

**IN THE OFFICE OF ENDANGERED SPECIES
U.S. FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR**

By Certified Mail

**Dakota Skipper
(*Hesperia dacotae*)**

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Petition for a Rule to list the Dakota Skipper (*Hesperia dacotae*) as THREATENED or ENDANGERED under the Endangered Species Act 16 USC § 1531 et seq. (1973 as amended) and for the designation of Critical Habitat.

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EXECUTIVE SUMMARY

The Dakota skipper (*Hesperia dacotae*) is a rare and critically imperiled butterfly species native to pristine prairie habitats of the northern Great Plains. The Dakota skipper has been the subject of conservation concern for many years and has been a Candidate for Endangered Species Act listing for nearly twenty years. Indeed, the decline and trend of the Dakota skipper toward extinction is undisputed by the U.S. Fish and Wildlife Service. Unfortunately, despite years of concern over the status of the species, documented trends toward extinction, and the availability of sufficient information to support a listing proposal under the Endangered Species Act, the Dakota skipper and its habitat has received little to no on-the-ground protection and remains imminently threatened by a variety of factors. Now, more than ever, the Dakota skipper is in dire need of Endangered Species Act protection.

The Dakota skipper meets several criteria for listing under the Endangered Species Act:

- **The present or threatened destruction, modification, or curtailment of its habitat or range**

The Dakota skipper has already experienced significant declines as a result of substantial prairie habitat destruction. Continued habitat destruction due to agricultural and other activities currently threatens the species. Additionally, habitat degradation caused by nonnative plant invasion, pesticide and herbicide application, domestic livestock grazing, haying, controlled burning, control or elimination of natural disturbances, and other activities threaten the Dakota skipper and pose significant threats to the well-being of the species.

- **Overutilization for commercial, recreational, scientific, or educational purposes**

The potential commercial collection of purple coneflower, which is a primary nectar source for Dakota skipper, poses threats to the Dakota skipper.

- **Disease and Predation**

Dakota skipper are known to be preyed upon by several other invertebrate species and potentially some bird species. Naturally occurring disease also causes Dakota skipper mortality.

- **The inadequacy of existing regulatory mechanisms**

The Dakota skipper and its habitat receives no protection through National or International law. Additionally, State and Provincial laws are entirely inadequate to protect the Dakota skipper and its habitat. Federal agencies have also failed to provide adequate protection to the Dakota skipper and its habitat on their land and the species also receives no formal protection on tribal lands.

- **Other natural or manmade factors affecting its continued existence**

The fragmentation of Dakota skipper habitat poses many significant threats to the species. Additionally, because of the small size and isolation of many Dakota skipper populations, the species is more vulnerable to the effects of stochastic events. Climate change also threatens the Dakota skipper and the delay of timely protection of the Dakota skipper also threatens the species.

Protecting the Dakota skipper under the Endangered Species Act will lead to many benefits. Because the Dakota skipper is an indicator of the health of prairie ecosystems, protection of the species under the Endangered Species Act will bring much-needed protection to prairie habitats where the Dakota skipper exists. In turn, protection of the prairie ecosystem has the potential to benefit several other imperiled species as well. Finally, protection of the prairie ecosystem now will also help to secure a foundation for future and possibly more widespread prairie ecosystem restoration.

I. INTRODUCTION

The Dakota skipper, a butterfly species native to tallgrass and mixed grass prairies of the northern Great Plains, has always been considered rare and has been the focus of much conservation attention for many years (Royer and Marrone 1992). In 1975, in apparent response to concerns over the status of the species, the U.S. Fish and Wildlife Service (“USFWS”) placed the Dakota skipper on the Federal Candidate list of species (USFWS 1975, 40 Fed. Reg. 12691). In 1978, the agency proposed to list the species as threatened and to designate critical habitat (USFWS 1978, 43 Fed. Reg. 28938-28945), but subsequently withdrew the proposed rule and critical habitat designation in 1979 (USFWS 1979, 44 Fed. Reg. 12382-12383). The Dakota skipper was designated a category 2 Candidate species in 1984 (USFWS 1984, 49 Fed. Reg. 21664-21675)¹. A category 2 Candidate species was defined as a species:

[F]or which information now in possession of the [U.S. Fish and Wildlife] Service indicates that proposing to list the species as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threats are not currently available to support proposed rules at this time (49 Fed. Reg. 21664).

In January of 1994, the USFWS received a petition to list the Dakota skipper as threatened or endangered under the ESA from Brendan McManus of the Biodiversity Legal Foundation, a non-profit public interest organization dedicated to the preservation of all native wild plants and animals, communities of species and naturally functioning ecosystems in North America (Biodiversity Legal Foundation 1994). While the USFWS agreed the petition presented substantial scientific information indicating the petitioned listing was probably warranted (USFWS 1994, 59 Fed. Reg. 38424-38425), the agency ultimately concluded the petitioned action was not warranted (USFWS 1995, 60 Fed. Reg. 10535-10536). In issuing the 12-month finding, the USFWS stated:

The Dakota skipper faces loss and degradation of its prairie habitat due to certain harmful burning, haying, grazing, and pesticide use practices. Invasion of prairie by alien plants, natural succession, and habitat loss through physical conversion of prairie to other purposes are also negative factors. The Dakota skipper (and its habitat) are in long-term decline, but the demise of the species does not appear imminent. The Service believes additional information is required concerning the species and its threats before making the determination that the species is endangered or threatened within the definition of the Act. Timely protection and appropriate prairie management might eliminate the need to list the species. (60 Fed. Reg. 10535)

Although the USFWS chose not to list the Dakota skipper under the ESA, the agency retained the Dakota skipper as a category 2 Candidate species.

¹ In 1996, the category 2 Candidate designation was eliminated (61 Fed. Reg. 64481-64485).

Since 1995, the USFWS apparently acquired the additional information required to determine whether the species is threatened or endangered within the definition of the ESA because in 2002, the Dakota skipper was formally designated a Candidate species (USFWS 2002b, 67 Fed. Reg. 40657-40679). A Candidate species is defined as a species for which the USFWS has “sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened but for which preparation and publication of a proposal is precluded by higher-priority listing actions” (67 Fed. Reg. 40658). See also, 50 CFR § 424.02(b). In 2002, the USFWS also assigned the Dakota skipper a “listing priority number,” which denoted the species’ priority for listing under the Endangered Species Act (“ESA”) (USFWS 2002a). Despite years of concern over the status of the species, documented trends toward extinction, and the availability of sufficient information to support a listing proposal under the ESA, the USFWS assigned the Dakota skipper a “listing priority number” of 11 – the lowest “listing priority number” a species can receive. A “listing priority number” of 11 means the USFWS believes the Dakota skipper faces “moderate to low” threats to its continued existence and that these threats are “non-imminent” (USFWS 2002b). However, as this petition documents, the USFWS appears to have grossly underestimated the threats facing this species.

As a Candidate species, the Dakota skipper faces an uncertain future. As of the date of this petition, a proposal to list the Dakota skipper has not been issued by the USFWS and there is no indication that such a proposal is being considered (Delphey 2003). Furthermore, the USFWS is not even obligated to issue a proposal to list the Dakota skipper as there is “no specific time frame during which the Secretary must act on the substantive or procedural provisions of the [Endangered Species] Act...” 50 CFR § 424.15(b). It is therefore entirely likely that, although the species clearly warrants listing under the ESA and is in decline, the Dakota skipper could remain a Candidate species for an indefinite period of time while the species continues its trend toward extinction. As such an outcome is not only prohibited by the ESA, but is also abhorred by the Petitioners, and the scientific community, the present Petition has become necessary.

Therefore, pursuant to the ESA, 16 USC § 1531 et seq., and regulations promulgated thereunder; the Administrative Procedures Act, 5 USC § 553(e); and the First Amendment to the Constitution of the United States; Biodiversity Conservation Alliance, Native Ecosystems Council, and Jeremy Nichols hereby petition the Secretary of Interior to promulgate a rule to list the Dakota skipper (*Hesperia dacotae*) as a threatened or endangered species under the ESA. Pursuant to 16 USC § 1631 et seq., 5 USC § 553(e), and 50 CFR § 424.14 (1990), petitioners further request that Critical Habitat be designated concurrent with the listing as required by 16 USC § 1533(b)(6)(C) and 50 CFR § 424.12.

Petitioners understand this petition action sets in motion a specific process placing definite response requirements on the USFWS and specific time constraints upon those responses. See 16 USC § 1533(b).

II. PETITIONERS

Biodiversity Conservation Alliance is a Laramie, Wyoming-based nonprofit conservation organization dedicated to protecting and restoring native species of plants and animals in the Rocky Mountain Region and Northern Great Plains. Using outreach, education, science, comments, administrative appeals, and litigation, Biodiversity Conservation Alliance works to protect and restore biodiversity, prevent the loss of native species and their habitat, and raise the threshold of public knowledge and appreciation of biodiversity and ecological health.

The Center for Biological Diversity is a nonprofit organization that combines conservation biology with litigation, policy advocacy, and an innovative strategic vision to secure a future for animals and plants hovering on the brink of extinction, for the wilderness they need to survive, and by extension for the spiritual welfare of generations to come.

The Center for Native Ecosystems is a Colorado-based nonprofit, science-based conservation organization dedicated to protecting and recovering native and naturally functioning ecosystems in the Greater Southern Rockies and Great Plains. Using the best available science, the Center for Native Ecosystems participates in policy and administrative processes, legal actions, and public outreach and education programs to protect and restore imperiled native plants and animals.

Native Ecosystems Council is a Montana-based, unincorporated, nonprofit, science-based conservation organization dedicated to protecting and restoring the health of the Northern Great Plains. Members and supporters of Native Ecosystems Council use and enjoy grasslands in eastern South Dakota for wildlife viewing, recreation, and scientific study.

The Xerces Society is an international nonprofit organization dedicated to preserving the diversity of life through the conservation of invertebrates. The Society works with scientists, land managers, and citizens to protect invertebrates and their habitats by producing information materials, presenting educational activities, implementing conservation projects, and advocacy.

Jeremy Nichols is a Laramie, Wyoming resident who has worked to protect and restore the natural values of the Northern Great Plains and nearby regions for several years. Mr. Nichols and his family use and enjoy grasslands throughout the Northern Great Plains primarily for viewing wildlife, hiking, and camping and have expressed numerous concerns over the Dakota skipper and other imperiled prairie species.

III. SPECIES AND POPULATION INFORMATION

A. Description

First described in 1911 from collections in South Dakota and Iowa (Skinner 1911), the Dakota skipper (*Hesperia dacotae*) is a small to medium-sized butterfly of the family Hesperiidae (skippers) and subfamily Hesperinae (grass or branded skippers) with a wingspan of 2.4 to 3.2 centimeters (Royer and Marrone). Royer and Marrone (1992) state the “species has hooked antennae, a short, stout body, and a characteristic rapid, skipping flight” (Royer and Marrone 1992). Because of a thick and strong thorax, the Dakota skippers have a faster and more powerful flight than most butterflies (Royer and Marrone 1992). Dakota skipper markings vary (Royer and Marrone 1992, Cochrane and Delphey 2002). The dorsal surface of adult male wings vary in color from tawny-orange to brown, with a prominent mark on the forewing. The ventral surface is dusty yellow-orange (Royer and Marrone 1992). The dorsal surface of adult female wings is darker brown with diffused tawny orange spots and a few diffused white spots on the margin of the forewing. See, Figure 1. The ventral surfaces are dusty gray-brown with a faint white spotband across the middle of the wing (Royer and Marrone 1992). While Dakota skippers may be confused with Ottoe skipper (*Hesperia ottoe*), the Ottoe skipper is somewhat larger with slightly longer wings (Royer and Marrone 1992). The pupae of Dakota skipper are reddish-brown and larvae are light brown with black collar and dark brown head (McCabe 1981). Dakota skipper larvae differ from others of the *Hesperia* genus in that the head capsule is pitted all over (McCabe 1981).



Figure 1. Female Dakota skipper (*Hesperia dacotae*) on purple coneflower (*Echinacea angustifolia*). Photo by Robert Dana.

Royer and Marrone (1992) provide the following technical description of the Dakota skipper:

At 2.4-3.2 cm wingspan, *Hesperia dacotae* is a small to medium sized hesperiine skipper. Adults are highly variable in marking, the dorsal surface of the wings of males ranging from nearly immaculate tawny buff to a broadly darkened brown. Females are generally much darker than males, often showing a rich, chocolate brown dorsal wing surface in newly emerged examples. In males there is but a faint indication of the postmedian ventral hind wing spotband typical of most *Hesperia*. Females are grayer beneath, and this spotband is generally evident. *H. dacotae* can occasionally be confused with the somewhat larger but similar *Hesperia ottoe*, from which it is best separated, when uncertainty occurs, by examination of the male genitalia. (The uncus and gnathos of *ottoe* are blunt and viselike, those of *dacotae* elongate and caliper-like.) McNeil (1964) notes that the uncus in dorsal view is “divided apically by a median cleft,” adding as well that 1) the antennal club is nearly half the length of the antennal shaft, 2) the length of the upper element of the stigma is usually greater than the width of the head, and 3) the hindwings lack the usual ventral white spots of the genus *Hesperia*. (p. 3)

B. Habitat

The Dakota skipper is considered an obligate of high quality prairie habitat and is considered an indicator of prairie ecosystem health (Royer and Marrone 1992). The butterfly inhabits wet-mesic tallgrass and dry-mesic mixed grass remnant bluestem prairies characterized by a variety of composites and alkaline soils (McCabe 1981, Royer and Marrone 1992). Royer and Marrone (1992) describe the two types of Dakota skipper habitat as follows:

Wet mesic habitat, which predominates in the eastern half of the range of *H. dacotae* in North Dakota, is typically dominated by bluestems (*Andropogon*), and almost universally contains an association of three flowers that bloom in synchrony with the flight of adult Dakota Skippers. They are Wood Lily (*Lilium philadelphicum*), Harebell (*Campanula rotundifolia*), and Alkali Grass (*Zigadenus elegans*). Wet mesic sites may or may not also include extensive stands of Narrow-leaved Purple Coneflower (*Echinacea angustifolia*), but most known wet mesic situations lack a dominance of this nectar source. In most wet mesic sites, the end of the adult flight is synchronized with withering of the blooms of *Zigadenus elegans* and emergence of blooms of Indian tobacco (*Lobelia inflata*). Wet mesic habitat includes much of what McCabe (1981) characterized as being associated with the margins of glacial lakes. It occupies all of the North Dakota sites studied by McCabe in the 1970s (McCabe and Post 1977; McCabe 1979, 1981, etc.). Wet mesic habitat is more commonly used as hayland. Populations in wet mesic habitat are typically quite dense.

Dry mesic habitat is characterized by an association of bluestems and needle-grasses (*Andropogon* and *Stipia*) in rolling terrain. Typically, this sort of habitat is found along river valleys in the more xeric western portions of the range, and along the Missouri Coteau in North Dakota and the Prairie Coteau in South Dakota (where it too is associated with glacial lake margins). Dicots which bloom in synchrony with *H. dacotae* emergence in dry mesic habitat also include *Campanula rotundifolia* and *Lilium philadelphicum*, but they seldom include *Zigadenus elegans*. Dry mesic sites typically support more extensive stands of *Echinacea angustifolia*, *Ratibida columnifera*, *Gaillardia*, and other aster family nectar sources. Dry mesic sites are

more commonly threatened by use as pastureland because topography precludes their use as hayland. Populations in dry mesic habitat are typically less dense and are closely synchronized with emergence of blooms of *Echinacea angustifolia*. (p. 21-22)

While at one time contiguous, these habitats are today greatly reduced and fragmented due to agricultural conversion, degradation, and other developments. Dakota skipper habitat is now found primarily on lands that are either agriculturally marginal due to poor soil quality (e.g., high alkalinity) or exists on topography that prohibits development (Royer and Marrone 1992).

In Minnesota, Dakota skipper primarily inhabit dry-mesic prairie dominated by mid-height grasses with abundant purple coneflower and stiff milkvetch (*Astragalus adsurgens*), but may also inhabit wet-mesic habitats in small numbers (Dana 1997, Swengel and Swengel 1999). In South Dakota, Dakota skipper also inhabit dry-mesic prairie with abundant purple coneflowers, but are also reported to inhabit wet mesic tallgrass prairies with wood lilies and smooth camas (*Zigadenus elegans*) (Skadsen 1997).

Dakota skipper habitat in North Dakota is varied (Cochrane and Delphey 2002). The species inhabits wet-mesic tallgrass prairies dominated by warm-season or bluestem grasses that contain wood lilies, harebane, and smooth camas in eastern North Dakota (McCabe 1981, Royer and Marrone 1992), dry and wet-mesic sites in north-central North Dakota (Lenz 1999), and dry mesic prairies with bluestems, needle-grasses, and nonnative Kentucky bluegrass that typically contain wood lilies, harebells, and coneflowers with some smooth camas in western North Dakota (Royer and Marrone 1992, Cochrane and Delphey 2002).

Soil conditions are also an important feature of Dakota skipper habitat and have been linked to the historical distribution of the species (McCabe 1981, Cochrane and Delphey 2002). McCabe (1981) states, “*Hesperia dacotae* (Skinner) is a northern Great Plains species associated with calcareous (alkaline) prairies” (p. 179). Soil moisture, compaction, surface temperature, pH, and humidity are believed to be important factors affecting the survival of Dakota skipper larvae (Cochrane and Delphey 2002).

The purple coneflower (*Echinacea angustifolia*) appears to be a necessary component of most Dakota skipper habitat as it is a major and consistent food source for the species. However, other nectar sources, including long-headed coneflower (*Ratibida columnifera*), fleabanes (*Erigeron*), Gaillardias (*Gaillardia*), and black-eyed Susans (*Rudbeckia*), are also favored by the species (McCabe 1981, Royer and Marrone 1992).

C. Biology

Dakota skippers complete one generation per year (Cochrane and Delphey 2002). A single adult Dakota skipper emerges from larval hibernation in mid-June to early July, depending on weather (McCabe 1979, Dana 1991, Royer and Marrone 1992, Skadsen 1997, Swengel and Swengel 1999, Cochrane and Delphey 2002). Mating occurs throughout this flight period, which lasts two to four weeks (McCabe 1979, 1981, Dana 1991). Females lay eggs on broadleaf plants and grasses, although a preference for little bluestem grasses has been documented (McCabe 1981, Opler and Krizek 1984, Dana 1991, Royer and Marrone 1992). Females lay eggs daily in diminishing numbers as they age (McCabe 1981, Dana 1991, Cochrane and Delphey 2002). Adult life span has been estimated at three weeks, although an average life of three to 10 days was documented in one Minnesota location (Dana 1991).

Dakota skipper eggs hatch after 7-20 days and the larvae crawl to the bases of grass plants where a silk tunnel or shelter is formed at or beneath the ground surface (McCabe 1981, Dana 1991). At night, the larvae emerge from their shelters and forage on grasses (McCabe 1981, Royer and Marrone 1992). Dakota skipper larvae prefer little bluestem as a food source, although several grass species are known to be consumed (McCabe and Post 1977, Dana 1991, Royer and Marrone 1992). Cochrane and Delphey (2002) state, "Seasonal senescence patterns of grass species relative to the larval period of Dakota skippers are likely important in determining the suitability of grass species as larval host plants" (p. 5). Dakota skipper larvae overwinter in their shelters (McCabe 1979, 1981, Dana 1991, Royer and Marrone 1992). During spring, the larvae resume foraging and continue growing before they pupate (Dana 1991, Cochrane and Delphey 2002).

Larval survival is affected by grassland fires, species compositions, soil pH, humidity, and extreme winter low temperatures (McCabe 1979, 1981, Royer and Marrone 1992). Grass height is an important factor in larval survival. According to Cochrane and Delphey (2002), "Grass height is important because larvae must travel at least daily from their shelters at or near the ground to palatable grass parts" (p. 5). The "hairiness" of grasses may also affect the ability of Dakota skipper larvae to travel up stems (Dana 1991, Cochrane and Delphey 2002).

Sources of nectar for the Dakota skipper include purple coneflower, harebell, white prairie clover (*Dalea candida*), long-headed coneflower, fleabanes (*Erigeron*), blanketflowers, black-eyed Susans, and evening primrose (*Oenothera serrulata*) (McCabe and Post 1977, Royer and Marrone 1992). However, Dakota skipper seem to prefer purple coneflower as nectar sources (Dana 1991, Royer and Marrone 1992).

D. Ecology

While the Dakota skipper may have once been a single contiguous metapopulation or several large metapopulations (Britten and Glasford 2002), the species' population is now greatly fragmented and isolated (Royer and Marrone 1992, Cochrane and Delphey 2002). The remaining extant populations of Dakota skipper now vary in size and density and are, for the most part, not influenced by dispersal between local populations (McCabe 1981, Dana 1991, 1997, Schlicht 1997, Reiser 1997, Spomer 2002, Cochrane and Delphey 2002). It has been suggested that populations may experience significant size fluctuations (Dana 1997). The size and density of Dakota skipper populations is most apparent during the mating period and high densities have been reported during this time (Dana 1991, Royer and Marrone 1992).

While not inclined to dispersal (Royer and Marrone 1992), the Dakota skipper has been documented to move up to 0.5 miles to "unusually heavy coneflower growth" (Cochrane and Delphey 2002, p. 6, Skadsen 1999). This movement was apparently facilitated by a connection of native prairie habitat (Cochrane and Delphey 2002). Cochrane and Delphey (2002) state, "The five Dakota skipper experts that we interviewed in 2001 indicated that it was unlikely that Dakota skippers were capable of moving greater than 1 km between patches of prairie habitat separated by structurally similar habitats (e.g., crops fields or pasture, but not native prairie)" (p. 6). Historically, the contiguous distribution of the Dakota skipper probably facilitated small-scale dispersal of local populations following disturbances (McCabe 1981, Britten and Glasford 2002). However, due to habitat destruction and degradation, Dakota skippers now occupy fragments of their original distribution (Cochrane and Delphey 2002). As a result, dispersal between many extant populations is highly unlikely (Royer and Marrone 1992, Cochrane Delphey 2002).

Dakota skippers are reported to be preyed upon by "ambush bugs (Hemiptera: *Phymata* spp.), flower spiders (Araneaea: *Miseumena* spp.), and orb weavers (various Araneidae)" (Cochrane and Delphey 2002, p. 9, McCabe 1979, 1981). Predation by white crab spiders (Araneidae: *Misumenops* spp.), and robber flies (Diptera: Asilidae) has also been reported (Dana 1991). Disease has also been reported to cause mortality among Dakota skipper (Dana 1991). McCabe (1981) states, "The most important [natural] mortality factor appears to be the bacteria septicemia reported by MacNeill (1964)" (p. 188).

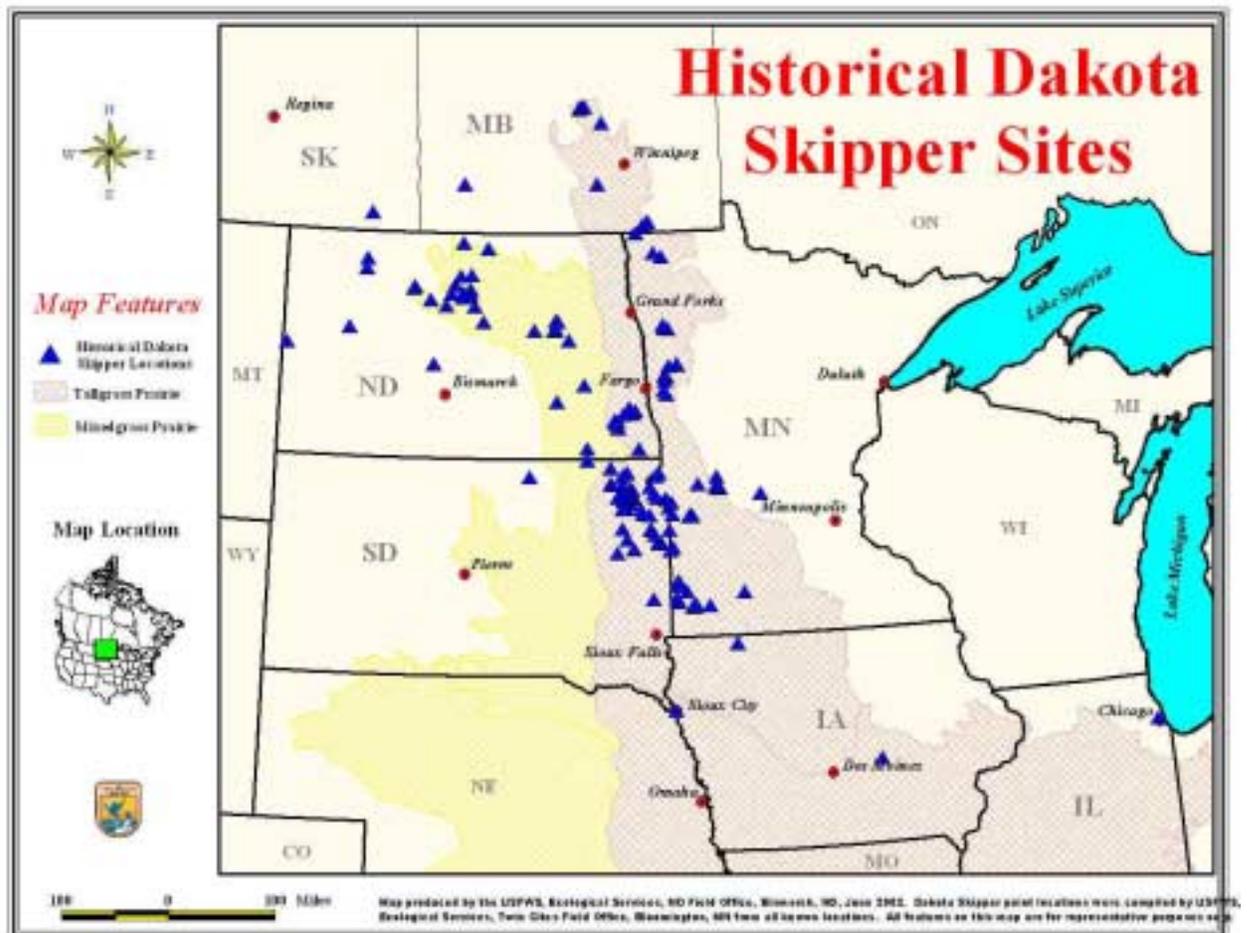
While the Dakota skipper is described as "one of the more environmentally sensitive invertebrate members of tallgrass and mixed grass prairie habitats" (Cochrane and Delphey 2002, p. 9), other sensitive species share habitat with the Dakota skipper (Royer and Marrone 1992). These species include regal fritillary (*Speyeria idalia*), Arogos skipper (*Atrytone arogos*), Ottoo skipper (*Hesperia ottoo*), poweshiek skipperling (*Oarisma poweshiek*), and the western prairie fringed orchid (*Platanthera praeclara*), which is currently listed as threatened under the ESA (Cochrane and Delphey 2002). Besides

the western prairie fringed orchid, the Dakota skipper does not share habitat with any other species listed under the ESA and does not share habitat with any mobile species listed under the ESA (Delphey 2003).

E. Population Status

The Dakota skipper was once widely distributed throughout the northern tallgrass, Dakota mixed grass, and a portion of the central tallgrass prairie ecoregions (Cochrane and Delphey 2002). Its distribution once included tallgrass and mixed grass prairies of Illinois, Iowa, Minnesota, South Dakota, North Dakota, Manitoba, and Saskatchewan (Royer and Marrone 1992, Cochrane and Delphey 2002). See, Figure 2. Royer and Marrone (1992) also suggested the Dakota skipper may have occurred historically in far eastern Montana (Royer and Marrone 1992).

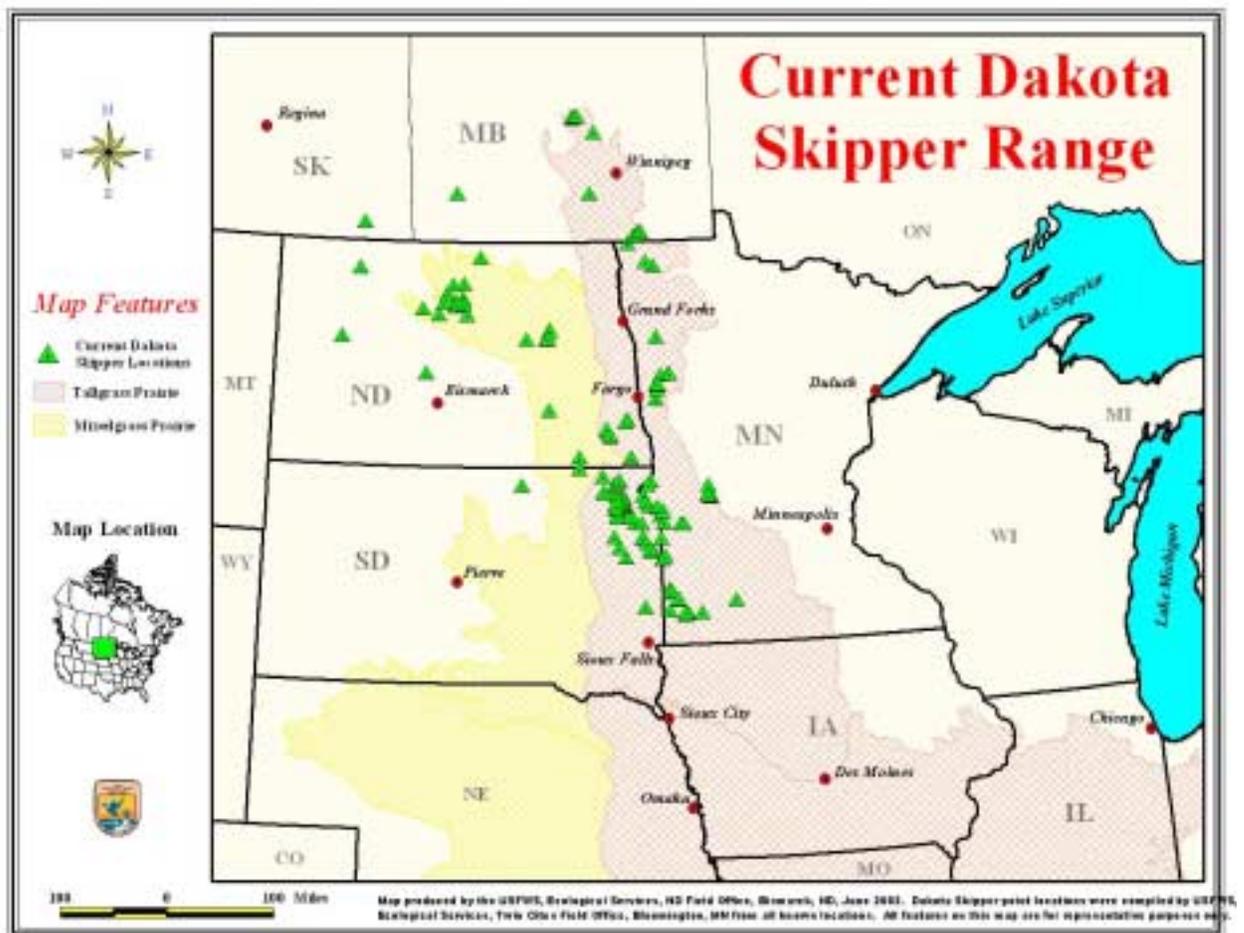
Figure 2. Historical Dakota Skipper Sites (Cochrane and Delphey 2002).



Based on genetic analyses, it is believed the Dakota skipper historically had a contiguous distribution, meaning populations were not fragmented and/or isolated, but rather existed as one single metapopulation or several large metapopulations connected by dispersal among local populations (Britten and Glasford 2002, Cochrane and Delphey 2002).

Due to the extensive loss and degradation of prairie habitat over the past decades, the distribution of the Dakota skipper has become fragmented and much-reduced (McCabe 1981, Royer and Marrone 1992, Schlicht and Saunders 1994, Royer 1997, Schlicht 1997 a, b, Skadsen 1997, 1999, Swengel and Swengel 1999, Cochrane and Delphey 2002). Indeed, the Dakota skipper is now extirpated from the States of Illinois and Iowa, where the species was last recorded in 1888 and 1992 respectively (McCabe 1981, Orwig and Schlicht 1999, Cochrane and Delphey 2002). Additionally, it is no longer believed the Dakota skipper may occur in far eastern Montana (Cochrane and Delphey 2002).

Figure 3. Current Dakota Skipper Range (Cochrane and Delphey 2002). Note loss of species in Illinois, Iowa and reduction of sites in Minnesota, North Dakota, and South Dakota as compared with Figure 2.



In western North Dakota and northern Minnesota, the status of the Dakota skipper is considered to be “tenuous,” with most populations highly isolated and vulnerable to or threatened with extirpation (Cuthrell 1991, Cochrane and Delphey 2002). The status of populations in Manitoba and Saskatchewan, Canada are unknown, although the species is considered rare in these locations and receives little to no protection (Britten 2001, Cochrane and Delphey 2002). The distribution of the Dakota skipper is now largely centered in western Minnesota, northeastern South Dakota, and the eastern half of North Dakota (Royer and Marrone 1992). See, Figure 3.

Experts and the USFWS believe the Dakota skipper is declining toward extinction (Schweitzer 1989, Royer and Marrone 1992, Cochrane and Delphey 2002, USFWS 2002a). Currently, only 150 extant or presumed extant populations of Dakota skipper are known to exist (Cochrane and Delphey 2002).

The decline and trend toward extinction of the Dakota skipper has been attributed to conversion of native prairies for agriculture or other uses and to habitat degradation of unconverted prairies (Royer and Marrone 1992, Cochrane and Delphey 2002). It is believed the decline of the species is “approximately” proportional to the loss of prairie habitats (Cochrane and Delphey 2002). The loss of native tallgrass and mixed grass prairie within the last 200 years has been extensive and so too has been the loss of Dakota skipper habitat (Royer and Marrone 1992, Cochrane and Delphey 2002). See, Table 1. Steinauer and Collins (1994) state, “Only about 4 percent of presettlement tallgrass prairie remains; most of the remainder was plowed for agricultural purposes soon after European settlement” (p. 43). Bragg and Steuter (1994) state, “As a result of human activities, mixed prairie has been substantially reduced” (p. 61).

Table 1. Historical loss of prairie in States and Provinces where Dakota skipper currently occur or are known to have occurred (Steinauer and Collins 1994, Samson et al. 1998, Cochrane and Delphey 2002).

	Historical (ha)	Current (ha)	Decline (%)
Tallgrass Prairie			
Illinois	8,900,000	930	99.9
Iowa	12,500,000	12,140	99.9
Manitoba	600,000	300	99.9
Minnesota	7,300,000	30,350	99.6
North Dakota	1,200,000	1200	99.9
South Dakota	3,000,000	449,000	85.0
Mixed Grass			
North Dakota	13,900,000	3,900,000	71.9
South Dakota	1,581,440	474,432	70.0
Saskatchewan	13,400,000	2,500,000	81.3

i. Iowa

Dakota skipper was historically reported from three counties in Iowa and was last seen at Cayler Prairie in 1992 (Cochrane and Delphey 2002). It is presumed that Dakota skipper is extirpated from Iowa (Royer and Marrone 1992, Schlicht and Orwig 1998, Selby 2001 pers. comm. cited in Cochrane and Delphey 2002). Cochrane and Delphey (2002) state, "...further surveys may be warranted to conclusively document the status of Dakota skipper in Iowa" (p. 16), although extensive surveys have been completed in recent years and have failed to confirm the existence of Dakota skipper (Schlicht and Orwig 1998, Swengel and Swengel 1999, Selby 2001 pers. comm. cited in Cochrane and Delphey 2002).

ii. Minnesota

Dakota skipper have been recorded at 63 sites in Minnesota covering 17 counties (Skadsen 1999c, Skadsen 2000, Cochrane and Delphey 2002).² Seven populations out of the 63 sites have become extinct since their discovery, with four sites becoming extinct since the 1970s (Braker 1985, Glenn-Lewis and Selby 1990, Swengel 1993, 1994, Schlicht 1994, Schlicht and Saunders 1994, Cochrane and Delphey 2002). The most recent population in Minnesota to become extinct was at the Roscoe Prairie (Schlicht and Saunders 1994). Of the 56 remaining sites, 40 occur within 10 groups that are assumed to be connected by dispersal and 16 sites are isolated. Only one Minnesota site – the Hole-in-the-Mountain Preserve – is considered to be secure. Two others are considered secure or vulnerable. The rest of the Minnesota sites are considered vulnerable, threatened, or of unknown status. See, Table 2.³ 12 sites are currently of unknown status. Of these, some may be extinct and two may be nonexistent due to their proximity to other populations.

Over half of the Dakota skipper sites in Minnesota are considered to be threatened, meaning there is a greater than 20% probability that these sites will become extinct within 20 years (Cochrane and Delphey 2002). See also, footnote 3. Dakota skipper sites in Minnesota are threatened with grazing, herbicide application, nonnative plant species invasion, mining, burning, inadequate management, tree encroachment, isolation, and other human uses (Skadsen 1999a, Cochrane and Delphey 2002). It is not likely that significant unrecorded populations of Dakota skipper will be found in Minnesota (Dana 2002 pers. comm. cited in Cochrane and Delphey 2002).

² Cochrane and Delphey (2002) define a "site" as "an entire population or part of a population under single, contiguous land ownership" (p. 16).

³ Cochrane and Delphey (2002) define "Secure" as "inherently viable, no active threats, <5% probability that extinction will occur within 50 years;" "Vulnerable" as "possibly not viable by isolation, etc., threats may affect, <20% probability that extinction will occur within 20 years;" and "Threatened" as "active threats and/or high inherent vulnerability, >20% probability of extinction within 20 years" (p. 61).

Table 2. Status of Minnesota Dakota Skipper Sites (Cochrane and Delphey 2002).

Total Extant and Presumed Extant Sites	Secure/Secure-Vulnerable	Vulnerable/Vulnerable-Threatened	Threatened/Threatened-Vulnerable	Unknown Status
56	3 (6%)	10 (18%)	31 (55%)	12 (21%)

Ownership of Dakota skipper sites in Minnesota include Minnesota Department of Natural Resources, The Nature Conservancy, a private landowner, county governments, USFWS, other private landowners, and the Minnesota Historical Society (Cochrane and Delphey 2002).

iii. North Dakota

Dakota skipper have been recorded at 43 sites in North Dakota covering 17 counties (Cochrane and Delphey 2002). At least 11 sites have become extinct since the 1980s and early 1990s (McCabe 1981, Royer and Marrone 1992, Orwig 1995, Royer 1997, Royer and Royer 1998, Cochrane and Delphey 2002). Of the 32 extant sites in North Dakota, 17 occur in two complexes that may be connected by dispersal – the Towner Karlsruhe, which supports 13 sites, and Sheyenne Grasslands, which supports 4 sites – in southeastern North Dakota. No Dakota skipper sites have been found on the Little Missouri National Grassland in western North Dakota (Royer and Hanley 1998). All other sites in North Dakota are isolated (Cochrane and Delphey 2002). No Dakota skipper sites in North Dakota are considered secure and 75% of the South Dakota sites are considered threatened, meaning there is a greater than 20% probability that these sites will become extinct within 20 years (Cochrane and Delphey 2002). See, Table 3. Dakota skipper sites in North Dakota are threatened by conversion of prairie habitat, grazing, burning, herbicide application, nonnative plant invasion, inadequate management, isolation, flooding, mining, and other human uses (Cochrane and Delphey 2002). It is highly unlikely that a significant undiscovered population of Dakota skipper exists in North Dakota (Royer and Marrone 1992).

Table 3. Status of North Dakota Dakota Skipper Sites (Cochrane and Delphey 2002).

Total Extant and Presumed Extant Sites	Secure/Secure-Vulnerable	Vulnerable/Vulnerable-Threatened	Threatened/Threatened-Vulnerable	Unknown Status
32	0	7 (22%)	24 (75%)	1 (3%)

Ownership of Dakota skipper sites in North Dakota include North Dakota Department of Lands, USFWS, U.S. Forest Service (“USFS”), The Nature Conservancy, and the North Dakota highway department.

iv. South Dakota

Dakota skipper have been recorded at 53 sites in South Dakota covering 10 counties (Cochrane and Delphey 2002). Five sites are known to have become extinct due to habitat loss and/or degradation, some since the early 1990s (Royer and Marrone 1992, Skadsen 1997, Cochrane and Delphey 2002). Of the 48 extant sites in South Dakota, all but 16 occur within complexes that may be connected by dispersal. These complexes include the Scarlet Fawn Prairie-Knapp’s Pasture, Bitter Lake, Crystal Springs, North End Coteau des Prairies, and the Lake Traverse Reservation (Cochrane and Delphey 2002). The rest of the South Dakota sites are considered isolated. The Ordway Prairie on the western extent of the historic range of the Dakota skipper may also be a “significant outpost” for Dakota skipper in South Dakota, but no thorough surveys have been completed (Backlund 2001 pers. comm. cited in Cochrane and Delphey 2002). The Dakota skipper has not been found on the Grand River National Grassland, which lies further west in South Dakota (Marrone 2002). Twenty seven Dakota skipper sites in South Dakota are considered secure and the rest are considered vulnerable, threatened, or of unknown status (Cochrane and Delphey 2002). See, Table 4. However, several Dakota skipper sites considered secure in South Dakota remain threatened by a variety of factors (Cochrane and Delphey 2002). Nineteen percent of Dakota skipper sites in South Dakota are considered threatened, meaning there is a greater than 20% probability that these sites will become extinct within 20 years (Cochrane and Delphey 2002). While Cochrane and Delphey (2002) believe “additional populations are likely” in South Dakota, several populations are at the same time currently threatened with extinction (Cochrane and Delphey 2002). Dakota skipper sites in South Dakota are threatened by grazing, burning, herbicide application, nonnative plant invasion, inadequate management, isolation, flooding, mining, and other human uses (Cochrane and Delphey 2002).

Table 4. Status of South Dakota Dakota Skipper Sites (Cochrane and Delphey 2002).

Total Extant and Presumed Extant Sites	Secure/Secure-Vulnerable	Vulnerable/Vulnerable-Threatened	Threatened/Threatened-Vulnerable	Unknown Status
48	27 (56%)	2 (4%)	9 (19%)	10 (21%)

Ownership of Dakota skipper sites in South Dakota include the Sisseton-Wahpeton Sioux tribe, the USFWS, South Dakota state conservation agencies, The Nature Conservancy, other private landowners, and one site owner is unknown (Cochrane and Delphey 2002).

v. Manitoba, Canada

Cochrane and Delphey (2002) report 13 Dakota skipper sites in Manitoba, although Delphey (2003) indicated more sites have since been found. While the status of these populations is unknown (Cochrane and Delphey 2002), it is known that some populations continue to persist (Britten 2001).

vi. Saskatchewan, Canada

Dakota skipper has been recorded from only one site in Saskatchewan after forty years of searching (Hooper 2002 pers. comm. cited in Cochrane and Delphey 2002). Three males and no females have been collected. Each male was found perching on *Echinacea* flowers on an ungrazed knoll of mixed grass prairie (Cochrane and Delphey 2002).

IV. CRITERIA FOR LISTING THE DAKIOTA SKIPPER AS THREATENED OR ENDANGERED

Several sections of the regulations implementing the ESA (50 CFR et seq.) are applicable to this petition. Those concerning the listing of the Dakota skipper as a threatened or endangered species are as follows:

424.02(e) “Endangered species” means a species that is in danger of extinction throughout all or a significant portion of its range.”... (k) “species” includes any species or subspecies that interbreeds when mature.

“Threatened species” means a species that “is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (16 USC § 1532(20))

424.11(c) “A species shall be listed...because of any one or a combination of the following factors:

1. The present or threatened destruction, modification, or curtailment of habitat or range;
2. Overutilization for commercial, recreational, scientific, or educational purposes;
3. Disease or predation;
4. The inadequacy of existing regulatory mechanisms; and
5. Other natural or manmade factors affecting its continued existence.

As a Candidate species, the USFWS has already determined the Dakota skipper meets at least one of the factors set forth in § 424.11(c) (USFWS 2002b). However as will be further demonstrated below,

probably all five of the factors set forth in § 424.11(c) are applicable to the present status of the Dakota skipper. As a result, the well-being of the Dakota skipper is significantly at risk and warrants immediate conservation attention under the ESA.

A. Present and Threatened Destruction, Modification, or Curtailment of Range or Habitat

The extent of the Dakota skipper’s habitat has decreased significantly since the early 1800’s (Royer and Marrone 1992). See, Table 1. Cochrane and Delphey (2002) state, “Loss of native prairie within the last 200 years has been extensive throughout the general region historically occupied by the Dakota skipper” (p. 11). In Iowa and Illinois, most tallgrass prairie habitat had been entirely converted to croplands by the 1900’s (Smith 1992). Tallgrass and mixed grass prairie habitat in Minnesota, North Dakota, South Dakota, and the Canadian Provinces has experienced similar and equally dramatic declines (Sampson and Knopf 1994, Samson et al. 1998). Finally, much of the remaining tallgrass and mixed grass prairie in the historical range of the Dakota skipper is degraded to the point that it is entirely unsuitable for the species (Cochrane and Delphey 2002). The result of habitat loss and degradation has been a corresponding decline in the Dakota skipper itself (Royer and Marrone 1992, Cochrane and Delphey 2002). There is no question that the range and habitat of the Dakota skipper has been significantly destroyed, modified, and curtailed as a result of many factors.

Furthermore, the range and habitat of extant Dakota skipper populations remains threatened by many factors. See, Table 5.

Table 5. Dakota Skipper sites threatened by agricultural conversion, conversion of habitat for other uses, habitat degradation, nonnative plant invasion, insecticide and herbicide application, domestic livestock grazing, early season haying, controlled burning, the control or elimination of natural disturbances, and other threats (Cochrane and Delphey 2002).

	Total Extant and Presumed Extant Sites	Sites Threatened
Minnesota	56	39 (70%)
North Dakota	32	29 (91%)
South Dakota	48	30 (63%)
Manitoba	13	Unknown
Saskatchewan	1	Unknown
Total	150	98 (65%)

Indeed, Dakota skipper populations are threatened by agricultural conversion, conversion of habitat for other uses, habitat degradation, nonnative plant invasion, insecticide and herbicide application, domestic livestock grazing, early season haying, controlled burning, the control or elimination of natural disturbances, and other threats. Even populations considered secure by Cochrane and Delphey (2002), such as many in South Dakota, are also considered threaten by these factors (Cochrane and Delphey 2002). Additionally, while several sites are threatened by two or more of these factors, as Table 5 shows, nearly every extant Dakota skipper site is threatened by one or more.

i. Conversion of Dakota skipper habitat to agriculture lands

While many Dakota skipper populations currently survive in fragments of prairie that are usually unsuitable for agricultural production (McCabe 1981), conversion of Dakota skipper habitat to agriculture lands has caused the extinction of several populations since 1980 (Cochrane and Delphey 2002). The loss of four Dakota skipper sites in North Dakota were attributed to the conversion of prairie habitat to potato fields and the loss of one site in South Dakota was also attributed to agricultural conversion (Royer and Marrone 1992). Conversion of Dakota skipper habitat to agriculture lands also threatens the Towner-Karlsruhe complex in North Dakota, which is considered the stronghold for the species in the state (Royer and Royer 1998, Lenz 1999, Cochrane and Delphey 2002). Cochrane and Delphey (2002) identify 12 of 32 extant sites, or 38% of the sites, in North Dakota are threatened with agricultural conversion. See, Table 6. In light of historical Dakota skipper habitat loss, the continued loss of habitat as a result of agricultural conversion poses significant risks to the well being of the Dakota skipper, especially in North Dakota. Agricultural conversion does not appear to be a threat to the species in other locations.

Table 6. Dakota skipper sites in North Dakota threatened with agricultural conversion (Cochrane and Delphey 2002).

Total Extant and Presumed Extant Sites	Extant and Presumed Extant Sites Threatened With Agricultural Conversion	Percentage
32	12	38%

ii. Loss of Dakota skipper habitat to mining and other causes

The conversion of prairie for uses other than agriculture has also caused the extirpation of Dakota skipper populations and threatens other populations (Cochrane and Delphey 2002). For instance, the

mining of prairie habitat for construction materials, such as sand and gravel, threatens some Dakota skipper sites in Minnesota (Dana 1997). Five Minnesota Dakota skipper sites are currently threatened with mining (Cochrane and Delphey 2002). Indeed, gravel mining at the Minnesota Felton Prairie Dakota skipper Complex is a significant threat to the species (Braker 1985, Cochrane and Delphey 2002). A planned 4-land highway project and associated gravel mining activities also threatens to destroy a Dakota skipper site in South Dakota (Skadsen 2001 pers. comm. cited in Cochrane and Delphey 2002).

iii. Habitat degradation

While the complete destruction of prairie habitat clearly threatens the Dakota skipper, the widespread degradation of prairie habitat also threatens the species. Indeed, a significant negative relationship between habitat degradation and Dakota skipper abundance has been reported (Swengel and Swengel 1999). Cochrane and Delphey (2002) state, “Changes in vegetation (e.g., species composition and structure), hydrology, or soil structure adversely affect one or more life stages of Dakota skipper at degraded sites” (p. 27). Habitat degradation can be caused by a variety of factors, including nonnative plant invasion, pesticide or herbicide application, excessive livestock grazing, haying, burning, suppression of natural disturbance regimes (Cochrane and Delphey 2002).

Habitat degradation causes prairie habitat to support fewer native plant species, especially nectar plants (Dana 2001 pers. comm. cited in Cochrane and Delphey 2002). Access to nectar plants is important for Dakota skippers as nectar provides a vital source of water and carbohydrates (Dana 1991, Cochrane and Delphey 2002). Cochrane and Delphey (2002) state, “The absence or paucity of preferred nectar species, however, may reduce adult survival, female fecundity, or both” (p. 27).

Habitat degradation may however, affect the survival of larvae more than adult Dakota skipper (Cochrane and Delphey 2002). Cochrane and Delphey (2002) state, “Soil compaction and vegetation removal, whether by extensive grazing, mowing, or fire, may substantially alter soil water movement, evaporation, and near-surface humidity, which in turn affect larval survival” (p. 27). McCabe (1981) reports, “Calcareous prairies are of a fragile nature and even carefully controlled grazing rapidly alters the flora through soil impaction and selective feeding, making it unsuitable for the skipper” (p. 179).

As will be discussed further, several Dakota skipper sites have been affected and are currently being affected by habitat degradation (Royer and Marrone 1992, Royer 1997, Swengel and Swengel 1999, Olson 2000, Spomer 2002, Cochrane and Delphey 2002). Habitat degradation threatens the Dakota skipper and poses significant risks to the well-being of the species.

iv. Nonnative plant invasion

The invasion of Dakota skipper habitat by nonnative or exotic plants threatens the Dakota skipper (Cochrane and Delphey 2002). Plants like leafy spurge, Kentucky bluegrass, and smooth brome often invade a site and become the dominant species, replacing forbs and grasses the Dakota skipper depends upon for survival (Cochrane and Delphey 2002). Indeed, Dakota skipper larvae may not be able to survive on grasslands dominated by smooth brome because of its “large, widely spaced stems and its mid- to late-summer senescence” (Cochrane and Delphey 2002, p. 28). Large and widely spaced stems may affect the ability of Dakota skipper larvae to efficiently travel between shelters and the food source, widely spaced stems may affect the ability of larvae to construct effective shelters, and mid- to late-summer senescence may limit the availability of food (Dana 1991). Dakota skipper larvae are also unable to feed upon Kentucky bluegrass as the plant is dormant during mid-summer, when larvae need palatable grass for feeding (Dana 1991). Royer (1997) reported leafy spurge had greatly modified Dakota skipper habitat at the McLeod Prairie in North Dakota site, possibly causing its extirpation.

Currently, at least 23% of all Dakota skipper sites are threatened with nonnative plant invasion, posing significant risks to the well-being of the species (Cochrane and Delphey 2002). See, Table 7.

Table 7. Dakota skipper sites threatened by nonnative plant invasion(Cochrane and Delphey 2002).

Location of Site	Total Extant and Presumed Extant Sites	Sites Threatened With Nonnative Plant Invasion
Minnesota	56	8 (14%)
North Dakota	32	10 (31%)
South Dakota	48	17 (35%)
Manitoba	13	Unknown
Saskatchewan	1	Unknown
Total	150	35 (23%)

v. Insecticide and herbicide application

Cochrane and Delphey (2002) state, “Broadcast spraying of insecticides to control grasshoppers kills butterflies and is greatly harmful to small Dakota skipper populations (Royer and Marrone 1992)” (p. 28). Insecticide spraying can reduce or threaten non-target insect populations, such as Dakota skipper (Arenz and Joerns 1996, Ostlie et al. 1997). Because Dakota skipper sites in the Sheyenne Grassland of North Dakota have been heavily impacted by grasshopper control and other activities, the extinction of the species in this area is believed to be “almost certain” (Royer 1997).

The control of nonnative plants through herbicide application also threatens the Dakota skipper (Cochrane and Delphey 2002). Chemical control of leafy spurge and other plants can eliminate nectar sources for the Dakota skipper (Royer and Marrone 1992). Royer and Marrone (1992) documented a correlation between the disappearance of Dakota skipper and the advent of chemical control of leafy spurge in North Dakota. Dana (1997) also reported the greatest threat to the Hole-in-the-Mountain complex in Minnesota to be herbicide application.

Currently, at least 7% of all Dakota skipper sites are threatened by insecticide and/or herbicide application (Cochrane and Delphey 2002). Insecticide and herbicide application therefore poses significant risks to the well-being of the Dakota skipper. See, Table 8.

Table 8. Dakota skipper sites threatened by insecticide and/or herbicide application (Cochrane and Delphey 2002).

Location of Site	Total Extant and Presumed Extant Sites	Sites Threatened With Insecticide and/or Herbicide Application
Minnesota	56	8 (14%)
North Dakota	32	2 (6%)
South Dakota	48	0
Manitoba	13	Unknown
Saskatchewan	1	Unknown
Total	150	10 (7%)

vi. Livestock grazing

Domestic livestock grazing poses significant risks to the well-being of the Dakota skipper (Royer and Marrone 1992, Cochrane and Delphey 2002).⁴ Livestock grazing may remove forage for Dakota skipper larvae, remove nectar sources for adults, directly trample larvae, alter larval microhabitats (Cochrane and Delphey 2002). It has been reported that livestock grazing reduces Dakota skipper numbers in direct proportion to the intensity of the grazing (Dana 1997). While Cochrane and Delphey (2002) believe Dakota skipper may be able to survive intense grazing, this situation could only occur “if a sufficient portion of the habitat patch remains suitable (e.g., left ungrazed or lightly grazed) for reproduction or if

⁴ It is important to note that, while Dakota skipper habitat was historically grazed by bison (*Bison bison*) (Bragg 1995, Schlicht and Orwig 1998), which is now extirpated from the prairie ecosystem (Benedict et al. 1994), the effects of bison grazing differs significantly from that of domestic livestock grazing (Noss et al. 1995, Matlack et al. 2001). Bison eat different plants than cattle (Plumb and Dodd 1993) and the confinement of cattle creates an environment that is not “spatially or temporally diverse” (Benedict et al. 1994, p. 155, Howe 1994, Knopf 1994).

nearby populations are not simultaneously extirpated and provide immigrants to refound the affected population” (p. 29). Livestock grazing also facilitates the invasion of nonnative plants and, as a secondary effect, may lead to the application of herbicides to control the spread of nonnative plants on grazed prairie habitats, which is detrimental to the Dakota skipper (Dana 1997, Jackson 1999, Cochrane and Delphey 2002).

Dakota skippers in mixed grass prairie habitat can tolerate little to no grazing (McCabe and Post 1977, Royer and Marrone 1992, Royer and Royer 1998). McCabe (1981) reported that livestock grazing eliminated Dakota skippers on alkaline prairies in North Dakota and reduced and/or eliminated nectar sources such as harebell and long-headed coneflower. Long term grazing in mixed grass prairie habitat often leads to the replacement of native plants with nonnative species and reduces floral diversity (Dana 1997, Cochrane and Delphey 2002). Even if livestock grazing pressures are reduced or eliminated, native plants and diversity are not restored (Cochrane and Delphey 2002). Grazing in mixed grass prairie habitat is also detrimental to Dakota skipper as a result of soil impacts (McCabe 1981). McCabe (1981) states, “Calcareous prairies are of fragile nature and even carefully controlled grazing rapidly alters the flora through soil impaction and selective feeding, making it unsuitable for the skipper” (p. 179). Cochrane and Delphey (2002) state, “Royer (*in litt.* 2000) suggests that adverse grazing impacts to Dakota skipper in mixed grass prairie may stem more from altered soil and moisture characteristics caused by cattle trampling than from direct mortality or changes to vegetation” (p. 29).

While Cochrane and Delphey (2002) assert the Dakota skipper may persist in grazed tallgrass prairie, they also conclude livestock grazing is a “significant threat” to the species in tallgrass prairie habitat. Heavy livestock grazing in tallgrass prairie habitat can eliminate Dakota skipper populations within one year (Dana 1983, Dana 1991). Livestock grazing is a predominant land use on privately owned tracts of tallgrass prairie and threatens many Dakota skipper populations (Higgins 1999, Cochrane and Delphey 2002). Dana (1997) observed that overgrazed tallgrass prairie in Minnesota had more nonnative plant species, less diversity, and the height of prairie foliage is low. Higgins (1999) found that private lands that are grazed have lower vegetation height and litter depth. Grazing or overgrazing in tallgrass prairie can eliminate Dakota skipper populations within one year (Dana 1991). Higher numbers of Dakota skipper have also been reported from ungrazed tallgrass prairie as opposed to habitat grazed by domestic livestock (Braker 1985).

Domestic livestock grazing currently threatens several Dakota skipper sites. For instance, Dakota skipper populations at the Sheyenne National Grassland, managed by the USFS, have suffered from “intensive grazing,” along with nonnative plant invasion and herbicide application (Royer and Marrone 1992, Cochrane and Delphey 2002). The USFS (2001b) also reports, “Approximately 40% of the private

rangelands on the northern prairie (71 million acres) are in poor to fair condition and this indicates a loss of higher successional plant communities (Natural Resources Conservation Service 1996). Rangelands in these conditions provide unsuitable to marginally suitable habitat for this [Dakota skipper] species” (p. H-71). Additionally, the Sica Hollow East Site, one of only three sites in the North End Coteau Des Prairies Complex, in South Dakota is also “overgrazed” (Cochrane and Delphey 2002). In total, livestock grazing threatens at least 24% of all Dakota skipper populations and poses significant risks to the well being of the species (Cochrane and Delphey 2002). See, Table 9.

Table 9. Dakota skipper sites threatened by domestic livestock grazing(Cochrane and Delphey 2002).

Location of Site	Total Extant and Presumed Extant Sites	Sites Threatened by Domestic Livestock Grazing
Minnesota	56	14 (25%)
North Dakota	32	7 (22%)
South Dakota	48	14 (29%)
Manitoba	13	Unknown
Saskatchewan	1	Unknown
Total	150	36 (24%)

vii. Haying

Haying may adversely impact Dakota skipper populations depending on how it is implemented (Cochrane and Delphey 2002). Late season haying appears to have little effect on the health of Dakota skipper populations (Skadsen 1997, Cochrane and Delphey 2002) and some have even suggested it may be beneficial (McCabe 1981). Early season haying however, appears to adversely impact the health of Dakota skipper populations and their habitat (Lenz 1999, Cochrane and Delphey 2002). Cochrane and Delphey (2002) state, “Mowing prairies before or during the Dakota skipper’s flight period, however, deprives adults of nectar sources, favors growth of Kentucky bluegrass, and may kill or cause adult Dakota skippers to emigrate (Royer and Marrone 1992, McCabe 1979, 1981, Dana 1983, Dana 1997)” (p. 30).

According to Cochrane and Delphey (2002), human uses, including early season haying, threaten several Dakota skipper populations. Currently, at least 10% of Dakota skipper populations may be threatened by early season haying, although it is impossible to distinguish early season haying from other human uses based on Cochrane and Delphey (2002). See, Table 10

Table 10. Dakota skipper sites threatened by early season haying (Cochrane and Delphey 2002).

Location of Site	Total Extant and Presumed Extant Sites	Extant Sites Threatened by Early Season Haying
Minnesota	56	6 (11%)
North Dakota	32	6 (19%)
South Dakota	48	3 (6%)
Manitoba	13	Unknown
Saskatchewan	1	Unknown
Total	150	15 (10%)

viii. Controlled burning

While fire is a natural part of the prairie ecosystem and is an important element in sustaining native grasslands (Bragg 1995), the use of prescribed burns to simulate natural fires may threaten the Dakota skipper (Cochrane and Delphey 2002). It is believed Dakota skippers are vulnerable to fire throughout their life cycle (Schlicht 2001). Controlled burning often differs from natural fires in terms of the frequency, intensity, timing, and patchiness. Cochrane and Delphey (2002) state, “For example, controlled fires are often set during dormant periods for native grass species (spring and fall) whereas wildfires mostly occurred during the summer (Bragg 1995)” (p. 30). Controlled burns also often occur more frequently and thoroughly than natural fires (Schlicht and Orwig 1999). Cochrane and Delphey (2002) further state, “...under at least some conditions and when too frequent or extensive relative to the area of suitable habitat, fire is a threat to Dakota skipper populations” (p. 31).

Given the level of fragmentation of prairie habitat today, controlled burns have the potential to burn large amounts of prairie fragments, eliminating all skippers that may exist in the habitat (Cochrane and Delphey 2002). Historically, natural fires were patchy, allowing Dakota skipper to colonize unburned areas (Swengel 1998a). Cochrane and Delphey (2002) state, “Without careful design, prescribed burning on isolated remnant prairies can cause local skipper extirpation (McCabe 1981, Dana 1991, Swengel 1998a, Orwig and Schlicht 1999).

In Minnesota, fewer Dakota skippers were observed on prairie habitat that had experienced controlled burning compared to sites that had been hayed (Swengel and Swengel 1999, Swengel 1998a). Fewer Dakota skipper have also been observed on sites that had experienced controlled burns as compared with grazed sites (Schlicht 1997). The decline of Dakota skipper at Prairie Coteau Preserve in Minnesota has also been attributed to controlled burning (Schlicht 2001). It is believed that controlled

burning caused the extirpation of the Dakota skipper from Iowa (Orwig and Schlicht 1999). Currently, at least 14% of all Dakota skipper populations are threatened by controlled burning, indicating a significant risk to the well-being of the species (Cochrane and Delphey 2002). See, Table 11.

Table 11. Dakota skipper sites threatened by controlled burning (Cochrane and Delphey 2002).

Location of Site	Total Extant and Presumed Extant Sites	Extant Sites Threatened by Controlled Burning
Minnesota	56	16 (29%)
North Dakota	32	2 (6%)
South Dakota	48	2 (4%)
Manitoba	13	Unknown
Saskatchewan	1	Unknown
Total	150	21 (14%)

ix. Control of elimination of natural disturbances

Cochrane and Delphey (2002) state, “Although inappropriate or excessive grazing, haying, and burning threaten Dakota skipper populations, their persistence depends on some type of disturbance implemented at appropriate frequencies and intensities” (p. 31). Accordingly, prairie habitats that are not subject to natural disturbance may undergo succession to shrubs or trees, accumulate excessive litter, have reduced nectar plants, and faced increased risk of nonnative plant invasion (McCabe 1981, Dana 1983, 1997). Populations at several Dakota skipper sites have been reported to be lower than at disturbed sites (Braker 1985, Swengel and Swengel 1999). Currently, management of several Dakota skipper sites precludes allowing natural disturbances from occurring and therefore threatens the species (Cochrane and Delphey 2002).

x. Other threats

At some Dakota skipper sites, the species is threatened by artificial tree planting (Cochrane and Delphey 2002). Tree planting converts prairie habitats to shrublands, forests, or semi-forested habitats and also facilitates the invasion of nonnative plant species (Cochrane and Delphey 2002). Trees also provide habitat for bird species that may prey on Dakota skipper, thereby increasing the threats of predation (Dana 1997). In Minnesota, 9 Dakota skipper sites are threatened by woody encroachment or tree planting, although Cochrane and Delphey (2002) do not distinguish between the two threats.

Additionally, two sites in South Dakota are also threatened by woody encroachment or tree planting (Cochrane and Delphey 2002).

Flooding has also been reported to adversely impact the Dakota skipper as a result of the loss of prairie habitat (Cochrane and Delphey 2002). A Dakota skipper site in South Dakota was lost as a result of rising water levels (Skadsen 1997). A Dakota skipper site in McHenry County, North Dakota is also threatened with flooding (Cochrane and Delphey 2002).

The direct loss of Dakota skipper habitat as a result of mining, road construction, and flooding poses significant risks to the well-being of the species, especially in light of historical habitat losses.

The extinction of Dakota skipper sites in North Dakota has been attributed to, among other things, the disturbance of habitat by heavy machinery (Royer 1997). Bulldozing and the subsequent degradation of Dakota skipper habitat at Killdeer Mountain in Dunn County, North Dakota caused the extinction of a population (Royer 1997). Habitat degradation caused by heavy machinery poses significant risks to the well-being of the Dakota skipper.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes.

i. Purple coneflower collection

The collection of purple coneflower (*Echinacea angustifolia*) for the commercial herbal remedy market may threaten the Dakota skipper (Skadsen 1997, Cochrane and Delphey 2002). Purple coneflowers are an important nectar source for Dakota skipper (Royer and Marrone 1992). While purple coneflower collecting has not been reported, Cochrane and Delphey (2002) state, "...illegal or unregulated harvest could become a problem in Dakota skipper habitats due to economic demands (Skadsen 1997)" (p. 31).

ii. Possible overcollecting of Dakota skipper

Cochrane and Delphey (2002) state, "Although its population biology could make the Dakota skipper sensitive to collection losses at some locations, the present level of scientific collection is incidental and does not threaten the existence of the species (Royer and Marrone 1992)" (p. 32). Therefore, the possible overcollecting of the Dakota skipper does not appear to pose a threat to the species.

C. Disease or Predation

Dakota skippers are known to be preyed upon by "ambush bugs (Hemiptera: *Phymata* spp.), flower spiders (Araneaea: *Misumena* spp.), and orb weavers (various Araneidae)" (Cochrane and Delphey 2002, p. 9, McCabe 1979, 1981). Predation by white crab spiders (Araneida: *Misumenops* spp.), and

robber flies (Diptera: Asilidae) has also been reported (Dana 1991). Disease has also been reported to cause mortality among Dakota skipper (Dana 1991). McCabe (1981) states, “The most important [natural] mortality factor appears to be the bacteria septicemia reported by MacNeill (1964)” (p. 188).

D. Inadequacy of Existing Regulatory Mechanisms

Currently, there exists no national or international protection for the Dakota skipper (Cochrane and Delphey 2002). This lack of protection is significant in that 52% of all Dakota skipper sites are found on private lands (Cochrane and Delphey 2002). Therefore, over half of all Dakota skipper populations receive no protection whatsoever and there is no mechanism in place to prevent private landowners from destroying or degrading habitat or directly causing the mortality of individual species. Furthermore, as will be documented below, no regulatory mechanisms exist to protect the Dakota skipper on Provincial, State, and Federally owned lands. The lack of adequate regulatory mechanisms in place to protect the Dakota skipper poses significant risks to the well-being of the species.

i. State of South Dakota

The Dakota skipper is not protected by South Dakota law and furthermore, no South Dakota law provides a mechanism for protecting invertebrates (Backlund 2001 pers. comm.. cited in Cochrane and Delphey 2002).

ii. State of North Dakota

Cochrane and Delphey (2002) state, “North Dakota Game and Fish Department has the authority under North Dakota Century Code 20.1-02-05(16) to preserve and manage threatened and endangered wildlife, including invertebrates, but has not yet exercised that authority” (p. 32). However, even if the North Dakota Game and Fish Department did exercise their authority under North Dakota Century Code, their ability to adequately protect the Dakota skipper only extends to State of North Dakota lands, which support very few Dakota skipper populations, and also fails to protect Dakota skipper habitat. Therefore, while the Dakota skipper receives no protection due to the failure of the North Dakota Game and Fish Department to exercise their authority, the butterfly would receive very little protection even if the authority was exercised.

iii. State of Minnesota

Dakota skipper is listed as a threatened species under State of Minnesota law. While State of Minnesota law prohibits taking Dakota skippers, the law does not protect Dakota skipper habitat from

destruction and degradation (Cochrane and Delphey 2002). The USFWS (200b2) states, "...this [threatened] designation lacks the habitat protections needed for long-term conservation" (67 Fed. Reg. 40662).

iv. Province of Manitoba

The Dakota skipper is designated an endangered species by Manitoba, but receives little protection as a result (Cochrane and Delphey 2002). According to the USFWS (2002b), "the protections in Manitoba are not sufficient to remove the threats to the species." (67 Fed. Reg. 40662). While Dakota skipper is a candidate for listing as a Canadian Species at Risk, Cochrane and Delphey (2002) state, "...such a listing would confer no legal protection by the Canadian federal government" (p. 33).

v. Province of Saskatchewan

It is unknown what regulatory mechanisms Saskatchewan may have in place to protect the Dakota skipper. However, since only one site is known to exist in the Province, it is unlikely that any regulatory mechanism implemented by Saskatchewan would be adequate to protect the Dakota skipper.

vi. U.S. Fish and Wildlife Service

The Dakota skipper is currently listed as a Candidate species by the USFWS (USFWS 2002b). However, as the USFWS (2002c) states, "Candidate species receive no legal protection under ESA. That is, there are no prohibitions against taking candidate species." Therefore, the Candidate status of the Dakota skipper confers no protection to the species or its habitat.

The USFWS also has the authority to manage Dakota skipper and their habitat on their lands. However, it does not appear that this authority is adequate to protect the species and its habitat. Indeed, of the 9 extant or presumed extant Dakota skipper sites that are owned and managed by the USFWS, only four are considered secure. And, of the four secure sites, all of them are threatened by habitat degradation. Nonnative plant invasion, isolation, and inadequate management by the USFWS threaten the species on National Wildlife Refuges and other USFWS lands (Royer 1997, Cochrane and Delphey 2002). It seems that the USFWS does not adequately utilize its authority to protect the Dakota skipper and its habitat on its lands and to eliminate threats to the species.

The USFWS has also purchased easements to prevent agricultural conversion of Dakota skipper habitat and to prevent haying before July 15. Grassland easements encompass four Dakota skipper sites in South Dakota and North Dakota. However, these easements do not prohibit or restrict domestic

livestock grazing, pesticide use, and other practices that may degrade Dakota skipper habitat (Cochrane and Delphey 2002).

The USFWS has also made conservation recommendations regarding the Dakota skipper (e.g., Cochrane and Delphey 2002). However, while these recommendations may help protect and recover the Dakota skipper if they are implemented, there exists no regulatory mechanism to mandate or assure they will be implemented. Indeed, for over 20 years, many specific management recommendations have been made regarding protection of the Dakota skipper and prairie habitat (see e.g., Opler 1981, Swengel 1991, 1996, 1998b, Royer and Marrone 1992, Moffatt and McPhillips 1993, Schlicht and Saunders 1994, Orwig 1996, Dana 1997, Schlicht 1997b, Panzer 1998, Royer 1998, Skadsen 1999b, Madden et al. 2000, Willson and Stubbendieck 2000, Reis et al. 2001, Britten and Glasford 2002). However, the decline and endangerment of the Dakota skipper speaks directly to the inability of existing regulatory mechanisms to ensure these or other conservation recommendations are implemented.

vii. U.S. Forest Service

The USFS is responsible for managing Dakota skipper and their habitat on the Sheyenne National Grassland (“SNG”) in southeastern North Dakota (USFS 2001b, Cochrane and Delphey 2002). The USFS is required to maintain viable and well-distributed populations of native vertebrate species of wildlife in accordance with the National Forest Management Act (“NFMA”) implementing regulations at 36 CFR § 219.19, although this requirement may soon be repealed (USFS 2002). Additionally, USFS policy has also relegated this protection to invertebrate species, such as the Dakota skipper. See, Forest Service Manual 2670.5(10) (1994) (defining “fish and wildlife” as “Any nondomesticated member of the animal kingdom including, without limitation, any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate, and including any part, product, egg, or offspring, thereof, or the dead body or parts thereof.”). The maintenance of viable populations of native species is supposed to occur through implementation of a Land and Resource Management Plan (“grasslands plan”), which directs management activities on the SNG in accordance with NFMA implementing regulations. The purpose of a such a plan is to guide management of National Forest land, which includes National Grasslands. That management must occur such that the viability of native vertebrate species is maintained.

Unfortunately, the USFS has failed in many regards to fulfill this requirement. Management of the SNG has allowed overgrazing, pesticide and herbicide application, and nonnative plant invasion in Dakota skipper habitat (Royer and Marrone 1992, Cochrane and Delphey 2002). These activities have all degraded Dakota skipper habitat and adversely impacted the species (Royer and Marrone 1992, Royer

1997, Cochrane and Delphey 2002). Royer (1997) states, “The majority of land in the Shoyenne National Grassland has since the 1970s been degraded dramatically by overgrazing and by chemical grasshopper and leafy spurge control efforts, in a majority of sections to the point of elimination of nearly all broad-leaf nectar sources and most native butterfly species” (p. 14). Because of irresponsible management of the SNG, the extirpation of the Dakota skipper from the Grassland is considered to be a certainty (Royer 1997).

Compounding the precarious status of the Dakota skipper on the SNG is the fact that the recently developed grasslands plan fails to provide any meaningful protection to the Dakota skipper and its habitat (USFS 2001a). For example, the entire grasslands plan relies on “Guidelines” to protect the Dakota skipper and its habitat. However, “Guidelines” are not enforceable, are entirely discretionary, and therefore provide no assurance of implementation or effectiveness and no assurance of protection for the Dakota skipper (USFS 2001b). While the USFS (2001b) concludes that the grasslands plan “may adversely impact individuals, but [is] not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide” (p. H-72), there is little support for this determination. Based on observations by other Dakota skipper experts (e.g., Royer and Marrone 1992), the Dakota skipper is greatly imperiled on the SNG (Cochrane and Delphey 2002). Additionally, the USFWS has determined the Dakota skipper warrants listing under the ESA (USFWS 2002b). It does not seem likely that the species is currently viable – both on the SNG and rangewide. By allowing individual Dakota skippers to be impacted on the SNG, the grasslands plan is ultimately failing to protect the species.

The Dakota skipper is designated as a “sensitive species” by the USFS (USFS 2001b). Sensitive species are managed by the USFS in accordance with FSM 2670.22 which states:

1. Develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions;
2. Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands; and
3. Develop and implement management objectives for population and/or habitat of sensitive species[.]

Despite these requirements, this designation has brought little to no increased protection to the species and its habitat on the SNG and has not resulted in the recovery of the species and its habitat on the SNG (Cochrane and Delphey 2002). Indeed, the USFS has been criticized for its failure to appropriately manage Dakota skipper habitat to prevent the species’ decline and endangerment.

viii. Tribal

There are 12 Dakota skipper sites that exist on tribal lands (Cochrane and Delphey 2002). While these sites are afforded no special protection by tribal governments, all of these sites are considered to be secure and face little to no threats. While no regulatory mechanism is in place to protect the Dakota skipper on tribal lands, it appears the species receiving some attention and respect from indigenous communities. However, one Dakota skipper site has become extinct as a result of tribal government leasing lands for domestic livestock grazing, indicating the lack of regulatory mechanisms is taking a toll on some Dakota skipper sites located on tribal lands (Cochrane and Delphey 2002).

E. Other Natural or Manmade Factors Affecting the Continued Existence of the Dakota Skipper.

i. Habitat fragmentation

Fragmentation of Dakota skipper populations, caused by agricultural conversion, conversion for other uses, and habitat degradation, poses significant threats to the Dakota skipper (Cochrane and Delphey 2002). Habitat fragmentation affects the Dakota skipper in many negative ways and poses significant risks to the well-being of the Dakota skipper.

First, habitat fragmentation exacerbates the effects of habitat degradation (Cochrane and Delphey 2002). Habitat fragmentation and the subsequent isolation of populations “eliminates the likelihood that immigrants from other populations will refound extinct populations” (Cochrane and Delphey 2002, p. 28). Therefore, if habitat destruction, degradation, or natural disturbances cause the extinction of a population, it is entirely unlikely that a new population will be founded once habitat is restored.

Second, habitat fragmentation and the subsequent isolation of populations may cause increased genetic drift among Dakota skipper populations (Britten and Glasford 2002, Couvet 2002). Genetic drift decreases genetic variability among a species over time, making the species more sensitive to environmental change and other factors affecting its survival (Britten and Glasford 2002, Cochrane and Delphey 2002). Furthermore, inbreeding among Dakota skipper populations may inhibit the ability of the species to adapt to environmental change and anthropogenic influences (Britten and Glasford 2002).

Third, because Dakota skipper populations are largely fragmented, the effects of natural disturbances and environmental stochasticity, even without habitat destruction and degradation, will have more pronounced effects on the species and continue to cause the decline of the species (McCabe 1981, Schweitzer 1989, Lande 1993, Ruggiero et al. 1994, Swengel 1998a). For instance, extreme weather conditions, natural fires, and natural flooding could wipe out an isolated Dakota skipper population and, due to the species inability to disperse long distances, the population would never again be reestablished

(Royer and Marrone 1992, Cochrane and Delphey 2002). Cochrane and Delphey (2002) state, “Long term (e.g., ≥ 50 year) persistence is only possible where metapopulations composed of interacting demes are large enough to persist when at least some local populations persist” (p. 33).

ii. Vulnerability of small and isolated populations

The small size and isolation of many Dakota skipper populations increases the risk of extinction. Indeed, Cochrane and Delphey (2002) identify 15 or 10% of all extant and presumed extant Dakota skipper sites as threatened with isolation. Additionally, Cochrane and Delphey (2002) consider 16 Dakota skipper sites in Minnesota to be isolated, 15 sites in North Dakota to be isolated, and 16 sites in South Dakota to be isolated. Cochrane and Delphey (2002) state, “Dakota skipper populations are largely isolated from one another” (p. 38). Smaller, more isolated populations are at greater risk of extirpation because there are fewer individual skippers and genotypes available to survive a catastrophic event. Inbreeding depression in small isolated populations, which may already be affecting a number of populations, may result in loss of fitness (Schemske and Lande 1985, Wilcox and Murphy 1985, Brussard and Gilpin 1989, Oostermeijer *et al.* 1995). As a result of their small size and isolation, remaining Dakota skipper populations are subject to genetic drift and restricted gene flow that will decrease genetic variability over time and adversely affect the species’ viability (Britten and Glasford 2002, Couvet 2002). While Dakota skipper metapopulations or groups of local populations connected by dispersal are important for the conservation of the species (Thomas and Jones 1993), they are vulnerable to the effects of genetic drift and may be inbred (Britten and Glasford 2002). Habitat destruction has also reduced the population size, making the Dakota skipper more susceptible to stochastic events (Allee *et al.* 1949, Petersson 1985, Brussard and Gilpin 1989, Hanski *et al.* 1996, Swengel and Swengel 1997). The USFWS (2002a) states, “Due to the extensive historical destruction of native prairie, even populations that inhabit relatively large remnants of native grassland are isolated and are also vulnerable to extinction due to stochastic events, such as exotic plant invasion, severe weather (e.g. hail storms), accidental fire, or escape of planned fires.”

iii. Climate change

Cochrane and Delphey (2002) state, “Global climate change – with projections of increased variability in weather patterns and greater frequency of severe weather events, as well as warmer average temperatures – would affect remnant prairie habitats and would likely be detrimental for Dakota skippers (Royer and Marrone)” (p. 33). Indeed, climate change in North Dakota, South Dakota, and Minnesota is expected to cause increased variability in weather patterns, warmer average temperatures, and increased

threats to prairie species, such as the Dakota skipper (U.S. EPA 1997, 1998a, 1998b). McCarty (2001) wrote, “Ongoing climate change is an additional source of stress for species already threatened by local and global environmental changes, increasing the risk of extinction” (p. 325).

iv. Delayed Protection

The Dakota skipper was placed on the USFWS’s candidate list of species in 1984 (USFWS 1984). Subsequently, populations of Dakota skipper declined, prairie habitat was destroyed and degraded, and the species continued its trend toward extinction (Royer and Marrone 1992, Cochrane and Delphey 2002). In an attempt to stem the tide of extinction, the Dakota skipper was petitioned for listing under the ESA in 1994. The USFWS (1995) subsequently determined listing was not warranted and stated:

The Service believes additional information is required concerning the species and its threats before making the determination that the species is endangered or threatened within the definition of the [Endangered Species] Act. Timely protection and appropriate prairie management might eliminate the need to list the species. (60 Fed. Reg. 10535)

While the Dakota skipper was not listed, the species remained on the Candidate list of species. Yet even after 1995, Dakota skipper populations and habitat have continued to suffer and continued to decline (Cochrane and Delphey 2002). Dakota skipper populations and habitat have declined so much in fact, that the USFWS now believes sufficient information exists to list the species (USFWS 2002b). It therefore seems “timely protection and appropriate management” has not occurred and indeed, the USFWS has concluded that the Dakota skipper is trending toward extinction as a result (Cochrane and Delphey 2002, USFWS 2002a). However, while the Dakota skipper is a Candidate species, there is no requirement that the species be listed under the ESA within any timeframe and there is no guarantee that a listing proposal will be developed at all. The Dakota skipper may remain a Candidate species indefinitely, even while the species continues its decline and trend toward extinction.

The benefits of listing the Dakota skipper under the ESA are tremendous and would most likely stem the species’ trend toward extinction and lead to its recovery. Protection under the ESA would actually protect the Dakota skipper and its habitat on private lands, would require that Federal agencies, such as the USFS, ensure that continued destruction or degradation of Dakota skipper habitat does not occur and that the species remains safe from its threats, and would require a recovery plan be developed for the species. Protection under the ESA would give the USFWS the ability to ensure its conservation recommendations are implemented on Dakota skipper sites in the United States, to ensure the Dakota skipper does not continue to succumb to habitat destruction and degradation, and most importantly,

would give the USFWS a mechanism to conserve the tallgrass and mixed grass prairie ecosystem within the historical range of the Dakota skipper.

Therefore, by keeping the Dakota skipper on the Candidate list indefinitely and delaying ESA protection for the Dakota skipper, the USFWS may be delaying timely protection of the species and its habitat throughout its range in the United States and may be precluding recovery of the species. As the species continues to decline, the ability of the USFWS to adequately protect and recover the species also becomes more limited. Therefore, delaying protection of the Dakota skipper under the ESA may be threatening the species and may pose significant risks to the well-being of the butterfly.

V. CRITICAL HABITAT

This petition requests that critical habitat be designated for the Dakota skipper concurrent with final ESA listing.

VI. ECOSYSTEM PROTECTION UNDER THE ESA

The purpose of the ESA, as described by the Act itself, is to “provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved...” (16 U.S.C. § 1531(b)). The ESA was specifically intended to prevent the extinction of species such as the Dakota skipper, which now faces a high risk of extinction due to the combined threats of extensive prairie habitat destruction and degradation.

Moreover, the ecosystem protection dimension of the ESA’s purpose was not anomalous or unintentional (Rosmarino 2002). Committee reports leading up to the passage of the Act in 1973 consistently endorsed the ecosystem protection goal. A July 1973 House Report commented that “the ecologists’ shorthand phrase ‘everything is connected to everything else’ is nothing more than cold, hard fact” (H. Rep. 93-412: 6) and a Senate Report similarly indicated that species need to be protected due to their “vital biological services to maintain a ‘balance of nature’” (Sen. Rep. 93-307: 2).

In the major subsequent amendments – in 1978, 1982, and 1988 – Congress and the Supreme Court have affirmed this ecosystem protection purpose. In 1978, when the Tellico Dam controversy erupted, pitting a three-inch species of perch against a \$100-million dam, the Supreme Court ruled that a species’ value is incalculable, in part, because of the “unforeseeable place such creatures may have in the chain of life on this planet” (Tennessee Valley Authority v. Hiram Hill (437 US 153 (1978)), pp. 178-179). In short, given the possibility of species extinction causing ecosystem collapse and the likelihood that humans may not know about such consequences before they occur, the value of a species is incalculable and no costs should be spared in preventing its extinction (Rosmarino 2002).

In that same year, although under great pressure by economic interests to exclude “insignificant” species from the ESA’s protections, Congress held firm to its commitment to prevent any species – charismatic or obscure – from being driven into extinction. In large part, Congress made this choice because of the argument that all species play roles in their native ecosystems. Senate bill manager John Culver (D-IA) stated that all species should be protected due to their participation in a “seamless web of interdependency” (1978 Floor: 21287). Sen. John Chafee (R-RI) similarly articulated the purpose of the Act as two-fold, including ecosystem protection and the conservation of endangered species and argued that charismatic species could not be protected unless one safeguarded “the network of life upon which they depend” (1978 Floor: 21147).

In 1982, Congress chastised the USFWS’s discrimination against so-called “lower life forms,” in listing decisions and was influenced, in part, by the argument that such discrimination was indefensible on ecological grounds. Scientists in the hearings leading up to the 1982 amendments vociferously criticized taxonomic discrimination, arguing that it violated Aldo Leopold’s view that “To keep every cog and wheel is the first precaution of intelligent tinkering” (Leopold 1966). The cogs and wheels of which Leopold spoke were species, and the implicit machine of which they were a part (i.e., the subject of one’s tinkering) was the ecosystem. Leopold was metaphorically rebuking the view that any species is insignificant, and his rebuke was made on ecosystemic grounds. Heeding Leopold’s metaphor, House Subcommittee Chairman John Breaux (D-LA) explicitly lamented the loss of “‘cogs and wheels’ of the biological mechanism that sustains life on Earth” on the House Floor (1982 Floor: 12957).

In the most recent set of amendments to the ESA, in 1988, House Subcommittee chairman Gerry Studds (D-MA) endorsed the ecosystem protection purpose of the ESA by quoting John Muir, “[w]henever we try to pick up anything by itself, we find it attached to everything in the universe.” Sen. John Chafee (R-RI) invoked the same sentiment in the Senate (1988 Floor: 18570-71).

Despite the ecosystem protection purpose of the ESA being a prominent part of the Act’s legislative history, at no point has a congressperson questioned the validity of that purpose. Nor has the ESA’s purpose been altered, despite attempts to dilute it with human welfare concerns. Under the present terms of the ESA, the ecosystem protection purpose could be served by listing species like the Dakota skipper, which is an obligate of high-quality prairie habitat and described as one of the best indicators of both mixed grass and tall grass prairie ecosystem health (Royer and Marrone 1992).

The USFWS has itself pledged to enforce the ESA in a way that maximizes ecosystem protection (USFWS 1997). We suggest that the protection of the Dakota skipper, given its dependence upon high quality prairie habitat, would effect such ecosystem-level protection. Our proposal is not an original one, but has in fact been promoted by conservation biologists and legal scholars as a method of obtaining

ecosystem-level protection under the current terms of the ESA (Noss 1991, Houck 1997, Miller et al. 1998/99).

That the Dakota skipper is an excellent indicator of prairie ecosystem health has been well-established by scientists (Kremen 1992, Royer and Marrone 1992). Further, the Dakota skipper is an indicator species facing the severe and ongoing cumulative threats of habitat destruction and degradation, habitat fragmentation, isolation, small population size, climate change, and other threats, alongside a lack of adequate regulatory mechanisms at the state, Federal, and International level (Cochrane and Delphey 2002). Listing the Dakota skipper under the ESA would thus further two primary purposes of the law – to prevent the extinction of native species and to protect the ecosystems on which they depend. FWS should therefore promptly list the Dakota skipper as a threatened or endangered species under the ESA and protect the ecosystems on which they depend.

VII. SUMMARY

The Dakota skipper, *Hesperia dacotae*, is a critically imperiled butterfly species that the USFWS has already determined warrants listing as threatened or endangered and therefore warrants critical habitat designation. The benefits of ESA listing for the Dakota skipper are substantial, as we suggest throughout this petition.

- Listing will require that federal agencies enter into Section 7 consultation with FWS, and carefully consider the potential impacts to Dakota skipper of ongoing and proposed activities under their jurisdictions. The result will be significantly improved protection on federal lands from mining, pesticide and herbicide application, domestic livestock grazing, controlled burning, haying, and other potentially detrimental activities in the form of a proactive approach to implementing conservation actions prior to allowing any Dakota skipper habitat to be impacted.
- Projects involving a federal nexus will also require Section 7 consultation; therefore the benefits of listing will extend to populations occurring on non-federal lands as well, such as Montana Department of Natural Resources lands, State of North Dakota and South Dakota lands.
- The designation of critical habitat, yet another exclusive benefit of ESA listing, will result in significant additional protection not only for occupied habitat but also for other habitat areas deemed essential to the recovery of the species. The ESA prohibits adverse modification of designated critical habitat.
- Listing will result in the development of a recovery plan aimed at biological recovery (and delisting).

- Listing will further interstate coordination in Dakota skipper management.
- Listing will help make Dakota skipper management consistent across land management boundaries.
- Listing will require protections that are not occurring now and will not occur otherwise through requirements for Section 7 consultation and Section 9 prohibitions on take. A conservation plan that involves the states taking active and effective conservation measures seems unlikely, especially given that a large amount of Dakota skipper habitat and populations are privately owned and even the most ambitious scenario involving state and federal agencies adopting their own conservation measures would, at best, result in the reduction of threats to Dakota skipper, not biological recovery.
- Listing will bring much-needed protection to remnant prairie habitats where the Dakota skipper exists. Protection of the prairie ecosystem has the potential to benefit several other imperiled species, including the poweshiek skipperling, regal fritillary, Arogos skipper, Ottoe skipper, and the Federally threatened western prairie fringed orchid. Protection of the prairie ecosystem now will also help to secure a foundation for future and possibly more widespread prairie ecosystem restoration.

As a Candidate species, the USFWS has already determined the Dakota skipper meets at least one of the factors set forth in § 424.11(c) (USFWS 2002b). However, probably all five of the factors set forth in § 424.11(c) are applicable to the present status of the Dakota skipper.

A. The present or threatened destruction, modification, or curtailment of its habitat or range

The Dakota skipper has already experienced significant declines as a result of substantial prairie habitat destruction. Continued habitat destruction due to agricultural and other activities currently threatens the species. Additionally, habitat degradation caused by nonnative plant invasion, pesticide and herbicide application, domestic livestock grazing, haying, controlled burning, control or elimination of natural disturbances, and other activities threaten the Dakota skipper and pose significant threats to the well-being of the species.

B. Overutilization for commercial, recreational, scientific, or educational purposes

The potential commercial collection of purple coneflower, which is a primary nectar source for Dakota skipper, poses threats to the Dakota skipper.

C. Disease or predation

Dakota skipper are known to be preyed upon by several other invertebrate species and potentially some bird species. Naturally occurring disease also causes Dakota skipper mortality.

D. The inadequacy of existing regulatory mechanisms

The Dakota skipper and its habitat receives no protection through National or International law. Additionally, State and Provincial laws are entirely inadequate to protect the Dakota skipper and its habitat. Federal agencies have also failed to provide adequate protection to the Dakota skipper and its habitat on their lands and the species also receives no formal protection on tribal lands.

E. Other natural or manmade factors affecting its continued existence

The fragmentation of Dakota skipper habitat poses many significant threats to the species. Additionally, because of the small size and isolation of many Dakota skipper populations, the species is more vulnerable to the effects of stochastic events. Climate change also threatens the Dakota skipper and the delay of timely protection also threatens the species.

VIII. DOCUMENTS CITED

Petitioners hereby incorporate by reference every document cited in this petition and/or cited in the References below.

IX. 90-DAY FINDING

Petitioners expect to receive a formal acknowledgement of this petition, expeditious finalization of a formal listing proposal and rule, and designation of critical habitat concurrent with a final rule. Petitioners expect to receive a formal acknowledgment of this petition and a decision within 90 days of its receipt.

Respectfully submitted,

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**References Supporting Petition to list the Dakota Skipper (*Hesperia dacotae*) as
Threatened or Endangered**

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