

Benton Lake National Wildlife Refuge

Benton Lake ISST

Accomplishments

Weed Species	Total Survey Acres ¹	Surveyed Acres Infested ²	Acres Treated ³
Canada thistle	43.13	3.49	3.49
Whitetop/Hoary cress	1.59	0.037	0.037
Project Site Totals	44.72	3.53	3.53

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.

Highlights

Schedule

Dates	Project Type	Target Species	Size of Crew	Project Notes
6-June-2013	Refuge Management Project	Whitetop/Hoary cress	3	Chemical treatment of Whitetop patch in the ditch along the West side of Bootlegger Trail.
5-September-2013	Refuge Management Project	Canada thistle	2	Chemical treatment of Canada thistle along entrance road of refuge.

Coordination and Cooperation

- ISST staff coordinated with Deputy Project Leader, Bob Johnson, prior to the project.



Canada Thistle, post treatment, at Benton Lake NWR. Photo by: Levi Morgan

Prevention and Education

- Whitetop and Canada thistle were targeted on the refuge to prevent the further spread to surrounding areas
- Surrounding roadways will continue to be a potential vector for further invasion on this site.

Early Detection and Rapid Response

- Deputy Project Leader, Bob Johnson, found a small patch of Whitetop (0.037 acres) in the West ditch along Bootlegger Trail.

Inventory and Monitoring

- ISST surveyed a 1.59 acre area outside of the 0.037 acre Whitetop infestation; no satellite infestations were found.

Management

- ISST treated 3.49 acres of Canada thistle on September 5, 2013.
 - Populations began at the beginning of the refuge entrance road and continued to the visitor center parking area. Patches typically did not extend more than 30 feet from the road.
 - 32.87 ounces of Milestone were used for chemical treatments of Canada thistle.
- ISST treated 0.037 acres of Whitetop/Hoary cress on June 6, 2013.
 - After the discovery of the population, 0.06 ounces of Escort XP was used to treat the patch.
 - Weather conditions at the time of treatment were optimal so effectiveness was high.

Herbicide Applied

- ISST applied 0.06 ounces of Escort XP to the Whitetop/Hoary cress infestation
- ISST applied 32.87 ounces of Milestone to Canada thistle on Benton Lake NWR.

Recommendations

- Continued hoary cress treatments should be made to eradicate the infestation. For best effectiveness, treatments should be made postemergence from pre-bloom to bloom stages of the plants.
- Canada thistle treatments along the road in 2013 proved very effective. Chemical treatments should continue in 2014 if time allows.
 - Mowing has been used to control the infestation as well. Mowing reduces the nutrient storage in the roots and suppresses flower formation. For mowing to be most effective, it should be repeated every 3 to 4 weeks.
 - Repeated mowing coupled with chemical treatments is the optimal control method for Canada thistle along the road.

Benton Lake Wetland Management District

Pumphouse Unit

Benton Lake ISST

Accomplishments

Weed Species	Total Survey Acres ¹	Surveyed Acres Infested ²	Acres Treated ³
Houndstongue	88.21	3.72	3.72
Whitetop/Hoary cress	6.97	0.004	0.004
Project Site Totals	95.18	3.724	3.724

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.

Highlights

Schedule

Dates	Project Type	Target Species	Size of Crew	Project Notes
29-May-2013	Refuge Management Project	Houndstongue	3	Point to point mechanical treatment of historic populations within the unit.
30-May-2013	Refuge Management Project	Houndstongue	3	Point to point mechanical treatment of historic populations within the unit.
04-June-2013	Refuge Management Project	Whitetop/Hoary cress	1	Point to point chemical treatment of historic populations within the unit.
04-June-2013	Refuge Management Project	Houndstongue	3	Point to point chemical and mechanical treatment of historic populations within the unit.
20-June-2013	Refuge Management Project	Houndstongue	3	Point to point mechanical treatment of historic populations within the unit.
24-June-2013	Refuge Management Project	Houndstongue	3	Point to point chemical and mechanical treatment of historic populations within the unit.

Coordination and Cooperation

- Project priorities and scheduling were coordinated with refuge by proposals and staff discussions.

Prevention and Education

- This is a heavily infested site. The Strike Team provides significant effort controlling houndstongue and whitetop/hoary cress and preventing additional infestation.

Early Detection and Rapid Response

In 2012, a small population of leafy spurge (0.005 acres) was found in culvert along road near the unit's southwest border.

Inventory and Monitoring

- ISST surveyed 95.18 total acres in 2013 compared to 97.77 acres in 2012. Point-to-point surveys were used rather than systematic coverage of the entire WPA.
- Of the total area surveyed, 88.21 acres was searched within the area of historical houndstongue infestations, which was similar to the 87.26 acres surveyed in 2012.
 - Observed fewer senesced seed heads in treated areas than in 2012.
 - Houndstongue flushed intermittently making it difficult to treat all populations.
- ISST searched 82.05 acres of historical whitetop/hoary cress infestations and found 0.004 acres were infested (0.09 acres in 2012). Treatments from 2012 have resulted in a 22.5% decrease in infestation size.
- ISST searched the historical area where leafy spurge was found. 2012 treatments appear to be very effective, no re-sprouts were found in or near the area. The site should continue to be monitored in 2013 and 2014 to be sure the infestation has been eradicated.
- Other weed species not targeted included: bull thistle, Canada thistle, cheatgrass, crested wheatgrass, field pennycress, musk thistle, and spotted knapweed.



Houndstongue close-up at Pumphouse Unit.
Photo by Levi Morgan.

Management

- ISST treated 0.004 acres of whitetop/hoary cress during one visit in 2013.
 - Historic populations throughout the unit were not actively growing in 2013. The only plant found was at a historic point just downstream from the pumphouse.
 - Canopy cover density decreased in populations compared to 2011 and 2012.
 - Whitetop treatments appeared effective upon review during subsequent houndstongue mechanical treatments.
- ISST treated 3.72 acres (4.55 acres in 2012) of houndstongue during several visits in 2013.
 - ISST treated all historical houndstongue populations accessible with ATV tank sprayers. Not all areas inaccessible to ATVs were treated due to time constraints and degree of infestations. Populations untreated were in thick shrubs/trees and needed to be removed with shovels.
 - Mechanical treatments were necessary due to weather and proximity to trees and bushes.
 - Populations were primarily in the drainages and understory of shrubs and trees.
 - Seed heads were bagged and disposed of in a dumpster.
- All ISST activities in the Pumphouse Unit were conducted point-to-point around historic observations of known weed populations. Although this minimizes disturbance to the site, it reduces the ability of the ISST to detect new populations before they become established on the rest of the WPA. It also dramatically limits the scope of weed mapping data for tracking invasive species population size over time and prevents the use of these data for rigorously determining effectiveness or supporting adaptive management strategies. Additional resources and methodologies will be required by refuge staff to now to determine or answer these types of questions.

Herbicide Applied

- ISST applied 0.418 ounces of Escort XP to houndstongue infestations in 2013.
- ISST applied 0.004 ounces of Escort XP to whitetop/hoary cress in 2013.

Recommendations

- Continued hoary cress treatments should be made to eradicate the infestation. For best effectiveness, treatments should be made postemergence from pre-bloom to bloom stages of the plants.
- Chemical treatments on the WPA have been effective; however, mechanical treatments have not been as successful due to the size of the infestations.
 - Digging, pulling, and cutting can be effective if the root crown is severed. Mechanical control must be done frequently to have any effect, and is only feasible for small infestations.
 - Finding a proper herbicide to treat infestations in the heavily vegetated areas would be more efficient and effective than digging, which has proven ineffective.



Legend

- Whitetop/Hoary cress
- USFWS Boundary

Survey Areas

- Whitetop/Hoary Cress Survey Area

Area Detail

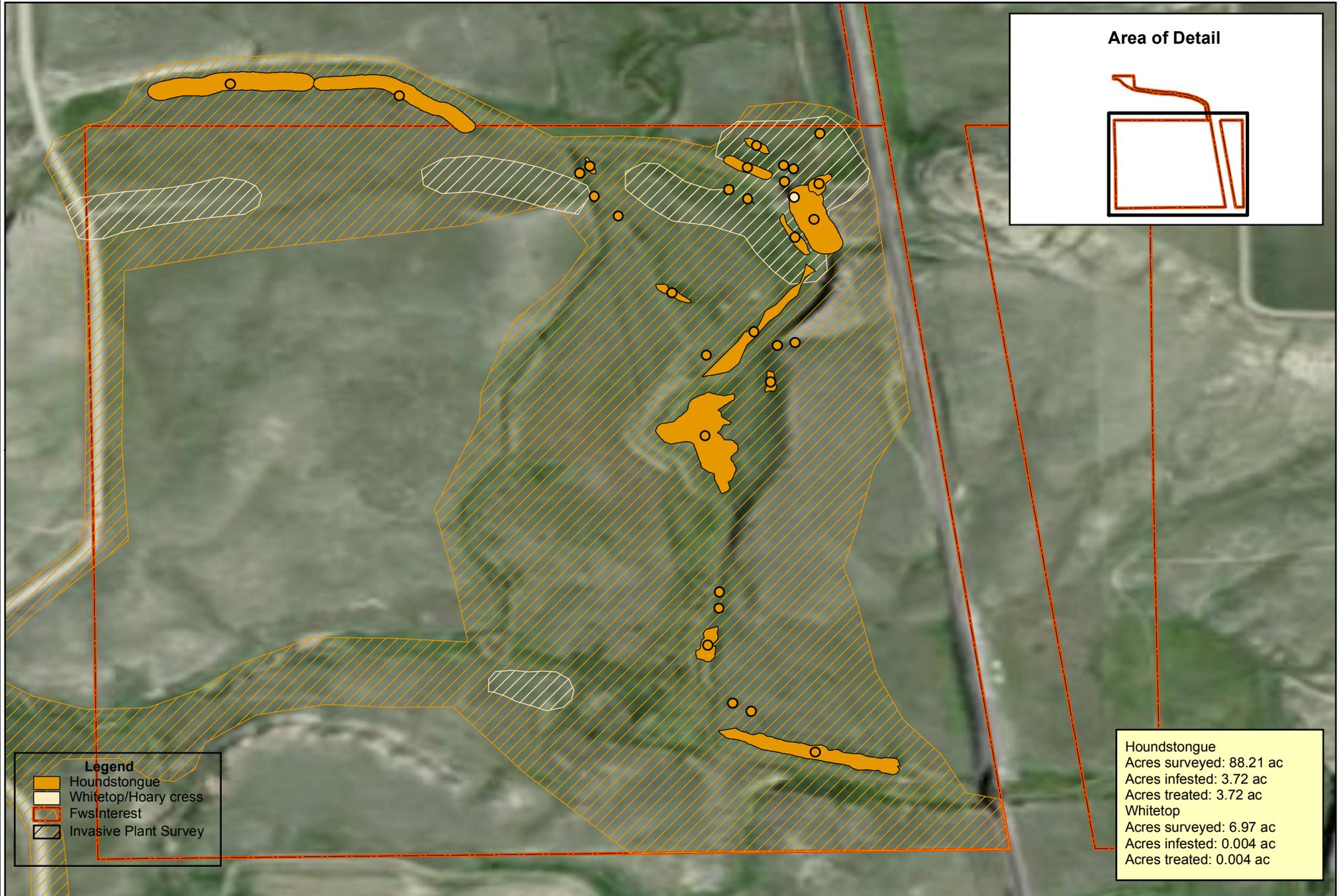
Whitetop
Acres Surveyed: 1.59 ac
Acres Infested: 0.037 ac
Acres Treated: 0.037 ac



0 0.125 0.25 0.5 Miles



0 0.2 0.4 0.8 Miles



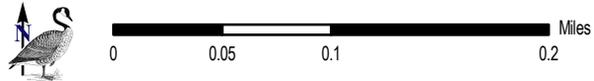
Legend

-  Houndstongue
-  Whitetop/Hoary cress
-  FwsInterest
-  Invasive Plant Survey

Area of Detail

Houndstongue
 Acres surveyed: 88.21 ac
 Acres infested: 3.72 ac
 Acres treated: 3.72 ac

Whitetop
 Acres surveyed: 6.97 ac
 Acres infested: 0.004 ac
 Acres treated: 0.004 ac



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

BUSINESS U.S. Fish and Wildlife Service	LICENSE# 104342-15
NAME Benton Lake NWR Invasive Species Strike Team	ADDRESS (Refuge or WPA) Benton Lake NWR
CITY, STATE, ZIP Great Falls, MT 59404	PHONE 406-727-7400 Ext. 213

	APPLICATION #1	APPLICATION #2
Applicator/Operator Name (s)	Levi Morgan	Bill Sparklin
Date	09-05-13	09-05-13
County	Cascade	Cascade
Time Start/Stop	0900-1100	0900-1100
Temperature	75°F	75°F
Relative Humidity	40%	40%
Wind Speed/Direction (from)	0	0
Pesticide Manufacturer	Dow Agro	Dow Agro
Trade Name	Milestone	Milestone
EPA Reg # or Formulation	62719-519	62719-519
Rate: Product/Diluent Per Acre	6 oz. / Ac.	6 oz. / Ac.
Amount of Chemical Applied	16.5 oz.	16.37 oz.
Equipment Used (atv,backpack,truck,saw)	ATV #10 boom	ATV #7 boom
Bio-Control (genus species)		
# released / acre		
Mechanical (mow,hand-pull)		
Plant Phenology & Stage	Pre-Flower	Pre-Flower
Dominant Pest(s)	Canada Thistle	Canada Thistle
Equipment Used	ATV #10 boom	ATV #7 boom
Acres/Area Treated or # of plants	Spot treatment, gps mapped	Spot treatment, gps mapped
GPS Filename		

Location #1 (Site specific description)

Sprayed and mapped Canada thistle along the BNL NWR entrance road, treated both sides of the road and the big patch behind the western most bunkhouse.
Location #2 (Site specific description)

COMMENTS/MAP: (any surfactant or dye used, PUP number, concerns with weather prior or post treatment, DETAILS, etc....)

Highlight @ 2.0 oz / 10 gal
MSO @ 32.0 oz / 10 gal

	Start	End	Total
Levi	10	0	10
	10	0	20
	10	8	22
Bill	10	0	10
	10	5	15

