

U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Polites mardon*

COMMON NAME: Mardon skipper

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

Species assessment

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: 12/11/02

90-day positive - FR date:

12-month warranted but precluded - FR date:

Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

- a. Is listing warranted (if yes, see summary of threats below) YES
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? YES
- c. If the answer to a. and b. is yes, provide an explanation of why the action is precluded. Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

Listing priority change

Former LP: ___

New LP: ___

Latest Date species became a Candidate: 10/25/99

Candidate removal: Former LP: ___

- A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

- F - Range is no longer a U.S. territory.
- I - Insufficient information exists on biological vulnerability and threats to support listing.
- M - Taxon mistakenly included in past notice of review.
- N - Taxon may not meet the Act's definition of "species."
- X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Insect; Hesperidae (Skippers)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE:

Washington, Oregon, and California

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:

Washington: Pierce, Thurston, Skamania, Yakima, and Klickitat counties;

Oregon: Jackson and Curry counties;

California: Del Norte County.

LAND OWNERSHIP: Most of the sites occur on Federal lands, however, State, Tribal, and private lands also have occurrences. In the following States, site ownership includes:

Washington Department of Defense (Fort Lewis Army Installation) (2 percent), Washington Department of Fish and Wildlife (1 percent), USDA Forest Service – Gifford Pinchot National Forest (27 percent), USDA Forest Service – Wenatchee-Okanogan National Forest (24 percent), Yakama Indian Reservation (17 percent), Private ownership (4 percent), U S Fish and Wildlife Service (1 percent).

Oregon: USDA Forest Service – Rogue River-Siskiyou National Forest (3 percent), Bureau of Land Management – Medford District (12 percent), Private ownership (2 percent), Oregon State Department of Parks (1 percent).

California: Redwood National Park (1 percent), USDA Forest Service (FS) Six Rivers National Forest (5 percent), Private ownership (1 percent).

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LEAD FIELD OFFICE CONTACT: Western Washington Fish and Wildlife Office, Ted Thomas (360) 753-4327, email: ted_thomas@fws.gov and Vince Harke (360) 753-9529, email: vince_harke@fws.gov.

BIOLOGICAL INFORMATION:

Species Description

The Mardon skipper (*Polites mardon*) is a small (20 to 24 millimeters; less than 1 inch), tawny-orange butterfly with a stout, hairy body. The upper surface of the forewings and hindwings is orange with broad dark brown borders, and the ventral hindwings have a distinctive pattern of light yellow to white rectangular spots (Pyle 2002, p. 88). Males are smaller than females, and have a small, dark brown, slender and branched streak (stigma) on the upper surface of the forewing. Females have a more distinct ventral hindwing pattern. The Mardon skipper is differentiated from other closely-related *Polites* species by its short, rounded wings, reduced stigmal elements, and other distinctive morphological features (MacNeill, 1993, p. 179). Like most Hesperinae butterflies, Mardon skippers have 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 (Potter et al. 1999, p. 1).

Taxonomy

The Mardon skipper is a butterfly in the Order Lepidoptera (butterflies and moths), superfamily Hesperioidea, and family Hesperidae (skippers), subfamily Hesperinae (grass skippers). It was originally described by W. H. Edwards (1881) as *Pamphila mardon* from three males and three females taken from near Tenino, Thurston County, Washington, by H. K. Morrison in 1880. The type locality, stated by Edwards as Mount Hood, Oregon, was later correctly designated as small prairies near Puget Sound (Mattoon et al. 1998, p. 767).

Mattoon et al. (1998, p. 768) proposed that the Oregon populations be given subspecies status as *Polites mardon klamathensis*, and the Washington and northern California populations, subspecies status as *Polites mardon mardon*. Adults of *P. m. klamathensis* are described as having a consistently tawnier dorsal and ventral coloration when compared to adults from other populations (Mattoon et al. 1998, pp. 771-772). The geographic split of the two *P. m. mardon* populations by *P. m. klamathensis* raises questions about this subspecies classification in California. The series of *P. mardon* from the California populations have not yet been carefully compared to the series of *P. m. mardon* from Washington due to the small number of specimens available for evaluation. The use of the name *P. m. mardon* for California populations should be considered tentative (Warren 2005, cited in Kerwin and Huff 2007, p. 8). No additional work or genetic studies have been done to clarify the subspecific designations described above (Kerwin and Huff 2007, p. 8). *Polites mardon* is recognized as a valid species by the Integrated Taxonomic Information System (ITIS) while *P. m. klamathensis* is a recognized subspecies (ITIS 2009).

Habitat /Life History

Mardon skippers are univoltine, completing one life cycle annually (i.e., egg-larva-pupa-adult). Adults typically emerge between May and July, but possibly later at higher elevations. Mark-recapture experiments indicate adults may live up to 3 weeks (Runquist 2004a), although most adult butterflies live less than 2 weeks (Scott 1986, p. 25). Dispersal of adults appears to be very

limited, with most individuals not dispersing beyond their natal sites (Runquist 2004a). Males have been found to travel further than females, often along corridors such as powerlines and roads with nectar sources (Potter and Fleckenstein 2001). Individual males have been detected up to 1 mile (mi) [(1.6 kilometer (km))] away from their original location (Runquist 2004a). Adults do not all emerge on the same date, so flight period duration at any given site depends in part on the number of skippers present. At one Washington site, Beyer and Black (2007) note that adult emergence went from zero on July 6 to 135 adults on July 9. In large populations the flight period may extend for over a month, while small populations may have adults present for only 10 or fewer days (Kerwin and Huff 2007, p. 9). Within the same geographic area, emergence dates vary with elevation, with emergence occurring earlier at lower elevations. Weather influences emergence and flight period duration. Wet or cold conditions delay emergence; conversely, warm, dry conditions promote earlier emergence, and both may affect the duration of the adult flight period (Potter et al. 2002).

After mating, females deposit their eggs (oviposit) into tufts of low-growing grasses or sedges. The total number of eggs laid is unknown, but Newcomer (1966a) observed about 25 eggs per female for captive *Polites*. Mardon skippers use several graminoid species for oviposition and larval food. Host plant species vary by geographic location and vary depending upon the species available at a particular site (Beyer 2009, p. 22, Beyer and Schultz 2010, p. 866). In the Oregon Cascades, the most common oviposition plant was California oatgrass (*Danthonia californica*) (Beyer and Black 2007).

In the Washington Cascades, oviposition was documented on 23 different plant species (Beyer and Schultz 2010, p. 866). However, this analysis indicated that Mardon skippers are selective for certain grass species within different meadows. The most frequently used oviposition plants include Idaho fescue (*Festuca idahoensis*), Kentucky bluegrass (*Poa pratensis*), timber oatgrass (*Danthonia intermedia*), long-stolen sedge (*Carex inops*) and red fescue (*Festuca rubra*) (Beyer and Schultz 2010, p. 866). One-spiked oatgrass (*Danthonia unispecta*) appears to be an important grass species at sites on the Wenatchee National Forest. Females have been observed ovipositing on this species (Henry 2009, p. 7), and higher densities of adult butterflies are commonly associated with patches of *D. unispecta* (St. Hilaire et al. 2009, p. 7). The variety of identified oviposition plants suggests that females may not always oviposit on specific host plants, but within a community of possible species that can be used by the larvae (Beyer and Black 2007).

Eggs hatch in 6 to 7 days (Newcomer 1966a, p.244), and the larvae feed on host grasses for approximately 3 months before entering diapause. Beyer and Black (2007) located eight individual larvae and collected information on behavior and larval instar life stages up to the third or fourth instar. It does not appear that the larvae disperse far from the oviposit location (less than 1.7 feet (ft); 0.5 meters (m)) (Beyer and Black 2007). Newcomer (1966a) suggests that Mardon skipper larvae overwinter as pupae, but recent evidence indicates that the larvae overwinter in diapause as larvae (Henry 2009, p.2). Beyer and Black (2007) found larvae present at a Washington Cascades site as late as October 21. Some captive-reared larvae at the Oregon Zoo (Portland, Oregon) went into diapause in the larval stage, while others diapaused as pupae; survival was variable in both circumstances (M. Linders, pers. comm., cited in Kerwin and Huff 2007, p. 10).

In the south Puget Sound region of Washington, Mardon skippers are found in open, glacial outwash grasslands with abundant Roemer's fescue (*Festuca roemerii*) interspersed with early blue violet (*Viola adunca*) (Potter et al. 1999). In this area, Mardon skippers oviposit on Roemer's fescue almost exclusively, indicating a strong association with this grass species (Henry 2009, p. 1). On these prairies, adults feed on nectar from a variety of herbaceous plants, although they prefer the early blue violet (Hays et al. 2000). The early blue violet and common vetch (*Vicia sativa*) were strongly preferred as nectar sources, and Scot's broom (*Cytisus scoparius*) was strongly avoided (Hays et al. 2000). Nectaring has also been observed on common camas (*Camassia quamash*), prairie lupine (*Lupinus lepidus*), fine-leaved desert parsley (*Lomatium utriculatum*), western buttercup (*Ranunculus occidentalis*), sea blush (*Plectritis congesta*), and yarrow (*Achillea millefolium*).

In the Washington Cascades, the Mardon skipper is found in open grasslands within mixed savanna/woodlands at mid to high elevations (1,800 to 5,500 ft (549 to 1,677 m)), and in small montane meadows (Potter et al. 2002). Adults have most frequently been observed nectaring on vetch (*Vicia* spp.), strawberry (*Fragaria* spp.), and clover (*Trifolium* spp.) (Beyer and Black 2007). Wallflower (*Erysimum capitatum*, *E. asperum*), hawkweed (*Hieracium* sp.), hawksbeard (*Crepis* sp.), geranium (*Geranium* sp.), fleabane (*Erigeron perigrinus*), and yarrow (*Achillea millefolium*) are also reported nectar sources from this region (Newcomer 1966b; Potter et al. 2002; Beyer and Black 2007).

Mardon skipper sites in the Washington Cascades vary in size from small (0.5 acre (ac); 0.25 hectare (ha)) meadows to large grassland complexes. Site conditions range from relatively dry, open ridgetops to small montane meadows associated with wetlands, springs, or riparian habitat. Wetland areas that are seasonally or perennially submerged do not support this species, but the species is often found in dry areas along the margins of wetlands. Sites with grassland vegetation, including grassy forest openings, roadside meadows, and grass-dominated tree plantations support Mardon skipper populations (Harke 2001; Potter et al. 2002).

Populations in southern Oregon occupy small (0.5 to 10 ac; 0.25 to 4 ha) high-elevation (4,500 to 5,100 ft; 1,372 to 1,555 m) grassy meadows within mixed conifer forests. The habitat features where Mardon skipper habitat is found are dominated by fescue grasslands and the primary nectar plants being utilized are diverse-leaved cinquefoil (*Potentilla diversifolia*), narrow-leaved mule's ears (*Wyethia angustifolia*), small-flowered penstemon (*Penstemon procerus*), and sea blush (*Plectritis congesta*) (Ross 2007a; Beyer and Black 2007, p. 16). The habitat for Mardon skipper in southwestern Oregon and northern California has been historically subjected to frequent low-intensity fires (Agee 1993, pp. 361-362), which played an important role in maintaining the grassland plant communities free from trees.

The California populations are located on serpentine balds dominated by Idaho fescue in sparse Jeffrey pine (*Pinus jeffreyi*) forests. Both Idaho fescue and California oatgrass are common at these sites (Haggard 2003) and are likely used as host plants for oviposition and larval food. Common nectar plants include spreading phlox (*Phlox diffusa*), cinquefoil, (*Potentilla* spp.) early blue violet, and harsh paintbrush (*Castilleja hispida*) (Runquist 2004b). The four principal grasslands of this historic population cover an area of less than 4.5 ac (2 ha).

The Mardon skipper is capable of using many different species of graminoids as host plants for oviposition and larval food, which enables the species to persist in variety of habitat types (Beyer and Schultz 2010, p. 867). Mardon skippers are apparently restricted to a narrow range of environmental conditions that allow the species to persist. The species larval development is prolonged, lasting for 3 months or more prior to diapause (Beyer and Black 2007). During this time, the larvae require palatable food for successful development. Mid- to high elevation montane meadows in the Cascades that are not seasonally flooded provide these habitats, but these sites are uncommon features in landscapes that are dominated by conifer forests. Alpine meadows located above treeline apparently do not support this species, perhaps due to the relatively short season these areas are free from snow cover. In coastal areas, persistent precipitation or coastal fog provides sufficient moisture to maintain host plant palatability, but these habitats are restricted to a narrow coastal band along the northern California/southern Oregon coasts with serpentine soils. In the Puget Sound region, conversion of native prairies to other uses (e.g., urban, agriculture, forestry) has resulted in the loss of approximately 97 percent of this species potential habitat (Crawford and Hall 1997), and the remaining native prairies are threatened by habitat modifications associated with invasive non-native plants and other uses.

Historical Range/Distribution

The Mardon skipper is a northwestern butterfly with a remarkably disjunct range. No estimates of abundance are available from any site prior to 1980. It is likely that Mardon skipper were historically more widely distributed prior to the widespread loss of grassland habitats due to fire suppression in the past century (Kruckeberg 1991; Agee 1993, p. 368). The species historic (post-1980s) and current range is known from four widely separated locations: the south Puget Sound region of Washington, the southern Washington Cascades, the Cascades-Siskiyou Mountains of southern Oregon, and coastal northern California/southern Oregon (Kerwin and Huff 2007, p. 4; Ross 2007b).

Current Range/Distribution

In Washington, the Mardon skipper has been observed and is regularly surveyed on south Puget Sound prairies and in the southern Cascades of Washington. In Oregon, several occupied sites have been documented in the Cascade-Siskiyou Mountains in southern Oregon. The Mardon skipper has also been documented along the southern Oregon coast. In northern California, the species is known from three general locations in Del Norte County. The northern California populations and the coastal Oregon population all occur within the same coastal region with serpentine soils and associated grasslands (Ross 2007b).

South Puget Sound Prairie

The Mardon skipper was originally described from specimens collected in 1880 from a prairie site located near Tenino, Washington (Pyle 2002, p. 88). Potter et al. (1999, p. 4) identified five historic south Puget Sound prairie locations for the species and surveyed these sites extensively from 1997 to 1999. No Mardon skippers were found at four of the five historic sites surveyed, and the species is now apparently extirpated from these sites (Potter et al. 1999, p. 4).

Currently, Mardon skippers are known from just two populations in the south Puget Sound area, one in Pierce County on the Fort Lewis Military Reservation and one from a State Wildlife Area in Thurston County. Despite surveys in recent years covering more than 2,000 ac (809 ha), no new populations have been detected on south Puget Sound prairies (A. Potter pers. comm., 2006; J. Fleckenstein, Washington Department of Natural Resources (WDNR), pers. comm., 2006).

Recent surveys on Fort Lewis have detected Mardon skippers at 3 sites along the periphery of the Artillery Impact Area, with day counts ranging from 20 to 100 individuals at each monitoring site (Department of Defense (DOD) 2007; 2008). The Artillery Impact Area is a large prairie complex encompassing approximately 7,000 ac. Whether Mardon skippers occur in other locations within this prairie complex is unknown. Butterfly surveys at other prairie sites on Fort Lewis (e.g., Johnson Prairie and Weir Prairie) have not detected the species (DOD 2007, 2008).

In Thurston County, Mardon skippers occur within a State-managed Wildlife Area which is actively managed to control nonnative invasive plants and maintain native prairie vegetation. The grassland habitat within the wildlife area is bisected by a forested stream and wetland which separates the site into two distinct areas. Mardon skippers have been documented in both the north and south units of the wildlife area. The distribution of Mardon skippers is localized over approximately 75 ac (30 ha) at the south unit and approximately 50 ac (20 ha) at the north unit. The population at the south unit is more robust with skippers distributed across a wider area. Recent day counts at these sites have ranged from less than 20 individuals to greater than 150 individuals, depending upon the timing of the survey (Potter 2009).

Southern Washington Cascades

The Mardon skipper was first documented in the southern Washington Cascades from two locations within the Yakama Indian Reservation (Newcomer 1966b). Newcomer (1966b) reported finding Mardon skippers in open meadows above 4,800 ft (1,460 m) elevation at Signal Peak, located about 15 mi (24 km) east of Mt. Adams, and also noted that the species had been collected in 1955 at Bird Creek meadows on the eastern slopes of Mt. Adams. Surveys completed over the past decade have documented over 70 sites in the general vicinity of Mt. Adams. The current known range extends from the Rimrock Lake area (Highway 12) south to Glenwood, Washington, and extends eastward into the Simcoe Mountains north of Goldendale, Washington. Approximately 100 occupied sites have been documented on Federal, Tribal, and private lands in the southern Washington Cascades.

Gifford Pinchot National Forest

Annual surveys for Mardon skippers have been conducted on the Gifford Pinchot National Forest since 2000. On the Cowlitz Valley Ranger District, ten occupied sites have been documented in mid-elevation meadows (4,000 to 4,500 ft (1220 to 1370 m) elevation) in the Upper Cispus River drainage in the vicinity of the Pacific Crest Trail. Additional occupied sites occur on the adjacent Yakama Indian Reservation. Meadows in this area support some of the highest densities of Mardon skippers observed (Beyer and Black 2007). One site (Grapefern Meadow, approximately 4 ac (1.6 ha)) has consistently had high annual counts of 300 plus Mardon skippers (T. Kogut, pers. comm., 2007). In 2009, the Mardon skipper populations at the Cowlitz Valley sites

experienced a major population decline, apparently caused by an unusually warm spring followed by several days with low temperatures that were at or below freezing in late June (Kogut 2009, p.2). Adult emergence at these sites did not occur until mid-July, approximately 2 weeks later than normal, and numbers of adults counted at all sites were 80 to 95 percent below the typical average counts seen at these sites in recent years. The Grapefern Meadow site, which typically supports a peak count of 300 skippers, had only 65 skippers in 2009, and other nearby sites which generally support more than 50 skippers had less than 10 skippers counted in 2009 (Kogut 2009, p.12). Natural conifer encroachment has been identified as the primary threat to meadow habitats in this area, as well as damage from recreational camping and off-road vehicle use (Kerwin and Huff 2007, pp. 37-38).

On the Mt. Adams Ranger District, Mardon skippers occur in scattered meadows and tree plantations in the Gotchen Creek area of the Upper White Salmon River basin, and in the Lost Creek area of the Little White Salmon River basin. Both areas are within active cattle grazing allotments. Mardon skippers occur in both small natural-origin meadows and in old clearcut areas that provide open grass habitat suitable for skippers. The Little White Salmon River area supports six sites, with significant populations occurring at Petersen Prairie and Cave Creek, with single-day counts of greater than 50 individuals in some years (USFS 2007, p. 85). Sites in this area range from 2,700 to 3,400 ft (820 to 1040 m) in elevation.

The Gotchen Creek area supports a total of 22 documented sites. Significant sites in this cluster include Smith Butte Meadow, Bunny Hill, Stagman Ridge, and Eureka Meadow. These are all natural-origin meadows with single-day counts of 50 to 100 or more individuals. Most of the documented sites in this area contain a few individuals that appear to have colonized old-clearcut areas; surveys at most of these sites counted 1-10 individuals. Occupied sites in this area range from 3,500 to 5,600 ft (1,070 to 1,710 m) in elevation. Cattle grazing, conifer encroachment, and invasive, nonnative weeds are recognized threats to meadow habitats on the Mt. Adams Ranger District (Kerwin and Huff 2007, pp. 39-41).

Okanogan-Wenatchee National Forest

Mardon skippers were first documented on the Wenatchee National Forest in 2006 at Pinegrass Ridge located on the Naches Ranger District. Subsequent surveys have resulted in the documentation of a total of 35 sites with Mardon skipper present (Jepsen et al. 2007a; St. Hilaire et al. 2009), including 5 sites with single day counts of 50 to 100+ Mardon skippers. One of these sites (Conrad Meadows) is a large meadow complex of more than 100 ac (40 ha) which supports the largest known Mardon skipper population (over 1,800 individuals were counted on 07/09/2008) (Jepsen et al. 2008). Occupied sites range from 2,970 to 5,100 ft (905 to 1,550 m) in elevation. Occupied sites include natural-origin meadows and grassy clearcut areas. All of the documented sites are located south of Rimrock Lake, in the vicinity of the South Fork Tieton River basin. Extensive surveys in meadows north of the Rimrock Lake – Highway 12 area have failed to detect Mardon skipper, although the meadows in these areas appear to contain suitable habitat for the species (St. Hilaire et al. 2008). All of the sites on the Naches Ranger District are located in active cattle grazing allotments. Sites on Pinegrass Ridge are located in old timber harvest areas where conifer succession is rapidly overtaking the grassy openings that provide suitable habitat for skippers (St. Hilaire et al. 2008).

Yakama Indian Reservation

As noted above, Mardon skippers have been documented from a few locations within the Yakama Reservation since the 1950s (Newcomer 1966b). Since 2004, Yakama Nation biologists have conducted annual Mardon skipper surveys at various locations within the Reservation. Excluding isolated sightings of single Mardon skippers, populations have been detected in roughly 11 site clusters within the Reservation. Clusters of sites occur in the upper Klickitat River basin, Potato Hill, Polo Fields, Swamp Creek Meadows, and Potato Butte areas. Recent surveys have detected Mardon skippers at 23 sites in the Reservation. Of these, more than 50 individuals have been detected in a single survey at 7 sites. Elevations of known sites range from 3,300 to 5,600 ft (1,010 to 1,710 m) in elevation (G. King, pers. comm., 2008).

Of particular note is the Potato Butte site complex (on the south boundary of the Reservation), discovered in 2006. Mardon skipper habitat appears to cover hundreds of acres of high meadows extending north of the butte, with observed densities as high as about 50 individuals observed per acre (0.4ha) (G. King, pers. comm., 2008).

Glenwood-Goldendale Area

Pyle (1989, p. 28) noted that Mardon skipper were present on the Conboy Lake National Wildlife Refuge located near Glenwood. Surveys at one historic site at Conboy Lake in recent years have failed to detect Mardon skippers (Potter and Fleckenstein 2001; Potter et al. 2002). However, Mardon skippers have been documented at another location on the Refuge, and at three sites on adjacent private lands (Potter and Fleckenstein 2001). To date, the four known locations in the Glenwood area represent the lowest elevation sites (approximately 1,800 ft. (550 m)) documented in the Washington Cascades. Potter et al. (2002) documented Mardon skippers at two sites on private lands in the Simcoe Mountains north of Goldendale, which represent the easternmost Mardon skipper sites in the Washington Cascades.

Other surveys efforts conducted in the southern Washington Cascades along the north side of the Columbia River and in the lower Klickitat River basin have failed to detect Mardon skippers (Potter et al. 2002; Flick and Harke 2006). Although these areas contain extensive grassland habitats, bunchgrasses in these areas appear to become senescent very early in the summer, and therefore may not provide suitable forage for Mardon skipper larvae (Potter et al. 2002).

Southern Oregon – Siskiyou Mountains

Mardon skippers are have been documented at 21 sites in the Cascade-Siskiyou Mountains in southern Oregon (Jepsen et al. 2007b), and have also been documented along the southern Oregon coast (Ross 2007b).

In the Siskiyou Mountains, Mardon skippers occur in small montane meadows from about 4,500 to 5,300 ft (1,370 to 1,620 m) elevation. All of the currently known sites occur within a 10-mile (16-km) radius of Howard Prairie Lake. Most of the documented sites (15) occur on Bureau of Land Management (BLM) lands within the Medford BLM district east of Ashland, Oregon. Mardon skippers have also been found at four sites within the Rogue River/Siskiyou National Forest. Two sites are known to occur on private lands. Cattle grazing, conifer encroachment,

and invasive weeds have been identified as threats to Mardon skipper habitat at these sites (Kerwin and Huff 2007, pp. 37-41).

Recent surveys on public lands in the southern Oregon Cascades (Ross 2005; Ross 2007b; Jepsen et al. 2007b; Black et al. 2008a) have searched dozens of sites in the vicinity of the known sites. In 2007, staff from the Xerces Society searched 42 sites for Mardon skippers on National Forest and BLM lands; no new populations were found (Jepsen et al. 2007b). Extensive surveys for Mardon skipper west of Ashland in the Mt. Ashland area have failed to detect this species (Black et al. 2008a). It now appears that most of the suitable Mardon skipper habitat on public lands in this area has been searched (S. Black, pers. comm. 2008). Of the known sites in the Siskiyou Mountains, only one site has a substantial population with more than 200 skippers, and most sites have less than 50 Mardon skippers (Jepsen et al. 2007b; Beyer and Black 2007).

Recent surveys indicated Mardon skipper may be declining at southern Oregon sites. In 2009, Mardon skippers were present at only 12 of 18 current and historic sites on Forest Service and BLM lands, with only 2 sites having peak counts of more than 20 skippers (S. Black, pers. comm., 2010).

Southern Oregon Coast

Coastal Mardon skipper populations are not well known as few surveys (Ross 2005, 2007b) have been conducted. To date, the species has been documented from three sites in coastal Oregon. The first known specimens from a coastal Oregon population of Mardon skipper were discovered by A. Warren in museum collections at the University of Florida in 2006 (Ross 2007b). The specimens were collected in late 1970's from a site near sea-level just north of Gold Beach, Oregon (A. Warren, pers. comm., 2006, cited in Ross 2007b). The Gold Beach specimen location has not been reconfirmed by recent survey efforts in this area (Ross 2008a).

In 2007, a single male Mardon skipper was documented at Lone Ranch Beach (Oregon State Parks) on the south side of Cape Ferrelo and is the recent first coastal Oregon record (Ross 2007b). Subsequent searches at this site in 2008 failed to detect the species (Ross 2008a). However, 2008 surveys on BLM lands east of Gold Beach documented a Mardon skipper population near Signal Buttes at a meadow complex in the headwaters of Hunter Creek (Ross 2008a). The Hunter Creek site is the northernmost of the few known coastal Mardon populations to date and documents the first coastal Oregon population (Ross 2008a). The Hunter Creek population is located approximately 42 miles (68 km) north of known sites in Del Norte County, California. Ross (2007b) suggests that all likely habitats within the coastal fog belt (from the shoreline to the interior ridges) should be viewed as potential Mardon skipper habitat at the present time.

Northern Oregon Cascades - Columbia River Gorge

During the 2003 to 2009 field seasons, surveys for Mardon skipper were conducted at many sites in the northern Oregon Cascades on the Willamette and Mount Hood National Forests, and on the Oregon side of the Columbia River Gorge National Scenic Area (Ross 2008b, Flick and Harke 2006). No Mardon skippers were detected during any of these surveys. To date, there are

no documented occurrences of Mardon skippers in northern Oregon, but the area appears to have suitable grassland habitats for the species. Two years of extensive survey effort at high priority sites on the Willamette National Forest have failed to detect the species (Ross 2008b). Based on the current survey information, the apparent distribution gap between Mardon skipper populations in the Washington Cascades and Cascades-Siskiyou Mountains of southern Oregon is a real distribution gap, and is not an artifact of a lack of surveys for the species in this region (Ross 2008b).

Coastal Northern California

The Mardon skipper was first documented in northern California from a single location in Del Norte County along High Divide Ridge in 1979 (Mattoon et al. 1998). Formal surveys for Mardon skippers in 2003, 2004, 2007 and 2008 have documented 3 Mardon skipper populations distributed across 9 sites in Del Norte County (Haggard 2003; Runquist 2004b; Jepsen et al. 2007c; Black et al 2008b).

The High Divide site is an area with mixed Jeffrey-pine forest and serpentine meadow habitat located about 7 mi (11 km) inland from the coast in the Six Rivers National Forest. Elevation at the site is 1,800 to 1,900 ft (550 to 580 m). Mardon skippers have been observed in a cluster of four small meadows that cover a 0.25 mi² area (0.4 km²). Day counts at these sites have ranged from less than 10 to more than 100 individuals, depending upon timing of the survey (Haggard 2003; Runquist 2004b). There is at least one Mardon skipper site on private lands in the High Divide Road area, but information for this site is not well documented (Ross 2008a).

Surveys on the Six Rivers National Forest documented a large Mardon skipper population in the Coon Meadows complex in 2008. Over 200 skippers were counted at 3 sites in this meadow complex on June 10, 2008 (Black et al. 2008b). This area is currently being managed with prescribed burning by the Forest Service to reduce conifer encroachment and maintain the meadow habitat. Monitoring within the burned areas at this site indicated a substantial reduction of Mardon skippers in the burned areas compared to unburned areas (Black et al. 2009, p.4).

A third Mardon skipper population has been documented at Little Bald Hill in Redwood National Park about 7 miles (11 km) south of the High Divide site (Haggard 2003). This site is also located about 7 miles (11 km) inland from the coast in a mixed Jeffrey pine/Idaho fescue plant community associated with serpentine soils (Haggard 2003). Surveys at this site 2006 and 2007 detected low numbers (less than five) of Mardon skippers (K. Schmidt, pers. comm., 2007, 2008).

Haggard (2003) and Ross (2007b) suggest that the mixed forest/grassland habitats associated with serpentine soils are most common within 10 miles (16 km) of the coast, and occur in a band from Redwood National Park north along the coast to the Gold Beach area in southern Oregon. Few surveys for Mardon skippers have occurred in this area, so it is possible that additional surveys may locate other populations.

Summary of Mardon Skipper Population Estimates/Status

Mardon skippers are a univoltine species, with adults having a short life cycle and producing one brood of eggs per year. The demography of populations is currently unknown, but as in many invertebrates, it likely varies widely from year to year depending on resource availability and previous year's reproductive output (Kerwin and Huff 2007, p. 14). Surveys to estimate relative abundance have been conducted by systematically walking transects through a site and counting the number of adult Mardon skippers encountered (Seitz et al. 2007; Potter et al. 2002). These have mostly been one-day counts so it is not known if they were conducted early or late in the adult flight period. Multiple surveys across a number of years would be required to accurately assess population size because the timing and length of adult flight periods can vary widely. Only one site (in Washington) has had a full spectrum of censuses that have covered the entire adult flight period (Beyer and Black 2007). Standardized counts have not been conducted long enough at any of the known sites to allow statistical analysis of population trends (Kerwin and Huff 2007, p. 14).

Mardon skipper habitat can consist of one to many occupied grasslands, interconnected or in close proximity to one another. For purposes of estimating the number of distinct populations/sites, occupied grasslands can be considered to belong to the same population/site if the grasslands are within the annual dispersal distance for the species, generally assumed to be 0.5 mi (0.8 km) or less (Potter and Fleckenstein 2001). However, population delineation may be influenced by barriers to dispersal (e.g., dense forest) or other factors which could make occupied grasslands separated by less than 0.5 mi (0.8 km) not connected (Kerwin and Huff 2007, p. 12). Because the dispersal behavior of the species is largely unknown, the delineation of populations is a generalization of local clusters of sites within a specific geographic area. For example, at Fort Lewis, Washington, Mardon skippers have been monitored at three separate locations. However, because these sites are all located within the same prairie complex, these three sites are considered to represent a single population (Table 1).

Table 1. Summary of known populations of the Mardon skipper.

LOCATION	Approximate Number of Documented Sites with Species Presence (Fall 2009)	Approximate Number of Populations (local clusters of sites)
South Puget Sound, WA		
Fort Lewis	3	1
Thurston Co.	2	1
Southern Cascades, WA		
Wenatchee NF	35	15
Gifford Pinchot NF	38	13
Yakama Reservation	23	11
Glenwood-Goldendale	6	3
Southern Oregon		
Siskiyou Mountains	21	11
Oregon Coast	2	1
Northern California		
Del Norte Co.	9	3

TOTALS	139 sites	59 populations
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In 1999, the Mardon skipper was known from approximately 14 sites located in 4 distinct geographic areas (Potter et al. 1999). The current total of approximately 139 sites representing 59 populations is much greater than the number of sites known in 1999. However, this increase is due to increased survey effort in areas not previously surveyed, rather than to increased habitat or expanding populations (Kerwin and Huff 2007, p. 13).

The Mardon skipper is a little-studied species; however, the species has received considerable attention and some funding for surveys since becoming a Federal candidate species in 1999. The species can be locally abundant where it is present (Pyle 1989, p. 28) with counts of greater than 100 individuals documented at several sites within its range (St. Hilaire et al. 2008; Beyer and Black 2007; Black et al. 2008b). Conversely, populations at several locations within the species' range are apparently persisting at very low levels (consistent day counts of less than 20 individuals). These small populations are vulnerable to stochastic events (e.g., inclement weather). In addition to highly variable population levels, the species current distribution is restricted to a few specific locations within its known range. Occupied habitats are often small meadows surrounded by miles of forest, with no apparent connectivity for dispersal between local populations (Kerwin and Huff 2007, p. 19).

Additional surveys in subsequent years may increase our understanding about the distribution of the species as well as better identify connections within local metapopulations (Kerwin and Huff 2007, p. 13).

DISTINCT POPULATION SEGMENT (DPS): Not applicable to invertebrate species.

THREATS:

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

Pyle (1989, p. 28) identified the threats to the Mardon skipper as any factor that degrades its obligate grassland habitats, including development, overgrazing, the use of herbicides and pesticides, encroachment by native and invasive nonnative vegetation, and succession from grassland to forest. Because the Mardon skipper is non-migratory, and thus relatively sedentary, maintaining high quality habitats that provide the species oviposition plants, larval food sources, and diverse nectar sources for adults is essential for the species conservation (Erhlich 1992, p. 8).

Habitat Loss Associated with Land Conversion or Successional Processes

Prairies, which once covered hundreds of thousands of acres of the south Puget Sound region, have been largely converted to other uses. Today, less than 3 percent of the original prairies in the south Puget Sound remain and much of this has competing human uses (Crawford and Hall 1997). In the Bald Hills of Redwood National Park, prairie habitats have declined by as much as 26 percent due to forest encroachment (Agee 1993, p. 362). In the Cascades, a long history of fire suppression and resultant conifer and shrub encroachment into meadow/grassland patches

has reduced the amount of habitat available for Mardon skippers, and reduced or eliminated the connections between meadows. Aerial photographs taken on the Gifford Pinchot National Forest clearly indicate that the meadow habitats at known Mardon skipper sites were historically much larger than they are today (USFS 2003, p. 79). Fire suppression in these areas has resulted in dramatic forest succession. Kerwin and Huff (2007, pp. 37-41) ranked conifer encroachment in Mardon skipper habitat as a primary or secondary threat in 30 out of 57 sites evaluated on USFS and BLM lands.

Invasion and dominance of nonnative plant species into native grasslands is common and has occurred rapidly at several current and historic Mardon skipper locations. Introduced plants threaten the Mardon skipper by directly competing with larval food plants. Many invasive, nonnative shrubs, forbs, and grasses also prevent or obscure access by adults to nectar plants. Invasive, nonnative, sod-forming grasses (such as velvet grass (*Holcus* spp.) and tall oat grass (*Arrhenatherum elatius*), and weedy forbs, including common cat's ear (*Hypochaeris radicata*), threaten native bunchgrass plant communities (*Festuca* spp.) that Mardon skippers depend on for egg deposition, larval food, and hibernaculum structures. The short character of *Festuca*-dominated grasslands allows access for the adult butterfly to its similarly short, native nectar sources (Black et al. 2002). Not all Mardon skipper sites have been evaluated for the presence of aggressive, nonnative plants; however, the problem is increasingly common (Potter et al. 1999). Tall oat grass has spread since 2001 into much of two south Puget Sound locations occupied by Mardon skippers, after the site was mowed to remove Scot's broom (A. Potter and D. Hays, pers. comm., 2004; 2007).

The invasive shrub, Scot's broom, poses a threat to grasslands on south Puget Sound prairies and elsewhere because of its ability to form dense stands that exclude native grassland species (Black et al. 2002). Parker et al. (1997) found a nearly exclusive relationship between Scot's broom and Roemer's fescue. Also, due to its highly flammable nature, areas of Scot's broom increase the vulnerability of nearby native plants and butterflies to high-intensity fire. While intensive management appears to be controlling Scot's broom at two south Puget Sound prairies, this management must be continued to maintain the prairie habitats. Unfortunately, control methods for Scot's broom, which may include hand pulling, herbicide spraying, tractor mowing, or burning, can negatively impact Mardon skippers. Some Mardon skipper eggs, larvae, or pupae, which are immobile and on ground-level vegetation, may be harmed by trampling or heat (Ehrhardt 1985; Dana 1991).

Habitat Loss Associated with Roads, Vehicles, and Recreation

Small, roadside meadows are vulnerable to damage or destruction associated with off-road vehicle use, roadside mowing, herbicide treatments, and invasive plant introductions when reseeding occurs after road work. Currently, this threat applies to many locations across the range of the species. In 2008, a known Mardon skipper site located on private lands in Del Norte County, California, was partially destroyed when the site was used as a dump for logging slash and debris (Ross 2008a). At least one historic locale in the southern Washington Cascades and a large portion of potential habitat was destroyed by this practice in 1997 or 1998 (Potter et al. 1999). At Fort Lewis, Washington, Mardon skippers occur along the periphery of a large military training range and artillery impact area. Although the Army makes efforts to avoid direct impacts to these sites, much of the potential Mardon skipper habitat in this area is subject

to damage associated with off-road vehicle use and military training operations (DOD 2008).

Human structures, including roads and trails, logging landings, helicopter pads, buildings, towers, livestock corrals, trail destinations, and campgrounds are often built in forest openings. Construction in these areas resulted in direct habitat loss and degradation of remaining habitat (Potter et al. 1999). In Washington, roads, trails, and buildings have destroyed habitat at one south Puget Sound prairie and in the late 1990s, helicopter landing pads removed habitat at two southern Washington Cascade locales (Potter et al. 1999). A lookout tower, roads, trails, and buildings are also present at one of these sites. Buildings at two additional southern Cascade locales have significantly reduced the area of available habitat and roads, trails, and camping areas have destroyed habitat at another (Potter et al. 1999). Oregon Siskiyou sites are located adjacent to roads in a highly managed landscape. Therefore, it is likely that these structures and associated human activities threaten southern Oregon populations as well (Potter et al. 1999)

Recreational activities, including walking, horseback and off-road vehicle use, may directly kill some Mardon skippers by trampling and crushing larvae (Kerwin and Huff 2007, pp. 20). These activities can also degrade habitat by damaging native plants and opening ground cover for invasion by weeds. Two occupied south Puget Sound prairies, three southern Washington Cascades sites, and one of the California populations (High Divide) are currently threatened by recreational activities (Potter et al. 1999). Kerwin and Huff (2007, pp. 37-41) identified recreational use as a primary or secondary threat to Mardon skipper habitat at 6 out of 57 sites ranked on USFS and BLM lands.

Habitat Modifications Associated with Fire

Small, isolated populations of sedentary insects, such as the Mardon skipper, are vulnerable to fire (Black et al. 2002). Their grassland habitat persisted partly because of repeated, patchy, low-intensity fires. However, large-scale, high-intensity fires are detrimental through direct mortality of individuals and damage to habitat because of the continuous, rather than patchy distribution of the burn. Large portions of the Pierce County Mardon skipper site (one of two extant south Puget Sound sites) burned in June 2003 (A. Potter pers. comm., 2004). This unseasonably early fire likely killed many Mardon skipper larvae encountered. The site is located on the Fort Lewis Artillery Impact Area where uncontrolled fires regularly occur. However, unusual environmental factors in 2003, including record spring drought and high north winds during the fire's ignition, combined to create an unusually large and intense spring fire that covered much of the Mardon-occupied area.

In the southern Washington Cascades, the potential for catastrophic wildfire poses a serious threat to Mardon skippers. In the Gotchen Creek area on the Gifford Pinchot National Forest, forest defoliation and widespread tree mortality associated with insects, disease, and drought has resulted in hazardous fuels conditions across thousands of acres (USFS 2003, p.3). A large wildfire in this landscape could result in local extirpation of up to 20 occupied Mardon skipper sites in the Gotchen Creek area (USFS 2003, p. 184).

In California, the recently discovered Coon Meadows Mardon skipper site on the Six Rivers National Forest is being managed with prescribed fire to maintain the meadow habitat at this site. The Forest Service was originally planning to burn the entire site in a single treatment, but have

modified their plans to a partial burn to minimize direct impacts to Mardon skippers (Black et al. 2008b). The plans to burn the area were made prior to the discovery that Mardon skippers were present, so the entire site could have easily been burned over. It was coincidental that the 2008 surveys located Mardon skippers at this site. Monitoring at this site in 2009 indicated Mardon skippers were 3-27 times more abundant in unburned areas compared to burned areas (Black et al. 2009, p.4). Although there were not enough replicates in this study to allow statistical analysis, the results consistently show substantially fewer butterflies in the burned areas of Coon Mountain meadows compared to unburned regions. Some areas where skippers were found in 2008 surveys lacked mardon completely or nearly so in the burned areas in 2009. Continued monitoring at this site is planned in 2010 to evaluate the rate and timing of re-colonization of burned areas by skippers (S. Black, pers. comm., 2009).

Habitat Modifications Associated with Cattle Grazing

Grazing can impact Mardon skipper populations through direct trampling of eggs, larvae, pupae, and adults (Potter et al. 1999; Black et al. 2002). Larval and adult food sources can be consumed or trampled by livestock. The native fescue bunch grasses, essential to Mardon skippers, regenerate by seeds that are likely consumed during grazing. Grazing has occurred on occupied habitat in the southern Cascades of Washington and on sites in the Oregon Siskiyou Mountains (Potter et al. 1999). Kerwin and Huff (2007, pp. 37-41) ranked grazing as either a primary or secondary threat to Mardon skipper habitat at 37 out of 57 sites ranked on USFS and BLM lands. The impact of cattle grazing to Mardon skipper populations is unclear, and is likely relative to the timing, duration, and magnitude of the grazing at the site. The short-grass meadow structure that Mardon skippers select for is maintained by native ungulate grazing at many sites on the Gifford Pinchot National Forest. Other sites, such as Conrad Meadows on the Wenatchee National Forest are subjected to native ungulate grazing in the spring, and then intensive cattle grazing during the summer months. Conrad Meadows has been in an active cattle grazing allotment for 80 years, and there continues to be a robust population of Mardon skippers at this site (St. Hilaire et al. 2008). All of the sites on the Wenatchee National Forest are located in active cattle grazing allotments, and grazing by cattle removed much of the available nectar sources and bunchgrass at these sites in 2007 and 2008 (St. Hilaire et al. 2008). Mardon skipper densities at sites grazed by cattle on the Wenatchee National Forest are comparable or higher than densities observed at sites on the adjacent Gifford Pinchot National Forest that are subjected only to native ungulate grazing. Robust Mardon skipper populations are apparently able to persist in heavily grazed habitats, whether the grazing is from native ungulates or introduced cattle. Sites with relatively low numbers of Mardon skippers may not be as resilient to grazing impacts. Several Mardon skipper sites located in cattle grazing allotments at Mt. Adams have chronically low numbers of individuals (i.e., less than 20 individuals counted), which may be exacerbated by cattle grazing. Although the impact of cattle grazing to meadow habitats has been well documented (e.g., reduced butterfly host plants, trampling, introduction of invasive plants, etc.), the significance of these various impacts to Mardon skipper populations is unknown.

Habitat Modifications Associated with Pesticide and Herbicide Use

Insecticide application poses a threat to Mardon skippers in the south Puget Sound region and the southern Washington Cascades, although its effects have not been quantified. The lepidopteran-specific insecticide, *Bacillus thurengensis* var. *kurstaki* (Bt or Btk) is applied in large-scale,

aerial applications to control Asian gypsy moth (*Lymantria dispar*) in the Puget Sound region and in the Washington Cascades to control spruce budworm (*Choristoneura occidentalis*). This insecticide has been proposed for use in the southern Washington and southern Oregon Cascades to control the Douglas-fir tussock moth (*Orygia pseudotsugata*) (Black et al. 2002). Although grasslands are not targeted for application, small meadow or savanna/woodlands may receive aerial applications due to the location of these small grassland openings within the wooded target area and from drift of the insecticide. Lepidoptera, such as the Mardon skipper, that are single brooded, spring-active species with caterpillars actively feeding during the application period of Btk are especially vulnerable (Potter et al. 1999). Several of the southern Washington Cascade Mardon skipper sites are located in areas where widespread applications of Btk were used on State, tribal, and private lands to control spruce budworm outbreaks (Potter et al. 1999). The widespread use of Btk has diminished in this area over the past few years. However, the use of this pesticide for forest management still poses a potential threat to Mardon skipper.

Herbicide use may affect Mardon skippers by damaging larval or adult food sources, or through the direct ingestion of a toxic substance. There are currently dozens of herbicide formulations that are available for general use. The toxicity of an herbicide to butterflies will vary from non-toxic to potentially lethal depending upon the compounds used. All herbicides are required to be tested on honeybees (*Apis* spp.) as part of registration requirements (USFS 2005, p. 252). The inclusion of other terrestrial invertebrates in toxicity studies varies for each herbicide. Data on the effects of herbicides to butterflies are almost non-existent. One study on the effects of herbicide to eggs and larvae of the Karner blue butterfly (*Lycaeides Melissa samuelis*) found that direct applications of many herbicide compounds apparently had no effect to egg survival and larval development. However, treatments with a glyphosate-triclopyr mix did significantly lower egg hatching rates (Sucoff, et al. 2001, USFS 2005, p. 254). Herbicides are recognized as an important tool for managing invasive plants and maintain habitat for butterflies. However, there are risks associated with herbicide use. The effect of herbicide use to Mardon skippers is uncertain, but poses a potential threat.

Summary

In summary, the primary threats to the Mardon skipper include ongoing habitat loss from the conversion of natural grasslands to other uses, and the invasion of nonnative forbs, shrubs and trees into native grasslands. Management efforts to control invasive plants and maintain grasslands also pose a threat, because Mardon skippers can be directly killed by the use of prescribed fire and other management activities (such as mowing and herbicide applications). A history of fire suppression has resulted in conifer encroachment into native grasslands, reducing the available habitat for Mardon skippers, and reducing the connectivity between grassland habitats. Intensive grazing is an ongoing threat at many Mardon skipper sites in Oregon and Washington, resulting in the loss of adult nectar sources, larval food plants, and potentially direct mortality to butterfly larvae. The unregulated use of off-road vehicles damages habitats and threatens Mardon skippers at several sites in Oregon, California, and Washington. Forest management practices, including pesticide applications (Btk), and logging road construction have resulted in habitat loss, habitat degradation, and potentially direct mortality to Mardon skipper larvae.

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

Insect collecting is a valuable component of research, including systematic work, and is often necessary for documenting the existence of populations (Black et al. 2002). Rare butterflies, such as the Mardon skipper, could be potentially desirable to collectors. Most Mardon skipper populations are easily accessible and could be vulnerable to collectors (Potter et al. 1999; Black et al. 2002). However, we currently have no information indicating mardon skippers populations have been negatively affected by collection or scientific research activities (Kerwin and Huff 2007, p. 20).

C. Disease or predation.

Disease and predation may be a threat to populations that are suppressed by other factors, but no specific examples are known for the Mardon skipper.

D. The inadequacy of existing regulatory mechanisms.

The Mardon skipper was identified as a Federal candidate for listing in November of 1991 (56 FR 58804 58836). A candidate species is one for which we have on file 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. Although candidate conservation actions are voluntary, we strongly encourage these collaborative conservation efforts for candidate species and offer technical and financial assistance to facilitate such efforts. In addition, most federal agencies have internal policies that require them to treat candidate species as if they were listed for the purposes of conservation.

Although there is no Washington State Endangered Species Act, the Washington Fish and Wildlife Commission has the authority to list species and provide protection from direct take. The Washington Fish and Wildlife Commission designated Mardon skipper as an endangered species in the state of Washington (Washington Administrative Codes 232-12-014, Endangered species; 232-12-011, Threatened species, Appendix D). This designation provides protection from direct take of the species but does not provide any protection to the habitat where the species is found. The Mardon skipper is not listed as a protected species in Oregon or California (Black et al. 2002).

Under the Washington State Forest Practices Act, the Washington State Forest Practices Board has the authority to designate critical wildlife habitat for State listed species affected by forest practices (WAC 222-16-050, WAC 222-16-080). However, critical wildlife habitat has not been designated by the Washington State Forest Practices Board for the Mardon skipper.

The Washington Department of Fish and Wildlife (WDFW) has prepared a Comprehensive Wildlife Conservation Strategy (CWCS) (WDFW 2005). The plan is a non-regulatory statewide approach to conservation in Washington and fulfills a requirement to access two Federal grant programs. The CWCS identifies the Mardon skipper as a “species of greatest conservation need” with a high number of threats, a high vulnerability, and a partly adequate amount of current protection (WDFW 2005, p. 215). The strategy describes the basic biology and distribution,

general and specific problems, and general conservation strategies for the Mardon skipper. It also identifies specific conservation actions including protecting known sites and potential habitat, and investigating limiting factors. Development of the Washington CWCS has proceeded on a parallel track with completion of assessments for nine ecoregions within Washington. For each ecoregion, WDFW will complete Wildlife Action Plans that will include the species-specific proposed conservation actions. The Wildlife Actions Plans are anticipated to be completed in 2010. However, it is unknown what actions will be proposed or when such actions will be implemented.

The Mardon skipper is ranked as critically imperiled and threatened by extinction by the Oregon Natural Heritage Information Center. The Oregon Natural Heritage Information Center lists the Mardon skipper as threatened or endangered throughout its range. Oregon has a State Endangered Species Act, but the Mardon skipper is not a State listed species. Although this species is on the Oregon sensitive species list and is considered critically sensitive, this designation provides little protection (OAR 635–100–0040). The “critical” designation indicates a species for which a listing as threatened or endangered is pending or listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Once an Oregon “native wildlife” species is federally listed as threatened or endangered, it is included as a State-listed species and receives some protection and management, primarily on State-owned or managed lands (OAR 635–100–0100 to OAR 635–100–0180; ORS 496.171 to ORS 496.192). The Oregon Department of Fish and Wildlife has prepared a Comprehensive Conservation Strategy (ODFW 2006). The plan is a non-regulatory statewide approach to conservation in Oregon and fulfills a requirement to access two Federal grant programs. The strategy identifies the Mardon skipper as a “strategy species.” Strategy species are found in low numbers at few locations and are considered to be at-risk species. The plan targets conservation actions for the most at-risk species. The strategy generally identifies special habitat needs, limiting factors and data gaps for the mardon skipper (ODFW 2006, p. 351). It also identifies specific conservation actions needed for the species. The strategy also identifies ecoregion opportunity areas; in the case of the Mardon skipper, the Klamath ecoregion is identified as such. At this time, it is unknown how and when any actions tied to the Conservation Strategy will be implemented.

In California, the Mardon skipper is considered a “special animal” and the California Natural Diversity Database ranks the Mardon skipper as S1 (imperiled). California has an Endangered Species Act but the Mardon skipper is not listed as threatened or endangered under the state ESA. The State Comprehensive Wildlife Action Plan (2006) placed the Mardon skipper on its Special Animal list, which is also referred to as a “species at risk” or “special status species” or “a species of conservation concern” known to occur in the Klamath ecoregion of northwestern California.

The Mardon skipper is a Forest Service Region 6 Sensitive Species and a BLM Special Status Species. Federal management for this species follows FS Region 6 Sensitive Species policy and OR/WA BLM Special Status Species policy (Kerwin and Huff 2007, p. 6). For OR/WA BLM administered lands, these policies describe the need to manage for species conservation. For FS Region 6 these policies require the agency to maintain viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands. Management “must not result in a loss of

species viability or create significant trends toward federal listing” for any identified Sensitive Species (Kerwin and Huff 2007, p. 6).

The Mardon skipper is not currently listed as a Forest Service Sensitive Species in California (Forest Service Region 5), and is therefore not afforded the same level of protection as Forest Service Sensitive Species. However, biologists on the Six Rivers National Forest have taken actions to protect occupied meadow habitats from off-road vehicle use and have altered meadow restoration projects to reduce direct impacts to Mardon skipper (B. Devlin, USFS Six Rivers NF, pers. comm. 2009).

The USFS/BLM completed a conservation assessment for the Mardon skipper which provides management recommendations for protecting and maintaining the species habitat on Federal lands managed by the USFS/BLM in Oregon and Washington (Kerwin and Huff 2007). The management recommendations within the conservation assessment provide guidance to USFS/BLM administrative units, but the management recommendations for species protection are not mandatory. However, the listing of Mardon skipper as a USFS Sensitive/BLM Special Status species ensures that the species is considered and addressed during the planning and implementation of USFS and BLM land management activities in Oregon and Washington. This Sensitive/Special Species status has resulted in direct protection and restoration of Mardon skipper habitat at several sites in the Washington Cascades (USFS 2003, p. 185; USFS 2007, p. 97).

The National Forest Management Act (NMFA) of 1976 (16 U.S.C. 1600 et seq.) directs the Forest Service to prepare management plans to guide long-term land and resource management decisions. The 1982 NFMA planning regulation (1982 rule, 36 CFR 219) guided the development of all the existing land and resource management plans covering National Forests and Grasslands. A new land and resource management planning regulation under NFMA (2008 rule, 36 CFR 219) was adopted on April 21, 2008 (73 FR 21467); the 2008 rule has provisions for social, economic, and ecological sustainability, and no longer has a provision regarding habitat to support species viability. The provision for ecological sustainability states an overall goal of providing “a framework to contribute to sustaining native ecological systems by providing appropriate ecological conditions to support diversity of native plant and animal species in the plan area. The 2008 rule also specifies: “If the responsible official determines that provisions in plan components [in addition to that for ecosystem diversity] are needed to provide appropriate ecological conditions for specific threatened and endangered species, species-of-concern, and species-of-interest, then the plan must include additional provisions for these species, consistent with the limits of Agency authorities, the capability of the plan area, and overall multiple use objectives” (2008 rule, 36 CFR 219. 10(b)(2)). All existing Forest plans involving Mardon skipper will eventually be revised using the new planning rule and related changes in policy.

In summary, there continue to be ongoing threats to the species due to the inadequacy of existing regulatory mechanisms. However, these threats have been substantially reduced through both State and Federal special status species programs. The existing regulatory mechanisms do not afford direct legal protection to the species habitat on State or private lands (except in Washington, where the species does receive some protections on State lands as a State-listed

endangered species). Ongoing threats that are not currently addressed by the existing regulatory mechanisms include habitat loss or degradation due to forest management practices on private lands, overgrazing on private and Federal lands, and use of herbicides and pesticides within Mardon skipper habitats. Although both Washington and Oregon have completed Comprehensive Conservation Strategies, it remains unclear when and how the strategies will be implemented and result in on-the-ground conservation actions for Mardon skipper.

E. Other natural or manmade factors affecting its continued existence.

Climate change, stochastic events, and isolated populations

Most Mardon skipper populations consist of low numbers of individuals that persist in habitats that are geographically isolated from other populations. Populations with low numbers of individuals (e.g., less than 50 individuals) may be vulnerable to extirpation from random events such as inclement weather, wildfire, or other threats identified above. Unseasonable weather (freezing temperatures, heavy rain events, or prolonged drought) can extirpate local butterfly populations by killing adults, larvae, or larval food plants (Guppy and Shephard 2001, p. 59).

The drastic decline in Mardon skipper numbers observed on the Gifford Pinchot National Forest in 2009 is an example of how variations in seasonal weather can have a profound effect on local Mardon skipper populations. The exact weather event that caused the decline is unknown, but unseasonably warm weather in May and June caused a rapid snowmelt to occur in these high elevation meadows, followed by at least 4 days of freezing temperatures in late June during the period when Mardon skipper adults typically emerge (Kogut 2009). The adult flight period in 2009 occurred later, in mid-July, and was very brief, and the total numbers of adults were approximately 80 to 95 percent less than what has typically been counted at these sites during the previous 6 years (Kogut 2009). The weather effect was not limited to Mardon skippers, other butterfly species were also affected, including the closely-related Sonora skipper (*Polites sonora*), which was apparently absent from all sites where the species commonly co-occurs with Mardon skippers at Cowlitz Valley (Kogut 2009). The apparent weather-related effect was also noted at sites on the adjacent Wenatchee-Okanogan National Forest, where the emergence of adults occurred later, and the adult flight period was shorter than in previous years (St. Hilaire et al. 2009, p.2), although the effect to the population was not as severe as that seen on the Gifford Pinchot National Forest. The apparent decline of Mardon skipper populations in Oregon may also be the result of a weather-related effect. In 2009, Mardon skippers were present at only 12 of 18 current and historic sites on Forest Service and BLM lands, with only 2 sites having peak counts of more than 20 skippers (S. Black, pers. comm., 2010).

The apparent weather-related population declines observed in 2009 indicate the Mardon skipper may be highly vulnerable to the ongoing effects of climate change. Mardon skippers occupy a relatively narrow range of habitats that support host plants that remain palatable to the larvae throughout the summer months. Changes in regional temperature and precipitation patterns could have profound implications for Mardon skipper populations and may already be contributing to annual variation in the reproduction or survival of local populations.

The climate in the Pacific Northwest has already experienced a warming of 0.8° C during the 20th century (Mote et al. 2008, p.3). Using output from eight climate models the Pacific

Northwest is projected to warm further by 0.6 to 1.9° C by the 2020s, and 0.9 to 2.9° C by the 2040s (Mote et al. 2008, pp.5-6). Additionally, the majority of models project wetter winters and drier summers (Mote et al. 2008, p.7), and of greatest consequence, a reduction in regional snowpack, which supplies water for ecosystems during the dry summer months (Mote et al. 2003). The small summertime precipitation increases projected by a minority of models do not change the fundamentally dry summers predicted in the Pacific Northwest and do not lessen the increased drying of the soil column brought by higher temperatures (Mote et al. 2003, p.8). The implications of drier summers to Mardon skippers include a potential disruption of normal larval development if host plants senesce earlier due to drier climate conditions, and increased wildfire frequency and severity that could result in local extirpations.

Locations where Mardon skippers have been extirpated are unlikely to be recolonized because Mardon skipper populations are widely separated, the populations are small, and the species has limited dispersal ability. In the south Puget Sound region, Mardon skippers are now extirpated from four of five historically documented sites (Potter et al. 1999, p. 4). Almost all remaining Mardon skipper population numbers are small and it is unlikely that Mardon skippers would recolonize an area unless the distance between sites was less than 1 mi (1.6 km) (Runquist 2004a).

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

South Puget Sound Prairie Management and Restoration Efforts

A Candidate Conservation Agreement/Candidate Conservation Agreement with Assurances (CCA/CCAA) for south Puget Sound prairie-associated species (including Mardon skipper) is under development and nearing completion. Several agencies and local land managers are partners in this effort, including DOD (Fort Lewis and McChord Air Force Base), WDFW, WDNR, Thurston County, The Nature Conservancy (TNC), Port of Olympia, Wolf Haven International, and Caveness Ranch. Representatives from these groups are working with the FWS to develop this agreement, which will guide habitat management and restoration activities on south Puget Sound prairies, including sites with current occupied Mardon skipper habitat, and other sites that may be suitable for future Mardon skipper reintroduction efforts. The CCA/CCAA will provide long-term conservation on more than 26,000 acres of grassland habitat in the south Puget Sound region of western Washington. A draft agreement has been completed for two of our partners, the Department of Defense (CCA) and the Nature Conservancy (CCAA).

Restoration of grasslands in the south Puget Sound region of Washington has resulted in temporary control of Scot's broom and other invasive woody plants through the use of herbicides, mowing, grazing, and prescribed fire. These efforts have been beneficial to Mardon skippers by maintaining the species habitat, host plants, and preferred nectar sources. The TNC of Washington, with funding from the FWS and DOD, has conducted restoration projects to maintain Mardon skipper habitat at Fort Lewis Military Reservation. The WDFW continues to manage nonnative grass problems at their local Wildlife Area in Thurston County. Portions of this 639-acre parcel are mowed each year, and other areas are treated with herbicide to manage invasive Scot's broom and tall oatgrass. Roemer's fescue was planted into the area in an effort to improve Mardon skipper habitat. Monitoring at treated sites indicates Mardon skippers are using

many areas where restoration activities had occurred in previous years. At the north unit of the Wildlife Area, the largest number of skippers counted was in areas treated to remove tall oatgrass and Scot's broom. Indications to date are that the combination of oatgrass control and Scot's broom removal is having a net positive effect on the Mardon skipper population at this site (D. Hays, pers. comm., 2008).

Experimental Captive Rearing and Reintroduction Efforts

Biologists from WDFW have been working to implement and refine captive rearing methods for Mardon skipper with staff at the Oregon Zoo. This work has been ongoing for approximately 5 years and the early results have not been fully successful for Mardon skipper. If Mardon skippers can be reared successfully in captivity, captive rearing techniques may be used to facilitate reintroduction of Mardon skippers to appropriate sites within the species' historic range in the Puget Sound region. WDFW, in cooperation with TNC, plans to experimentally reintroduce Mardon skippers at currently unoccupied sites within the species' historic range in the south Puget Sound area. A small private parcel of prairie land was acquired in 2005 with funding from the Endangered Species Act (16 U.S.C. 1531 *et seq.*) (ESA) section 6 Recovery Lands Acquisition funds. This 130-acre parcel will contribute to the conservation of prairie associated species in south Puget Sound, including Mardon skipper. Mardon skippers will be introduced onto this parcel when the captive rearing methods have been improved and larvae are available to move onto the site. TNC, in coordination with the FWS, will oversee management of the parcel.

US Forest Service (USFS) and Bureau of Land Management (BLM) Conservation Efforts

Conservation efforts on National Forests in Washington and California have included conifer removal in meadows, invasive plant treatments, placement of off-road vehicle barriers, and construction of cattle exclosures (Kogut 2008, B. Devlin, USFS, pers. comm. 2009). FWS has funded several USFS Mardon skipper projects via Interagency Agreements. To date, cooperative projects on the Gifford Pinchot National Forest have maintained or restored meadow habitats on approximately 26 acres (Kogut 2008).

In 2005 an interagency Mardon Skipper Work Group was convened by the Interagency Special Status/Sensitive Species Program for Region 6 of the USFS and Oregon/Washington BLM. This collaboration between the two Federal land management agencies included technical input from the FWS, WDFW, USFS, BLM, and the Xerces Society. The task of this work group was to summarize the current state of the knowledge on the biology and ecology of the Mardon skipper butterfly, and to develop management guidelines for the conservation of Mardon skipper habitat on USFS/BLM lands in Oregon and Washington. The USFS/BLM completed the conservation assessment for the Mardon skipper in 2007 (Kerwin and Huff 2007). The listing of Mardon skipper as a USFS Sensitive/BLM Special Status species in Oregon and Washington ensures that the species is considered and addressed during the planning and implementation of USFS and BLM land management activities. The sensitive species status has resulted in direct protection and restoration of Mardon skipper habitat at several sites in the Washington Cascades (USFS 2003, p. 185, USFS 2007, p. 97).

Under a decision signed in September, 2007, the Gifford Pinchot National Forest is reducing the

level of cattle grazing permitted at Mardon skipper sites located within the Ice Caves cattle and horse grazing allotment (USFS 2007, p. 97). The decision to reduce cattle grazing in this area will benefit Mardon skippers by reducing the threats associated with grazing at these sites. Cattle will be excluded (with additional fencing and exclosures) from several occupied Mardon skipper sites within the allotment that were historically grazed. Total grazing use will be reduced at other occupied sites in the allotment. The reduction in cattle grazing at these sites will improve habitat quality for mardon skippers by increasing the nectar sources and larval host plants available for Mardon skippers, and reduce the mortality associated with trampling and incidental consumption of butterfly larvae. The Rogue River-Siskiyou National Forest is also revising a cattle grazing management plan for at least one Mardon skipper site in southern Oregon (MWSG Notes 03/04/2008).

Mardon Skipper Surveys

In 1999, the Mardon skipper was known from approximately 14 sites located in four disjunct geographic areas (Potter et al. 1999). Over the past 9 years, biologists from FWS, WDFW, WDNR, USFS, BLM, National Park Service, DOD, TNC, Yakama Indian Reservation, and the Xerces Society have searched hundreds of locations in Washington, Oregon, and California for Mardon skippers. The current total of 139 sites representing approximately 59 populations is considerably greater than what was known in 1999. However, this increase is not due to increased habitat or expanding populations, but instead due to increased survey effort in areas not previously surveyed (Kerwin and Huff 2007, p. 13). These survey efforts have refined our knowledge of the species distribution, abundance, and habitats.

The interagency Mardon Skipper Work Group plans to continue surveys on USFS and BLM lands in 2010. The Wenatchee National Forest will focus their survey efforts in the vicinity of the recently detected populations on the Naches Ranger District. The Coos Bay BLM is also planning to continue surveys in the Gold Beach area of coastal Oregon. In California, the Six Rivers National Forest will be working with the Xerces Society to monitor the effects of prescribed burning on the Mardon skipper population at the Coon Meadows site.

SUMMARY OF THREATS

The greatest threats currently posed to Mardon skippers are stochastic events such as a catastrophic wildfire or unseasonable weather. Almost all remaining Mardon skipper population numbers are small and it is unlikely that Mardon skippers would recolonize an area unless the distance between sites was less than 1 mi (1.6 km). Other threats to the Mardon skipper include direct impacts to individuals and local populations by: (1) livestock grazing; (2) pesticide drift; (3) off-road vehicle use; (4) grassland/meadow management activities such as prescribed burning and mowing; (5) habitat loss or modification through conifer encroachment; invasive nonnative plants; and (6) roadside maintenance. However, these threats have been reduced due to protections provided by State and Federal special status species programs. Ongoing threats that are not currently addressed by the existing regulatory mechanisms include potential habitat loss or degradation due to forest management practices on private lands, unregulated off-road vehicle use, overgrazing by livestock on private and Federal lands, and use of herbicides and pesticides

within Mardon skipper habitats.

The magnitude of threats is considered to be moderate to low because over 70 percent of documented Mardon skipper sites are located on Federal or State lands where the species is now protected to some degree by special status species programs. Livestock grazing on Federal and private lands continues to be an ongoing threat, and overgrazing of meadow habitats at some sites has led to significant habitat degradation. The magnitude of the impact of grazing to Mardon skipper populations is uncertain, and likely varies depending upon the timing and intensity of livestock grazing at individual sites. Ongoing habitat management and restoration activities on south Puget Sound prairies, including sites with current occupied Mardon skipper habitat, are reducing threats and maintaining the species habitat.

Threats are imminent because all sites within the species range currently have one or more identified and ongoing threats that are resulting in direct impacts to individuals within the populations, and a gradual loss or degradation of grassland habitats. Ongoing threats are causing the species to persist at low levels at many sites within its range. In the south Puget Sound region, populations are entirely dependant upon ongoing habitat management to control invasive nonnative plants. The ongoing habitat management in this region is essential to maintain Mardon skipper populations, but these activities can also result in direct impacts (e.g., trampling) to individuals. Habitat loss due to conifer encroachment and invasive plants in the Cascades is a gradual process that can be checked with meadow and grassland management. The small population sizes and highly disjunct distribution make the Mardon skipper vulnerable to local extirpations.

We find that this species is warranted for listing throughout all of its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES

- All current and high priority historic locations for Mardon skipper butterflies should be monitored.
- Potential suitable habitat composed of native species of bunchgrasses and forbs should be surveyed for the presence of the Mardon skipper. If the species is found to occupy a site, a formal survey or a complete assessment of the site should be made.
- Management actions that improve the amount and distribution of suitable habitat for Mardon skipper butterflies are recommended. Recommended management procedures for improving habitat include reducing or eliminating livestock grazing, reducing conifer encroachment in meadows, mowing (usually early fall or pre-emergence of larvae in the spring), prescribed burning of patches to conserve eggs and larvae, and judicious use of herbicides to manage invasive plants.
- The acquisition of grassland and bald habitats using Federal funds (e.g., ESA Section 6 Recovery land funding) should be a high priority to conserve Mardon skipper.
- To further the reintroduction programs in south Puget Sound prairies, continued work on the development of captive rearing techniques is also recommended.

- Currently, the south Puget Sound populations are restricted to two general areas. The establishment of additional populations through a reintroduction program is recommended because the distances between prairies managed for conservation are great enough that natural dispersal and colonization of additional sites is unlikely to occur.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	<u>Imminent</u>	Monotypic genus	7
		<u>Species</u>	8*
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The magnitude of the threats is moderate to low because current regulatory mechanisms associated with State and Federal special status species programs afford the species a relatively high level of protection from additional habitat loss or destruction across most of the species range. Over 70 percent of documented Mardon skipper sites are located on Federal or State lands and are considered during planning and implementation of land management activities in Oregon and Washington. Also, the discovery of new populations and the wide geographic range for the Mardon skipper means that there are enough populations to provide a buffer against threats destroying all existing habitat simultaneously or jeopardizing the continued existence of the species.

Imminence: Threats are imminent because all sites within the species range currently have one or more identified and ongoing threats that are resulting in direct impacts to individuals within the populations, and are experiencing a gradual loss or degradation of grassland habitats. Low numbers of individuals have been found at most of the known locations. Only a few locations are known to support greater than 100 individuals and specific populations could easily be lost by changes in vegetation composition or from wildfire. The great distances between the known locations for the species would not allow for dispersal of the species between populations. Loss of any population could lead to extirpation of the species at any of these locations.

Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? **YES**

Is Emergency Listing Warranted? **NO.** Emergency listing of the Mardon skipper is not warranted. The Mardon skipper is a little-studied species; however, the species has received considerable attention and some funding for surveys since becoming a Federal candidate species in 1999. The number of documented locations of Mardon skippers has expanded from less than 10 in 1998 to 139 in 2009. New site locations have been documented in each year that targeted surveys have been conducted since 1999. In the past 5 years, significant local populations have been located in the Washington Cascades and in coastal areas of Oregon and California, with local sites supporting populations of 100s of Mardon skippers. New finds may continue because there are more trained people looking for Mardon skippers. Current regulatory mechanisms associated with State and Federal special status species programs afford the species a high level of protection from additional habitat loss or destruction across most of the species range. The discovery of new populations and the wide geographic range for the Mardon skipper provides a buffer against threats destroying all existing habitat simultaneously or jeopardizing the continued existence of the species. An emergency listing of this species is not warranted at this time.

DESCRIPTION OF MONITORING

Surveys follow general protocols for butterfly sampling or recent protocols developed specifically for Mardon skipper (Seitz et al. 2007). A slow and deliberate walk is made through potential and marginal habitat. For each geographic area, the timing of surveys varies, depending on local climates and food plant availability. Butterfly surveys are conducted in appropriate temperatures (> 55 degrees F) and preferably during low wind conditions. Surveys on the prairies of south Puget Sound, in southern Oregon Cascades and in northern California begin in late May; surveys in the southern Cascades of Washington usually begin in mid to late June. Surveys at all locations extend for 4 to 6 weeks. Information collected at each surveyed site includes the site name, date, description of the habitat and the results of the surveys. In 2009, Mardon skipper surveys will be conducted on various FS and BLM lands in all three states, and WDFW and DOD will continue to monitor populations in the Puget Sound regions.

COORDINATION WITH STATES

We, the Washington Fish and Wildlife Office, have coordinated with the Washington Department of Fish and Wildlife on Mardon skipper surveys since 1997 and have periodically funded restoration projects to benefit Mardon skipper at Scatter Creek Wildlife Area, a local prairie site managed by WDFW. WDFW has been instrumental in their coordination with the FWS on Mardon skipper and has taken the lead on field workshops to train agency and private consultants on survey methods and the identification of Mardon skipper throughout the species range. We continued to refine and move towards completion of a CCA/CCAA with several Federal, state, and local land managers that will provide long-term conservation to more than 26,000 acres of grassland habitat in the south Puget Sound region of western Washington.

For this review, we contacted species experts and agency staff from all three states where the

species is known to occur. Information including annual survey and monitoring reports were received from agency staff in all three states. We have included this new information in the preparation of this assessment.

LITERATURE CITED

- Agee, J.K. 1993. Fire Ecology of Pacific Northwest Forest. Island Press, Washington, DC. 493 pp.
- Beyer, L. and S. Hoffman Black. 2007. Site utilization by adults and larvae of Mardon skipper butterfly (*Polites mardon*) at four sites in Washington and Oregon. Final report to the Forest Service and BLM. 72 pp.
- Beyer, L. 2009. Oviposition selection by a rare grass skipper, *Polites mardon*, in montane habitats: Advancing ecological understanding for developing conservation strategies. Masters Thesis. Washington State University, Vancouver, Washington. May 2009. 56 pp.
- Beyer, L.J., and C.B. Schultz. 2010. Oviposition selection by a rare grass skipper *Polites mardon* in montane habitats: Advancing ecological understanding to develop conservation strategies. *Biological Conservation* 143 (2010) 862-872.
- Black, S.H., K. Hitt, and M. Vaughan. 2002. Petition to list the Mardon skipper butterfly (*Polites mardon*) as an endangered species under the U.S. Endangered Species Act. Report submitted to The Xerces Society, Gifford Pinchot Task Force, The Northwest Environmental Defense Center, Center for Biological Diversity, Oregon Natural Resources Council, Friends of the San Juans, and Northwest Ecosystem Alliance. 25 pp.
- Black, S.H., S. Jepsen, and L. Lauvray. 2008a. Report to the U.S. Forest Service. Xerces Society surveys for *Polites mardon klamathensis* in southern Oregon's Mt. Ashland area (Summer 2008). 15 pp.
- Black, S.H., S. Jepsen, and L. Lauvray. 2008b. Report to the U.S. Fish and Wildlife Service. Xerces Society surveys for *Polites mardon* in Del Norte County of northern California. September 2008. 17 pp.
- Black, S.H., C. Mazzacano, and L. Lauvray. 2009. Report to the U.S. Fish and Wildlife Service and U.S. Forest Service. Mardon skipper survey of the Coon Mountain burn site, Xerces Society, October 2009. 13 pp.
- Crawford, R.C. and H. Hall. 1997. Changes in the south Puget prairie landscape. Pages 11 - 16 in P. V. Dunn, and K. Ewing, eds. 1997. Ecology and Conservation of the South Puget Sound Prairie Landscape. The Nature Conservancy, Seattle, WA. 289 pp.
- Dana, R.P. 1991. Conservation management of the prairie skippers *Hesperia dacotae* and *Hesperia ottoe*: basic biology and threat of mortality during prescribed burns. University of Minnesota. Minnesota Agricultural Experiment Station Bulletin 594B1991 (ADBSBB 5511BS). 62 pp.

- Department of Defense (DOD). 2007. 2007 Range and training land assessment butterfly monitoring field summary. Unpublished agency report by Wolford, L., L. Randolph, A. Lyons, and B. Hughes. U.S. Army, Fort Lewis, Washington. 27 pp.
- Department of Defense (DOD). 2008. 2008 Integrated Training Area Management, Fort Lewis, WA. Range and Training Land Assessment. Unpublished agency report prepared by L. Randolph. U.S. Army, Fort Lewis, Washington. 87 pp.
- Edwards, W.H. 1881. Description of new species of butterflies. *Papilio* 1(4):43B48.
- Ehrhardt, A. 1995. Diurnal Lepidoptera: sensitive indicators of cultivated and abandoned grassland. *Journal of Applied Ecology* 22:849B861.
- Ehrlich P. R. 1992. Population Biology of Checkerspot Butterflies and the Preservation of Global Biodiversity. *Oikos* 63:1 p 6-12.
- Flick, C. and Harke, V. 2006. Inventory for mardon skipper, *Polites mardon*, Columbia River Gorge National Scenic Area and Mt. Hood National Forest. Report to the Interagency Special Status Sensitive Species Program FY2006 Inventory and Conservation Planning Project. 15 pp.
- Guppy, C.S., and J.H. Shepard. 2001. Butterflies of British Columbia. University of British Columbia Press. Vancouver, BC. 414 pp.
- Haggard, J. 2003. 2003 status report for mardon skipper (*Polites mardon mardon*) in Del Norte County, California with appendix of vegetation characterization. Report to U.S. Fish and Wildlife Service, Arcata, CA. 32pp.
- Harke, V. 2001. U.S. Fish and Wildlife Service surveys for Mardon skipper in southwestern Washington summary year 2001. Unpublished report submitted to Washington Department of Fish and Wildlife, Olympia, WA. 19 pp.
- Hays, D.W., A. Potter, C. Thompson, and P. Dunn. 2000. Critical habitat components for four rare south Puget Sound butterflies. Washington Department of Fish and Wildlife, Olympia, and The Nature Conservancy of Washington, Seattle. 35 pp.
- Henry, E. 2009. Mardon skipper in south Puget Sound: Life history and habitat characteristics selected for oviposition. 2009 ACUB project progress reports submitted to the Washington Department of Fish and Wildlife, Olympia, WA. 9 pp.
- ITIS (Integrated Taxonomic Information System). 2009. <http://www.itis.gov/>.
- Jepsen, S., S.H. Black, and L. Lauvray. 2007a. Report to the U.S. Forest Service. Xerces Society surveys for *Polites mardon mardon* in the Naches Ranger District of Washington (Summer 2007). 56 pp.

- Jepsen, S., S.H. Black, and L. Lauvray. 2007b. Report to the Bureau of Land Management. Xerces Society surveys for *Polites mardon klamathensis* in southern Oregon (Summer 2007). 76 pp.
- Jepsen, S., S.H. Black, and L. Lauvray. 2007c. Report to the U.S. Fish and Wildlife Service. Xerces Society surveys for *Polites mardon* in Del Norte County of northern California (late May and early June 2007). 25 pp.
- Jepsen, S., L. Lauvray, and S.H. Black. 2008. Report to the U.S. Forest Service. Xerces Society surveys for *Polites mardon mardon* in the Naches Ranger District (Wenatchee National Forest) of Washington (Summer 2008). 15 pp.
- Kerwin, A. E., and Huff, R. 2007. Conservation assessment for the mardon skipper (*Polites mardon*). Version 1.0. May, 2007. USDA Forest Service Region 6, Oregon and Washington. USDI Bureau of Land Management, Oregon and Washington. 42 pp.
- Kogut, T. 2008. Restoration and management of upland meadows on the Gifford Pinchot National Forest: History and lessons learned. Unpublished agency report. Gifford Pinchot National Forest, Cowlitz Valley Ranger District. Randle, WA. 11 pp.
- Kogut, T. 2009. 2009 mardon skipper surveys Cowlitz Valley Ranger District, Gifford Pinchot National Forest. Unpublished agency report and associated email correspondence. Gifford Pinchot National Forest, Cowlitz Valley Ranger District. Randle, WA. 14 pp.
- Kruckeberg, A. R. 1991. The natural history of Puget Sound country. University of Washington Press, Seattle, WA. 468 pp.
- MacNeill, D.C. 1993. Comments on the genus *Polites*, with the description of a new species of the Themistocles group from Mexico (Hesperiidae:Hesperiinae). Journal of the Lepidopterists Society 47(3) 177-198).
- Mattoon, S.O., J.F. Emmel and T. C. Emmel. 1998. The distribution of *Polites mardon* (Lepidoptera: Hesperiiidae) in North America, and description of a new subspecies from southern Oregon. Systematics of Western North American Butterflies. Pp. 767-774.
- Mote, P.W., E.A. Parson, A.F. Hamlet, W.S. Keeton, D. Lettenmaier, N. Mantua, E.L. Miles, D.W. Peterson, D.L. Peterson, R. Slaughter, and A.K. Snover. 2003. Preparing for climate change: The water, salmon, and forests of the Pacific northwest. Climate Change 61: 45-88.
- Mote, P., E. Salathe, V. Duliere, and E. Jump. 2008. Scenarios of future climate for the Pacific Northwest. A report for the Climate Impacts Group, University of Washington, Seattle, Washington. 12pp.
- Newcomer, E.J. 1966a. Life histories of three western species of *Polites*. Journal of Research on the Lepidoptera 5(4):243B247.

- Newcomer, E.J. 1966b. Butterflies of Yakima County, Washington, additions and corrections. *Journal of the Lepidopterists' Society* 20(4):253B254.
- Oregon Department of Fish and Wildlife (ODFW). 2006. Oregon conservation strategy. Oregon Department of Fish and Wildlife, Salem, Oregon.
- Parker, I., W. Harpole, and D. Dionne. 1997. Plant community diversity and invasion of the exotic shrub *Cytisus scoparius*: testing hypotheses of invisibility and impact. Pages 149-161 in P. V. Dunn, and K. Ewing, eds. 1997. *Ecology and Conservation of the South Puget Sound Prairie Landscape*. The Nature Conservancy, Seattle, WA. 289pp.
- Potter, A. 2009. Monitoring mardon skippers at Scatter Creek Wildlife Area – 2009 project summary. Summary report submitted to the Washington Department of Fish and Wildlife, Olympia, WA. September 17, 2009. 4 pp.
- Potter, A., J. Fleckenstein, and J. Feen. 2002. Mardon skipper range and distribution in Washington in relation to state and federal highways with a habitat description and survey method guidelines. Final report to Washington Department of Transportation. Washington Department of Fish and Wildlife, Olympia, WA. 18 pp.
- Potter, A., and J. Fleckenstein. 2001. Southern Cascade surveys for the mardon skipper. Summary year 2000. Final report to the U.S. Fish and Wildlife Service, Western Washington Office, Lacey, WA. 11 pp.
- Potter, A., J. Fleckenstein, S. Richardson, and D. Hayes. 1999. Washington state status report for the Mardon skipper. Washington Department of Fish and Wildlife, Olympia, WA. 39 pp.
- Pyle, R.M. 1989. Washington butterfly conservation status report and plan. Washington Department of Wildlife, Nongame Program, Olympia, WA. 217 pp.
- Pyle, R.M. 2002. *The Butterflies of Cascadia*. Audubon Society. Seattle, Washington. 420 pp
- Ross, Dana. 2005. 2005 Surveys for Mardon skipper (*Polites mardon klamathensis*) on public lands in southern Oregon. A report submitted to the U.S. Fish and Wildlife Service, Portland, Oregon. 10 pp.
- Ross, Dana. 2007a. 2006 Surveys for Mardon skipper (*Polites mardon klamathensis*) on public lands in Southern Oregon. A report submitted to the U.S. Fish and Wildlife Service, Portland, Oregon. 15 pp.
- Ross, Dana. 2007b. 2007 Surveys for Mardon skipper (*Polites mardon*) in southwestern Oregon. A report submitted to the Xerces Society for Invertebrate Conservation and the U.S. Fish and Wildlife Service, Portland, Oregon. December 2007. 17 pp.

- Ross, Dana. 2008a. 2008 Surveys for Mardon skipper (*Polites mardon*) in coastal southern Oregon. A report submitted to the Xerces Society for Invertebrate Conservation and the U.S. Fish and Wildlife Service, Portland, Oregon. December 2008. 17 pp.
- Ross, Dana. 2008b. 2008 Surveys for Mardon skipper on the Willamette National Forest. A report submitted to U.S. Forest Service, Willamette National Forest, McKenzie River Ranger District. December 2008. 8 pp.
- Runquist, E. 2004a. Workshop on the ecology and status of the Mardon skipper (*Polites mardon*): An unusual Pacific Northwest butterfly. Ashland, OR.
- Runquist, E. 2004b. 2004 Line transect sampling and surveys for Mardon skippers (*Polites mardon*) in Del Norte County, California. Report submitted to USFWS, Arcata, CA.
- Scott, J. A. 1986. The butterflies of North America. A natural history and field guide. Stanford University Press, Stanford, CA. 583 pp.
- Seitz, R., A. Potter, K. Van Norman, N. Barrett, and M. Wainwright. 2007. Survey protocol for the Mardon skipper (*Polites mardon*), version 1.1. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington, Portland, Oregon. 30 pp. <http://www.fs.fed.us/r6/sfpnw/issssp/inventories/>
- St. Hilaire, J., J. Bernatowicz, and W. Moore. 2008. U.S. Forest Service and Washington Department of Fish and Wildlife Mardon skipper (*Polities mardon mardon*). Report Naches Ranger District, Okanogan-Wenatchee National Forest, Spring and summer 2008. Unpublished agency report to USDA Forest Service and Washington Department of Fish and Wildlife, Naches, WA. 35 pp.
- St. Hilaire, J., J. Bernatowicz, and W. Moore. 2009. U.S. Forest Service and Washington Department of Fish and Wildlife Mardon skipper (*Polities mardon mardon*). Report Naches Ranger District, Okanogan-Wenatchee National Forest, Spring and summer 2009. Unpublished agency report to USDA Forest Service and Washington Department of Fish and Wildlife, Naches, WA. 24 pp.
- Sucoff, E., Nichols, T. & Lu, E.Y. 2001. Herbicide effects on host plants of Karner Blue butterfly and on butterfly development from egg to adult. Department of Forest Resources Staff Paper Series Number 151. University of Minnesota College of Natural Resources: St. Paul, Minnesota. 47pp.
- U.S. Forest Service (USFS). 2003. Final Environmental Impact Statement for the Gotchen risk reduction and restoration project. Mt. Adams Ranger District, Skamania and Yakima Counties, Washington. USDA Forest Service, Gifford Pinchot National Forest, Vancouver, WA. October 2003.
- U.S. Forest Service (USFS). 2005. Biological assessment for the USDA Forest Service Pacific Northwest Region Invasive Plant Program. USDA Forest Service, Portland, OR. June

2005. 465 pp.

U.S. Forest Service (USFS). 2007. Environmental assessment for the Ice Caves grazing allotment. Mt. Adams Ranger District, Klickitat County, Washington. USDA Forest Service, Gifford Pinchot National Forest, Vancouver, WA. February 2007. Decision notice signed September 21, 2007.

Warren, A. D. 2005. Lepidoptera of North America 6. Butterflies of Oregon – Their taxonomy distribution and biology. Corvallis OR.

Washington Department of Fish and Wildlife (WDFW) 2005. Washington's comprehensive wildlife conservation strategy. Final draft. Submitted September 19, 2005). Olympia, WA.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all 12-month petition findings, additions of species to the candidate list, removal of candidate species, and listing priority changes.

Approve:

Carolyn L. Bohan
Acting Regional Director, Region 1, Fish and Wildlife Service
5/18/10
Date

Rowan W. Gould
ACTING
Director, Fish and Wildlife Service
October 22, 2010

Concur:

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 15, 2010

Conducted by: T. Thomas and V. Harke

Reviewed by: Jodi Bush Date: April 30, 2010
Division Manager, Listing and Recovery, WFWO

Ken Berg Date: May 3, 2010
Manager, WFWO

