

**Report to the U.S. Forest Service**  
**Xerces Society Surveys for *Polites mardon mardon***  
**in The Naches Ranger District of Washington (Summer 2007)**



*Polites mardon mardon* photograph by Vince Harke

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## INTRODUCTION

The Mardon skipper (*Polites mardon*) is a small, tawny-orange butterfly (20-24 mm) with a stout body. The Mardon skipper is visually distinguishable from other similar skippers by a diagnostic pattern of rectangular white spots visible on the ventral hind wings (Pyle 2002). Mardon skippers are currently found at four geographically disjunct areas including low elevation grasslands of coastal northern California (note: In 2007 one Mardon skipper was found in southern Oregon approximately 20 miles northwest of known sites in California), prairies of the South Puget Sound in Washington State, and grasslands between roughly 500 and 1700 meters in the Cascade Mountain Range of Washington (around Mt. Adams), and Oregon (east of Ashland). Most sites are relatively small, and support populations of less than 50 individuals. However, there are a few robust sites that maintain populations of over two hundred individuals. The Mardon skipper is listed as a federal candidate species under the U.S. Endangered Species Act, and is listed as endangered in the state of Washington (Black & Vaughan 2005).

*P. mardon* use more than one graminoid species for oviposition. The most common oviposition plants in Oregon are *Danthonia californica*, *Festuca rubra*, and *Carex* species. In Washington, the most common oviposition plants are *Festuca idahoensis* and *Carex* species (Beyer & Black 2007). Oviposition studies have not been conducted in California, but *Festuca idahoensis* is abundant at the known California Mardon skipper sites (Haggard 2003). In addition, *Polites mardon* seem to use a variety of nectar flower species. The most common observations were on *Vicia* species (Washington sites) and *Potentilla diversifolia* (Oregon sites).

Most habitats are subject to a variety of anthropogenic disturbances such as recreation, grazing, introduction of noxious weeds, various insecticides including Btk<sup>1</sup> as well as natural succession (i.e., conifer encroachment on meadows) which may threaten persistence of individual sites. Little genetic exchange between populations may contribute to possible inbreeding. Mardon skippers are assumed to have limited dispersal (Runquist 2004), though long term studies are necessary to determine the effects of climatic and other variables on dispersal and annual reproductive success. Lack of genetic interchange and migration / dispersal between populations may make it impossible for an extirpated population to become reestablished.

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<sup>1</sup> *Bacillus thuringiensis* var *kurstaki* is a lepidopteran-specific insecticide

### *Taxonomy*

The Mardon skipper (*Polites mardon*) is in the family *Hesperiidae* (skippers) and the subfamily *Hesperiinae* (grass skippers). It was first described by W. H. Edwards (1881) from specimens taken near Tenino, Thurston County, Washington by H. K. Morrison (Dornfeld 1980). Mattoon et al. (1998) proposed that the Oregon population be given subspecies status *Polites mardon klamathensis* and that the Washington and California populations be considered *Polites mardon mardon*. Adults of *P. m. klamathensis* have a consistently tawnier dorsal and ventral coloration, when compared to adults from other populations (Warren 2005). A group of *P. mardon* populations exists in coastal Del Norte County approximately 80 air miles to the west of *P. m. klamathensis* populations. However the series of *P. mardon* from Del Norte County populations have not yet been carefully compared to series of *P. mardon mardon* from Washington and the use of the name *P. mardon mardon* for California populations should be considered tentative (Warren 2005).

### *Summary of 2007 survey efforts*

To locate new populations of Mardon skippers in Washington, Sarina Jepsen and Logan Lauvray searched 41 sites in 14 areas over 6 days in late June and early July of 2007. All sites are in Yakima County, except ‘Mosquito Valley 3’, which is in Lewis County. We found 8 new populations of Mardon skippers and verified three other populations that had been found earlier by individuals from the US Forest Service, the Washington Department of Fish and Wildlife, and the US Fish and Wildlife Service. At one of the sites that we revisited (Conrad Meadows), we counted the largest known *Polites mardon* population (457 individuals were observed in a one day count; this site is referred to in the report as ‘Conrad Finger 2’). In this report, we provide a summary of all sites visited, the findings at each site, and recommendations for which sites should be revisited in future years. We also provide general habitat management recommendations regarding grazing, fire, conifer encroachment, use of Btk and off-road vehicle use. Appendix A lists the geographic location of each site surveyed, and a summary of whether or not Mardon skippers were found, and whether or not the site should be resurveyed. Appendix B summarizes the new Mardon skipper sites discovered in 2007 as part of the Xerces Society survey effort. Appendix C includes topographical maps of each site.

## **SURVEY PROTOCOL**

Unless otherwise stated, all sites were surveyed during the following environmental conditions:

Minimum temperature: Above 60 degrees Fahrenheit.

Cloud cover: Partly sunny or better. On cooler days, the sun can play a very important role in getting butterflies to take to the air. On warmer days (above 60 degrees F), direct sunlight is less important, but a significant amount of the sun’s energy should be coming through the clouds to help elevate the temperature of basking butterflies.

Wind: Less than 10 MPH. On windy days, butterflies will drop out of the air if they cannot maintain their direction and/or speed of flight.

Time of year: All sites were visited between June 27 and July 10, 2007.

We followed this protocol after arriving at each potential site:

1. Approach the site and scan for any butterfly activity, as well as suitable habitat.
2. Fill out all of the site information on datasheet.
3. Give closer attention to wetter areas first. Mardon skippers seem to prefer habitat close to small streams or other seasonally wet features.
4. Walk through the site slowly (about 5 minutes to walk 100 meters), look back and forth on either side, approximately 20 to 30 feet out. Do your best to walk in a path such that you cover the entire site with this visual field, or at least all of the areas of apparently suitable habitat.
5. If you leave your path to look at a particular butterfly, do your best to return to where you left your path when you resume walking/searching through the site.
6. When a suspected Mardon skipper butterfly is encountered, we net the butterfly to confirm its identification. This is especially important because of its similarity to the Sonoran skipper *Polites sonora*, which also occurs at many sites supporting Mardon skippers. No vouchers were taken at sites.
7. Record all data for sites whether butterflies are seen or not. In this way, we document both new sites where *P. mardon* is found and, as well as our overall search effort.

## **MANAGEMENT RECOMMENDATIONS**

Mardon skipper populations face a variety of threats, including cattle grazing, conifer and shrub encroachment, off road vehicle (ORV) use of meadows, recreation (including camping), applications of Btk, and landownership patterns that may lead to incompatible uses on adjacent land, thus affecting Mardon skipper site condition and survival. In this report, we provide general recommendations for managing grazing, conifer encroachment, ORV use and Btk applications. We also provide general recommendations for how to preserve Mardon skipper populations while using fire as a management tool. Other threats, such as shrub encroachment, recreation, and incompatible uses of nearby lands are not addressed in this report.

### **Cattle Grazing**

Most of the Mardon skipper sites have some grazing by cattle. Livestock grazing may cause adverse impacts to butterfly populations by (1) trampling eggs, larvae, pupae, and adults, (2) eating larval and adult food sources, and (3) disturbing the soil, which allows weeds to invade (Warren 1993). Tall-grass and mixed-grass prairies appear to be very susceptible to the effects of overgrazing (McCabe and Post 1997, Royer and Marrone 1992, Royer and Royer 1998, cited in COSEWIC 2003), “which reduced or eliminated critical adult nectar sources and removes forage for larvae.” In a study on the Dakota skipper (*Hesperia dacotae*), Dana (1997) found that grazing cattle reduced skipper numbers in direct proportion to grazing intensity. However, grazing is not always detrimental (Dana 1991); “light or light rotational grazing can be beneficial by creating

areas of mixed-grass vegetation structure preferred by the (Dakota) skipper” (Dana 1991).

In order for grazing to have a minimal impact on the Mardon skipper, the combination of timing, intensity, and duration must be found that is best suited for the specific ecology of the butterfly. In some sites the correct solution may be to eliminate grazing while in other sites some grazing at the appropriate time of the year may not negatively impact the site.

In Washington, adult Mardon skippers require adequate floral nectar for survival, successful reproduction, and adequate egg production from mid-May through early August.<sup>2</sup> Livestock grazing or site use during this period reduces or altogether removes key nectar resources. Likewise, grazing when butterfly larvae are active on host plants can result in direct mortality or remove important larval vegetation (Smallidge & Leopold 1997). In Washington, Mardon larvae are believed to be active from approximately late March through October, although this window of activity is variable, and is probably influenced by the elevation of each site. Grazing intensity and duration are also important to consider. Although intensive grazing has been shown to be categorically detrimental, moderate to light stocking levels with herds rotated through the management area to create a mosaic pattern of grazing stages can be a useful method for halting succession (Schtickzelle *et al* 2007). The timing and frequency of rotation depends on both the size of the herd and the size of the grazed area (Schtickzelle *et al* 2007). Generally speaking, grazing periods should be short, with recovery periods for the habitat relatively long.

*General Recommendations (Note: Management plans should be developed for each site)*

- At the most severely impacted sites cattle should be excluded from the area to allow the habitat time to repair.
- Grazing should never be allowed during the flight period of the adult Mardon skipper.
- Optimally, cattle should not be allowed to enter a site when Mardon skipper larvae are active, although more research is needed to determine the impact of cattle on Mardon skipper larvae at various times of the year.
- Keep grazing periods short, with recovery periods for the habitat relatively long.

The BLM and Forest Service should implement a grazing study by looking at different grazing regimes. In the long-term, habitat management research should address: 1) Does grazing degrade, maintain, or have no effect on Mardon skipper habitat quality?, 2) What grazing regime is least harmful to Mardon skippers and their habitat?, 3) How does site vegetation change over time with various applications of livestock grazing? For areas where elk are present the study design should include areas that exclude cattle but not elk. In this way we can better understand the impact of cattle grazing and work toward better management of these sites.

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<sup>2</sup> In Washington, the Mardon skipper adult flight period varies by elevation and individual site microclimates. Throughout the state, the flight times span from mid-May through early August, although adult flight times at individual sites last approximately 3-4 weeks.

## **Prescribed fire**

Due to the importance of fire in maintaining many native ecosystems, the use of controlled burning as a management tool has become increasingly common. Although the effects of fire on vegetation and vertebrate communities are more widely understood than the effects of fire on invertebrates, fire can benefit, harm, or have no significant effect on invertebrates depending on the biology of the specific taxa (Gibson *et al* 1992). Burning of meadows with populations of butterflies, such as the Mardon skipper, could extirpate the population if not done carefully, with consideration of butterfly behavior and life stage at time of burn and knowledge of where the skipper population is distributed across the meadow. In addition, with isolated populations, there are often no source populations available for recolonization once a population has been locally extirpated. Swengel (1996) and Swengel and Swengel (2001) found that fire had consistent negative effects on prairie specialist species of butterflies that persisted for 3-5 years post-fire. In a modeling approach Schultz and Crone (1998) found that burning one-third of the butterfly occupied habitat every year to control encroaching woody shrubs would maximize the average annual population growth rate of Fender's Blue *Icaricia icarioides fenderi*. Swengel (1996) suggests that management techniques should be varied between sites, providing not only short term diversity of habitat, but counteracting any potential long term effects that reliance on one method of site management may have on a given population of butterflies. If controlled use of fire within a Mardon skipper occupied site is feasible, and there is a management goal that can be best accomplished with controlled burning, then in order to protect the Mardon skipper population, specific steps must be employed in conducting the burn. A careful and well-researched prescribed burning regimen should have the correct combination of timing, intensity, and size that is appropriate for the management area and will result in long-term stability of Mardon skipper populations. Knowledge of how butterflies respond to fire is integral to designing an effective fire management strategy. Sites that support small numbers of individuals should in general not be considered for burns.

*General Recommendations (Note: Management plans should be developed for each site)*

- Conditions (site size, access, vegetation desiccation and humidity levels) must allow for controlling fire once it starts.
- A management objective has been defined that will be best accomplished by use of fire.
- Identify core Mardon skipper habitats, especially egg-laying areas, as part of a burn plan.
- Burn in fall or early winter as Mardon skippers have ceased foraging and are present as larvae, or in a state of diapause to prepare for the winter.
- A single prescribed fire should not burn more than 1/10 to 1/5 of the core habitat in any given year.
- As a fire moves through an area it may leave small patches unburned. These skips should be left intact as potential micro-refuges.
- Periods between managed burns at the same site should be conservative and can be anywhere from 3-10 years for adequate recovery of butterfly populations, depending on the ecosystem.
- Not all sites within the same complex should be burned.

- If burns are undertaken a comprehensive monitoring program should be put in place to determine the short and long term impact on the population.
- Care must be taken to avoid actions that could degrade habitat and kill individual skippers as a result of heavy equipment use or people trampling meadows.

**Encroaching conifers** (*Note: Management plans should be developed for each site*)

In some areas fire suppression has led to grassland encroachment by native trees and shrubs (Potter and Fleckenstein, 2001), which could have a negative impact on Mardon populations. Many Mardon skipper meadows have encroaching conifers. At sites where conifers are encroaching, the small trees should be removed as soon as possible, before the trees grow larger and reproduce. Management plans may need to be developed to selectively and carefully remove some young conifers.

*General Recommendations*

- Conifers over 4" Diameter at Breast Height (DBH) should be left at the site.
- Wherever possible hand cutting with chainsaws or handsaws would be optimal.
- Care must be taken to avoid actions that could degrade habitat and kill individual skippers as a result of heavy equipment use, people trampling meadows, piling of trees in meadows, or burning of piles in meadow habitat.
- Larger trees at the edges of meadows should be maintained since they may play an important role in maintaining the microclimate and hydrology at the sites.

**Off-road vehicles (ORVs)**

When ORVs drive through meadows occupied by the Mardon skipper, the skipper is directly threatened. In areas with ORV traffic, we recommend fencing off core Mardon skipper habitat areas.

**Use of Btk**

Btk (*Bacillus thuringiensis* var. *kurstaki*), a Lepidoptera-specific insecticide, has been widely used to treat defoliators in western forests (Wagner and Miller 1995). Btk is a bacterium, which when ingested, is lethal to butterfly and moth larvae.

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

The threat of Btk is heightened because Btk has been shown to drift at toxic concentrations for distances greater than two miles from target spray areas (Barry 1993 and Whaley et al. 1998). As a result, aerial spraying with Btk can have significant adverse effects on Mardon skippers in the general area of an aerial Btk spray project. We recommend not spraying Btk on forested areas within five miles of any Mardon skipper population.



## SITES VISITED

### 1111 (1-5)

Sarina Jepsen and Logan Lauvray of the Xerces Society surveyed 5 meadows along trail 1111 on July 8, 2007 from 12:10 to 2:15 p.m. Mardon skippers were not observed at any of these sites, but the following meadows appeared to have suitable Mardon skipper habitat and should be checked earlier in the season next year: 1111(1), 1111(2), and 1111(3). See Appendix A for the geographic location of each site. 1111(1), 1111(2) and 1111(3) had the known larval host plants: *Festuca* sp. and *Carex* sp. They also had patches of *Danthonia unispicata*, a plant that was observed in high abundance at a new Washington Mardon skipper site with 450+ individuals (Mardon skippers use *Danthonia californica* as an oviposition plant in southern Oregon). Sites 1111(4) and 1111(5) looked less likely to support Mardon skippers, mainly because they were very dry and there were no areas within the meadows that looked like they had surface water earlier in the season.



**Figure 1.** 1111(1)





**Figure 2.** 1111(2)

### **Cash Prairie**

Sarina and Logan (Xerces) surveyed Cash Prairie on July 8, 2007 from 5:45 to 6:45 p.m. No Mardon skippers were observed at this site. This large meadow has some wet areas, abundant floral resources, *Festuca* sp. and *Carex* sp. Cash Prairie is significantly higher (5900-6100 feet) than the highest known Mardon sites. The plant community appeared appropriate to support Mardon skippers, (it was moist and had appropriate host plants) so we did not think that our timing was off in conducting this survey. Although we surveyed late in the day the weather was appropriate for seeing Mardon on the wing. Thus, we would not recommend resurveying this site next year.



**Figure 3.** Cash Prairie

### **Conrad Meadows Complex (Fingers 1-2, 3-9)**

#### ***Fingers 1, 2***

On June 27, 2007, from 12:45 to 3:30 p.m., Sarina and Logan (Xerces), Joan St. Hilaire of the USFS, and Jeff Bernatowitz (Bernie) and Will Moore of WDFW surveyed two ‘fingers’ of Conrad Meadows that extend east of the south fork of the Tieton River. No Mardon skippers were observed in Conrad Finger 1; the habitat appeared too dry to support Mardon skippers. In Conrad Finger 2, 457 Mardon skippers were observed in a one-day count (Figures 4 and 5). The highest density of Mardon skippers was in the southeast end of the meadow, in an area dominated by onespoke oatgrass (*Danthonia unispicata*). *Festuca* sp. and *Carex* sp. were also present in this meadow. On July 10, 2007, Sarina Jepsen and Logan Lauvray returned to the Conrad Finger 2 site, and observed only 3 Mardon skippers. We counted 40 cattle grazing on this site. We noted that there were no longer any flowering plants, and that many of the larval host plants had been eaten or trampled (Figure 6). Please see the above recommendations that we provide regarding cattle grazing and butterfly habitat conservation.





**Figure 4.** Conrad Finger 2 on June 27, 2007



**Figure 5.** Conrad Finger 2 on June 27, 2007



**Figure 6.** Cattle grazing on Conrad Finger 2 on 7/10/2007

### ***Conrad 3***

Bernie and Will (WDFW) and Sarina (Xerces) surveyed Conrad 3 meadow along the trail just west of Conrad Meadows on June 27, 2007 at 4:00 p.m. Four Mardon skippers were observed in this small meadow (approximately 0.25 acres). No *Festuca* sp. was observed, but there was abundant *Danthonia unispicata*. There was no surface water present in this meadow.

### ***Conrad 4***

Joan (USFS), Will and Bernie (WDFW), and Logan and Sarina (Xerces) surveyed Conrad 4, a small meadow near the bridge that crosses the south fork of the Tieton River. No Mardon skippers were observed at this site. The area marked on the map (provided by USFS) as a meadow was filled with alders and small conifers. The meadow surveyed was the closest meadow to this mapped area but did not seem appropriate to support Mardon skippers.

### ***Conrad 5***

Sarina and Logan (Xerces), Joan (USFS), and Bernie and Will (WDFW) surveyed a small meadow: 'Conrad 5' on June 27, 2007 at 5:05 p.m. This meadow is just northwest of the bridge that crosses the S. fork of the Tieton River. This meadow is a small opening in the trees, on both sides of a dirt road. No Mardon skippers were observed at this site, and the plant community did not seem appropriate to support Mardon skippers. While there was abundant *Carex* sp., no *Festuca* sp. or *Danthonia* sp. was observed.

### ***Conrad 6***

Sarina and Logan (Xerces) surveyed a large meadow complex along trail 1120 on June 27, 2007 at 5:40 p.m. Twenty-four Mardon skippers were observed in this meadow. Part of the meadow was in the shade during the time that it was surveyed; it was perhaps too late in the day to get an accurate one-day count of this site. Thus, this meadow should be



resurveyed next year. This site has a large amount of *Danthonia unispicata* and *Carex* sp. One female Mardon skipper was observed ovipositing on *Carex* sp. This meadow has a shed and some old tractors sitting in it.

*Threats:* This meadow has many encroaching small pines and a fair amount of cattle activity.



**Figure 7.** Conrad 6



**Figure 8.** Conrad 6

### ***Conrad 7***

Sarina and Logan (Xerces) visited 'Conrad 7' meadow along trail 1120 at the sign for the Goat Rocks Wilderness. The meadow was visited at 6:36 p.m. on July 7, 2007. It was entirely shaded, so it was not surveyed for Mardon skippers. The habitat looked like it could potentially support Mardon skippers, so it should be surveyed next year. This site had abundant *Carex* sp., although no *Festuca* sp. was observed.



**Figure 9.** Conrad 7

### ***Conrad 8***

Logan and Sarina (Xerces) visited 'Conrad 8' meadow along trail 1120 at 6:25 p.m. on July 7, 2007. This meadow was not surveyed because it was entirely in the shade. The meadow ground was very wet in most places, with a small amount of drier ground near the trail edge. It appeared to be too wet to support Mardon skippers, and thus we place a low priority on resurveying it in future years.





**Figure 10.** Conrad 8

### ***Conrad 9***

Sarina and Logan (Xerces) visited this meadow on July 10, 2007 at 7:10 p.m. This meadow is just east of the area where the Conrad Creek joins the South Fork of the Teton River. The meadow was entirely shaded, so it was not surveyed for Mardon skippers. However, the habitat was assessed for its suitability to support Mardon skippers. This meadow is almost entirely a wetland, filled with Bog orchids, *Carex* spp., *Castilleja* sp., and grasses. It appears to be too wet to support Mardon skippers, and thus we do not recommend resurveying this meadow in future years.

### **Deadhorse Meadow**

Sarina and Logan (Xerces) surveyed this meadow on July 8, 2007 at 11:30 a.m. This meadow consisted of a very small opening in the trees (~1 acre) at the end of Rd. 1382000. There were no Mardon skippers and there was no suitable Mardon skipper habitat. This meadow appears to have once been a forest that has been logged.

### **Four Way Meadow**

Sarina and Logan (Xerces) surveyed a narrow meadow that runs across Highway 19 (Four Way Meadow) on July 9, 2007 at 5:45 p.m. No Mardon skippers were observed, although the habitat looked like it could support Mardon skippers. This site should be checked much earlier next year. The elevation is low (3174 feet), so one would expect that if Mardon skippers were here, they would be active about one month previous to the time that this meadow was checked (it should be revisited in early June). This site is also much farther north than any of the other known Mardon skipper sites. Many flowering forbs, *Festuca* sp., *Carex* sp. and *Danthonia unispicata* were all present at this site.





**Figure 11.** Four Way Meadow

### **Fox Meadow**

Sarina and Logan (Xerces) surveyed this meadow on July 8, 2007 at 2:50 p.m. No Mardon skippers were observed, although parts of this meadow appeared to be suitable to support Mardon skippers. Part of this meadow is in wetland habitat; the upland, drier areas contained flowering forbs, *Festuca* sp., *Carex* sp., and some *Danthonia unispicata*. The upland areas were surveyed intensively for Mardon skippers. This site is somewhat higher than any of the known Mardon skipper sites in Washington (5717 feet). We believe that we surveyed this meadow at the most appropriate time of year, given its elevation. Thus, we would not recommend resurveying it next year.

### **Lost Meadow**

Sarina and Logan (Xerces) visited this meadow on July 9, 2007 at 6:40 p.m. No Mardon skippers were observed, although the habitat looked like it could potentially support Mardon skippers. Lost Meadow had *Festuca* sp., *Potentilla* sp., many flowering forbs and a small, seasonal creek ran through the meadow. This meadow sits at 3115 feet; one would expect Mardon skippers to be active at a site of this elevation in early June, rather than when it was surveyed in early July. For these reasons, we would recommend rechecking Lost Meadow earlier in the season next year. This meadow is also farther north than any of the known Mardon skipper sites.

### **Mad Cow Meadow**

Sarina and Logan (Xerces) surveyed part of this meadow on July 8, 2007 at 7:15 p.m. No Mardon skippers were observed in this small, wet meadow. The habitat, which included some *Festuca* sp. and *Carex* sp., looked like it could potentially support Mardon skippers. However, all of the flowers (including *Potentilla* sp.) had been eaten off of their stalks, presumably by cattle. This meadow was not completely surveyed because part of it was in the shade and an aggressive cow was present. We recommend rechecking this meadow again next year.



**Figure 12.** Mad Cow meadow

### **Minnie Meadows**

Sarina and Logan (Xerces) surveyed Minnie Meadows at 10:30 a.m. on July 7, 2007. No Mardon skippers were observed. Vince Harke and Joan St. Hilaire found 38 Mardon skippers on June 20, 2007. Their data sheet indicated that there was a higher density of Mardon skippers within a research exclosure than outside of it (Figure 13), which appeared to be due to the higher abundance and diversity of flowering plants inside of the exclosure. This site and cattle exclosure could potentially be incorporated into a future study that examines the effects of grazing on the Mardon skipper.



**Figure 13.** Minnie meadows cattle exclosure; note the higher abundance of flowering plants within the exclosure (right) than outside of the exclosure (left)



### **Mosquito Valley 1-3**

Sarina and Logan (Xerces) surveyed two meadows along trail 1106 and one meadow along trail 1156 near Mosquito Valley on July 8, 2007. No Mardon skippers were observed at any of the three meadows surveyed. Mosquito Valley 1 and 2 (along trail 1106) were very wet meadows, with wetlands interspersed throughout them. The ground of both meadows seemed too wet to support Mardon skippers. The habitat at Mosquito Valley 3 (a large meadow complex in Lewis County, just past Dumbell lake along trail 1156) appeared to be more suitable for Mardon skippers; there was a small creek running through the meadow, and *Festuca* sp., *Carex* sp. and many flowering plants were present. While the habitat looked promising, we surveyed the site extensively and did not find any Mardon skippers. We believe we visited the site at the appropriate time of day and time of year to see Mardon on the wing, so we would not recommend resurveying this site.



**Figure 14.** Mosquito Valley 3

### **Pinegrass 1 and 2**

Sarina and Logan (Xerces), Joan (USFS), and Bernie and Will (WDFW) surveyed two meadows in the Pinegrass area on July 6, 2007 from 12:35 to 1:55 p.m. At Pinegrass 1, approximately 21 Mardon skippers were counted (32 total skippers were observed, about 2/3 of which were Mardon skippers and 1/3 were Sonora skippers. We positively identified 20% of the skippers that we counted). Two Mardon skippers were counted at Pinegrass 2. The plant community at Pinegrass 1 contains *Festuca* sp., *Carex* sp., clover, grasses, and false hellebore. This meadow appeared very dry, but it looks like it may have been wet earlier in the season. Pinegrass 2 is a mostly dry meadow off of Road 741 that

appeared to be wet earlier in the season. We recommend surveying this meadow 2-3 weeks earlier next season, as we think it is possible that we observed the tail end of the Mardon skipper emergence.

*Threats:* Many small fir trees are encroaching on this meadow.



**Figure 15.** Pinegrass 1



**Figure 16.** Pinegrass 2

### **Rimrock Lake South**

Sarina and Logan (Xerces), Joan (USFS), and Bernie and Will (WDFW) surveyed Rimrock Lake South on July 6, 2007 at 11:55 a.m. There were no Mardon skippers observed, and the habitat did not look like it would support Mardon skippers. There was no *Festuca* sp., although some *Carex* sp. was present. We do not recommend surveying this site in future years.

### **Surprise Lake Complex**

A series of meadows were surveyed along trail 1120. All meadows along trail 1120 that are between Conrad meadows and the location where Conrad Creek flows into the south fork of the Tieton River are labeled Conrad 3-9; all meadows along trail 1120 that are east of the joining of the two creeks are labeled Surprise Lake 1-11. Surprise Lake Meadows 1-4 are before the beginning of the ‘loop’ trail that goes to Surprise Lake; Surprise Lake Meadows 5-11 are within the ‘loop’ trail. Appendix A lists the geographic location of each site and site maps are included in Appendix C.

#### ***Surprise Lake 1***

Sarina and Logan (Xerces) surveyed Surprise Lake 1 on July 7, 2007 at 2:40 p.m. Twenty-five Mardon skippers were observed at this site. The Mardon skippers were mainly found in the drier, upland area of this meadow that abuts trail 1120. This meadow contains abundant *Festuca* sp., *Carex* sp., false hellebore, wild strawberry, *Calochortus* sp., yarrow, clover, vetch, dandelion, penstemon, wild carrot, potentilla and other grasses.

*Threats:* There is some conifer encroachment on this meadow. Also, there is a fair amount of grazing on this meadow.





**Figure 17.** Surprise Lake 1

***Surprise Lake 2***

Sarina and Logan (Xerces) surveyed Surprise Lake 2 on July 7, 2007 at 3:40 p.m. No Mardon skippers were observed. This is a long wetland/ wet meadow complex on the south side of the south fork of the Tieton River. This site has very little mesic habitat and does not look like it would support Mardon skippers. We do not recommend resurveying this meadow in the future.



**Figure 18.** Surprise Lake 2

### ***Surprise Lake 3***

Sarina and Logan (Xerces) surveyed this meadow on July 7, 2007 at 4:15 p.m. No Mardon skippers were observed, although 6 Sonora skippers were observed and the habitat looked like it could support Mardon skippers. We observed many flowering forbs, *Festuca* sp., *Carex* sp. and *Danthonia unispicata*. We recommend resurveying this site in the future.



**Figure 19.** Surprise Lake 3



#### ***Surprise Lake 4***

Sarina and Logan (Xerces) surveyed Surprise Lake 4 on July 7, 2007. No Mardon skippers were observed, and there was no *Festuca* sp. observed. The habitat looked somewhat dry on the edges, although there was a wet area in the middle of the meadow. We recommend placing a medium priority on resurveying this site in the future.

#### ***Surprise Lake 5***

Sarina and Logan (Xerces) surveyed a complex of four interconnected meadows just east of the beginning of the 'loop' portion of the Surprise Lake loop trail (1120) at 5:20 p.m. on July 7, 2007. No Mardon skippers were observed. The habitat did not look like it would support Mardon skippers, as no *Festuca* sp. was observed and the meadows were relatively dry. We would not place a high priority on resurveying these sites.

#### ***Surprise Lake 6***

Sarina and Logan (Xerces) surveyed Surprise Lake 6 on July 10, 2007 at 1:10 p.m., which was a large complex of meadows along approximately 0.5 miles of trail 1120, just west of Surprise Lake. No Mardon skippers were observed at any of these meadows. Many of these meadows have small, glacier fed creeks running through them. The plant community looks very different from the plant community at the lower elevation known Mardon skipper sites. We do not recommend resurveying any of these sites.



**Figure 20.** Surprise Lake 6

### ***Surprise Lake 7***

Sarina and Logan (Xerces) surveyed Surprise Lake 7 at 3:00 p.m. on July 10, 2007. No Mardon skippers were observed, and the habitat does not look ideal. This meadow is filled with false hellebore, cow parsnip, yarrow, and grasses. We do not recommend resurveying this meadow in the future.



**Figure 21.** Surprise Lake 7

### ***Surprise Lake 8***

Sarina and Logan (Xerces) surveyed Surprise Lake 8 on July 10, 2007 at 3:25 p.m. Two Mardon skippers were observed and photographed. Four unidentified skippers were also observed, but they were not counted since their identity could not be confirmed. The 2 Mardon skippers from this site were concentrated around the tiny, mossy creek that emerges from the ground and flows through this site (Figure 22). This site is the highest known Mardon skipper site in Washington (5237 feet). There is some *Festuca* sp. and abundant *Carex* sp. in this meadow. There is also false hellebore, lupine, cow parsnip, and other grasses and forbs. This meadow is on both sides of trail 1120, but the Mardon skippers were only observed in the part of the meadow that is on the north side of the trail.





**Figure 22.** Surprise Lake 8

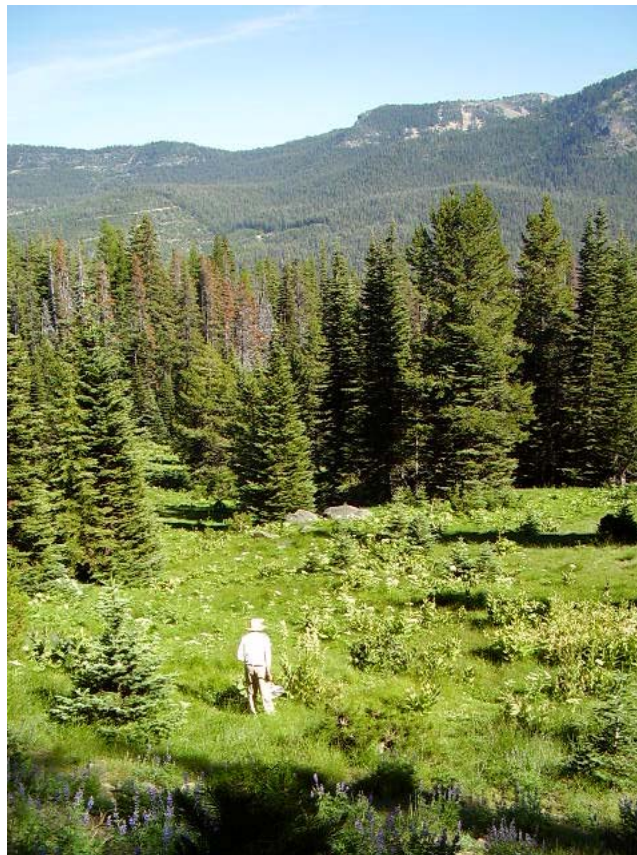


**Figure 23.** Surprise Lake 8

### ***Surprise Lake 9***

Sarina and Logan (Xerces) surveyed Surprise Lake 9 on July 10, 2007 from 4:05 to 5:15 p.m. One hundred and fifty-three Mardon skippers were observed in a one-day count of this site. Most of the Mardon skippers were nectaring on the abundant vetch or the *Calochortus* sp., although one was observed nectaring on lupine. *Festuca* sp. was not observed at this site, although abundant *Carex* sp. was observed. This is a damp, southeast sloping meadow of approximately 7 acres with a small, mossy creek running through the middle of it. Some of the other plants observed at this site include: cow parsnip, false hellebore, grasses, blue-eyed iris, yarrow, and clover.

*Threats:* Many small conifers are encroaching on this meadow.



**Figure 24.** Surprise Lake 9





**Figure 25.** Surprise Lake 9

***Surprise Lake 10***

Sarina and Logan (Xerces) surveyed Surprise Lake 10 on July 10, 2007 at 5:25 p.m. Eight Mardon skippers were observed. Surprise Lake 10 consists of two interconnected meadows (totaling about 5 acres) that are predominately on the south side of trail 1120. This meadow was not fully surveyed because most of it was in the shade. Thus, it should be resurveyed next year for a more accurate assessment of the actual Mardon skipper population size. At this site we observed *Festuca* sp, vetch, *Calochortus* sp., lupines, phlox, grasses, penstemon and false hellebore.



**Figure 26.** Surprise Lake 10

***Surprise Lake 11***

Sarina and Logan (Xerces) surveyed Surprise Lake 11, a small meadow just south of trail 1120, on July 10, 2007 at 5:45 p.m. Sixteen Mardon skippers were observed in this south sloping meadow. There was a fair amount of moss present on the ground, although this site is somewhat drier than Surprise Lake 9 and 10. Some of the plants in this meadow include: vetch, yarrow, lupine, *Calochortus* sp., and *Carex* sp.



**Figure 27.** Surprise Lake 11



### **Wildcat 1-3**

#### ***Wildcat 1***

Sarina and Logan (Xerces), Joan (USFS), and Bernie and Will (WDFW) surveyed Wildcat 1 on July 6, 2007 from 2:40 to 3:05 p.m. Two Mardon skippers were observed at this site. This meadow is approximately 10 acres, and is along Wildcat Road (1306). There is a seasonal creek that runs through the meadow that is mostly dry, but still has a few pockets of water. The area where the skippers were found is just SE of Wildcat Road. The habitat looked like it was beginning to dry out. This site should be checked approximately 2 weeks earlier in the season next year to get a more accurate estimate of the Mardon skipper population size.



**Figure 28.** Wildcat 1

#### ***Wildcat 2***

Sarina and Logan (Xerces), Joan (USFS), and Bernie and Will (WDFW) surveyed Wildcat 2 on July 6, 2007 from 4:15 to 4:40 p.m. No Mardon skippers were observed at this site. However, two unusual skippers were netted and photographed (Figures 30 and 31). Those of us in the field were unable to conclusively determine whether these skippers were *Polites mardon*, *Polites sonora*, or another *Polites* species. The photographs were shared with many lepidopterists and others who have worked with Mardon skippers. Some individuals concluded that that they were *Polites mardon*, whereas others concluded that they were *Polites sonora*. The three lepidopterists: Andy Warren, John Pelham, and Robert Michael Pyle, all independently concluded that the individuals were *Polites sonora*. Andy Warren noted that they were aberrant individuals.



This site should be revisited next year, and, if similar skippers are encountered, at least one male specimen should be collected and sent to either John Pelham or Andy Warren. This finding presents somewhat of a problem for field surveys, as the aberrant *P. sonora* specimens had ventral hind wing markings that somewhat mimic those of *P. mardon* (elongated, rectangular shaped cells). The ventral hindwing character is the primary character that is used in field surveys for *P. mardon*. This experience illustrates the need to collect a voucher male specimen at any sites where identification of a specimen is disputed. It also will be important for surveyors to identify male specimens using the stigma on the dorsal forewing.



**Figure 29.** Wildcat 2



**Figure 30.** This butterfly from Wildcat 2 was identified as *Polites sonora* by Andy Warren, John Pelham, and Robert Michael Pyle



**Figure 31.** This butterfly from Wildcat 2 was identified as *Polites sonora* by Andy Warren, John Pelham, and Robert Michael Pyle

### ***Wildcat 3***

Sarina and Logan (Xerces) surveyed a third meadow, Wildcat 3, along Wildcat Road at 5:25 p.m. on July 6, 2007. No Mardon skippers were observed, although the habitat looked like it could support Mardon skippers. It should be checked earlier in the season next year. There are a few small streams and small pools of water within this site. Abundant *Festuca* sp. was observed.



**Figure 32.** Wildcat 3

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**Appendix A:** Summary of all sites and areas surveyed in Washington by the Xerces Society (Sarina Jepsen and Logan Lauvray) during the 2007 field season.

TABLE OF SITES VISITED IN WASHINGTON					
Site	Elevation (feet)	Longitude (W)	Latitude (N)	Mardon extant	Resurvey in 2008
1111(1)	4682	121°14.028'	46°39.604'	N	Y
1111(2)	4896	121°14.136'	46°39.882'	N	Y
1111(3)	5050	121°14.336'	46°39.881'	N	Y
1111(4)	5284	121°14.559'	46°40.021'	N	N
1111(5)	5430	121°14.757'	46°40.184'	N	N
Cash Prairie	6000	121°08.898'	46°42.835'	N	N
Conrad Finger 1	4269	121°17.167'	46°29.972'	N	N
Conrad Finger 2	4052	121°17.158'	46°30.237'	Y	Y
Conrad 3	4138	121°17.869'	46°29.914'	Y	Y
Conrad 4	4078	121°18.301'	46°29.616'	N	N
Conrad 5	4123	121°18.508'	46°29.669'	N	N
Conrad 6	4147	121°18.569'	46°29.750'	Y	Y
Conrad 7	4143	121°18.744'	46°29.847'	N	Y
Conrad 8	4188	121°18.929'	46°29.896'	N	N
Conrad 9	4150	121°18.890'	46°29.855'	N	N
Deadhorse Meadow	4300	121° 14.360'	46°39.520'	N	N
Four Way	3174	121° 12.074'	47° 03.250'	N	Y
Fox Meadow	5717	121° 15.309'	46° 40.768'	N	N
Lost Meadow	3115	121° 13.348'	47° 03.454'	N	Y
Mad Cow Meadow	3649	121° 06.615'	46° 41.743'	N	Y
Minnie Meadows	3527	121° 14.948'	46° 33.796'	Y*	Y
Mosquito Valley 1	3658	121° 22.862'	46° 40.001'	N	N
Mosquito Valley 2	5058	121° 22.264'	46° 41.62'	N	N
Mosquito Valley 3	5120	121° 23.497'	46° 41.715'	N	N
Pinegrass 1	4044	121° 12.697'	46° 36.892'	Y	Y
Pinegrass 2	4217	121° 13.348'	46° 36.465'	Y	Y
Rimrock Lake South	3022	121° 11.050'	46° 37.560'	N	N
Surprise Lake 1	4181	121°19.310'	46°29.473'	Y	Y
Surprise Lake 2	4216	121°19.502'	46°29.242'	N	N
Surprise Lake 3	4254	121°19.780'	46°29.101'	N	Y
Surprise Lake 4	4272	121°20.155'	46°28.961'	N	Y
Surprise Lake 5	4326	121°20.490'	46°28.875'	N	N
Surprise Lake 6	5320	121°22.072'	46°28.253'	N	N
Surprise Lake 7	5342	121°21.805'	46°29.106'	N	N
Surprise Lake 8	5237	121°21.822'	46°29.093'	Y	Y
Surprise Lake 9	5048	121°21.064'	46°29.214'	Y	Y
Surprise Lake 10	5001	121°21.030'	46°29.277'	Y	Y
Surprise Lake 11	5069	121°20.883'	46°29.232'	Y	Y

Wildcat 1	3704	121°09.397'	46°39.525'	Y	Y
Wildcat 2	4677	121°12.013'	46°39.391'	N	Y
Wildcat 3	3827	121°10.854'	46°39.255'	N	Y

\*38 Mardon skippers were observed at Minnie Meadows by Vince Harke and Joan St. Hilaire on June 20, 2007, but no Mardon skippers were observed by Sarina Jepsen and Logan Lauvray on July 7, 2007.

**Appendix B:** Summary of new Mardon skipper sites in Washington after the 2007 field season, approximate meadow size, and recorded one day counts from these sites.

Site Name	Geographic Location	Approximate meadow size	Date Surveyed	Day Count
<b>Conrad Meadows Complex</b>				
Conrad Finger 2	T12N R12E Sec 26	10 acres	6/27/2007	457
Conrad 3	T12N R12E Sec 27	0.25 acres	6/27/2007	4
Conrad 6	T12N R12E Sec 27	6 acres	6/27/2007	24
<b>Minnie Meadows site</b>				
Minnie Meadows	T13N R13E Sec 31 T12N R13E Sec 6 T12N R12E Sec 1	10 acres	6/20/2007*	38
<b>Pinegrass Complex</b>				
Pinegrass 1	T13N R13E Sec 6	4 acres	7/6/2007	32
Pinegrass 2	T13N R13E Sec 20	6 acres	7/6/2007	2
<b>Surprise Lake Complex</b>				
Surprise Lake 1	T12N R12E Sec 28	10 acres	7/7/2007	25
Surprise Lake 8	T12N R12E Sec 29/30	2 acres	7/10/2007	2
Surprise Lake 9	T12N R12E Sec 29/32	7 acres	7/10/2007	153
Surprise Lake 10	T12N R12E Sec 32	5 acres	7/10/2007	8
Surprise Lake 11	T12N R12E Sec 32	1 acre	7/10/2007	16
<b>Wildcat site</b>				
Wildcat 1	T14N R13E Sec 36	10 acres	7/6/2007	2

\*Vince Harke and Joan St. Hilaire conducted the survey on 6/20/07 at Minnie Meadows and observed 38 Mardon skippers. Sarina Jepsen and Logan Lauvray conducted a second survey on 7/7/07, but did not observe any Mardon skippers at that time.



**Appendix C:** Maps of all sites visited. Note: sites outlined in red indicate extant Mardon skipper populations. Sites outlined in blue indicate no Mardon skippers were observed and the site should not be rechecked in future years. Sites outlined in green indicate Mardon skippers were not observed, but the site should be rechecked in the future.

**\*Please contact the Xerces Society for a complete version of this report (including all maps): Tel. 503-232-6639, [sarina@xerces.org](mailto:sarina@xerces.org)**