Management Plans for Southern Oregon Cascade mardon skipper (*Polites mardon* ssp. *klamathensis*) sites on the Rogue River Siskiyou National Forest, High Cascades Ranger District.

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March 2013

U.S.D.A. Forest Service Region 6 and U.S.D.I. Bureau of Land Management
Interagency Special Status and Sensitive Species Program

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SECTION 1: STATUS AND THREATS

Background

The mardon skipper, *Polites mardon*, (U.S. Federal Species of Concern, Washington State Endangered Species, Global Heritage Status Rank of G2G3, United States National Heritage Status Rank of N2N3, state rank of S1 in Washington and California, and S2 in Oregon, Forest Service Region 6 Sensitive Species, and a BLM Special Status Species) is a rare butterfly in the Pacific Northwest of the United States of America. Mardon skippers are grassland and open meadow obligates endemic to the states of Washington, Oregon, and California. Historic mardon skipper ranges are not known, as historical documentation of this butterfly is scarce, with most population surveys only occurring in the past decade (Black & Vaughan 2005). Despite the lack of data, mardon skippers were likely more widespread and abundant prior to the past 150 years of human development, livestock grazing, fire suppression, and invasion of grassland habitat by native and non-native vegetation.

The mardon skipper is known from four geographic areas: (1) southern Puget Sound, (2) the east side of the Cascade Mountains (Mt. Adams area and the Wenatchee National Forest Washington), (3) the Cascade Mountains in southern Oregon, and (4) Del Norte (north-coastal) California and the southern coast of Oregon.

History and Taxonomy of Mardon Skipper in Southern Oregon

Mardon skippers were first described by W. H. Edwards (1881) from specimens taken near Tenino, Thurston County, Washington by H. K. Morrison (Dornfeld 1980). For nearly 100 years the only known populations were in Washington State. In June 1979, Sterling and Eileen Mattoon discovered a population on High Divide Ridge in Del Norte County, California. The first confirmed records for Oregon came in the late 1980's when John Hinchliff found three male specimens in collections held at the American Museum of Natural History in New York City. These specimens were collected by W.E. Lawrence in 1931 at Lake of the Woods, Klamath County. After Hinchliff's discovery, John Vernon and Mike Richard found a population on Dead Indian Road, Jackson County in 1990. Then, in 1991, Sterling Mattoon and others working on The Xerces Society Mount Ashland butterfly count added three additional populations in Jackson County, including the Soda Mountain Road population (now called the Hobart Peak complex) that eventually became the type specimen for the subspecies *Polites mardon* ssp. *klamathensis* in 1998 (Mattoon *et al.* 1998).

There are two described subspecies of mardon skipper. Mattoon *et al*. (1998) proposed that the Oregon Cascade's population be given subspecies status of *Polites mardon* ssp. *klamathensis,* and that the Washington and Northern California and Southern Oregon coastal populations be given the subspecies status of *P. m. mardon*. The remainder of this review focuses on the subspecies *P. m.* ssp. *klamathensis.*

Species Range, Distribution, Abundance, and Trends

All confirmed *P. m.* ssp. *klamathensis* populations occur in a small geographic area to the east of the city of Ashland in the Cascades of southern Oregon. All of the sites are encompassed in

an area that is 18 miles from north to south and eight miles from east to west, with the southern border at Hobart Peak in the Cascade Siskiyou National Monument (See Map 1). The sites range in size from ¾ to 31 acres (1/3 to 13 ha) and are high-elevation (1,372 to 1,555 m (4,500 to 5,100 ft)) grasslands within mixed conifer forests that are associated with an ephemeral or permanent water source (Beyer & Black 2007).

Recent Searches for Mardon Skipper in Southern Oregon

Work by The Xerces Society and others has added to our knowledge of the species distribution in southern Oregon (Vaughan & Black 2004, Black & Vaughan 2005, Ross 2005, Vaughan & Black 2005, Black 2006, Jepsen *et al.* 2007, Beyer & Black 2007, Black *et al.* 2008 a,b). Since 2004, The Xerces Society has worked with the US Forest Service and the BLM to survey over 200 potential sites in the southern Oregon Cascades. The areas surveyed are as follows:

- Ashland Resource Area, Medford District BLM;
- Klamath Falls Resource Area, Lakeview District BLM to the east side of the Cascade crest; and
- High Cascades and Siskiyou Mountains Ranger Districts of the Rogue River/Siskiyou National Forest north of Dead Indian Memorial Highway and around Mt. Ashland west of I-5.

The Xerces Society has also completed limited surveys around Lake of the Woods on the on the Fremont-Winema National Forest. Xerces Staff also trained biologists on that Forest to complete a more comprehensive survey effort. To date they have completed multiple surveys on the Fremont-Winema National Forest.

The Xerces Society has also completed one day population estimates at many of the sites in multiple years since 2005. These one day population estimates are completed as close to the peak of the adult butterfly flight period as possible. The Xerces Society also completed a study to determine host plant preferences at three sites in Southern Oregon (Beyer & Black 2007).

With over 200 potential mardon skipper sites surveyed on public lands, we believe that the vast majority of sites on public lands in the southern Oregon Cascades have been located and that subsequent searches would yield few, if any, additional sites.

Status of *Polites mardon* ssp. *klamathensis* in southern Oregon

At present, 21 confirmed current and historic sites in 13 complexes are known from Forest Service and BLM lands in the Cascade Mountains in southwestern Oregon (Appendix 1). Of these 21 sites on public lands, 17 were found to have extant populations of mardon skippers in surveys from 2009 to 2012. Note: We have excluded some sites where in past years one individual was found in one survey and subsequent surveys yielded no positive findings, as these may be errant findings and may not denote a site or population.

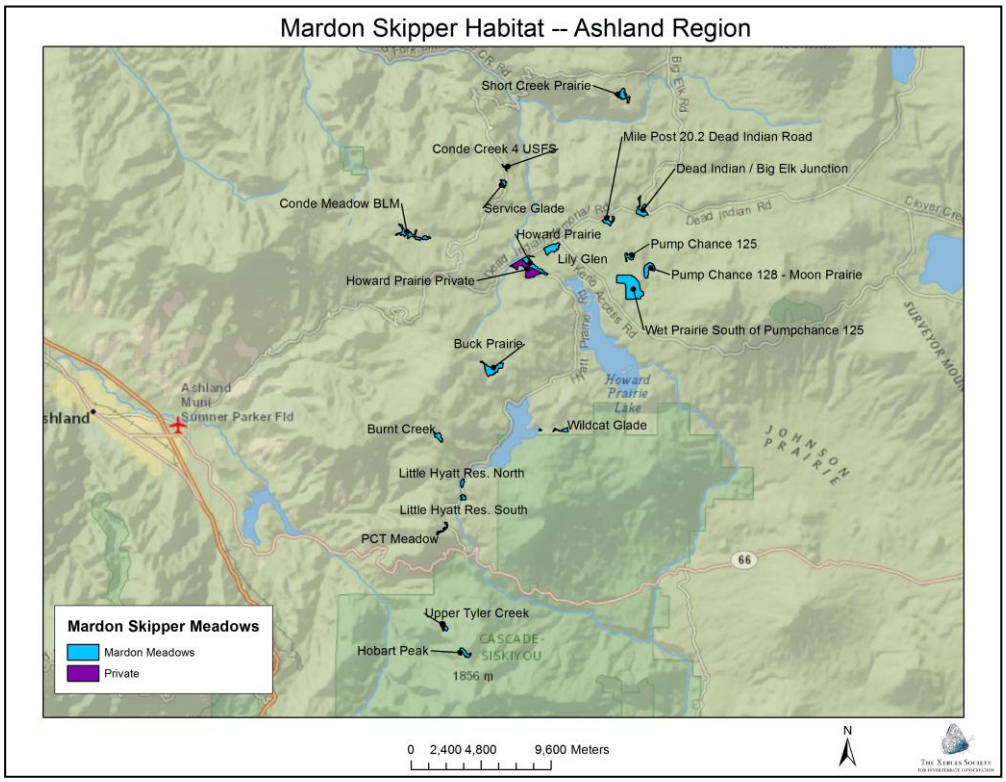
Four known populations are located on private lands, although the status of those sites is not fully known. Of those four sites, one site is likely extirpated and two others have been degraded by grazing and off road vehicle use (S. Black, personal observation).

Status on the Rogue River Siskiyou National Forest

Five sites are known from Rogue River Siskiyou National Forest; two of these are in the Gold Beach Ranger District and three of them are located in the High Cascades Ranger District (HCRD). The remainder of this document only covers those sites on the HCRD. All three HCRD sites had extant populations of mardon skippers in 2011 and 2012 (Table 1). In 2011, one day population counts near the peak of mardon skipper flight season were: Service Glade 27 mardon, Conde 4 had 4 mardon, Short Creek 1 had 22 mardon, Short Creek 2 had 13 mardon, and Short Creek 3 had 10 mardon (Table 1). In 2012, one day population counts yielded 14 mardon in Service Glade, 14 mardon in Conde 4, 11 in Short Creek 1, 2 in Short Creek 2 and 78 in Short Creek 3 (Table 1). Note: 2012 one day counts may not have been at peak flight.

Table 1: One day population counts at all known USFS mardon skipper sites from surveys conducted July 1st 2011 and June 13, 2012.

Management Unit	Site	# Mardon 2011	# Mardon 2012
FS MU1	Service Glade	27	14
FS MU2	Conde 4	4	14
FS MU3	Short Creek 1	22	11
	Short Creek 2	13	2
	Short Creek 3	10	78



Map 1: Mardon skipper (*Polites mardon* ssp. *klamathensis*) sites in the southern Oregon Cascades.

<u>Species Life History</u>

Mardon skippers are part of the grass feeding butterfly family Hesperiidae, meaning the larvae feed exclusively on graminoids. Recent studies have revealed some of the ways in which mardon skippers utilize their habitats.

Mardon skippers are univoltine, completing one life cycle annually. Individuals live between five days and two weeks. Adults do not all emerge on the same date, so the duration of flight period at a given site depends, in part, on the population size at that site. Sites with large populations may have a flight period that extends for more than a month, whereas sites with small populations may have adults present for only ten or fewer days. Weather influences emergence and flight period duration. Wet or cold conditions delay emergence and conversely, warm, dry conditions promote earlier emergence (Potter *et al.* 2002).

Figure 1: Mardon skipper (*Polites mardon* ssp. *klamathensis*). Photo by Donald H. Gudehus.

In the Oregon Cascades, adult mardon skippers eclose from late May to early July. Adults actively nectar throughout their flight period, and seek refuge from adverse weather low in the vegetative turf under grasses and forbs. Females lay eggs singly into graminoid bunches while perched (Beyer & Black 2007, Beyer & Schultz 2010). Eggs are thought to hatch within seven days (Black & Vaughan 2005), and larvae feed through the late summer into the fall.

It was previously believed that pupae hibernate through the winter (Potter *et al.* 1999, Dornfeld 1980 and Newcomber 1966 in Potter *et al*. 1999), but preliminary studies of flagged mardon skipper larvae in the field by Beyer and Black (2007, See Figure 2) suggests that Cascade populations overwinter in the larval life stage. In addition, in captive rearing studies, some

mardon skippers appear to enter diapause and overwinter as larvae (Mary Jo Anderson, personal communication).

Figure 2: Mardon skipper larva in fescue. Photograph by Loni Beyer.

Occupancy by mardon skippers in meadow habitats is patchy; distribution is rarely homogeneous across an entire site (Beyer & Black 2007). This is likely dependent upon microclimatic conditions (Ehrlich 1992), and may be associated with palatability of the host plant due to proximity with a water source.

Female mardon skippers have been observed ovipositing on multiple graminoid species, indicating that the larvae may be generalists (Beyer & Schultz, 2010). Although mardon skippers do not select for specific graminoids during oviposition, they do exhibit plant specificity within localities. In Washington State, for example, the mardon skipper exhibits oviposition preferences for *Carex* spp. at one location and *Danthonia* spp. at another nearby location. Yet, when Idaho fescue (*Festuca idahoensis)* is present, it is generally preferred by ovipositing females (Beyer & Schultz 2010). At the two sites studied in Oregon, California oatgrass (*Danthonia californica*) was the most frequently utilized oviposition plant, although mardon skippers also fed on Roemer's fescue (*Festuca idahoensis* spp. *roemeri*) when available (Beyer & Black 2007). Variables such as graminoid structure and tree shading also influence oviposition behavior. The degree to which these preferences are shown depends on the specific habitat available to each mardon skipper population (Beyer & Schultz 2010).

Threats and General Management Recommendations

Mardon skipper populations face a variety of threats; including grazing by domestic livestock, conifer, shrub, and grass encroachment, off road vehicle (ORV) use in meadows, prescribed and natural fire, recreation (including camping), applications of Btk, climate change, and issues related to small population size and stochastic events.

Small and fragmented populations are generally at greater risk of extinction from normal population fluctuations due to predation, disease, and changing food supply; as well as, from natural disasters such as droughts (*reviewed in* Shaffer, 1981). Small populations are also threatened with extinction from a loss of genetic variability and reduced fitness due to the unavoidable inbreeding that occurs in such small populations (*reviewed in* Shaffer, 1981). The subspecies of mardon skipper *Polites mardon* ssp. *klamathensis* is known from 25 sites – most separated by a distance of over two miles. During adult flight, mardon skippers avoid heavily forested habitats and are assumed to have limited dispersal abilities (Beyer & Schultz 2010; Beyer & Black 2007; Runquist 2004). Therefore, there is little opportunity for the individual populations to intermix.

Due to the local (cluster of habitat patches) and regional (four disjunct populations in WA, OR and CA) distribution of mardon sites, there is considerable evidence that the mardon skipper exhibits metapopulation dynamics. Metapopulations are defined as regionally distributed populations that are interdependent over time. There are many models of metapopulations, but a central theme to all of them is frequent local extirpations of individual habitat patches and subsequent recolonization, or rescuing, from nearby successful populations. In order for metapopulations to survive over time, there must be some opportunity for connectivity between patches of habitat. Considering changes in fire regime and land use, the connectivity of the landscape has changed significantly since 1950. A 1995 study noted a 39% decrease in forest openings (meadow habitat) in the Klamath Mountains between 1944 and 1985 indicating significant forest encroachment in this time (Skinner, 1995). Much of this forest encroachment happened along meadow connections, leading to further isolation of individual forest openings. Skinner (1995) also found that the median distance to the nearest forest break had doubled between 1944 and 1985. From comparing photos from 1953 to 2011, similar forest encroachment has occurred in both the Service Glade complex and the Short Creek Complex (see figures 3 and 4). Because of the limited dispersal abilities of mardon skippers, these changes have likely isolated remnant populations and reduced the probability of recolonization in the event of a local extirpation.

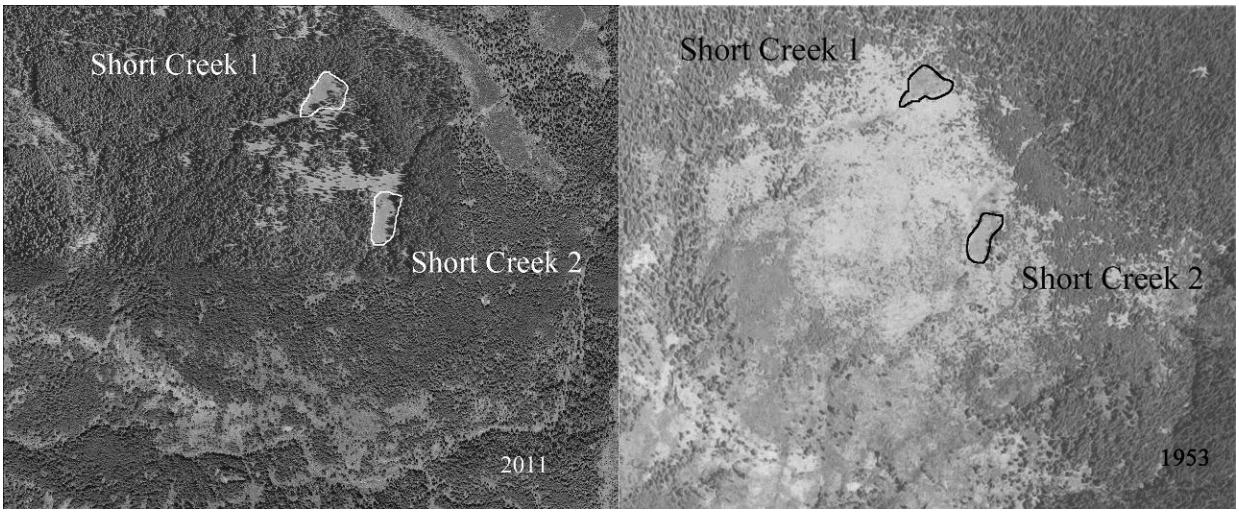


Figure 3: Aerial photographs of the Short Creek Complex in 1953 and 2011. Note the openness of the habitat in 1953 that has experienced dramatic forest encroachment by 2011.

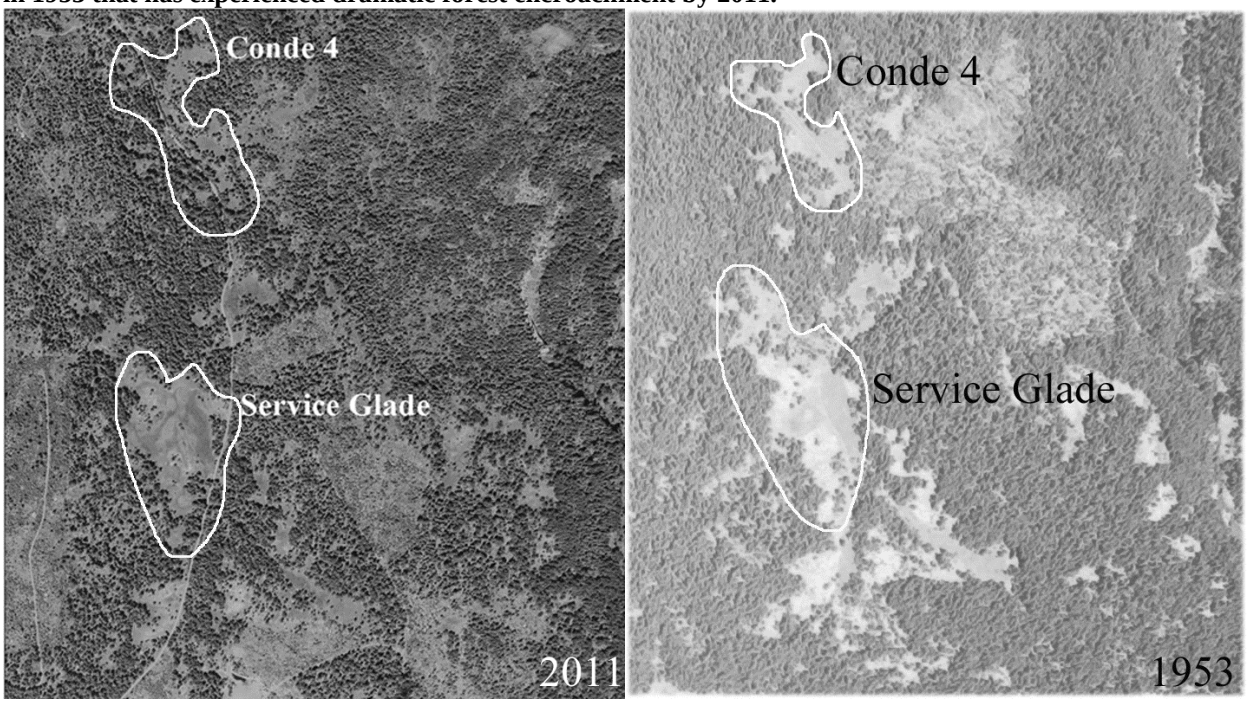


Figure 4: Aerial photographs of the Service Glade Complex in 1953 and 2011. Note the connections between meadows in 1953 that have been closed by 2011.

Global climate change could threaten the mardon skippers' survival. Assessment of climate change trends in North America has already revealed changes in precipitation patterns, hydrology, and plant bloom time. Overall, annual mean air temperature increased in North America from 1955-2005. The effects of global climate change are projected to include warming in the western mountains, causing snowpack and ice to melt earlier in the season (Field *et al.* 2007), which will have an impact on mardon skipper sites as all are associated with permanent, ephemeral, or subsurface water. These climactic changes may lead to drier summer conditions, particularly in arid western areas where snowmelt is important to maintaining ephemeral water

sources. Spring and summer snow cover has already been documented as decreasing in the western United States, and drought has become more frequent and intense (Intergovernmental Panel on Climate Change 2007, Saunders *et al*. 2008). Because the mardon skipper is associated with wet areas, its survival may be threatened by climate change induced habitat impairments. Moreover, since fewer seedlings and saplings will die in warmer winter and spring temperatures, and models predict an increase in fall precipitation, climate change seems to improve conditions for increased shrub and tree encroachment in open meadow habitats (Widermaier and Strong 2010). Although management at the population scale cannot directly address global climate change, providing quality habitat spread in multiple sites across the landscape is thought to insulate species from climate change.

Below we provide information on threats and general recommendations for managing grazing, conifer encroachment, prescribed fire, ORV use, invasive tall stature grass (i.e. meadow foxtail) and Btk applications. For information on management at the three USFS mardon skipper Management Units, please see site specific information in Section 2 of this document.

The following discussion of guidelines for management can only be understood and implemented when used in conjunction with site specific threat information that is available in Section 2. Mardon skippers persist in open prairie and meadow ecosystems. These ecosystems are naturally maintained by disturbance (Coop & Givinish 2007). Yet, a delicate balance is needed to create sufficient disturbance to restore and maintain the system without creating so much disturbance that the habitat is further degraded (Schultz and Crone 2008).

Livestock Grazing

Graminoid cover, composition, and structure are important for mardon skippers (Beyer and Schultz 2010); as they provide larvae with adequate food, microclimate, and protection from predation and parasitism. Livestock grazing can adversely impact butterfly populations directly by trampling during immobile life stages (egg, larvae, pupae), or during cool temperatures when adult movement is restricted (Warren 1993). Grazing can also be detrimental to butterfly populations indirectly by altering plant community composition (Stoner & Joern 2004) and stripping habitat of vegetation, removing adult nectar resources, introducing invasive weeds (Hayes & Holl 2003) and changing meadow hydrology (Belsky *et al*. 1999). 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, light-rotational grazing can maintain vegetation heights and habitat heterogeneity favorable to some butterflies (Ravenscroft 1994). For instance, the silver spotted skipper has not only shown a positive response to moderate grazing, but depends on it to maintain the structure of its host plant (Davies *et al.* 2005; Thomas & Jones 1993). 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. Runquist (2011), in a study focusing specifically on the butterfly taxa of the Cascade-Siskiyou National Monument, found that graminoid-feeding butterflies were 1/3 less abundant at higher grazing utilization classes (>30% utilization). 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. The timing and frequency of livestock 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 relatively long recovery periods for the habitat, and grazing should not take place during the adult flight period since butterflies are utilizing nectar sources and looking for oviposition sites during this time.

Figure 5: Grazing impacts at Forest Service Conde 4. Stubble height was very low with some areas reduced to bare soil. Photo by Scott Hoffman Black.

In Jackson County of southern Oregon, adult mardon skippers require plentiful floral nectar for survival, successful reproduction, and adequate egg production from late-May through early July. Livestock grazing 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 removal of important larval vegetation (Smallidge & Leopold 1997). In Oregon, mardon skipper larvae are believed to be active from approximately late April through October, although this window of activity varies, and is probably influenced by the microclimate of each site.

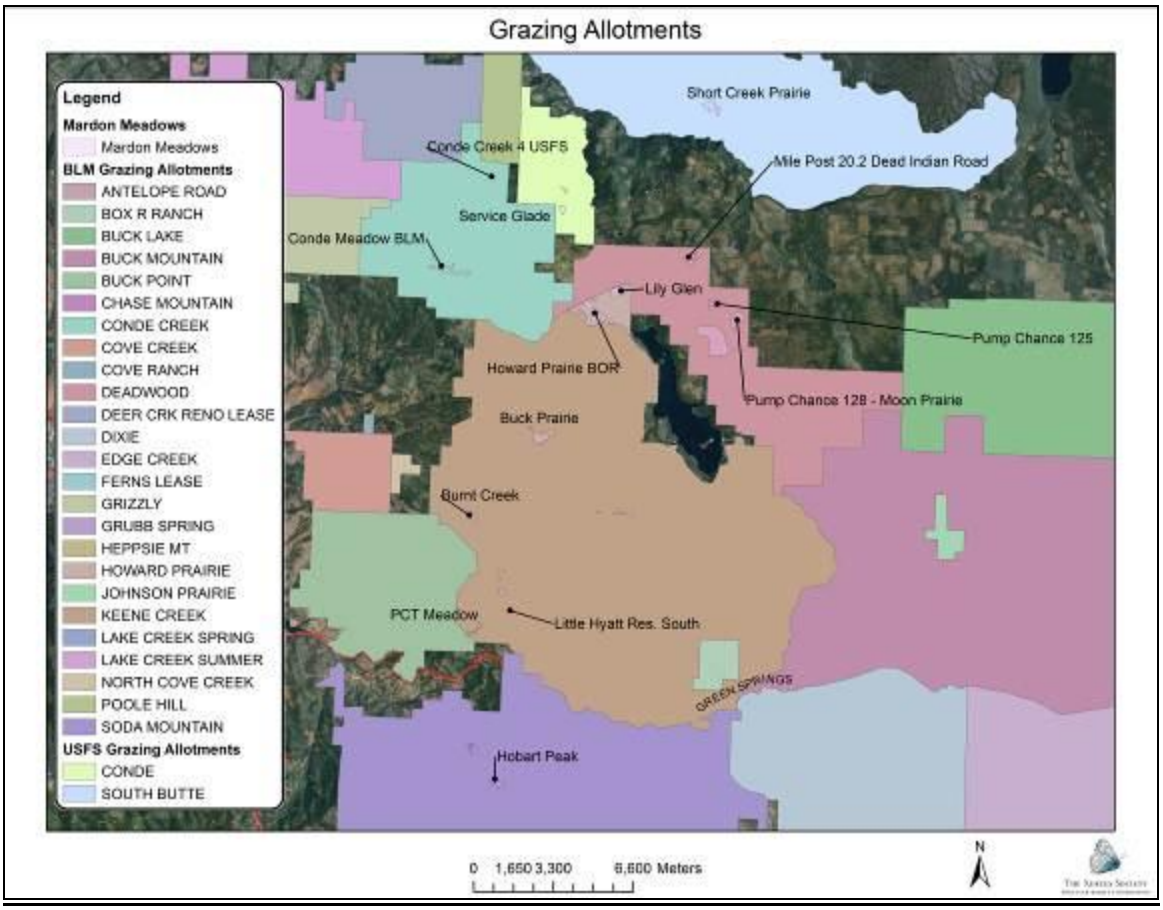
The negative impact of grazing to the mardon skipper has been documented at all Forest Service mardon sites and over grazing is suspected to have played a role in the extirpation of mardon skippers from BLM Conde Meadows (S. Black, personal observation).

General Recommendations (Note: See specific management plans for each site)

- At the most severely impacted sites, exclude cattle from habitat in the meadow to allow the habitat time to repair. After a repair period of at least 3 years, practice adaptive

management that suits the habitat. If appropriate, grazing, as described below, could be a part of this adaptive management.

- Do not allow grazing within mardon skipper habitat during the flight period of the adult mardon skipper.
- Keep grazing periods short, with recovery periods for the habitat relatively long.



Map 2: Grazing allotments and mardon skipper sites. Note: The Keene allotment was retired in 2009.

Forest Encroachment

The removal and alteration of the natural disturbance regimes (such as fire suppression), that once maintained low shrub and conifer seedling establishment rates, has led to the loss and degradation of forest-meadow ecosystems (Coop & Givinish 2007; Norman & Taylor 2005). Forest encroachment not only reduces the amount of open habitat, but closes off corridors between meadows reducing butterfly dispersal (Roland & Matter 2007). During the adult flight, mardon skippers avoid heavily forested habitats, avoid forest edges and trees during oviposition, and are assumed to have limited dispersal abilities (Beyer & Schultz *2010*; Beyer & Black 2007; Runquist 2004). Large dense shrubs likely have a similar adverse impact as encroaching trees to the habitat and behaviors of this butterfly.

Figure 6: Tree encroachment at Conde 4. Photo by Scott Hoffman Black

The lack of genetic interchange and movement of individuals between populations will likely lead to lower overall fitness and extirpations of local populations. A better understanding of the feasibility and the effects of reconnecting neighboring mardon skipper populations that have been isolated by forest and shrub encroachment is warranted (Bergman 1999; Dennis *et al.* 2006).

Conifer encroachment is negatively impacting all Forest Service sites, although some sites have higher levels of encroachment than other sites.

General Recommendations

In areas where tree and shrub encroachment are occurring, small trees and problematic shrubs should be removed as soon as possible, before they grow larger and reproduce.
A plan should be developed to remove trees using methods that incorporate sensitivity to the butterflies' life history. The plan should include the following:

- In general remove only small trees under 4 in. Diameter at Breast Height (DBH) from the open meadow portion of the site.
- Wherever possible, cut by hand with chainsaws or handsaws.
- Remove all downed wood and branches from the meadow area.
- 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, scattering or piling of trees or branches in meadows, or burning of piles in or adjacent to the core area of the site.

- Maintain a buffer of large trees at the edges of meadow since they may play an important role in maintaining the microclimate and hydrology of the local habitat. If thinning is needed for fuels and/or ecosystem needs, remove only small diameter trees. If additional tree removal is needed, consult with a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow.
- If openings between meadows have closed off due to encroachment, develop a plan to improve connectivity, especially if adjacent or nearby meadows have suitable mardon skipper habitat and/or are known occupied sites.
    - If plans for opening meadow connections are pursued, pay careful attention to the hydrology within and between meadows and, where possible, do not alter current circumstances. A change in meadow hydrology could dramatically affect mardon skipper habitat.

<u>Non-native grasses</u>

Changes of vegetation structure at oviposition sites can impact larval survival and host plant selection by ovipositing mardon skippers (Henry and Schultz 2012). Mardon skippers prefer open habitat with isolated patches of host plant for oviposition. The invasion of tall stature grasses can dramatically change the structure of the vegetation and therefore the microhabitats within the meadow. Runquist (2011) believes that tall stature grasses have led to a decline in some mardon populations on BLM lands. Butterfly populations are constrained by temperature (Crozier 2003, 2004) and are restricted to especially warm macro- and microhabitats in temperate climates (Thomas et al. 2001). The small tufts and open habitat structure selected by ovipositing females are likely to correspond to the warmest locations in the prairie or meadow (Forsberg 1987; Stoutjesdijk and Barkman 1992). The invasion of a tall stature grass, like meadow foxtail, will significantly change the sun exposure and moisture content of invaded areas, thereby changing the attractiveness to mardon skippers, and survival of larvae, even if desired host plants remain in the understory of the tall stature grass.

Meadow foxtail (*Alopecurus pratensis* L.) was originally introduced as a pasture grass, however high water table requirements have made spring grazing difficult and the palatability of the grass declines drastically in summer (USDA, NRCS, 2004). It appears as though meadow foxtail is encroaching at all forest service sites (Black and Hatfield, pers. obs.) and options to control the grass invasion are limited. Applying glyphosate in August has been a successful management option for removing meadow foxtail in mixed swards in the UK, but experiments may be necessary in the Pacific Northwest to determine the effects of an August application of glyphosate on native grasses and forbs (OSU 2005).

Develop a plan that looks at alternatives for controlling these grasses. This would likely involve testing a series of methods for invasive grass removal including, but not limited to:

- Herbicide treatment at different times of year.
- Having volunteers remove grass seed heads before they reach maturity.
    - Using weed whackers
    - Hand clipping
- Localized frequent heavy cutting.

- See OSU, 2005 and Morisawa, 1999 for more information.

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. 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 with careful 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 re-colonization once a population has been locally extirpated.

A recent study on prescribed burning and the mardon skipper in California showed substantially fewer butterflies in the burned areas of meadows compared to unburned areas after one, two, and three years following the burn event (Black *et al*. 2011). Counts for all four zones across all survey dates in 2009, 2010, and 2011 showed mardon numbers that ranged from 2 to 27 times higher in unburned zones compared to burned zones on the same dates (Black *et al*. 2011).

Figure 7: Controlled burn at a mardon skipper site in California. By Brenda Devlin

Burning meadows that contain populations of mardon skippers may kill all butterflies within the fire area, as this species is thought to overwinter as a caterpillar at the base of its host plant, and is thus highly susceptible to ground fires.

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 specific steps must be employed in order to protect the mardon skipper.

To our knowledge, there are no pending plans for prescribed fire at any of the mardon skipper sites on Forest Service lands. If future prescribed burning is warranted, a detailed burn plan should be developed for each site.

General Recommendations (Note: Develop site specific management plans for each site before implementing a prescribed burn)
A careful and well-researched prescribed burning regimen will likely provide 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.

- Do not burn more than one-third of the core habitat in any given year, and less if possible.
- As a fire moves through an area it may leave small patches unburned. Leave these skips intact as potential micro-refuges.
- Develop a comprehensive monitoring program to accompany any plans for continuing burns to determine the immediate and long-term impacts on Mardon skipper populations. Delay additional burns until there is full re-colonization of burned areas by mardon skippers.
- While implementing a burn plan, measures must be taken to avoid actions that could degrade existing habitat and kill individual skippers, including heavy equipment use and additional or excessive foot traffic by burn staff in mardon meadows.
- Since mardon skipper larvae are active April through October, the best time of year to conduct a burn is after October 15.

Off Road Vehicles
Mardon skipper eggs, caterpillars, pupae, and adults are killed by recreational activities such as off-road vehicle (ORV) driving (Potter *et al*. 1999). These activities can also damage native host plants and may lead to an invasion of non-native plant species. ORVs aid the dispersal of invasive non-native species deep into forestlands. One study found that in just one trip on a 10 mile course, an ORV dispersed 2,000 spotted knapweed seeds (MSU 1992). In Wisconsin, a survey of seven invasive plant species along ORV routes found at least one of these (exotic) plant species on 88 percent of segments examined (Rooney 2005).

Off road vehicle use may have been one of the factors that have led to a significant decline in the mardon population at the BLM Buck Prairie site and a site on private land north of Little Hyatt Reservoir. Damage from ORVs has been observed at Short Creek although steps have been taken to limit access to the site and to provide signage.

General Recommendations
In areas with ORV traffic, close off access to mardon skipper habitat areas and educating the public on the detrimental impacts of this form of recreation to sensitive habitats.

Use of Btk

Btk *(Bacillus thuringiensis* var. *kurstaki*), a Lepidoptera-specific insecticide, has been widely used to treat defoliators in western forests (Wagner & 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, which feed during the application period for the target species are especially vulnerable to Btk (Wagner & 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.

Figure 8: Off road vehicle signage at Short Creek 1. Photo by Pepper Trail.

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.

General Recommendations

Do not spray Btk on forested areas within two miles of any mardon skipper population.

Site Priorities

All of the remaining extant mardon skipper sites on Forest Service lands are critical to the survival of this subspecies, thus all extant sites should be considered a high priority (Table 2). The highest priority sites on Forest Service lands are within the Short Creek Management Unit. Although some historic sites, like Conde 4 are very small, it is still important to manage them for the mardon skipper so that the habitat remains suitable.

Table 2: Site priority of mardon skipper sites on The Rogue River – Siskiyou National Forestlands in Southern OR. Highest priority sites are listed with a 1 and lowest with a 4. Priority is based on population size and opportunity for management that may help populations.

Management Unit	Site	Priority
MU1	Service Glade	2
MU2	Forest Service Conde 4	2
MU3	Short Creek 1	1
	Short Creek 2	1
	Short Creek 3	1

Management Plans by Unit

Suggested management at each management unit is detailed below. In some cases, there are more than one alternative given to managers to allow for some flexibility. In other cases, such as curbing off-road vehicle traffic and cutting down small encroaching trees, only one alternative is given. We did not include a no-action alternative in these plans as our information indicates that action is needed at these sites to ensure survival of the rare butterfly.

Management Unit 1: Service Glade (Priority 2)

Site Name: Service Glade
Coordinates (Centroid of core area): N 42.300948, W -122.458758

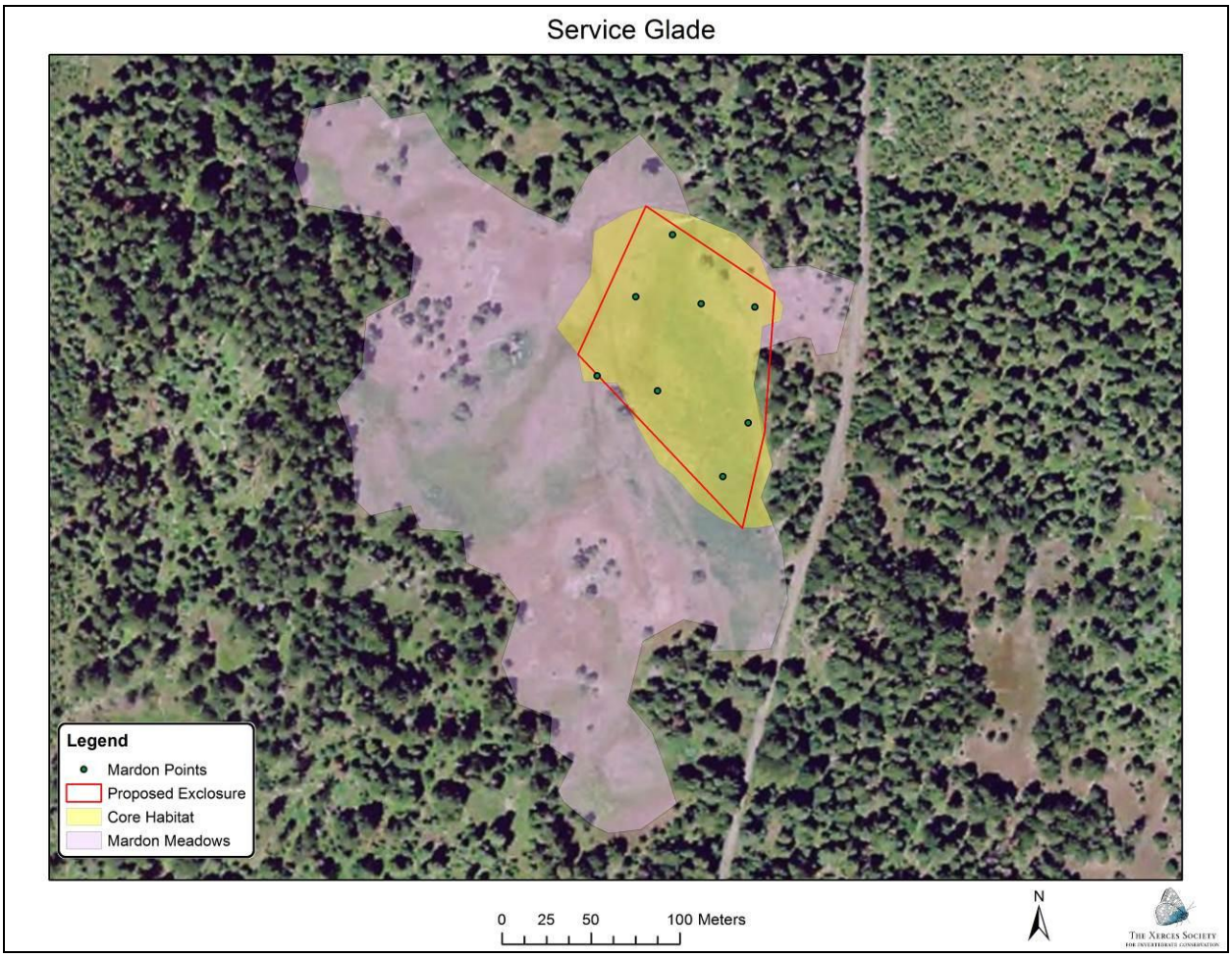
Goal of the Site Management Plan

Sustain extant mardon skipper populations through the manipulation of the grazing regime at the site and controlling non-native grasses. Also, maintain open meadow conditions by curbing conifer encroachment.

Site Distribution, Abundance, and Trends

Mardon skippers are distributed in small patches of habitat within the taller grass at the site. Most of the meadow does not contain mardon skippers as the non-native grass has crowded out potential host plants and nectar sources (See Map 3). The mardon skipper habitat is now pushed to an area adjacent to trees, which is not optimum because of shade.

It is hard to tell population trends from one day counts but the population at Service Glade is relatively small. The highest one day count was 32 in 2007 and the lowest was 2 the year that the site was found in 2005. Eleven individuals were counted in 2006, 24 in 2008, 8 in 2010, 27 in 2011 and 14 were counted in 2012.



Map 3: Service Glade site with core area and locations of mardon sightings marked. Proposed cattle exclosure is outlined in red.

Site Description

Service Glade is a relatively large meadow but only a small portion is used by mardon skippers. A small ephemeral stream passes through the middle of this habitat area. This stream is usually partly dry by late June and appears to have less flow now than there was in earlier visits, but there is no data set to corroborate this observation (S. Black, personal observation). The majority of the site has been taken over by meadow foxtail (*Alopecurus pratensis*), a non-native grass that has increased at the site since it was discovered in 2005 (S. Black, personal observation). The mardon are only found in small pockets of habitat that include suitable host plant and nearby nectar sources.

Figure 9: Service glade. Photo by Scott Hoffman Black.

Site Threats

The areas where mardon concentrate seem to get heavily grazed. In two visits (2009 and 2011) these areas were severely impacted and there was little vegetation left for mardon larvae. The other major threat is the invasion of meadow foxtail. Research by Beyer (2007) indicates that mardon skippers have a sensitivity to grass structure, with host plant height, cover, and density influencing oviposition selection. Cattle also seem to preferentially graze the areas where the habitat is more suitable for the mardon skipper (S. Black personal observation). By eating the native vegetation, cattle may be allowing the nonnative grass to spread faster. There are also small ponderosa pine trees starting to encroach on the edges of the meadow. There is limited evidence of ORV traffic through the site.

Site Management History and Current Land Allocations

Service Glade lies in the Conde grazing allotment (1,357 ha). Currently the allotment consists of 50 cow/calf pairs from July 1 to September 30, or if conditions allow (based on AUMs and utilization levels), up to October 31. NEPA documents were completed and signed in 2004.

Figure 10: Grazing impact on mardon habitat at Service Glade. Photo by Scott Hoffman Black.

Management Needs

Alternative 1 (Recommended Alternative)
(Cattle grazing)

- *Create an exclosure around the mardon skipper core area. Exclude cattle from the core area for three years to allow the habitat time to repair. Exclosure would be approximately 3.5 acres (illustrated in Map 3).*
- *Continue surveys every two years to determine population size.*
- *If the site meets identified goals (abundant mardon skippers and larval host plants and high diversity of nectar plants), then grazing could be resumed at the site after three years. Implement future grazing on an every other year fall schedule with no grazing before August 15.*

(Invasive grass encroachment)

- *Map extent of meadow foxtail invasion in the meadow.*
- *Test various methods of meadow foxtail removal.*
- *Based on results, develop a site specific plant for removal of meadow foxtail.*
- *Continue to monitor the meadow at least every other year for changes in the extent of invasive tall stature grasses.*

Figure 11: Cattle seem to preferentially graze in higher quality mardon habitat at Service Glade. Photo by Scott Hoffman Black.

(Forest encroachment)

- *Remove all conifers under 4" Diameter at Breast Height (DBH) from the open meadow portion of the site.*
- *Leave conifers over 4" (DBH) at the site unless a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow is consulted.*
- *Hand cut trees to be removed with chainsaws or handsaws.*
- *Care must be taken to avoid actions that could degrade habitat and kill individual mardon skippers as a result of heavy equipment use, people trampling meadows, piling of trees in meadows, or burning of piles in or adjacent to the mardon skipper habitat area identified on Map 3.*
- *Maintain a buffer of large trees at the edges of meadow since they may play an important role in maintaining the microclimate and hydrology of the local habitat. If thinning is needed for fuels and or ecosystem needs, remove only small diameter trees. If additional tree removal is needed consult with a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow.*

(ORV traffic)

- *Install large boulders or tree stumps to eliminate access for ORVs at the site.*

Alternative 2
(Cattle grazing)

- *Create an exclosure around the core area. Allow grazing in the exclosure on an every other year fall schedule with no grazing before August 15. The exclosure would be approximately 3.5 acres (illustrated in Map 3).*
- *Continue surveys every two out of three years to determine mardon skipper population size with careful attention to survey after years with grazing, and after years without grazing.*
- *If the site fails to meet identified goals (abundant mardon skippers and larval host plant and high diversity of nectar plants), exclude grazing from the core area to allow time for habitat recovery.*

(Invasive grass encroachment)

- *Map the extent of meadow foxtail in the meadow.*
- *Monitor the extent of meadow foxtail annually for changes in the extent of the meadow with meadow foxtail.*
- *If meadow foxtail is found to be expanding within the meadow, follow recommendations in Alternative 1.*

(Forest encroachment)

- *Follow recommendation in Alternative 1*

(ORV traffic)

- *Follow recommendations in Alternative 1*

Alternative 3

(Cattle grazing)

- *Exclude grazing from the entire meadow until September 1.*

(Invasive grass encroachment)

- *Follow recommendation in Alternative 2*

(Forest encroachment)

- *Follow recommendation in Alternative 1*

(ORV traffic)

- *Follow recommendations in Alternative 1*

Management Unit 2: Forest Service Conde 4 (Priority 2)

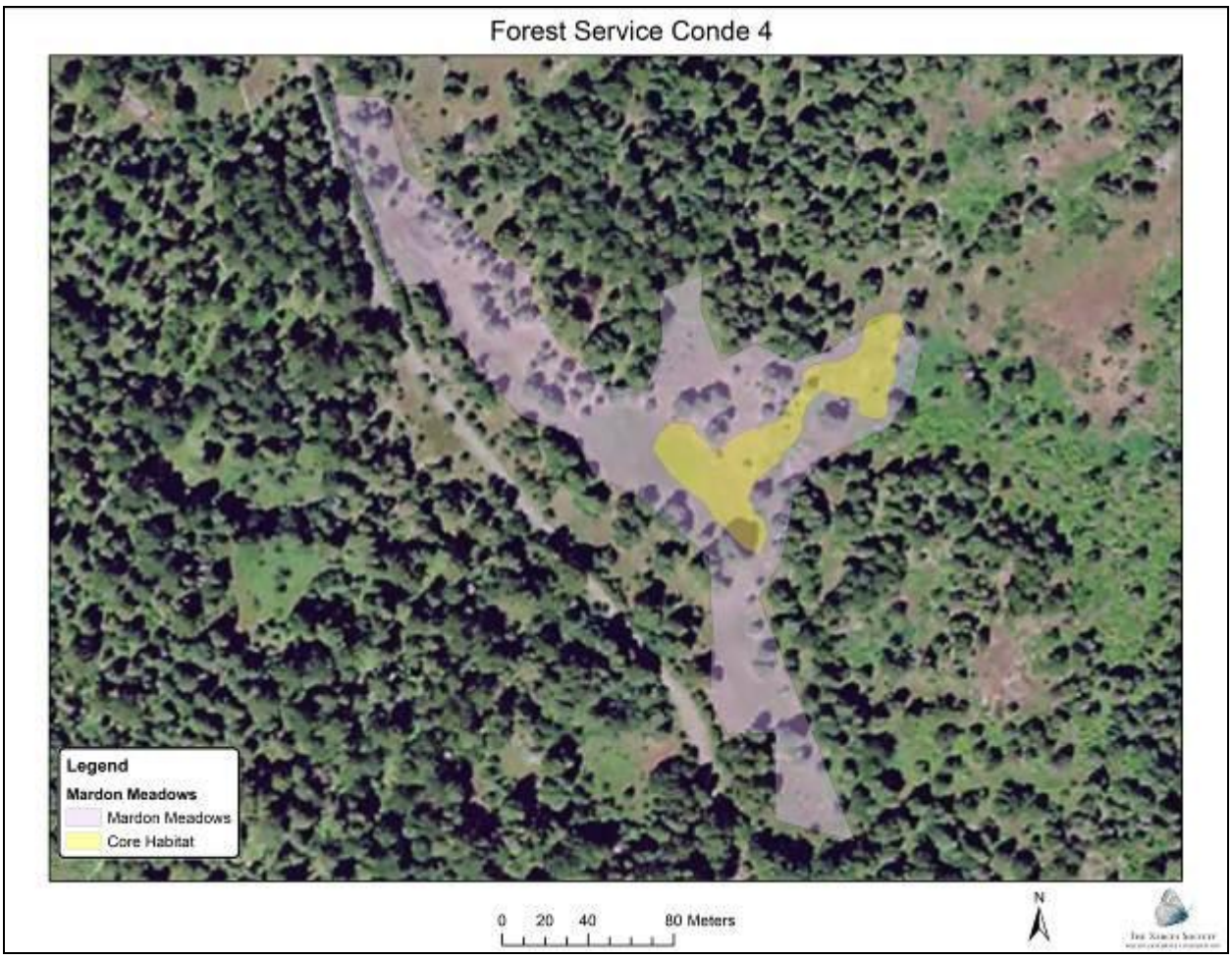
Site Name: Forest Service Conde 4
Coordinates (Centroid of core area): N 42.307757 W -122.45788

Goal of the Management Plan

Sustain extant mardon skipper populations through manipulation of grazing regime at the site. Also, maintain open meadow conditions by curbing conifer encroachment.

Site Distribution, Abundance, and Trends

Forest Service Conde 4 is a very small site with a relatively small mardon population. It is hard to determine population trends from one day counts, but the site had a high count of 42 individuals in 2007. Four individuals were counted in 2005, 10 in 2006, 13 in 2008, 2 in 2009, 4 in 2011 and 14 in 2012. See map 4 for the core area for mardon skippers.



Map 4: Forest Service Conde 4 site with marked core area.

Site Description

The Conde 4 site is drier than most occupied sites, although sedges are scattered in patches throughout the site. The site is very flat with no active surface water in June. There is a small area that was obviously dug out for cattle watering adjacent to the site but it has never had water during June surveys. This is one of only two known sites in southern Oregon cascades without surface water. Both large and small conifers have encroached on this site.

Site Threats

This site showed evidence of heavy grazing. In 2011 stubble height was short throughout and there was a high proportion of bare ground. There are small ponderosa pine and Douglas fir trees starting to encroach on the edges of the meadow. There is also evidence of ORV use and camping in the far southern portion of the meadow. For mardon skippers, encroaching trees are the biggest threat at this site.

Figure 12: Conde 4 site. Photo by Scott Hoffman Black.

Site Management History and Current Land Allocations

Conde 4 lies in the Conde grazing allotment (1,357 ha). Currently the allotment consists of 50 cow/calf pairs from July 1 to September 30, or if conditions allow (based on AUMs and utilization levels), up to October 31. NEPA documents were completed and signed in 2004.

Management Needs

Alternative 1 (Recommended Alternative)
(Forest encroachment)

- *Develop a site specific plan for removal of conifers.*
- *Remove all conifers under 4" Diameter at Breast Height (DBH) from the open meadow portion of the site.*
- *Several larger trees (up to approximately 8" DBH) are also recommended for removal. Consult a mardon expert to mark the larger trees.*
- *Leave conifers over 4" (DBH) at the site unless a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow is consulted.*
- *Hand cut trees to be removed with chainsaws or handsaws.*
- *Care must be taken to avoid actions that could degrade habitat and kill individual mardon skippers as a result of heavy equipment use, people trampling meadows, piling of trees in meadows, or burning of piles in or adjacent to the mardon skipper habitat area identified on Map 4.*

- *Maintain a buffer of large trees at the edges of meadow since they may play an important role in maintaining the microclimate and hydrology of the local habitat. If thinning is needed for fuels and or ecosystem needs, remove only small diameter trees within the area occupied by mardon skippers. If additional tree removal is needed consult with a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow.*

Figure 13: Conifer encroachment at Conde 4. Photo by Scott Hoffman Black.

(ORV)

- *Install boulders or tree stumps to prevent access to meadow for camping or ORVs.*

(Cattle Grazing)

- *Exclude cattle from the site until August 15th of each year.*
- *Continue surveys every two years to determine population size and vegetation response to management action.*

Alternative 2

(Forest encroachment)

- *Follow recommendation in alternative 1.*

(ORV)

- *Follow recommendation in alternative 1*

(Cattle grazing)

- *If monitoring is not possible, build an exclosure around the mardon core area. Allow grazing in the exclosure on an every other year fall schedule with no grazing before August 15.*

Figure 14: Cattle grazing has eliminated vegetation at Conde 4 and dense conifers surround the site. Photo by Scott Hoffman Black.

Management Unit 3: Short Creek (Priority 1)

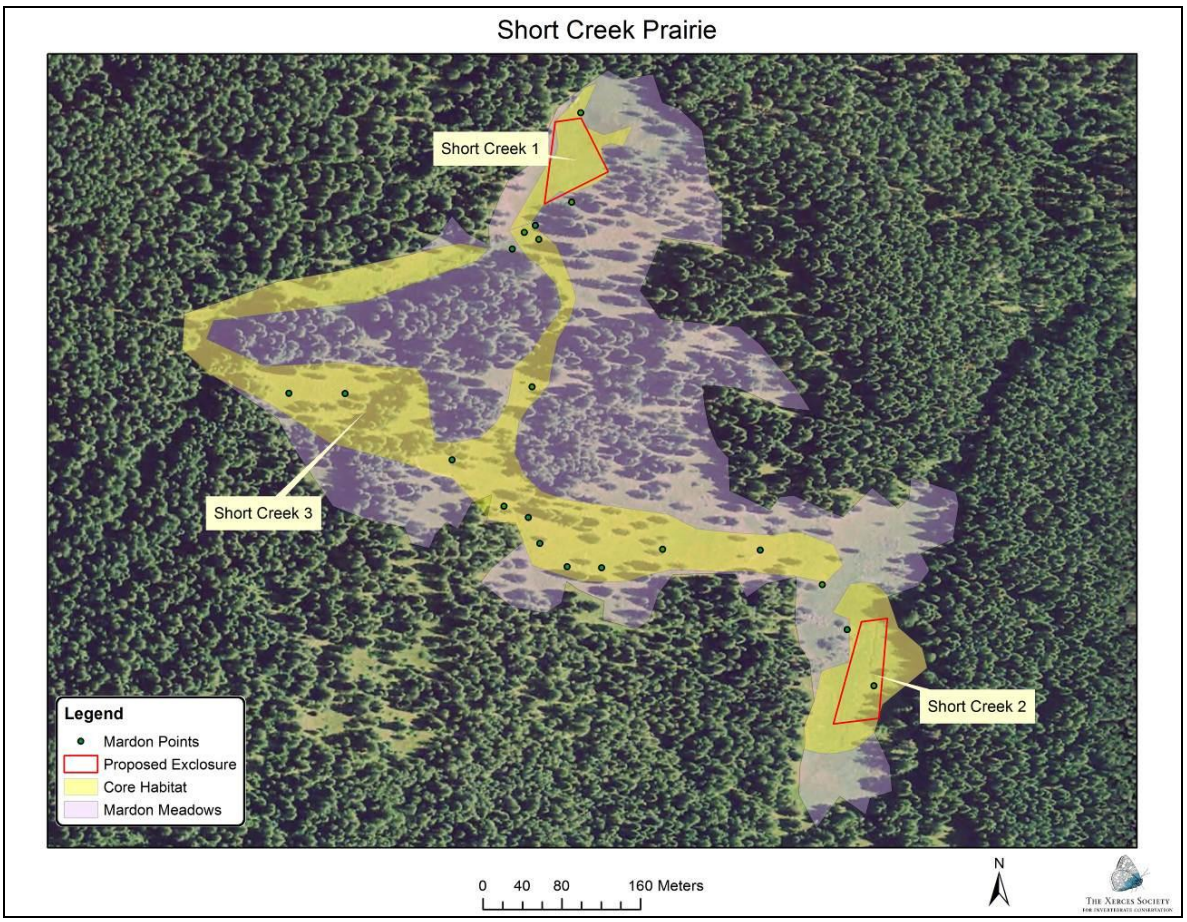
The Short Creek Management Unit contains a large population of mardon skippers and it is essential to conserve the existing resources at these sites. This site complex contains the largest mardon skipper population on Forest Service land in southern Oregon, and thus should be considered a very high priority. Despite its importance to the overall mardon skipper population in Southern Oregon, the site specific details of the population dynamics are unclear. There appear to be three distinct populations of mardon skippers at this site, although the interaction between them, as well as the timing and distribution of each population, but particularly at Short Creek 3, remains poorly understood. While protecting mardon skippers from grazing and meadow foxtail encroachment are important at this site, understanding the population dynamics will allow for better management recommendations.

At this time, start with a year-long thorough survey of this entire Management Unit:

- Visit the site at least once a week for six consecutive weeks during the adult flight season.
- During each visit the surveyor will:
    - Count the number of mardon skippers in the meadow using standard protocols.
    - Map the location of mardon skippers found within the meadow using a GPS unit.

- Two additional visits will be made in July and August to gague grazing intensity at Short Creek one and Short Creek two with special attention paid to whether cattle are selectively avoiding meadow foxtail.

These surveys will help land managers understand when each portion of the meadow is being used by adult butterflies, the relative timing of the peak population at each site, and the approximate population sizes of each site. This information will help to inform where the critical habitat is found in the meadow and further inform how the meadow is being used both temporally and spatially. In our opinion, this information would greatly inform management recommendations, particularly within Short Creek 3. If a thorough survey is not possible at this time, we have made site specific recommendations below based on our best knowledge to date. However, we stress that the recommendations would be better informed after a more thorough survey of the populations at this site.



Map 5: Short Creek Prairie Management Unit. Proposed cattle exclosures based on current knowledge are outlined in red.

<u>Site Name</u>: Short Creek 1
<u>Coordinates (Centroid of core area):</u> -122.386572 W, 42.342827 N

Goal of the Management Plan

Sustain the extant mardon skipper population through manipulation of grazing, controlling non-native vegetation encroachment and managing off road vehicles at the site. Also, maintain open meadow condition by curbing encroachment by conifers.

Species Range, Distribution, Abundance, and Trends

This is the largest mardon population on Forest Service lands in the southern Oregon Cascades. Minimum population counts in 2008 tallied 83 mardon and in 2010 76 mardon where counted. The remainder of the survey history can be found in Appendix 1. The mardon skippers are distributed on either side of Short Creek from the cabin to where the wetter portion of the meadow ends. They are not found in the wettest portions of the meadow.

Figure 15: Short Creek 1. Photo by Scott Hoffman Black.

Site Description

Short Creek 1 is an open meadow area on either side of Short Creek. This site is dominated by a wet meadow. The mardon prefer the edges on either side of the wet meadow. The site has an abundance of nectar sources but is also experiencing the encroachment of a non-native grass.

Site Threats

Grazing is a potential threat to this site. In the past a salt lick was left in the middle of the mardon core area which denuded the area around it. However, the main threat at this site is

the encroachment of non-native grass. In the last several years more area has been taken over by this grass and mardon skippers are now only found in the small pockets of habitat that remain. Other invasive forbs are also encroaching. There was also evidence of ORV use but the Forest Service has already taken action to curb ORV access. Likewise the Forest Service has worked to eliminate some shrub encroachment although there are some additional actions that could be taken.

Site Management History and Current Land Allocations

Short Creek Prairie lies in the South Butte grazing allotment (10,357 ha). Currently the allotment consists of 225 cow/calf pairs from July 1 to October 15 and 5 horses from July 1 to November 15.

Figure 16: Area at Short Creek 1 where a salt lick was placed three years later. Photo by Scott Hoffman Black

Management Needs

This site complex contains the largest mardon skipper population on Forest Service and in southern Oregon, and is considered a very high priority.

Alternative 1 (Recommended Alternative)
(Cattle grazing)

- *Create an exclosure around the mardon skipper core area. Exclude cattle from the core area for three years to allow the habitat time to repair. Exclosure would be approximately 0.8 acres (illustrated in Map 6).*
- *Continue surveys every two years to determine population size.*
- *If the site meets identified goals (abundant mardon skippers and larval host plants and high diversity of nectar plants), then grazing could be resumed at the site after three years. Implement future grazing on an every other year fall schedule with no grazing before August 15.*

Figure 17: Meadow foxtail encroachment at Short Creek 1. Photo by Scott Hoffman Black.

(Control of non-native grasses and forbs)

- *Develop site plan to research and experiment how to control invasive grasses and forbs.*
    - *Map current extent of the invasion of meadow foxtail and other problematic forbs (e.g. St. John's Wort).*
    - *Test various methods of invasive species removal.*
    - *Based on results, develop a site specific plan for removal.*
- *Continue to monitor the meadow at least every other year for changes in the extent of invasive tall stature grasses or problematic forbs.*

(Forest encroachment)

- *Remove all conifers under 4" Diameter at Breast Height (DBH) from the open meadow portion of the mardon skippers core area (see Map 6).*
- *Leave conifers over 4" (DBH) at the site unless a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow is consulted.*
- *Hand cut trees to be removed with chainsaws or handsaws.*
- *Care must be taken to avoid actions that could degrade habitat and kill individual mardon skippers as a result of heavy equipment use, people trampling meadows, piling of trees in meadows, or burning of piles in or adjacent to the mardon skipper habitat area identified on Map 6.*
- *Maintain a buffer of large trees at the edges of meadow since they may play an important role in maintaining the microclimate and hydrology of the local habitat. If thinning is needed for fuels and or ecosystem needs, remove only small diameter trees. If additional tree removal is needed consult with a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow.*

(ORV traffic)

- *Continue to monitor ORV barriers and signage.*

Alternative 2
(Cattle grazing)

- *Create an exclosure around the core area. Allow grazing in the exclosure on an every other year fall schedule with no grazing before August 15. The exclosure would be approximately 0.8 acre (illustrated in Map 6).*

Figure 18: Off road vehicle damage at Short Creek 1. Better methods of excluding ORV's and signage seems to have helped. Photo by Scott Hoffman Black.

- *Continue surveys every two out of three years to determine mardon skipper population size with careful attention to survey after years with grazing and after years without grazing.*
- *If the site fails to meet identified goals (abundant mardon skippers and larval host plant and high diversity of nectar plants), exclude grazing from the core area and follow the recommendation in Alternative 1.*

(Control of non-native grasses and forbs)

- *Map the extent of meadow foxtail and problematic forbs in the meadow.*
- *Monitor the extent of meadow foxtail every other year for changes in the extent of invasive plants near the mardon core area.*
- *If meadow foxtail is found to be expanding within the meadow, follow recommendations in Alternative 1.*

(Forest encroachment)

- *Follow recommendation in Alternative 1*

(ORV traffic)

- *Follow recommendations in Alternative 1*

Alternative 3
(Cattle grazing)

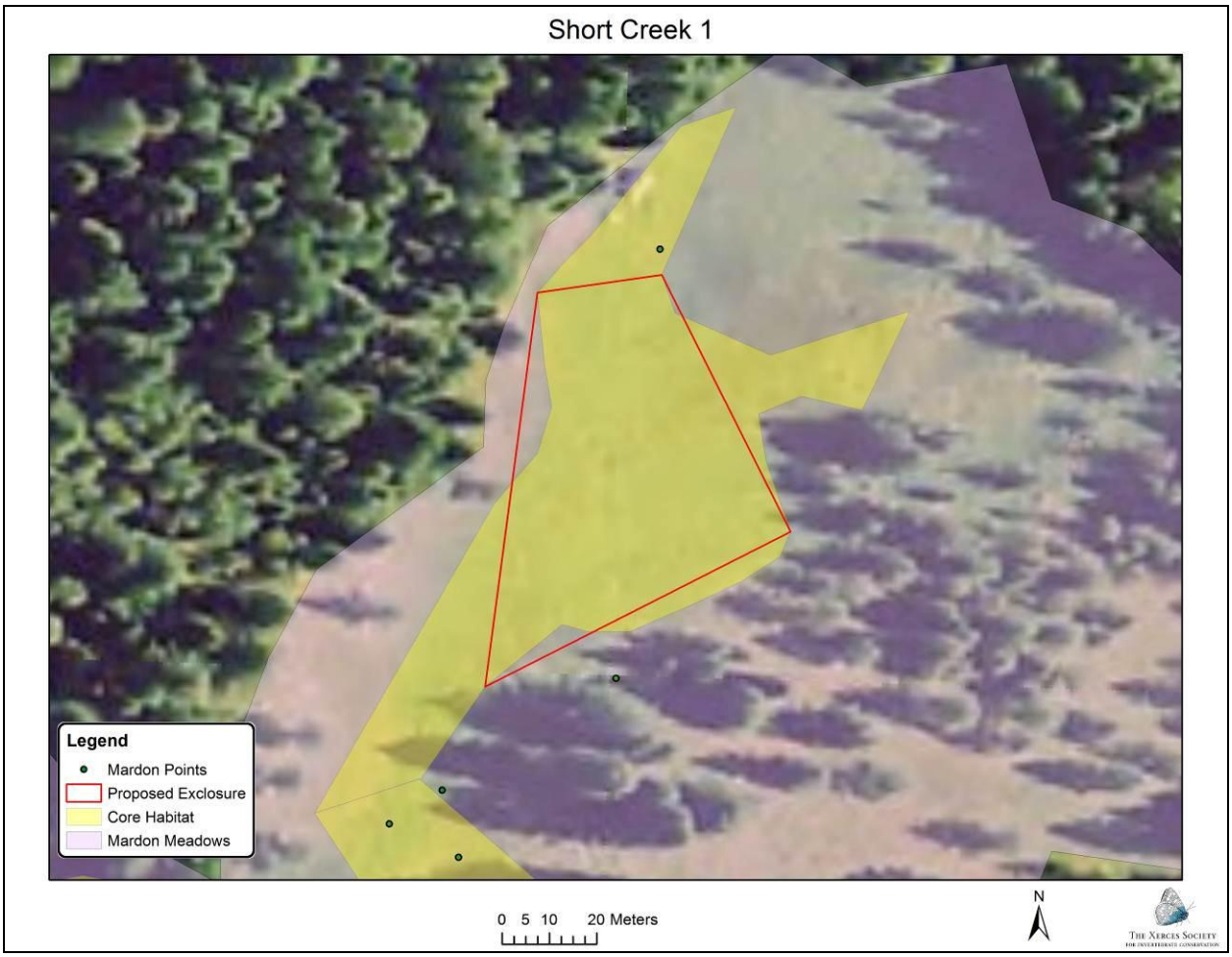
- *Allow no grazing on Short Creek Prairie before September 1.*

(Control of non-native grasses and forbs)

- *Follow recommendation in Alternative 2*

(Forest encroachment)

- *Follow recommendation in Alternative 1*



Map 6: Short Creek 1 with proposed cattle exclosure.

Management Unit 3: Short Creek 2 (Priority 1)

Coordinates (Centroid of core area): -122.382796 W, 42.338212 N

Goal of the Management Plan

Sustain the extant mardon skipper population through manipulation of grazing, controlling non-native vegetation and managing off road vehicles at the site. Also, maintain open meadow condition by curbing encroachment by conifers.

Site Distribution, Abundance, and Trends

Short Creek 2 is a large meadow that surrounds an ephemeral waterway. Although the meadow is large, only a relatively small portion of the site is occupied by mardon skipper. The majority of the site consists of tall stature non-native grass. The mardon core habitat is adjacent to an aspen grove in pockets along the ephemeral stream. This site has a relatively robust population of mardon skipper. Minimum population counts for 2007 were 40, 67 in 2008, 26 in 2010, 13 in 2011 and 2 in 2012. The remainder of the survey history can be found in Appendix 1.

Site Description

This is a relatively large wet meadow with an ephemeral stream in the middle. The entire site is surrounded by conifers except for one side where this meadow has a relatively open connection that leads to Short Creek 1 which is ½ mile away and Short Creek 3. This site is also adjacent to an aspen grove that is subject to additional management plans, including a proposed cattle exclosure.

Figure 19: Short Creek site 2 core habitat. Photo by Scott Hoffman Black.

Site Threats

The site shows evidence of impacts from grazing and invasion by meadow foxtail. Native shrub and conifer encroachment are also a potential issue.

Site Management History and Current Land Allocations

Short Creek Prairie lies in the South Butte grazing allotment (10,357 ha). Currently the allotment consists of 225 cow/calf pairs from July 1 to October 15 and 5 horses from July 1 to November 15.

Figure 20: Short Creek site 2. Shrubs were cut at this site but never removed. Photo by Scott Hoffman Black.

Management Needs

This site contains the largest mardon skipper population on Forest Service and in southern Oregon, and thus is considered a very high priority.

Alternative 1 (Recommended Alternative)
(Cattle grazing)

- *Create an exclosure around the mardon skipper core area. Exclude cattle from the core area for three years to allow the habitat time to repair. Exclosure would be approximately 0.9 acres (illustrated in Map 7).*
- *Continue surveys every two years to determine population size.*
- *If the site meets identified goals (abundant mardon skippers and larval host plants and high diversity of nectar plants), then grazing could be resumed at the site after three years. Implement future grazing on an every other year fall schedule with no grazing before August 15.*

(Control of non-native grasses and forbs)

- *Develop a site specific plan to research and experiment how to control invasive grasses and forbs.*
    - *Map current extent of the invasion of meadow foxtail and other problematic forbs (e.g. St. John's Wort).*
    - *Test various methods of invasive species removal.*
    - *Based on results, develop a site specific plan for removal.*

- *Continue to monitor the meadow at least every other year for changes in the extent of invasive tall stature grasses or problematic forbs.*

(Forest encroachment)

- *Remove all conifers under 4" Diameter at Breast Height (DBH) from the open meadow portion of the mardon skippers core area (see map 5 and map 7)*
- *Leave conifers over 4" (DBH) at the site unless a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow is consulted.*
- *Hand cut trees to be removed with chainsaws or handsaws.*
- *Care must be taken to avoid actions that could degrade habitat and kill individual mardon skippers as a result of heavy equipment use, people trampling meadows, piling of trees in meadows, or burning of piles in or adjacent to the mardon skipper habitat area identified on Map 7.*
- *Maintain a buffer of large trees at the edges of meadow since they may play an important role in maintaining the microclimate and hydrology of the local habitat. If thinning is needed for fuels and or ecosystem needs only remove small diameter trees. If additional tree removal is needed consult with a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow.*

(ORV traffic)

- *Continue to monitor ORV barriers and signage.*

Alternative 2

(Cattle grazing)

- *Create an exclosure around the core area. Allow grazing in the exclosure on an every other year fall schedule with no grazing before August 15. The exclosure would be approximately 0.9 acres (illustrated in Map 7).*
- *Continue surveys every two out of three years to determine population size with careful attention to survey after years with grazing, and after years without grazing.*
- *If the site fails to meet identified goals (abundant mardon skippers and larval host plant and high diversity of nectar plants), exclude grazing from the core area and follow the recommendation in Alternative 1.*

(Control of non-native grasses and forbs)

- *Map the extent of meadow foxtail and problematic forbs in the meadow.*
- *Monitor the extent of meadow foxtail every other year for changes in the extent of invasive plants near the mardon core area.*
- *If meadow foxtail is found to be expanding within the meadow, follow recommendations in Alternative 1.*

(Forest encroachment)

- *Follow recommendation in Alternative 1*

(ORV traffic)

- *Follow recommendations in Alternative 1*

Alternative 3

(Cattle grazing)

- *Allow no grazing on Short Creek Prairie before September 1.*

(Control of non-native grasses and forbs)

- *Follow recommendation in Alternative 2*

(Forest encroachment)

- *Follow recommendation in Alternative 1*

(ORV traffic)

- *Follow recommendations in Alternative 1*

Map 7: Short Creek 2 with proposed grazing exclosure.

Management Unit 3: Short Creek 3 (Priority 1)
<u>Site Name</u>: Short Creek 3
<u>Coordinates (Point within core area): -122.388098 W, 42.340607 N</u>

Goal of the Site Management Plan

To provide corridors for mardon movement between Short Creek 1 and Short Creek 2 and to maintain mardon habitat within the corridor.

Site Distribution, Abundance, and Trends

This site was not surveyed until recently as it was believed that mardon found at the site were simply moving between Short Creek 1 and Short Creek 2. But in 2009 over a dozen mardon

were found in the area, in 2011 12 individuals were counted, and in 2012 78 mardon were located in this area. In 2009 and 2011 oviposition was observed on *Carex sp (S. Black, pers. obs.).*

Site Description

This area is upland habitat that connects Short Creek sites 1 and 2 (See Map 5). The land has been heavily modified and has large furrows running through it. It is largely made up of *Solidago sp.* and *Carex sp.* There are very few nectar sources available during the mardon flight season.

Site Threats

Solidago sp. dominates the site and seems to be expanding. Conifer and shrub encroachment could become an issue.

Figure 21: The Short Creek Corridor looking from Short Creek 2. Photo by Scott Hoffman Black

Site Management History and Current Land Allocations

Short Creek Prairie lies in the South Butte grazing allotment (10,357 ha). Currently the allotment consists of 225 cow/calf pairs from July 1 to October 15 and 5 horses from July 1 to November 15.

Management Needs

For this site, we stress the importance of following the recommendations given at the beginning of the management unit (page 28-29). If a comprehensive site survey is not possible at this time we provide recommendations below using our best knowledge to date.

Alternative 1 (Recommended alternative)
(Forest encroachment)

- *Do an extensive survey of the mardon skipper population at this site (follow the recommendations at the beginning of this management unit).*
- *Based on those surveys, develop a site specific plan for tree and small shrub removal to increase connectivity between sites (within short creek 3, but connections to short creek 1 and 2 as well).*

(Control of non-native grasses and forbs)

- *Develop a site specific plan for removal/control of invasive species to ensure there is sufficient host plant and nectar sources for mardon skippers throughout this site.*

(Cattle grazing)

- *Exclude cattle from the site until August 15th of each year.*
- *Continue surveys every two years to determine population size and vegetation response to management action.*

(ORV traffic)

- *Continue to monitor ORV barriers and signage.*

Figure 22: The Short Creek Corridor with *Carex* sp. in foreground and *Solidago* sp. behind. Photo by Scott Hoffman Black.

Alternative 2
(Forest and shrub encroachment)

- *Remove all conifers under 4" Diameter at Breast Height (DBH) from the open meadow portion of the mardon skippers core area (see map 8).*

- *Leave conifers over 4" (DBH) at the site unless a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow is consulted.*
- *Hand cut trees to be removed with chainsaws or handsaws.*
- *Care must be taken to avoid actions that could degrade habitat and kill individual mardon skippers as a result of heavy equipment use, people trampling meadows, piling of trees in meadows, or burning of piles in or adjacent to the mardon skipper habitat area identified on Map 8.*
- *Maintain a buffer of large trees at the edges of meadow since they may play an important role in maintaining the microclimate and hydrology of the local habitat. If thinning is needed for fuels and or ecosystem needs, remove only small diameter trees. If additional tree removal is needed consult with a biologist familiar with the effects of habitat restoration, mardon skipper biology, and their distribution within the meadow.*
- *Develop a site specific plan to contain and control shrub expansion after previous removal project.*

(Control of non-native grasses and forbs)

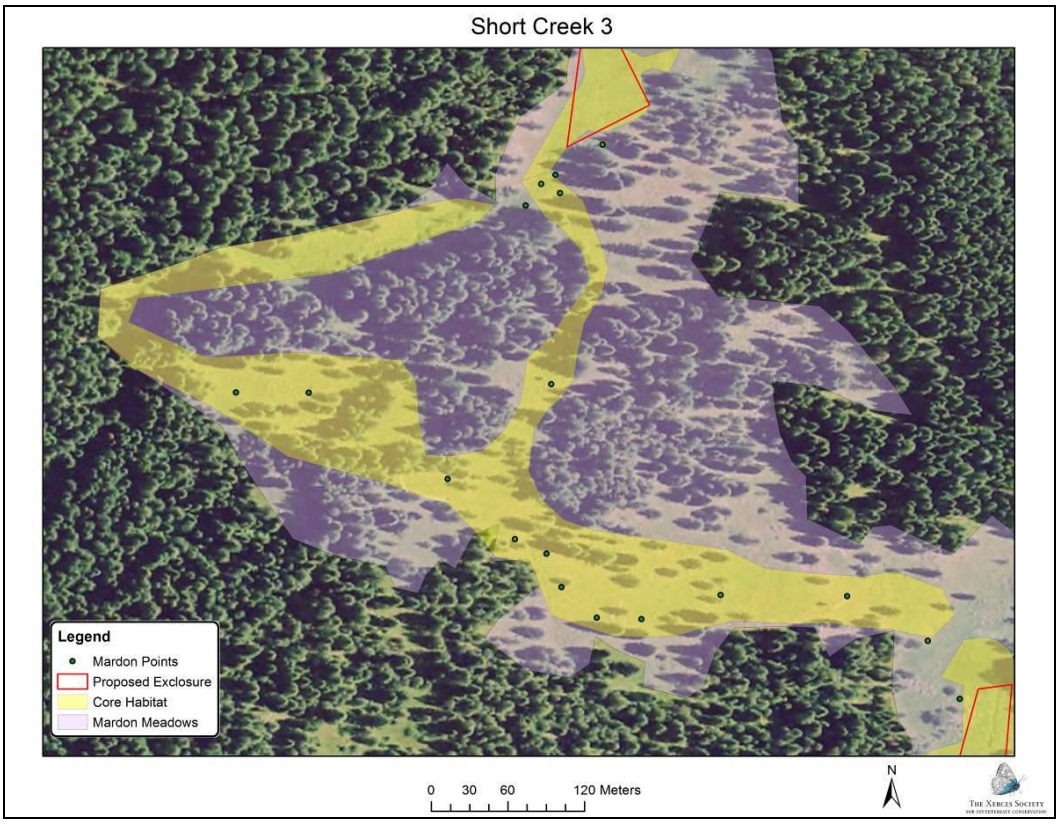
- *Follow recommendations in Alternative 1*

(Cattle grazing)

- *Follow recommendations in Alternative 1*

(ORV traffic)

- *Follow recommendations in Alternative 1*



Map 8: Short Creek 3 core area.

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Appendix 1

Summary of all known mardon skipper sites in southern Oregon with all associated one day counts.

Site Name	Geographic Location	Administrative Unit	Date - **Day Counts**
USFS Conde Complex			
Service Glade	N:42°18.006' W:122°27.622'	Ashland RD Rogue River/ Siskiyou NF	6/21/05 – **2** 6/21/06 – **11** 6/16/07 – **32** 7/1/08 – **24** 7/6/10 – **8** 7/1/2011 – **27** 6/13/2012 – **14**
Conde Creek 4	N:42°18.452' W:122°27.582'	Ashland RD Rogue River/ Siskiyou NF	6/21/05 – **4** 6/21/06 – **10** 6/16/07 – **42** 7/1/08 – **13** 7/6/10 – **2** 7/1/2011 – **4** 6/13/2012 – **14**
USFS Short Creek Complex			
Short Creek Prairie Site 1	W:122°23.291' N: 42°20.540'	Ashland RD Rogue River/ Siskiyou NF	6/22/05 - **9** 7/8/05 – **9** 6/8/2006 – **7** 6/14/2006 – **10** 6/21/06 – **20** 6/17/07 – 30 7/1/08 – **83** 7/6/10 –**76** 7/1/11—**22** 6/13/2012 – **11**
Short Creek Prairie Site 2	W:122°23.023' N:42°20.304'	Ashland RD Rogue River/ Siskiyou NF	7/8/05 – **7** 6/8/2006 – **3** 6/14/2006 – **7** 6/21/06 – **24** 6/17/2007 – **40** 7/1/2008 – **67** 7/6/10 – **26** 7/1/11—**13** 6/13/2012 – **2**
Short Creek Prairie Site 3	W: -122.388098° N: 42.340607°	Ashland RD Rogue River/ Siskiyou	6/8/2006 – 7 7/1/11 – 10 6/13/2012 – 78

Site Name	Geographic Location	Administrative Unit	Date - **Day Counts**
		NF	
BLM Conde Site **BLM Management Unit 1**			
Conde Meadow	W: 122°30.960' N: 42°16.594'	Medford District BLM, Ashland RA	6/24/05 – **8** 6/16/07 **– 0** 6/16/09 – **0** 7/6/10 **– 0** 6/13/2012 – **0**
Indian Road Site **BLM Management Unit 2**			
MP 20.2 Dead Indian Road	W:122° 23.619' N:42° 17.119'	Medford District BLM, Ashland RA	6/9/05 - **0** 6/24/05 – **13** 6/17/07 – **4** 6/16/09 – **6** 6/21/2012 – **43**
Moon Prairie Complex **BLM management Units 3-4**			
Moon Prairie Meadow **(Pumpchance 128)**	W: 122°22.287' N: 42°15.745'	Medford District BLM, Ashland RA	6/24/05 - **46** 7/5/05 – **27** 6/17/07 – **62** 6/16/09 – **45** 7/6/10 **–7** 7/21/2012 **– 50**
Pumpchance 125 Meadow	W: 122°22.972' N:42°16.012'	Medford District BLM, Ashland RA	6/9/05 - **11** 6/24/05 - **74** 7/5/05 – **50** 6/18/06 – **102** 6/25/06 – **128** 6/17/07 – **265** 7/1/2008 – **88** 6/16/09 – **304** 7/6/10 – **91** 6/12/2012 – **77**
Wildcat Glade Site **BLM Management Unit 5**			
Wildcat Glade	W: 122°25.465' N: 42°11.262'	Medford District BLM, Ashland RA	6/23/05 – **25** 6/18/07 – **0** 6/18/09 – **0** 6/13/12 – **0**

Site Name	Geographic Location	Administrative Unit	Date - **Day Counts**
Buck Prairie Site **BLM Management Unit 6**			
Buck Prairie	W:122° 28.275' N:42° 13.346'	Medford District BLM, Ashland RA	7/6/05 – **4** 6/18/07 – **95** 6/17/09 –**0** 7/7/10 –**2** 6/21/12 – **7**
Table Mt. Site **BLM Management Unit 7**			
Table Mountain **(Burnt Creek Meadow)**	W:122° 30.101' N:42° 11.123'	Medford District BLM, Ashland RA	6/23/05 – **9** 6/18/07 – **25** 6/15/09 – **16** 7/7/10 – **11** 6/19/2012 – **2**
Little Hyatt Reservoir Site **BLM Management Unit 8**			
Little Hyatt Reservoir South	W:122°29.115' N:42°9.478'	Medford District BLM, Ashland RA	6/23/05 – **28** 6/19/06 – **41** 6/26/06 – **10** 6/18/07 – **11** 6/15/09 – **12** 7/7/10 –**9** 6/19/2012 – **4**
PCT Complex **BLM Management Unit 9**			
PCT Meadow South	W:122°29.788' N:42°8.596'	Medford District BLM, Ashland RA	6/10/05 - **0** 6/22/05 – **4** 6/19/07 – **20** 6/15/09 – **6** 7/7/10 – **4** 6/19/2012 – **8**
PCT Meadow North	W:122°29.755' N:42°8.745'	Medford District BLM, Ashland RA	6/10/05 - **0** 6/22/05 – **1** 6/19/07 – **2** 6/15/09 – **1** 7/7/10 – **0** 6/19/2012 – **0**

Site Name	Geographic Location	Administrative Unit	Date - **Day Counts**
PCT Meadow West	W: -122.500082° N: 42.141438°	Medford District BLM, Ashland RA	6/10/05 - **1** 6/22/05 – **1** 6/15/09 – **1** 7/7/10 – **0** 6/19/2012 – **0**
Hobart Peak Complex BLM management Unit 10			
Hobart Peak 1 (East)	W:122.48257° N:42.08592°	Medford District BLM, Ashland RA	6/10/05 - **0** 7/5/05 – **2** 6/19/07 – **2** 6/15/09 – **0** 7/7/10 **– 0** 6/19/2012 – **0**
Hobart Peak 2 (middle)	W:122°29.109' N:42°5.172'	Medford District BLM, Ashland RA	7/5/05 – **1** 6/15/09 – **1** 7/7/10 **– 1** 6/19/20102 – **1**
Hobart Peak 3 (West) (exclosure)	W:122° 28.922' N:42° 05.132'	Medford District BLM, Ashland RA	6/10/05 – **10** 7/5/05 – **7** 6/15/09 – **0** 7/7/10 **– 0** 6/19/2012 – **5**