

Report to the Bureau of Land Management
Xerces Society Surveys for *Polites mardon klamathensis*
in Southern Oregon (Summer 2007)



Photograph of *Polites mardon klamathensis* by Donald H. Gudehus

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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).

Polites 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 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.

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

Scott Hoffman Black, Sarina Jepsen and Logan Lauvray of the Xerces Society searched 42 southern Oregon sites over eight days in late May and June of 2007. In Klamath county and Josephine county, the goal was to identify new populations of *Polites mardon klamathensis*. In Jackson county, we monitored existing populations and identified potential threats to the survival of these populations. We did not find any new populations of Mardon skippers in southern Oregon. The Xerces Society also held a workshop for the BLM on June 12, 2007 about Mardon skipper biology, ecology and field identification. 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 and shrub encroachment and off-road vehicle use. Appendices A, B, C and D list the geographic location of each site surveyed, a summary of whether or not Mardon skippers were found, and whether or not the site should be resurveyed. Appendix E summarizes the known Mardon skipper sites in southern Oregon and the one day counts from each site.

SURVEY PROTOCOL

All sites were visited between May 29, 2007 and June 20, 2007. 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 late May and early June.

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 skipper seems 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 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, 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

In this report, we provide our observations of threats observed at brief visits to known Mardon skipper sites. However, this is not a comprehensive management plan. We suggest that a comprehensive management plan should be developed to ensure the survival of the extant Mardon skipper populations in southern Oregon. 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 and some sites have been excessively degraded (Figure 9). 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 Jackson County of southern Oregon, adult Mardon skippers require adequate floral nectar for survival, successful reproduction, and adequate egg production from mid-May through early July.¹ 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 Oregon, Mardon larvae are believed to be active from approximately late April through October, although this window of activity varies, 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.

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.

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

¹ In Jackson County, the adult flight times span from mid-May through early July, although adult flight times at individual sites only last approximately 3-4 weeks.

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 IN CURRY COUNTY

Old Wimer Road 1 and 2

Sarina Jepsen and Scott Hoffman Black of the Xerces Society drove the entire Old Wimer/ Low Divide Road between O'Brien, Oregon and High Divide Road, California. Two meadows were found and surveyed along the Oregon section of Old Wimer Road on May 29, 2007 between 2:00 and 6:00 p.m. The geographic locations of each meadow are listed in Appendix A. Mardon skippers were not observed at either of these sites, and the habitat did not appear to be suitable to support Mardon skippers.

SITES VISITED IN JACKSON COUNTY

Buck Prairie

Sarina and Logan Lauvray (Xerces) surveyed Buck Prairie from 10:00 to 11:47 am on June 18, 2007. Ninety-five Mardon skippers were observed in a one day count, 87 of which were observed in a small area just northwest of the area designated as ‘core habitat’ in previous years (Figure 1). The dominant plants in the area with a high density of mardon skippers were: *Spirea douglasii*, *Potentilla* sp., *Festuca* sp., *Danthonia californica*, *Penstemon* sp., and *Wyethia angustifolia*. The rest of the prairie was very wet and filled with wildflowers (Figure 2).

Threats: *Spirea douglasii* bushes are encroaching on this meadow (Figure 1). In addition, there are some small firs encroaching upon the meadow.



Fig. 1. A high density of Mardon skippers was observed in this drier, upland part of Buck Prairie, NW of the ‘core habitat’ area.



Fig. 2. Few Mardon skippers were observed in this wet section of Buck Prairie

Burnt Creek

Sarina and Logan (Xerces) surveyed Burnt Creek at 4:00 p.m. on June 18, 2007. Twenty-five Mardon skippers were observed in a one day count, 20 of which were concentrated in the drier, upland part of the core habitat (Figure 3). Ant mounds are scattered at a high density throughout this site.

Threats: Tire tracks run through the middle of the core habitat of this site (Figure 4). This area appears to be heavily used by cattle.



Fig. 3. Upland area of Burnt Creek where most Mardon skippers were observed



Fig. 4. Tire tracks in the middle of the core habitat at Burnt Creek

Conde Creek 4

Sarina and Logan (Xerces) surveyed Conde Creek (USFS site) at 4:21 p.m. on June 16, 2007. Forty-two Mardon skippers were observed in a one-day count, including a mating pair (Figure 6). Nearly all Mardon skippers were observed within patches of flowering *Wyethia angustifolia* (Figure 5). We observed a small amount of *Festuca* sp. at this site, and abundant *Danthonia californica*.

Threats: There are many young ponderosa pines and a few douglas firs encroaching upon this meadow (Figure 7). ATV tracks were also observed in this meadow.



Fig. 5. Conde Creek



Fig. 6. A mating pair of Mardon skippers at Conde Creek



Fig. 7. Note the many small conifers encroaching on this meadow

Conde Meadows

Sarina and Logan (Xerces) surveyed Conde Meadows from 1:15 to 2:17 p.m. on June 16, 2007. No Mardon skippers were observed in a one-day count, although numerous other butterflies were observed at the site, including: 1 Sonora skipper, 1 Arctic skipper, 5 Checkered skippers, blues and coppers.

Threats: In previous years, Mardon skippers have been observed at Conde meadows, although this year none were observed. This site appears to be very heavily impacted by cattle use.



Fig. 8. Conde Meadows



Fig. 9. Conde Meadows, heavily used by cattle

Dead Indian Rd. Milepost 20.2 (1-2)

On June 17, 2007, Sarina and Logan (Xerces) surveyed two sites along Dead Indian Road. At site '1', which abuts an irrigation canal, 2 Mardon skippers were observed. There is a tiny sliver (about 5 feet X 5 feet) of suitable Mardon skipper habitat at this site, adjacent to a fence. There appears to be good Mardon skipper habitat in the meadow on the other side of the fence, although the meadow was not surveyed because it is privately owned. At site '2', 2 Mardon skippers were also observed. This site is very dry, although there were abundant wildflowers. It is possible that we caught the tail end of the Mardon skipper population peak at this site, as the plants were very dry.

Threats: At site '2', we observed a few young, encroaching Ponderosa pines (Figure 12) and evidence of a fair amount of grazing.



Fig. 10. Dead Indian Rd. Milepost 20.2(1)



Fig. 11. Dead Indian Rd. Milepost 20.2(1)



Fig. 12. Dead Indian Rd. Milepost 20.2(2)



Fig. 13. Dead Indian Rd. Milepost 20.2(2)

Hobart Peak Complex (East, Middle, West)

Sarina and Logan (Xerces) surveyed the Hobart Peak Complex on June 19, 2007 from 10:40 a.m. to 12:30 p.m. Two Mardon skippers were observed at Hobart Peak East. It appeared very dry; perhaps the peak of the population occurred 1-2 weeks earlier than surveyed. Mardon skippers were not observed at Hobart Peak Middle or Hobart Peak West. Note: There was some confusion regarding the exact location of Hobart Peak Middle and Hobart Peak West because of how it was mapped. The sites surveyed in 2007 may not have been the same sites where Mardon skipper populations were previously

documented. It will be important to delineate these sites for future survey and management.

Threats: Shrubs are encroaching on the meadow at Hobart Peak East. There is evidence of some cattle activity at Hobart Peak East.



Fig. 14. Hobart Peak East

Hyatt Lake East Shore

Sarina and Logan (Xerces) surveyed Hyatt Lake East Shore on June 18, 2007 from 12:45 to 1:35 p.m. No Mardon skippers were observed, although 10 Sonora skippers were seen. This site contains a small stream running into the reservoir, *Festuca* sp., and many flowering plants.

Threats: No threats were observed.



Fig. 15. Hyatt Lake East Shore

Little Hyatt Reservoir South

Sarina and Logan (Xerces) surveyed Little Hyatt Reservoir South on June 18, 2007 from 5:00 to 5:40 p.m. Eleven Mardon skippers were observed in a one-day count. One week previous to this survey, Sarina Jepsen and Scott Hoffman Black observed 22 Mardon skippers in a similar one-day count. The site seemed much drier on June 18 than when it was first visited on June 12.

Threats: Many small pines are encroaching on this meadow (Figures 17 and 18). Additionally, some vehicles appear to be driving on this patch of habitat (Figure 16).



Fig. 16. Little Hyatt Reservoir South

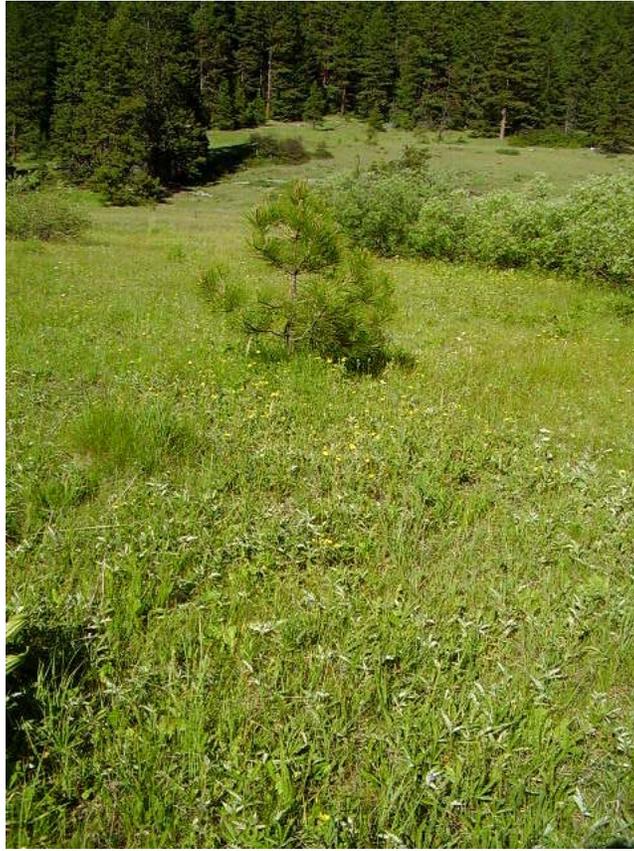


Fig. 17. Little Hyatt Reservoir South



Fig. 18. Little Hyatt Reservoir south

PCT Meadow

Sarina and Logan (Xerces) surveyed the PCT Meadow on June 19, 2007. The part of the meadow on west of the road was surveyed from 9:00 to 10:25 a.m. The area east of the road was still shaded at this time, so it was surveyed later in the day (from 12:45 to 1:00 p.m.). Twenty-two Mardon skippers were observed at this site, 20 of which were seen in the meadow west of the road. Mardon skippers were observed nectaring on *Plectritis* sp., *Potentilla* sp. and *Penstemon* sp.

Threats: Tire tracks run through the habitat at this site (Figure 19). There are also many conifers encroaching upon this meadow (Figure 20). Additionally, this site appears to be drying out (Figure 21); anecdotal reports from past years suggest that there was more water flow through the meadow in the early summers of previous years.



Fig. 19. Tire tracks through habitat at PCT meadow



Fig. 20. Encroaching conifers at PCT Meadow



Fig. 21. Dry creek bed at PCT Meadow

Pumpchance 125

Sarina and Logan (Xerces) surveyed Pumpchance 125 on June 17, 2007 from 9:30 to 11:28 a.m. Two hundred and sixty-five Mardon skippers were observed at this site in a one-day count. Densities were highest among patches of *Wyethia angustifolia* and *Potentilla* sp.

Threats: The main threats to this site include heavy cattle grazing in part of the site and encroachment by bushes of *Spirea douglasii* in the area of the core habitat adjacent to the pond. Mardon skippers were not observed this year among areas near the pond with heavy *S. douglasii*, although anecdotal reports suggest that Mardon skippers have previously occupied the habitats closest to the pond, before the *S. douglasii* bushes were there.



Fig. 22. There is evidence of heavy cattle activity in some areas of Pumpchance 125



Fig. 23. *Spirea douglasii* shrubs encroaching upon the Pumpchance 125 Meadow.

Pumpchance 128 – Moon Prairie

Sarina and Logan (Xerces) surveyed Pumpchance 128 – Moon Prairie on June 17, 2007 from 11:45 a.m. to 1:18 p.m. Sixty-two Mardon skippers were observed in the core habitat. They were seen nectaring on *Potentilla* sp., *Wyethia angustifolia*, and checkersmallow.

Threats: This site appears to be very heavily impacted by cattle grazing, second only to Conde Meadows. An additional threat to this population comes from vehicles; tire tracks run through the middle of the core habitat at this site (Figure 24). Lastly, many small Ponderosa pines are encroaching upon this site (Figure 25).



Fig. 24. Tire tracks at Pumpchance 128 – Moon Prairie



Fig. 25. Conifers encroaching at Pumpchance 128 – Moon Prairie

Service Glade

Sarina and Logan (Xerces) surveyed Service Glade on June 16, 2007 from 3:00 to 4:45 p.m. Thirty-two Mardon skippers were observed in a one-day count of the core habitat. We observed abundant floral resources, including: sea blush, lupines, yarrow and potentilla.

Threats: There appears to be a fair amount of cattle activity at this site. In addition, there are medium sized encroaching Ponderosa pines (20-30 feet tall, Figure 26).



Fig. 26. Encroaching conifers at Service Glade

Short Creek 1-2

Sarina and Logan (Xerces) surveyed Short Creek 1 and 2 on June 17, 2007 from 4:47 p.m. to 6:45 p.m. In the core habitat area of Short Creek 1 (the easternmost section of the habitat, Figure 27), we observed 22 Mardon skippers. On the upland edges of the core habitat, we observed an additional 15 skippers, about half of which were *Polites sonora*, and the other half were *Polites mardon klamathensis*. This site has abundant *Festuca* sp. and *Carex* spp.

At Short Creek 2 (the westernmost section of this site), we observed 40 Mardon skippers. Ten of the Mardon skippers were observed in the area previously labeled 'core habitat' (Figure 28), and the remaining 30 were observed in an upland, drier area that did not look like typical Mardon habitat. This upland area, which was about 4 acres, was dominated by a single plant (Figure 29), and did not contain any floral resources, surface water, or the known larval host plants.

Threats: Tire tracks run through the middle of the Mardon skipper habitat at Short Creek 1. There is a gate that would prevent ATVs and other vehicles from driving through this site, but it is unlocked. There is also some conifer encroachment at Short Creek 1. At Short Creek 2, the main threats appear to be cattle activity, and some encroachment by shrubs and hawthorn.



Fig. 27. Short Creek 1 (East)



Fig. 28. The 'core habitat' at Short Creek 2 (West), although few Mardon skippers were observed here



Fig. 29. Many Mardon skippers were observed in this upland section of Short Creek 2 (West)

Wildcat Glade

Sarina and Logan (Xerces) surveyed Wildcat Glade on June 18, 2007 from 1:45 to 2:30 p.m. No Mardon skippers were observed, although 7 Sonora skippers were counted. The creek that runs through this site is completely dry, and the vegetation throughout the site also appears to be too dry to support Mardon skippers. Additionally, most of the flowers at this site appear to be done blooming. It is possible that the Mardon skipper population at this site already emerged and senesced earlier this season. This site contains abundant *Festuca* sp., *Danthonia californica* and *Carex* spp.

Threats: Tire tracks are present throughout the core habitat of this site (Figure 30).



Fig. 30. Wildcat Glade



Fig. 31. Wildcat Glade

SITES VISITED IN JOSEPHINE COUNTY

White Meadow

Scott and Sarina (Xerces) visited White Meadow on May 29, 2007 at 11:15 a.m. Mardon skippers were not observed at this meadow, although many other butterfly species were observed. This meadow contained a small, damp area with abundant floral resources and was surrounded by Ponderosa pines and cedars.

SITES VISITED IN KLAMATH COUNTY

Overall Recommendations

We recommend resurveying meadows in Johnson Prairie (Johnson Prairie 17, 21 and the private meadow that was formerly owned by UST) about one month earlier in the season than they were surveyed this year. This year, we discovered that Mardon skippers emerge approximately one month earlier in the Wenatchee National Forest (east side) than in the Gifford Pinchot National Forest (west side) in Washington. It is much drier on the eastern side of the mountains than on the western side, which appears to be driving the earlier emergence of the Mardon skippers. If this pattern holds true in southern Oregon, one would expect to find Mardon skippers in Klamath County in early to mid May. Most of the sites we visited in Klamath County were incredibly dry and did not look like they would support Mardon skippers. However, the Johnson Prairie sites, while dry, appeared to have the most potential. This is based on the presence of known nectar and oviposition plants and the water regime in the meadows. We would place the highest priority on resurveying the Johnson Prairie sites. Hamaker meadow and Hayden mouse meadow could also potentially be resurveyed earlier in the season next year, but we would recommend that they be a lower priority. We would not recommend that any of the other meadows surveyed in Klamath County be resurveyed in future years.

Buck Meadow

Scott and Sarina (Xerces) surveyed Buck Meadow on June 11, 2007 from 4:30 to 5:00 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat (Figure 32). This site is a wet meadow that is overgrown by willow, other shrubs and small trees. There is a small area with open water and tall forbs, but it is inaccessible. No *Festuca* sp. was observed.



Fig. 32. Buck Meadow

Cold Creek

Scott and Sarina (Xerces) surveyed Cold Creek with Rob Roninger, Kristin Hiatt, and others from the BLM on June 12, 2007 from 3:00 to 4:00 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat. This wet, sloped meadow had abundant surface water and wildflowers. Numerous other species of butterflies were observed.

Crazy 8 Meadow

Sarina and Logan (Xerces) and Rob Roninger of the BLM, surveyed Crazy 8 Meadow on June 20, 2007 at 1:30 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat. This wet meadow is adjacent to the Klamath River and has abundant *Carex* spp. The general plant community was very dissimilar to any of the other known Mardon skipper sites. There was apparently no mesic area – the site had very wet areas, with very dry areas adjacent. There were no semi-wet regions between the wet and dry areas.

East Buck Lake Complex (1-3)

Scott and Sarina (Xerces) surveyed meadows in the East Buck Lake Complex on June 11, 2007 from 2:45 to 4:20 p.m. No Mardon skippers were observed at any of the sites, and there was no Mardon skipper habitat. The meadows at East Buck Lake 1 and 2 were inundated with water and surrounded by willow, aspen, lodgepole pines, firs, and shrubs. The East Buck Lake 3 site consisted of a small stream within a forested area. There was very little open habitat; most of the area surrounding the stream was shrubby or had willows. A small amount of *Festuca* sp. was observed.



Fig. 33. East Buck Lake 1



Fig. 34. East Buck Lake 3

Edge Creek North

Sarina and Logan (Xerces) surveyed Edge Creek North on June 19, 2007 from 3:50 to 4:15 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat. This site seemed way too dry to support Mardon skippers. The habitat immediately surrounding the creek is wet, and there is some *Festuca* sp., but the plant community is very dissimilar to the plant community at other known southern Oregon Mardon skipper sites.



Fig. 35. Edge Creek North

Eggshell meadow

Sarina and Logan (Xerces) and Rob (BLM) surveyed Eggshell Meadow on June 20, 2007 from 6:00 to 6:30 p.m. There were no Mardon skippers observed, and there was no Mardon skipper habitat. The BLM-owned portion of this meadow is completely dry. The privately-owned portion of the meadow has a man-made pond at the south end, but there is no suitable Mardon skipper habitat surrounding the pond. There are a lot of cattle grazing on the meadow, and the plant community is very dissimilar to that of any of the known southern Oregon Mardon skipper sites. A juvenile bald eagle and an adult bald eagle were observed at this site.



Fig. 36. Eggshell meadow

Exclosure meadow

Sarina and Logan (Xerces) and Rob (BLM) surveyed Exclosure meadow at 1:00 p.m. on June 20, 2007. No Mardon skippers were observed, and there was no Mardon skipper habitat. Most of this meadow was dry, and the wet areas contained tall sedges and grasses. Eight Juba skippers were observed. Also, a rattlesnake was observed.



Fig. 37. Exclosure Meadow

Hamaker meadow

Sarina and Logan (Xerces) surveyed Hamaker meadow from 7:00 to 7:30 p.m. on June 19, 2007. There were no Mardon skippers observed. The plant community looked somewhat similar to known Mardon skipper sites (including *Festuca* sp. and *Potentilla* sp.), but it was quite dry. There was a high diversity of flowering plants at this site, although many of the plants appeared to be nearly finished blooming.



Fig. 38. Hamaker Meadow

Hayden Mouse Meadow

Sarina and Logan (Xerces) surveyed Hayden Mouse Meadow on June 19, 2007 from 5:15 to 5:45 pm. No Mardon skippers were observed. There is a stream flowing through this meadow. Along the edges of the stream is a wet area with abundant *Carex* sp. and some *Festuca* sp. There is a small area within this meadow with abundant wildflowers. Two Juba skippers were observed. This site does not look like a typical southern Oregon Mardon skipper site, but looks more promising than most of the other Klamath county sites that we have surveyed.



Fig. 39. Hayden Mouse Meadow

Johnson Prairie Complex (17, 17-2, 21)

Three meadows were surveyed in the Johnson Prairie area. Johnson prairie 17 and 17-2 are both on privately owned land, whereas Johnson Prairie 21 is on BLM land. On June 12, 2007, Sarina and Scott (Xerces) surveyed Johnson Prairie 21 from 4:25 to 5:37 p.m. On June 20, 2007, Sarina and Logan (Xerces) and Rob (BLM) surveyed Johnson Prairie 17 and Johnson Prairie 17-2 (a nearby meadow that was formerly owned by UST, see Appendix D for the geographic location of these meadows). No Mardon skippers were observed at any of the meadows, but the habitat looked like it could have supported Mardon skippers earlier in the season. All three meadows have at least a small amount of permanent water, and many floral resources. The plant communities look similar to the plant communities that support Mardon skippers in Jackson county. Johnson Prairie 17 has both *Festuca* sp. and *Danthonia californica* in areas near the creek. Sonora skippers were observed at all three sites.

Long Prairie Meadow

Sarina and Logan (Xerces) surveyed Long Prairie Meadow on June 19, 2007 at 3:15 p.m. There were no Mardon skippers and no Mardon skipper habitat. The meadow was extremely dry and heavily used by cattle. There was some *Festuca* sp., but it was heavily grazed, and no other known Mardon skipper nectar or oviposition plants were observed.



Fig. 40. Long Prairie Meadow

Onion Springs

Sarina and Scott (Xerces) surveyed Onion Springs on June 11, 2007 from 1:45 to 2:45 p.m. No Mardon skippers were observed, and there was no Mardon skipper habitat. There is a spring in this area that feeds a small pond (about 30 feet x 20 feet x 2-3 feet deep). Numerous other butterfly species were observed. Most of the site is covered in shrubs, although there are some grassy areas with forbs. There is a ponderosa pine plantation to the west of this site, and the pines are encroaching on the wet meadow. No *Festuca* sp. was observed, although there was abundant *Carex* sp. This site is significantly higher than any known Mardon site (6221 feet).

Rob's Birthday Meadow

Sarina and Logan (Xerces) and Rob (BLM) surveyed Rob's Birthday Meadow on June 20, 2007 at 2:00 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat. This is a wet meadow at the base of the canyon that the Klamath River flows through. The plant community was very dissimilar to that of any of the known southern Oregon Mardon skipper sites.

Squirrel Body Meadow

Sarina and Logan (Xerces) surveyed Squirrel Body Meadow on June 19, 2007 at 4:30 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat. This meadow was very dry; there was a dry creek bed, but no visibly wet areas. The plants in the meadow also appeared to be very dry.

Surveyor Complex (1-3)

Sarina and Scott (Xerces) surveyed meadows in the Surveyor Complex on June 11, 2007 from 5:10 to 6:30 p.m. No Mardon skippers were observed, and there was no Mardon habitat. Surveyor 1 (Figure 41) was a completely wet meadow within a forested area; this

meadow was much too wet to support Mardon skippers. A nearby drier meadow did not have the appropriate plant community to support Mardon skippers. Surveyor 2 and 3 were two points along a linear site. This site contained some openings with forbs and surrounded by firs and some lodgepole pines. In general, the plant communities at all of the Surveyor meadows were very dissimilar from those of the known southern Oregon Mardon skipper sites.



Fig. 41. Surveyor 1

Wetfoot Meadow

Sarina and Logan (Xerces) and Rob (BLM) surveyed Wetfoot Meadow on June 20, 2007 at 2:30 p.m. There were no Mardon skippers, and there was no Mardon skipper habitat. This wet meadow adjacent to the Klamath River supports a population of Monarch butterflies. Approximately 15 Monarchs were observed within the meadow, and Monarch caterpillars were seen on milkweed plants (Figure 43).



Fig. 42. Wetfoot meadow with milkweed and many monarch butterflies



Fig. 43. Monarch caterpillar on a milkweed plant in Wetfoot meadow

SITES NOT VISITED

Jackson County

Dead Indian/ Big Elk Junction

This site was not visited because it is entirely on private land.

Little Hyatt Reservoir North

This site was not visited because it is entirely on private land.

Mt. Ashland

Time did not allow us to look for meadows that may support Mardon skippers on Mt. Ashland.

SE Wildcat (site approximately 1 mile SE of Wildcat)

This site was not visited because it was inaccessible. The road leading to the site is gated and locked, and there are about 10 'No Trespassing' signs posted on and around the gate. There are no other roads that lead to this site.

Upper Tyler Creek

This site was not visited because it is entirely on private land.

Wet prairie S. of Pumpchance 125

This site was not surveyed, because it is on private land. However, Sarina and Logan (Xerces) did look at this site from the fence line on June 17, 2007. We observed young conifers and willows encroaching on the meadow and about 50 head of cattle.



Fig. 44. Wet prairie south of Pumpchance 125 (private meadow)

Klamath County

County Road Meadow

Time did not allow us to visit this site. We deemed it to be a low survey priority when we found that nearby meadows did not have any Mardon skippers or any Mardon skipper habitat.

Edge Creek South

When we surveyed Edge Creek North, we walked for ~0.75 miles down the creek, toward the Edge Creek South site. None of the habitat looked appropriate for Mardon skippers, so we decided to spend our time surveying other meadows instead of continuing on to Edge Creek South.

No Cliff Meadow

Time did not allow us to visit this site. We deemed it to be a low survey priority when we found that nearby meadows did not have any Mardon skippers or any Mardon skipper habitat.

Topsy Meadow

Time did not allow us to visit this site. We deemed it to be a low survey priority when we found that nearby meadows did not have any Mardon skippers or any Mardon skipper habitat.

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APPENDICES

Appendix A: Summary of all sites surveyed in Curry County, Oregon by the Xerces Society (Scott Hoffman Black and Sarina Jepsen) during the 2007 field season.

TABLE OF SITES VISITED IN CURRY COUNTY					
Site	Elevation (feet)	Latitude (N)	Longitude (W)	Mardon extant	Resurvey in 2008
Old Wimer Road 1	~1500	123° 44.364'	42° 03.303'	N	N
Old Wimer Road 2	~1500	123° 44.924'	42° 02.649'	N	N

Appendix B: Summary of all sites surveyed in Jackson County, Oregon by the Xerces Society (Scott Hoffman Black, Sarina Jepsen, and Logan Lauvray) during the 2007 field season.

Site	Elevation (feet)	Mardon extant	Resurvey in 2008
Buck Prairie	4750	Y	Y
Burnt Creek	5247	Y	Y
Conde Creek 4	4596	Y	Y
Conde Meadows	4872	N	Y
Dead Indian Rd. Milepost 20.2(1)	4785	Y	Y
Dead Indian Rd. Milepost 20.2(2)	4671	Y	Y
Hobart Peak East	4836	Y	Y
Hobart Peak Middle	4832	N	Y
Hobart Peak West	4769	N	Y
Hyatt Lake East Shore	5040	N	Y
Little Hyatt Reservoir south	4629	Y	Y
PCT meadow	4691	Y	Y
Pumpchance 125	4799	Y	Y
Pumpchance 128 – Moon Prairie	4650	Y	Y
Service Glade	4523	Y	Y
Short Creek 1	4698	Y	Y
Short Creek 2	4744	Y	Y
Wet prairie S. of Pumpchance 125	4635	N/A*	Y
Wildcat Glade	5162	N	Y

* The wet prairie south of Pumpchance 125 was only photographed from the fence line and not surveyed since it was on private land.

Appendix C: Summary of sites surveyed in Josephine County, Oregon by the Xerces Society (Scott Hoffman Black and Sarina Jepsen) during the 2007 field season.

TABLE OF SITES VISITED IN JOSEPHINE COUNTY					
Site	Elevation (feet)	Latitude (N)	Longitude (W)	Mardon extant	Resurvey in 2008
White Creek	~2800	123° 27.619'	42° 15.342'	N	N

Appendix D: Summary of all sites surveyed in Klamath County, Oregon by the Xerces Society (Scott Hoffman Black, Sarina Jepsen, and Logan Lauvray) during the 2007 field season.

TABLE OF SITES VISITED IN KLAMATH COUNTY					
Site	Elevation (feet)	Latitude (N)	Longitude (W)	Mardon extant	Resurvey in 2008
Buck Meadow	4969	122° 12.281'	42° 15.047'	N	N
Cold Creek	5000	122° 12.654'	42° 12.642'	N	N
Crazy 8 Meadow	3183	122° 06.123'	42° 01.669'	N	N
East Buck Lake 1	4943	122° 10.063'	42° 15.234'	N	N
East Buck Lake 2	4943	122° 10.083'	42° 15.349'	N	N
East Buck Lake 3	5027	122° 10.248'	42° 14.399'	N	N
Edge Creek North	3727	122° 13.365'	42° 01.481'	N	N
Eggshell meadow	4406	122° 00.919'	42° 00.314'	N	N
Exclosure meadow	3341	122° 07.940'	42° 01.505'	N	N
Hamaker meadow	4799	121° 57.769'	42° 06.047'	N	L
Hayden Mouse meadow	3755	122° 10.548'	42° 02.235'	N	L
Johnson Prairie 17 (private)	3930	122° 15.816'	42° 10.964'	N	Y
Johnson Prairie 17-2 (private)	4012	122° 15.284'	42° 11.046'	N	Y
Johnson Prairie 21	3930	122° 14.421'	42° 09.550'	N	Y
Long Prairie Meadow	3786	122° 15.188'	42° 01.852'	N	N
Onion Springs	6221	122° 11.396'	42° 12.652'	N	N
Rob's birthday meadow	3170	122° 06.022'	42° 02.019'	N	N
Squirrel Body Meadow	3737	122° 11.191'	42° 01.886'	N	N
Surveyor 1	5050	122° 14.993'	42° 13.774'	N	N
Surveyor 2	5143	122° 14.420'	42° 14.003'	N	N
Surveyor 3	5143	122° 14.410'	42° 13.093'	N	N
Wetfoot Meadow	3000	122° 05.456'	42° 03.246'	N	N

Y=YES, N=NO, L=LOW PRIORITY

Appendix E: Summary of all known Mardon skipper sites in southern Oregon and recorded days counts from these sites in 2007.

Site Name	Administrative Unit	Date Surveyed	Day Count
USFS Conde Complex			
Service Glade	Ashland RD Rogue River/ Siskiyou NF	6/16/2007	32
Conde Creek 4	Ashland RD Rogue River/ Siskiyou NF	6/16/2007	42
Short Creek Complex			
Short Creek 1 (East)	Ashland RD Rogue River/ Siskiyou NF	6/17/2007	29
Short Creek 2 (West)	Ashland RD Rogue River/ Siskiyou NF	6/17/2007	40
BLM Conde Complex			
Conde Meadow	Medford District BLM, Ashland RA	6/16/2007	0
Indian Road Complex			
Dead Indian Road – MP 20.2(1)	Medford District BLM, Ashland RA	6/17/2007	2
Dead Indian Road – MP 20.2(2)	Medford District BLM, Ashland RA	6/17/2007	2
Dead Indian/Big Elk Junction	Private	Not surveyed	N/A
Moon Prairie Complex			
Pumpchance 128 – Moon Prairie	Medford District BLM, Ashland RA	6/17/2007	62
Pumpchance 125	Medford District BLM, Ashland RA	6/17/2007	265
Wet Prairie S. of Pumpchance 125	Private	Not surveyed	N/A
Wildcat Complex			
Wildcat	Medford District BLM, Ashland RA	6/18/2007	0
Hyatt Lake East Shore	Medford District BLM, Ashland RA	6/18/2007	0
Buck Prairie Site			
Buck Prairie	Medford District BLM, Ashland RA	6/18/2007	95
Table Mt. Sites			
Burnt Creek Meadow	Medford District BLM, Ashland RA	6/18/2007	25
Little Hyatt Reservoir site			
Little Hyatt Reservoir South	Medford District BLM,	6/18/2007	11

Site Name	Administrative Unit	Date Surveyed	Day Count
	Ashland RA		
PCT Complex			
PCT Meadow South & Meadow SW of PCT Meadow South	Medford District BLM, Ashland RA	6/19/2007	20
PCT Meadow North	Medford District BLM, Ashland RA	6/19/2007	2
Hobart Peak Complex			
Hobart Peak East	Medford District BLM, Ashland RA	6/19/2007	2
Hobart Peak Middle	Medford District BLM, Ashland RA	6/19/2007	0
Hobart Peak West (exclosure)	Medford District BLM, Ashland RA	6/19/2007	0