# Weed Biocontrol Trip Report

2024 Weed Biological Control and Island Monitoring, Upper Missouri Watershed Alliance (UMOWA), Cascade and Lewis & Clark Counties, MT

## Forest Health Protection, Weed Biological Control

### Functional Assistance MFO-TR-

**Trip Dates:** July 22-23, 2024

**FHP Personnel Present:** Carol Randall, Forest Entomologist and Weed Biological Control Specialist, 208-783-2107

**Agency/Unit:** Upper Missouri Watershed Alliance, UMOWA; Monitoring summary for the Smith River Habitat Project (SRHP) SIMP plots.

**Local Contact:** Sherry Meador, smeador@umowa.org, UMOWA Board Chairman

**Others Present:** Sherry Meador, TimTilton, and Joe Kierkfeldt- UMOWA Board

**Keywords:** Standardized Impact Monitoring Protocol (SIMP); leafy spurge, *Euphorbia virgata*; Upper Missouri Watershed Alliance (UMOWA), Upper Missouri River, Smith River, MT; Cascade Co, MT; Meagher Co, MT; Smith River Habitat Project (SRHP).

On July 22, 2024, I, Carol Randall- Forest Service (FS) Forest Health Protection Entomologist, traveled to Cascade, MT and met with Sherry Meador, Board Chairman of the Upper Missouri Watershed Alliance (UMOWA), to discuss UMOWA's vegetation monitoring strategy as UMOWA evaluates and treats noxious weed populations along the Upper Missouri River. On July 23rd, Sherry and I were joined by Tim Tilton and Joe Kierkfeldt to visit candidate monitoring sites.

Our first stop was on an island in the Missouri River near Wolf Creek, MT (47.03077°N, 112.00166°W). The site is infested with noxious weeds including spotted knapweed (*Centaurea stoebe*), houndstongue (Cyanoglossum officinale)and hoary alyssum (*Berteroa incana*), and has been treated with herbicides by raft to prevent noxious weeds from dominating the island's vegetation which includes desirable plants such as milkweed (*Asclepias* species) and American licorice (*Glycyrrhiza lepidota*, Appendix 1). Based on a survey of the island, I do not feel it would be an appropriate monitoring site. The island has noxious weeds; however, we were unable to find a uniform patch of weeds that would accommodate a Standardized Impact Monitoring Protocol (SIMP, Appendix 2) monitoring transect.

After leaving Wold Creek, we continued to three sites where leafy spurge biological control agents, including two species of flea beetles (*Aphthona nigriscutus* and *A. lacertosa*) and the red-headed stem borer (*Oberea erythrocephala*) had been released.


**Figure 1: Locations of candidate leafy spurge (*Euphorbia virgata*) biological control monitoring sites for the Upper Missouri Watershed Alliance, from top to bottom: *Aphthona flava* site, Yetter LS, Blue Jay, and Eagle Island, 7/23/2024..**

The first site we visited was Yetter, and we installed a SIMP Plot (Appendix 3). Leafy spurge biological control agents had been released at Yetter a few weeks prior to this trip, so we did not disturb the recently released adult flea beetles with sweep netting. We did see evidence that flea beetles were present. We installed a SIMP vegetation monitoring transect (Appendix 2) and we found that across the 20-meter transect the average percent cover of leafy spurge in ten 1/8$^{th}$ meter$^2$ Daubenmire frame samples ranged from 10-40% with a mean of 22%; other weed cover ranged from 0-25% with a mean of 8% cover (mostly cheatgrass (*Bromus tectorum*)). Forbs/ shrubs cover ranged from 0-10% with a mean of 3% cover; desirable grasses accounted for between 0- 20% with a mean of 14.5% cover; bare ground (including rock) accounted for between 0-10% with a mean of 4% cover; litter accounted for between 40-65% with a mean of 53% cover; and no moss cover was observed. The height of the tallest leafy spurge plants in the sample ranged from 41-108 cm with a mean of 68.4 cm; the density of leafy spurge in the Daubenmire frames ranged from 16-184 stems per meter$^2$ with an average of 68.4 stems per meter$^2$

**Figure 2: Yetter leafy spurge SIMP site being installed, from left to right Sherry Meador, Joe Kierkfeldt, and Tim Tilton, 7/23/2024.**

After leaving the Yetter site we drove north to another area with a population of leafy spurge (Figure 1). While we did not find a large enough patch of leafy spurge to monitor, we did sweep the site and found that flea beetles were established in the area including an unexpected species, *Aphthona flava* (Figure 3)

**Figure 3: Sweep net containing leafy spurge plant material and Aphthona flea beetle adults, including *Aphthona flava*, 7/23/2024/**

Our next candidate monitoring site was on Blue Jay Road (Figure 4) where leafy spurge biological control agents were released over the past few years. We installed a SIMP Plot (Appendix 4). We found that across the 20-meter transect the average percent cover of leafy spurge in ten 1/8$^{th}$ meter$^2$ Daubenmire frame samples ranged from 15-40% with a mean of 25%; other weed cover ranged from 5-25% with a mean of 13.5% cover (mostly cheatgrass). There was no forbs/ shrubs cover; desirable grasses ranged from 5-25% with a mean of 11.5% cover; there was no bare ground; litter accounted for between 25-50% with a mean of 40% cover; and moss accounted for between 0-20% with a mean of 10.% cover. The height of the tallest leafy spurge plants in the sample ranged from 44-80 cm with a mean of 59.5 cm; the density of leafy spurge in the Daubenmire frames ranged from 120-296 stems per meter$^2$ with an average of 207 stems per meter$^2$.

We used sweep nets to monitor leafy spurge biological control agents at the Blue Jay road site. We conducted six sets of 10 sweeps, and found between 80-250 with an average of 168 *Aphthona*

*nigriscutus*; 2-5 with an average of <1 *Aphthona lacertosa*; 6 *Aphthona flava* in only one of the six sets of 10 sweeps; and we found red headed leafy spurge stem borers in 2 of the 6 sets of sweeps- 4 in one set and 1 in the other (Appendix 4)

**Figure 4 Blue Jay Road Leafy Spurge SIMP site, established 7/23/2024.**

Our final monitoring site was on Eagle Island (Figure 5) where leafy spurge biological control agents were released over the past few years. We installed a SIMP Plot (Appendix 5). We found that across the 20-meter transect the average percent cover of leafy spurge in ten 1/8$^{th}$ meter$^2$ Daubenmire frame

samples ranged from 0-50% with a mean of 20.5%; other weed cover ranged from 5-50% with a mean of 25% cover (mostly cheatgrass and houndstongue). Forbs/ shrubs cover ranged from 0-15% with a mean of 5% cover; there was no desirable grass sampled in the transect; bare ground (including rock) accounted for between 0-5% with a mean of 4% cover; litter accounted for between 30-65% with a mean of 45% cover; and moss accounted for between 0-5% with a mean of 0.5.% cover. The height of the tallest leafy spurge plants in the sample ranged from 14-102 cm with a mean of 57.5 cm; the density of leafy spurge in the Daubenmire frames ranged from 0-184 stems per meter$^2$ with an average of 84 stems per meter$^2$

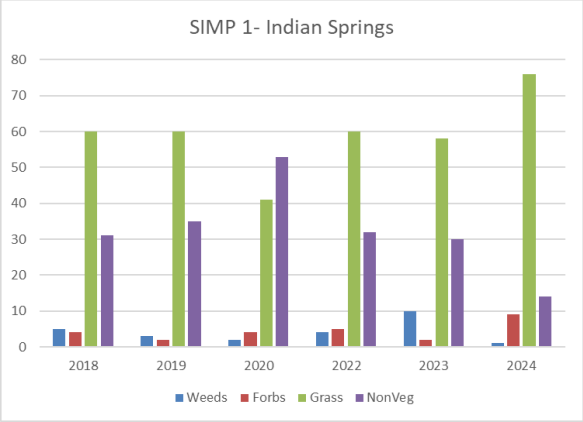
**Figure 5 Eagle Island SIMP monitoring transect, 7/23/2024.**

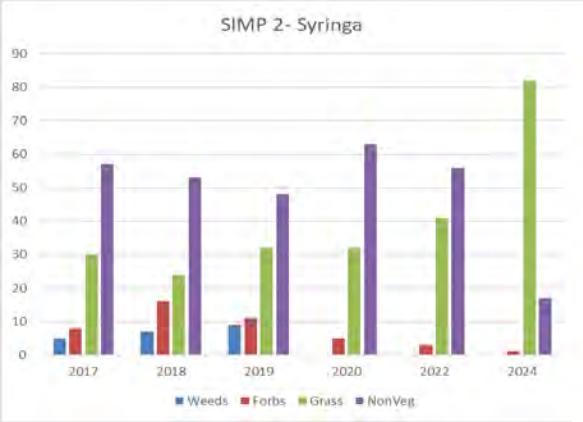
We conducted six sets of 10 sweeps, and found between 25-75 with an average of 50 *Aphthona nigriscutus*; and we found red headed leafy spurge stem borers in 2 of the 6 sets of sweeps- 1 in one set and 3 in the other (Appendix 5)

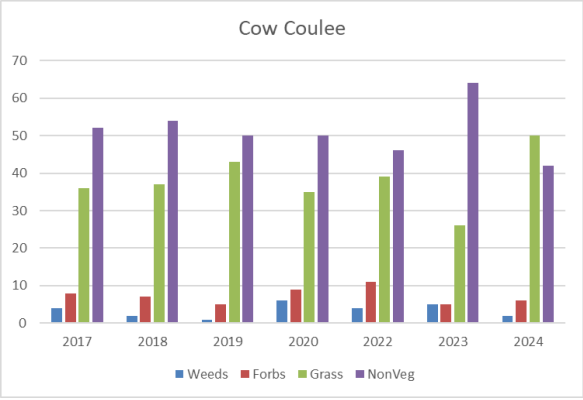
With the establishment of three SIMP plots, UMOWA has begun the important task of monitoring current conditions and putting a monitoring protocol in place which, if repeated annually, will enable UMOWA to detect changes in vegetation that will inform and help guide future management actions that ensure desirable vegetative communities are not displaced by invasive and noxious weeds along the Upper Missouri River.

## Smith River SIMP Monitoring Data through 2024

The West River Land Management, LLC. SIMP data for percent cover by vegetation class is summarized in Figure 6 (Appendix 6). Reductions in the percent cover of leafy spurge occurred on all SIMP sites at some point between 2017 and 2024, likely a result of herbicide applications. As the percent cover of leafy spurge decreased, the response of other vegetation classes was variable. One concern about using herbicides to control leafy spurge is the potential to decrease forb / shrub cover while increasing grass and non-vegetation cover; with three to four years of SIMP monitoring data such a trend is not evident across the eight sites; however, the cover of forbs was less than 10% on all SIMP plots but two in 2020. Herbicide treatments occurred prior to monitoring, so it is unclear what the percent of forb cover would be in the absence of herbicide treatment, though it is clear that leafy spurge would be more abundant.



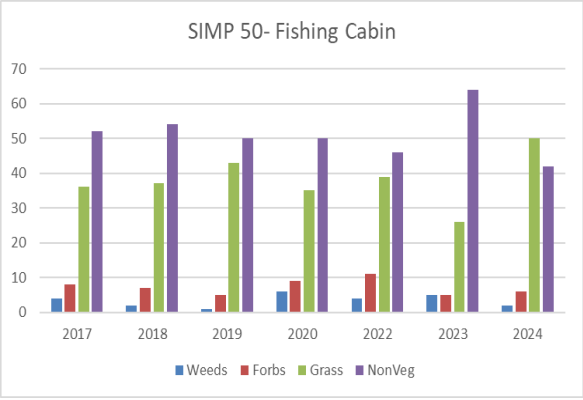




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**Figure 6 Changes in vegetative cover (weeds, forbs, desirable grass, non-vegetated) for the eight SIMP sites established along the Smith River and monitored by West Riverland LLC, 2017-2024.**

Leafy spurge density and height data may be found in Figure 7. Leafy spurge stem density decreased at all sites at some point between the 2017-2024 sample period, likely the result of herbicide treatments. Continued monitoring will be necessary to ensure leafy spurge populations/ densities remain at acceptable levels. If leafy spurge populations begin to increase at these sites and herbicide applications are not possible, we may consider releasing leafy spurge biological control agents and re-vegetation with desired grasses and forbs.

| Site | Year | # Stems/ M2 | Average height of tallest stem (cm) | Tallest Stem (cm) |
|---|---|---|---|---|
| SIMP ONE- INDIAN SPRINGS | 2017 | 20.8 | 32.5 | 52.5 |
| | 2018 | 4 | 24 | 28 |
| | 2019 | 0 | | |
| | 2020 | 3.2 | 28.75 | 45 |
| | 2022 | 5.6 | 43.33333333 | 55 |
| | 2023 | 1.33 | 25 | 25 |
| | 2024 | 1.6 | 21.5 | 30 |
| SIMP TWO- SYRINGA | 2017 | 29.6 | 28 | 60 |
| | 2018 | 24.8 | 46.11111111 | 60 |
| | 2019 | 68 | 48.7 | 70 |
| | 2020 | 0 | | |
| | 2022 | 0 | | |
| | 2024 | 0 | | |
| COW COULEE SIMP | 2018 | 4 | 50.5 | 56 |
| | 2019 | 0 | | |
| | 2020 | 5.6 | 22.5 | 45 |
| | 2022 | 0 | | |
| | 2023 | 0 | | |
| | 2024 | 3.2 | 2 | 2 |
| SIMP 50-DOWNSTREAM FISHING CABIN | 2017 | 8 | 63.333 | 75 |
| | 2018 | 10.4 | 41.3333333 | 58 |
| | 2019 | 2.4 | 5.833333333 | 35 |
| | 2020 | 22.4 | 37.66666667 | 63 |
| | 2022 | 9.6 | 20 | 60 |
| | 2023 | 32 | 64.6667 | 85 |
| | 2024 | 2.4 | 13.33333333 | 35 |
| SIMP 51- UPPER PARKER FAR END | 2017 | 46 | 51 | 83 |
| | 2018 | 0 | | |
| | 2019 | 0 | | |
| | 2020 | 1.6 | 12 | 35 |
| | 2022 | 0 | | |
| | 2024 | 3.2 | 28.5 | 60 |
| SIMP 52- CAVE VIEW SHORE RIDGE | 2017 | 65 | 89 | 100 |
| | 2018 | 0 | | |
| | 2019 | 0 | | |
| | 2020 | 0 | | |
| | 2022 | 1.6 | 4.5 | 45 |
| | 2024 | 2.4 | 2.9 | 20 |
| SIMP 53- HAY RAKE MEADOW | 2017 | 82 | 67 | 75 |
| | 2018 | 9.6 | 49.5 | 80 |
| | 2019 | 1.6 | 5 | 20 |
| | 2020 | 45.6 | 71.85 | 104 |
| | 2022 | 24.8 | 35 | 45 |
| | 2023 | 47.2 | 28.88888889 | 60 |
| | 2024 | 16 | 12.5 | 20 |
| SIMP THREE- STAGMILLER | 2017 | 141.6 | 25.5 | 35 |
| | 2018 | 7.2 | 14.33333333 | 25 |
| | 2020 | 2.4 | 17.5 | 35 |
| | 2022 | 0 | | |
| | 2023 | 0 | | |
| | 2024 | 0.8 | 3.75 | 7.5 |

**Figure 7: Smith River Standardized Impact Monitoring Protocol leafy spurge density (stems per $m^2$) and height (cm) data, 2017-2024.**

The data summarized in Figure 6 and 7 can be useful for planning future management activities. For example, revegetation activities may be prioritized on SIMP sites where there was no increase in desirable vegetation (forbs/ shrubs/ and grasses) after herbicide applications reduced the abundance of leafy spurge; prescribed fire may be considered on sites where a significant increase in litter was observed.

I applaud the SRHP's commitment to monitoring and evaluation as a key component of their invasive plant adaptive management strategy. By collecting annual data in leafy spurge infested areas treated with different weed control tactics, the SRHP will be better able to identify successful weed control strategies and how to best integrate management tools to provide the best result. If I may be of further assistance, please let me know.

/s/ Carol Randall

Carol Randall
Entomologist and Biological Control of Invasive Plants Specialist
USFS Northern and Intermountain Regions
Forest Health Protection
Smelterville, ID

## References

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## Appendix 1:

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

# Plant Fact Sheet

## AMERICAN LICORICE

### *Glycyrrhiza lepidota* Pursch.

Plant Symbol = GLLE3

*Contributed by: USDA NRCS Plant Materials Center, Manhattan, Kansas*

Copyright: Mike Haddock
Kansas Wildflowers and Grasses Website

**Alternate Names**
Wild licorice, licorice-root, and dessert root

**Uses**
*Grazing/Rangeland:* Forage analysis indicates that American licorice produces highly digestible and nutritious forage which compares favorably with alfalfa. Forage of juvenile licorice is greedily eaten by cattle. Close grazing will eliminate American licorice from a stand by the time the pasture is considered to be in fair condition. Its bur-like seed pod can become entangled in sheep wool and cause dockage when sold.

*Wildlife value*: Deer and pronghorn antelope consume licorice foliage. Birds and small rodents eat the seed of licorice, while pocket gophers consume their roots.

*Erosion control:* It has a deep root system extending some 12 feet into the prairie soil. It is recognized for its soil binding capabilities and it has wide ecological amplitude. Licorice has extensive rhizome production and it exhibited vigorous growth on mine spoil sites in North Dakota.

*Ethnobotanical:* American licorice was widely used as medicine by the Indians of the Great Plains. The Cheyenne's drank medicinal tea made from the peeled, dry roots of the plant for diarrhea and upset stomach. The Lakota's used the root as a medicine for flu. The Dakota's steeped the licorice leaves in boiling water to make a topical medicine for earache. The roots were also chewed and held in the mouth to relieve toothache. The Blackfeet made a tea from the root to relieve coughs, chest pain, and sore throat.

**Status**
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

**Description and Adaptation**
This plant belongs to the legume family (Fabaceae). *Glycyrrhiza* is a Greek word that means "sweet root". The species name, *lepidota,* means "scaly" and refers to the minute scales on young leaves. American licorice is a native, perennial legume common to disturbed areas, draws, woods, and depressions over much of temperate North America. The plant reproduces by seed and underground stems called rhizomes. Licorice has an erect growth habit and is 1.5 to 3 feet tall. Its stems are smooth and branched. The leaves are smooth, alternately attached to the stem, and have many (7 to 21) leaflets that are arranged opposite each other along the leaf stem. The flowers are on short stalks and crowded on terminal spikes. Its flowers are yellowish-white and shaped similar to alfalfa flowers. Flowers bloom June to August and seed matures from July to October. The seed pods are brown, leathery and ½ to 1 inch long. The pods are covered with many stout, hooked, brown spines which form a burr. This hooked pod assists the plant in dispersal since they stick to animal fur and are moved to new growing sites. The Dakota

Plant Materials <http://plant-materials.nrcs.usda.gov/>
Plant Fact Sheet/Guide Coordination Page <http://plant-materials.nrcs.usda.gov/intranet/pfs.html>
National Plant Data Center <http://npdc.usda.gov>

name for licorice is "wi-nawizi" (jealous woman), refers to the burrs which "take hold of a man". Seeds are green to reddish-brown, smooth and bean shaped.

**Establishment**
Seed scarification of licorice is important for quick and consistent germination of this legume species. Since this is a legume species it should be inoculated with *rhizobium Glycyrrhiza* Spec. 1 before planting to allow for nodulation of the plants. This inoculation will allow for the plant to produce nitrogen through the symbiotic relationship with the bacterium.

**Management**
Manage the plant for the intended use of the species whether that be for forage production, wildlife habitat, or conservation improvement.

**Pests and Potential Problems**
A bruchid beetle *Acanthosclides aureolus* is a major seed predator of American licorice. A rust fungus *Uromyces glycyrrhizae* has been reported on American licorice in South Dakota. In germination and establishment studies with licorice scientists discovered that some populations of this species exhibited chlorophyll deficient seedlings that were fatal to the individual seedlings. American licorice plants grown in a monoculture situation did not produce very many flowering structures.

**Environmental Concerns**
The only environmental concern would be the fact that some people consider licorice to be prone to weediness. It does have aggressive vegetative reproduction via rhizomes in a monoculture situation. The bur-like seed pods can become entangled in domestic livestock or animal fur.

**Cultivars, Improved, and Selected Materials (and area of origin)**
At the present time there are no cultivar releases or any type of plant materials releases of American licorice.

**Prepared By and Species Coordinator:**
Richard Wynia, USDA NRCS Manhattan Plant Materials Center, Manhattan, Kansas

Edited: 070817 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov/> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov/>

# Appendix 2

**Standardized Impact Monitoring Protocol (SIMP) for Biological Control of Invasive Plants**

### Sampling Design

The Standardized Impact Monitoring Protocol (SIMP) is based upon a permanent 20 meter vegetation sampling transect randomly placed in a suitable (at least ½ hectare) infestation of the target invasive plant (target weed). Annual vegetation sampling is conducted to characterize the plant community and the abundance and vigor of the target weed.

Biological control agent populations are sampled along six transects using sweep nets or timed counts. Transects are randomly placed through the target weed infestation. Either a series of ten "sweeps" are conducted along each transect; the number of biological control agents in the net after ten sweeps are counted and recorded. Alternatively six three-minute times count of adult biological control agents are conducted; one 3-minute observation along each of the six transects.

### Necessary Supplies

1) 25 x 50 cm Daubenmire frame made from PVC (preferred) or rebar,
2) 20 m (or longer) tape measure for the transect and smaller tape measure for target weed height,
3) 10 permanent markers (road whiskers) and nails,
4) Post or piece of rebar to permanently mark the starting point of the transect (1/2 to 2 meters in length),
5) Global Positioning System (GPS) to record plot location coordinates,
6) For sweep net sampling: sweep net, plastic tub to sort contents of sweep nets, and an aspirator to collect biological control agents from sweeps to be counted.
7) For Timed Counts: a stop watch.

### Vegetation Monitoring

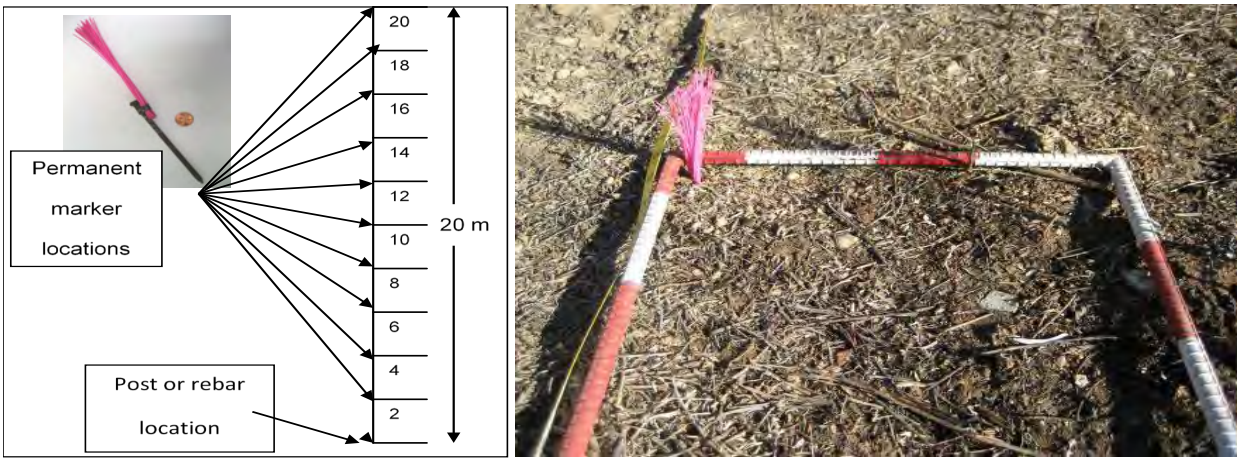


**Figure 7: Standardized Impact Monitoring Protocol (SIMP) transect design and monumentation: Left: schematic of the layout of the monitoring transect, Right: photo showing placement of Daubenmire frame along 20 meter transect and placement of the permanent marker.**

### *Installation of Vegetation Monitoring Transect

A 20 meter measuring tape is randomly placed within the target weed infestation. A rebar post is used to mark the starting point of the 20 meter transect. Permanent markers (road whiskers) are placed every two meters along the length of the 20 meter tape for a total of 10 markers (Figure 2).

### *Conducting Vegetation Monitoring

The Daubenmire frame was placed parallel to the vegetation monitoring transect on the 50 cm side with the permanent marker in the upper left corner for each of the 10 permanent markers (Figure 3). With the frame in position, estimates were made of percent cover of the target weed, other weeds, forbs, grasses, bare ground, litter, and moss within the frame to the nearest 5%. When trace amounts of a particular class occurred, it was marked as 5% and the coverage of other classes were adjusted so that total percent cover of all classes was 100% per state guidelines.

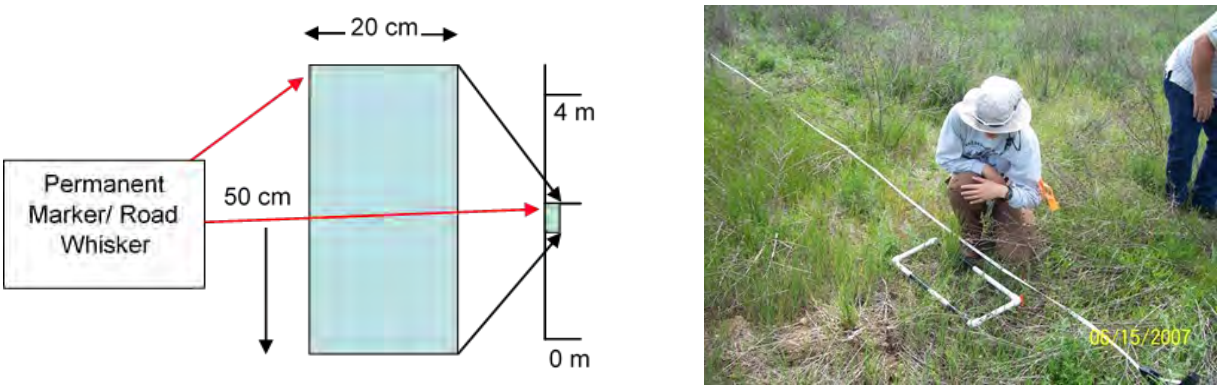


**Figure 8: How to position the Daubenmire frame along the 20 meter monitoring transect for the Standardized Impact Monitoring Protocol (SIMP) biological control monitoring program.**

***Remeasuring Existing Statewide Biological Control Monitoring Plots**

GPS coordinates recorded during plot establishment are entered into a Global Positioning Unit (GPS) and used to relocate the plot. Once at the plot, a 20 meter (or longer) tape is attached to the post marking the start of the vegetation monitoring transect (Figure 2). The 20 meter (or longer) tape is extended along the road whiskers installed at the time of plot establishment. If road whiskers are missing, they are replaced at the proper distance from the starting stake. Once the tape is extended and all road whiskers accounted for, vegetation monitoring occurs per the description below "Conducting Vegetation Monitoring."

Once vegetation monitoring is complete, six three-minute observations or six 10-sweep transects are made to count adult biocontrol agents. All data is noted on a data sheet, and a picture is taken of the plot including the plot stake and unique features of the landscape.

The number of target weed stems occurring within the Daubenmire frame are counted and the height of the tallest target weed stem are measured.

**Biocontrol Agent Monitoring**

**Sweep Net Method:** Six sweeping transects are randomly located in the target weed infestation avoiding the permanent vegetation monitoring transect. At the end of 10 sweeps, the contents of the sweep net are emptied into a plastic basin or tub and an aspirator is used to aspirate and count adult biocontrol agents. The number of biocontrol agent adults collected is recorded per transect sampled.

**Timed Count Method:** Six transects are randomly located in the target weed infestation avoiding the permanent vegetation monitoring transect. The observer then walks along a transect for a total of three minutes, counting all adult biological control agents observed. At the end of the three minute observation, the number of biocontrol adults observed is recorded on the datasheet, and the observer moves to another transect and repeats the three-minute observation.

## Appendix 3:

**Standardized Impact Monitoring Protocol (SIMP)**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Carol Randall/ TimTilton/Joe Kierkfeldt/Sherry Meador | | Date: 7/2382024 | Landowner: PVLA |
| Permanent site? Y | Site name: Yetter LS | | Weed: Leafy Spurge |
| Biocontrol agent: Aphthona beetles | | Insect Stage: adults | |
| Lat/Long: N 47.13899 | W 111.89016 | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: 1 acre | Picture taken? Y | | If Y, picture direction: 20 degrees N |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub % | Grass% | Bare ground % | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 40 | 0 | 0 | 0 | 5 | 55 | 0 | 100 |
| 2 | 30 | 5 | 0 | 5 | 10 | 50 | 0 | 100 |
| 3 | 15 | 25 | 5 | 10 | 5 | 40 | 0 | 100 |
| 4 | 20 | 10 | 5 | 10 | 5 | 50 | 0 | 100 |
| 5 | 30 | 10 | 10 | 5 | 5 | 40 | 0 | 100 |
| 6 | 30 | 5 | 0 | 15 | 0 | 50 | 0 | 100 |
| 7 | 15 | 0 | 0 | 10 | 5 | 70 | 0 | 100 |
| 8 | 10 | 5 | 0 | 15 | 5 | 65 | 0 | 100 |
| 9 | 20 | 5 | 0 | 10 | 0 | 65 | 0 | 100 |
| 10 | 10 | 15 | 10 | 20 | 0 | 45 | 0 | 100 |

Target weed size/density:

| Frame | Number of stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 2 | 108 |
| 2 | 16 | 85 |
| 3 | 16 | 73 |
| 4 | 14 | 85 |
| 5 | 23 | 75 |
| 6 | 14 | 52 |
| 7 | 8 | 56 |
| 8 | 9 | 48 |
| 9 | 21 | 61 |
| 10 | 9 | 41 |

Biological control agent:

| Count # | # insects seen during 3 minute count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes: First release a few weeks ago- did not sweep because did not want to disturb BCAs- other weeds Cheat grass, misc. mustards- shrub=snowberry

## Appendix 4

**Standardized Impact Monitoring Protocol (SIMP)**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Carol Randall/ Tim Tilton | | Date: 7/23/2024 | Landowner: PVLA |
| Permanent site? Y | Site name: Blue Jay Rd LS (Landell) | | Weed: Leafy Spurge |
| Biocontrol agent: Aphthona spp/ Oberea | | Insect Stage: Adult | |
| Lat/Long: N 47.12898 | W 111.89634 | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: 5 | Picture taken? | Y | If Y, picture direction: 178 degree S |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub % | Grass% | Bare ground % | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 25 | 15 | 0 | 25 | 0 | 35 | 0 | 100 |
| 2 | 15 | 20 | 0 | 10 | 0 | 50 | 5 | 100 |
| 3 | 20 | 15 | 0 | 15 | 0 | 35 | 15 | 100 |
| 4 | 30 | 5 | 0 | 15 | 0 | 45 | 5 | 100 |
| 5 | 25 | 15 | 0 | 15 | 0 | 25 | 20 | 100 |
| 6 | 20 | 15 | 0 | 5 | 0 | 40 | 20 | 100 |
| 7 | 20 | 25 | 0 | 5 | 0 | 40 | 10 | 100 |
| 8 | 20 | 5 | 0 | 10 | 0 | 45 | 20 | 100 |
| 9 | 35 | 10 | 0 | 5 | 0 | 50 | 0 | 100 |
| 10 | 40 | 10 | 0 | 10 | 0 | 35 | 5 | 100 |

Target weed size/density:

| Frame | Number of stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 15 | 57 |
| 2 | 24 | 47 |
| 3 | 27 | 57 |
| 4 | 20 | 62 |
| 5 | 18 | 57 |
| 6 | 23 | 73 |
| 7 | 28 | 80 |
| 8 | 31 | 68 |
| 9 | 36 | 44 |
| 10 | 37 | 50 |

Biological control agent:

| Count # | # insects seen during 3 minute count |
|---|---|
| 1 | 250 APNI/ 4 OBER |
| 2 | 220 APNI/ 2 APLA |
| 3 | 150 APNI/ 5 APLA/ 6 APFL |
| 4 | 80 APNI |
| 5 | 130 APNI/ 1 OBER |
| 6 | 180 APNI |

Notes: other weeds= cheatgrass

## Appendix 5

**Standardized Impact Monitoring Protocol (SIMP)**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Carol Randall/ Tim Tilton/ Joe Kierkfeldt | | Date: 7/23/2024 | Landowner: PVLA |
| Permanent site? Y | Site name: Eagle Island LS | | Weed: Leafy Spurge |
| Biocontrol agent: Aphthona beetles | | Insect Stage: adults | |
| Lat/Long: N 47.12109 | W 111.88825 | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: 3 acres | Picture taken? Y | | If Y, picture direction: 0 degrees N |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub % | Grass% | Bare ground % | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 50 | 0 | 0 | 5 | 45 | 0 | 100 |
| 2 | 5 | 40 | 10 | 0 | 5 | 40 | 0 | 100 |
| 3 | 5 | 30 | 15 | 0 | 5 | 45 | 0 | 100 |
| 4 | 15 | 30 | 0 | 0 | 0 | 55 | 0 | 100 |
| 5 | 15 | 5 | 10 | 0 | 5 | 65 | 0 | 100 |
| 6 | 15 | 10 | 15 | 0 | 5 | 55 | 0 | 100 |
| 7 | 50 | 15 | 0 | 0 | 0 | 30 | 5 | 100 |
| 8 | 50 | 15 | 0 | 0 | 5 | 30 | 0 | 100 |
| 9 | 35 | 20 | 0 | 0 | 5 | 40 | 0 | 100 |
| 10 | 15 | 35 | 0 | 0 | 5 | 45 | 0 | 100 |

Target weed size/density:

| Frame | Number of stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | |
| 2 | 2 | 16 |
| 3 | 3 | 14 |
| 4 | 18 | 65 |
| 5 | 15 | 64 |
| 6 | 16 | 74 |
| 7 | 11 | 102 |
| 8 | 13 | 81 |
| 9 | 23 | 69 |
| 10 | 4 | 33 |

Biological control agent:

| Count # | # insects seen during 3 minute count |
|---|---|
| 1 | 75 APNI 1 OBER |
| 2 | 63 APNI |
| 3 | 40 APNI |
| 4 | 68 APNI |
| 5 | 29 APNI |
| 6 | 25 APNI 2 OBER |

Notes: Other weeds include houndstongue and cheatgrass, shrub = snowberry

## Appendix 6

| Site | Year | Target weed% | Other weed% | Forb/shrub% | Grass% | Bare ground% | Litter% | Moss % | Date Monitored |
|---|---|---|---|---|---|---|---|---|---|
| SIMP ONE- INDIAN SPRINGS | 2017 | 2.5 | 1.5 | 4 | 68 | 0.5 | 23.5 | 0 | 6/9/2017 |
| | 2018 | 1 | 4 | 4 | 60 | 1 | 27.5 | 2.5 | 6/28/2018 |
| | 2019 | 0 | 3 | 2 | 60 | 0 | 35 | 0 | 6/25/2019 |
| | 2020 | 2 | 0 | 3.5 | 41.5 | 1 | 51.5 | 0.5 | 7/7/2020 |
| | 2022 | 1.5 | 2 | 5 | 60 | 1.5 | 30 | 0 | 7/9/2022 |
| | 2023 | 6.66666667 | 2.5 | 1.666666667 | 58.333 | 4.1666667 | 26.66667 | 0 | 7/5/2023 |
| | 2024 | 1 | 0 | 9 | 75.5 | 2 | 6.5 | 6 | 6/24/2024 |
| SIMP TWO- SYRINGA | 2017 | 5 | 0 | 8 | 29.5 | 14 | 33 | 10.5 | 6/11/2017 |
| | 2018 | 6.5 | 0 | 16 | 24 | 3.5 | 47.5 | 4.5 | 6/29/2018 |
| | 2019 | 9 | 0 | 10.5 | 32.5 | 5.5 | 29.5 | 13 | 6/26/2019 |
| | 2020 | 0 | 0 | 4.5 | 32 | 16 | 34.5 | 13 | 7/9/2020 |
| | 2022 | 0 | 0 | 3 | 41 | 27.5 | 20 | 8.5 | 7/10/2022 |
| | 2024 | 0 | 0 | 0.5 | 81.5 | 3 | 10.5 | 4.5 | 6/25/2024 |
| COW COULEE- SIMP | 2018 | 1.5 | 11 | 12 | 34 | 16 | 15.5 | 10 | 10/8/2018 |
| | 2019 | 0 | 5 | 8.5 | 26.5 | 12 | 38 | 6 | 6/28/2019 |
| | 2020 | 1 | 35 | 8 | 26 | 9.5 | 18.5 | 2 | 7/10/2020 |
| | 2022 | 0 | 0.5 | 22.5 | 43 | 11 | 23 | 0 | 7/10/2022 |
| | 2023 | 0 | 13 | 15 | 26 | 17 | 26 | 3 | 9/29/2023 |
| | 2024 | 1 | 0 | 8.5 | 43.5 | 22.5 | 23 | 1.5 | 6/27/2024 |
| SIMP 50-DOWNSTREAM FISHING CABIN | 2017 | 3 | 1 | 8 | 35.5 | 0 | 14.5 | 38 | 9/28/2017 |
| | 2018 | 1.5 | 0 | 7 | 37 | 0.5 | 31.5 | 22.5 | 7/13/2018 |
| | 2019 | 0.5 | 0 | 5 | 43 | 0 | 32 | 20 | 6/29/2019 |
| | 2020 | 5.5 | 0 | 9.5 | 35 | 0.5 | 32 | 17.5 | 7/12/2020 |
| | 2022 | 3.5 | 0 | 11 | 39.5 | 0.5 | 24.5 | 21 | 7/11/2022 |
| | 2023 | 4.5 | 0 | 4.5 | 26 | 5 | 24 | 36 | 9/27/2023 |
| | 2024 | 1.5 | 0 | 5.5 | 49.5 | 2 | 8.5 | 33 | 6/28/2024 |
| SIMP 51- UPPER PARKER FAR END | 2017 | 9.5 | 2 | 7.5 | 62.5 | 0 | 18.5 | 0 | 9/28/2017 |
| | 2018 | 0 | 0 | 9.5 | 31.5 | 9 | 50.5 | 0 | 7/14/2018 |
| | 2019 | 0 | 1 | 19.5 | 38.5 | 3 | 37 | 0.5 | 6/30/2019 |
| | 2020 | 1 | 2 | 20.5 | 55 | 5.5 | 16 | 0 | 7/12/2020 |
| | 2022 | 0 | 1 | 5 | 60.5 | 6.5 | 26.5 | 0.5 | 7/11/2022 |
| | 2024 | 1.5 | 0 | 6 | 64.5 | 6 | 21.5 | 0.5 | 6/29/2024 |
| SIMP 52- CAVE VIEW SHORE RIDGE | 2017 | 12.5 | 2.5 | 13 | 53 | 1.5 | 16.5 | 2 | 9/28/2017 |
| | 2018 | 0 | 0 | 7 | 63 | 8 | 15 | 7 | 9/18/2018 |
| | 2019 | 0 | 0 | 11.5 | 57.5 | 2,5 | 24 | 4.5 | 6/30/2019 |
| | 2020 | 0 | 0 | 14.5 | 64 | 3 | 12.5 | 6 | 7/13/2020 |
| | 2022 | 0.5 | 0 | 15.5 | 59.5 | 0 | 22.5 | 2 | 7/11/2022 |
| | 2024 | 1 | 0 | 21.5 | 55.5 | 1.5 | 16 | 4.5 | 6/29/2024 |
| SIMP 53- HAY RAKE MEADOW | 2017 | 19 | 0.5 | 0 | 54.5 | 10 | 12.5 | 2.5 | 9/28/2017 |
| | 2018 | 3 | 0 | 1 | 58 | 20 | 14.5 | 3.5 | 9/18/2018 |
| | 2019 | 0.5 | 0 | 0 | 33 | 23 | 25 | 18.5 | 6/30/2019 |
| | 2020 | 8.5 | 1.5 | 1.5 | 54 | 14 | 18.5 | 2 | 9/4/2020 |
| | 2022 | 5.5 | 0 | 2 | 57.5 | 16.5 | 18 | 0.5 | 7/11/2022 |
| | 2023 | 6 | 2 | 1.5 | 65 | 11.5 | 6 | 8 | 9/28/2023 |
| | 2024 | 2 | 0 | 2.5 | 65.5 | 14.5 | 14 | 1.5 | 6/29/2024 |
| SIMP THREE- STAGMILLER | 2017 | 19.5 | 8.5 | 17 | 9.5 | 30.5 | 12.5 | 2 | 6/24/2017 |
| | 2018 | 1.5 | 0 | 4 | 33 | 30.5 | 12 | 19 | 7/4/2018 |
| | 2020 | 0.5 | 19 | 2.5 | 23 | 24.5 | 10.5 | 20 | 7/13/2020 |
| | 2022 | 0 | 0 | 0 | 18 | 62.5 | 7.5 | 15 | 7/11/2022 |
| | 2023 | 0 | 0 | 5 | 28 | 47.5 | 8.5 | 11 | 9/28/2023 |
| | 2024 | 0.5 | 0.5 | 1.5 | 20.5 | 31 | 31.5 | 14.5 | 6/29/2024 |

*Monitoring biological control agents is an essential component of a successful biological control program. Monitoring data can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Colter & Haley | | Date: 6.24.24 | Landowner: National Forest Serv. |
| Permanent site? Y N | Site name: Indian Springs | | Weed: Leafy Spurge |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | (Yes) No | If Y, picture direction: up + down |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 10% | 75% | 0% | 10% | 5% | 100% |
| 2 | 0% | 0% | 20% | 70% | 0% | 5% | 5% | 100% |
| 3 | 0% | 0% | 5% | 80% | 5% | 5% | 5% | 100% |
| 4 | 0% | 0% | 25% | 53% | 5% | 5% | 10% | 100% |
| 5 | 0% | 0% | 10% | 80% | 0% | 5% | 5% | 100% |
| 6 | 0% | 0% | 0% | 80% | 5% | 10% | 5% | 100% |
| 7 | 5% | 0% | 5% | 80% | 0% | 5% | 5% | 100% |
| 8 | 0% | 0% | 5% | 75% | 5% | 10% | 5% | 100% |
| 9 | 5% | 0% | 5% | 80% | 0% | 5% | 5% | 100% |
| 10 | 0% | 0% | 5% | 80% | 0% | 5% | 10% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 0 | — |
| 6 | 0 | — |
| 7 | 1 | 5in |
| 8 | 0 | — |
| 9 | 1 | 12in |
| 10 | 0 | — |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes:

*Monitoring biological control agents is an essential component of a successful biological control program. Monitoring data can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Colter + Haley | | Date: 6.25.24 | Landowner: State of Montana |
| Permanent site? (Y) N | Site name: Syringa | | Weed: Leafy Spurge |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | (Yes) No | If Y, picture direction: |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 0% | 80% | 0% | 15% | 5% | 100% |
| 2 | 0% | 0% | 0% | 85% | 0% | 10% | 5% | 100% |
| 3 | 0% | 0% | 5% | 80% | 0% | 10% | 5% | 100% |
| 4 | 0% | 0% | 0% | 80% | 0% | 15% | 5% | 100% |
| 5 | 0% | 0% | 0% | 90% | 0% | 5% | 5% | 100% |
| 6 | 0% | 0% | 0% | 90% | 0% | 5% | 5% | 100% |
| 7 | 0% | 0% | 0% | 80% | 5% | 15% | 0% | 100% |
| 8 | 0% | 0% | 0% | 75% | 10% | 10% | 5% | 100% |
| 9 | 0% | 0% | 0% | 80% | 5% | 10% | 5% | 100% |
| 10 | 0% | 0% | 0% | 75% | 10% | 10% | 5% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 0 | — |
| 6 | 0 | — |
| 7 | 0 | — |
| 8 | 0 | — |
| 9 | 0 | — |
| 10 | 0 | — |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes: Original SIMP had been destroyed so we installed a new SIMP a few yards away, in a slightly better location. Data may vary slightly.

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**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Lotter & Hadley | | Date: 6.27.24 | Landowner: Forest Service |
| Permanent site? (Y) N | Site name: Cow Coulee | | Weed: leafy Spurge, Thistle |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | (Yes) No | If Y, picture direction: both |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 5% | 40% | 30% | 20% | 5% | 100% |
| 2 | 0% | 0% | 0% | 60% | 5% | 30% | 5% | 100% |
| 3 | 0% | 0% | 0% | 55% | 20% | 20% | 5% | 100% |
| 4 | 0% | 0% | 0% | 50% | 20% | 30% | 0% | 100% |
| 5 | 0% | 0% | 0% | 70% | 10% | 20% | 0% | 100% |
| 6 | 0% | 0% | 0% | 75% | 5% | 20% | 0% | 100% |
| 7 | 0% | 0% | 0% | 80% | 5% | 15% | 0% | 100% |
| 8 | 0% | 0% | 0% | 5% | 70% | 25% | 0% | 100% |
| 9 | 5% | 0% | 30% | 0% | 55% | 10% | 0% | 100% |
| 10 | 5% | 0% | 50% | 0% | 5% | 40% | 0% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 0 | — |
| 6 | 0 | — |
| 7 | 0 | — |
| 8 | 0 | — |
| 9 | 3 | 4" - Thistle |
| 10 | | — |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes:

*Monitoring biological control agents is an essential component of a successful biological control program. Monitoring data can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Hafley + Colter | | Date: June 28th 2024 | Landowner: NB Mayers |
| Permanent site? (Y) N | Site name: Fishing Cabin | | Weed: Leafy Spurge |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | (Yes) No | If Y, picture direction: up/down stream |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 5% | 60% | 5% | 10% | 20% | 100% |
| 2 | 5% | 0% | 10% | 50% | 5% | 10% | 20% | 100% |
| 3 | 0% | 0% | 5% | 60% | 0% | 5% | 30% | 100% |
| 4 | 0% | 0% | 5% | 55% | 5% | 5% | 30% | 100% |
| 5 | 0% | 0% | 0% | 50% | 5% | 5% | 40% | 100% |
| 6 | 5% | 0% | 5% | 60% | 0% | 20% | 10% | 100% |
| 7 | 0% | 0% | 0% | 70% | 0% | 10% | 20% | 100% |
| 8 | 0% | 0% | 0% | 30% | 0% | 10% | 60% | 100% |
| 9 | 5% | 0% | 5% | 35% | 0% | 5% | 50% | 100% |
| 10 | 0% | 0% | 20 | 25% | 0% | 5% | 30% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 1 | 12in |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 0 | — |
| 6 | 1 | 6in |
| 7 | 0 | — |
| 8 | 0 | — |
| 9 | 1 | 14in |
| 10 | 0 | — |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes:

*Monitoring biological control agents is an essential component of a successful biological control program. Monitoring data can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Haley & Colter | | Date: 6-29-24 | Landowner: Clearwater Canyon LLC |
| Permanent site? (Y) N | Site name: Cave Ustu SIMP | | Weed: Leafy Spurge |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year: | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | (Yes) No | If Y, picture direction: up/down |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 10% | 80% | 0% | 10% | 0% | 100% |
| 2 | 0% | 0% | 10% | 60% | 0% | 20% | 10% | 100% |
| 3 | 0% | 0% | 10% | 50% | 5% | 30% | 5% | 100% |
| 4 | 0% | 0% | 60% | 30% | 0% | 10% | 0% | 100% |
| 5 | 5% | 0% | 20% | 55% | 0% | 15% | 5% | 100% |
| 6 | 0% | 0% | 25% | 60% | 0% | 10% | 5% | 100% |
| 7 | 0% | 0% | 10% | 70% | 0% | 20% | 0% | 100% |
| 8 | 0% | 0% | 0% | 70% | 5% | 20% | 5% | 100% |
| 9 | 0% | 0% | 20% | 50% | 5% | 15% | 10% | 100% |
| 10 | 5% | 0% | 50% | 30% | 0% | 10% | 5% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 2 | 8in |
| 6 | 0 | — |
| 7 | 0 | — |
| 8 | 0 | — |
| 9 | 0 | — |
| 10 | 1 | 35in |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes:

*can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Colter + Haley | | Date: 6.29.24 | Landowner: Ned Morgens |
| Permanent site? (Y) N | Site name: Hay Table | | Weed: Leafy Spurge |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | Yes No | If Y, picture direction: |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 0% | 70% | 15% | 15% | 0% | 100% |
| 2 | 0% | 0% | 0% | 75% | 10% | 15% | 0% | 100% |
| 3 | 0% | 0% | 0% | 70% | 15% | 15% | 0% | 100% |
| 4 | 0% | 0% | 0% | 75% | 10% | 15% | 0% | 100% |
| 5 | 0% | 0% | 0% | 70% | 20% | 10% | 0% | 100% |
| 6 | 0% | 0% | 5% | 70% | 15% | 5% | 5% | 100% |
| 7 | 5% | 0% | 5% | 60% | 15% | 15 | 0% | 100% |
| 8 | 5% | 0% | 5% | 50% | 20% | 20% | 5% | 100% |
| 9 | 5% | 0% | 10% | 60% | 10% | 10% | 0% | 100% |
| 10 | 5% | 0% | 0% | 55% | 15% | 20% | 5% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 0 | — |
| 6 | 0 | — |
| 7 | 2 | 6in |
| 8 | 5 | 8in |
| 9 | 7 | 3in |
| 10 | 6 | 3in |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes: Re-installed entire simp in same area. Entire field is heavily grazed most fall growing seasons. Spurge is more prevalent throughout the field than the simp data

*can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Colter + Haley | | Date: 6.29.24 | Landowner: Ned Morgens |
| Permanent site? (Y) N | Site name: Hay Table | | Weed: Leafy Spurge |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | Yes No | If Y, picture direction: |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 0% | 70% | 15% | 15% | 0% | 100% |
| 2 | 0% | 0% | 0% | 75% | 10% | 15% | 0% | 100% |
| 3 | 0% | 0% | 0% | 70% | 15% | 15% | 0% | 100% |
| 4 | 0% | 0% | 0% | 75% | 10% | 15% | 0% | 100% |
| 5 | 0% | 0% | 0% | 70% | 20% | 10% | 0% | 100% |
| 6 | 0% | 0% | 5% | 70% | 15% | 5% | 5% | 100% |
| 7 | 5% | 0% | 5% | 60% | 15% | 15 | 0% | 100% |
| 8 | 5% | 0% | 5% | 50% | 20% | 20% | 5% | 100% |
| 9 | 5% | 0% | 10% | 40% | 10% | 10% | 0% | 100% |
| 10 | 5% | 0% | 0% | 55% | 15% | 20% | 5% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 0 | — |
| 6 | 0 | — |
| 7 | 2 | 6in |
| 8 | 5 | 8in |
| 9 | 7 | 3in |
| 10 | 6 | 3in |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes: Re-installed entire simp in same area. Entire field is heavily grazed most fall growing seasons. Spurge is more prevalent throughout the field than the simp data

*Monitoring biological control agents is an essential component of a successful biological control program. Monitoring data can be used to accurately document the impact of this weed management practice. This monitoring form has been endorsed by the Nez Perce Biocontrol Center, University of Idaho, Forest Health Protection, Bureau of Land Management, and Idaho State Department of Agriculture. The monitoring information from this form will be used to document vegetation cover, target weed density, and biological control agent abundance. When conducted annually, this monitoring data will document changes that occur over time.*

**Standardized Impact Monitoring Protocol (SIMP) Biological Control Monitoring Form**

General Information:

| | | | |
|---|---|---|---|
| Observer(s): Colter + Haley | | Date: 6.29.24 | Landowner: Ned Morgens |
| Permanent site? (Y) N | Site name: Stegmiller | Weed: leafy spurge, Houndstongue, Knapweed | |
| Biological control agent: | | Insect Stage: | |
| Lat/Long: N ° ' | W ° ' | UTM Datum: | UTM E: |
| | | UTM Year : | UTM N: |

Weed Infestation:

| | | | |
|---|---|---|---|
| Size in acres: | Picture taken? | (Yes) No | If Y, picture direction: Both |

Vegetation cover (all in %, rows add to 100%):

| Frame | Target weed% | Other weed% | Forb/shrub% | Perennial Grass% | Bare ground% | Litter% | Moss% | Total% |
|---|---|---|---|---|---|---|---|---|
| 1 | 0% | 0% | 0% | 0% | 20% | 20% | 60% | 100% |
| 2 | 0% | 0% | 0% | 5% | 40% | 35% | 20% | 100% |
| 3 | 0% | 0% | 0% | 5% | 80% | 10% | 5% | 100% |
| 4 | 0% | 0% | 0% | 5% | 20% | 70% | 5% | 100% |
| 5 | 5% | 0% | 0% | 5% | 5% | 85% | 5% | 100% |
| 6 | 0% | 0% | 0% | 15% | 40% | 40% | 5% | 100% |
| 7 | 0% | 0% | 5% | 35% | 30% | 20% | 10% | 100% |
| 8 | 0% | 5% | 5% | 35% | 30% | 20% | 5% | 100% |
| 9 | 0% | 0% | 5% | 60% | 15% | 10% | 10% | 100% |
| 10 | 0% | 0% | 0% | 40% | 30% | 10% | 20% | 100% |

Target weed size/density:

| Frame | Number of Stems | Height of tallest stem (cm) |
|---|---|---|
| 1 | 0 | — |
| 2 | 0 | — |
| 3 | 0 | — |
| 4 | 0 | — |
| 5 | 1 | 3in |
| 6 | 0 | — |
| 7 | 0 | — |
| 8 | 0 | — |
| 9 | 0 | — |
| 10 | 0 | — |

Biological control agent:

10 sweeps repeated 6 times (for AP, GA, LA, CYAC & OBER) **OR** a 3 minute timed count repeated 6 times (for MEJA, ACMA galls & URCA galls)

| Count site | Insect (or gall) count |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Notes: Used multi-colored flags. Rocky bank that appears to have been washed out at some point. Cows also frequent this area.