United States Department of the Interior

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February 16, 2017

IN REFERENCE REFER TO:
03E19000-2017-F-0108 Recovery Permit - The Nature Conservancy

Memorandum

To: Assistant Regional Director, Ecological Services, Midwest Region (Region 3), Bloomington, MN

Assistant Regional Director, Ecological Services, Mountain-Prairie Region (Region 6), Lakewood, Colorado

From: Field Supervisor, Twin Cities Ecological Services Field Office, Bloomington, MN

Field Supervisor, South Dakota Ecological Services Field Office, Pierre, SD

Subject: Intra-Service Section 7 Consultation on Region 3's and Region 6's Proposal to Issue a Section 10(a)(1)(A) Permit to The Nature Conservancy

This document transmits the U.S. Fish and Wildlife Service's (Service) Intra-Service biological opinion on the effects of issuing section a 10(a)(1)(A) scientific research permit to The Nature Conservancy for the Dakota skipper (*Hesperia dacotae*) in Minnesota, North Dakota, and South Dakota. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act, 1973, as amended (16USC 1531 et seq.) (ESA).

At issue is the take of the Dakota skipper for scientific and conservation purposes by The Nature Conservancy as they implement habitat management at preserves in Minnesota, North Dakota, and South Dakota. Take is likely to occur as a result of at least some of the habitat management practices and possibly also due to monitoring, but will be minimized as is detailed in the permit application and in the attached biological opinion. This activity is likely to improve our scientific knowledge of the species and promote its conservation.

Critical habitat has been designated for the Dakota skipper and the Poweshiek skipperling (*Oarisma poweshiek*) in Regions 3 and 6 and would be affected by the proposed action at four of the proposed study sites (Appendix). We concur with a determination that the proposed action may affect, but is not likely to adversely affect both species' critical habitat. The effects to the species' critical habitat that are likely to occur as a result of the proposed action and the basis for the findings of 'not likely to adversely affect' are provided in the Appendix.

For reasons discussed within, it is our biological opinion that the proposed actions carried out pursuant to section 10(a)(1)(A) are not likely to jeopardize the continued existence of the Dakota skipper.

cc: FWS R6, ES, Doug Laye
FWS R6, ES, Kathy Konishi
FWS R3, ES, Carlita Payne

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BIOLOGICAL OPINION

Section 10(a)(1)(A) Permit for the Dakota skipper

CONSULTATION HISTORY

U.S. Fish and Wildlife Service (Service) must consult under section 7(a)(2) of the ESA when an action we permit, fund, or carry out may affect a federally listed species. This consultation covers the proposed issuance of a section 10(a)(1)(A) permit to The Nature Conservancy (TNC) to implement habitat management and to study its effects to the Dakota skipper (*Hesperia dacotae*) and its habitat at preserves in Minnesota, North Dakota, and South Dakota where the species may be present. This biological opinion considers the effects of the issuance of this permit on this species. Section 10(a)(1)(A) permits are referred to as 'recovery permits' and are used to authorize take for the purposes of carrying out actions that will contribute to the recovery of the species. TNC filed its permit application with the Service in January 2016.

DESCRIPTION OF THE PROPOSED ACTION

Action Area

The action area is not only the immediate area involved in the action, but includes all areas to be affected directly or indirectly by the Federal action (50 CFR § 402.02). The action area contains the most far-reaching potential effects of the federal and non-federal actions on the species being discussed. The action area is defined as "…all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area is not limited to the "footprint" of the action, but encompasses the biotic, chemical, and physical impacts to the environment resulting directly or indirectly from the action.

For this consultation, the action area includes TNC preserves in Minnesota, North Dakota, and South Dakota where the Dakota skipper may be present. The preserves include Blazing Star Prairie (Minnesota, MN), Bluestem Scientific and Natural Area (SNA, MN), Hole-in-the Mountain Prairie (MN), Ordway Prairie (SD), and Brown Ranch (ND) (Fig. 1).

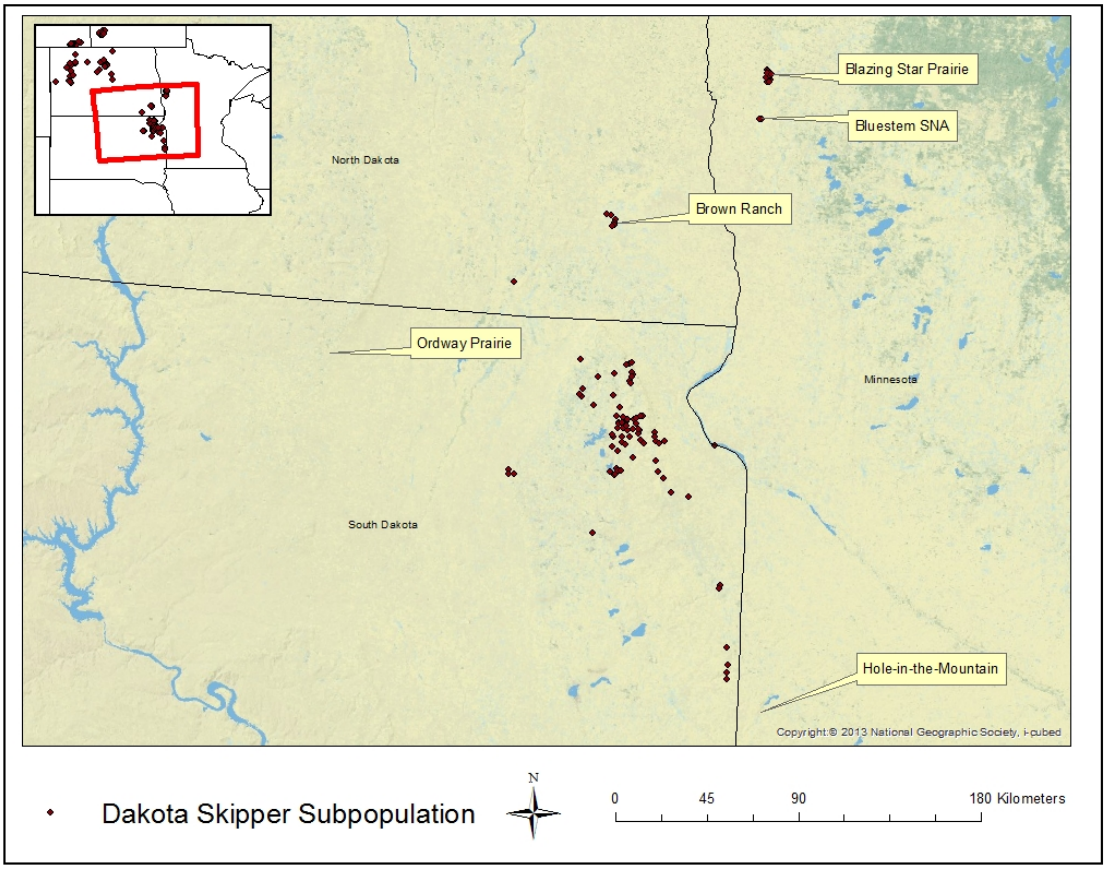

Figure 1. The Nature Conservancy preserves where take of the Dakota skipper may occur as a result of proposed action. The species may be extirpated from both Hole-in-the-Mountain and Ordway Prairie. Reintroduction of the species is planned at Hole-in-the-Mountain in 2017, however, and there may be a small likelihood that it could still be present at Ordway Prairie.

The following description of the action area is modified from the permit application.

Occupied Sites

Blazing Star Prairie, Minnesota

The Blazing Star Prairie is in Clay County, Minnesota. The original 160 acres of the preserve are in Township 141N, Range 45W, and Section 5 NE1/4. The portion of the Blazing Star Prairie that is likely to be affected by the proposed action is restricted to the Northern Sand-Gravel prairie in the NE1/4 S5 and the Northern Mesic Prairie in the southern portion of the of NE1/4 of Section 5 (Fig. 2).

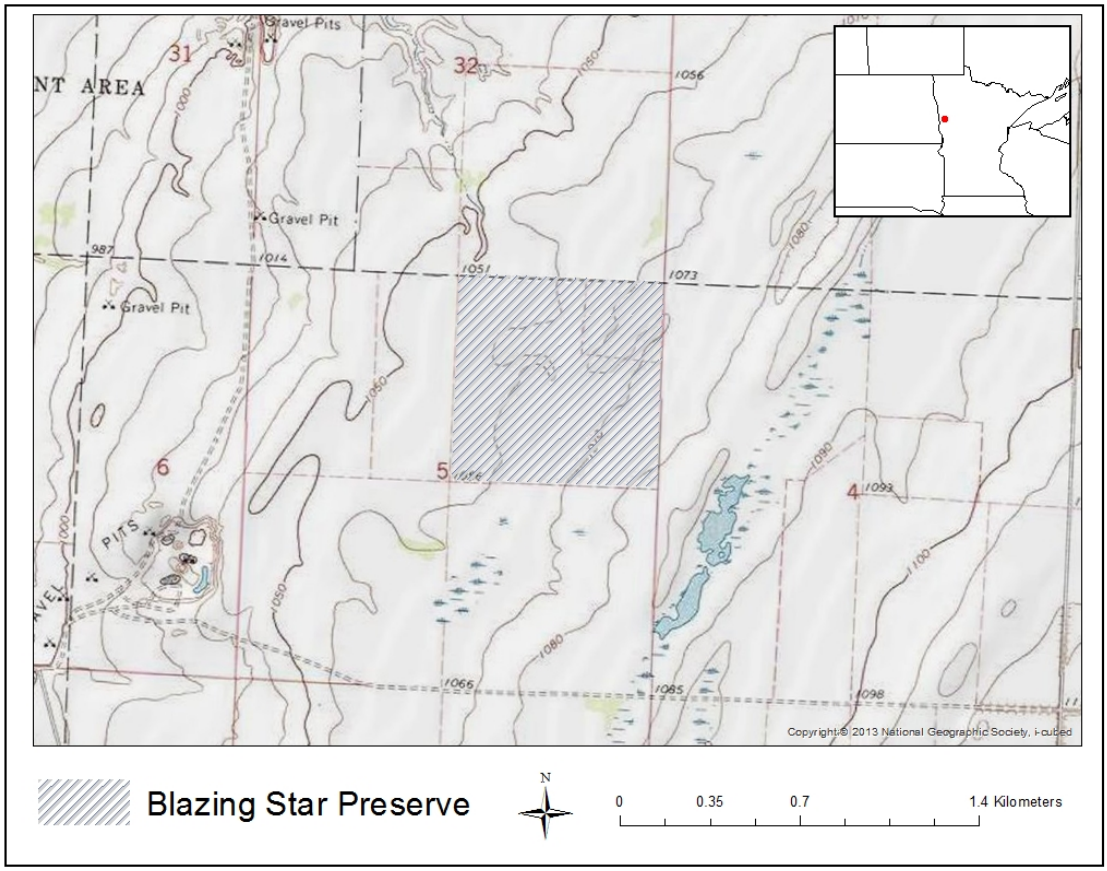

Figure 2. Blazing Star Prairie in Minnesota.

Bluestem Scientific and Natural Area, Minnesota

The Bluestem Scientific and Natural Area (SNA) is also in Clay County, Minnesota. In the S1/2 of Section 14 (T139 R46W S14), TNC proposes to coordinate its land management, including prescribed fire, with that of Buffalo River State Park and the MN Department of Natural Resources (DNR) Scientific and Natural Areas Program. TNC asserts in its application that it will be important to alternate burning cycles with the state ownership to the north as a precautionary measure to minimize Dakota skipper mortality.

Sites with Unknown Occupancy

The following sites have a history of negative Dakota skipper surveys that casts the status of the Dakota skipper there in doubt. We will assume that the species is still present at these sites, however, until additional survey data allow us to draw a definitive conclusion regarding the species' status at the respective sites. After submitting its application, the Service and TNC discussed the species' status at Altamont Prairie, which was included as a site with unknown occupancy. After these discussions, the Service concluded that it is unlikely that the Dakota skipper is still present at Altamont Prairie. Therefore, Altamont Prairie is no longer considered to be subject to either the permit application or this biological opinion.

Hole-in-the-Mountain Prairie, Minnesota

The Hole-in-the-Mountain Prairie is located in Lincoln County, Minnesota. For the purposes of this project, TNC has divided Hole-in-the-Mountain into six "sub-sites," five of which occur on

TNC property. This approach factors in a potential subpopulation structure, based on the advice of Minnesota Biological Survey (MBS). Planning of prescribed fire and monitoring will be based on these sub-sites following the general parameters described in this biological opinion.

Hole-in-the-Mountain Prairie is currently the focus of a proposed reintroduction of the Dakota skipper – a collaborative project by the (Service), Minnesota Zoo, and TNC. Therefore, the species may again inhabit this site during the proposed 5-year duration of the permit.

Brown Ranch, North Dakota
The Brown Ranch preserve is located in Ransom County, North Dakota (Townships 134 and 133, Range 53, Sections 28, 3, 4, 5, 8, and 9). The approximately 1500-acre site is embedded within the Sheyenne National Grasslands in southeastern part of North Dakota and is composed of an interwoven complex of upland grasslands and wetlands.

For the purposes of this project, TNC has divided Brown Ranch into 2 "sub-sites" – one (I) is in Section 28, where some of the highest quality habitat is located and where activities will be coordinated with the adjacent U.S. Forest Service. The second (II) is a mile to the south and is the heart of the Brown Ranch preserve with about 1,000 acres total. Prescribed fire and monitoring activities will be implemented independently within each of these sub-sites following the general parameters described elsewhere in this biological opinion.

Ordway Prairie, South Dakota
Ordway Prairie is located in McPherson County, South Dakota. The preserve covers about 7,800 acres and is along the Missouri Coteau physiographic region. As with Brown Ranch and Hole-in-the-Mountain Prairie, TNC has divided Ordway Ranch into "sub-sites." The two sub-sites will be managed independently of each other following the general parameters described elsewhere in this biological opinion. TNC adopted this approach on Robert Dana's (MBS) recommendation, which was to divide the preserve roughly into a northern sub-site and a southern sub-site. The northern sub-site includes the highest quality suitable skipper habitat and is where all the historical occurrences have been detected. The southern sub-site also includes suitable skipper habitat, but not as consistently high-ranking as the northern portion.

Proposed Action
The Service proposes to issue a section 10(a)(1)(A) permit to take the Dakota skipper for recovery or scientific purposes or for the enhancement of propagation or survival. Pursuant to section 10 of the ESA, the Service may authorize otherwise prohibited actions under the ESA for scientific purposes or to enhance the propagation or survival of listed species. All activities we authorize under section 10(a)(1)(A) must meet permit issuance criteria at 50 CFR 17.22, 17.32, or 17.52. Importantly, the ESA and its implementing regulations mandate that such activities be for the purposes of enhancement or conservation of listed species.

In determining whether to issue a section (10)(a)(1)(A) permit, the Service must consider and understand the following:

(1) whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the Dakota skipper;

(2) the probable direct and indirect effects that issuing the permit would have on the wild populations of the Dakota skipper;
(3) whether the permit, if issued, would conflict with any known programs intended to enhance the survival of the Dakota skipper;
(4) whether the purpose for which the permit is required would be likely to reduce the threat of extinction of either species;
(5) the opinions or views of scientists or other persons or organizations who have expertise concerning the species or other matters germane to the application; and,
(6) whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

The Service proposes to issue a permit under section 10(a)(1)(A) of the ESA to TNC to allow it to carry out management and monitoring activities intended to conserve the Dakota skipper on the preserves where it occurs in Minnesota, North Dakota, and South Dakota. Proposed activities that are likely to result in take of the Dakota skipper include: 1) surveys in the wild that may involve pursuit and capture (e.g., netting) of Dakota skippers; 2) salvage of dead specimens; and, 3) prescribed fire. This study is intended to improve our ability to manage Dakota skipper habitats in a manner that will minimize stressors and facilitate conservation of the species.

Prescribed Burns

The overall goal of this project is to evaluate the impact of prescribed fire on the adult and larval habitat quality and population status of the Dakota skipper. With this project, TNC will test the effectiveness of current recommended best practices for prescribed fire extent and frequency in meeting conservation objectives for 1) Dakota skipper recovery and 2) healthy prairie habitats. Specifically, TNC plans to divide the identified breeding habitat at each site or sub-site, as applicable, into 3-6 burn units, of which only one will be burned in any given year. The lower end of the range (3 burn units) will require waiting a full year between burns, whereas the upper end of the range (6 or more) would allow for annual burns within any given site.

Prescribed burns will be conducted by qualified burn bosses meeting National Wildfire Coordinating Group (NWCG) and TNC standards. TNC attached curriculum vitae to its application for the TNC personnel that will oversee burn planning and implementation at each of the five preserves. In some cases, other burn bosses meeting the NWCG standards will implement burns.

TNC will conduct prescribed burns at all five preserves in the spring, fall, or a combination. It will conduct burns in such a way as to minimize impacts to Dakota skippers. TNC proposes to take a conservative approach with its prescribed fire treatments by following best practices identified in the literature and guidelines to the fullest extent possible, while also taking into account site-specific constraints and logistical challenges inherent to prescribed fire management.

TNC proposes to coordinate with the Service as it makes plans for annual prescribed fire on the five sites**.** This will provide the Service with an opportunity for review of these plans. For context, annual burn plans may be submitted with relevant spatial information about

management history, in particular prescribed fire that was conducted in the year preceding the study period and cumulative histories over the course of the project.

The prescribed burn framework for this project relies on information and insight on the likely distribution of the Dakota skipper at each site and is intended to facilitate the recovery of Dakota skipper populations. Using the best information available for each site, including historical occurrence records, recent surveys, Dakota skipper habitat suitability assessments, and expert knowledge, for example, TNC has identified where the larvae may most likely be present.

For each site, or "sub-site" in the case of Hole-in-the-Mountain, Brown Ranch and Ordway, the identified larval habitat will be divided into units for burning. TNC stated in its application that it will strive for at least three or (ideally) four burn units, of which only one would be burned in any given year to provide refugia from fire and to ensure that a significant percentage of areas inhabited by larvae will be unburned (Panzer 1988; Swengel et al. 2011).

For each site or sub-site, the minimum fire return interval will be four years for any burn unit (Panzer 1988; Panzer 2002; USFWS 2015). For sites or sub-sites with at least three burn units, a 6-year rotation may be observed. If the site can accommodate six or more burn units (e.g., Ordway) TNC may burn only one unit each year. This is intended to allow a generation of Dakota skippers at that site or sub-site to complete its life cycle without exposure to fire.

To accomplish desired fire frequencies at each site, TNC proposes to coordinate with adjacent management entities as it finalizes its strategy for burning during the permit period. This applies to the sites in Minnesota and North Dakota, but at this point does not include the Ordway Prairie, South Dakota. This is TNC's largest site and is embedded in a landscape where prescribed fire is not the norm.

Dakota Skipper Monitoring

TNC proposes to hire qualified and permitted surveyors to conduct surveys for the Dakota skipper. Dakota skipper surveys will be conducted within likely or confirmed breeding habitat, as identified in its permit application. If and when the Service develops a survey protocol that differs from the proposed survey methods described below, TNC proposes to cooperate with the Service to determine if and how to adjust its monitoring methods.

TNC proposes to map the extent of each fire conducted in Dakota skipper habitat to ensure that future fire planning is based on an accurate understanding of prior fire history. Pre- and post-burn surveys will be conducted and other relevant information reviewed to assess the likely distribution of Dakota skippers within burn units. This approach is adapted from the Service's Dakota Skipper Conservation Guidelines[1] (USFWS 2015).

Sites with unknown occupancy

The purpose of surveys in sites with unknown occupancy is to determine whether Dakota skippers are present. TNC proposes to use expert surveyors to implement presence/absence survey methods across habitat mapped as suitable for skippers in a method that follows

[1] The Service revised and updated its conservation guidelines for the Dakota skipper in 2016 after TNC submitted its application. The approach proposed by TNC, however, is consistent with the revised and updated guidelines.

"checklist" searching methods as defined by Royer et al. (1998) and further described by Royer et al. (2014). Dakota skippers will be searched for in patches of suitable habitat identified at each site. Sampling will occur under the same weather conditions, the same timeframe, and at the same pace as the intensive surveys (described below). Only individual Dakota skippers identified within about 5 m of the surveyor (on either side, above, or in front) qualify as "encounters." Confident identification is the only encounter considered valid. If skippers are detected using this more extensive approach, the site or sub-site will be reclassified as "occupied," and intensive monitoring methods will be followed as described below.

Occupied sites

Expert surveyors will conduct intensive monitoring of Dakota skipper populations as described below. Monitoring habitat change after burning will also be most intensive for these sites.

TNC proposed the following survey methods in its permit application:

> Ambient conditions affecting butterfly activity include air temperature, wind speed, and sky cover. As a general rule, air temperature should be between 20° and 37°C (68°-99°F), and surveys should not be conducted when the temperature is below 15°C (60° F). Average wind speeds should be no greater than 19 kph (12 mph) (Beaufort scale 3), and cloud cover should be ≤50% of the sky. However, there is no cloud cover restriction if the temperature is above 21° C (70° F). No one of these restrictions is determinative by itself (e.g., activity will occur at lower air temperatures if it is sunny and calm), and the surveyor will use professional judgment to assess whether the particular combination of conditions permits butterflies to be active and detectable. If one or more of these conditions is violated, the surveyor will note on the data form why conditions were appropriate for a survey. Survey work should be suspended when this is not the case and only resumed when suitable conditions return. Be sure to note that the survey was ended on the data form and record the final weather conditions. No survey work would be done if there is any precipitation.
>
> Weather conditions will be recorded at the beginning and end of each survey period including: temperature (°C), percent relative humidity, cloud cover (expressed as the % of sky occluded), and maximum wind speed (km/h). If a survey needs to be terminated because of poor weather conditions, the same weather information will be recorded at the time the survey is ended. (Adapted from Michigan Natural Features Inventory 2015).
>
> Timing. Survey effort will be confined to times and ambient conditions in which butterflies are active. Generally, surveys should be conducted between 09:30 and 18:00 (all times CDT). Other factors will sometimes make surveys outside these limits acceptable. (Michigan Natural Features Inventory)
>
> Each surveyor will have a GPS unit and will record the survey route or transects using the tracking function. Set the GPS unit to collect the location along the track at 30 sec intervals. Once the track has been recorded during the first visit to a particular site, the tracking function can be turned off during the second visit and the same tracks can be followed during the second survey. Each surveyor will download the survey tracks at the

end of the season as an ArcMap shapefile to facilitate surveying the same routes in future years.

Surveyors are expected to be able to reliably identify Dakota skippers on sight. Inspection of netted individuals may be necessary from time to time, but most species determinations will be made without this time-consuming and potentially harmful step. All observations of Dakota skippers will be recorded (and a GPS point taken), including the sex if possible, time, and location, the last two using the GPS device. Recording behavior and habitat features of the location is optional.

If observed at a site or sub-site, Dakota skippers will be vouchered photographically, if possible. Photographs of a single individual will be acceptable, and these may be netted specimens. For photography, insects may be held in a transparent container, or temporarily anesthetized with CO2 and released after recovery (only a few minutes at most).

Finally, surveyors will provide general information about survey sites during each visit, such as potential threats and nectar sources. A short summary of the suitability of the habitat for Dakota skippers would be useful, including a description of any nectar sources or larval host plants present and a description of any invasive species infestations.

Overall Butterfly Diversity: All butterfly species observed during Dakota skipper surveys will be listed on the data form used for each site. Because estimating relative abundance would be difficult for multiple species and likely to distract observers from surveying for Dakota skippers, observers should only note when the species of butterflies seen and should not attempt to count species other than Dakota skippers.

Site characterization: Observers will collect general information about survey sites during each visit, such as potential threats and nectar sources.

Dakota Skipper Habitat Monitoring Methods

The permit application contains a detailed description of the habitat monitoring methods to be implemented by TNC. The primary purpose of the habitat monitoring proposed by TNC is to assess the effects of prescribed fire on the distribution and abundance of larval host plants and nectar sources for Dakota skippers and to track the habitat change after burns. For each burn unit where fire is implemented, follow-up monitoring will be conducted mid-June through the end of August – ideally when most plants are flowering and readily identifiable. The unit may be reassessed one or more times following the implementation of the burn during the course of the permit period.

Conservation Measures

Conservation measures are actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action. These actions will be taken by the Federal agency or applicant, and serve to minimize or compensate for project effects on the species under review. These may include actions taken prior to the initiation of

consultation, or actions which the Federal agency or applicant have committed to complete in a project proposal, permit application, or similar document.

The entire action is essentially a conservation action for the Dakota skipper. Some aspects of the action, however, are intended to minimize the expected adverse effects.

Prescribed Burns

TNC proposes to minimize fire-related injury or death to Dakota skippers within a given burn unit to the extent possible. For example, prescriptions may be designed specifically to encourage patchiness of the burn. Burn bosses may also choose to reduce fuel loads before the burn. Burns conducted in early spring and fall may minimize effects to emerging Dakota skipper larvae, when they may remain below the litter layer (Dana 1991; USFWS 2015). Seasonality of the burn will be factored into burn plans accordingly, weighing desired outcomes for Dakota skipper habitat against expected mortality of larvae. For example, a fall burn may be required to increase the availability of nectar plants, or a late spring burn may be needed if cool-season, non-native grasses are degrading Dakota skipper habitat. TNC proposes to take an adaptive approach to burning with prescriptions that are informed by Dakota skipper and habitat monitoring conducted as part of this research and in coordination with the Service.

The prescribed burn framework for this project emphasizes spatiotemporal factors that are compatible with conserving Dakota skipper populations. The identified breeding habitat will be divided as well as possible into units for burning, striving for at least three, and ideally four burn units, of which only one would be burned in any given year (USFWS 2015). The minimum fire return interval for each burn unit as described above will be 4-6 years (Panzer 1988; Panzer 2002; USFWS 2015; Robert Dana, Minnesota Biological Survey, Minnesota Department of Natural Resources, pers. comm., 8 Dec 2015). TNC proposes to coordinate with adjacent ownerships that have documented occurrences of Dakota skipper and/or mapped likely breeding habitat (e.g., Bluestem and Blazing Star) to ensure that these spatiotemporal parameters are maintained consistently over time.

TNC proposes to coordinate with the US Fish and Wildlife Service as they make plans for annual prescribed fire on the six sites identified in this proposal, offering an opportunity for review of these plans. For context, annual burn plans may be submitted with relevant spatial information about management history, in particular prescribed fire, conducted in the year preceding the study period and cumulative histories over the course of the project.

Species-Specific Permit Conditions

Conditions Specific for Dakota Skipper Permits

In addition to the general criteria for issuance of section 10(a)(1)(A) permits, permits issued for the Dakota skipper also contain the following species-specific measures. Any deviation from these measures requires approval from the Ecological Services Project Leader for the state(s) in which the activities will occur.

1. Capture, pursuit, or harassing of Dakota skippers for the purposes of conducting surveys:
   1.1. Before conducting surveys, contact the appropriate Ecological Services (ESFO) Field Office to ensure that survey methods are conducted according to established protocols; if Service-approved protocols are not established, the ESFO will ensure that surveys are conducted according to accepted methodologies and are appropriate for their stated purpose.
   1.2. To the extent practicable, identification of Dakota skippers shall be done in a manner that avoids capture. When capture of an individual is necessary to confirm identification, the following conditions will apply:
      1.2.1. Any Dakota skipper captured shall be released as near to the capture site as soon as is practicable;
      1.2.2. The geographic coordinates of all capture and release sites shall be reported to the Service no later than February 1 of the following year.
      1.2.3. Unless otherwise stated in the permit conditions, captured individuals must be released as soon as is practicable to avoid injury and may be held for a maximum of five minutes to facilitate specific identification. Any permit issued for activities that would require longer holding times (e.g., collection of eggs for captive rearing), will include specific limits on holding times.
      1.2.4. Any captured Dakota skippers shall be handled in a manner that minimizes the likelihood of injury.
         1.2.4.1. If captured in a net, all reasonable efforts must be made to allow the butterfly to walk freely inside the net and to avoid direct contact with the butterfly while confirming its specific identity. This may be done, for example, by holding the net upside down and holding the bottom of the net upwards to allow the butterfly to walk up into the net – a pouch may be created in the upside-down net to facilitate close inspection by pinching the net below the butterfly while ensuring its free movement inside the net.
         1.2.4.2. Captured butterflies may also be placed inside plastic jars by carefully coaxing them from the net into the jar. The jar must contain some type of tissue (preferred), paper towel, or soft cloth that the butterfly may stand or walk on while in the jar to facilitate visual inspection.
   1.3. Handling affects the behavior of some butterflies after their release (Mallet et al. 1987, p. 328). Therefore, we are seeking information with respect to the post-release behavior of any Dakota skippers that are captured and released. The behavior of each captured and released butterfly will be noted and reported annually as follows:
      1.3.1. Flew to and perched on herbaceous vegetation, low shrubs, or to out-of-sight location in herbaceous vegetation (e.g., into plant litter or duff layer or into bases of grasses);
      1.3.2. Flew into tall shrubs or trees and out-of-sight;
      1.3.3. Flew away – did not see butterfly perch or fly into vegetation; or,
      1.3.4. Post-release behavior unknown.
   1.4. If either species is found in a location where it was not been recorded previously or in a location where the species was thought to have been extirpated, contact the Project Leader within 24 hours. For each new location record, take a photograph that shows diagnostic features for the species, if feasible. Only take a photograph if it may be done while avoiding injury to the butterfly.

1.5. A qualified biologist, as specified in the permit, will be present in the field to supervise all survey activities.
1.6. No mutilation (e.g., leg removal) or marking schemes are authorized.
1.7. Any incidental injury (e.g., removal of labial palps or legs during netting) must be described in annual reports.

2. If any individual dies or suffers an injury that may be lethal (e.g., a puncture or compression injury), the permitted activity must cease until the Service is contacted and has allowed the activity to resume. Initial contact should be the Service Ecological Services Field Office in the state where the death or injury occurred.
3. Collection of voucher specimens may occur only when either species is encountered in a county where it has not been previously recorded. In addition, dead or dying specimens may be collected for voucher specimens regardless of geographic area. The latter may include specimens held in captivity. Specimens held in captive environments that exhibit signs or symptoms of potentially infectious diseases may be killed and disposed of or preserved to prevent spread of diseases to other animals. Upon approval and review by the Service, any individuals accidentally killed or lethally injured may also be collected as voucher specimens. The number, location, cause of death (if known), sex, and any other information relevant to specimens vouchered must be reported to the Service by February 1 of the year following their collection.
4. Designated repositories – the Service is in the process of identifying appropriate repositories in each state for any dead specimens of either species collected by permittees. Until the repositories are identified, contact the ESFO to determine the appropriate repository.

Minimum Qualifications for Surveyors

Dakota skipper may not be readily identified in the field without specialized training and experience. Therefore, agencies and others who want to determine whether or not these species are present in an area must secure the assistance of individuals who are qualified to carry out scientifically credible surveys.

The Service adapted the following qualifications from criteria developed for a variety of animal surveys by Minnesota Department of Natural Resources (MN DNR). Similar to MN DNR, the Service will use these qualifications to evaluate individuals, not firms. To meet the minimum qualifications for the target species, individuals must meet the following criteria:

1. Demonstrated ability to complete surveys for target species or similar species and prepare technical reports based on those surveys; and,
2. Previous experience surveying for and identifying target species. Exceptions may be made for persons with prior experience with similar species and/or extensive experience with other butterfly species – e.g., extensive experience conducting surveys for rare butterfly species outside the range of the two target species.

STATUS OF THE DAKOTA SKIPPER

Detailed information may be obtained on the Dakota skipper, including species descriptions, habitats, and life histories, by accessing the following proposed and final listing rules in the Federal Register: October 24, 2013, 78 FR 63574-63625; October 24, 2014, 79 FR 63672-63748. A summary of each species' life history, ecology, and current status is provided below.

Regulatory Status

The Dakota skipper was listed as threatened under the ESA on October 24, 2014 (79 Federal Register 63672-63748). The proposed rule to list the species was published October 24, 2013, and critical habitat for each of them was proposed at the same time (78 FR 63574-63625), Critical habitat for the species was designated on October 1, 2015 (FR 80:59248-59384). A special rule was also issued under the authority of section 4(d) of the ESA for the Dakota skipper with the final listing designation (79 FR 63672-63748). The special rule exempted take that occurred on non-federal lands and that was incidental to livestock grazing and associated activities and maintenance of recreational trails.

Species Description and Life History

The Dakota skipper is a small to medium-sized butterfly with a wingspan of 2.4–3.2 centimeters (cm) [0.9–1.3 inches (in)] and hooked antennae (Royer and Marrone 1992, p. 3). Like other Hesperiidae species, Dakota skippers have a faster and more powerful flight than most butterflies because of a thick, well-muscled thorax (Scott 1986, p. 415).

Eggs are laid on native grasses in early summer, hatching after about 7-20 days. For the majority of its lifespan, the Dakota skipper is in the larval stage. Dakota skipper larvae are light brown with a black collar and dark brown head (Fig. 3). The larvae form shelters of silk and vegetation near the base of native grass species, emerging at night to feed. They grow and molt several times before overwintering in ground-level or subsurface shelters. In the spring, the larvae emerge to resume feeding on native grasses, molt two more times, and then pupate. Finally, they emerge as adults and begin their short flight period (lasting only 2-3 weeks), that may occur from the middle of June through the end of July. During this time they utilize native prairie nectar sources, mate, and the females lay eggs. Adults may fly and reproduce only a few days, up to about 3 weeks, and then die, thus completing their annual life cycle.

Figure 3. Adult male – stigma on upper side of wing not visible in this photo (upper left); adult female (upper right); larva emerging from egg; and, later stage larva. All photos courtesy of Minnesota Zoo except for adult male (upper left).

The species has low mobility; it may be incapable of moving more than 1 kilometer (km) (0.6 miles). Its short adult life span and single annual flight are factors in this limitation. Concentrated activity areas shift annually in response to local nectar sources and disturbance. If the species is extirpated from a site, that extirpation may be permanent unless its location is near a site that generates a sufficient number of emigrants.

Dakota Skipper Habitat

In the United States, Dakota skipper occurs in two general habitat types. The first is a low wet-mesic prairie with little topographic relief that occurs on near-shore glacial lake deposits – Royer et al. (2008, p. 14-16) refer to this as 'Type A' Dakota skipper habitat. In the United States, 'Type A' Dakota skipper habitat occurs primarily in North Dakota, but it may also comprise a small amount of the species' habitat in northeastern South Dakota. 'Type A' habitat may be flooded in some years, but has "sufficient relief to provide segments of non-inundated habitat during the spring larval growth period within any single season" (Royer et al. 2008, p. 15; Royer et al. 2014, p. v).

Dakota skipper 'Type B' habitats typically support a high diversity and abundance of native forbs, including purple coneflower, purple prairie clover (*Dalea purpurea*), white prairie clover

(*D. candida*), yellow sundrops (*Calylophus serrulatus*), prairie groundsel (*Packera plattensis*), groundplum milkvetch (*Astragalus crassicarpus*), eastern pasqueflower (*Pulsatilla patens*), old man's whiskers (prairie smoke, *Geum triflorum*), western silver aster (*Symphyotrichum sericeum*), dotted blazing star (*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).

Dana (1991) recorded the number of nectaring observations by the Dakota skipper during his study in what would be 'Type B' habitat in southwestern Minnesota. He observed "many hundreds" of visits to purple coneflower (*Echinacea angustifolia*); about 35 and 11-25 visits to prairie milkvetch (*Astragalus laxmannii* Jacq. var. *robustior*) by males and females, respectively; occasional (1-10 visits) and frequent (11-25 visits) use of hoary vervain (*Verbena stricta*); males also frequently visited purple locoweed (*Oxytropis lambertii* Pursh var. *lambertii*).

Conservation

To recover the species, its' remaining habitats must be managed with grazing, fire, or haying to maintain the diversity of native prairie plant species on which Dakota skipper relies. Unless implemented appropriately, however, these practices may also result in levels of mortality or adverse effects to reproduction that are too high to ensure the persistence of local populations. Land management may also degrade habitat conditions to the degree that the species is extirpated from the affected area.

Within a management area, effective conservation of Dakota skipper often relies on a thorough understanding of the species' distribution and the current condition of the species' habitat. In addition, it is important to consider the effects of management on Dakota skipper larvae (caterpillars) because the species remains in the larval stage for most of its life cycle – from about late July until the following June or July. The adult flight period, although short, is a critical period because failure to reproduce in any single year may result in the extirpation of local populations. Many Dakota skipper populations are isolated due to habitat fragmentation. As a result, the species is often unable to recolonize isolated habitat patches (Fig. 4).

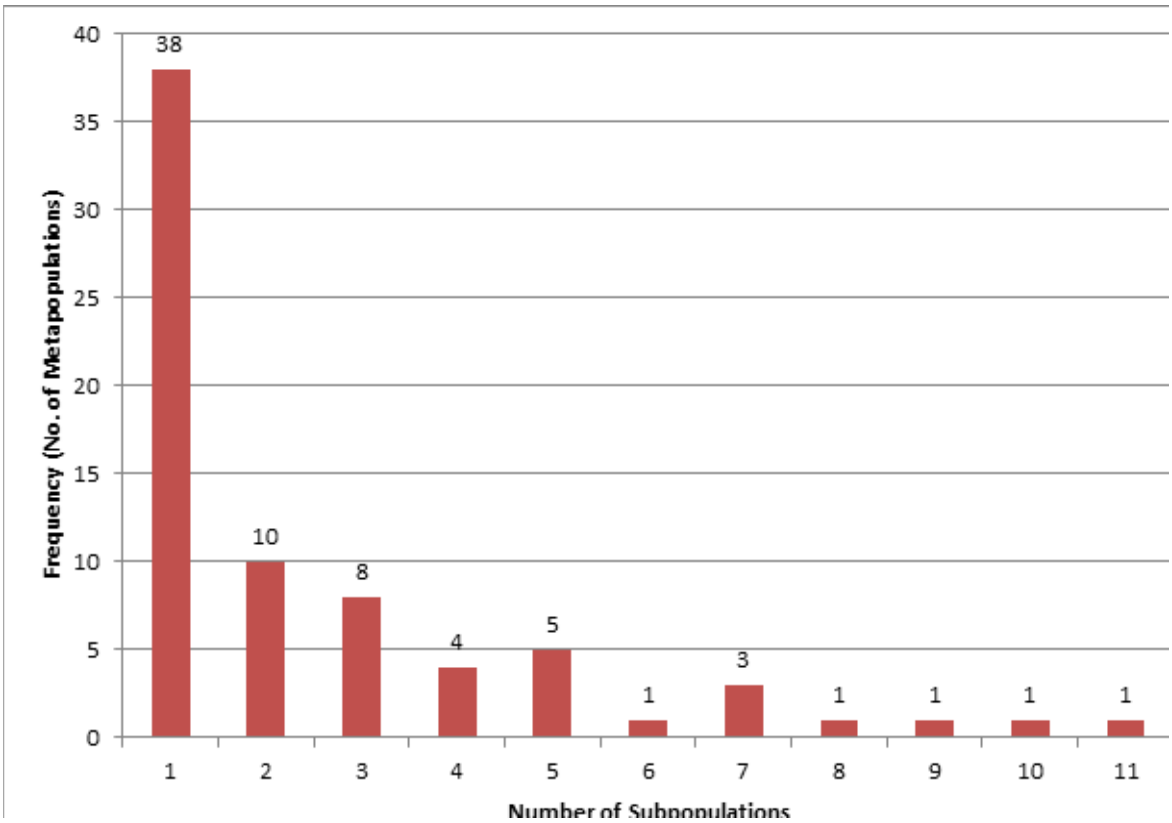

Figure 4. The number of subpopulations that comprise metapopulations of the Dakota skipper. Over half (52%) of identified metapopulations consist simply of a single isolated population.

Potential Threats and Impacts to Dakota Skipper

Loss of native prairie and the degradation of remaining patches of habitat have led to the decline of Dakota skipper and pose continuing threats to the species' continued existence. Factors responsible for habitat loss and degradation include conversion of native prairie to cropland or for development; ecological succession to habitats dominated by brush or trees; invasive species; flooding; and, grazing, fire, or haying that degrades or destroys the species habitat. In some cases, habitat management that is too intense, widespread, and persistent removes essential habitat features and may impede reproduction or cause unsustainable levels of mortality. Other factors that may have played a role in the decline of the Dakota skipper include adverse impacts of herbicides and, pesticides; and weather patterns, such as drought.

Conservation of the Dakota skipper will rely on effective partnerships between private, tribal, and public landowners who manage the species' habitat and agencies working to recover the species. In the absence of grazing, fire, or haying, Dakota skipper habitat is likely to become too brushy or wooded to support the species (e.g., Rigney 2013, p. 151). Nevertheless, management of Dakota skipper habitat must be implemented carefully to avoid excessive mortality or significant depletion of important nectar and larval food sources. Minimizing adverse effects of management by engaging landowners in conservation is especially important for populations that inhabit small and isolated habitat patches.

When Dakota skipper larvae metamorphose into adults in late June or early July, habitats must provide nectar sources that are sufficient in quality and quantity to meet the butterflies' water and nutritional requirements. Although brief, the adult flight period is crucial – failure to reproduce during this period may result in the species' local extirpation. Extirpation of Dakota skipper from a habitat patch may be permanent if it is too far from another population. Therefore, it is essential that managers consider the likely impacts on both larvae and adults within the management area when planning and implementing management actions. An initial assessment of the site and its Dakota skipper population conducted by a species expert and frequent reevaluation of the population are essential.

Status and Distribution

Today, the Dakota skipper is considered extirpated from Illinois and Iowa, but the species is considered present in Minnesota, North Dakota, South Dakota, Manitoba and Saskatchewan. Only 73 of 264 historic sites (~28%) are considered extant today.

Surviving populations of the Dakota skipper are distributed among patches of native grassland in the species' historical range as both isolated populations and as groups of populations that we presume interact by dispersal (metapopulations). To identify metapopulations of the Dakota skipper, the Service used a survey dataset that contains geographic coordinates and other attribute data associated with over 1,900 surveys conducted in the range of the species, from 1905 to 2016. The geographic coordinates associated with each survey record represent one of the following: 1) the approximate center point of the habitat patch surveyed; 2) the approximate center point of Dakota skipper observations within the surveyed patch; or, 3) precise locations of observed Dakota skippers.

To group Dakota skipper survey records into putative metapopulations, the Service used the following definition:

> Dakota skipper metapopulations are comprised of subpopulations that occupy habitat patches that are no more than five kilometers from one another, on average, with the maximum distance separating occupied patches of no more than 8 kilometers.

With respect to this definition, the Service treated each survey record (point) as a distinct subpopulation (Fig. 5) and calculated mean distances among survey records (points) to determine how to group them into metapopulations. For example, if the average distance among a set of survey points was greater than 5 km, outlying survey points were eliminated until the average distance among the remaining points was no more than 5 km. The resulting points each represented a subpopulation and, together, comprised a metapopulation.

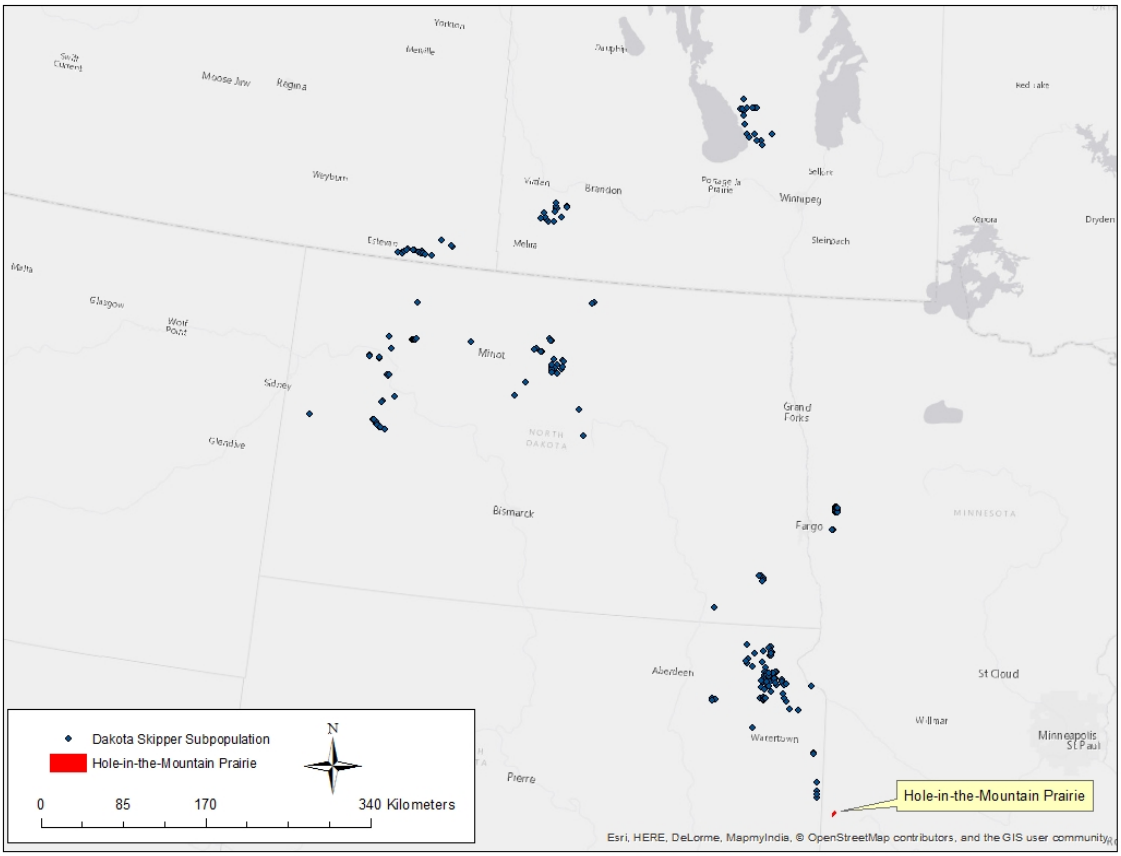

Figure 5. Extant subpopulations of the Dakota skipper in relationship to the Hole-in-the-Mountain Prairie in Minnesota, where the species' reintroduction is planned in 2017.

So far, the Service has described only metapopulations that appear to contain at least one extant subpopulation. Dakota skipper records for extirpated populations have not yet been placed into metapopulations.

This analysis indicates that there are 73 distinct metapopulations of the Dakota skipper that contain at least one extant subpopulation, but the viability of these populations is unclear. As mentioned above, these metapopulations may represent about 28% of the metapopulations that have been documented for the species. The mean number of subpopulations per metapopulation is 2.6, but more than half of the 'metapopulations' (38 populations) consist simply of a single, isolated population (Fig. 4). In addition, the species has not been recorded since before 2006 at over one-third of the metapopulations (Fig. 6).

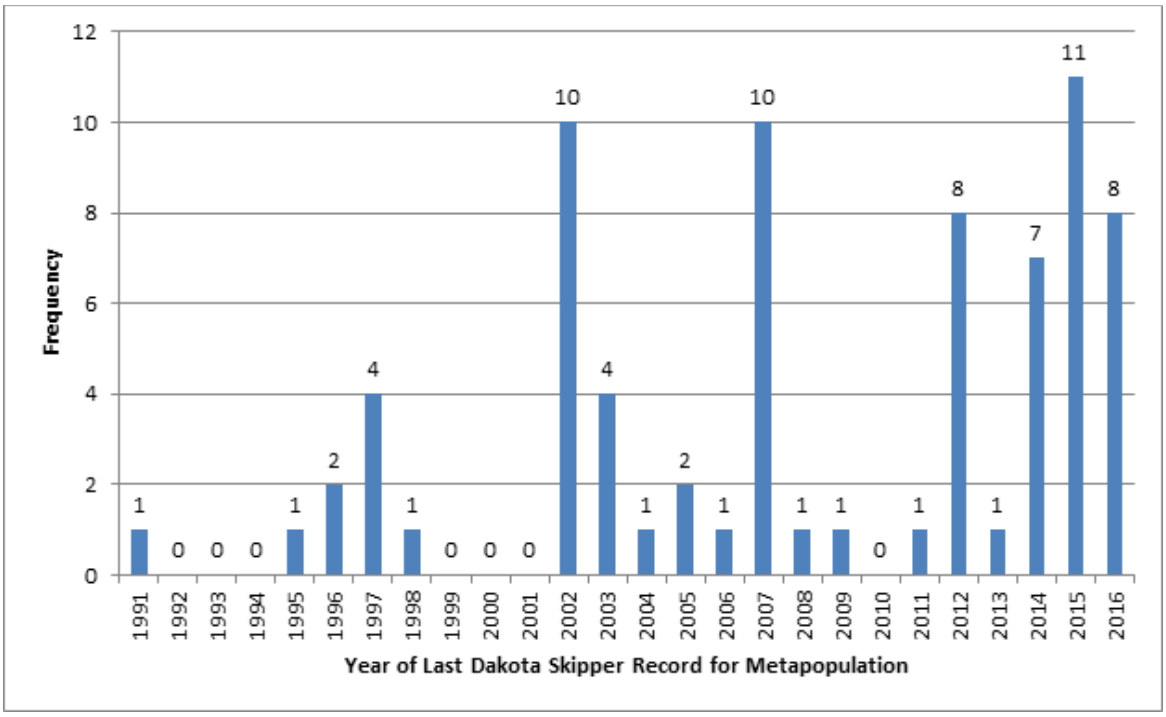

Figure 6. The last year that the Dakota skipper was recorded at the 73 presumed metapopulations. For more than one-third of metapopulations, the Dakota skipper has not been observed since before 2006.

Survival and Recovery Needs

Restoration and Maintenance of High Quality Habitats

Recovery of the Dakota skipper will be closely tied to the extent and condition of its native grassland habitat. The species is endemic to North American tallgrass and mixed grass prairie and does not inhabit non-native grasslands, weedy roadsides, tame hayland, or other habitats that are not remnant native prairie. In addition, Dakota skippers have not been recorded in reconstructed prairie – e.g., former cropland that has been replanted to native prairie. Therefore, conservation of the Dakota skipper is likely to rely on actions by conservation agencies, such as TNC, other state and federal agencies, tribal governments, non-governmental organizations, and private landowners to protect, restore, and maintain high-quality prairie remnants within the species' range (Fig. 1).

The Dakota skipper needs native prairie habitats that are diverse in flowering herbaceous plants and native grasses. Nectar is a critical source of water for adult Dakota skippers during their flight period, which ranges from late June to early or mid-July. Flowering herbaceous plants (forbs) must be present in sufficient quantity and in proximity to suitable larval habitats to provide reliable sources of nectar for adults during their summer flight period.

Larvae rely for growth and survival on mid-height native grasses, such as prairie dropseed (*Sporobolus heterolepis*), little bluestem (*Schizachyrium scoparium*), and sideoats grama (*Bouteloua curtipendula*), which typify the species' habitat along with certain forbs. Some important threats to the species may originate from areas outside of the prairie remnants that they

inhabit. Nevertheless, the protection of high-quality remnant prairies that are well distributed throughout the species' range (see Fig. 5) will be fundamental to the species' recovery.

Land management actions that affect Dakota skipper habitat will also play a critical role in the species' survival. The intensity, timing, duration, and extent of these activities will all play critical roles in determining the species' persistence within habitat patches. Haying, grazing, and fire are essential management tools to maintain native prairie and the essential features of the Dakota skipper's grassland habitats. Fragmentation of the species' habitat, however, makes it important that these practices are carried out in ways that minimize adverse impacts to early life stages and that facilitate reproduction during the summer flight period.

Research and Captive Rearing

The captive rearing program at Minnesota Zoo is now capable of producing significant numbers of the Dakota skipper *ex situ*, such that reintroduction of the species may soon be feasible (Runquist 2015). During a workshop facilitated by Conservation Breeding Specialist Group and held at Minnesota Zoo in October 2015, U.S. Fish and Wildlife Service, its partner agencies, and species experts drafted a plan to guide ex situ management of the species. Under that plan, ex situ management would be used to facilitate important research, but could also produce animals for reintroduction. Specifically, the workshop participants set a preliminary goal to restore at least one population in the wild by 2021.

ENVIRONMENTAL BASELINE OF THE ACTION AREA

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with the consultations in progress.

Conversion of prairie for agriculture was the primary factor in the decline of the Dakota skipper since Euro-American settlement. By 1994, tallgrass prairie may have declined by 99.9 percent in Illinois, Iowa, Indiana, North Dakota, Wisconsin, and Manitoba; and by 99.6 percent in Minnesota; and 85 percent in South Dakota (Samson and Knopf 1994, p. 419). Samson and Knopf (1994, p. 419) did not provide a figure for the decline of tallgrass prairie in Saskatchewan, but mention an 81.3 percent decline in mixed grasses from historical levels. By 1994, mixed-grass prairie had declined from historical levels by 99.9 percent in Manitoba and 71.9 percent in North Dakota (Samson and Knopf 1994, p. 419). Destruction of tallgrass and mixed-grass prairie began in 1830, but significant documentation of the ecosystem's butterfly fauna did not begin until about 1960. Therefore, most of the decline of the Dakota skipper went unrecorded.

In the final listing rule (79 FR 63672-63748), we identified a number of stressors to the habitat of the Dakota skipper that operated in the past, are impacting both species now, and will continue to impact the species in the future. The decline of both species is the result of the long-lasting effects of habitat loss, fragmentation, degradation, and modification from agriculture, development, invasive species, secondary succession, grazing, and haying. Although efforts have been made to effectively manage habitat in some areas, the long-term effects of large-scale

and wide-ranging habitat modification, destruction, and curtailment will last into the future. Invasion of the species' habitat by exotic species and woody vegetation, overgrazing, long-lasting or permanent alterations in water levels or hydrology, and too frequent or improperly timed haying remove or significantly reduce the availability of plants that provide nectar for adults and food for larvae. Fire and flooding cause direct mortality or destroy nectar and food plants if the intensity, extent, or timing is not conducive to the species' biology.

Of the 160 Dakota skipper sites for which we evaluated for one or more habitat stressors, at least 131 sites had at least one documented stressor with moderate to high estimated levels of impact to populations – these sites occur across the current range of the species in Minnesota, North Dakota, South Dakota, Manitoba, and Saskatchewan (USWFWS 2012; 2014 unpubl. data). Fifty-eight sites had two or more documented stressors of moderate to high levels of impact to populations and 24 sites had three or more documented stressors of moderate to high level of impact to populations. Sites with three or more stressors were found across most of the current range of the species; these sites occur in Minnesota, North Dakota, South Dakota, and Manitoba (USWFWS 2012; 2014 unpubl. data). Sites with more than one stressor acting on them concurrently may have more intense effects than any one stressor acting independently. Habitat-related stressors occur at sites with Dakota skipper populations within every state and province of occurrence.

Status of the Species in the Action Area

Of the three sites located in Minnesota, two have confirmed presence of Dakota skippers (Blazing Star and Bluestem) whereas the current status of the species is unknown at Brown Ranch and Ordway Prairie. The fifth site, Hole-in-the-Mountain, has not had a recent detection for Dakota skipper but historically was a stronghold for this species and the species' reintroduction is planned for 2017.

The two preserves in the Dakotas have not had recent detections of skippers (Ordway and Brown Ranch) and it is unclear whether populations persist at these sites. TNC has included them in this project to be conservative and to use the information gained through this project to refine our knowledge about if and where Dakota skippers persist on these sites.

Blazing Star Prairie, Minnesota

This preserve is part of the Felton grassland complex, which may support the last stronghold for the Dakota skipper in Minnesota. The presence of the Dakota skipper is well-documented for this site. In 2014, Robert Dana counted seven Dakota skipper adults along his survey transect at Blazing Star. In 2015, he recorded two on one date and none during two additional surveys. In 2016 he recorded only one on one of the three surveys that he conducted during the flight period. The numbers counted in the related Bicentennial Prairie and Clay County Populations showed "successive declines from 2014 to 2016." All of the Dakota observations in Blazing Star have been along the fairly short stretch of well-developed beach ridge in this unit that supports dry-mesic prairie (R. Dana, Minnesota Biological Survey, pers. comm. 2017).

Bluestem Scientific and Natural Area, Minnesota

An adult Dakota skipper was detected on the Bluestem preserve in 2015 for the first time in many years, indicating that a population still persists at this site. After consulting mapped

documented and probable occurrences, TNC narrowed the proposed Bluestem recovery permit research project area to Section 15 only (T139 R46W S15).

Hole-in-the-Mountain Prairie, Minnesota

The Hole in the Mountain Prairie is located in Lincoln County, Minnesota. Despite surveys for the past five years at this site, Dakota skippers have not been detected here since 2010. Historically, this site supported a relatively large and healthy population of skippers, and high quality habitat for the skippers still exists at this site. TNC proposes to proceed with land management, including prescribed fire, in a manner consistent with the needs of Dakota skippers following the same best practices as at the other sites. A reintroduction of the species is planned for 2017.

Brown Ranch, North Dakota

Dakota skippers were last detected on the site in 2003, but the most recent survey was in 2012 with no detections recorded. The status of Dakota skippers at this site is unknown because survey effort has been limited, but high quality habitat remains on the site.

Not all of Brown Ranch includes high quality habitat suitable for Dakota skippers. During the summer of 2015 TNC contracted with Diane Narem, a graduate student at South Dakota State University working on her M.S. characterizing Dakota skipper habitat, to map and rank the habitat across Brown Ranch according to suitability for Dakota skippers. Diane used a protocol that she developed for her M.S. and was revised by herself, Marissa Ahlering (TNC Prairie Ecologist), Phil Delphey (USFWS) and Robert Dana (Ecologist with MN Department of National Resources). Based on Diane's mapping results TNC included all areas ranked as an A or B potential Dakota skipper habitat; to be conservative TNC also included the top half of the C-ranked areas, which included some relatively invaded habitat that still had low levels of larval and adult host plants for the skippers. This determination resulted in the inclusion of 740 acres of the ranch as possible Dakota skipper habitat.

Ordway Prairie, South Dakota

Ordway Prairie is in McPherson County, South Dakota. The preserve in total covers about 7,800 acres and is located along the Missouri Coteau physiographic region. The site includes a matrix of mixed-grass prairie along with a complex of wetland classes from temporary to semi-permanent. The last confirmed detection of Dakota skippers on this site was in 2003, and recent surveys in 2014 and again in 2015 have not detected any occurrences. Therefore, the status of Dakota skippers on the site remains unknown, but areas of high quality habitat still exist.

The situation on Ordway Prairie is similar to Brown Ranch. The entire site does not include high quality habitat suitable for Dakota skippers. TNC contracted with Diane Narem to conduct the same habitat mapping and condition ranking surveys across Ordway as she did on Brown Ranch (see above). Once again TNC included all A and B ranked areas as potential Dakota skipper habitat and included the upper half of the C-ranked areas that included a lot more exotic cover, but low levels of larval and host plant species for the skippers. This determination results in the inclusion of 4,790 acres of the site as potential Dakota skipper habitat for this project.

EFFECTS OF THE PROPOSED ACTION

The implementing regulations for section 7 (50 CFR 402.02) define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, which will be added to the environmental baseline."

Direct and Indirect Effects of the Proposed Action

"Indirect effects" are caused by the proposed action, and are later in time, but still are reasonably certain to occur (50 CFR 402.02). Indirect effects may occur outside of the immediate footprint of the project area, but would occur within the action area as defined. Direct effects are defined as "…the direct or immediate effects of the project on the species or its habitats" (50 CFR 402.02).

The proposed actions are expected to contribute to the recovery of the species, but some adverse effects are likely to result. Negative effects of the activities proposed by TNC will be minimized through implementation of measures described above, which includes careful planning and coordination with the Service and with agencies that share management of the affected metapopulations. The Dakota skipper metapopulation that includes Blazing Star Prairie, for example, also inhabits land owned and managed by MN DNR; Clay County, MN; and, a private landowner. In some situations adverse effects result from actions that are necessary for the long term survival of these species – management of the species' native prairie habitats relies on periodic disturbance that often includes an unavoidable amount of mortality. Nevertheless, given the nature of the proposed action; its inclusion of appropriate conservation measures; and the general and species-specific issuance criteria for permitting these types of actions, we expect that the action will provide for long-term beneficial effects to the Dakota skipper. Effects associated with the specific activities that are likely to occur under these programs are detailed below.

The proposed actions are likely to result in both purposeful and incidental take of the Dakota skipper, but we expect them to have a net benefit to the recovery of each species. Surveys may include purposeful take in the form of capture and incidental take in the form of infrequent injury to captured individuals, but are integral to planning and implementing conservation actions and to minimizing adverse effects of development, land management, and other projects. Likewise capture of adults is essential to efforts to conserve the species through captive rearing.

Effects of Research & Monitoring Actions

Actions designed to conduct scientific research to gather critical information are necessary to develop recovery goals and criteria and to evaluate when those criteria are met. These actions include, but are not limited to, the following: surveys conducted in areas where the species has been recorded previously or in areas where its presence is suspected; and, research designed to develop inferences with regard to habitat requirements, and effects of land management or other potential stressors. Surveys and monitoring may be implemented to simply determine whether the Dakota skipper is present in an area or may be carried out to estimate and track trends in the species' relative abundance or density in specific areas. The effects of most of these actions would be limited to short-term disturbance of individuals. However, as stated above, the handling of individuals always poses some risk of injury or death and there may be more subtle effects of capture and handling of individuals, as described below (see **Survey and Monitoring**,

below). Precautions will be required to avoid adverse effects, but some individuals may be harmed or killed. These actions are designed to provide critical information necessary to implement the recovery of species. Therefore, the benefits to the population should outweigh the adverse effects to individuals as described in more detail below.

Some surveys will include pursuit and capture of Dakota skippers with the use of butterfly nets. During surveys, biologists may only net butterflies to confirm specific identification in cases when the presence of the species at a site is especially significant or if it may not be identified otherwise (e.g., when individuals are extremely worn and distinguishing marks are reduce or no longer present). Close-up examination – with or without binoculars – visual confirmation of specific behavioral and diagnostic markings, and photography are typically sufficient to identify both species (Royer and Royer 2012; R. Royer, pers. comm. 2015; E. Runquist, Minnesota Zoo, pers. comm. 2015). The need to net to confirm identification increases when similar species are present. Other skippers, such as long dash (*Polites mystic*), however are similar in appearance to Dakota skipper. At sites where they are present netting to confirm identification of Dakota skipper may occur more frequently. Even in those situations, however, only a maximum of about 10% of Dakota skippers that are observed are typically netted (R. Dana, Minnesota Department of Natural Resources, pers. comm. 2015).

Although not common, netting may result in injury. Dakota skippers are more aggressive fliers, and up to 25% of netted Dakota skippers may experience the loss of one or more labial palps (R. Dana, pers. comm. 2015). Loss of a labial palp, which is a sensory organ, does not appear to cause the skippers any obvious problems and some individuals damaged in this manner have been recaptured in apparently good condition up to several days later (R. Dana, pers. comm. 2015). Loss of a leg also occurs on occasion with Dakota skippers as a result of tangling the leg in the net mesh. Dakota skippers are strong enough to break off the entangled leg while attempting to fly away (R. Dana, pers. comm. 2015). The proportion of Dakota skippers that lose legs during netting is unknown.

Anticipated effects of accidental leg removal on Dakota skippers are uncertain. Leg removal from cabbage whites (*Pieris rapae*) did not significantly affect male or female mating success, egg production, or the location of egg-laying on leaves (Crawford et al. 2013). The authors cautioned that their study "was sufficiently powerful to detect large and moderate effects of the treatments", but had limited ability to detect small effects. They also pointed out that effects of leg removal could have greater effects on species that have only four functional legs and "in species where females have a strong tendency to oviposit on only one particular side of the leaf." Neither of these are true for the Dakota skipper although it could affect their ability to grasp and hold onto vegetation under windy conditions. Dakota skippers may otherwise seek shelter during periods of high wind by, for example, moving into the plant litter or deeply into plant structures (P. Delphey, U.S. Fish and Wildlife Service, pers. obs.) may exhibit similar behavior.

The Conservation Measured listed above (see **DESCRIPTION OF THE PROPOSED ACTION**, above) that will be included in permits issued to qualified surveyors will reduce the likelihood of these kinds of injuries or death. Any survey that TNC carries out that that may include capture of Dakota skippers will be done by persons who have been issued a separate section 10(a)(1)(A) permit from the Service who have significant expertise in butterfly

identification and most permittees are likely to have substantial experience with the Dakota skipper. This will minimize the number of individuals that will be captured because the expertise of surveyors will allow them to frequently identify the species without handling. Moreover, when handling does occur persons with significant expertise may be more likely to have mastered techniques of capture and release that minimize the likelihood of injury.

Netting may result in changes in the behavior of butterflies after release, but it is unclear whether this would be significant for either species considered here. *Heliconius* butterflies, for example, avoided the specific sites where they were handled, but handling did not cause a complete change of home range or reduced survival of individuals (Mallet et al. 1987). In that study, butterflies were also marked. Mark-recapture techniques to estimate population size and to test hypotheses are useful, but must be used only very cautiously with endangered and threatened butterflies (Murphy 1988) and will not be allowed under the permit considered here. In another study with a conservation priority species in England, most netted individuals did not exhibit any rapid flight ''escape'' reaction on release, suggesting that marking did not substantially interfere with their subsequent behaviour" (Clarke et al. 2011). The following conservation measures are likely to minimize the occurrence of any adverse behavioral responses to netting:

- Only qualified individuals shall be authorized to conduct activities pursuant to any permit.
- Any Dakota skipper captured shall be released as near to the capture site as is practicable.
- Unless otherwise stated in the permit conditions (e.g., for captive rearing), captured individuals must be released as soon as is practicable to avoid injury and may be held for a maximum of five minutes to facilitate specific identification.
- No mutilation (e.g., leg removal) or marking schemes are authorized.

In summary for Dakota skipper, we expect that no more than 10% of Dakota skippers observed during surveys would be netted and that, on average 25% of those netted would suffer sub-lethal injuries. Among the sites that are the subject to this consultation, the Dakota skipper is only likely to be captured at Blazing Star Prairie, Bluestem SNA, Brown Ranch, and Ordway Prairie; and, if the reintroduction is successful, at Hole-in-the-Mountain Prairie. Of these only substantial numbers of Dakota skippers are likely to be observed at Blazing Star Prairie – about 25 each year. At each of the other sites, we would anticipate no more than ten to be observed. If no more than 10% of the Dakota skippers observed are netted and 25% of the netted butterflies are injured, then we would expect that each year surveys would result in injuries to about one Dakota skipper at Blazing Star Prairie and an addition one at the other four sites combined. These injuries are expected to not be lethal and to consist primarily of loss of a labial palp and, in a few cases, the loss of a leg. As stated above, adverse effects as a result of the loss of a labial palp or of a leg in a net are typically not apparent to surveyors. Although we require the reporting of any observed injuries by permittees, we will not require permittees to inspect netted butterflies for injury. This would increase handling time and may further increase the risk for injury. Instead, quick and careful release is most prudent.

This is likely a conservative estimate of anticipated injury rates based on 2015 results. In 2015, only 14 Dakota skippers were netted during surveys – far lower than the 150 per year that we

anticipate based on our assumptions described above. We had anticipated that 10% of Dakota skippers observed would be netted whereas in 2015 it was about 5% and no injuries were reported. In addition, none of the 26 Dakota skippers that were captured for captive rearing in 2015 were injured before release. Therefore, there were zero injuries in 2015 among the 42 Dakota skipper that were captured (Table 1).

Table 1. Summary of 2015 survey results for the Dakota skipper.

No. Locations Surveyed	No. Locations Dakota Skipper Detected	Total Number Dakota Skipper Detections	Total Number Netted for Surveys	Number Injuries	Survey Dates	Dates Dakota Skippers Detected	Source
57	4	32	0	0	28 June – 15 July	30 June-9 July	R. Dana, pers. comm. 2016; Dana (2016)
29	8	93	0	0	24 June – 10 July	26 June-9 July	Skadsen and Backlund (2015)
13	8	29	13	0	2-16 July	3-8 July	Selby (2016)
12	0	0	0	0	1-18 July	n/a	Selby (2015)
8	0	0	0	0	12-17 July	n/a	Dankert & Reiser (2015)
5	1	1	1	0	30 June – 2 July	1 July	Stegeman (2016)
8	5	139	0	0	30June-12 July	30 June-11 July	Runquist (2015)
129	**23**	**294**	**14**	**0**			

Data from 2015 is not conclusive, but does not suggest any significant effects to behavior of Dakota skippers related to netting and release (Table 2). We will continue to compile data on the initial post-release behavior of any Dakota skippers netted and released.

Table 2. Post release behavior of Dakota skippers captured and released in 2015. Surveyors were asked to report post-release behavior as follows: 1) Flew to and perched on herbaceous vegetation, low shrubs, or to out-of-sight location in herbaceous vegetation (e.g., into plant litter or duff layer or into bases of grasses); 2) Flew into tall shrubs or trees and out-of-sight; 3) Flew away – did not see butterfly perch or fly into vegetation; or, 4) Post-release behavior unknown.

Source	Number Netted & Released	Post-Release Behavior					Comments
		Flew to Perch	Flew Into Tall Shrubs or Trees	Flew Away	Did Not Disperse	Unknown	
Stegeman (2016)	1	1	0	0	0	0	
Selby (2016)	13	2	0	11	0	0	Two that flew away first perched on the net and/or a finger.
E. Runquist, pers. comm. 2016	20	7	0	0	13	0	All individuals were released gently from tubes directly onto *Echinacea* in the cool morning hours. Thirteen stayed directly on the *Echinacea* flower to nectar and did not fly away. This non-dispersal behavior is not a category in this table. The remaining 7 flew a short distance (≈10 m) into grass or to another *Echinacea.*
C. Nordmeyer, Minnesota Zoo, pers. comm. 2016	7	0	0	0	3	2	All individuals were released gently from their tubes directly onto *Echinacea*. Three stayed on the *Echinacea* flowers; two flew away to an unknown location; one died before release that was "quite old" when captured, with faded ragged wings and a skinny abdomen. She did not lay any eggs in captivity and likely died of old age, not due to any causes directly related to handling.

Collection of voucher specimens from the wild is likely to have only minimal effects to the species because it will be limited to counties with no prior records for the species. Surveys for the Dakota skipper in counties with no prior records are likely to be minimal. The Service's section 7 guidance, for example, does not recommend surveys for the species except where its habitat is present in counties where it has been recorded previously and where it likely still occurs. Additionally, since habitat for these species is likely contracting, not expanding, documentation of either species outside their currently known ranges may become less likely over time. We anticipate that no more than one voucher will be collected in any single year to document a new county record for either species.

Effects of Prescribed Fire & Grazing

Prescribed Fire

Multiple factors require managers to carefully plan and implement habitat management activities to conserve remaining Dakota skipper populations. The litter-dwelling habits of Dakota skipper larvae; the single annual flight period; and, habitat fragmentation all reduce the species' resiliency to the effects of intense management practices. During the vast majority of their annual life cycle Dakota skippers are larvae that occur at the bases of their larval food plants (Fig. 7). Fire is likely to kill some portion of larvae in the burned area and under certain conditions mortality may be high (Dana 1991). Fuel loads, soil temperatures, weather and other factors all likely play a role in the proportion of the larvae that are killed by fire (Dana 1991). Post-fire recovery in the burned area may take years, depending on the proportion of the local population that was killed and the effect of immigration from nearby unburned areas. Immigration may only be effective if a stable or growing population of Dakota skipper is left unburned near the burned area – perhaps less than a kilometer away.

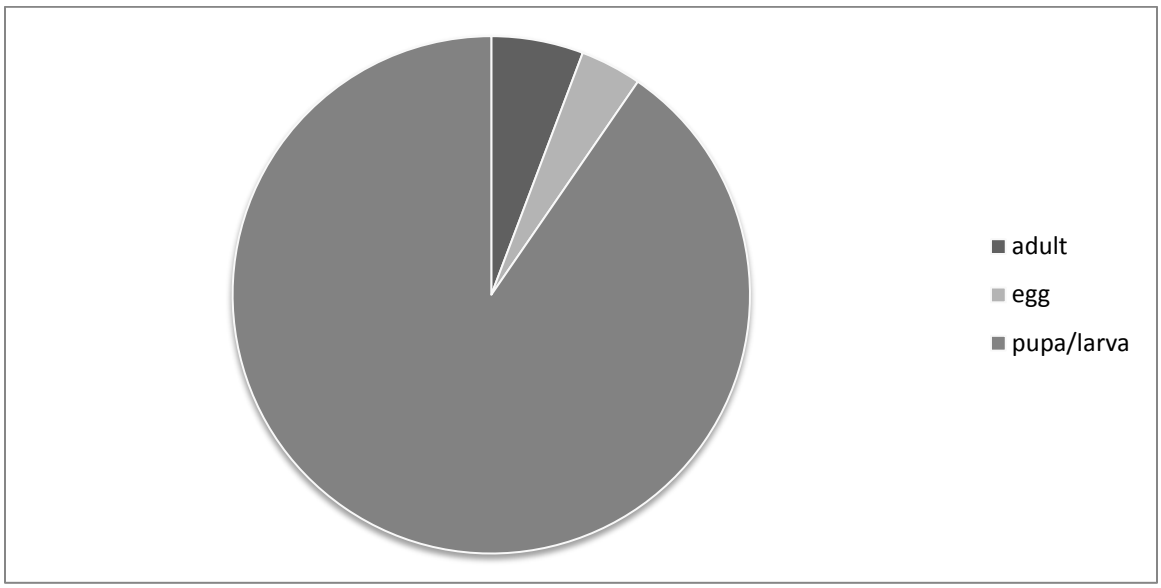

Figure 7. The vast majority of Dakota skipper's life is spent as a larva.

Below we list the Service's conservation guidelines (USFWS 2016) that are relevant to the actions proposed by TNC and that may result in effects to the Dakota skipper. Under each of the relevant conservation guideline, we describe briefly – in italics – how the actions proposed by TNC conform.

1. Divide Dakota skipper habitat at the site into as many burn units as is feasible – at least three – and burn no more than one unit in any single year. Units should contain approximately equal amounts of Dakota skipper habitat to ensure that the population is not disproportionately affected by any single burn. If it is not practicable to divide Dakota skipper habitat into at least three burn units within a management area, then we recommend managing the site with haying or carefully implemented grazing, if feasible. In cases where there are nearby local populations of Dakota skipper that will provide immigrants from outside of the management area it may also be feasible to conserve a Dakota skipper population with less than three burn units, but that would require close coordination with neighboring landowners to ensure that dispersal of adults is likely to be sufficient to reinforce numbers in the burned area (see **Coordinated Management**, below).

2. Use the maximum length fire return interval that is adequate to maintain or restore high-quality native prairie habitat on each unit. Allow *at least* 3 years to elapse without fire (i.e., minimum 4-year rotations) before re-burning any area.

   With respect to both of the above guidelines, TNC plans to divide the identified breeding habitat at each site (or sub-site as applicable) into 3-6 burn units, of which only one will be burned in any given year. The lower end of the range (3 burn units) will require waiting a full year between burns, whereas the upper end of the range (6 or more) would allow for annual burns within any given site.

3. If feasible to achieve management objectives, allow fires to burn in a patchy ("fingering") pattern within units. Do not make a concerted effort to burn 'every square inch'; leave fire "skips" unburned. Burning under cool or damp conditions may increase survival of insects present in the litter layer within the burned unit (Panzer 2003).

   "TNC proposes to minimize the possibility of fire-related injury or death to individuals within a given burn unit to the extent possible. For example, prescriptions may be designed specifically to encourage patchiness of the burn" (TNC 2016).

4. Map the extent of each fire in Dakota skipper habitat to ensure that future fire planning is based on an accurate understanding of prior fire history.

   "TNC proposes to coordinate with the US Fish and Wildlife Service as they make plans for annual prescribed fire on the six sites identified in this proposal, offering an opportunity for review of these plans. For context, annual burn plans may be submitted with relevant spatial information about management history, in particular prescribed fire, conducted in the year preceding the study period and cumulative histories over the course of the project." (TNC 2016)

5. Consider the use of proactive techniques to increase the patchiness of fires, especially if habitats that would serve as sources of recolonizing adults are small or not contiguous with the burn unit.

   See comment on #3 above and the following – "Burn bosses may also choose to reduce fuel loads before the burn." (TNC 2016)

6. Conduct pre-burn surveys and evaluate other applicable information to understand the distribution and relative abundance of Dakota skippers within and among burn units. Poor weather or other conditions (e.g., persistent high winds; limited availability of qualified surveyors) may reduce the likelihood of adequate survey conditions during the flight period in any given year. Therefore, it may be prudent to plan surveys for at least two consecutive years before a planned burn.

   "Using the best information available for each site, including historical occurrence records, recent surveys, Dakota skipper habitat suitability assessments, and expert knowledge, TNC has identified in its application areas where the larvae are most likely to be present (see maps 1-6)." (TNC 2016)

7. If feasible to achieve management objectives, conduct spring burns as early as is feasible – this may limit larval mortality because larvae may still be in shelters at or below the ground surface. Late spring burns may also delay flowering of early and midsummer blooming forbs, which may limit nectar sources for Dakota skippers during their flight period (Dana 1991:56).

   "From the perspective of emerging Dakota skipper larvae, early spring and fall are the most desirable timing for burns, to avoid the timeframe when larvae are above the litter layer ((Dana 1991); USFWS Conservation Guidelines 2015). Seasonality of the burn will be factored into burn plans accordingly, weighing desired outcomes for Dakota skipper habitat and reducing the risk of injury or death to individuals." (TNC 2016)

8. Fall burns may result in higher soil temperatures than early spring burns and greater mortality of larvae, even after they have retreated for the season to shelters at or below the ground surface. In addition, the removal of plant material by fall burns may expose larvae to greater temperature extremes during winter.

   See comments under #7, above, and the following: "…a fall burn may be required to increase the availability of nectar plants, or a late spring burn may be needed if cool-season, non-native grasses are degrading Dakota skipper habitat" (TNC 2016). As stated in the conservation guidelines, there are inherent risks to Dakota skippers that may be specific to fall burns. We expect that the relative risks and benefits of fall burns will be discussed between TNC and the Service before any fall burns are carried out. We base this expectation on the following statement in the permit application – "TNC proposes to coordinate with the US Fish and Wildlife Service as they make plans for annual prescribed fire on the six sites identified in this proposal, offering an opportunity for review of these plans. For context, annual burn plans may be submitted with relevant spatial information about management history, in particular prescribed fire, conducted in

the year preceding the study period and cumulative histories over the course of the project." (TNC 2016)

9. High fuel levels increase the likelihood that fires will kill Dakota skippers, even during early spring burns when larvae are still in their subsurface shelters. Therefore, consider reducing fuel levels (e.g., by haying the previous fall) before conducting burns where fuel levels seem to be high – if that would not interfere with the burn objectives.

   Burn bosses may also choose to reduce fuel loads before the burn. (TNC 2016)

10. If fires may need to be conducted in late spring to address a particular management need (e.g., control of smooth brome, *Bromus inermis*), other precautionary measures will be especially important. These include the division of occupied Dakota skipper habitat into as many burn units as is practicable; ensuring that fires do not escape from burn units; maximizing the number of years between fires; and, reducing fuel loads (e.g., by haying or grazing) in Dakota skipper habitat in units where frequent or intense fire is not necessary.

    Late spring burns may be needed if cool-season, non-native grasses are degrading Dakota skipper habitat, a common cause for degradation of Dakota skipper habitat. If left unchecked, non-native cool season grasses could reduce the quality and quantity of Dakota skipper habitat. This may only be addressed by ensuring that burns are well targeted to resolve this stressor and that the effects to the Dakota skipper population are minimized by acquiring robust information regarding the likely locations of Dakota skipper larvae and by ensuring that only a portion of the population's larvae are affected in any single burn. The methods described above (see nos. 1-2, and 6) are sufficient to minimize the adverse effects that may result from late spring burns.

11. If you plan to change the configuration of burn units or make other changes to your prescribed fire plan, review the location and timing of recent burns to understand the potential effects of these previous fires on the current abundance and distribution of Dakota skippers on the management area.

    See no. 4, above.

12. Plan for escape of fires out of burn units if that is a reasonable possibility. That is, plan for the contingency that a prescribed fire will escape a burn unit and burn one or more additional units that contain Dakota skipper habitat. If this is reasonably likely, determine how the Dakota skipper population would persist despite such a scenario.

    This is one factor that may not have been addressed completely in the TNC permit application. It is difficult to predict now the specific circumstances when this may be a significant issue, but it may be prudent to incorporate this consideration into plans.

Effects of Interrelated or Interdependent Actions

The implementing regulations for section 7 define interrelated actions as those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. No interrelated or interdependent actions have been identified in this consultation.

It may be argued that all of the effects discussed above are interrelated and interdependent to the proposed federal action, which is to issue an Endangered Species Act 10(a)(1)(A) permit to TNC to carry out the actions proposed in its permit application. Nevertheless, no additional effects are anticipated except those that are addressed in the previous section, **Direct and Indirect Effects of the Proposed Action.**

CUMULATIVE EFFECTS

The implementing regulations for section 7 define cumulative effects to include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Cumulative effects are likely to include primarily the following:

- effects of habitat management intended to maintain or improve tallgrass prairie;
- typical preserve science and stewardship activities, such as scientific studies, boundary maintenance, etc.

Livestock Grazing

TNC implements livestock grazing at two of the study sites – Hole-in-the-Mountain and Brown Ranch. Grazing can be an effective tool to manage Dakota skipper habitat. It may maintain or help to restore Dakota skipper habitat with less mortality than may be caused by fire and may be used in combination with fire management – for example, to reduce fuel loads before a prescribed burn.

It is difficult to describe generally the effects of grazing on Dakota skipper populations. Therefore, planning and implementation of grazing at sites inhabited by the species should include the combined skills and knowledge of persons with Dakota skipper expertise and persons with grazing expertise. Also critical is the input of the land manager who is familiar with the site's grazing history and characteristics.

Beyond a certain level, grazing is likely to adversely affect Dakota skipper populations in proportion to its intensity due to a reduction in nectar resources and other factors. For example, overgrazing may result in an increased coverage of invasive species and a reduced density of nectar plants and larval food plants (Smart et al. 2011; Rigney 2013, p. 143 and 153).

The habitat monitoring methods proposed by TNC in its permit application offer an excellent opportunity to assess the effects of grazing on Dakota skipper habitat and to adjust grazing to decreases in habitat quality. There is also the potential to assess effects to the affected populations of Dakota skipper, but it is unclear whether the sparse populations that we anticipate

at these sites would allow for statistical test that would be sufficiently robust to draw strong conclusions. Brown Ranch is divided into two sub-sites. At the sub-site with the highest quality habitat – in section 28 – the Dakota skipper was last detected in 1995. At the other subsite, the species was detected in 2003, but not during a survey in 2012. At Hole-in-the-Mountain, the species is evidently extirpated based on extensive surveys conducted through 2016, although its reintroduction is planned for 2017.

It may be imprudent to describe generally the effects of grazing on Dakota skipper populations. Service guidelines for grazing Dakota skipper habitats are admittedly vague and defer to site-specific information and planning. Planning and implementation of grazing at sites inhabited by the species should include the combined skills and knowledge of persons with Dakota skipper expertise and persons with grazing expertise. Also critical is the input of the land manager who is familiar with the site's grazing history and characteristics. TNC's proposal affords an opportunity for such an inter-disciplinary approach.

The special rule for the Dakota skipper exempts incidental take of the species that may be caused by grazing on non-federal lands. (For a set of frequently asked questions regarding the special rule, see http://www.fws.gov/midwest/endangered/insects/dask/DASKfinal4dRuleFAQs22Oct2014.html). This provides an opportunity to experiment with grazing techniques that may result in some take of Dakota skippers, but that have the potential for long-term benefits to the species. Experimentation may be most appropriate and useful where habitats have been degraded due to prior management or other factors and are near existing populations of the Dakota skipper. At these sites, immigration and reestablishment or increase of the species at the site could provide evidence that grazing management has succeeded.

We do not anticipate that these cumulative effects will add significantly to the effects already discussed above. Incidental trampling or disturbance of the Dakota skipper may occur, but is unlikely.

CONCLUSION

The regulatory definition of the ESA's phrase "…jeopardize the continued existence of…" is "…to engage in an action that reasonably would be expected directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

The Service has reviewed the current status of the Dakota skipper, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects. After that review, it is the Service's Biological Opinion that the proposed action to issue a section 10(a)(1)(A) permit to The Nature Conservancy is not likely to jeopardize the Dakota skipper. This conclusion is based on the following.

1. The proposed action would affect only three of the 73 identified metapopulations of the Dakota skipper and the effects are likely to be beneficial in the long-term with only short-term adverse effects that are likely to be minimized effectively.

2. Most of the few Dakota skippers likely to be captured during surveys will be only temporarily harassed. About one Dakota skipper may be injured at Blazing Star and one additional may be injured among the four other sites that are subject of the TNC study. The extent of capture and likely injury related to survey activities is unlikely to have significant effects on the number or reproduction of either species at any individual site. Injuries are unlikely to be lethal and may not have significant effects on the fitness of the affected individual. Even if effects are lethal, the loss of a single individual per site per year is unlikely to have a detectable effect on the viability of any population. In addition, preliminary data from 2015 suggest that our anticipated annual levels of netting and injuries to Dakota skipper are likely overestimates – especially with regard to injuries.
3. The action is unlikely to cause significant impacts on the reproduction or numbers of the species at any individual site and we do not anticipate adverse effects on the species' distribution. In fact, we expect that the study proposed in the TNC permit application is likely to improve the status of the Dakota skipper at each of the study sites where it occurs and that it will yield information that may be applied to the species' conservation at other sites. Therefore, this action is not likely to result in the appreciable reduction in the probability of survival and recovery of the Dakota skipper.

The action may affect, but is not likely to adversely affect Dakota skipper critical habitat (see **Appendix**).

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering." Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply.

Amount or Extent of Take Anticipated

Incidental take in the form of harm (non-lethal) is expected to occur to the Dakota skipper through netting and associated handling. As stated above, we expect non-lethal injuries to occur

to no more than one Dakota skipper each year at Blazing Star Prairie and one additional Dakota skipper at the remaining four sites where it may be present.

We anticipate that incidental take will occur as a result of some prescribed fires each year. The amount and extent of take cannot be described precisely until specific burn plans are complete. With regard to fire, this consultation essentially establishes a framework for future, site specific actions that are subject to section 7 consultations and incidental take statements, but they do not authorize, fund, or carry out those future site-specific actions; and (2) they do not include sufficient site-specific information to determine precisely where, when, and how listed species are likely to be affected by the program (U.S. Fish and Wildlife Service. 2015. Interagency Cooperation—Endangered Species Act of 1973, as Amended; Incidental Take Statements. Federal Register 80:26832- 26845).

TNC proposes in its permit application to coordinate annually with the Service as it makes plans for annual prescribed fire on the sites identified in the permit application. At this time, the Service may amend this biological opinion to document the anticipated amount and extent of incidental take that is likely to occur as a result of planned management activities.

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to jeopardize the continued existence of the Dakota skipper.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize impacts of incidental take of the Dakota skipper.

1. Ensure that the coordination proposed in the permit application is carried out to minimize incidental take of the Dakota skipper that is likely to occur as a result of prescribed fire.
2. Ensure that the most robust and up-to-date recommendations for land management and monitoring are carried out with respect to the conservation of the Dakota skipper.

Terms and Conditions

1. Ensure that the coordination proposed in the permit application is carried out to minimize incidental take of the Dakota skipper that is likely to occur as a result of prescribed fire.

   1.1. In its permit application, TNC proposed to coordinate with the Service as it makes plans for annual prescribed fire on the five sites identified in the attached biological opinion. This coordination shall be carried out directly with the Service's Twin Cities Ecological Services Field Office (TCFO). As part of this coordination, TNC shall:

   1.1.1. Describe where prescribed burns are proposed and the location, extent, and quality of any Dakota skipper habitat to be affected.

   1.1.2. Ensure that TCFO is provided with the results of any Dakota skipper survey data that is relevant to the area where fire is proposed.

   1.1.3. Describe how it proposes to coordinate with adjacent management entities with respect to the planned management activities.

2. Ensure that the most robust and up-to-date recommendations for land management and monitoring are carried out with respect to the conservation of the Dakota skipper.

   2.1. TNC proposed in its permit application to carry out several activities in accordance with U.S. Fish and Wildlife Service's Dakota Skipper Conservation Guidelines. The Service has developed and updated these guidelines for several years and posts the most recent version on the Internet. The Service shall ensure that TNC coordinates at least annually with TCFO to acquire the current recommendations and needs for land management and monitoring.

Reporting and Monitoring Requirements

The implementing regulations for incidental take require that Federal agencies must report the progress of the action and its impact on the species (50 CFR 402.14(i)).

1. Provide to the TCFO annually a report that describes:
   a. The nature, location, and extent of all prescribed fire activities in the preserves where the Dakota skipper may be present.
   b. The results of any surveys conducted for the Dakota skipper.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop new information on listed species.

The Service has identified no additional conservation recommendations to apply to the proposed actions at this time.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Service's proposal to issue a section 10(a)(1)(A) permit for the Dakota skipper in Regions 3 and 6. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

LITERATURE CITED

Clarke, S. A., D. G. Green, J. Joy, K. Wollen, and I. Butler. 2011. Leptidea sinapis (Wood White butterfly) egg-laying habitat and adult dispersal studies in Herefordshire. Journal of Insect Conservation 15:23-35.

Crawford, L. A., D. Koscinski, K. M. Watt, J. N. McNeil, and N. Keyghobadi. 2013. Mating success and oviposition of a butterfly are not affected by non-lethal tissue sampling. Journal of Insect Conservation 17:859-864.

Dana, R. 1997. Characterization of three Dakota skipper sites in Minnesota. Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program, St. Paul, MN. 17 p.

Dana, R. 2016. Imperiled Prairie Butterfly Conservation, Research, and Breeding Program: Butterfly Status Monitoring: A Report on 2015 Survey Activities in Minnesota Dept. of Natural Resources State Parks, Scientific and Natural Areas, including Prairie Bank Easements, and Wildlife Management Areas; U.S. Fish and Wildlife Service Waterfowl Production Areas; Preserves of The Nature Conservancy; and properties owned by local units of government. Minnesota Department of Natural Resources, St. Paul, MN. 14 p.

Dana, R. P. 1991. Conservation management of the prairie skippers Hesperia dacotae and Hesperia ottoe. Minnesota Agricultural Experiment Station, University of Minnesota, St. Paul, Minnesota. 63 p.

Dankert, N. E. and J. M. Reiser. 2015. Dakota Skipper Survey, Altamont and Ordway Prairies Deuel and McPherson Counties, South Dakota 2015. Report submitted to Marissa Ahlering, Prairie Ecologist, The Nature Conservancy. The Nature Conservancy 25 p.

Mallet, J., J. T. Longino, D. Murawski, A. Murawski, and A. S. DeGamboa. 1987. Handling effects in Heliconius: Where do all the butterflies go? Journal of Animal Ecology 56:377-386.

Michigan Natural Features Inventory (2014). Poweshiek skipperling (*Oarisma poweshiek*) survey protocol. Lansing, MI: 4 p.

Murphy, D. D. 1988. Are We Studying Our Endangered Butterflies to Death? Journal of Research on the Lepidoptera 26:236-239.

Panzer, R. 1988. Managing prairie remnants for insect conservation. Natural Areas Journal 8:83-90.

Panzer, R. 2002. Compatibility of prescribed burning with the conservation of insects in small, isolated prairie reserves. Conservation Biology 16:1296-1307.

Panzer, R. (2003). Importance of In Situ Survival, Recolonization, and Habitat Gaps in the Postfire Recovery of Fire-Sensitive Prairie Insect Species. Natural Areas Journal [Nat. Areas J.]. 23(1): 14-21.

Rigney, C. L. 2013. Habitat characterization and biology of the threatened Dakota skipper (Hesperia dacotae) in Manitoba. Masters of Science. The University of Winnipeg, Winnipeg, Manitoba, Canada. 259 p.

Royer, R. A. and G. M. Marrone. 1992. Conservation status of the Dakota skipper (Hesperia dacotae) in North and South Dakota. U.S. Department of the Interior, Denver, CO. 44 p.

Royer, R. A., R. A. McKenney, and W. E. Newton. 2008. A characterization of non-biotic environmental features of prairies hosting the Dakota skipper (Hesperia dacotae, Hesperiidae) across its remaining U.S. range. Journal of the Lepidopterists Society 62:1-17.

Royer, R. A. and M. R. Royer. 2012. Dakota Skipper Field Survey and Habitat Assessment at Twenty-Nine North Dakota Sites During the 2012 Season. Division of Science, Minot State University, Minot, ND. 1- 26 p.

Royer, R. A., M. R. Royer, and E. A. Royer. 2014. Dakota skipper field survey and habitat assessment at twelve North Dakota sites during the 2014 season. A final report submitted to Twin Cities Field Office, U.S. Fish and Wildlife Service, Bloomington, MN. Minot State University, Minot, ND. 53 p.

Runquist, E. 2015. Minnesota Zoo Prairie Butterfly Conservation Program - 2015 Annual Report. Minnesota Zoo, Apple Valley, MN. 27 p.

Samson, F. and F. Knopf. 1994. Prairie conservation in North America. BioScience 44:418-421.

Scott, J.A. 1986. The Butterflies of North America: A Natural History and Field Guide. Stanford University Press, Palo Alto, CA. 548 p.

Selby, G. 2015. USDA Forest Service Dakota Prairie Grassland (Little Missouri National Grassland) McKenzie Ranger District 2015 Dakota Skipper Survey. USDA Forest Service, Indianola, IA. 18 p.

Selby, G. 2016. Federal Fish and Wildlife Permit: Native Endangered Species Recovery – E Wildlife; Authorized Species: Dakota skipper (Hesperia dacotae) Poweshiek skipperling (Oarisma poweshiek). Ecological and GIS Services, Indianola, IA. 7 p.

Skadsen, D. and D. Backlund. 2015. 2015 Year-End Report: Dakota Skipper Surveys in South Dakota. Grenville, SD. 7 p.

Skadsen, D. R. 2006. Surveys for Butterflies Listed as Endangered, Threatened or Species of Tribal Concern on the Sisseton-Wahpeton Oyate Lake Traverse Reservation. Natural History Investigations and Biological Services, Inc., Webster, SD. 18 p.

Smart, Alexander J.; Nelson, Matthew J.; Bauman, Peter J.; and Larson, Gary E. Effects of herbicides and grazing on floristic quality of native tallgrass pastures in eastern South Dakota and southwestern Minnesota. Great Plains Research 21 (Fall 2011):181- 89.

Stegeman, A. 2016. SWCA Environmental Consultants 2015 Dakota Skipper Survey Annual Report Pursuant to U.S. Fish and Wildlife Service Recovery Permit TE704930-1. SWCA Environmental Consultants, Bismarck, ND. 6 p.

Swengel, S. R., D. Schlicht, F. Olsen, and A. B. Swengel. 2011. Declines of prairie butterflies in the midwestern USA. Journal of Insect Conservation 15:327-339.

The Nature Conservancy. 2016. Recovery Permit Application for Dakota Skipper (*Hesperia dacotae*) – Prescribed Burn Effects on Dakota Skipper.

U.S. Fish and Wildlife Service. 2015. Dakota skipper conservation guidelines. Twin Cities Ecological Services Field Office, Bloomington, MN.

Appendix – Analysis of Effects to Dakota Skipper and Poweshiek Skipperling Critical Habitat

The proposed action will affect critical habitat for the Dakota skipper at Blazing Star Prairie; Brown Ranch; Hole-in-the-Mountain Prairie; and, Bluestem Scientific and Natural Area and it will affect critical habitat for the Poweshiek skipperling (*Oarisma poweshiek*) at Blazing Star Prairie; Hole-in-the-Mountain Prairie; and, Bluestem Scientific and Natural Area. The Service designated critical habitat for both species in 2015 (Federal Register Vol. 80, pp. 59248-59384, October 1, 2015. We find that the proposed action may affect, but is not likely to adversely affect critical habitat for each species at the sites listed above. Below we quote the primary constituent elements (PCE) of critical habitat for each species, directly from the final rule, and describe briefly – in italics – how the proposed action is likely to affect each element.

(1) Primary Constituent Element 1—Wet-mesic tallgrass or mixed-grass remnant untilled prairie that occurs on near-shore glacial lake soil deposits or high-quality dry-mesic remnant untilled prairie on rolling terrain consisting of gravelly glacial moraine soil deposits, containing:

a. A predominance of native grasses and native flowering forbs,

b. Glacial soils that provide the soil surface or near surface (between soil surface and 2 cm depth) micro-climate conditions conducive to Dakota skipper larval survival and native prairie vegetation,

c. If present, trees or large shrub cover of less than 5 percent of area in dry prairies and less than 25 percent in wet mesic prairies; and

d. If present, nonnative invasive plant species occurring in less than 5 percent of area.

(2) Primary Constituent Element 2—Native grasses and native flowering forbs for larval and adult food and shelter, specifically:

a. At least one of the following native grasses to provide larval food and shelter sources during Dakota skipper larval stages: Prairie dropseed *(Sporobolus heterolepis)* or little bluestem *(Schizachyrium scoparium);* and,
b. One or more of the following forbs in bloom to provide nectar and water sources during the Dakota skipper flight period: Purple coneflower *(Echinacea angustifolia),* bluebell bellflower*(Campanula rotundifolia),* white prairie clover (*Dalea candida),* upright prairie coneflower *(Ratibida columnifera),*fleabane *(Erigeron* spp.), blanket flower *(Gaillardia* spp.), black-eyed Susan*(Rudbeckia hirta),* yellow sun drops *(Calylophus serrulatus),* prairie milkvetch *(Astragalus adsurgens),* or common gaillardia *(Gaillardia aristata).*

PCE1 and PCE2 – The Service's proposed issuance of an endangered species section 10(a)(1)(A) permit to TNC is likely to have positive effects on PCE1 and PCE2. Permit issuance will facilitate management practices the TNC typically carries out to enhance and restore the essential elements of the native prairie ecosystem upon which the Dakota skipper and other species rely. In addition, TNC intends to monitor the effects of its fire management to ensure that it is having the desired effect of improving the native species composition and diversity that addresses directly these two PCEs.

(3) Primary Constituent Element 3—Dispersal grassland habitat that is within 1 km (0.6 mi) of native high quality remnant prairie (as defined in Primary Constituent Element 1) that connects high-quality wet-mesic to dry tallgrass prairies or moist meadow habitats. Dispersal grassland habitat consists of undeveloped open areas dominated by perennial grassland with limited or no barriers to dispersal including tree or shrub cover less than 25 percent of the area and no row crops such as corn, beans, potatoes, or sunflowers.

The Service did not distinguish formally what portions of critical habitat were intended to function as dispersal habitat, but it appears as if each of the affected units was not designated in this role. Rather, each unit was designated to function primarily as core breeding habitat. Nevertheless, these habitats also function to facilitate dispersal and the proposed action is likely to have only positive effects on that function.

Poweshiek Skipperling

(1) Primary Constituent Element 1—Wet-mesic to dry tallgrass remnant untilled prairies or remnant moist meadows containing:

a. A predominance of native grasses and native flowering forbs;

b. Undisturbed (untilled) glacial soil types including, but not limited to, loam, sandy loam, loamy sand, gravel, organic soils (peat), or marl that provide the edaphic features conducive to Poweshiek skipperling larval survival and native prairie vegetation;

c. If present, depression wetlands or low wet areas, within or adjacent to prairies that provide shelter from high summer temperatures and fire.

d. If present, trees or large shrub coverless than 5 percent of area in dry prairies and less than 25 percent in wet mesic prairies and prairie fens; and,

e. If present, nonnative invasive plant species occurring in less than 5 percent of the area.

(2) Primary Constituent Element 2—Prairie fen habitats containing:

a. A predominance of native grasses and native flowering forbs;

b. Undisturbed (untilled) glacial soil types including, but not limited to, organic soils (peat), or marl that provide the edaphic features conducive to Poweshiek skipperling larval survival and native prairie vegetation;

c. Depressional wetlands or low wet areas, within or adjacent to prairies that provide shelter from high summer temperatures and fired;

d. Hydraulic features necessary to maintain prairie fen groundwater flow and prairie fen plant communities;

e. If present, trees or large shrub coverless than 25 percent of the unit; and,

f. If present, nonnative invasive plant species occurring in less than 5 percent of area.

(3) Primary Constituent Element 3—Native grasses and native flowering forbs for larval and adult food and shelter, specifically:

a. At least one of the following native grasses available to provide larval food and shelter sources during Poweshiek skipperling larval stages: Prairie dropseed *(Sporobolus heterolepis),* little bluestem *(Schizachyrium scoparium),* sideoats grama *(Bouteloua curtipendula),* or mat muhly *(Muhlenbergia richardsonis);* and,

b. At least one of the following forbs in bloom to provide nectar and water sources during the Poweshiek skipperling flight period: Purple coneflower *(Echinacea angustifolia),* black-eyed Susan *(Rudbeckia hirta),* smooth ox-eye *(Heliopsis helianthoides),* stiff tickseed *(Coreopsis palmata),* palespike lobelia *(Lobelia spicata),* sticky tofieldia *(Triantha glutinosa),* or shrubby cinquefoil *(Dasiphora fruticosa ssp. floribunda).*

The proposed action will affect Poweshiek skipperling critical habitat PCE1 and PCE3 in the same manner as for Dakota skipper. The proposed action will not affect Poweshiek skipperling critical habitat PCE2.

(4) Primary Constituent Element 4—Dispersal grassland habitat that is within 1 km (0.6 mi) of native high quality remnant prairie (as defined in Primary Constituent Element 1) that connects high quality wet-mesic to dry tallgrass prairies, moist meadows, or prairie fen habitats. Dispersal grassland habitat consists of the following physical characteristics appropriate for supporting Poweshiek skipperling dispersal: Undeveloped open areas dominated by perennial grassland with limited or no barriers to dispersal including tree or shrub cover less than25 percent of the area and no row crops such as corn, beans, potatoes, or sunflowers.

Effects to Poweshiek skipperling critical habitat PCE4 is similar to effects to Dakota skipper critical habitat PCE4.