

**PETITION TO LIST THE
Great Basin Silverspot (*Speyeria nokomis nokomis*)
UNDER THE ENDANGERED SPECIES ACT**



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Great Basin Silverspot Butterfly (*Speyeria nokomis nokomis*)

**Petition Submitted to the U.S. Secretary of the Interior, Acting through the Fish and
Wildlife Service**

Petitioner:

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INTRODUCTION

WildEarth Guardians requests that the U.S. Secretary of the Interior, acting through the Fish and Wildlife Service (FWS), an agency within the Department of the Interior, list the Great Basin silverspot butterfly (*Speyeria nokomis nokomis*) as “threatened” or “endangered” under the Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544). Petitioner also requests that the FWS designate critical habitat for the species.

The Great Basin silverspot is a brushfooted butterfly, typically orange-brown with black markings. It is among the largest species in the *Speyeria* genus. It lives in four states in the U.S.: Utah, Colorado, Arizona, and New Mexico. It requires streamside meadows, seepage areas, and marshes in the midst of otherwise desert environment. However, it appears to be extirpated from most known sites.

The Great Basin silverspot is threatened by at least three factors identified in the ESA as listing criteria. Habitat loss and fragmentation due to development, altered hydrology, heavy grazing, mineral extraction, and other human activities are the most severe ongoing threats to the silverspot. It has no legal protection at either the state or federal level, with the exception of populations within the Navajo Nation. Severe weather exacerbated by climate change, biocides, and the synergistic impacts of all the above threats are also a concern.

PETITIONER

WildEarth Guardians is a nonprofit environmental advocacy organization that works to protect endangered species and biodiversity, in part, by securing ESA protection for imperiled species. The organization has more than 14,000 members and maintains offices in New Mexico, Colorado, and Arizona. WildEarth Guardians has an active endangered species program that works to protect imperiled species and their habitat throughout the United States and beyond.

ENDANGERED SPECIES ACT AND IMPLEMENTING REGULATIONS

The Endangered Species Act of 1973 (ESA) protects plants and animals that are listed by the federal government as “endangered” or “threatened” (16 U.S.C. § 1531 et seq.). Any interested person may submit a written petition to the Secretary of Interior requesting him or her to list a species as “endangered” or “threatened” under the ESA (50 C.F.R. § 424.14(a)). An “endangered species” is “any species that is in danger of extinction throughout all or a significant portion of its range” (16 U.S.C. § 1532(6)). A “threatened species” is defined as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. § 1532(20)). “Species” includes subspecies and distinct population segments of sensitive taxa (16 U.S.C. § 1532(16)).

The ESA sets forth listing factors under which a species can qualify for protection (16 U.S.C. § 1533(a)(1)):

- A. The present or threatened destruction, modification, or curtailment of habitat or range;
- B. Overutilization for commercial, recreational, scientific, or educational purposes;

- C. Disease or predation;
- D. The inadequacy of existing regulatory mechanisms; or
- E. Other natural or manmade factors affecting its continued existence.

A taxon need only meet one of the listing criteria outlined in the ESA to qualify for federal listing. If the Secretary determines that a species warrants listing as “endangered” or “threatened” under the ESA, he or she is obligated to designate critical habitat for that species based on the best scientific data available (16 U.S.C. § 1533(b)(2)).

Within 90 days of receiving this petition, the Secretary “shall make a finding as to whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted” (*Id.* at § 1533(b)(3)(A)). “Substantial information” is further defined as “that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted” (50 C.F.R. § 424.14(b)(1)). If the Secretary determines that a species warrants a listing as “endangered” or “threatened” under the ESA, and the species lives within the United States or its waters, he or she is also obligated to designate critical habitat for that species based on the best scientific data available (16 U.S.C. § 1533(b)(2)).

CLASSIFICATION AND NOMENCLATURE

Common name. “Nokomis fritillary” is the generally accepted common name for *Speyeria nokomis* (Miller 1992 at 74), and it is typically used for the subspecies *S. n. nokomis* (Tilden and Smith 1986 at 81, NatureServe 2012 at 1). This subspecies is also commonly called the Great Basin silverspot butterfly (Selby 2007 at 13). Within this petition, “Nokomis fritillary” will be used when referring to the species and “Great Basin silverspot butterfly” (or simply “silverspot”) will be used when referring to the subspecies.

Taxonomy. The petitioned species is *Speyeria nokomis nokomis*. The species’ taxonomic classification is shown in Table 1.

Table 1. Taxonomy of *Speyeria nokomis nokomis*. Source: Selby 2007 at 13.

Class	Insecta
Order	Lepidoptera
Family	Nymphalidae (Brush-footed butterflies)
Subfamily	Heliconiinae
Genus	<i>Speyeria</i>
Species	<i>Speyeria nokomis</i>
Subspecies	<i>Speyeria nokomis nokomis</i>

SPECIES DESCRIPTION

An adult Nokomis fritillary has a wingspan from 6.3 to 7.9 cm (2.5 to 3.1 inches), making it among the largest species in the *Speyeria* genus. The dorsal wing surface of a male is typically orange-brown with black markings, with a lightly to greatly darkened wing base; females have a

dorsal wing surface with a more pronounced darkening of the wing base, while the outer portion is primarily a white-cream or bluish-white color, rather than the orange-brown observed in males. Both sexes have similar ventral wing surfaces, with orange-brown forewings and a ground coloring – ranging from light-to-dark cinnamon brown, deep olive or blackish depending on the subspecies – of the hindwing disc (the area between veins at the wing base) (Selby 2007 at 14). The color of the ventral hindwing disc helps differentiate subspecies (Table 2, Figure 1). The black-bordered silver spots found on their wings are the basis for the “silverspot” common name (Id.).

Table 2. Diagnostic differences between *Speyeria nokomis* subspecies. Source: Selby 2007 at 16

Subspecies	Male	Female
<i>S. n. apacheanna</i>	Yellowish buff	Light olive-green
<i>S. n. carsonensis</i>	Buff; slightly greenish aspect	Buff; olive-yellow aspect
<i>S. n. coerulescens</i>	Red-brown	Brown to green
<i>S. n. nitocris</i>	Deep reddish brown	Black
<i>S. n. nokomis</i>	Light brown	Deep olive

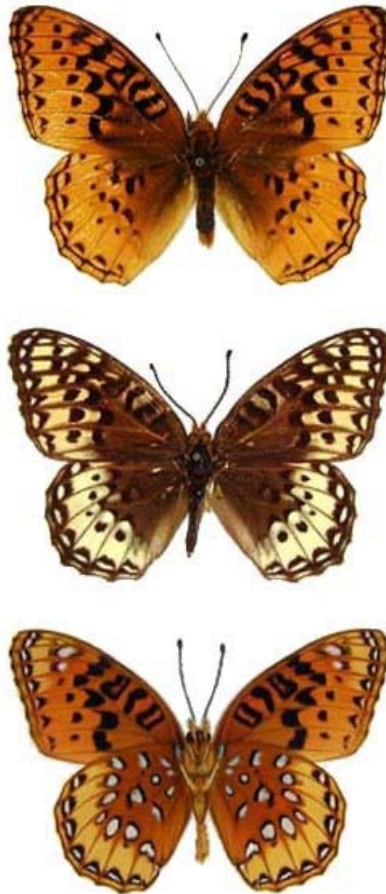


Figure 1. Nokomis fritillary male dorsal (top), female dorsal (middle), and male ventral (bottom). Source: Selby 2007 at 15.

GEOGRAPHIC DISTRIBUTION: HISTORIC AND CURRENT

Nokomis fritillary range. The range of the Nokomis fritillary includes basin and range country from the Sierra Nevada in eastern California through Nevada, Utah, and the Rocky Mountains in western Colorado, and south through eastern Arizona and New Mexico to Northern Mexico. This includes 56 counties in six U.S. states, and three states in Mexico (Selby 2007 at 10-11, 17).

NatureServe has determined that the Nokomis fritillary species is globally vulnerable and has assigned it a Global Heritage Status Rank of G3. The rationale for the G3 ranking cites the species' very spotty distribution in wet places that are associated with generally arid range, disturbance and significant problems at many sites, and increasing isolation of the less than 100 viable metapopulations. (Selby 2007 at 10)

Great Basin silverspot range. The Great Basin silverspot butterfly subspecies has a much more limited range than the Nokomis fritillary species as a whole. "It has been recorded from at least 20 counties in four states (Arizona = 1 county [includes Navajo Nation]; Colorado = 11 counties; New Mexico = 4 counties; Utah = 4 counties)" (Selby 2007 at 17, *see* Figure 2). The Global Heritage Status Rank for the subspecies is critically imperiled (G3T1), based on its limited range, few remaining sites, and significant threats to habitats (NatureServe 2012 at 1, *see* Table 3). Its range encompasses approximately 250-20,000 square km (about 100-8000 square miles), and it is extirpated from most known sites (*Id.* at 2).

Table 3. Natural Heritage Program Global, National, and State Status Ranks¹ for the Nokomis fritillary and its subspecies. Source: Selby 2007 at 12.

	<i>Speyeria nokomis</i>	<i>S. n. nokomis</i>	<i>S. n. nitrocris</i>	<i>S. n. coerylescens</i>	<i>S. n. apacheana</i>	<i>S. n. carsonensis</i>
Global	G3	G3T1	G3T3	G3T1T3	G3T2	G3T1
USA (National)	N3	N1	N3	NX	N2	N1
USA (State)						
Arizona	SNR	SNR	SNR	SH	—	—
California	S3	—	—	—	SNR	S1
Colorado	S1	S1	SNR	—	—	—
Navajo Nation	SNR	S2S3	—	—	—	—
Nevada	SNR	—	—	—	S2	S1
New Mexico	SNR	S1	SNR	—	—	—
Utah	S2?	SNR	—	—	—	—

¹Status Rank Definitions:

G1/T1/N1/S1 = Critically Imperiled	G-ranks = Global Status
Ranks G2/T2/N2/S2 = Imperiled	N-ranks = National Status
Ranks G3/T3/N3/S3 = Vulnerable	S-ranks = State Status
SNR = Not ranked	T-ranks = Global Status

Colorado. Many of Colorado's historic populations have not been seen in more than 15 years. Surveys in 1997 found only two extant populations in Mesa County and Moffat County (Selby 2007 at 19). "The Unaweep Canyon population in Mesa County is probably the largest and most secure population in Colorado, and the second largest population for the subspecies... The

prognosis for all other populations in the state is uncertain” (*Id.* at 31). “[R]ecently verified colonies occur at only four previously known locations in La Plata, Mesa, Montrose, and Ouray counties,” according to the Colorado Natural Heritage Program in 2004 (*Id.* at 19). “At least one population in La Plata County has been eliminated as a result of housing developments, and the putative neotype site in Ouray County was being ‘abusively overgrazed’ when Ellis examined it in September 1989” (*Id.*, internal citations omitted).

Arizona and the Navajo Nation. The only records for the Great Basin silverspot butterfly in Arizona are from Apache County and likely reference the same populations in the Navajo Nation (Selby 2007 at 20). There have been 12-13 breeding populations found in the Navajo Nation, each colony typically 1-2 acres in size. “Most of the populations appear to be stable. Threats include grazing as it is typically practiced in the area (e.g., intense grazing by cows, horses, and sheep) and hydrologic changes resulting from water usage and drought” (*Id.*).

New Mexico. There are historical records of the silverspot from San Juan, Mora, San Miguel, and Taos counties. The San Juan County records likely correspond to the occurrences in the Navajo Nation. No other information is available on the current status of these populations (*Id.*).

Utah. There are historical records of the silverspot from Duchesne, Uintah, Grand, and San Juan counties, though it is theorized that populations west of San Juan and Uintah are hybridized with the Apache fritillary (*S. n. apacheanna*). The Uintah County site, located along Ashley Creek north of Vernal, contains the largest known colony. Extant populations were found in the Uintah County section of Dinosaur National Monument in 1997 and an ovipositing female was observed in Duchesne County in 1969. Updated data are needed for these populations (*Id.*).

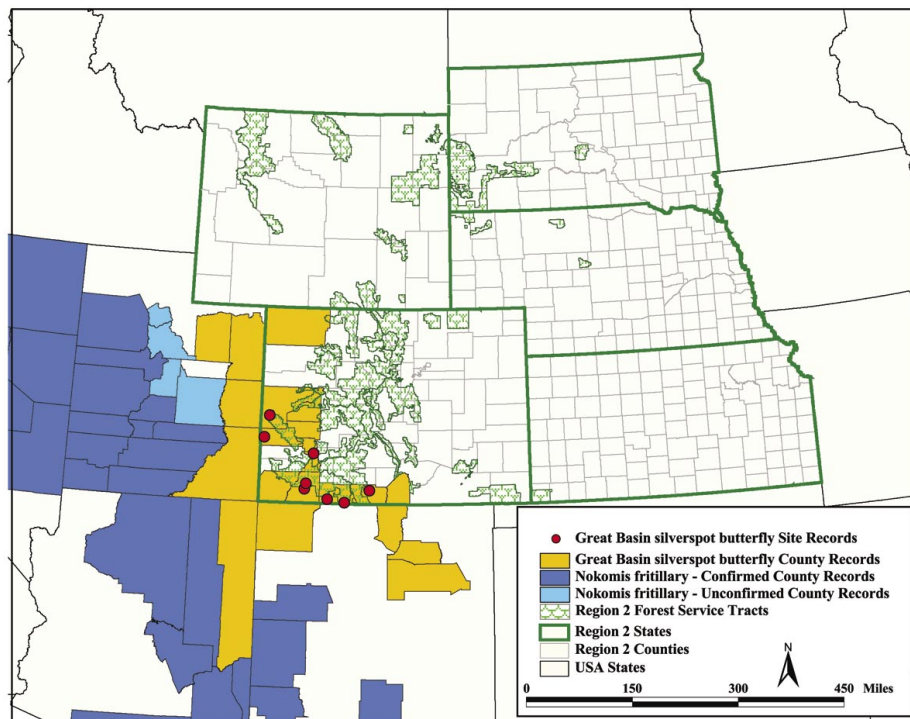


Figure 2. County distribution and Natural Heritage Program records for Great Basin silverspot butterflies and National Forest System lands within Region 2. Source: Selby 2007 at 18.

HABITAT REQUIREMENTS

“The habitat of the Nokomis fritillary is associated with the Upper Sonoran (pinyon-juniper, various shrubs) and Canadian (fir-spruce-tamarack, some pine, aspen-maple-birch-alder-hemlock) Life Zones of the southwestern United States and northern Mexico” (Selby 2007 at 22). Their habitat generally consists of permanent streamside meadows, seepage areas, and marshes in generally desert habitats (*Id.* at 23, NatureServe 2012 at 3). Habitat components critical to sustaining Colorado Great Basin silverspot populations are: spring fed and/or sub irrigated wetlands at >7,500 ft. elevation, larval food plant *Viola nephrophylla*, wet meadows interspersed with willows and other woody wetland species, and adult nectar sources (Selby 2007 at 23). “Great Basin silverspot butterflies are found only at sites with bog violets, the only confirmed larval food source for this butterfly in the wild (*Id.* at 24, internal citations omitted). Population persistence appears to require continuous, connected riparian zones where silverspots can consistently complete their life cycle:

Great Basin silverspot butterflies do not migrate, but they are strong fliers and can move between isolated colonies within a continuous riparian zone. However, it is unlikely that they will disperse long distances between highly isolated riparian systems. Therefore, for those populations to persist, the entire life cycle must be completed successfully each year at each colony or system of colonies within a given riparian system. (*Id.* at 22, internal citations omitted)

LIFE HISTORY

Diet. Violets are the food plants for all members of the genus *Speyeria* and bog violets (*Viola nephrophylla*) are the only confirmed larval food source for the silverspot (*Id.* at 23-24). Conditions for bog violets include soggy soil and shade, typically beneath shrubs such as willows (*Id.* at 24). Adult silverspots utilize an array of plant species as nectar sources; thistles are strongly favored and they appear to prefer blue- and yellow-flowered composites: documented sources include native and introduced thistles, horsemint, and joe pye weed (*Id.* at 23).

Reproduction. Nokomis fritillary males spend much of their time patrolling for receptive females (Selby 2007 at 24). “Following mating, females enter a prolonged period during which there is no further fat body depletion or maturation of the oocytes” (*Id.*). Reproductive diapause (defined as a delay in development in response to recurring periods of adverse environmental stimuli) is a fundamental trait of the genus *Speyeria*’s reproductive cycle. “Termination of reproductive diapause and the initiation of oogenesis (meiotic division and maturation of the oocytes) coincide with shorter photoperiods and rapid increases in the levels of juvenile hormone” (*Id.*, see also Sims 1984, entire). This reproductive strategy may be an adaptation to the seasonal phenology of violets (Kopper *et al.* 2001 430-431).

Oviposition is delayed in many *Speyeria* species, and while it likely occurs in the Nokomis fritillary and its subspecies, specific references documenting this were not found in the literature. Great Basin silverspot butterflies lay eggs singly and haphazardly near their larval host plant. Unlike most other violets species, bog violet leaves are still

green at the time when eggs are laid (late summer to fall), and olfactory cues given off by the plants might help females to select areas with violet concentrations. Hard substrates such as tree trunks, downed logs, and willow stems appear to be preferred for oviposition, and they may provide additional protection for the small first instar larvae during winter diapause (Selby 2007 at 24, internal citations omitted).

Eggs require approximately 17 to 18 days to hatch, given favorable conditions (Id.). Larvae enter winter diapause upon hatching; at this stage, mortality rates are high for most *Speyeria* species (Id.). Development of larva resumes in the spring as violet leaves continue to emerge. There are six larval stages (known as instars), followed by the pupal stage. Data for the time of individual developmental stages has not been not recorded (Selby 2007 at 24-25).

Ecological influences on survival. The size and quality of wetland communities, bog violet populations, nectar sources, and riparian corridors are all important in determining the size of the species population in a given area. The isolated nature of these habitats tends to result in limited reproductive potential, leaving individual populations vulnerable. No evidence has been found to confirm long-distance dispersal. Therefore, it is best to assume that long-distance dispersal is unlikely – which indicates that, if a single colony within a given riparian corridor is extirpated, the probability of repopulation is low (Selby 2007 at 26). Because silverspots have only a single generation per year, it is anticipated that a significant reduction in population would be far more devastating for them than it would be for species that produce multiple generations a year (Id., Panzer 2002 at 1304). Since individual colonies are vulnerable to extinction, it is important to protect multiple groups within an area to create a buffer for the entire population.

Food resources may be a limiting factor:

Long-lived butterflies (e.g., *Speyeria* species) use food resources for egg production, necessitating a constant supply of nectar to maintain maximum fecundity. The availability of diverse nectar sources throughout the adult flight may be a critical factor limiting fecundity. Litter buildup can limit population growth by making it more difficult for first instar larvae to locate foodplants, lowering the abundance and nutritional quality of the foodplants, and reducing flowering of nectar sources. Limited grazing, haying, or fire can be beneficial by removing litter and reducing competition with other vegetation. (Selby 2007 at 26, internal citations omitted)

IDENTIFIED THREATS TO THE PETITIONED SPECIES: CRITERIA FOR LISTING

The Great Basin silverspot butterfly meets at least three of the criteria for listing identified in ESA § 4 (16 U.S.C. §1533(a)(1)) (in bold):

- A. Present or threatened destruction, modification, or curtailment of habitat or range**
- B. Overutilization for commercial, recreational, scientific, or educational purposes
- C. Disease or predation
- D. Inadequacy of existing regulatory mechanisms**
- E. Natural or manmade factors**

(Factor A) The Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Human disturbances have been responsible for serious population declines in the Nokomis fritillary (Hammond and McCorkle 1983 at 219). Great Basin silverspot butterflies are restricted to streamside meadows and seepage areas with an abundance of their larval foodplant (bog violets) and adult nectar sources. Conditions for this habitat are scarce and tend to occur in isolated spots associated with permanent sources of flowing water within the arid landscape of the southwestern United States (Selby 2007 at 29). The trend in the area is one of habitat loss:

More than half of wetlands in the Great Basin, which is otherwise considered an arid landscape, have been completely eliminated in the last 150 years. Remaining wetland communities, which include springs, seeps, and riparian areas, are now more isolated than they were historically and are subject to diverse impacts from human activities, receiving disproportionate use in the form of recreational vehicles, livestock grazing, water diversions, and well development. (Sanford 2011 at 716, internal citations omitted)

While silverspots can move between isolated colonies within a continuous riparian zone, it is unlikely that they will disperse long distances between highly isolated zones. Because of this, loss of one colony may cause unrecoverable losses in the overall population (*Id.* at 26). Habitat loss constitutes the greatest historic, current, and future threat to the long-term survival of the Great Basin silverspot butterfly (Selby 2007 at 3).

Development. At least one colony in La Plata County, Colorado, has been eliminated by housing development (Selby 2007 at 29). Gravel mining has disturbed a colony in the same area (*Id.*). The human population of La Plata County grew an estimate 2.1 percent between April 1, 2010 and July 1, 2012 (Census 2013a at 1). Continued population growth will likely mean continued development pressures on habitat and resources. Two of the other four Colorado counties with recently recorded extant populations (*see* “Geographic Distribution: Historic and Current,” *above*) experienced growth during the same time period (Ouray county, 2.1 percent (Census 2013b at 1), Mesa county, 0.8 percent (Census 2013c at 1)). The single county in Arizona with a recently recorded extant population has experienced a similar level of growth (Apache County, 2.3 percent (Census 2013d at 1)).

“Rampant” mineral development was noted as a potential threat to populations on private land in Uintah County, Utah (Selby 2007 at 20). Of all the counties with extant populations of silverspot, this one is experiencing the fastest growth in human population: 5.9 percent (Census 2013e at 1).

Altered hydrology. Larval foodplants required by the various Nokomis fritillary subspecies rely on a constant source of water throughout the summer. Altering hydrology is likely to impact wetland communities and, by proxy, silverspot butterflies (Selby 2007 at 29). New Mexico “is a semi-arid state where water can be locally scarce... Modern modification of hydrologic environments by human activities further fragments these habitats and may threaten survival of some obligate riparian butterflies, such as *Limenitis archippus*, *Speyeria nokomis*, and *Ochlodes yuma*” (Cary and Holland 1992 at 61). These threats are not limited to New Mexico: “[t]he wetlands necessary to this butterfly’s survival are subject to draining, capping of springs,

development, and other causes. Several populations have been lost in the past due to the above factors... This species is dependant on wetlands fed by springs or seeps and any alteration of the vegetational composition of these grasslands by draining, capping of springs, development, and other causes has resulted in local extirpations” (FS 2001 at 2). Water diversion and storage projects are among the biggest threats (Selby 2007 at 29). Capping springs and draining wetlands for cultivation have also been identified as threats (Id.).

Logging, road construction, and other forms of development can affect hydrology. An example provided by Cary and Holland (1992 at 61): in the Sacramento Mountains of New Mexico, tree removal in the early 20th century resulted in rapid runoff of storm water, leading to extensive gullying, which ultimately lowered the water table. The effect of this was devastating to the landscape’s ability to support Nokomis fritillaries, as miles of streamside wet meadows that had supported bog violets were converted into dry meadows.

Exotic species. Because Great Basin silverspot butterfly colonies occur in isolated fragments within riparian corridors, they are often surrounded by altered or degraded habitats where exotic species are abundant. According to Ellis (1989, *quoted in* Selby 2007 at 30), “noxious herbaceous weed invasion probably represents the most serious and most intractable ecological threat to the maintenance of native plant species diversity within these wetlands.” If left unchecked, perennial species such as Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphorbia esula*) can replace diverse native communities with dense monocultures (Selby 2007 at 30).

Grazing impacts. Livestock grazing impacts include reduced nectar availability and vegetation cover, soil compaction, and reduced water infiltration (Fleishman *et al.* 2002 at 713). Excessive grazing can be a serious threat to Nokomis fritillary habitats, as it can lead to a loss of larval host plants and can introduce invasive, non-native grasses (Id.). Therefore, timing and intensity of grazing are critical to the conservation of Nokomis fritillaries: sustained and intense grazing is not recommended. “Grazing, as it is typically practiced, is generally a threat... while violets might persist, nectar sources are often negatively impacted” (Selby 2007 at 30).

Habitat fragmentation. The research conducted by Williams *et al.* (2003, summarized in Selby 2007 at 25) regarding the impacts of habitat fragmentation and isolation in regal fritillaries showed that fragmented populations tend to increase differentiation and decrease genetic diversity when compared with unfragmented populations. Over time, this could reduce population fitness as inbreeding increases and heterozygosity decreases. Preliminary conclusions from a genetic study of Great Basin silverspots and Apache fritillaries suggest that “(1) there is very little genetic variation in these populations; (2) they either share a recent common ancestry (likely) or a lot of gene flow (unlikely); and (3) they have suffered from many population bottlenecks” (Selby 2007 at 25).

Research on the closely related Apache fritillary supports the need for high-quality habitat patches: “patch quality can supersede patch geometry as an explanation for metapopulation dynamics” (Fleishman *et al.* 2002 at 713) and “extinction and colonization events may be more closely related to multiple aspects of habitat quality that are not static in their relative importance” (Id. at 715). “[D]isturbance [mainly cattle grazing in the cited study] tended to be

negatively correlated with occupancy and colonization and positively correlated with extinction” while nectar availability and larval host plants were correlated with occupancy (Id. at 713). “Probability of occupancy decreased as litter increased, perhaps because heavy (as opposed to moderate) cover of litter may impede oviposition” (Id.).

(Factor B) Over-utilization for commercial, recreational, scientific, or educational purposes

Collecting rarely has an impact on insect populations due to their high reproductive capabilities and should not generally be a problem for most butterflies. Destruction of habitat and/or food resources is usually the primary factor responsible for population declines. However, populations that are already depressed or concentrated in small habitat fragments, like Great Basin silverspot butterflies, can be more sensitive to overcollecting. In addition, amateur and commercial collectors both value this species. When females are removed before they have a chance to reproduce, populations can be further reduced. (Selby 2007 at 31, internal citations omitted)

(Factor D) The Inadequacy of Existing Regulatory Mechanisms

The Global Heritage Status Rank for the subspecies is “critically imperiled.” However this provides no protection and despite this designation, existing regulations have failed to prevent severe declines in this species’ distribution and abundance.

Federal protection. The Great Basin silverspot was designated as a candidate for listing under the Endangered Species Act (ESA) until 1996, when it was removed from the candidate list (Selby 2007 at 12).

In Forest Service Region 2, this subspecies is found only in western and south-central Colorado and the Forest Service lists it as “sensitive.”¹ The rationale for the listing cites the small and isolated nature of silverspot populations, compromised metapopulation dynamics, and pervasive loss and modification of the very limited springs and spring-fed wetlands that they require (FS 2003, *see also* FS 2001, entire). There is “[n]o available data on population numbers and variation from year to year but known losses of populations point to an overall declining population (FS 2001 at 1). The species is also listed as “sensitive” in Forest Service Region 3 (Arizona and New Mexico), where it is threatened by “[h]erbicide, improper livestock grazing, hydrologic changes... [and p]otentially overcollecting (FS 2007 at 25). It is a “[n]arrow endemic [and has a l]imited range with few remaining sites and significant threats to habitat” (Id.).

Forest Service Sensitive Species Policy... calls National Forests to assist states in achieving conservation goals for endemic species; to complete biological evaluations of programs and activities; avoid and minimize impacts to species with viability concerns; analyze significance of adverse effects on populations or habitat; and coordinate with states, U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). The Forest Service Manual... defines Sensitive Species as "those plant and

¹ <http://www.fs.usda.gov/wps/portal/fsinternet/detail/r2/plants-animals/?cid=stelprdb5350842>

animal species identified by a Regional Forester for which population viability is a concern as evidenced by significant current or predicted downward trend in numbers or density" and... "habitat capability that would reduce a species existing distribution."²

"Listing of the Great Basin silverspot butterfly as a sensitive species in USFS Regions 2 and 3 does not confer legal protection, but it does help to ensure that appropriate conservation/management objectives and practices are implemented on National Forest System lands" (Selby 2007 at 12).

Navajo Nation. The Navajo Nation has granted the Great Basin silverspot butterfly a Group 3 designation (i.e. "prospects of survival or recruitment are likely in jeopardy in the foreseeable future") which grants it legal protection as an endangered species (Selby 2007 at 12). However this only provides protection to the populations within the Navajo Nation, leaving the rest unprotected.

State protection. The Nokomis fritillary and its subspecies do not have legal protection at the state level. While the silverspot subspecies is afforded protected status in the Navajo Nation, it has no legal protection or designations in any of the states where it occurs (Id.).

(Factor E) Other Natural or Man-made Factors Affecting its Continued Existence

Biocides. Indiscriminant use of insecticides for pest control on rangeland or adjacent cropland can be a major direct threat to Great Basin silverspot butterflies (Selby 2007 at 30). The broadcast of herbicides can affect communities by eliminating larval foodplants and nectar sources (Id.; *see also* Moffat and McPhillips 1993 at 10-11). Selective application can be an effective method of controlling exotic species or invasive vegetation; however, the high water table associated with silverspot habitats might make safe application difficult. Non-persistent herbicides (e.g. glyphosphates) are preferable to persistent herbicides (e.g. picloram), but they may not be as effective. Broadcast spraying with broadleaf herbicides is common in range management, but is not recommended for native systems as this would likely damage native forbs along with targeted invasive species (Id. at 33, *for more detail see* CDNR 2004)

Climate change. Climate change is impacting temperatures and water resources in the Great Plains.

Significant trends in regional climate are apparent over the last few decades. Average temperatures have increased throughout the region, with the largest changes occurring in winter months and over the northern states. Relatively cold days are becoming less frequent and relatively hot days more frequent. Precipitation has also increased over most of the area... Projected changes in long-term climate and more frequent extreme events such as heat waves, droughts, and heavy rainfall will affect many aspects of life in the Great Plains. These include the region's already threatened water resources, essential agricultural and ranching activities, unique natural and protected areas, and the health and prosperity of its inhabitants. (USGCRP 2009 at 123)

² See www.fs.fed.us/r9/wildlife/tes/faq.shtml.

Climatic warming and droughts can affect butterflies by altering the hydrology of wetlands. The first instar larvae are susceptible to extreme winter weather, late spring hard frost, severe storms, or cool damp conditions. Severe storms can cause direct adult mortality, while prolonged periods of cool temperatures, overcast skies, or rain can limit reproduction by limiting adult activity (Selby 2007 at 31). The FWS should investigate the possible impacts of climate change on the regal fritillary and its habitat.

Synergistic effects. Brook *et al.* (2008 at 453) open their article by stating that “[i]f habitat destruction or overexploitation of populations is severe, species loss can occur directly and abruptly. Yet the final descent to extinction is often driven by synergistic processes (amplifying feedbacks) that can be disconnected from the original cause of decline.”

The aforementioned threats could work synergistically to cause the extinction of the silverspot. “Ongoing habitat destruction and fragmentation are the primary drivers of contemporary extinctions... synergistic interactions with hunting, fire, invasive species and climate change are being revealed with increasing frequency” (Brook *et al.* 2008 at 457). In this context, “synergistic” describes the “simultaneous action of separate processes (extrinsic threats or intrinsic biological traits) that have a greater total effect than the sum of individual effects alone... For instance, habitat loss can cause some extinctions directly by removing all individuals over a short period of time, but it can also be indirectly responsible for lagged extinctions by facilitating invasions, improving hunter access, eliminating prey, altering biophysical conditions and increasing inbreeding depression” (Brook *et al.* 2008 at 453).

The silverspot is already at risk due to habitat loss and fragmentation, small populations, and lack of protective regulation. The risk of extirpation is increased due to the synergistic interaction of these threats. Existing regulatory measures are insufficient to protect the silverspot population from further decline. Listing the silverspot as “threatened” or “endangered” under the ESA would provide needed regulation to halt further decline of this species. In addition, listing the silverspot under the ESA would ensure adequate habitat protection, take restrictions, and recovery planning for the species (*see* 16 U.S.C. § 1538(a)(1)(B)).

CONCLUSION AND REQUESTED DESIGNATION

WildEarth Guardians hereby petitions the U.S. Fish and Wildlife Service within the U.S. Department of Interior to list the Great Basin silverspot butterfly (*Speyeria nokomis nokomis*) as an “endangered” or “threatened” species pursuant to the ESA. This listing action is warranted, given that Great Basin silverspots are threatened by three of the five listing factors: present and threatened destruction, modification, and curtailment of habitat and range; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors. Overutilization is a potential threat as well. WildEarth Guardians also requests that critical habitat be designated for this species in its U.S. range concurrent with final ESA listing.

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