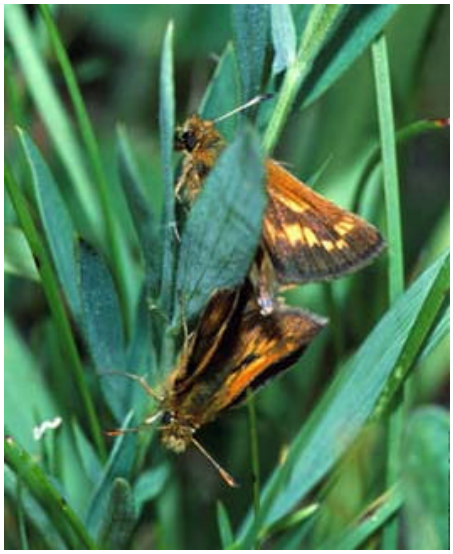
PETITION TO LIST

THE MARDON SKIPPER BUTTERFLY

(Polites mardon)

AS AN ENDANGERED SPECIES

UNDER THE U.S. ENDANGERED SPECIES ACT



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Submitted by

The Xerces Society,
Gifford Pinchot Task Force,
The Northwest Environmental Defense Center,
Center For Biological Diversity,
Oregon Natural Resources Council,
Friends of the San Juan's, and
Northwest Ecosystem Alliance

December 10, 2002

Ms. Gale Norton
Secretary of the Interior
Office of the Secretary
Department of the Interior
18th and C Street N.W.
Washington D.C., 20240

Dear Ms. Norton,

The Xerces Society, Center for Biological Diversity, Gifford Pinchot Task Force, Northwest Environmental Defense Center, Northwest Ecosystem Alliance, Oregon Natural Resources Council and Friends of the San Juans hereby formally petition to list the Mardon skipper (*Polites mardon*) as endangered or threatened pursuant to the Endangered Species Act, 16 U.S.C. 1531 *et seq.* This petition is filed under 5 U.S.C. 553(e) and 50 CFR 424.14 (1990), which grants interested parties the right to petition for issue of a rule from the Assistant Secretary of the Interior.

Petitioners also request that critical habitat be designated concurrent with the listing, as required by 16 U.S.C. § 1533(b)(6)(C) and 50 CFR 424.12, and pursuant to the Administrative Procedures Act (5 U.S.C. 553).

The Mardon skipper *(Polites mardon)* has a limited, disjunct geographic range, its habitat is under significant and immediate threat, and it is divided into separate subspecies, which must be individually preserved to effect the conservation of the species. We are aware that this petition sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service and very specific time constraints upon those responses. 16 U.S.C. § 1533(b).

Sincerely,

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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.

Gifford Pinchot Task Force The mission of the Gifford Pinchot Task Force is to act as an advocate for the ecosystems and communities of Southwest Washington with particular focus on the Gifford Pinchot National Forest. We promote an increasing ecologically sustainable use of public forests, with recognition of all ecologically important benefits derived by local economies from non-consumptive uses.

The Northwest Environmental Defense Center is a non-profit conservation organization dedicated to the protection of the natural heritage of the Pacific Northwest. It was founded at Lewis and Clark Law School in 1969.

Center for Biological Diversity Combining conservation biology with litigation, policy advocacy, and an innovative strategic vision, the Center for Biological Diversity is working 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.

Northwest Ecosystem Alliance was established in 1988 and is a non-profit 501(c)(3) public interest organization incorporated in the State of Washington. NWEA and its members are dedicated to the protection and restoration of biological diversity. NWEA conducts research and advocacy to promote the conservation of sensitive and endangered wildlife and their habitat in the northern Pacific region.

Oregon Natural Resources Council's mission is to aggressively protect and restore Oregon's wild lands, wildlife and waters as an enduring legacy. One of our top goals it to protect and restore habitat for native species, including rare and imperiled species such as butterflies.

Friends of the San Juans mission is to protect and promote the health and future of the San Juan Islands: land, water, natural and human communities.

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I. EXECUTIVE SUMMARY

The Mardon skipper butterfly (*Polites mardon*) is a small, tawny-orange butterfly dependent upon native, fescue-dominated grasslands in Washington, Oregon, and northwest California. Mardon skippers were likely more widespread and abundant prior to large-scale loss of their open, grassland habitat. This habitat has declined dramatically in the past 150 years due to agricultural and residential sprawl, fire suppression, livestock grazing, and introduction of exotic species. For example, in western Washington, 95% of the native prairie grasslands have been destroyed. These pressures have reduced the Mardon skipper to just four small, geographically isolated areas: south Puget Sound, the Cascade Mountains in southern Washington, the Siskiyou Mountains in southern Oregon, and coastal northern California.

Within these four general areas, the Mardon skipper has been recorded at 37 sites. But it has recently been extirpated from four sites in south Puget Sound and one in the southern Washington Cascades and the current status of four other sites in Washington is uncertain. All of the remaining sites are very small, most measuring just a few acres. Most sites support less than 50 butterflies; none support more than a few hundred. The butterflies are threatened by insecticides, control practices for invasive plants, military training, fire, recreational activities and facility development. The grassland and savanna landscapes upon which Mardon skippers depend are threatened today by forest encroachment, invasion by native and non-native plants, development, recreational activities, grazing, agricultural practices, and application of herbicides. None of the sites are managed for Mardon skipper conservation.

The disjunct nature of the four areas and thirty-seven sites alone places the Mardon skipper at risk of extinction. Small, isolated populations are much more likely to go extinct than large, interconnected populations. In the short term, each Mardon skipper population must be preserved. In the long-term, existing populations must be expanded, new populations must be established, and habitat between populations must be protected to ensure metapopulation connectivity.

There is no mandated or dedicated funding for managing any Mardon skipper habitat. Although the Mardon skipper is listed as endangered by the state of Washington and is a federal candidate species, this affords no habitat protection on state, federal, private or Yakama Indian Nation land. The populations in Oregon and California are also afforded no protection under any local, state or federal statutes.

The Mardon skipper meets four criteria under the Endangered Species Act for consideration as a threatened or endangered species: 16 U.S.C. § 1533 (a)(1)(A)(D)&(E) (Section 4):

(A) The present or threatened destruction, modification, or curtailment of its habitat or range.
(B) Overutilization for Commercial, Recreational, Scientific, or Educational Purposes
(D) The inadequacy of existing regulatory mechanisms.
(E) Other natural or manmade factors affecting its continued existence.

The Mardon's skippers historic decline, current vulnerability, and lack of significant state or federal conservation efforts qualifies it for listing as endangered or threatened under the federal Endangered Species Act. Listing will entail establishment of specific "critical habitat" conservation areas, increased

funding for research and conservation, a requirement that federal land managers take pro-active steps to conserve the species and its habitat, and will ensure mitigation for destruction of biologically essential private land parcels.

II. BACKGROUND, STATUS AND LISTING HISTORY

The Mardon skipper *(Polites mardon mardon)* in Washington and northern California has a Global Heritage Status Rank of G2G3T2T3 and a rounded Global Heritage Status Rank of T2 and the United States National Heritage Status Rank is N2N3 (01Jun1999). *Polites mardon klamathensis* in southern Oregon has a Global Heritage Status Rank of G2G3T1T2 and a rounded Global Heritage Status Rank: T1 The United States National Heritage Status Rank is N1N2 (01Jun1999).

The listing process for the Mardon skipper began 13 years ago when the U.S. Fish and Wildlife Service placed it on the lists of "candidates" for federal protection. It was classified as a C2 on the 1989, 1991, and 1994 candidate lists. After the C1 and C2 designations were dropped by Interior, it was classified as a Candidate species on the 1999, 2001, and 2002 candidate lists. Candidate designation does not confer protection for the species or its habitat. Indeed, large acreages of Mardon skipper habitat have been destroyed during the species' long wait on the candidate list. It has been extirpated from several sites during this period.

The Washington Fish and Wildlife Commission listed it as a state endangered species in 1999 (WAC 232-12-014). The state law does not protect habitat, however, and has proven inadequate to protect individuals of the species. It is not listed as a protected species in Oregon or California.

III. SPECIES DESCRIPTION

The Mardon skipper is a small (20-24 mm; <1 inch), tawny-orange butterfly with a stout, hairy body. The upper surface of both wings is orange with broad dark borders. The wings from below are light tan-orange with a distinctive pattern of light yellow to white rectangular spots. Males are smaller than females and have a small, dark brown streak (stigma) on the upper surface of the forewing. Like most members of the *Hesperiinae* sub-family, Mardon skippers have a fast, skipping flight, bent antennae clubs, and a characteristic basking posture in which the forewings are held at a 45-degree angle and the hind wings are fully spread.

IV. TAXONOMY

The Mardon skipper *(Polites mardon*) is in the family *Hesperiidae* (skippers) and the subfamily *Hesperiinae* (grass skippers). It was first described by W. H. Edwards (1881) from specimens taken near Tenino, Thurston County, Washington by H. K. Morrison (Dornfeld, 1980). Mattoon et al. (1998) recognizes two subspecies: *Polites mardon mardon* in Washington and Del Norte County in northern California, and *Polites mardon klamathensis* in Klamath and Jackson Counties of southern Oregon.

V. POPULATION DISTRIBUTION AND STATUS

A. Historic Distribution

The historic range and abundance of Mardon skippers is not precisely known because systematic and quantitative studies were not conducted prior to 1980. It is clear, however, that the species has suffered significant range contraction and population decline as the grassland habitats with which it is associated have been lost or degraded. (Potter et al., 1999). For example, Northwest grasslands were formerly much healthier, larger, and interconnected—conditions that would have supported a greater distribution and abundance of Mardon skippers.

Historically, Mardon skippers were collected from three counties in Washington (Thurston, Klickitat, and Yakima), two counties in Oregon (Klamath and Jackson), and Del Norte County, California (Mattoon *et al* 1998; Potter *et al*., 1999).

B. Present Distribution [1]

The Mardon skipper is now known from 37 sites located in four geographic areas: (1) southern Puget Sound, (2) the Mt. Adams area (eastside of the Cascade Mountains) in southern Washington, (3) the Siskiyou Mountains in southern Oregon, and (4) Del Norte (north-coastal) California (Potter and Fleckenstein, 2001). All of the sites are small, with the majority supporting less than 50 individuals. No sites are known to support more than several hundred individuals.

1. Puget Sound Prairie Areas

When surveys for this butterfly were initiated in the 1990's, Mardon skipper populations were known at eight sites around the Tenino Prairie in Thurston County, Washington. Despite intensive surveys in recent years, Mardon skippers have not been found at four of these historic Puget prairie sites and they are thought to be extirpated from them (Potter et al., 1999). It is also thought (although evidence is not conclusive) that the Mardon skipper is extirpated from a fifth site (Potter, pers. comm., 2002). *Therefore the Mardon skipper is extant at only three Puget Sound sites.* Populations were estimated for two of the sites in 1998, with one population having 50 to 80 individuals and another only 5 to 10 individuals (Table 1) (Potter et al., 1999).

[1] Mardon skippers are known from 37 "sites" in four geographic areas. While there is likely no interaction between these areas, it is difficult to speculate on the population structure within and between "sites." For this reason, the petition uses "sites" rather than "populations" as the basic unit of discussion, except where expressly discussing population dynamics and conservation.

Table 1: Status of Washington Puget Sound Mardon skipper sites. (Modified from Potter et al 1999)

Site Name	Observed 1997	Observed 1998	Estimated population 1998	Status
Puget Prairie 1	50	17	Unknown	Occupied
Puget Prairie 2	3	2	5-10	Occupied
Puget Prairie 3	50	30	50-80	Occupied
Puget Prairie 4	0	0	0	Extirpated
Puget Prairie 5	0	0	0	Extirpated
Puget Prairie 6	0	0	0	Extirpated
Puget Prairie 7	0	-	0	Extirpated
Puget Prairie 8	0	0	0	Uncertain*

* This site is now thought to be extirpated (Ann Potter, pers. comm., 2002)

2. Mt. Adams Area

Before the 2000 field season, only nine Mardon skipper sites were known on the federal, state, tribal and private land centered around Mount Adams in south central Washington. During the spring and summer of 2000, combined agency surveys of 77 potential sites confirmed Mardon skipper at 19 of them. At the same time, six of the nine historic sites were surveyed. Five of these sites were found to still have the butterfly, while it had been extirpated from one. With the newly discovered sites there are now a confirmed 29 sites in Washington's southern Cascades (Potter and Fleckenstein 2001). All of the sites are small and at risk.

The three extant sites around Mt. Adams that were known prior to 2000, but were not resurveyed, are located on Yakama Nation lands where access was denied. These sites were a priority for survey as this area was exposed to large scale spraying of *Bacillus thuringiensis var. kurstaki* in 1999 (Potter and Fleckenstein 2001).

Numbers of individuals are low at many sites (Potter and Fleckenstein 2001). Notably, only five sites in this area were found to have 50 or more Mardon skippers and, at twelve sites, fewer than ten individuals were found (Potter and Fleckenstein 2001). Furthermore, there is evidence that at least some of these sites are in decline. For example, a *partial* survey of one site in 1998 found 20 to 30 individuals. That same site was revisited four times in 2000, including two complete site surveys. Of these four visitations, the most successful survey found only nine individual Mardon skippers; a substantial decline from the robust population that was found at this site in 1998. This drop has been attributed to Btk spraying near the site in 1999 (Potter and Fleckenstein 2001).

3. Siskiyou Mountains Area

Three Mardon skipper sites are located within a 10-mile radius of each other in the Siskiyou Mountains of southern Oregon (Jackson and Klamath counties). During a visit in July 1999, Runquist (1999) found about 100 Mardon skipper individuals at the primary site near Soda Mountain Road. The populations of the other two sites are thought to be much smaller, but recent surveys have not been

completed (Mattoon, pers. comm., 2002). These populations reside within the boundaries of the Cascade-Siskiyou National Monument between Soda Mountain and Fish Lake (US Dept. of Interior 2001). Mattoon et al. (1998) recently proposed these Oregon populations be considered a separate subspecies, *Polites mardon klamathensi*s.

4. Del Norte County Area

There is a single known coastal California site in Del Norte county, California (Mattoon pers. comm., 2002). The site may support 100 to 150 individuals during peak years in its 1-2 acre core area (Mattoon, pers. comm., 2002).

5. Mount Shasta Area

In 1991, one individual was found near Yreka in an area north of Mount Shasta in Siskiyou county, California (Mattoon et al., 1998). Subsequent sampling in the years following 1991failed to locate additional specimens or any suitable habitat (Mattoon, pers. comm., 2002). According to Mattoon (pers. comm., 2002) the individual was likely collected in southern Oregon the week before and was mistakenly included in with other butterflies from the Mt. Shasta area.

VI. HABITAT REQUIREMENTS AND STATUS

In the Puget lowlands, the Mardon skipper is found on glacial outwash prairies where it inhabits open grasslands with abundant Idaho fescue (*Festuca idahoensis)* interspersed with early blue violet. They are found in areas with only limited cover of Scotch broom (*Cytisus scoparius*) . In the Mt. Adams area, the Mardon skipper is found in openings, *Ceanothus* breaks, meadows and fescue grasslands within Ponderosa pine savanna/woodland, at elevations ranging from 1900' to 5100' (Pyle, 2002). Mt. Adams sites vary in size from small meadows, (half-acre or less), to large grassland complexes, and site conditions range from dry, open ridge tops to areas associated with wetlands or riparian habitats (Potter et al., 1999). The southern Oregon populations occur in meadow habitats surrounded by incense cedar (*Calocedrus decurrens*), white fir (*Abies concolor*) Douglas-fir (*Pseudotsuga menziesii*), Oregon grape (*Mahonia* spp), bedstraw (*Galium* spp), and wild cherry clover (*Trifolium* sp.) (Mattoon et al., 1998). The population in Del Norte County California is located in the edge of a fog break area with serpentine soil (Mattoon et al., 1998).

A. Habitat Status

Grasslands once common across much of the lowland landscape from southern Vancouver Island south through western Washington and into the Willamette Valley of Oregon are now nearly gone. Mardon skippers were likely more widespread and abundant prior to large-scale loss of this open, fescue-dominated, grassland habitat. Currently, no sites are managed specifically for Mardon skipper conservation.

The vast majority of this grassland habitat was lost during the past 150 years due to development, livestock grazing, fire suppression, and invasion by native and non-native plants. Prairies covered hundreds of thousands of acres of pre-settlement south Puget Sound (Crawford and Hall, 1997). Today, less than 3% of that original landscape remains and much of it is degraded or bears competing human uses (Crawford and Hall, 1997).

Current and historic Mardon skipper sites are under the jurisdiction of various federal, state, local, private, and tribal landowners, with the bulk of the populations on federal land. While five of the eight Puget Sound sites are managed, at least in part, for native prairie vegetation (Potter et al., 1999), all remaining sites in Washington, Oregon and California lack planning for grasslands or butterflies. During 1997-98 surveys recent and significant habitat alterations were noted at four historic locales in the south Puget Sound (Potter et al., 1999). Broadcast spreading of cow manure applied over a period of years resulted in near elimination of native bunchgrass from one Puget Prairie site. At another Puget Prairie site, bulldozing removed vegetation and leveled topography in the *Festuca*-dominated portion of the site. Roadwork at two Washington Cascade sites resulted in near complete loss of native *Festuca* bunchgrass from these locales (Potter et al., 1999).

Historic land use practices that cultivated prairie habitat have long been abandoned and are now considered impractical. Within Puget Sound, prairie habitat was historically maintained, in part, through periodic burning by Native Americans (Norton, 1979). Active habitat management methods, including controlled burning and mowing, are necessary to maintain these grassland sites today. However, vegetation management practices can be directly lethal to butterflies, and must be conducted under special prescriptions regarding scale and location in order to minimize this impact (Char and Boersma, 1995; Swengel, 1996; Swengel, 1998; Schultz, 1998; Schultz and Crone, 1998; Kwilosz and Knutson, 1999).

Mt. Adams area grasslands and Ponderosa pine savanna/woodland habitats have been reduced and degraded especially through fire suppression, development, and grazing. The areas occupied by Mardon skippers in Oregon are periodically subject to substantial livestock impact and heavy grazing continues on the Siskiyou monument despite the new monument designation. (Dept. Interior, BLM 2001).

The site in Del Norte County California is small (1-2 acres) but is relatively intact with few invasive species (Mattoon pers. comm., 2002).

B. Diet

Most butterflies have very specific requirements for larval food plants. The Mardon skipper larvae feed on Idaho fescue (*Festuca idahoensis*) and red fescue (*F. rubra*). The populations in Puget Sound use Idaho fescue, while, populations in the Mt Adams area use Idaho fescue and red fescue (*F. rubra)* as well as another unidentified fescue species (Potter pers. comm., 2002). The population in Del Norte County California seems to use red fescue, (Mattoon et al., 1998).

Adult Mardon skippers require a variety of nectar source plants. The short, open stature of native, fescue bunchgrass stands allows Mardon skippers to readily access nectar and oviposition plants on Puget Sound prairies. Adults feed on nectar from a variety of flowers but blue violet (*Viola adunc*a) is a strongly preferred nectar source and Scotch broom is strongly avoided. Nectaring has also been observed on common vetch (*Vicia sativa*), prairie lupine (*Lupinus* sp.), Idaho blue-eyed-grass

(binomial), penstemon (*Penstemon* spp.), sego lily (*Erythronium*) and wallflower (*Erysimum*) (Pyle, 2002). The Oregon adults avidly visit clover (Mattoon et al., 1998).

C. Reproduction

Mardon skippers complete one life cycle annually, and in Washington adults emerge between May and July for a month-long flight period. After mating, females deposit their eggs into native bunchgrass where they hatch after 6 to 7 days. Larvae feed on fescue grass (*Festuca* sp.) for about 3 months and pupae hibernate through the winter.

VII. CURRENT AND POTENTIAL THREATS – SUMMARY OF FACTORS FOR CONSIDERATION

The Mardon skipper is threatened directly and indirectly by a number of factors. Pyle (1989) identifies the threats to this species as any factors that degrade its obligate grasslands, including: development, overgrazing, herbicides, introduced plants, and succession to forest. Because butterflies like the Mardon skipper are sedentary and have a low degree of vagility, maintaining the quality of occupied habitat is perhaps the most important management concern (Erhlich, 1992). Many of the threats discussed below work in concert at particular sites to negatively impact Mardon skipper habitat.

In addition, there are a number of potential threats to Mardon skipper populations for which little information is available. Competition from introduced insects, diseases affecting larval host plants and butterflies, and predation by introduced wildlife have adversely affected other butterfly species, but no information on their potential impacts to the Mardon skipper is available and they are not discussed further in this petition. However, these impacts warrant thorough review and consideration during status evaluations.

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

1. Invasive non-native plant species

Invasion and dominance of native grasslands by exotic plants is a common issue that threatens grassland butterflies (Warren, 1993; Schultz, 1998), and has occurred rapidly at several current and historic Mardon skipper sites (Potter et al., 1999). Introduced plants threaten the Mardon skipper in several ways. In addition to directly competing with larval and adult food plants, many invasive shrubs, forbs, and grasses prevent or obscure access to nectar plants (Potter et al., 1999). In general, the short structure of fescue bunchgrass sites allows the adult butterfly to access its similarly short, native, nectar and oviposition plants. Invasive, non-native, sod-forming grasses, such as velvet-grass *(Holcus lanatu*s) and tall oatgrass *(Arrhenatherum elatiu*s), and weedy forbs, including cat's ear *(Hypochaeris radicat*a) directly compete with the native bunchgrass upon which Mardon skippers depends for oviposition sites, larval food, and hibernaculum structures (Hays and Johnson, 1998; McCorkle et al., 1980). Introduced plants are a critical issue at south Puget Sound sites, however, the problem is increasing in the Mt. Adams area, and most sites are vulnerable given their highly accessible nature. Invasive species are also a concern the Del Norte site in California (Mattoon pers. comm., 2002).

On Puget Sound sites, the invasive shrub Scotch broom, poses a particular threat to prairies because of its ability to form dense stands, which exclude native grassland species. In addition, Scotch broom is highly flammable, and hence increases vulnerability of native plants and butterflies to highly intense fires. The higher the intensity of a fire, the greater mortality to butterflies and their larvae.

Vegetation management practices currently attempt to eliminate non-native species in some Puget Sound areas. Though the long-term effects will probably benefit the Mardon skipper, short-term effects can be directly lethal to butterflies (Potter et al., 1999). Mowing likely kills sessile larvae and pupae, and hand pulling results in trampled eggs, larvae, and pupae.

Native plant species in the small meadow sites characteristic of some Cascade locales also may be removed or overrun when roads are routed through these sites and the area is reseeded with non-native grasses. Currently, this threat applies to several Mt. Adams area sites. In particular, two sites owned by the U.S. Forest Service in the Washington Cascades have been severely damaged by the reseeding of roads with non-native grasses (Potter et al. 1999).

2. Livestock grazing

Livestock grazing may cause adverse impacts to butterfly populations by (1) trampling eggs, larvae, pupae, and adults, (2) eating larval and adult food sources, and (3) disturbing the soil, which allows weeds to invade (Warren 1993). On two sites in the Mt. Adams area Potter and Fleckenstein (2001) observed patches of habitat used by Mardon skippers become trampled and sparsely vegetated because of cattle grazing activities. The Forest Service continues to allow cattle grazing within the south Mt. Adams area where the largest Mardon skipper populations are known to exist. Despite discovery of these populations more than two years ago, the Forest Service has failed to take even minimal efforts, such as fencing, to reduce the impacts of livestock on Mardon skippers.

For example, at the single largest known Mardon skipper site in the south Mt. Adams area - the Gotchen Guard station site, a leaky water storage tank attracts cattle into the middle of the meadow where Mardon skippers have been observed. There has been severe trampling and overgrazing that continues despite the documented importance of this site.

Similar results are found in the Klamath Cascade Monument sites where intensive cattle grazing caused native Mardon skipper habitat loss and the areas occupied by Mardon skippers in Oregon are periodically "subject to substantial livestock impact" (US Department of Interior 2001). Heavy grazing continues on the Monument despite these impacts.

Grazing has been implicated in the decline of two grass skippers in Minnesota (Dana, 1991). The native fescue bunchgrasses (Idaho and red fescue), upon which Mardon skippers depend, regenerate by seeds that are likely consumed during grazing. Because the native grass food plants of the Mardon skipper are favored forage for cattle, grazing effects are not likely to be beneficial to Mardon skippers.

Livestock grazing has also contributed to expanded distribution and increased density of many woody species across the western United States (see reviews by Arnold 1950; Ellison 1960; Bahre 1991; Archer and Smeins 1991). Scientists have found that livestock grazing causes increased tree densities in two ways: 1) livestock consume and lower the density of grasses that would otherwise compete with tree seedlings for space, water and nutrients, and 2) · livestock remove the herbaceous understory, a plant layer that provides fuel for 'cool' surface fires that kill regenerating trees.

3. Logging and vegetation management

In some areas fire suppression has led to grassland encroachment by native trees and shrubs (Potter and Fleckenstein, 2001), which could have a negative impact on Mardon populations. Management plans may need to be developed to selectively and carefully remove some woody plant species. But logging adjacent to meadows with skipper habitat could degrade habitat and kill individual skippers as a result of heavy equipment use, people trampling meadows, piling of log slash, burning of log piles in meadow habitat, and the increased risk of fire that accompanies logging.

The Gifford Pinchot National Forest, for example, is currently proposing a major vegetation removal and logging project in the Gotchen area in and around the critical south Mt. Adams Mardon Skipper populations. While it is not yet clear what the effects of this project could be on the Mardon skipper, there are presently no legal protections for the Mardon skipper to ensure that projects such as this are consistent with its continued viability.

For the populations in Oregon vegetation management is also a potential problem (Mattoon pers. comm., 2002). The Siskiyou –Cascade monument management plan considers logging among its options.

4. Agricultural development

In western Washington, 63% of native grassland communities have been lost to agriculture or development for residential and commercial purposes, and a number of agricultural practices may affect habitat suitability for Mardon skippers. Plowing often destroys native plants and encourages invasion by plant species that don't benefit this skipper. Applying insecticides or herbicides can impact skippers or their habitat.

Even today, the few remaining populations continue to be impacted by agricultural practices. At one site in the Puget Sound area dairies recycled their waste by spreading large quantities of manure across this native prairie. This practice is harmful to populations of native bunchgrass species and significantly degraded the site.

The development of recreation facilities can also directly impact Mardon skipper habitat and individuals during construction activities, and perpetuate chronic and long-term habitat degradation and Mardon skipper mortality by concentrating horse grazing and camping activities within Mardon skipper habitat. In August 2000, the Gifford Pinchot National Forest proposed development of the Mt. Adams Horse Camp at Bugle Springs that included 8 individual campsites, 3 group campsites, vault toilet, stock lines, corrals, water troughs, and a water diversion and buried pipeline. The Forest Service anticipated that

over 500 groups and individuals with stock would use the facility between June 1 and Labor day (USDA, 2000).

Mapping of Mardon skipper habitat at the Bugle Springs site demonstrated that proposed campground development would directly impact about half of the skipper habitat at the site. Long term use of the site was expected to be detrimental to Mardon skippers as a result of trampling by humans and horses, and grazing by horses within Mardon skipper habitat (USDA, 2000). Although the proposal to develop recreation facilities at Bugle Springs was eventually abandoned, recreation development can pose a significant threat to the Mardon skipper and its habitat.

5. Catastrophic or controlled fire

Small, isolated populations of sedentary insects, such as the Mardon skipper, are vulnerable to fire (Schultz and Crone, 1998; Dana, 1991; Warren et al., 1987). Historically, grassland habitats for the Mardon skipper were maintained in part, by recurring fires. However, current site fuel loads, including invasive trees and shrubs, combined with reduction and fragmentation of Mardon skipper populations, and reduction in size of native grasslands, makes natural or prescribed burning a potential threat to the Mardon skipper. Management approaches have been developed and are currently being tested to utilize fire for maintenance and restoration of grasslands, while minimizing impacts to butterfly populations (Schultz and Crone, 1998; Pickering, 1997).

Catastrophic, large scale, and high temperature fires resulting from the long time fire suppression efforts of Forest Service, state, and private landowners could threaten the Mardon skipper. The Gotchen area of the Gifford Pinchot National Forest, which is home to the single largest skipper concentration (Mt Adams sites) is recognized as having a high fire risk due to high road density, human access, and forest fuel loads. A single fire event in an area where skippers are concentrated could extirpate an entire population.

While efforts to reduce the fire risk in this area and restore a more natural fire regime are clearly needed, these efforts must be planned to decrease their associated risks. Otherwise, increasing the number of workers entering Mardon skipper habitats or otherwise impacting these habitats during potential vegetation management activities will threaten Mardon skippers.

6. Military Activities

In the Puget Prairie, one known Mardon skipper site boarders the Artillery Impact Area on Fort Lewis. If there were any alterations from the current pattern of shelling, tracked vehicle training, or planned firing ranges, the population could be destroyed (Potter, pers. comm. 2002). Even with a good faith effort to protect the site an errant bomb could wipe out the local population.

Because specific records describing the timing and type of training that has taken place in and around prairie environments on Fort Lewis are not available, it is difficult to determine their historic impact. However, it is possible to find general information on troop training activity levels at Fort Lewis. Between the late 1970s and 1991, the 9th Infantry Division was stationed on Fort Lewis with a battalion of tracked vehicles. In 1992, the 9th Infantry Division was inactivated, but other units located at Fort

Lewis have used tracked vehicles since the mid-1990s. Currently, more heavy mechanized vehicles are stationed on Fort Lewis than ever before (Stedman, pers. comm. 1999).

It is expected that training with tracked vehicles on prairie could have impacts on Mardon skippers including direct mortality, loss or degradation of habitat, and soil disturbance that allows for introduction and spread of invasive weeds. Increased training or presence of heavy machinery and tracked vehicles can be expected to pose increased risk to Mardon skipper populations on Fort Lewis. There are some restrictions on vehicular maneuvering in prairies, but it is unknown if these are intended to protect Mardon skipper sites.

The number of troops stationed on Fort Lewis has also fluctuated along with changing military budgets. Until 1991, approximately 26,000 troops were stationed at Fort Lewis and the Yakima Training Center. Between 1991 and 1995, this number dropped to approximately 16,000 troops. From 1995 to 2002, there were approximately 20,000 troops stationed and training on Fort Lewis. Light infantry brigades train in the oak/prairie environs of Fort Lewis. It is not known how this training may affect Mardon skipper populations, but is expected to include trampling of habitat and direct mortality. Training is periodic, located in various areas around Fort Lewis, and fescue prairies are part of some but not every training routine.

7. Prairie management

Recent efforts to maintain and restore native prairies in south Puget Sound have met with some initial success; however, restoration goals and methods have regularly focused on general weed control across grasslands rather than specific needs of rare wildlife species. Erhlich (1992) suggests that the quality of a butterfly's habitat is much more important than its extent. Management and restoration of habitat for Mardon skippers will likely require small-scale, site specific treatments focused on augmenting food and nectar plants. These types of projects are infrequently conducted for rare butterflies due to their cost and long-term nature (Schultz, 1997). Funding for prairie management efforts is well below levels that are needed to ensure restoration efforts will succeed (Potter et al., 1999).

The long-term persistence of Mardon skippers at any site depends, in part, upon the site being large enough to accommodate necessary habitat management practices. Unfortunately, methods used to maintain and restore plant communities can negatively affect Mardon skippers. Mowing likely kills sessile larvae or pupae, and people hand-pulling invasive plants may trample eggs, larvae, or pupae (Erhardt, 1985). Grazing has been recommended for maintaining butterfly habitat where tall introduced grasses are a problem (Warren 1993). However, as non-selective grass browsers, cattle have the potential for adverse impacts to native as well as introduced grasses (Pickering, 1997). Livestock grazing may cause adverse impacts to butterfly populations by (1) trampling eggs, larvae, pupae, and adults and (2) eating larval and adult food sources, and (3) disturbing the soil, which allows weeds to invade (Warren 1993). Fire may pose a particular danger to Mardon skipper larvae (Dana, 1991; Schultz and Crone 1998). Although prairies and Mardon skippers evolved with fire, fuel loads (e.g., Scotch broom) are significantly greater now than they were historically, resulting in more intense and larger fires that can kill skipper eggs, larvae, pupae, or adults (Dana, 1991). Mardon skippers often occupy discrete patches within a grassland site (Potter et al., 1999). The sites are also at a considerable

distance from one another, likely well beyond dispersal distance. Re-colonization is unlikely if populations were to be eliminated by management practices.

8. Application of herbicides

Commonly used herbicides could harm larval or adult food sources. Weed control and grassland management practices often utilize large-scale herbicide applications, potentially killing plants necessary for the Mardon skipper as well as target weeds.

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

1. Collecting

Insect collecting is a valuable component of research, including systematic work, and is often necessary for documenting the existence of populations and population trends. Collecting is also a potential threat to rare species. Butterfly populations that are small and easily accessible (such as most Mardon skipper populations) are especially vulnerable to over-collection.

C. Other natural or manmade factors affecting its continued existence

1. Application of herbicides and pesticides

Insecticide applications threaten Mardon skipper populations. Btk *(Bacillus thuringiensis* var. *kurstak*i), a Lepidoptera-specific insecticide, has become the pesticide of choice to treat defoliators in western forests (Wagner and Miller, 1995). Btk is a bacterium, which when ingested, is lethal to butterfly and moth larvae.

Species such as the Mardon skipper that are single-brooded with spring-active larvae that feed during the application period for the target species are especially vulnerable to Btk (Wagner and Miller, 1995). Because of the Mardon skipper's current patchy distribution on isolated sites and low vagility, its populations are even more threatened by Btk applications due to the decreased probability of re-colonization.

In the 1990's Btk was applied in large-scale, aerial treatments to control Asian gypsy moths *(Lymantria dispa*r) around Puget Sound, and spruce budworm *(Choristoneura occidentali*s) in the Washington and Oregon Cascades. In addition, large-scale, aerial applications of this insecticide have recently been proposed in the Washington and Oregon Cascades to control the Douglas-fir tussock moth *(Orgyia pseudotsugat*a) (Wenatchee National Forest, 1999). Although, grasslands are not a habitat targeted for application, they are difficult to avoid with aerial spraying because of pesticide drift, especially small meadow or savanna/woodland sites nested within forested areas. Most of the Mt. Adams area Mardon skipper sites are within areas which have either recently been treated or are proposed for Btk applications by federal, state, tribal, and private land managers (Potter et al 1999).

The threat of Btk is heightened because Btk has been shown to drift at toxic concentrations for distances greater than two miles from target spray areas. (Barry 1993 and Whaley et al. 1998) As a result, aerially spraying even relatively small areas with Btk can have significant adverse effects on Mardon skippers in the general area of an aerial Btk spray project.

In 2000, thousands of acres within Mardon skipper range were aerially treated with this larvicide and future projects are proposed (Potter and Fleckenstein, 2001). Btk was applied in 1999 in close proximity to two historic Mardon skipper sites within the Yakama Indian Reservation (Potter and Fleckenstein, 2001).

There is also evidence that Btk may have led to a significant decline at one site in the Mt Adams region. In 1999, Btk was aerially applied within a half-mile of a site in the Mt Adams area that had been partially surveyed in 1998. The 1998 partial survey showed a robust Mardon skipper population (20 – 30 individuals in one partial search). Despite four surveys in 2000, including two complete site searches, nine individuals was the largest Mardon skipper count that year (Potter and Fleckenstein, 2001).

A project to aerial spray Btk approved in May of 2000 by the Gifford Pinchot National Forest highlights the magnitude of the threat to the Mardon skipper. The project, which included spraying of 300 acres in the Gotchen Late Successional Reserve, would have been directly adjacent to what is likely the single largest known population of Mardon skippers in the Mt. Adams area. In preparing an environmental assessment (EA) for the spray project as required by the National Environmental Policy Act the Forest Service failed to even conduct basic presence or absence surveys for the Mardon skipper in and around the proposed target spray areas and merely concluded that the spraying would not have had any significant effects on the Mardon skipper (USDA 2000).

After the project EA was released, however, field surveys conducted by Washington Department of Fish and Wildlife, USFWS and Forest Service biologists, discovered what is now the largest known collection of Mardon skippers in close proximity to sites targeted for Btk spraying. (Potter and Fleckenstein, 2001). After finding the new populations, WDFW biologists informed the Forest Service that they believed the proposed spraying would have significant adverse effects on Mardon skippers. Despite these concerns and the new information about the presence of this significant Mardon skipper population, the Forest Service continued with its Btk spray plans for the Gotchen area.

On October 18, 2000 the Forest Service denied an administrative appeal filed by a number of petitioners that contended the Forest Service had failed to consider the impacts of the project on Mardon skippers. Only after a number of the petitioners filed a lawsuit under NEPA did the Forest Service withdraw plans for the Gotchen Btk spray project. Gifford Pinchot Task Force v. U.S. Forest Service, Case No. CO1-5031.

Absent this costly legal action, this single Btk spray project could have significantly reduced the Mt. Adams populations of Mardon skipper. Because the Mt. Adams populations make up a majority of all known Mardon skippers, this single Btk spray project could have significantly reduced the entire Mardon skipper population.

The Forest Service, the Yakama Nation, private and state landowners continue to use Btk to control spruce budworm and other species. Future Btk spray projects could significantly reduce Mardon skipper populations absent their protection under the ESA.

2. Recreation

Mardon skipper eggs, caterpillars, pupae and adults are killed by recreational activities such as walking, horseback riding, and off-road vehicle driving (Potter et al., 1999). These activities damage native plants and may lead to an invasion of non-native plant species. Two currently occupied Puget Prairie sites and three Mt. Adams sites are particularly threatened by recreation (Potter pers. comm., 2002). There is also a concern about recreational impact at the Del Norte County California site as it is situated on Forest Service land directly adjacent to private holdings (Mattoon pers comm., 2002).

3. Population Dynamics and Structure

Many butterfly populations exhibit metapopulation structure, where fluctuations in occupancy of patches of habitat are directly related to the size of patches, the interrelation of patches, dispersal patterns, and dispersal distances of the butterfly (Hanski et al., 1995; Thomas and Harrison, 1992; Harrison and Quinn, 1989). In some instances, small populations are dependent upon the dispersal of butterflies from larger source populations for re-colonization after extirpations (Thomas and Harrison, 1992). Remaining Mardon skipper sites are small in size and, likely, isolated from one another. Sites from which Mardon skippers are extirpated are unlikely to be re-colonized due to the fragmented nature of the remaining suitable habitat.

Many, if not most insect populations normally experience large fluctuations in size (Ehrlich, 1992; Schultz 1998). Weather, predation, and disease may cause annual changes in butterfly numbers of an order of magnitude or more. Normal population fluctuations, coupled with habitat alteration or loss (sometimes seemingly minor habitat alterations) can result in population extirpations (Hanski *et al.*, 1995). The small size of remaining Mardon skipper populations increases their vulnerability to extirpation due to natural fluctuations.

D. Inadequacy of existing regulations

Currently, the Mardon skipper is listed as a Candidate species under the Federal Endangered Species Act. This status however, provides no substantive protection under federal law, it only serves to notify agencies and parties that the Mardon skipper may be threatened or endangered. While Mardon populations exist in three states, only one recognizes the Mardon's plight. Washington listed the Mardon skipper as endangered under the Washington State Endangered Species Act at the end of 1999. The populations in Oregon and California are afforded even less security, as there are no local, state or federal statutes that mandate their protection.

Under Washington state law, it is unlawful to hunt, possess, maliciously harass, or kill Mardon skippers, or to maliciously destroy their eggs (RCW 77.15.120, 77.15.130). Although the Mardon skipper is listed as endangered by the state of Washington this affords no habitat protection on state, federal, private and Yakama Indian Nation land where the all of the population exists. Despite Washington state's effort, the regulatory tools are inadequate to prevent threats to the species because without regulatory mechanisms to protect the Mardon's skippers habitat, the Mardon skipper remains threatened. Under Washington state law, a timber sale, herbicide application, or grazing would not constitute a "take" because the management practice alters habitat, which the state law does not consider. Protecting the species without protecting its habitat will accomplish little.

There is no enforcement mechanism for the Washington endangered species law. While the state is authorized to enforce wildlife laws and administer penalties (RCW 77.15.055), there is no mechanism to enforce illegal takings. Federal, tribal, and private entities are not required to consult with the state when a listed species is known to occupy an area slated for management activity.

No formal review process exists for the state to take preventive measures for the Mardon skipper's benefit that would be afforded through reasonably prudent alternatives or quantitative incidental take permits. Thus, the state lacks the ability to effectively prevent species loss that could be prevented through consultation requirements. Even if a non-state agency or individual does initiate communication with the state concerning planned activities, the actor is not bound by law to follow the state's guidance. Moreover, Washington state law does not grant citizens the right to file an action for illegal takings of state listed species, thereby eliminating an effective public enforcement mechanism that the federal Endangered Species Act offers.

VIII. CONCLUSION

More than 95% of the original prairie grasslands that the Mardon skipper depends on are gone from western Washington and there has been substantial loss of habitat in southern Washington, Oregon and California. The grassland and savanna landscapes upon which Mardon skippers depend are threatened today by forest encroachment, invasion by native and non-native plants, development, recreational activities, grazing, agricultural practices, and application of herbicides. The butterflies are threatened by insecticides, control practices for invasive plants, military training, fire, and recreational activities.

At none of the Mardon skipper sites does a mandate and dedicated funding occur for managing Mardon skipper habitat. Although the Mardon skipper is listed as endangered by the state of Washington, this affords no habitat protection for the Mardon skippers. Nor does Washington law provide mechanisms for the state to protect the species itself. The Oregon and California populations receive no protection under any local, state or federal status.

For the foregoing reasons, the Mardon skipper meets four criteria under the Endangered Species Act for consideration as a threatened or endangered species: 16 U.S.C. § 1533 (a)(1)(A,B,D,E) (Section 4).

(A) The present or threatened destruction, modification, or curtailment of its habitat or range.
(B) Overutilization for Commercial, Recreational, Scientific, or Educational Purposes
(D) The inadequacy of existing regulatory mechanisms.
(E) Other natural or manmade factors affecting its continued existence.

Due to the threat of extinction and because of the Mardon skipper's small population size, limited distribution, isolation, and the numerous factors threatening the species and its remaining habitat, the **Xerces Society, Center for Biological Diversity, Gifford Pinchot Task Force, Northwest Environmental Defense Center, Northwest Ecosystem Alliance, Friends of the San Juans and the Oregon Natural Resources Council** formally petition for listing of the Mardon skipper butterfly (*Polites mardon)* as a threatened or endangered species. Furthermore, petitioners strongly request the

Service to use their authority to establish Critical Habitat based on the facts presented to prevent further decline of this vulnerable butterfly species.

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