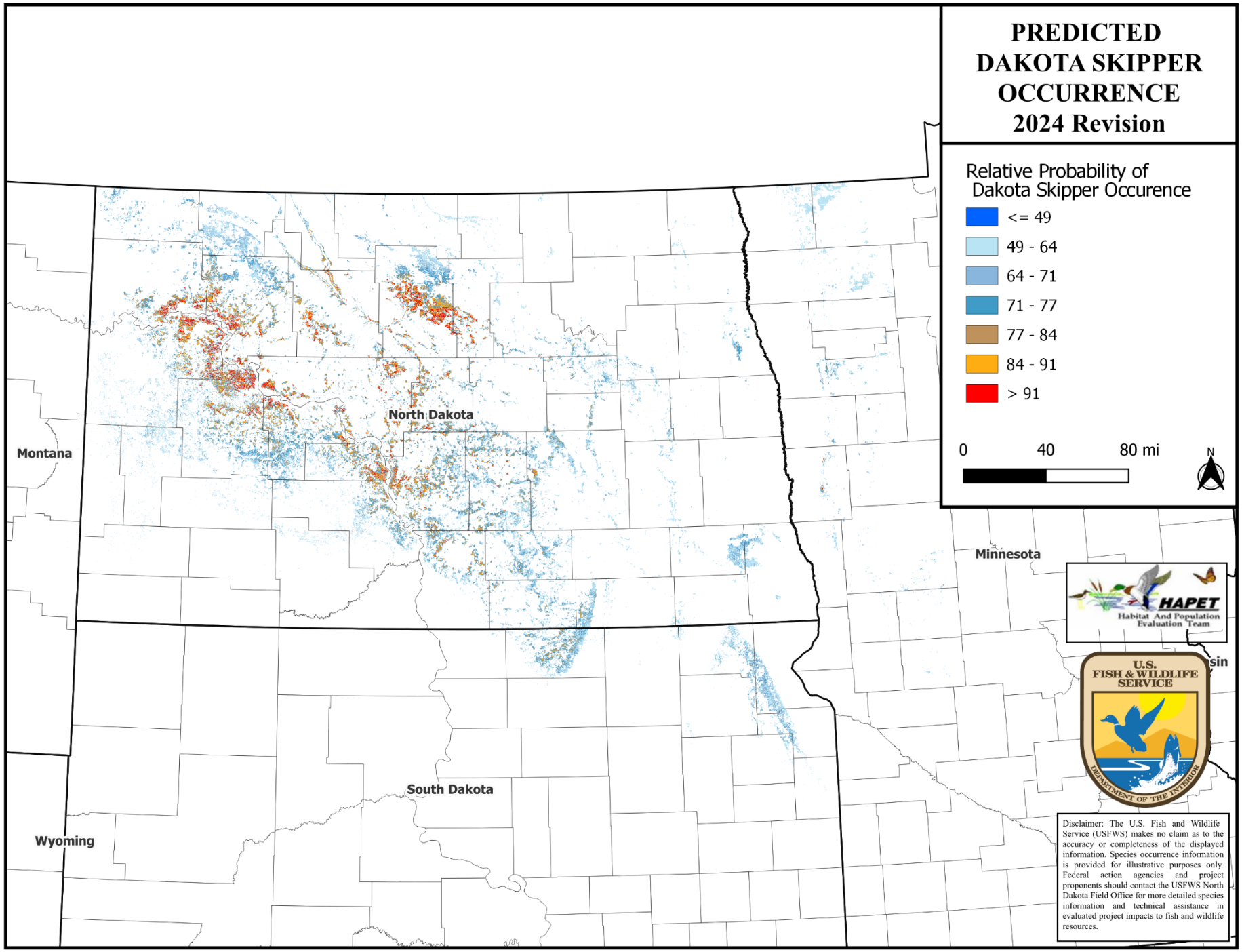
Disclaimer: The U.S. Fish and Wildlife Service (USFWS) makes no claim as to the accuracy or completeness of the displayed information. Species occurrence information is provided for illustrative purposes only. Federal action agencies and project proponents should contact the USFWS North Dakota Field Office for more detailed species information and technical assistance in evaluated project impacts to fish and


PREDICTED
DAKOTA SKIPPER
OCCURRENCE
2024 Revision
Relative Probability of
Dakota Skipper Occurence
<= 49
49 - 64
64 - 71
71 - 77
77 - 84
84 - 91
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80 mi
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South Dakota
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HAPET
Habitat And Population
Evaluation Team
U.S.
FISH & WILDLIFE
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Appendix B - Dakota Skipper Habitat Descriptions

1. Type A Habitat

Type A Dakota skipper habitat consists of low-lying, wet-mesic prairie with little topographic relief that occurs on near-shore glacial lake deposits (Royer et al. 2008, p. 14-16).

Although Type A habitats vary throughout the growing season (Rigney 2013), during the Dakota skipper's flight period, three plant species are almost always present and blooming:prairie lily *(Lilium philadelphicum),* bluebell bellflower (*Campanula rotundifolia),* and mountain deathcamas (smooth camas; *Zigadenus elegans)* - the latter appears to be an especially strong indicator of Dakota skipper Type A habitat in North Dakota (McCabe 1981, p. 190; Royer et al. 2014, p. 1).

Later in the season, common forbs blooming within Type A habitat include Rocky Mountain blazing star *(Liatris ligulistylis),* Canada goldenrod *(Solidago canadensis),* strict blue-eyed grass *(Sisyrinchium montanum),* common goldstar (yellow star grass; *Hypoxis hirsuta),* and blackeyed Susan *(Rudbeckia hirta)* (Lenz 1999, p. 6). Type A habitats also contain small patches of dry-mesic prairie inhabited by Dakota skippers. Stiff sunflower *(Helianthus pauciflorus Nutt. ssp. pauciflorus)* and candle anemone *(Anemone cylindrica)* are typical in these dry-mesic habitats; purple coneflower *(Echinacea angustifolia),* an indicator of Type B habitats (see below) may be present, but is rare in these dry-mesic 'inclusions' (Lenz 1999, p. 6-11).

Plants that are important as nectar sources for Dakota skipper 'Type A' habitats appear to vary geographically, but blackeyed Susan is significant throughout the range of this habitat type. Habitat conservation value for Dakota skippers may be greater at sites where the presence of a variety of species that serve as nectar sources occurs because plant species likely vary in their energetic value or availability during the adult flight period (Dana 1991, p. 48).

Big bluestem *(Andropogon gerardii)* and little bluestem (*Andropogon scoparius*) are typically the dominant grasses in North Dakota 'Type A' habitats and indiangrass *(Sorhastrum nutans)* may also be present (Royer et al. 2014, p. 1). Dakota skipper adults are typically encountered in "pre-floral stands" of these grass species where they are associated with the forb species described above (Royer et al.2014, p. 1).

2. Type B Habitat

Type B Dakota skipper habitat (Royer et al. 2008, p. 14), typically supports a high diversity and abundance of native forbs, including purple coneflower, purple prairie clover *(Dalea purpurea),* white prairie clover (D. *candida),* yellow sundrops *Calylophusserrulatus),* lambstongue groundsel *(Senecio integerrimus),* groundplum milkvetch *(Astragalus crassicarpus),* eastern pasqueflower *(Pulsatilla patens),* old man's whiskers (prairie smoke, *Geum triflorum),* western silver aster *(Symphyotrichum sericeum),* dotted blazingstar *(Liatris punctata),* tall blazing star (*L. aspera),* meadow zizia (heartleaf golden alexanders; *Zizia aptera),* blanket flower *(Gaillardia sp.),* prairie sagewort *(Artemisia frigida),*and leadplant *(Amorpha canescens)* (Skadsen 2006, p. 1-2). Prairie milkvetch *(Astragalus laxmannii Jacq. var. robustior)* also occurs in 'Type B' habitats in Minnesota (Dana 1997, p. 8).

In the rolling terrain of river valleys and the Missouri Coteau of North Dakota, on the western edge of the species' known range, Dakota skippers inhabit a variant of 'Type B' habitats. These habitats typically contain an association of little bluestem, big bluestem, and needlegrasses that is often invaded by Kentucky bluegrass *(Poa pratensis)*(Royer and Marrone 1992, p. 22). These prairies, also

typically contain prairie lily, bluebell bellflower, coneflowers, and other asters as nectar sources; in some areas, mountain death camas also occur (Royer and Marrone 1992, p. 22).

Type B habitat (Royer et al. 2008, p. 14), occurs primarily on rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem, little bluestem, and needle or porcupine grasses *(Hesperostipa spp.*). As in 'Type A' habitats, bluebell bellflower and prairie lily are present in 'Type B' habitats, but they support more extensive stands of purple coneflower, upright prairie coneflower *(Ratibida columnifera),* and common gaillardia (blanketflower; *Gaillardia aristata)* (Royer et al. 2014, p. 1-2). Each of these is a documented nectar source for the Dakota skipper in 'Type B' habitats (McCabe 1981; Dana 1991).

Little bluestem and porcupine grass *(Hesperostipa spartea)* are the predominant grass species in South Dakota 'Type B' habitats, but side oats grama, needle-and-thread grass *(H. comata),* and prairie dropseed are also typical (Skadsen 2006, p. 1-2). In a variant of'Type B' habitats found in western North Dakota, western wheatgrass *(Pascopyrum smithii)* is also typical (Royer et al. 2014, entire).