National Bison Range National Wildlife Refuge

Lee Metcalf ISST

Accomplishments

Weed Species	Total Survey Acres[1]	Survey Acres Infested[2]	Acres Treated[3]
Bull thistle	1.02*	0.005	0.005
Canada thistle	1.02*	0.01	0.01
Common burdock	1.02*	0.07	0.07
Dame's rocket	0	0.63	0
Field pennycress	1.02*	0.01	0.01
Houndstongue	1.02*	0.1	0.1
Leafy spurge	118.76	0.16	0.05
Meadow hawkweed	60.58*	0.15	0.15
North Africa grass	2,251.15	1,044.07	0
Oxeye daisy	60.58*	0.005	0.005
Spotted knapweed	3.37*	0.12	0.12
Project Site Total	**2,446.38**	**1,045.33**	**0.51**

[1] Area covered during the course of weed management activities regardless of presence or absence of target weed species as measured by perimeter in GIS.

[2] Area occupied by weed species within the survey area that does not contain the space between individuals or populations (i.e. net infestation size) as measured by GPS feature for monitoring and treatment combined, but areas in common not additive.

[3] The area or subset of infested area that has received some form of treatment as measured by GPS feature.

* One survey area was searched for multiple species but this survey acreage was only counted once.

Highlights

Schedule

Dates	Project Type	Target Species	Size of Crew	Project Notes
2-June-2014	Refuge Inventory & Monitoring	North Africa grass	5	Alexander Basin & Biological control work
3-June-2014	Biocontrol Tour	Training Day	5	Data points collected of established biological control agents.
16-June-2014 to 19-June-2014	Refuge Inventory & Monitoring	North Africa grass	15	Alexander Basin. Strike Team and Montana Conservation Corps
7-July-2014 to 10-July-2014	Refuge Inventory & Monitoring	North Africa grass	5	Alexander Basin
	EDRR Chemical Treatment	Meadow hawkweed, Oxeye daisy	3-5	Sheep Pasture
22-Sept-2014	Refuge Chemical Treatment	All Broadleaf Weeds	3	Bison Corrals
23-Sept-2014	EDRR Chemical Treatment	Leafy spurge	4	Alexander Basin

Coordination and Cooperation

- ISST Crew Leader Jessica Zarate coordinated with Biologist Amy Lisk via email or phone prior to each visit. The "Strike Team Expectation and Accomplishment Checklist" (Appendix A-D) was used at the start and end of each visit to outline projects and provide summary of work completed.
    - Further coordination with Amy Lisk or Brendan Moynahan the week of July 7th was done on arrival to the refuge and before leaving each week.
- Due to plant phenology, and completion of projects, changes were made to the schedule as deemed necessary. All project changes were coordinated with Amy and ISST supervisor Lindy Garner prior to any work completed.
- Mapping methods used for the North Africa grass survey in Alexander Basin were not consistent with established protocols used by ISST. Amy Lisk coordinated with Lindy Garner to alter methods prior to working with Jessica Zarate and surveying crew. Methods used for mapping and post-processing are detailed below.
    - Amy Lisk and Jessica Zarate met with the entire 15 person crew at the start of the first and second day to go over identification, mapping and site logistics.
- ISST provided additional funding to the refuge for the following projects:
    - $4,500 for inventory and management of multiple species including: medusahead grass, North Africa grass, rush skeleton weed, and blueweed. The medusahead grass inventory and management project was led by PRISM and is detailed in a separate report in the Community Reports Section of this ISST annual report. The blueweed and North Africa grass projects were coordinated between the refuge and the Montana Conservation Corps (MCC). A MCC youth crew was used for the blueweed project and an MCC adult crew was used for the grass inventory project.
    - $5,400 for riparian enhancement for two weeks of work with an MCC youth crew.

Prevention and Education

- Preventing the spread and reducing infestations of new invaders on the refuge is a top priority.

Early Detection and Rapid Response

Leafy spurge

- On the Bison Range leafy spurge is only known to occur within Alexander Basin.
    - New patches of leafy spurge were found and mapped during surveys for North Africa grass in June.
- Prior to fall treatment, the crew leader worked to compile leafy spurge data collected in June 2014 and add it to historic data so that all spurge could be treated this season. Unfortunately due to computer issues and time constraints this could not be completed, so the team used primarily historic data for locating treatment areas.
- The team cover over 100 acres surveying well beyond the historic areas in attempt to capture all spurge in the basin. A few of the new patches mapped located south and east of the surveyed area were missed. Of the 0.16 acres detected in 2014, a total of 0.05 acres were treated.
- Leafy spurge is difficult to control, but ISST recommends this species remains a priority for treatment while infestations are small and provides a higher cost benefit relative to treatment costs, and may further enhance protection of the area.

Sheep Pasture - Meadow hawkweed & Oxeye daisy

- Point-to-point surveys were conducted for these species in and around historic locations.
    - All plants found were mapped and then later treated using backpack sprayers.
- In areas where roses were present, following herbicide application, roses were clipped back to help reduce non-target impacts to this species.
- Plants were found in the rosette, and early bud-bloom stages. This combined with the thick vegetation made these plants difficult to detect, so the team used tight transects (5-10 meters apart to help reduce the chance of missing plants.

Yellow toadflax

- Known locations along the north boundary fence line and in the amphitheater were surveyed for treatment of yellow toadflax.
- A few unusual specimens were collected in 2013 that were believed to possibly be yellow and Dalmatian toadflax hybrids. Therefore, prior to surveys this season, ISST received a collection kit for appropriately preserving potential hybrids, so they could be submitted for further identification and research.
- No yellow toadflax plants were found this season. Annual monitoring and management is recommended.

Inventory and Monitoring

North African wiregrass

- ISST performed a reconnaissance-level inventory of North African wiregrass in the Alexander Basin management unit using modified survey and data analysis guidelines to determine estimated acres of wiregrass within the survey area.
- Surveys were conducted primarily on foot over four and half days in June and two days in July covering over 2,200 acres. The team tried to use ATVs in some areas as terrain permitted but inclement weather prevented their use as a viable option. Four people used quads for a half a day in June and two people used them on the last day to travel to the area left to be covered and then performed transects on foot.
- Standard ISST mapping methods were not used in an effort to quickly generate coarse level information about presence and absence of this species in the area. Below is a summary of events and methods used for this survey:
    - Day 1 (June 5th): The Lee Metcalf crew Strike Team (5 people) joined Amy Lisk in the basin for training on plant identification, look-a-likes and other grasses, discussed mapping methods and planned to begin mapping. However, panicles were not yet open and plants were difficult to detect.
    - Day 2 (June 16th): Amy Lisk, two crews from the Strike Team (7 people) and an adult Montana Conservation Corps crew (7 people) began inventory work in the basin. Prior to beginning the inventory, Amy requested we used a modified mapping strategy. I contacted ISST supervisor Lindy Garner for guidance but was unable to reach her. Lindy later returned a call Amy to discuss the pro's and con's of using a modified mapping method. It was decided modification to mapping to suit the needs of the project were acceptable provided it is understood these data would not be comparable to any other data collected and would likely not result in an accurate estimate of infested acres but merely provide reconnaissance-level location data. Following this discussion, the team went out and reviewed North African wiregrass identification and began collecting points to indicate the start and end of infestations along a transect line. Some people also collected points to note the presence of the species. Track logs were also collected and intended to be used for digitizing approximate location of infestations when correlated with points collected. All 15 people worked together in a long line and since there were not enough GPS units for every person, so people without units were dispersed between those with them. At the end of the day, Jessica Zarate collected all units and downloaded both the data and tracklogs to review and discuss with Amy. It was decided that post-processing point data would be time-consuming and in some cases difficult to interpret. Tracks were merged and loaded to the units. Amy and Jessica decided to divide up the group into 3

North Africa wiregrass (*Ventenata dubia*). Photo by Jessica Zarate.

teams of 4-5 people with MCC dispersed with Strike Team members. Amy and Jessica further discussed mapping techniques and changes.

- Day 3 (June 17th): The survey group met in the office prior to going in the field to discuss mapping guidelines and safety. Three Strike Team leads were designated, teams were formed, and areas to be covered outlined. Methods for mapping from this day forward were as follows: As transects were walked, those mapping would start a line when the target plant and then stop the line when the species dropped out. Small patches would be mapped as points and notes were to be taken if density or other noteworthy info was applicable. Members of the teams were to be 30-50 meters apart for quicker coverage of the large area. People without units were to be dispersed among those with them and people without units were not to be placed on the end of the team, so the boundaries of areas covered could be determined. This morning we tried to have a one team of 4 people conduct surveys by ATV but freezing rain and wind caused resulted in safety issues so walking transects was resumed the remainder of the day. All tracks were downloaded, merged and loaded onto units at the end of the day for use the next day.
- Day 4 and 5 (June 18th and 19th): The crews continued transecting and mapping as outlined the previous day. The evening of the 18th tracks were once again downloaded, merged and loaded onto units. Processing tracks daily allowed for groups to work close to one another in open areas that don't have good boundaries for reference, helps prevent doubling up on areas covered and can ensured adequate coverage of areas. By the end of this day an approximate estimate of 1,900 acres had been covered. Throughout the week the teams had intermittent problems with RLGIS checkouts and frequently used shapefiles for collecting data that were later combined with RLGIS files.
- Day 6 and 7 (July 8th and 9th): The Lee Metcalf crew Strike Team (5 people) returned to the basin to complete survey of the basin for North Africa grass. Weather was good but all remaining work was done on foot due to terrain.

- While modification to mapping methods did allow for a greater area to be covered in a shorter period of time, the large amount of data collected using the modified method of collection required more time post-processing of data than usual to determine estimated areas of infestation and associated acreages.
  - With the methods used the intent was for the Strike Team to use the start and end points, tracks and raw line data to hand-delineate digitized polygons of infestations present. This is extremely time-consuming given the large amount of data collected. In addition, missing information in data collected (date, origin, etc.), made pairing data with tracks difficult and the extent of infestations to either side of the line and/or widths associated with lines collected in most cases was unknown as well as individuals surveying without GPS units added to the complexity of the post-processing.
- Keeping in mind the collection of data was intended to generate coarse-level information about presence and absence of this species the following was completed for the post-processing of data.
  - All data checked in to RLGIS geodatabases were exported as shapefiles and combined with shapefiles collected in the field. These data were edited to add survey date and origin when possible) as well as target species name, and a legend field indicating the feature represents a "Start", "End", "Presence" or "Absences" of infestation.
  - Points and line feature data collected were buffered out 40 meters (20M to either side of a line). This median distance was used for buffer because the distance apart between surveyors in any given team varied depending on terrain, vegetation and visibility from approximately 30M to 50M apart in most cases. The extent of infestations surrounding the point and line data is unknown and using raw data to hand-digitize a polygon around all of the raw line is not feasible and likely would not be accurate. Therefore creating a standardized buffer to illustrate the extent of infestation appeared to be the best option in this scenario given the time available to summarize these data.
  - Data from the first day included "Start" and "End" points and corresponding tracks were matched up and used to hand-digitize approximate areas of infestation.
  - Buffered data and digitized polygons were merged together and then the boundaries were dissolved to create a final shapefile used to calculate acreage and display the infestation mapped in the basin.

- Post-processing this inventory data took about 40 hours for post-processing for several reasons
    - There are no current established methods for post-processing, so methods had to be created.
    - Missing information within the collected features had to be traced back to the original checkout file in order to matchup data to populate fields. As a result only the minimum was completed as needed and there are still many fields within the summary data that are missing information.
    - Data was collected using both RLGIS management and monitoring feature classes, as well as shapefiles created on the fly. None of these feature classes have matching fields and were combined in ways to preserve data collected. The RLGIS monitoring polygon feature class shapefile was used as the final fields "structure" for all data collected.
    - There was a problem that arose during the checkin process, resulting in missing data that had to be tracked down. All missing files were located and added to the final summary.
    - ISST supervisor William Sparklin and Amy Lisk were consulted during the processing of data to help expedite post-processing to the extent possible while still providing adequate location data and estimated acreage information.

Dame's Rocket

- This species was incidentally found while surveying for North Africa grass in Alexander Basin.
- Although the Strike Team has treated this species in previous years it was not the focus of inventory and/or treatment this season.
- There may be more present in the Basin than was mapped since not all crew members were surveying for this species at the time and location these plants were found.

Mission Valley Biocontrol Tour

- ISST spent a day participating in a training event aimed to educate people on biological control agents presently used for controlling weeds in the Mission Valley. In addition, monitoring biological agents was covered using the Standard Impact Monitoring Protocol (SIMP).
- The day prior to this event, Amy had ISST worked with her to cover several areas on the refuge as potential stops sites along the tour. In addition, she requested the team map a few locations of the toadflax weevil (*Mecinus janthinus*) that may be suitable collection or release sites in the future.
- The day of the tour, ISST GPS mapped locations of stops along the tour.

Participants discussing biological control agents used at the National Bison Range during the Biocontrol Tour of the Mission Valley. Photo by Jessica Zarate.

Management

Bison Corrals

- With some time available in during the fall visit, the ISST worked on another special project for the refuge and treated all broadleaf weeds found in the Bison corrals area in preparation for the upcoming annual Roundup event.
- Several species of weeds were sprayed using a 8% solution of *Aqua Neat*, in an effort to burn all weeds down to the gravel.
    - Plants found included: common burdock, field pennycress, houndstongue, pepperweed, pigweed, prickley lettuce, spotted knapweed, thistle and a few unknown species.
- Acreages of weeds mapped in this area should not be considered an inventory of infestations in these areas but rather locations and acreages of where several species of broadleaf weeds were treated.

Spotted knapweed

- Spotted knapweed is common on the National Bison Range and was not a priority species for treatment this year. However, it was targeted near the maintenance area when the team had a couple of gallons of *Milestone* herbicide to be use prior to switching chemicals.
    - A total of 2.35 acres were covered near the maintenance area and 0.1 acres were treated.

Herbicide Applied

- 1.2oz of *Milestone* was used for treatment meadow hawkweed and oxeye daisy
- 42.5 oz of *Aqua Neat* was used for treatment of a variety of broadleaf weeds in the corrals
- 0.04 oz of *Plateau* was used for treatment of leafy spurge

Proposed 2015 Schedule

- Meadow hawkweed and oxeye daisy in the Sheep Pasture should remain a priority for treatment in 2015.
- Clipping leafy spurge should be done mid to late June and herbicide treatment should follow the first hard frost in fall which is typically in September.
- Yellow toadflax monitoring and management in the fall should also continue. If conditions are extremely dry as in 2014, the refuge may want to check for this species in late August rather than waiting until September.

Spectacular sunrise over the Mission Mountains from the National Bison Range. Photo by Jessica Zarate.

Appendix A

Strike Team Expectation and Accomplishment Checklist

Arrival Interview

Station: National Bison Range Complex Date of Visit: 06/2/14-06/5/14

Objectives and Priority Areas defined:

Species	Unit	Section of Unit	Inventory/Monitor	Treat	Chemical (ref or isst)
Ventenata dubia	NBR Refuge	Alexander Basin	Systematic transecting	No	N/A
Leafy spurge, yellow toadflax, hawkweeds, oxeye daisy, Dame's rocket			Systematic transecting	No	N/A

Notes:
Mon 6/2 – Meet with NBR staff and visit location with known *Ventenata dubia* for training for surveys and then begin transect surveys on foot for this species & other EDRR target species.
Tues 6/3 – Biocontrol Tour in the Mission Valley. Inventory surveys in Alexander Basin continued if time available.
Wed 6/4 – 2 people continue surveys in Alexander Basin and 3 people will be doing ATV training.
Thurs 6/5 – Inventory in Alexander Basin continued in the morning only. Will be calibrating quads in the afternoon.

ATV Use: (define whether allowed, if partial allowance any restricted areas or travel directions, including only along fence line or not, only along two-track or if can systematically traverse project site, or if point-to-point treatment)
All use of ATVs will be discussed with refuge staff before going in the field to determine restrictions. ATVs will be used in Alexander Basin if permitted and use will be discussed with Amy Lisk on arrival.

Other access issues, conflicts, etc…:
It is the nesting seasons, so we will be on the lookout for ground nesting birds and do try to avoid riding over nests. Bison, rattlesnakes, and other wildlife may be present in areas worked and safety will be discussed prior to starting surveys.

Station or Site Manager (or Acting):_____Date:_____

(back has Exit Interview)

Exit Interview

Species	Unit	Section of Unit	Inventory/Monitoring	Treat	Completed (yes or no with explanation)
Ventenata dubia	NBR Refuge	Alexander Basin	Systematic transecting	No	No, species was up but panicle was not yet open making the plants and patch boundaries difficult to discern. This survey will be conducted in a few weeks.
Leafy spurge, yellow toadflax, hawkweeds, oxeye daisy, Dame's rocket			Systematic transecting	No	T No, will be searched for when *Ventenata* surveys are conducted
Biocontrols		Along tour road	Yes, mapped release and future collection sites	No	Yes, worked with Amy to map collections and release sites
Oxeye daisy	Duck Haven	Entire site	No	Yes, Milestone @6oz/ac with Spreader 90 @1pt/100 gal	Yes, no oxeye found
Common teasel					Yes, all found was sprayed. Significantly less found than was mapped last year.
Houndstongue				Yes, mechanical	Yes, all found was shoveled and early developing flower heads were chopped off. No old stalks were found.

Notes:
Checked oxeye daisy in Mission Valley Pasture at NBR prior to heading to Duck Haven for treatment and plants were up and in early flower. While at Duck Haven we also keep watch for leafy spurge, meadow hawkweed, yellow toadflax, and purple loosestrife while doing point-to-point surveys for species targeted for treatment. Kelsey Guffey of Lake County worked with us on Wed at Duck Haven.

Concerns with Project:
None.

Station or Site Manager (or Acting):_____Date:_____

Appendix B

Strike Team Expectation and Accomplishment Checklist

Arrival Interview

Station: National Bison Range Complex Date of Visit: 06/16/14-06/19/14

Objectives and Priority Areas defined:

Species	Unit	Section of Unit	Inventory/Monitor	Treat	Chemical (ref or isst)
Ventenata dubia	NBR Refuge	Alexander Basin (2297ac)	Systematic transecting	No	N/A
Yellow toadflax, hawkweeds, oxeye daisy, Dame's rocket			Systematic transecting	No	N/A
Leafy spurge	NBR Refuge	Alexander Basin	Systematic transecting & Historic points	Yes, clip and bag flowers	N/A
Leafy spurge	Anderson WPA	Historic points	No	Yes, clip and bag flowers	N/A

Notes:
Benton Lake and Lee Metcalf ISST crews will team to complete inventory of this area. Refuge has MCC adult crew this week also that will be joining them for these inventory surveys. Two people from Metcalf team will go to Alexander Basin to clip known locations of spurge.

ATV Use: (define whether allowed, if partial allowance any restricted areas or travel directions, including only along fence line or not, only along two-track or if can systematically traverse project site, or if point-to-point treatment)
All use of ATVs will be discussed with refuge staff before going in the field to determine restrictions. ATVs will be used in Alexander Basin if permitted in some areas and use will be discussed with Amy Lisk on arrival. It is anticipated that the majority of this inventory will be completed on foot.

Other access issues, conflicts, etc…:
It is the nesting seasons, so we will be on the lookout for ground nesting birds and do try to avoid riding over nests. Bison, rattlesnakes, and other wildlife may be present in areas worked and safety will be discussed prior to starting surveys.

Station or Site Manager (or Acting):_____Date:_____
(back has Exit Interview)

Exit Interview

Species	Unit	Section of Unit	Inventory/Monitoring	Treat	Completed (yes or no with explanation)
Ventenata dubia	NBR Refuge	Alexander Basin	Systematic transecting	No	No, over 1900 acres completed based on preliminary estimate from GPS tracks. Will continue surveys when we return early July.
Yellow toadflax, hawkweeds, oxeye daisy, Dame's rocket			Systematic transecting	No	No, will continue surveys in July. So far only Dame's rocket was reported as found and mapped.
Leafy spurge			Systematic transecting	No	No, will continue surveys in July. So far, additional patches of leafy found within drainage of historic locations.

Notes:

The weather was poor all week, so all surveys were conducted on foot with the exception of a few hours the morning of 6/17/14. On this day there were four people on quads trying to get more area covered but the weather was cold with pouring rain not conducive to riding.
The first day all three crews worked together with Amy from NBR in one long transect line. Because it was difficult to work in a line with so many people, smaller teams were made for the following days. Three foot teams consisting of four to five people worked in distinct areas divided up by J Zarate. There were not enough GPS units available for all people on the teams to have units so mapping was limited to ISST members which were placed on the ends of the transect lines and were responsible for mapping the target species.

Prior to developing mapping guidelines for *Ventenata*, Amy Lisk and Lindy Garner discussed benefits/drawbacks to changing mapping methods. Additional time for post processing data will be required since the standard guidelines were not used. Points and Lines were used to map presence of *Ventenata* and polygons will be digitized based on the information collected. There was not enough time available to work on any other projects other than those in Alexander Basin this week.

Concerns with Project:

Did not used the standard protocol for mapping *Ventenata* and mapping guidelines used may difficult to determine patch size, density and may not be comparable to current or future ISST data. Guidelines for mapping were developed for course reconnaissance level mapping only.
Station or Site Manager (or Acting):_____Date:_____

Appendix C

Strike Team Expectation and Accomplishment Checklist

Arrival Interview

Station: National Bison Range Complex Date of Visit: 07/07/14-07/10/14

Objectives and Priority Areas defined:

Species	Unit	Section of Unit	Inventory/Monitor	Treat	Chemical (ref or isst)
Ventenata dubia	NBR Refuge	Alexander Basin (2297ac)	Systematic transecting	No	N/A
Yellow toadflax, hawkweeds, oxeye daisy, Dame's rocket			Systematic transecting	No	N/A
Leafy spurge	NBR Refuge	Alexander Basin	Systematic transecting & Historic points	Yes, clip and bag flowers	N/A
Meadow hawkweed & Oxeye daisy	NBR Refuge	Sheep Pasture	Point-to-point with 30M buffer around historic and current plants.	Yes, backpack spray. Clip roses following application.	Milestone 6oz/acre
Leafy spurge	Anderson WPA	Historic points	No	Yes, clip and bag flowers	N/A

Notes:
Two people from Metcalf team will go to Alexander Basin to clip known locations of spurge since not enough time was available to complete this during the last visit in June.

ATV Use: (define whether allowed, if partial allowance any restricted areas or travel directions, including only along fence line or not, only along two-track or if can systematically traverse project site, or if point-to-point treatment)

All use of ATVs will be discussed with refuge staff before going in the field to determine restrictions. ATVs will be used in Alexander Basin if permitted in some areas and use will be discussed with Amy Lisk on arrival. It is anticipated that the majority of this inventory will be completed on foot.

Other access issues, conflicts, etc…:

It is the nesting seasons, so we will be on the lookout for ground nesting birds and do try to avoid riding over nests. Bison, rattlesnakes, and other wildlife may be present in areas worked and safety will be discussed prior to starting surveys.

Station or Site Manager (or Acting):_____Date:_____

(back has Exit Interview)

Exit Interview

Species	Unit	Section of Unit	Inventory/Monitoring	Treat	Completed (yes or no with explanation)
Ventenata dubia	NBR Refuge	Alexander Basin (2297ac)	Systematic transecting	No	Yes, continued surveys where we left off from last visit.
Yellow toadflax, hawkweeds, oxeye daisy, Dame's rocket			Systematic transecting	No	Yes, none found this visit. Only Dame's rocket and leafy spurge found during last survey period.
Leafy spurge	NBR Refuge	Alexander Basin	Systematic transecting & Historic points	Yes, clip and bag flowers	No. Not enough time to go back and clip these plants following inventory surveys.
Meadow hawkweed & Oxeye daisy	NBR Refuge	Sheep Pasture	Point-to-point with 30M buffer around historic and current plants.	Yes, backpack spray. Clip roses following application.	Yes, all found were treated.
Leafy spurge	Anderson WPA	Historic points	No	Yes, clip and bag flowers	Yes, all found were treated.

Notes:
Alexander Basin – We did not complete the triangle-shape corner fields that are located north of the tour road and fenced off from the rest of the pasture. I was not able to meet with Amy to coordinate on that this week, so that area was left un-surveyed and can be added later if needed.

Concerns with Project:
None.

Station or Site Manager (or Acting):_____Date:_____

Appendix D

Strike Team Expectation and Accomplishment Checklist

Arrival Interview

Station: National Bison Range Complex Date of Visit: 09/22/14-09/25/14

Objectives and Priority Areas defined:

Species	Unit	Section of Unit	Inventory/Monitor	Treat	Chemical (ref or isst)
Yellow toadflax	NBR Refuge	Alexander Basin and on North Boundary Road	Point-to-point historic locations plus a 30M buffer around these areas and new plants found	Yes	Tordon and Distinct – Refuge/ISST
Leafy spurge		Alexander Basin	Systematic transecting & Historic points	Yes, clip and bag flowers	Plateau and MSO – Refuge
Leafy spurge	Anderson WPA	Historic points	No	Yes, clip and bag flowers	Plateau and MSO – Refuge

Notes:

ATV Use: (define whether allowed, if partial allowance any restricted areas or travel directions, including only along fence line or not, only along two-track or if can systematically traverse project site, or if point-to-point treatment)

All use of ATVs will be discussed with refuge staff before going in the field to determine restrictions. ATVs will be used for treatments as needed but many of the areas will likely be accessed on foot with a backpack sprayer.

Other access issues, conflicts, etc…:

Bison, rattlesnakes, and other wildlife may be present in areas worked and safety will be discussed prior to starting surveys.

Station or Site Manager (or Acting):_____Date:_____
(back has Exit Interview)

Exit Interview

Species	Unit	Section of Unit	Inventory/Monitoring	Treat	Completed (yes or no with explanation)
Yellow toadflax	NBR Refuge	Alexander Basin and on North Boundary Road	Point-to-point historic locations plus a 30M buffer around these areas and new plants found	Yes	Yes, none found on boundary road and only two plants found in Alexander Basin were pulled. Extremely dry conditions.
Leafy spurge		Alexander Basin	Systematic transecting & Historic points	Yes, clip and bag flowers	Yes, historic locations were treated. Most plants very dry except where found within the snowberry.
Leafy spurge	Anderson WPA	Historic points	No	Yes, clip and bag flowers	Yes, location off site was still green but plants onsite were very dry.
Yellowflag iris	Ninepipe NWR	Entire site	No	Yes	No, see notes below.

Notes:

Ninepipe NWR: There were two people working north of the lake and three people to the south. We began work on the west side and worked moving East. We covered most of the north and two-thirds of the south side.

Concerns with Project:

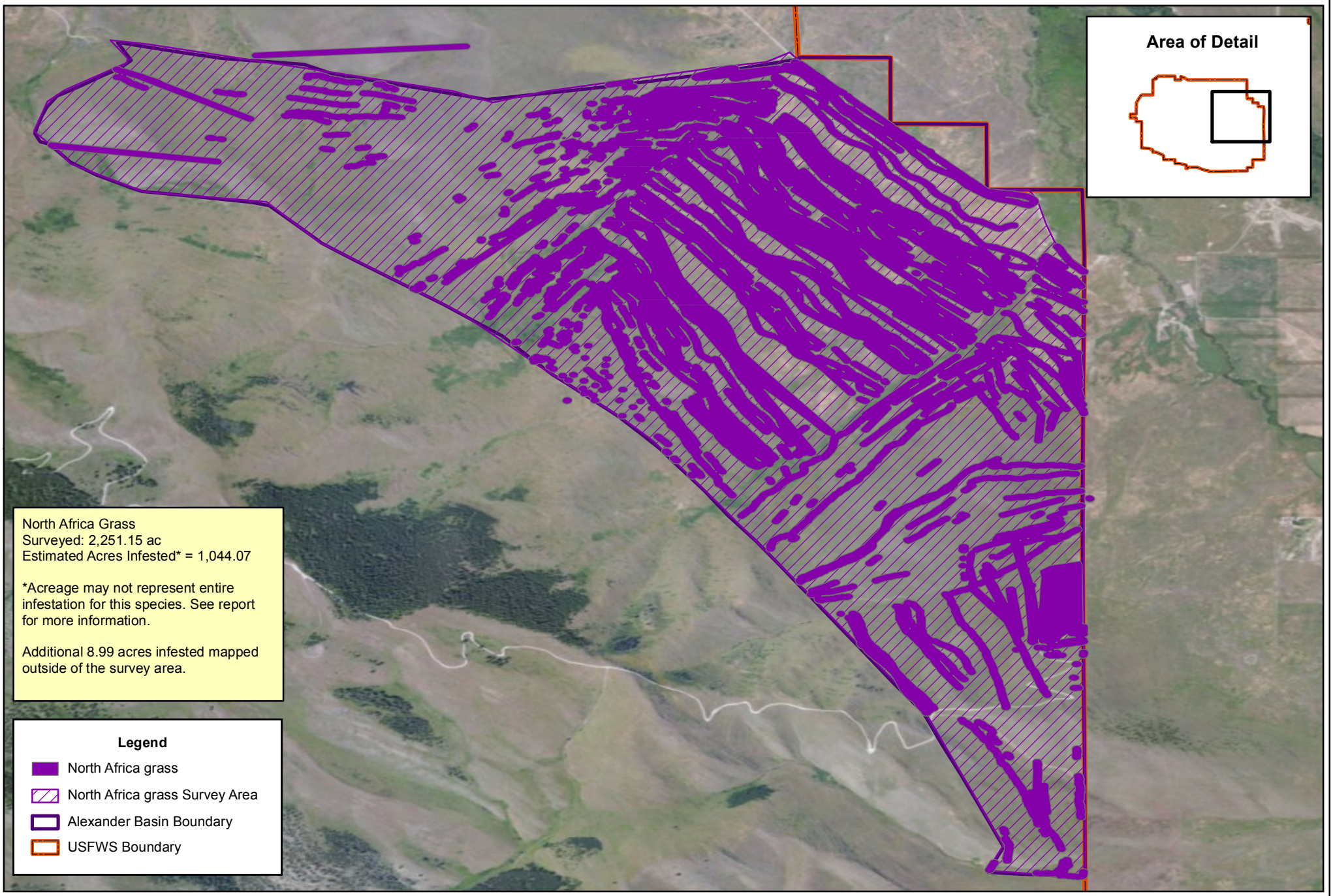
None.

Station or Site Manager (or Acting):_____Date:_____

U.S. Fish & Wildlife Service

MOYOCO Invasive Species Strike Team

National Bison Range - 2014 Survey Acres Infested



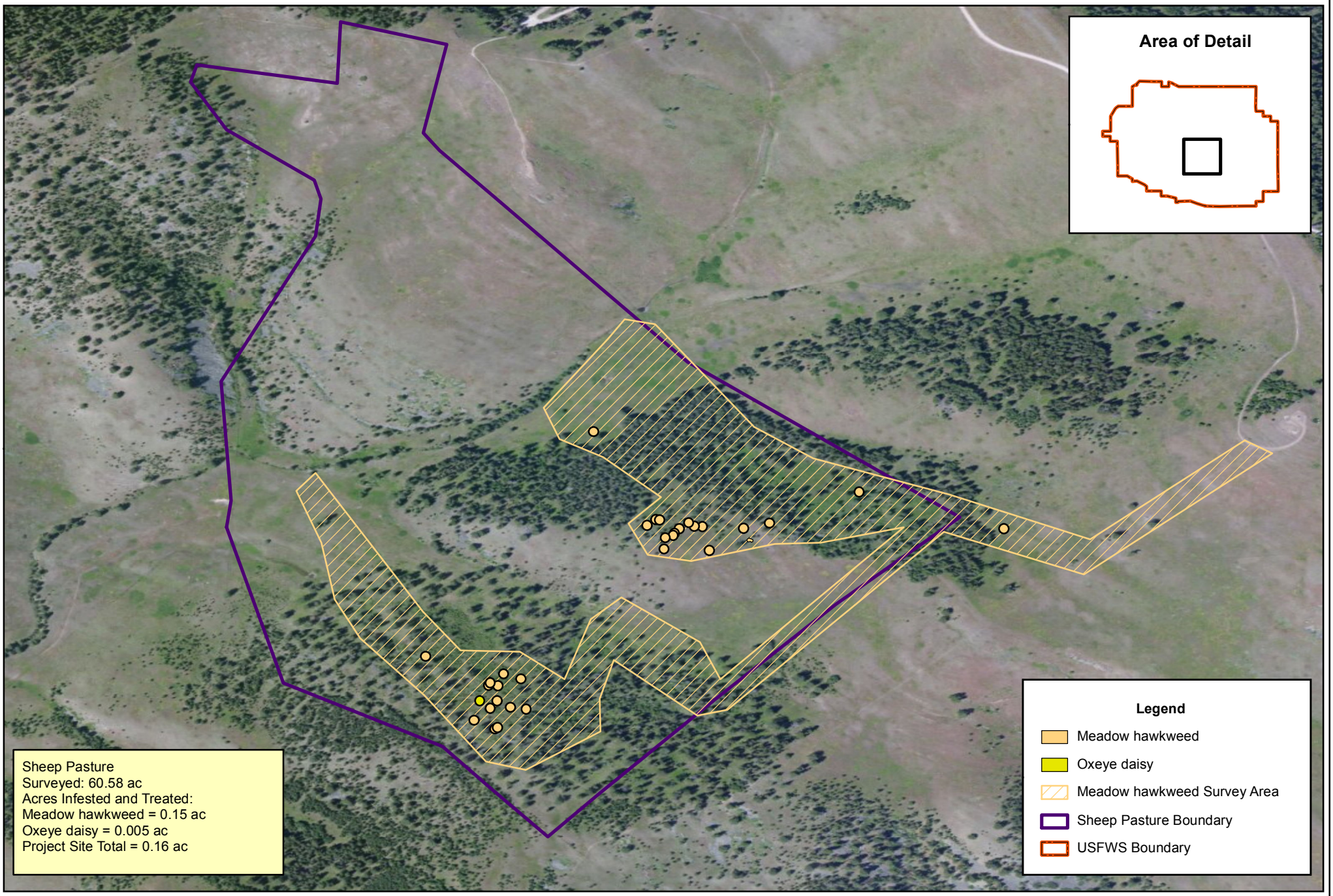
Reference image from ESRI ArcMap Basemap Imagery

North Africa grass in Alexander Basin - 1 of 6 Maps

U.S. Fish & Wildlife Service

MOYOCO Invasive Species Strike Team

National Bison Range - 2014 Survey Acres Infested and Treated



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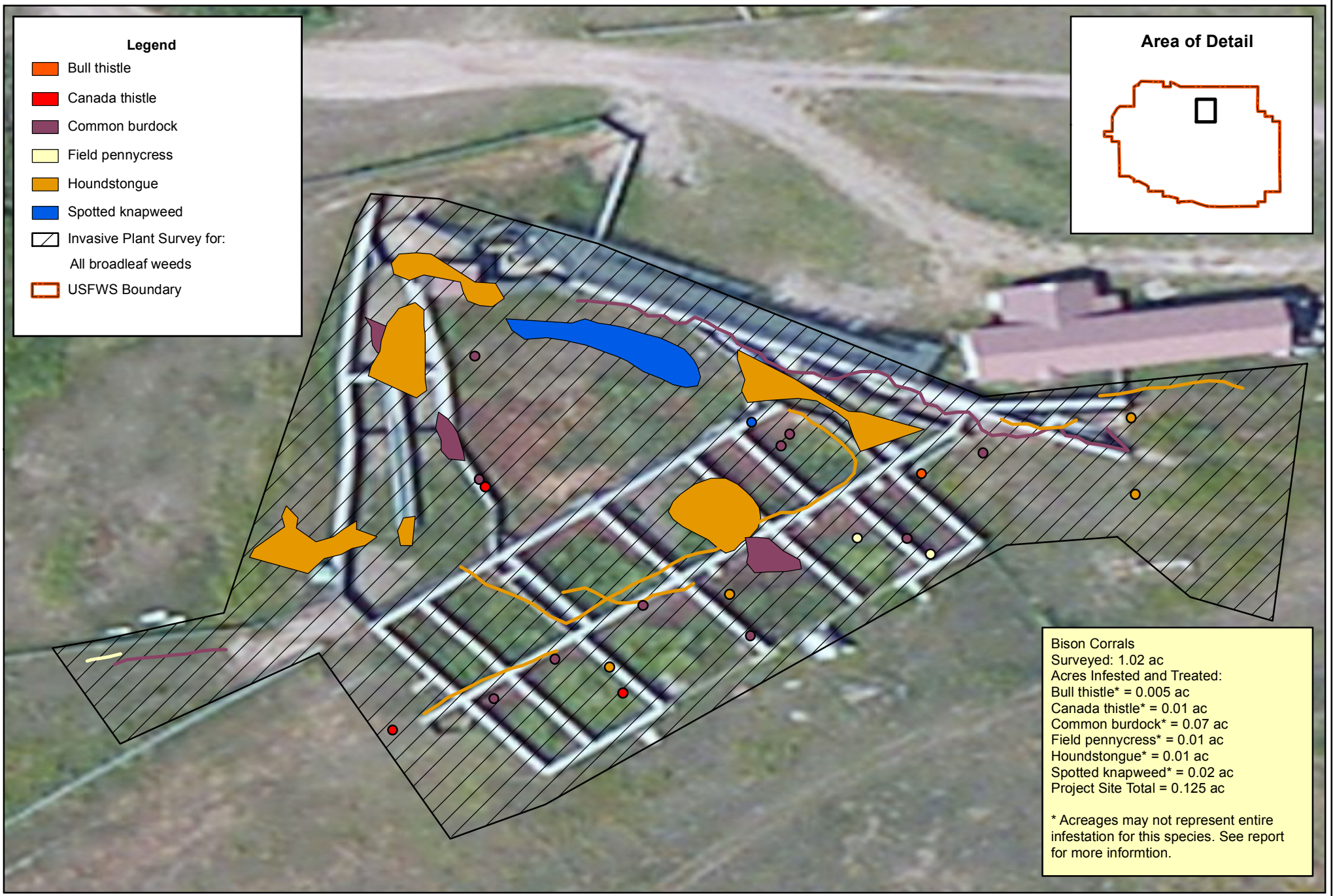
Reference image from ESRI ArcMap Basemap Imagery

Sheep Pasture - 2 of 6 Maps

U.S. Fish & Wildlife Service

MOYOCO Invasive Species Strike Team

National Bison Range - 2014 Survey Acres Infested and Treated



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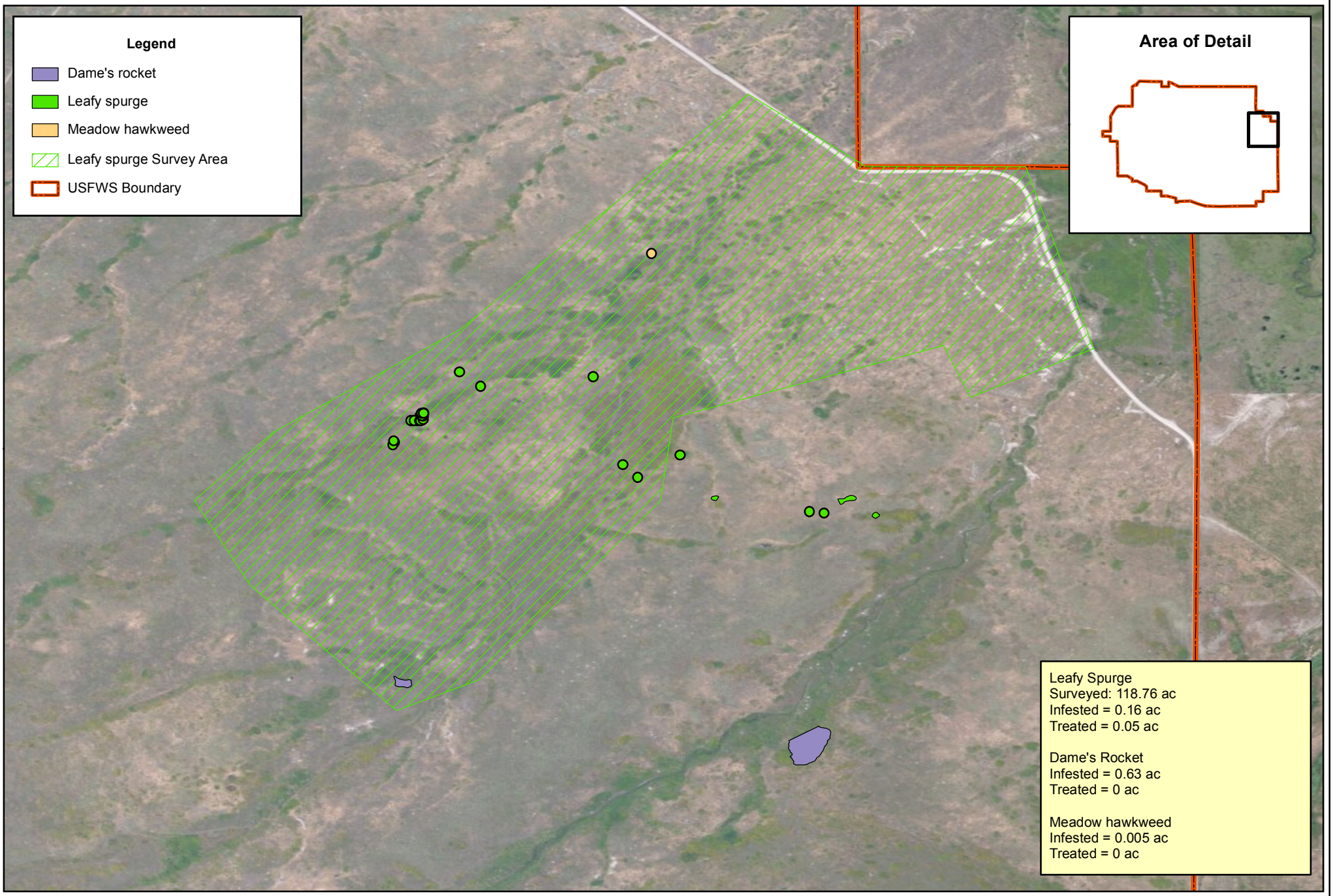
Reference image from ESRI ArcMap Basemap Imagery

Bison Corrals - 3 of 6 Maps

U.S. Fish & Wildlife Service

MOYOCO Invasive Species Strike Team

National Bison Range - 2014 Survey Acres Infested and Treated



0 0.1 0.2 0.4 Miles

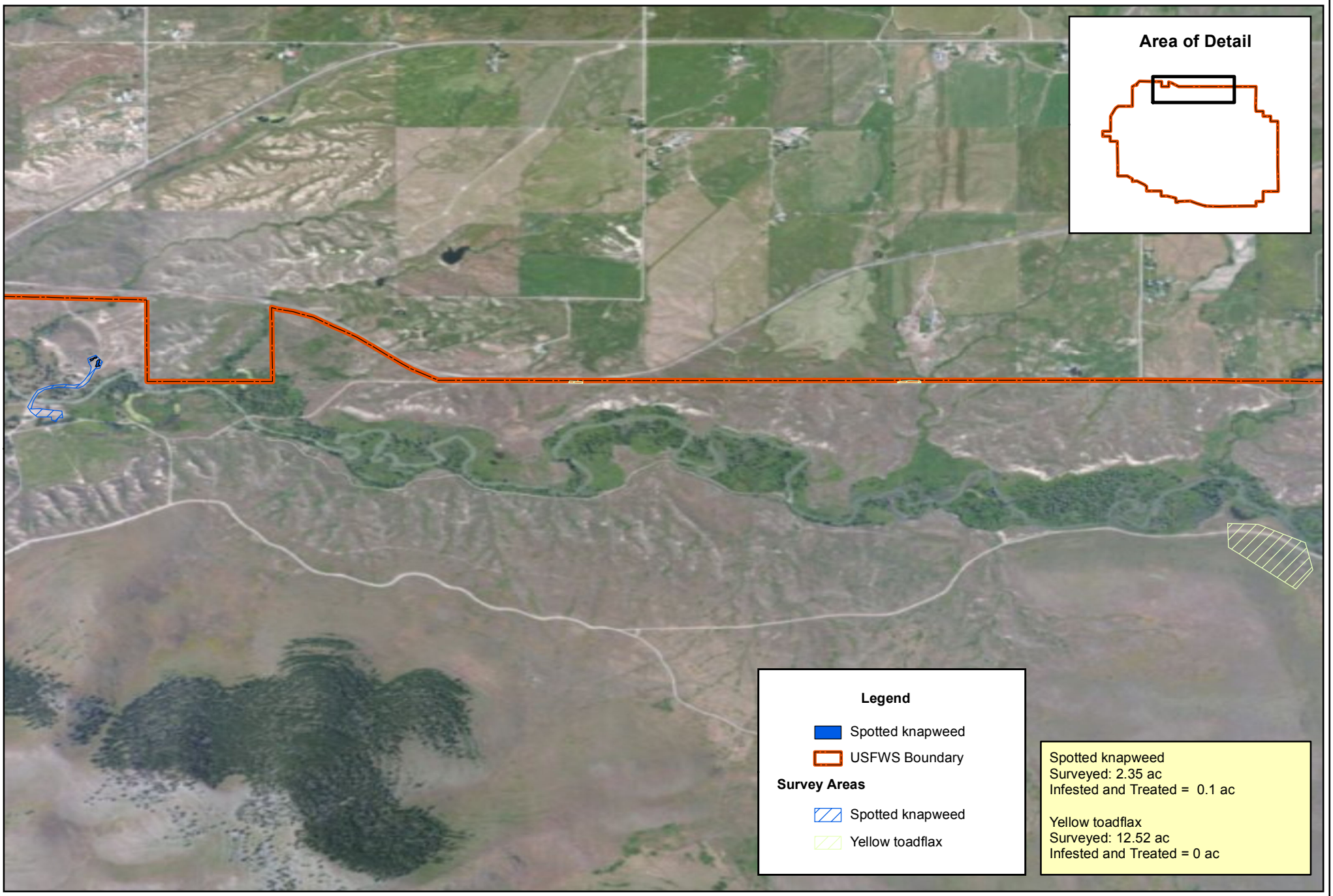
Reference image from ESRI ArcMap Basemap Imagery

Alexander Basin Leafy Spurge and Other Weeds - 4 of 6 Maps

U.S. Fish & Wildlife Service

MOYOCO Invasive Species Strike Team

National Bison Range - 2014 Survey Acres Infested and Treated



0 0.25 0.5 1 Miles

Reference image from ESRI ArcMap Basemap Imagery

Yellow toadflax and Spotted knapweed - 5 of 6 Maps

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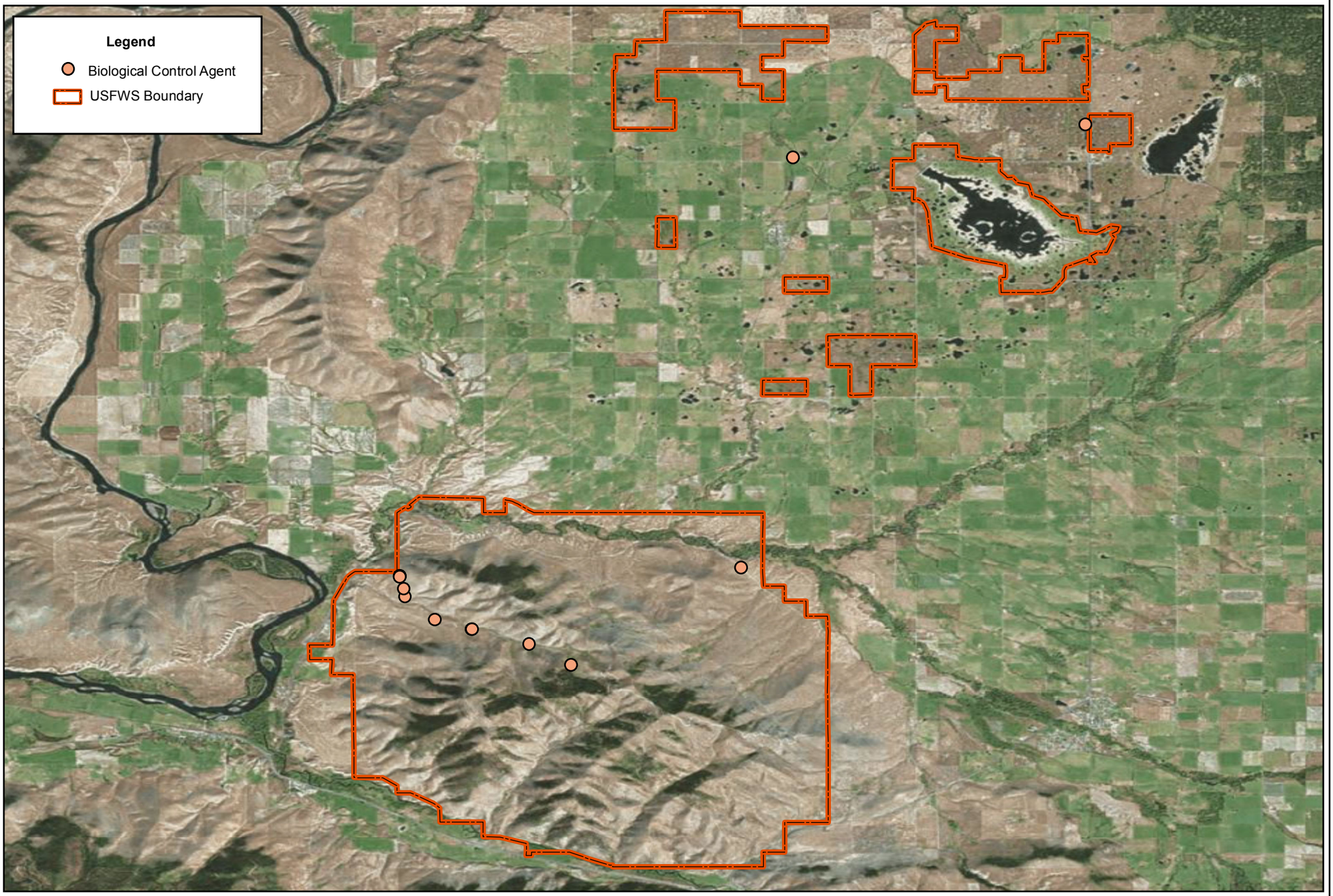
MOYOCO Invasive Species Strike Team

National Bison Range - 2014 Biological Control Agents



Miles

0 1 2 4

Reference image from ESRI ArcMap Basemap Imagery

BioControl Tour Species Locations - 6 of 6 Maps

Compliments of the
MONTANA DEPARTMENT OF AGRICULTURE
AGRICULTURAL SCIENCES DIVISION
PO BOX 200201
HELENA, MT 59620-0201
Phone 406-444-3730

DAILY PESTICIDE APPLICATION RECORD

BUSINESS U.S. Fish and Wildlife Service	LICENSE# 101891-15
NAME Lee Metcalf Invasive Species Strike Team	ADDRESS (Refuge or WPA) National Bison Range NWR
CITY, STATE, ZIP Stevensville, MT 59870	PHONE (406) 544-2552

	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	C. Holtz	J. Miskella
Date	7/7/2014	7/7/2014
County	Lake	Lake
Time Start/Stop	2:00pm-4:00pm	2:00pm-4:00pm
Temperature	86^{o}F	86^{o}F
Relative Humidity	20%	20%
Wind Speed/Direction (from)	0-5 mph variable	0-5 mph variable
Pesticide Manufacturer	Dow AgroSciences	Dow AgroSciences
Trade Name	Milestone	Milestone
EPA Reg # or Formulation	62719-519	62719-519
Rate: Product/Diluent Per Acre	6oz/ac	6 oz/ac
Amount of Chemical Applied	0.13oz (0.5 gal mix)	0.078oz (0.25 gal mix)
Equipment Used (atv,backpack,truck,saw)	Backpack (23 GPA)	Backpack (19 GPA)
Bio-Control (genus species)	-	-
# released / acre	-	-
Mechanical (mow,hand-pull)	-	-
Plant Phenology & Stage	Pre-flowering, Flowering	Pre-flowering, Flowering
Dominant Pest(s)	Meadow hawkweed	Meadow hawkweed
Equipment Used	-	-
Acres/Area Treated or # of plants	0.02 acres	0.01 acres
GPS Filename	-	-

Location #1 (Site specific description) Sheep Pasture Location #2 (Site specific description)	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. For both applications: Spreader 90 used at 3.2oz /10 gallons Hi-Light used at 3.0oz/10gal

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NAME Lee Metcalf Invasive Species Strike Team	ADDRESS (Refuge or WPA) National Bison Range NWR
CITY, STATE, ZIP Stevensville, MT 59870	PHONE (406) 544-2552

	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	J. Wilson	
Date	7/7/2014	
County	Lake	
Time Start/Stop	2:00pm-4:00pm	
Temperature	86^{o}F	
Relative Humidity	20%	
Wind Speed/Direction (from)	0-5 mph variable	
Pesticide Manufacturer	Dow AgroSciences	
Trade Name	Milestone	
EPA Reg # or Formulation	62719-519	
Rate: Product/Diluent Per Acre	6oz/ac	
Amount of Chemical Applied	0.01oz (0.125 gal mix)	
Equipment Used (atv,backpack,truck,saw)	Backpack (64 GPA)	
Bio-Control (genus species)	-	
# released / acre	-	
Mechanical (mow,hand-pull)	-	
Plant Phenology & Stage	Flowering/Basal rosette	
Dominant Pest(s)	Meadow Hawkweed Complex	
Equipment Used	-	
Acres/Area Treated or # of plants	0.0002 acres	
GPS Filename	-	

Location #1 (Site specific description) Sheep Pasture Location #2 (Site specific description)	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. Spreader 90 used at 3.2oz /10 gallons HiLight used at 3.0oz/10gal Only sprayed 2 plants.

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	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	J. Miskella	B. Mullen
Date	7/10/2014	7/10/2014
County	Lake	Lake
Time Start/Stop	9:00am-12:30pm	9:00am-12:30pm
Temperature	64^{o}F	64^{o}F
Relative Humidity	30%	30%
Wind Speed/Direction (from)	5 mph variable	5 mph variable
Pesticide Manufacturer	Dow AgroSciences	Dow AgroSciences
Trade Name	Milestone	Milestone
EPA Reg # or Formulation	62719-519	62719-519
Rate: Product/Diluent Per Acre	6oz/ac	6oz/ac
Amount of Chemical Applied	0.12oz (0.4 gal mix)	0.047oz (0.5 gal mix)
Equipment Used (atv,backpack,truck,saw)	Backpack (19 GPA)	Backpack (64 GPA)
Bio-Control (genus species)	-	-
# released / acre	-	-
Mechanical (mow,hand-pull)	-	-
Plant Phenology & Stage	Flowering	Flowering
Dominant Pest(s)	Meadow hawkweed, Oxeye daisy	Meadow hawkweed, Oxeye daisy
Equipment Used	-	-
Acres/Area Treated or # of plants	0.02 acres	0.01 acres
GPS Filename	-	-

Location #1 (Site specific description) Sheep Pasture- west side Location #2 (Site specific description)	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. For both applications: Spreader 90 used at 3.2oz /10 gallons HiLight used at 3.0oz/10gal

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BUSINESS U.S. Fish and Wildlife Service	LICENSE# 101891-15
NAME Lee Metcalf Invasive Species Strike Team	ADDRESS (Refuge or WPA) National Bison Range NWR
CITY, STATE, ZIP Stevensville, MT 59870	PHONE (406) 544-2552

	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	J. Zarate	J. Zarate
Date	9/22/2014	9/22/2014
County	Lake	Lake
Time Start/Stop	1:45pm-5:00pm	1:45pm-5:00pm
Temperature	82^{o}F	82^{o}F
Relative Humidity	45%	45%
Wind Speed/Direction (from)	3 mph E	3 mph E
Pesticide Manufacturer	NuFarms Inc.	-
Trade Name	AquaNeat	-
EPA Reg # or Formulation	228-265	-
Rate: Product/Diluent Per Acre	8% solution	-
Amount of Chemical Applied	5oz (0.5 gal mix)	-
Equipment Used (atv,backpack,truck,saw)	Backpack (30 GPA)	-
Bio-Control (genus species)	-	-
# released / acre	-	-
Mechanical (mow,hand-pull)	-	Handpull
Plant Phenology & Stage	Scenesed, Rosettes	Old Seed stalks
Dominant Pest(s)	Houndstongue, common burdock and other weeds (see below)	Houndstongue, common burdock
Equipment Used	-	-
Acres/Area Treated or # of plants	0.02 acres	0.01 acres
GPS Filename	-	-

Location #1 (Site specific description) Bison Corrals Location #2 (Site specific description)	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. R-900 used at rate of 3.2oz/10gal Brandt Bigfoot dye used at 1oz/gal Common weeds found include but are not limited to: prickly lettuce, clasping pepperweed, spotted knapweed, pigweed, etc.

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CITY, STATE, ZIP Stevensville, MT 59870	PHONE (406) 544-2552

	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	J. Miskella	J. Miskella
Date	9/22/2014	9/22/2014
County	Lake	Lake
Time Start/Stop	12:30pm-2:00pm	3:00pm-4:30pm
Temperature	82^{o}F	82^{o}F
Relative Humidity	32%	32%
Wind Speed/Direction (from)	4 mph N	4 mph N
Pesticide Manufacturer	Dow AgroSciences	NuFarms Inc.
Trade Name	Milestone	AquaNeat
EPA Reg # or Formulation	62719-519	228-265
Rate: Product/Diluent Per Acre	6oz/ac	8% solution
Amount of Chemical Applied	0.36oz (4 gal mix)	22.5oz (2.25 gal mix)
Equipment Used (atv,backpack,truck,saw)	ATV handgun (64 GPA)	Backpack (30 GPA)
Bio-Control (genus species)	-	-
# released / acre	-	-
Mechanical (mow,hand-pull)	-	-
Plant Phenology & Stage	Rosettes, Post-flowering	Rosette, Post-flowering
Dominant Pest(s)	Spotted knapweed	Houndstongue, Prickly lettuce, Clasping pepperweed
Equipment Used	-	-
Acres/Area Treated or # of plants	0.06 acres	0.08 acres
GPS Filename	-	-

Location #1 (Site specific description) Near the Maintenance Shop Location #2 (Site specific description) Bison Corrals	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. For Application #1: Spreader 90 used at rate of 3.2oz/10gal Dynamark used at rate of 3.0oz/10gal For Application #2: R-900 used at rate of 3.2oz/10gal Brandt Bigfoot dye used at 1oz/gal

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CITY, STATE, ZIP Stevensville, MT 59870	PHONE (406) 544-2552

	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	C. Holtz	
Date	9/22/2014	
County	Lake	
Time Start/Stop	12:30pm-2:00pm	
Temperature	81^{o}F	
Relative Humidity	45%	
Wind Speed/Direction (from)	3 mph E	
Pesticide Manufacturer	NuFarms Inc.	
Trade Name	AquaNeat	
EPA Reg # or Formulation	228-265	
Rate: Product/Diluent Per Acre	8% solution	
Amount of Chemical Applied	15oz (1.5 gal mix)	
Equipment Used (atv,backpack,truck,saw)	Backpack (30 GPA)	
Bio-Control (genus species)	-	
# released / acre	-	
Mechanical (mow,hand-pull)	-	
Plant Phenology & Stage	Rosettes, Post-flowering	
Dominant Pest(s)	Spotted knapweed, Common burdock, Houndstongue	
Equipment Used	-	
Acres/Area Treated or # of plants	0.06 acres	
GPS Filename	-	

Location #1 (Site specific description) Bison Corrals Location #2 (Site specific description)	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. R-900 used at rate of 3.2oz/10gal Brandt Bigfoot dye used at 1oz/gal

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	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	J. Wilson	J. Zarate
Date	9/23/2014	9/23/2014
County	Lake	Lake
Time Start/Stop	11:00am-12:00pm	11:00am – 12:30pm
Temperature	77^{o}F	80^{o}F
Relative Humidity	45%	50%
Wind Speed/Direction (from)	0-3 mph variable	0mph
Pesticide Manufacturer	BASF	-
Trade Name	Plateau	-
EPA Reg # or Formulation	241-365	-
Rate: Product/Diluent Per Acre	11oz/ac	-
Amount of Chemical Applied	0.04oz (0.125 gal mix)	-
Equipment Used (atv,backpack,truck,saw)	ATV handgun (36 GPA)	-
Bio-Control (genus species)	-	-
# released / acre	-	-
Mechanical (mow,hand-pull)	-	Hand-pull
Plant Phenology & Stage	Rosette	Leaf on
Dominant Pest(s)	Leafy spurge	Yellow toadflax
Equipment Used	-	-
Acres/Area Treated or # of plants	0.003 acres	0.0001 ac (2 plants)
GPS Filename	-	-

Location #1 (Site specific description) Alexander Basin, west of Indian Springs Location #2 (Site specific description) Amphitheater	COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc…. For Application #1: MSO used at rate of 32oz/ac Dynamark dye used at 3oz/10gal For Application #2: Surveyed historic location of yellow toadflax in amphitheater and along the north boundary road. Only 2 plants were found in amphitheater that were still somewhat green. No other yellow toadflax found but conditions were extremely dry and most plants in these areas were desiccated.