

**PLACE – BASED WEED MANAGEMENT AT
CRATERS OF THE MOON NM&P:
Goals, Objectives, and Current Tactics
2014**

Below is a quick summary of what was accomplished with the weed management program at Craters of the Moon NM and P for the 2014 season. Summaries of the park management units and current and historic weed tactics can be found in the 2013 annual report but a summary of prioritized management objectives is below.

Summary of Management Units and Objectives:

Below are the 19 management objectives across 7 main management units that are discussed in detail in the following report. Objectives have been prioritized according to a scoring rubric in Appendix 1. Four people scored each work objective based on a where the project occurs, what weeds are being addressed, the likelihood of project success, whether prior treatments have been effective, what are the local resources at risk, and the timing when the project needs to occur.

<u>Management Unit</u>	<u>Objective</u>	<u>Priority</u>
Wapi Lava Field	Eradicate Dyers Woad	high
VC, Housing, Loop Road, and Parking	Eradicate Weeds on Park Trails	high
VC, Housing, Loop Road, and Parking	Eradicate Weeds around Park Facilities	high
North End	Eradicate Canada Thistle	high
Internal Lava Fields	Survey / Eradicate Weeds from "Park Special" Kipukas	high
Internal Lava Fields	Survey / Eradicate Weeds from Other High Priority Kipukas	high
North End	Survey and Eradicate Weeds from Highway / Spur Roads	high
CRMO Wilderness / CRMO Lava – East	Survey and Eradicate Weeds from Buttes and Cinder Cones	medium
North End	Mechanically Eradicate Weeds in Big Cottonwood	medium
Carey Lava Field / CRMO Lava – West	Eradicate Leafy Spurge from the boundaries of CRMO	medium
CRMO Wilderness / CRMO Lava – East	Survey and Eradicate Weeds from Wildfire Areas	medium
BLM Monument Lands	Suppress Noxious Weeds from the Little Park Fire	medium
VC, Housing, Loop Road, and Parking	Suppress Cheatgrass around Park Facilities	medium
North End	Suppress Highway Sweet Clover	low
Wapi Lava Field	Eradicate Other Noxious Weeds in Wapi Kipukas	low
North End	Eradicate Biennials in Little Cottonwood / Leech Creeks	low
BLM Monument Lands	Survey and Eradicate Weeds from Monument Roads	low
BLM Monument Lands	Survey / Eradicate Weeds from Eastern Monument lands	low
Wapi Lava Field	Detect and Eradicate New Invaders	low

Visitor Center, Housing, Loop Road, Trails, and Parking Areas

Objective 1: Park Facilities

Pursuant to objective 1, park staff surveyed facilities, parking areas, and roads throughout the summer. Admittedly though, it is occasionally unclear as to which weeds require treatment. Below are the workdays spent in 2013 to address this objective:

Total workdays (2013)	# of people	# of days	Total
	4	1	4

Objective 2: Park Trails

In 2014, all park trails were systematically surveyed for weeds starting in early July. One individual hiked each trail segment looking for noxious weeds along the trail and a narrow buffer (around 10 feet). Essentially crew members were outfitted with GPS units to map new infestations and no new sites were discovered. As seen below, four work days were used to address this objective in 2014:

Total workdays (2013)	# of people	# of days	Total
	1	-	-

Objective 3: Cheatgrass Around Facilities

Cheatgrass had a banner year in 2014 and a number of areas surrounding park facilities harbored dense areas of cheatgrass. Parking islands and areas surrounding the west side of the visitor center were aggressively hand pulled of cheatgrass

Starting in 2011, the Devils Orchard Trail has also been annually hand weeded of small and mostly isolated patches of cheatgrass along the edge of the eastern parts of the trail. These patches appear anecdotally to be the only invaded areas surrounding Devils Orchard.

The only herbicide treatments performed in this management unit are during the fall. In late October, herbicides have been applied on larger cheatgrass patches around the visitor center, housing areas, and any areas where it has invaded from recent disturbance (i.e. past construction, etc.). From 2009 to 2011, park staff sprayed cheatgrass and saw reductions that surprisingly lasted several seasons beyond treatment. Below are the workdays spent in 2013 to address this objective:

Total workdays (2013)	# of people	# of days	Total
	3	2	6

Craters of the Moon Wilderness Area / Craters of the Moon Lava Field - East

Objective 1: Buttes and Cinder Cones

Pursuant to objective 1, after hearing early season reports in 2013 of large infestations of rush skeletonweed across south facing portions of The Sentinel and a number of other buttes, staff took a longer look at these areas in early and mid-summer. While several areas were false reports, park staff did map 25 new rush skeletonweed infestations (averaging 4-5 plants) mainly in the area disturbed by the 2000 Echo Crater Fire. These plants were mechanically removed and sites will need to be revisited as hand removal of skeletonweed is highly variable. Other noxious weeds and mullein need to also be addressed in these areas to meet objective 2. Crews spent the amount of effort below on this objective in 2013, a very reasonable annual investment to keep these areas noxious weed free.

Total workdays (2013)	# of people	# of days	Total
	4	2.5	10

Objective 2: Wildfire Areas

Four wildfires have burned in this management unit since 2000 and are listed below and shown on the unit map (page 9). Essentially these are the significant wildfires that have occurred on NPS acreage for the last 30 years. Several other small areas (Coyote Butte and others) have also partially burned in the recent past and these small lightning fires have gone essentially unrecorded.

Total workdays (2013)	# of people	# of days	Total
	4	4	16

North End (including two-tracks, spur roads, and the HWY 20/26/93 corridor)

Objective 1: Highway and Northern Spur Roads

Knapweeds have long been an issue along the highway and spur roads in northern CRMO. While counties annually treated these areas, they treat them once a season and often miss infestations beyond the immediate right-of-way. To address this concern, CRMO first received funding to treat all northern road segments in 2003 using Student Conservation Association (SCA) interns via funding through the Public Land Corp Program. Additional funding was obtained in 2006, 2008, and 2010 via Natural Resource Cyclic Maintenance funding (PMIS #109928). Twice surveying all roads throughout the summer on foot for eight straight years, infestations have been greatly reduced. These treatments have been so timely and effective that in 2010 it was decided that that site-by-site treatment was no longer necessary along the highway. For the last four seasons (2010 to 2013), knapweeds, rush skeletonweed, Canada thistle, and any other noxious weeds are now treated and tallied by highway mile sections using a 65-foot buffer from the highway centerline. Spur road sites, sites falling outside this buffer, and highway polygons (larger infestations) are still surveyed and treated independently. Permanent eradication of knapweeds, rush skeletonweed, and Canada thistle is not realistic as highway traffic will continue to introduce seeds of these invasive plants. In particular, trucks

Bringing hay west to south western Idaho stock yards are common and hay bales are occasionally lost in transit. Regardless, pursuant to objective 1, surveys and treatments should continue to eradicate these noxious weeds along all northern road segments to protect the greater landscape. New invaders (namely leafy spurge, Dalmatian toadflax, and houndstongue) should also be eradicated.

Finally, one single workday is performed at the "Brody Property", a privately owned ranch about 3 miles up Blizzard Mountain Road just north of CRMO boundaries, with the Lost River Cooperative Weed Management Area (CWMA). Brody was the name of the previous owner; the current owner is unknown at this time. This spray day has been conducted annually since 2008 and its purpose is to eradicate noxious weeds, knapweed primarily, from the ranch property to the northeast of the CRMO boundary.

A great number of workdays were performed on this objective in 2013:

Total workdays (2013)	# of people	# of days	Total
	4	7.5	30

Objective 2: Canada Thistle

Canada thistle has been treated at CRMO since 2003; however, a successful and big picture treatment strategy for this plant is still being refined. Historically, park staff would conduct several work days in early August to chemically spray thistle patches prior to seed set. Other local area land managers have had great success in recent years chemically treating Canada thistle in the early fall after seed set when plants are putting resources to their roots. The general consensus is that Canada thistle spreads and expands more from its root system than from seedling establishment. While a difficult change to accept (allowing plants to go to seed), park staff started waiting to treat all of our patches in mid-September starting in 2011. Unfortunately, several years into this strategy and it appears many sites are not declining as expected. Another variable has been the use of Habitat herbicide on sites that are near the water's edge which changes year to year. A number of sites indicate this herbicide may not be as effective as Milestone. Several test plots were established in 2013 to try and determine which fall herbicide treatment is most effective. Half of several patches near Leech Creek were treated with Milestone and half treated with Habitat. If resources allow, another strategy with persistent sites may be to "dead head" plants (removing and bagging seed heads by hand) in early August with a follow up fall spray treatment in mid-September.

In 2013, park staff also began treating sites beyond the northern Monument boundary in an attempt to curb invasion by isolated patches to the northwest of CRMO. These herbicide applications need to be choreographed with local land owners as there are several and Lava Lake still maintains an organic band of sheep that periodically graze the main Big Cottonwood drainage. Herbicides would compromise their organic status but the current understanding is that if they are isolated and we inform them, we may be able to treat them. If thistle patches are ever to be addressed in the main Big Cottonwood drainage, Lava Lake LLC would need to be convinced that they are a significant threat to their entire operation.

To achieve objective 2, park staff should continue to discover an effective treatment strategy and apply it to eradicate thistle from the park and eradicate other patches proximate to CRMO that have the potential to invade. Below is the number of workdays performed in 2013:

Total workdays (2013)	# of people	# of days	Total

Objective 3: Sweet Clover

For 2014, very few clover plants were discovered in areas historically treated. Only five plants were found in across the Idaho Transportation Department maintained snow break area near mile marker 227, an area typically dominated by the plant. As such, no work days were spent in 2014 addressing this objective.

Total workdays (2013)	# of people	# of days	Total
	-	-	-

Objective 4: Biennials in Little Cottonwood and Leech Creeks

In 2010, aggressive attempts were made to mechanically and chemically (using Habitat) treat burdock throughout lower portions of Leech Creek and Little Cottonwood Creek. With so many infestations throughout both drainages that are often difficult to access, it was felt that this approach was impractical and burdock has not been systematically addressed since that year. Fortunately burdock has an affinity for shaded riparian areas and it is generally restricted to the wettest areas of these creeks.

Below are 2014 time commitments for this objective:

Total workdays (2013)	# of people	# of days	Total

Objective 5: Big Cottonwood

To achieve objective 5, the roads along Big Cottonwood are mechanically treated for weeds with assistance from Lava Lake LLC, one of the adjoining private land owners and operators of an organic sheep operation. One half-day (on 7/1/14) was spent making initial treatments and one follow up (on 7/7/14). The following table shows the limited workdays spent on this objective in 2014:

Total workdays (2013)	# of people	# of days	Total
	5	0.5	2.5

Wapi Lava Field (southern Great Rift WSA)

Objective 1: Dyers Woad

Since it was discovered in 2007, dyers woad has been aggressively surveyed and treated along the southern third of the lava field annually from early May through mid-June. Park staff, occasionally joined by the Northern Rockies Exotic Plant Management Team (EPMT), visit as many known patches as possible, as many times as possible using 5-6 seasonal water caches delivered by horseback. Every year since 2008, water cache delivery has been funded by the Blaine County Cooperative Weed Management Area (CWMA). However, state funds are in decline and it is uncertain whether the CWMA will continue to fund the project.

Pursuant to objective 1, park staff must continue to be equally aggressive and survey and treat all plants. As indicated below, this is the most work investment of any single objective for CRMO; it's more than double the amount of the second largest work investment (highway and spur roads at 38 hours).

	# of people	# of days	Total
Total workdays (2013)	5	17	85

Objective 2: Other Noxious Weeds in Kipukas

During aggressive attempts to eradicate dyers woad, a common question arises as rush skeletonweed, and to a lesser degree Scotch thistle, is rapidly invading southern areas of the Wapi (particularly in the south central part). Why isn't CRMO being as aggressive with these weeds as they are with dyers woad? There are a couple of reasons. First and foremost, few dyers woad infestations are known from anywhere near the boundaries of CRMO making local eradication very possible. Second, dyers woad appears to have a particular affinity for the sparsely vegetated rocky terrain of the Wapi and a number of kipukas have already been invaded. Third, controlling these other species beyond kipukas would mean much greater manpower, additional site visits, and more chemical combinations to make survey and treatments efficient. Fortunately, besides woad, noxious weeds are rarely found in Wapi kipukas and this objective could be met with targeted diligence. Thus, to meet objective 4b, park staff should opportunistically survey Wapi kipukas for rush skeletonweed, Scotch thistle, and any new invaders and treat these to continue to keep kipukas noxious weed free. It is obvious from looking below at the workdays spent in 2013 this objective can be met with a couple extra days spent down on the Wapi.

	# of people	# of days	Total
Total workdays spent (2013)	4	2	8

Objective 3: New Invaders

For objective 3, GIS weed layers from Burley BLM in 2009 showed a couple new invaders within 5 miles of CRMO's southwestern boundary. Medusahead and starthistle could be devastating to

the Monument's native plant communities. Though Burley BLM has indicated they have addressed these sites, there is little confidence they have been completely eradicated. To date, three medusahead patches have not been visited because of other work priorities and because they are through a large tract of private agriculture east of the Carey Kimama Road. These and any other new infestations need to be a greater priority going forward. No workdays were invested in this objective in 2013.

Total workdays spent (2013)	# of people	# of days	Total
	-	-	-

Carey Lava Field (Raven's Eye WSA) and Craters of the Moon Lava Field - West

Objective 1: Leafy Spurge

Leafy spurge has invaded over 25,000 acres of the Wild Horse Desert southwest of CRMO. The Shoshone BLM has been treating this region of their district for over 30 years. It is unclear when spurge first became established but sites discovered in the Monument south of the Carey Lava Field make up the north and northeast edges of this large infestation. Today, an interagency treatment strategy involves the establishment of a large containment line around the entire perimeter, spot chemical treatments on the periphery, about a dozen releases of biological controls within the containment area, and routine helicopter surveys along Little Wood River and the Carey Lava Field across the western and northern infestation boundaries respectively. NPS crews have agreed to only chemically treat infestations north of the road that runs east-west just south of the Carey Flow to avoid conflicts with biological release sites. Essentially, NPS crews work in the Monument north of the road running from Preacher Bridge to the Carey Kimama Road. The BLM however does land and spot treat spurge sites they encounter during their helicopter survey efforts.

To date, close to 130 spurge sites found in and around the southern Carey Lava Field are currently maintained in the CRMO weed geodatabase. No plants were found at 73 of these sites when they were surveyed in 2013. Further, no plants have been found at 38 sites for at least 3 years. However, an average of 3-4 new sites have been discovered each year since 2011 and many of these have been quite large (over 500 plants).

The Northern Rockies EPMT was instrumental from 2004 to 2007 to get most areas surveyed, mapped, and treated. These efforts did, however, create some logistical challenges causing CRMO to systematically remove sites from the park weed geodatabase*. All spurge sites are visited and chemically sprayed in the early summer with Tordon, currently CRMO's only restricted use pesticide herbicide. Sites need to be thoroughly surveyed and treated to a diameter of 30 meters surrounding each GPS point. Starting in 2010, spurge sites on NPS lands are also visited in the fall (mid-Sept) and sprayed with Plateau, an herbicide not currently approved for BLM lands. In recent years, when time constraints existed, sites that had been dead for at least 3 years were not visited. In the fall, any sites obtained by BLM's aerial helicopter survey the previous June are also a high priority for visit and treatment. The weed geodatabase is updated only on the first visit. An exception is if no plants are found in the summer (site was "dead") but plants are found in the fall. In these events, the number of fall plants, cover, and etc. are assigned leaving the summer visit date.

Total workdays spent (2013)	# of people	# of days	Total
	7	3	21

BLM Monument Lands

Objective 1: Little Park Fire

In September of 2008, a human caused fire burned 1,792 acres of near-pristine sagebrush in the northeast corner of Little Park. Figure 7 shows the area and the number of new weed locations by year since 2009. Approximately 435 acres of the burned area (essentially the southwestern quarter) was ground seeded with both native and introduced species by the BLM. There is also a 5-acre enclosure along the western edge (blue box in figure below), half of it seeded and half of it unseeded for comparison; however, it is not known how well these seeded plants have established.

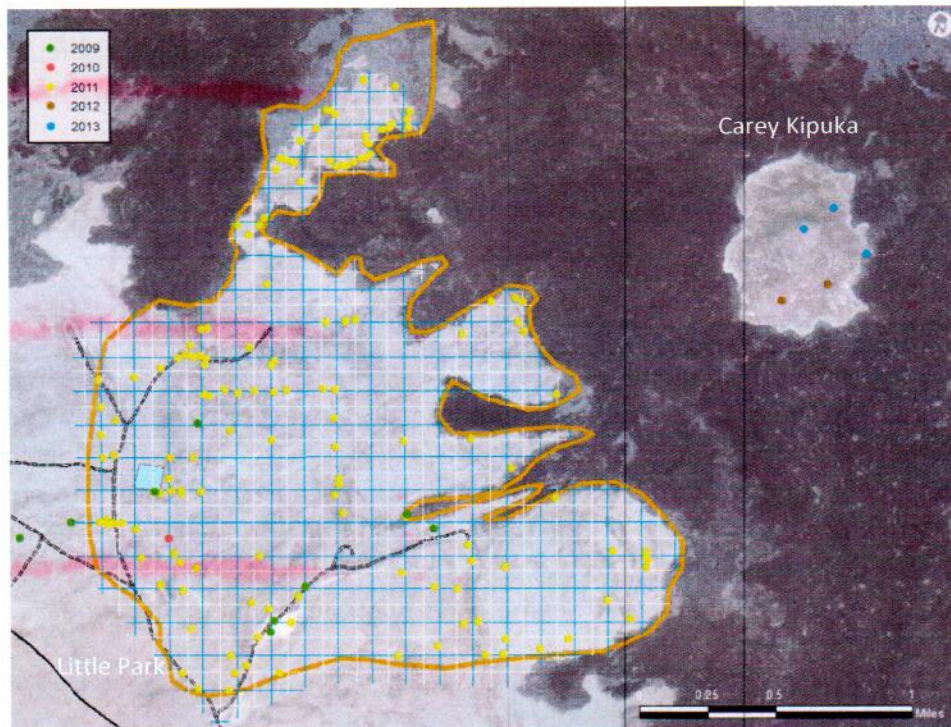


Figure 7. Weed locations to date for the 2008 Little Park Fire and Carey Kipuka.

NPS crews began systematically surveying the entire Little Park Fire in 2009 using 100 meter grid separation. Every other year the grid is offset by 50 meters to provide tighter overall ground coverage. Full eradication of all noxious weeds by mechanical means was the objective to help aid the recovery of native and seeded vegetation in Little Park and to protect surrounding areas, namely Carey Kipuka to the immediate east (see map above).

Anecdotal evidence suggests that the area continues to improve. For 2009 and 2010, there was extensive nonnative tumble mustard and prickly lettuce, particularly along roads, but that has since declined. Few noxious weeds (less than a dozen sites) were discovered and treated mechanically during these first two years. Unfortunately in 2011, rush skeletonweed was found scattered throughout the burn and our mapped sites went from 11 to 158 with most sites ranging between 1 and 10 plants. A few knapweed and one Canada thistle site has been

discovered and a large infestation of mullein was found in 2013 in the northern section of the burn. Not enough resources are available to eradicate mullein from this area.

In 2013, we changed our weed management strategy for the Little Park Fire*. Rather than realistically eradicating all weeds, we have decided to suppress rush skeletonweed for a set time frame while eradicating all others. It would take weeks of work to locate all rush plants using available resources. Instead, no new sites are mapped as it has become too difficult for large work crews to cover the area using GPS units while conducting an efficient search. In 2013, sites were also chemically treated (w/ Milestone) as it became doubtful that mechanical removal was completely eradicating each weed location.

It is hoped that with a new strategy defined by a set number of work days each season that weeds will be sufficiently suppressed allowing native plants to progressively outcompete the scattered weeds that remain. Below is the number of workdays spent on this objective in 2013. Based on previous years' experience, a maximum of 20 workdays should be spent on Little Park weed suppression efforts.

Total workdays spent (2013)	# of people	# of days	Total
	6	3	18

Objective 2: Roads in Paddelford Flat, Laidlaw Park, and Little Park

Monument roads into these areas have been haphazardly surveyed for noxious weeds since 2003. As for other areas, it is simply too difficult to survey large expanses of mainly intact sagebrush grasslands of Paddelford Flat and Laidlaw Park. Because roads are common vectors for new and recurring weeds, they continue to be highlighted in our weed management program. No work days were devoted to this objective in 2013 but at least 3 workdays should be tallied in 2014 covering as many road segments as possible in mid to late June.

Total workdays spent (2013)	# of people	# of days	Total
	-	-	-

Objective 3: Eastside of the Monument and Preserve

The Arco-Minidoka Road receives some of the least weed management oversight of any area in the Monument and Preserve. At this time, the only systematic weed management of this area is performed by the Lost River Cooperative Weed Management Area. Their staff of 3-4 annually treats knapweed infestations along the Butte County boundary, mainly by ATV. No work days were devoted to this objective in 2013.

Total workdays spent (2013)	# of people	# of days	Total
	-	-	-

Internal Lava Fields

Objective 1: "Park Special" Kipukas

"Park special" kipukas are those with specific designation (research natural areas, natural national landmarks, etc.) or those that simply have been uniquely defined and/or carefully researched. A couple of kipukas needed this special attention because the kipuka prioritization effort (Appendix 2) doesn't rank them high enough for strategic survey and protection. Quite frankly this category was created to ensure these seemingly low priority kipukas (namely Sand Kipuka and its associated RNA) get addressed in addition to those that are rated high and specifically designated. In total, fifteen kipukas have been assigned as "park specials" including several "complexes", areas where its best served to survey multiple kipukas in one area. Currently three kipukas (Sand Kipuka, Carey Kipuka, and North Laidlaw Butte) all currently have small infestations of noxious weeds as of 2013 and they will need to receive annual survey efforts to rid them of these plants. Beyond that, the other 12 kipukas will be rotationally surveyed every three years to ensure they remain noxious weed free (see Appendix 2). Here's how many workdays were spent in 2013 on this objective at North Laidlaw Butte, Sand Kipuka, and Carey Kipuka:

Total workdays (2013)	# of people	# of days	Total
	5	6	30

Objective 2: Other High Priority Kipukas

A total of 75 other "high priority" kipukas beyond those determined to be "park specials" will need to be systematically surveyed to ensure they are noxious weed free. A number of these are grouped into "complexes" (groups of kipukas) so that survey efforts can be more efficient. Reviewing Appendix 2, note that three colors were used to define 2014, 2015, and 2016 anticipated survey efforts. Park staff will need to visit 27 kipukas in this category in 2014, 26 in 2015, and 22 in 2016 for a total of 75. Efforts will need to be efficient as there is a 3-4 week window in which noxious weeds, namely rush skeletonweed, are easy to identify.

No work days were devoted to this objective in 2013.

Total workdays (2013)	# of people	# of days	Total
	-	-	-

1. The first part of the report deals with the general situation of the country and the progress of the work during the year. It is a summary of the work done and a statement of the results achieved. It is a statement of the work done and a statement of the results achieved.

2. The second part of the report deals with the work done during the year.

3. The third part of the report deals with the work done during the year. It is a summary of the work done and a statement of the results achieved. It is a statement of the work done and a statement of the results achieved.

4. The fourth part of the report deals with the work done during the year.