



2014 Annual Report

Spalding's Catchfly, *Silene spaldingii*, Wallowa Lake Key Conservation Area

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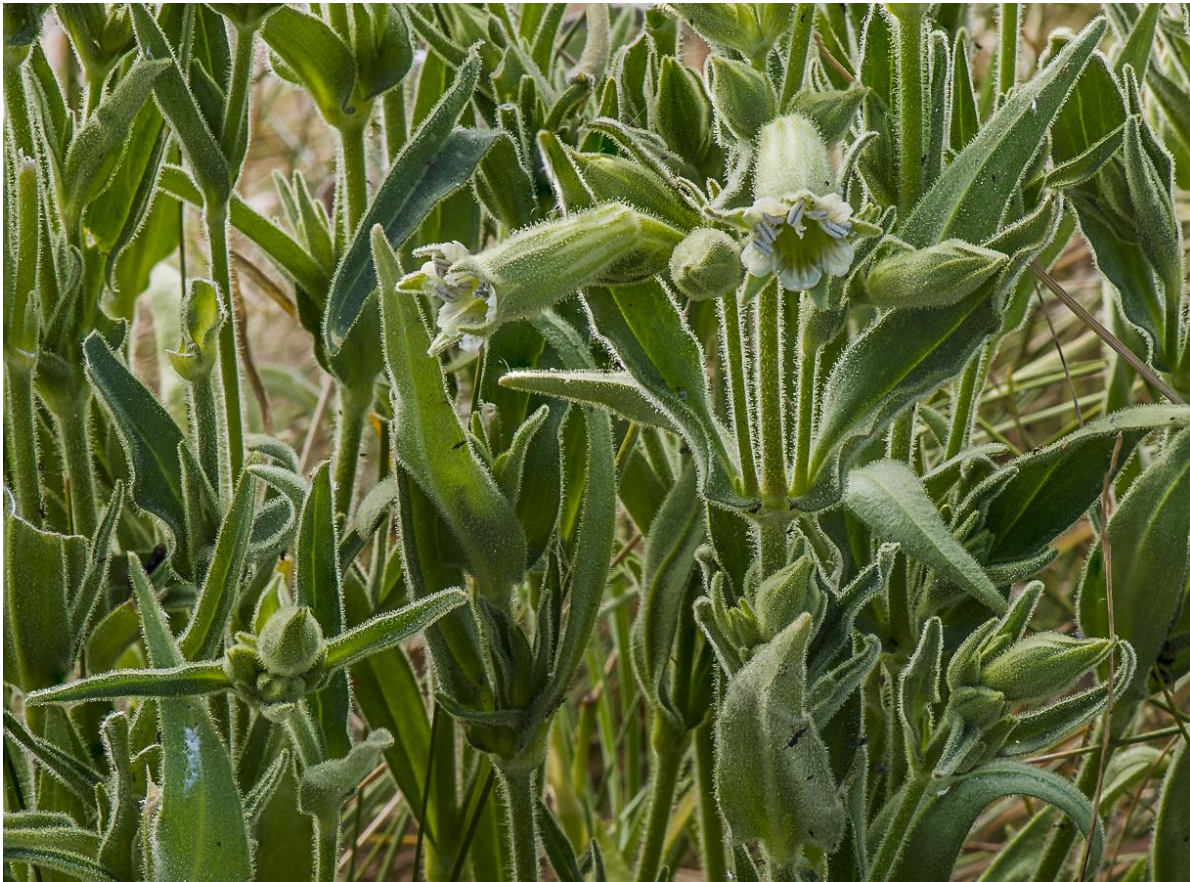


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INTRODUCTION

Spalding's Catchfly

Spalding's catchfly (*Silene spaldingii*), is an herbaceous perennial plant in the pink family (Caryophyllaceae). The plants, ranging in height from 20 to 76 centimeters (8 to 30 inches), rise from a persistent caudex atop a long taproot. Most commonly, plants are found with only one stem but often multiple stems are present. The lanceolate leaves which are 5 to 8 centimeters (2 to 3 inches) in length are opposite and attach to the stem at swollen nodes. The approximately 1.5 centimeters (0.6 inch) corollas are greenish-white with petal blades 1-2 millimeters (~0.02 inch) that extend only past the calyx. Normally 3 to 20, though sometimes more than 100, flowers are positioned horizontally near the top of the plant in a branched inflorescence (Hitchcock and Cronquist 1973). The leaves, stems and calyx of the plant are covered in sticky glandular-pubescent hairs (Figure 1). These hairs collect foreign material including insects providing the common name "catchfly."



Figure 1. Spalding's catchfly (*Silene spaldingii*) with short petal blades and dense sticky hairs.

Spalding's catchfly can be confused with similar appearing members of the *Silene* genus that occur within its range. Figure 3 shows a comparison with *Silene scouleri* (Scouler's catchfly), *S. douglassii* (Douglas' catchfly), *S. oregona* (Oregon catchfly), and *S. scaposa* var. *scaposa* (scapose silene). Scouler's catchfly is the species most likely to be confused with Spalding's catchfly within the area considered in this report (Figure 2).

Figure 2. Scouler's catchfly (*Silene scouleri*)



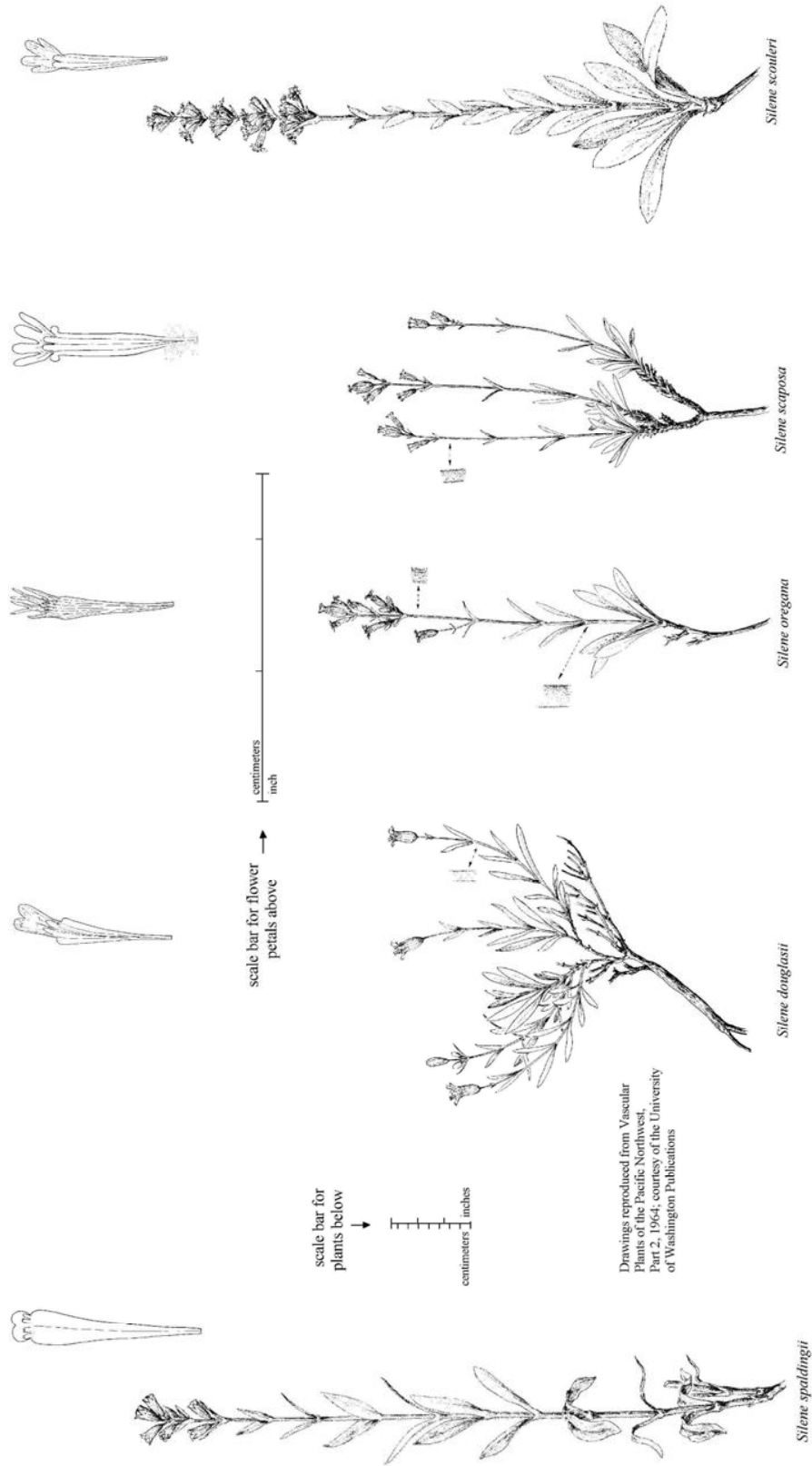


Figure 3. *Silene spaldingii* and a few of its closest look-alikes.

Spalding's catchfly plants can be undetectable in a given year during periods of dormancy when the extensive root structure does not produce above-ground shoots. Dormancy may last as long as five years and may be affected by the availability of resources and environmental variation (Lesica 1999, Lesica and Crone 2007, Taylor et al. 2012). Because of the variation in detectability of this plant, multiple year studies are necessary to determine the strength and stability of any population of Spalding's catchfly.

Spalding's catchfly plants will be found in one of four stages throughout the year: rosettes (basal leaves), vegetative (non-flowering stems), reproductive (flowering/fruitletting), or dormant (Lesica and Crone 2007). The methods described in this report are intended to track changes in individuals and the population through annual and multiple year study.

The current study is a continuation of efforts conducted in 2010, 2011, 2012 and 2013 (Elseth et al. 2012, Jocius 2013, Moholt 2013). For consistency and comparability of data, methods that were used in this study follow, as closely as possible, those used by Elseth et al. 2012, Jocius 2013 and Moholt 2013.

Site Description

In response to the increasing potential for extinction due to habitat loss and degradation, in 1995 the Oregon Department of Agriculture listed Spalding's catchfly as endangered in the State of Oregon. The plant was federally listed as threatened under the Endangered Species Act on October 10, 2001 (U.S. Fish and Wildlife Service 2001).

Spalding's catchfly is a perennial wildflower; found in bunchgrass grasslands, sagebrush-steppe, and occasionally in open pine communities; in eastern Washington, northeastern Oregon, west-central Idaho, western Montana, and a very small portion of British Columbia, Canada.

The current project was conducted as part of an ongoing effort to locate and monitor Spalding's catchfly plants within the area designated as the Wallowa Lake Key Conservation Area. Within the conservation area, long-term monitoring efforts were focused on 13 acres held in trust by the Department of the Interior for the Nez Perce and Umatilla Tribes, but managed by the National Park Service (Old Chief Joseph Gravesite and Cemetery) and on 62 acres purchased by a coalition of the Oregon Parks and Recreation Department, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Reservation, Confederated Tribes of the Colville Reservation and the Oregon State Parks Trust (Iwetemlaykin State Heritage Site). An additional survey effort was made to locate and record new occurrences of Spalding's catchfly and to note invasive species on approximately 181 acres of private lands. These private lands (see Figure 4) are located on the east moraine of Wallowa Lake (168 acres owned by the Yanke family) and a small portion of the lake's terminal moraine area (13 acres owned by the Bridges family).

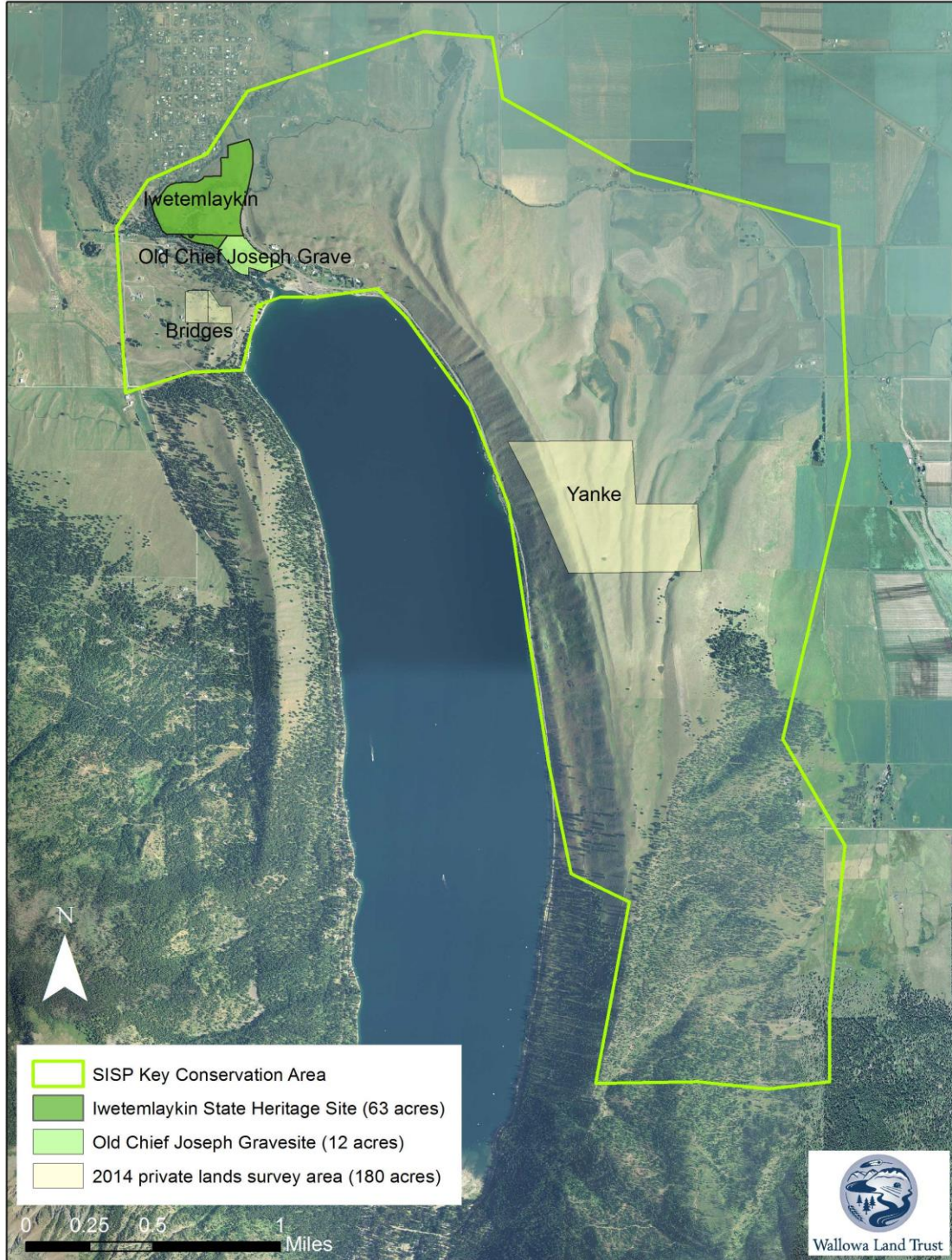


Figure 4. The Spalding’s Catchfly Wallowa Lake Key Conservation Area With 2014 Survey Area.

STUDY OBJECTIVES

The goal of ongoing monitoring and survey efforts within the Wallowa Lake Key Conservation Area is to obtain information that will aid management and restoration decisions critical to ensuring that the Spalding's catchfly population in the Wallowa Lake Area is protected, reproductively active and self-sustaining.

The primary objectives of the 2014 Wallowa Lake Spalding's catchfly investigation were to:

- Monitor Spalding's catchfly occurrences at Iwetemlaykin State Heritage Site & the Old Chief Joseph Gravesite and to collect reproductive output data in a continuation of the ongoing monitoring program started in 2010.
- Conduct intensive surveys to locate and map previously unknown individual Spalding's catchfly plants and subpopulations on private land in the Wallowa Lake Key Conservation Area.
- Continue the collection of baseline information needed to develop a draft management plan that can be implemented for Spalding's catchfly in the Wallowa Lake Key Conservation Area.

METHODS

2014 Plant Occurrences at Iwetemlaykin State Heritage Site & Old Chief Joseph Gravesite

As stated by Elseth et al. 2012:

"Detailed monitoring protocols for accurately estimating the size of populations of *Silene spaldingii* in a variety of habitats have been developed (Lichthardt and Gray 2003, Hill and Gray 2005, Lesica and Crone 2007, Taylor et al. 2009). However, monitoring the population at the Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite and Cemetery site did not require a population size estimation technique, as the small number of plants present here could be censused individually."

Phase 1:

A Bio-Resources, Inc. botanist coordinated with the Wallowa Land Trust who provided experienced partner agency personnel and volunteers to assist with an inventory of Iwetemlaykin State Heritage Site and Old Chief Joseph Gravesite. On August 6, 2014 inventory participants were spaced in teams approximately five meters apart on the 13-acre Old Chief Joseph Gravesite property. The five meter-spaced transects were walked approximately parallel to the highway

from southeast to northwest. Upon completion of the transects, the inventory teams moved west along the northern boundary fence and reestablished a new series of transects approximately five meters from the western most transect on the previous run. This sweep was conducted from the northern fence to the southern fence also spaced five meters apart. This allowed the teams to cover the entire site, as the western most inventory transect on the second sweep abuts the western boundary of the property (see Figure 5). The initial survey work was completed before noon and lunch was eaten outside of the site boundaries per a request from Timothy Nitz, Manager for Nez Perce National Historical Park.

Using the same techniques, a survey was conducted on the Iwetemlaykin State Heritage Site property. Crews walked transects from south to north in the same pattern as described above, marking Spalding's catchfly sites accordingly. When Spalding's catchfly plants were encountered, if no permanent tag was present, plants were marked with pin flags. Whenever a plant was observed at least two other observers, including one botanist, verified that the plant was, in fact, Spalding's catchfly (*Silene spaldingii*) and not another *Silene* species.

On August 8, 2014, the Bio-Resources, Inc. botanist returned to both the Iwetemlaykin State Heritage Site and Old Chief Joseph Gravesite site to revisit points where plants had been previously recorded but where no plants or tags were found by the survey effort on August 6th.

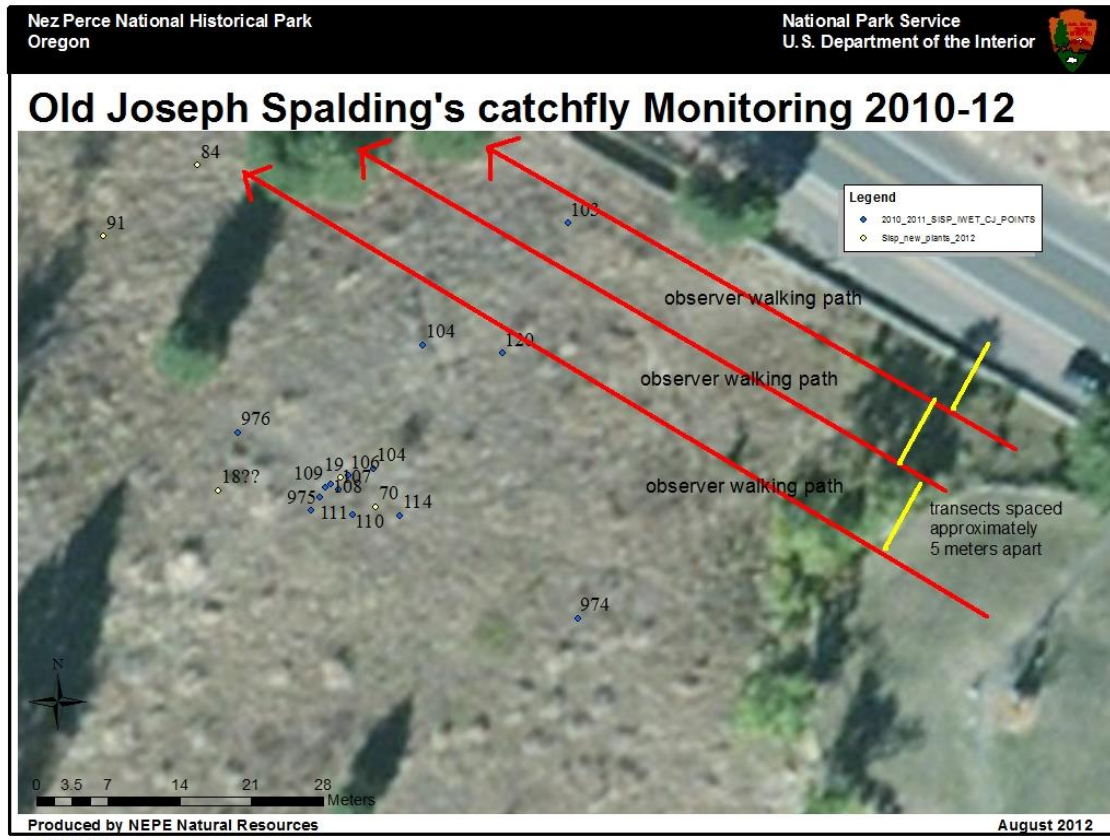


Figure 5. Data collection methodology from 2010-2013 also used in 2014 showing observer walking paths and distance from one another (from: Jocius, 2013).

Phase 2:

Individual plants encountered during the inventory that were new to the project were recorded with a GPS unit and marked with permanent metal stakes and numbered tags. Previously, plants that were found very close to the Old Chief Joseph monument mound on the National Park Service site were only documented with a GPS point and not a permanent tag. However, no new plants were found in this sensitive area in 2014.

Phase 3:

The team that included the Bio-Resources, Inc. botanist visited all known Spalding's catchfly sites, both new and previously recorded. Stem, browse, flower and fruit data were recorded for each plant on a data sheet (see Appendix C). All temporary pin flags were removed.

Resurvey Late Season Plants at Iwetemlaykin and Old Chief Joseph Gravesite

On September 9 and 10, 2014, a Bio-Resources, Inc. botanist revisited Iwetemlaykin State Heritage Site and Old Chief Joseph Gravesite to collect flower and fruiting data on all known individuals. If new plants were located, they were to be marked, locations recorded with a GPS and added to the data base with stem, browse, flower, and fruit data recorded.

Survey for 2014 Plant Occurrences on Private Land

The Wallowa Land Trust arranged permission to access private land owned by the Yanke family on the East Wallowa Lake Moraine and the Bridges family on a small portion of the Wallowa Lake Terminal Moraine area. Areas to be selected for survey and data collection were those with high probability habitat where Spalding's catchfly has not previously been located.

On August 19th, 2014 experienced partner agency personnel assisted a Bio-Resources, Inc. botanist with an initial Spalding's catchfly inventory of the Yanke property (Figure 4). On August 20th and 26th, 2014, a Bio-Resources, Inc. botanist continued inventories of the Yanke property. Two Bio-Resources, Inc. botanists surveyed the Bridges family property on August 25th, 2014.

The inventory of private land was conducted via an “intuitive” random meander method. With this approach, the examiner covers the entire area but focuses efforts, based on professional judgment, to habitats that appear best suited to harbor the target species. Although this method does not yield statistically interpretable results, it does provide a relatively high assurance that, if the target plant were present, it would be detected. In this study, a majority of the area surveyed was considered very high probability habitat. In such habitat, methods entail walking parallel lines spaced approximately five meters apart and moving across the landscape visually scanning for this species. For ease of walking, these lines were generally kept on the contour of hills. Tracking on a handheld GPS was used to keep transects approximately five meters apart. When

plants were located, they were recorded with the GPS and later mapped. Plants found on private lands were not marked with permanent metal rods or numbered tags. In survey areas, heavy noxious weed infestations, for species on the Wallowa County "A" List, were also recorded if infestations were considered extreme enough to merit treatment.

Macro Vegetation Plots at Iwetemlaykin

The following methods are those presented by Elseth et al. 2012 and are presented here with only minor modifications (e.g. dates).

Two adjacent macro plots measuring 5x20m (running east-west with a 7m buffer between them) were set up in 2010 on the Iwetemlaykin State Heritage Site, in an area where no individuals of Spalding's catchfly were found (Figure 7). Five transects were then created running west to east in each of the four subplots. Along these transects 20 50x50cm quadrants were designated. The first quadrant was located in the southwest corner of the plot. Moving east incrementally 50cm and alternating between the south and north side of each transect, 20 quadrants were designated in a checkerboard fashion (Figure 7). No plants of Spalding's catchfly were known to occur in the area selected for this part of the study, but three plants are known on the boundaries of the macro plot. These will be avoided during herbicide application.

One macro plot was treated on April 30, 2014 with herbicide SelectMax™ (active ingredient Clethodim) mixed at 1.5% with 1% Modified Seed Oil (MSO) as an adjuvant. The other macro plot remained untreated. Each macro plot was divided into two smaller plots, by splitting the macro plots directly in half to create a total of four subplots each measuring 5x10m. One subplot was treated with herbicide then seeded with native grass seed, one was treated with herbicide only, one was seeded only, and one was left untreated as a control.

Because quadrant size can influence frequency data (Smith et al. 1986), ODA staff (Elseth et al. 2012) designed a nested plot frame that allows efficient collection of data from a series of quadrant sizes. This technique of using this frame (nested frequency monitoring) allows flexibility in the selection of the appropriate quadrant size to include in analysis (see [http://www.webpages.uidaho.edu/veg_measure/Modules/Lessons/Module%206\(Frequency\)/Nested%20Frequency%20Techniques.htm](http://www.webpages.uidaho.edu/veg_measure/Modules/Lessons/Module%206(Frequency)/Nested%20Frequency%20Techniques.htm), Launchbaugh 2009). Plot frames are divided into four quadrant sizes (5x5cm, 25x25cm, 25x50cm, 50x50cm). Although data are recorded for each plot size, the subsequent analysis focuses on the most informative data set. (If a quadrant is too small, the target species may never be recorded, and if the quadrant is too big, target species may be in all plots.) Depending on the type and density of vegetation present, different plot sizes may be appropriate for each species or vegetation group. In the field, the smallest quadrant in which a functional group or species occurs is recorded. The appropriate quadrant size for each functional group or species is then selected based on the frequency of occurrences being between 20% and

80%.

In our study, vegetation functional groups were defined as: exotic perennial grasses (EPG; predominantly the target non-native grass *Poa pratensis*), exotic annual grasses (EAG; *Bromus tectorum* and others), native perennial grasses (NPG; *Festuca idahoensis*, *Koeleria cristata* etc.), native annual and perennial forbs (NAF; *Artemisia ludoviciana* ssp. *candicans*, *Achillea mollis*, *Lithospermum ruderale* and others), and exotic forbs (EF; *Cynoglossum officinale* and others).

Following herbicide and native plant seeding treatment, the data collected from the nested frequency monitoring is to be analyzed using a chi square statistic to determine if the frequency of occurrence for each functional group differs before and after treatment. Pre and post treatment differences for the treated plots will then be compared with those for the control (no treatment) to quantify a treatment effect.

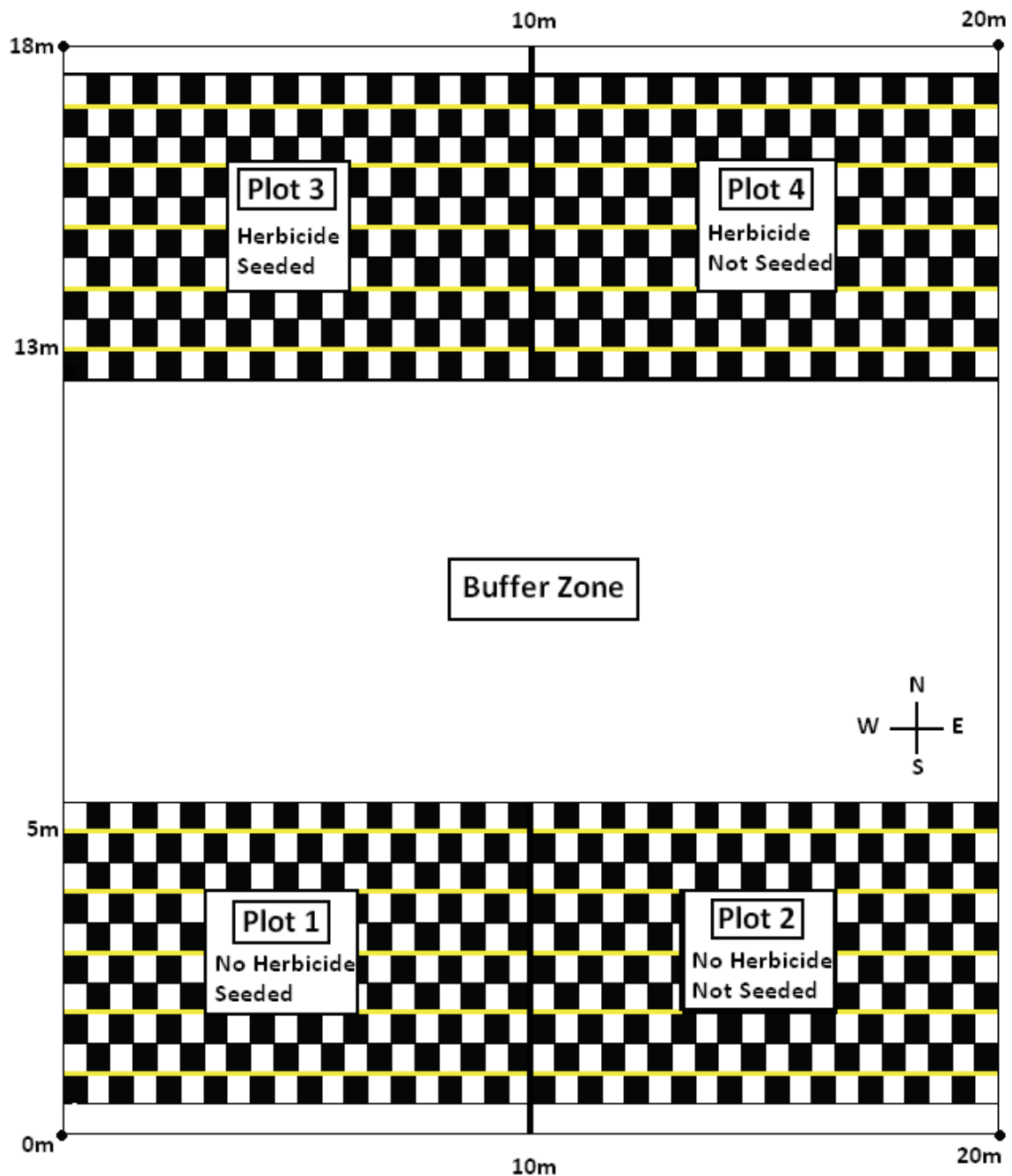


Figure 7. Habitat improvement plot layout. Plots were surveyed in a checkerboard fashion (black squares = surveyed quadrants; white squares = un-surveyed quadrants) using five transects (yellow) in each plot. The corners of the total habitat improvement area are marked with rebar stakes (black dots). Plots 1 and 2 will not be treated with herbicide but plots 3 and 4 will. In addition, plots 1 and 3 will be seeded with native grass, while the others will remain unseeded (from Elseth et al. 2012).

RESULTS

2014 Plant Occurrences at Iwetemlaykin State Heritage Site & Old Chief Joseph Gravesite

As noted above, the monitoring effort at the Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite and Cemetery site is an attempt to track all individual plants and is not based on a population estimate technique. Therefore, the data presented here is a representation of the potential reproductive output of the entire subpopulation found at the Iwetemlaykin Site and Old Chief Joseph Gravesite (Table 2).

During the August 6th and 8th, 2014 survey of the Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite Cemetery site, 36 plants were located. All 36 were located on the 6th and no additional plants were found on the 8th. The plants had a mean of 1.42 stems per plant (see Table 2). At this relatively early date in the plants' breeding phenology, a majority of the plants (80%) were in flower while only 1 of the 36 plants (3%) had fruits. It should be noted that even at this early stage in the reproductive season for Spalding's catchfly, 38% of the plants (39% of the stems) showed signs of large mammal herbivory where at least 10% of a stem's biomass was estimated to have been removed (see Figure 8). In the absence of herbivory, the number of plants in flower may have been significantly higher. In every case during the August 6, 2014 observation where no flowers were present, all the plants' stems (1 or 2 stems) had been browsed. Of the 36 plants located in 2014 during the monitoring of the Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite, 5 plants were new to the study (see Appendix A).

Appendix D presents reproductive output data from five years of monitoring. Caution should be used when comparing these data among years because plants may not have been observed during identical points in the subpopulations breeding phenology (see Discussion).

Table 2. Summary of August 6, 2014 Monitoring Data at Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite (n=36).

	<i>No. of stems</i>	<i>browsed stem</i>	<i>No. of flowers</i>	<i>fruits</i>
Total	51	20	284	4
Mean	1.42	0.56	7.89	0.11
Median	1	0	5	0
Standard Deviation	0.84	0.81	9.18	0.66
Standard Error	0.14	0.13	1.53	0.11
Minimum	1	0	0.00	0.00
Maximum	4	3	36	4



Figure 8. A Spalding's catchfly plant showing signs of heavy browsing likely from deer.

Resurvey Late Season Plants at Iwetemlaykin and Old Chief Joseph Gravesite

A revisit to the Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite on September 9th and 10th, 2014 located 50 detectable plants. 40 stakes and tags were located with no plants detectable and 16 previously identified plant sites were not located. The plants had a mean of 1.36 stems per plant (see Table 3). The August survey found plants primarily in flower. This mid-September survey found plants significantly advanced in their phenology with the majority of the plants, 64%, in fruit and only 12% with flower. The number of stems showing signs of herbivory was similar at the time of both surveys (44% plants [47% of stems] in September versus 38% of plants [39% of stems] in August). However, the reduction in mean stems per plant from 1.42 in August to 1.36 in September may be explained by herbivory. Later season plants, when they start to dry, tend to be brittle at the junction of the stem and caudex top (personal observation) so herbivory may break and remove the stem rather than clip it.

Table 3. Summary of September, 2014 Monitoring Data at Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite (n=50).				
	<i>No. of stems</i>	<i>browsed stem</i>	<i>No. of flowers</i>	<i>fruits</i>
Total	68	32	21	443
Mean	1.36	0.64	0.42	8.86
Median	1	0	0	2.5
Standard Deviation	0.85	0.98	1.55	15.30
Standard Error	0.12	0.14	0.22	2.16
Minimum	1	0	0.000	0.000
Maximum	5	5	10.000	75.000

Table 4. September 09, 2014 End of Season Resurvey of
Iwetemlaykin State Heritage Site
and the Old Chief Joseph Gravesite

Tag number	Total number of stems	Number of browsed stems	Number of flowers (per plant)	Number of fruits (per plant)
1	0	-	-	-
9	0	-	-	-
18	Tag not located	-	-	-
19	1	1	0	0
24	0	0	0	0
28	0	0	0	0
29	1	0	0	51
38	Tag not located	-	-	-
43	2	0	0	75
48	1	1	0	0
54	1	1	0	0
55	0	-	-	-
56	1	0	0	0
57	0	-	-	-
58	0	-	-	-
59	0	0	0	0
61	1	0	10	38
62	0	-	-	-
63	0	-	-	-
64	1	0	0	9
65	Tag not located	-	-	-
66	Tag not located	-	-	-
68	1	0	0	4
70	1	0	0	12
70	Tag not located	-	-	-
72	1	1	0	0
75	1	0	0	0
76	1	1	0	0
77	Tag not located	-	-	-
81	0	-	-	-
(45)83	0	0	0	0
84	1	0	0	27
85	0	-	-	-
87	1	0	0	1
90	0	-	-	-
91	1	1	0	2
92	0	0	0	0
95	1	0	0	9

96	1	0	3	5
98	0	0	0	0
99	0	-	-	-
99	0	0	0	0
100	3	3	0	0
101	2	2	0	0
103	1	1	1	6
104	1	0	0	3
105	Tag not located	-	-	-
106	1	0	0	24
107	0	-	-	-
108	0	-	-	-
109	1	0	0	5
110	1	0	0	0
111	1	0	0	7
112	1	0	0	38
113	1	1	0	6
114	0	-	-	-
115	1	1	0	0
116	1	0	0	0
117	1	1	0	0
118	1	0	0	2
119	1	1	0	3
120	0	-	-	-
121	3	2	0	8
122	2	0	0	10
123	Tag not located	-	-	-
124	0	-	-	-
125	0	-	-	-
126	0	-	-	-
127	5	5	0	1
128	0	-	-	-
129	0	-	-	-
130	2	0	3	39
131	0	-	-	-
132	0	-	-	-
133	0	-	-	-
134	0	-	-	-
135	0	-	-	-
136	0	-	-	-
137	0	0	0	0
138	Tag not located	-	-	-
139	0	-	-	-
240	1	1	0	0
264	1	1	0	0
265	Tag not located			

289	Tag not located			
293	1	0	0	0
968	1	0	0	1
969	4	3	2	1
970	1	0	0	9
971	Tag not located	-	-	-
972	Tag not located	-	-	-
973	Tag not located	-	-	-
974	0	-	-	-
975	0	-	-	-
976	1	1	0	0
977	0	-	-	-
978	1	1	0	0
979	1	1	0	3
979	0	-	-	-
980	0	-	-	-
981	2	1	0	17
982	3	0	2	18
984	Tag not located	-	-	-
985	Tag not located	-	-	-
986	1	0	0	8
987	1	0	0	1

Survey for 2014 Plant Occurrences on Private Land

Surveys of private land with high probability habitat for Spalding's catchfly in 2014 located 650 plants that had not previously been documented (see Appendix B). These plants were found on the East Wallowa Lake Moraine area on the Yanke property. The majority of the habitat in the East Wallowa Lake Moraine area appeared to be managed in a way that posed minimal threat to Spalding's catchfly. The exception to this observation was the potential of expansion of dry land grain farming which could eliminate habitat and subpopulations. Habitat surveyed in the Wallowa Lake Terminal Moraine area (Bridges property) appears to have been modified and now contains a significant number of non-native grass species. No new Spalding's catchfly plants were found at this area? on the Bridges property.

The total number of mature Spalding's catchfly plants now known within the Wallowa Lake Key Conservation Area is approximately 1341 individuals. However, approximately 95 percent of the plants have been found on private land. This current population estimate is significant because the U.S. Fish and Wildlife Service Spalding's catchfly Recovery Plan lists one of the objectives of its recovery program to be documenting at least "twenty-seven populations, with at least 500 reproducing *Silene spaldingii* individuals" (U.S. Fish and Wildlife Service 2007). At the time the recovery plan was written, only 10 populations with more than 500 individuals were known.

The private land surveyed in 2014 was relatively free from infestation by noxious weeds on the Wallowa County "A" List. A few scattered individual plants of spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), St. John's wort (*Hypericum perforatum*), and sulfur cinquefoil (*Potentilla recta*) were noted but no infestations on a significant level requiring a major eradication effort were located.

Macro Vegetation Plots at Iwetemlaykin

Frequency of functional groups varied among subplots (Figure 10). These data will be compared with 2015 post treatment data using a chi square statistic to determine if the frequency of occurrence for each functional group differs before and after treatment. Pre and post treatment differences for the treated plots will then be compared with those for the control (no treatment) to quantify a treatment effect.

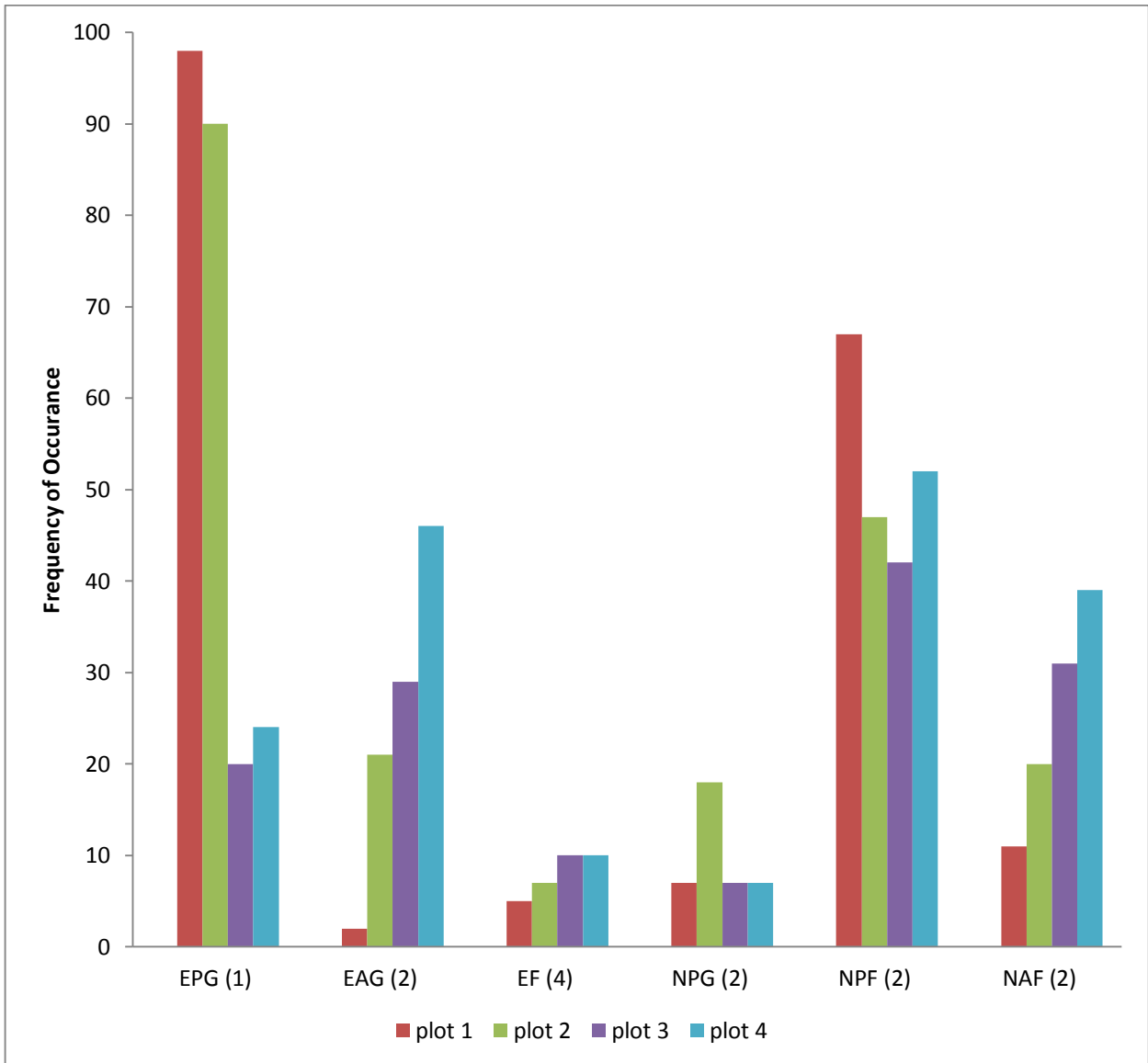


Figure 10. Frequencies of functional vegetative groups varied among plots. EPG=exotic perennial grass; EAG=exotic annual grass; EF=exotic forb; NPG= native perennial grass; NPF= native perennial forb; NAF= native annual forb. Values in parentheses represent quadrant size selected (1)=5x5cm; (2)=5x25cm; (3)=25x50cm; (4)=50x50cm.

DISCUSSION

The 2014 investigation of the Wallowa Lake Key Conservation Area Spalding's catchfly population monitored individual plants through the reproductive season on the portion of the population found on public land. As noted above, the early August investigation found most of the individual plants in bloom and relatively heavy browsing by mammalian herbivores, primarily deer. The monitoring in the later part of September found most plants in fruit. The total number of fruits recorded changed from 4 fruits on one plant in early August to 443 fruits on 32 plants in September. Clearly, a late season survey is required to determine a maximum reproductive potential to be determined based on number of fruits, seeds produced, and the viability of these seeds as proposed by Elseth et al. 2012. Comparison of reproductive output among years should take into consideration plants' phenology when observations were made. Monitoring in 2014 was the fifth year of tracking the Wallowa Lake population on public land. It is recommended that, after 2015 data collection, it would be appropriate to assess the variability and stability of reproductive output of this population. When possible, comparison of reproductive output from year to year should take into consideration multiple observations within each year. A comparison of the maximum number of viable fruits produced in a year could be a more appropriate measure as long as enough site visits were made to ensure observations were made during peak fruiting. To complicate matters further, the timing of maximum fruit production may vary from plant to plant within a given year. In addition, an estimate of actual reproductive output made too early in a given season, calculated by the number of fruits, could provide an overestimate due to early senescence, herbivory or aborted fruit. Multiple observations of plants late in their phenology (i.e. mid-September through mid-October) is recommended. An understanding of successful seed germination in the field and survivorship to fruiting age would greatly improve the assessment of the stability of this population.

Surveys in 2014 of private land were successful in locating many previously undocumented mature Spalding's catchfly plants. Portions of the Wallowa Lake Key Conservation Area have still not been adequately surveyed. It is recommended that, if permission is granted, this survey effort is continued.

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Appendix A

Spalding's catchfly (*Silene spaldingii*) plants new to the project in 2014
found on the Iwetemlaykin State Heritage Site and the Old Chief Joseph Gravesite

Waypoint	Lat/Long Coordinate System (NAD 83)	
240	45.33643853	117.22273096
264	45.33615765	117.22190291
265	45.33603662	117.22184340
289	45.33607400	117.22186318
293	45.33617869	117.22190090

Appendix B

Spalding's catchfly (*Silene spaldingii*) plants found on private land in 2014

		Lat/Long Coordinate System		UTM Coordinate	
		Latitude	Longitude	Y Projection	X Projection
WAYPOINT	217	45.3260132	-117.1976536	5312306.76430	-1394149.13792
WAYPOINT	218	45.3259842	-117.1976335	5312303.05803	-1394148.59461
WAYPOINT	215	45.3260078	-117.1976189	5312305.29520	-1394146.61890
WAYPOINT	214	45.3258571	-117.1977454	5312291.79379	-1394161.80995
WAYPOINT	220	45.3258148	-117.1976340	5312284.34830	-1394154.61824
WAYPOINT	219	45.3258397	-117.1975966	5312286.16647	-1394150.81727
WAYPOINT	213	45.3257913	-117.1976178	5312281.34916	-1394154.17971
WAYPOINT	212	45.3257678	-117.1976558	5312279.69466	-1394157.97820
WAYPOINT	216	45.3259978	-117.1976236	5312304.31019	-1394147.33677
WAYPOINT	211	45.3257160	-117.1976356	5312273.46627	-1394158.23335
WAYPOINT	203	45.3257050	-117.1976492	5312272.59119	-1394159.68000
WAYPOINT	204	45.3256784	-117.1976604	5312269.93253	-1394161.48798
WAYPOINT	205	45.3255940	-117.1978681	5312265.77966	-1394180.66314
WAYPOINT	206	45.3255680	-117.1978831	5312263.27331	-1394182.75326
WAYPOINT	210	45.3260933	-117.1982296	5312329.96432	-1394191.21033
WAYPOINT	209	45.3256034	-117.1978614	5312266.65047	-1394179.80904
WAYPOINT	208	45.3255753	-117.1977959	5312261.91544	-1394175.69678
WAYPOINT	207	45.3255676	-117.1978826	5312263.22552	-1394182.73331
WAYPOINT	567	45.3197641	-117.1922830	5311482.27108	-1393951.13506
WAYPOINT	564	45.3198039	-117.1922519	5311485.89724	-1393947.30377
WAYPOINT	565	45.3198010	-117.1922596	5311485.76240	-1393948.00254
WAYPOINT	566	45.3197827	-117.1922712	5311484.03341	-1393949.55617
WAYPOINT	562	45.3197958	-117.1922430	5311484.78627	-1393946.89567
WAYPOINT	553	45.3197168	-117.1926573	5311486.37143	-1393981.98614
WAYPOINT	551	45.3197235	-117.1925766	5311485.10406	-1393975.46215
WAYPOINT	552	45.3197232	-117.1925726	5311484.96632	-1393975.16070
WAYPOINT	554	45.3195512	-117.1925999	5311466.63505	-1393983.35926
WAYPOINT	550	45.3200672	-117.1927469	5311527.32703	-1393976.59951
WAYPOINT	555	45.3188469	-117.1925600	5311387.80796	-1394005.12590
WAYPOINT	556	45.3194425	-117.1921986	5311444.62283	-1393955.91223
WAYPOINT	557	45.3194558	-117.1922018	5311446.17534	-1393955.68942
WAYPOINT	561	45.3197984	-117.1922410	5311485.01471	-1393946.64994
WAYPOINT	563	45.3197941	-117.1922478	5311484.71085	-1393947.33054
WAYPOINT	560	45.3194758	-117.1921867	5311448.01314	-1393953.80540
WAYPOINT	558	45.3194596	-117.1922250	5311447.17940	-1393957.36401
WAYPOINT	559	45.3194607	-117.1922155	5311447.05283	-1393956.58291
WAYPOINT	568	45.3197564	-117.1923012	5311481.87217	-1393952.82570
WAYPOINT	576	45.3206700	-117.1926575	5311591.72705	-1393948.34130
WAYPOINT	570	45.3198129	-117.1921094	5311483.33641	-1393935.87029
WAYPOINT	583	45.3221115	-117.1925130	5311747.44720	-1393886.16285
WAYPOINT	584	45.3220867	-117.1927690	5311751.08312	-1393906.99781
WAYPOINT	585	45.3220983	-117.1927616	5311752.17823	-1393906.01454

WAYPOINT	586	45.3223886	-117.1928857	5311787.35921	-1393905.43184
WAYPOINT	587	45.3224203	-117.1929088	5311791.43686	-1393906.11636
WAYPOINT	582	45.3219940	-117.1923789	5311731.11828	-1393879.85653
WAYPOINT	589	45.3224242	-117.1929081	5311791.84568	-1393905.92814
WAYPOINT	588	45.3224204	-117.1929066	5311791.39139	-1393905.94356
WAYPOINT	581	45.3219896	-117.1923715	5311730.44058	-1393879.43204
WAYPOINT	580	45.3219934	-117.1923726	5311730.89635	-1393879.38694
WAYPOINT	579	45.3219411	-117.1924148	5311726.16647	-1393884.52129
WAYPOINT	573	45.3206594	-117.1925947	5311588.98686	-1393943.82199
WAYPOINT	572	45.3198230	-117.1921145	5311484.58444	-1393935.91063
WAYPOINT	571	45.3198187	-117.1921218	5311484.29527	-1393936.63723
WAYPOINT	569	45.3197659	-117.1923300	5311483.64509	-1393954.72981
WAYPOINT	574	45.3206705	-117.1926641	5311591.94526	-1393948.83358
WAYPOINT	549	45.3200603	-117.1927654	5311527.02919	-1393978.28621
WAYPOINT	575	45.3206713	-117.1926528	5311591.75829	-1393947.92829
WAYPOINT	578	45.3213499	-117.1924231	5311661.03458	-1393906.04768
WAYPOINT	577	45.3206653	-117.1926635	5311591.35720	-1393948.97166
WAYPOINT	548	45.3203198	-117.1928038	5311556.66643	-1393972.11463
WAYPOINT	530	45.3238490	-117.1944969	5311988.90960	-1393979.47668
WAYPOINT	546	45.3205645	-117.1929819	5311588.14591	-1393977.36104
WAYPOINT	517	45.3239271	-117.1946384	5312001.06919	-1393987.74881
WAYPOINT	518	45.3239145	-117.1945992	5311998.69356	-1393985.13701
WAYPOINT	519	45.3239110	-117.1945735	5311997.67222	-1393983.25243
WAYPOINT	520	45.3238824	-117.1945785	5311994.62891	-1393984.65730
WAYPOINT	505	45.3255684	-117.1951713	5312195.74272	-1393971.32312
WAYPOINT	516	45.3241115	-117.1944683	5312017.21068	-1393967.96896
WAYPOINT	522	45.3238450	-117.1945822	5311990.58956	-1393986.26535
WAYPOINT	521	45.3238656	-117.1945812	5311992.84335	-1393985.45826
WAYPOINT	515	45.3250326	-117.1950511	5312133.53167	-1393980.87114
WAYPOINT	514	45.3250241	-117.1950613	5312132.85158	-1393981.96756
WAYPOINT	513	45.3250226	-117.1950674	5312132.83719	-1393982.49804
WAYPOINT	508	45.3251158	-117.1949666	5312140.62610	-1393971.34353
WAYPOINT	507	45.3258828	-117.1949864	5312225.88419	-1393945.80131
WAYPOINT	506	45.3256168	-117.1953044	5312204.41212	-1393979.98242
WAYPOINT	504	45.3255575	-117.1951621	5312194.30940	-1393970.98897
WAYPOINT	509	45.3250078	-117.1950581	5312130.96507	-1393982.29639
WAYPOINT	590	45.3224220	-117.1929040	5311791.50369	-1393905.68511
WAYPOINT	510	45.3250086	-117.1950654	5312131.23072	-1393982.83791
WAYPOINT	512	45.3250137	-117.1950697	5312131.91097	-1393982.98827
WAYPOINT	511	45.3250087	-117.1950727	5312131.43031	-1393983.40141
WAYPOINT	547	45.3203221	-117.1928027	5311556.89900	-1393971.94664
WAYPOINT	523	45.3238431	-117.1945677	5311990.02489	-1393985.19983
WAYPOINT	525	45.3238639	-117.1945311	5311991.41078	-1393981.61614
WAYPOINT	539	45.3236055	-117.1944626	5311961.14251	-1393985.39835
WAYPOINT	540	45.3229759	-117.1939855	5311879.66428	-1393970.44019
WAYPOINT	541	45.3229619	-117.1939923	5311878.29810	-1393971.46715
WAYPOINT	542	45.3229891	-117.1939125	5311879.30948	-1393964.27972
WAYPOINT	543	45.3229010	-117.1938799	5311868.76020	-1393964.84972
WAYPOINT	538	45.3236814	-117.1945305	5311971.21836	-1393988.01200

WAYPOINT	545	45.3228924	-117.1939136	5311868.64585	-1393967.78130
WAYPOINT	544	45.3228920	-117.1938974	5311868.20537	-1393966.53256
WAYPOINT	537	45.3237512	-117.1945737	5311980.01268	-1393988.91787
WAYPOINT	536	45.3239013	-117.1944909	5311994.54073	-1393977.15883
WAYPOINT	535	45.3238895	-117.1944940	5311993.31161	-1393977.81803
WAYPOINT	528	45.3238651	-117.1944644	5311989.87867	-1393976.37251
WAYPOINT	527	45.3238537	-117.1944693	5311988.73983	-1393977.15410
WAYPOINT	526	45.3238630	-117.1945276	5311991.22138	-1393981.37419
WAYPOINT	524	45.3238546	-117.1945848	5311991.71977	-1393986.12756
WAYPOINT	529	45.3238603	-117.1944572	5311989.17072	-1393975.97921
WAYPOINT	532	45.3238655	-117.1945005	5311990.82313	-1393979.16760
WAYPOINT	531	45.3238588	-117.1945022	5311990.12539	-1393979.54183
WAYPOINT	534	45.3238860	-117.1944949	5311992.95434	-1393978.01127
WAYPOINT	533	45.3238754	-117.1944978	5311991.84941	-1393978.60931
WAYPOINT	591	45.3224298	-117.1929021	5311792.31657	-1393905.25950
WAYPOINT	432	45.3206622	-117.1930754	5311601.27599	-1393981.19666
WAYPOINT	593	45.3224487	-117.1930030	5311796.92441	-1393912.45921
WAYPOINT	651	45.3240397	-117.1938540	5311993.96576	-1393922.61711
WAYPOINT	652	45.3240240	-117.1938700	5311992.63081	-1393924.41260
WAYPOINT	653	45.3226221	-117.1931182	5311818.95168	-1393915.31587
WAYPOINT	654	45.3226311	-117.1929835	5311816.59593	-1393904.49459
WAYPOINT	655	45.3224386	-117.1927714	5311790.03313	-1393894.75966
WAYPOINT	650	45.3242647	-117.1937322	5312015.80310	-1393905.16591
WAYPOINT	657	45.3226438	-117.1927466	5311812.09301	-1393885.57817
WAYPOINT	656	45.3224601	-117.1927598	5311792.12351	-1393893.09055
WAYPOINT	658	45.3226573	-117.1927968	5311814.83609	-1393889.01618
WAYPOINT	649	45.3242693	-117.1936783	5312014.95963	-1393900.80388
WAYPOINT	647	45.3243219	-117.1937874	5312023.49692	-1393907.45379
WAYPOINT	640	45.3243662	-117.1936361	5312024.62751	-1393894.09137
WAYPOINT	641	45.3243815	-117.1936206	5312025.92786	-1393892.34389
WAYPOINT	642	45.3243991	-117.1935919	5312027.15668	-1393889.48072
WAYPOINT	643	45.3244061	-117.1935883	5312027.84704	-1393888.95762
WAYPOINT	644	45.3243557	-117.1936658	5312024.19969	-1393896.77762
WAYPOINT	648	45.3243702	-117.1935931	5312023.99154	-1393890.59966
WAYPOINT	646	45.3243323	-117.1936819	5312022.01575	-1393898.85904
WAYPOINT	645	45.3243517	-117.1936814	5312024.14385	-1393898.13510
WAYPOINT	659	45.3226723	-117.1928319	5311817.37582	-1393891.21560
WAYPOINT	660	45.3234490	-117.1929169	5311905.33255	-1393870.41065
WAYPOINT	661	45.3236108	-117.1929029	5311922.86284	-1393863.60545
WAYPOINT	674	45.3256263	-117.1932352	5312153.90082	-1393818.32866
WAYPOINT	675	45.3256509	-117.1932158	5312156.13060	-1393815.94477
WAYPOINT	676	45.3256468	-117.1932179	5312155.74062	-1393816.25673
WAYPOINT	677	45.3256498	-117.1932170	5312156.04152	-1393816.08151
WAYPOINT	678	45.3255485	-117.1932238	5312145.02044	-1393820.18715
WAYPOINT	673	45.3256338	-117.1932191	5312154.32415	-1393816.80995
WAYPOINT	503	45.3255516	-117.1951503	5312193.36610	-1393970.27479
WAYPOINT	672	45.3256481	-117.1932426	5312156.49381	-1393818.13326
WAYPOINT	671	45.3256234	-117.1932541	5312154.05551	-1393819.89895
WAYPOINT	670	45.3256257	-117.1932690	5312154.67814	-1393820.98200

WAYPOINT	664	45.3236546	-117.1929823	5311929.68795	-1393868.25232
WAYPOINT	663	45.3236364	-117.1929633	5311927.20366	-1393867.41185
WAYPOINT	662	45.3236108	-117.1929078	5311922.98618	-1393863.99139
WAYPOINT	639	45.3243579	-117.1936370	5312023.73111	-1393894.45003
WAYPOINT	665	45.3236844	-117.1929866	5311933.08262	-1393867.53525
WAYPOINT	667	45.3259674	-117.1937183	5312203.63080	-1393843.94147
WAYPOINT	666	45.3258759	-117.1935840	5312190.17919	-1393836.70315
WAYPOINT	669	45.3256272	-117.1932779	5312155.06653	-1393821.62176
WAYPOINT	668	45.3259659	-117.1937128	5312203.33831	-1393843.56751
WAYPOINT	638	45.3243932	-117.1936731	5312028.52282	-1393896.02328
WAYPOINT	637	45.3249814	-117.1937162	5312094.61132	-1393878.61076
WAYPOINT	636	45.3252598	-117.1938590	5312128.94285	-1393879.90488
WAYPOINT	606	45.3223705	-117.1930616	5311789.74142	-1393919.78940
WAYPOINT	607	45.3223700	-117.1930523	5311789.45419	-1393919.08116
WAYPOINT	608	45.3223618	-117.1930786	5311789.19950	-1393921.41740
WAYPOINT	609	45.3224786	-117.1929376	5311798.60107	-1393906.29746
WAYPOINT	610	45.3224785	-117.1930425	5311801.19724	-1393914.48633
WAYPOINT	605	45.3223708	-117.1930672	5311789.90684	-1393920.21174
WAYPOINT	612	45.3224536	-117.1930616	5311798.92250	-1393916.85542
WAYPOINT	611	45.3224568	-117.1930561	5311799.13592	-1393916.31116
WAYPOINT	604	45.3223641	-117.1930709	5311789.26027	-1393920.74232
WAYPOINT	603	45.3223614	-117.1930692	5311788.91911	-1393920.70011
WAYPOINT	602	45.3223708	-117.1930748	5311790.09695	-1393920.80665
WAYPOINT	596	45.3224296	-117.1930490	5311795.95673	-1393916.71529
WAYPOINT	595	45.3224227	-117.1930514	5311795.25799	-1393917.14740
WAYPOINT	594	45.3224281	-117.1930437	5311795.65829	-1393916.35694
WAYPOINT	613	45.3224566	-117.1930635	5311799.30301	-1393916.89881
WAYPOINT	597	45.3224208	-117.1930706	5311795.52283	-1393918.71179
WAYPOINT	599	45.3224065	-117.1930677	5311793.86828	-1393918.99649
WAYPOINT	598	45.3224108	-117.1930640	5311794.25598	-1393918.54777
WAYPOINT	601	45.3224051	-117.1930724	5311793.83505	-1393919.40325
WAYPOINT	600	45.3224052	-117.1930719	5311793.83343	-1393919.36768
WAYPOINT	592	45.3224196	-117.1929693	5311792.87074	-1393910.85873
WAYPOINT	614	45.3224812	-117.1931257	5311803.56723	-1393920.88105
WAYPOINT	616	45.3224859	-117.1930818	5311802.99236	-1393917.29064
WAYPOINT	629	45.3243136	-117.1938461	5312024.04147	-1393912.32124
WAYPOINT	630	45.3243099	-117.1939072	5312025.15719	-1393917.21495
WAYPOINT	631	45.3243129	-117.1939048	5312025.43155	-1393916.92619
WAYPOINT	632	45.3243269	-117.1938274	5312025.04903	-1393910.39321
WAYPOINT	633	45.3256066	-117.1944790	5312182.71615	-1393915.99507
WAYPOINT	628	45.3243002	-117.1938017	5312021.45456	-1393909.33788
WAYPOINT	635	45.3260192	-117.1946212	5312231.86356	-1393912.50174
WAYPOINT	634	45.3258052	-117.1945659	5312206.82704	-1393915.75788
WAYPOINT	627	45.3242959	-117.1938369	5312021.85772	-1393912.22687
WAYPOINT	626	45.3239529	-117.1941356	5311991.39347	-1393947.63278
WAYPOINT	625	45.3238540	-117.1943364	5311985.46597	-1393966.78455
WAYPOINT	619	45.3225330	-117.1930748	5311808.02254	-1393915.07820
WAYPOINT	618	45.3224857	-117.1930667	5311802.59559	-1393916.11386
WAYPOINT	617	45.3224848	-117.1930780	5311802.78655	-1393917.03159

WAYPOINT	615	45.3224859	-117.1931236	5311804.03436	-1393920.55132
WAYPOINT	620	45.3226087	-117.1931355	5311817.91072	-1393917.13944
WAYPOINT	622	45.3237985	-117.1942797	5311977.92016	-1393964.31959
WAYPOINT	621	45.3237340	-117.1941559	5311967.70119	-1393956.94730
WAYPOINT	624	45.3238817	-117.1942405	5311986.13365	-1393958.33130
WAYPOINT	623	45.3238250	-117.1942788	5311980.82385	-1393963.31253
WAYPOINT	502	45.3255613	-117.1951491	5312194.41121	-1393969.84022
WAYPOINT	416	45.3202373	-117.1928530	5311548.77748	-1393978.86356
WAYPOINT	500	45.3254640	-117.1951894	5312184.65889	-1393976.41412
WAYPOINT	312	45.3242177	-117.1954112	5312052.44395	-1394037.73713
WAYPOINT	313	45.3243393	-117.1954481	5312066.79572	-1394036.31923
WAYPOINT	311	45.3242236	-117.1955034	5312055.38824	-1394044.71202
WAYPOINT	309	45.3242052	-117.1954989	5312053.24953	-1394045.01405
WAYPOINT	310	45.3242039	-117.1955009	5312053.15042	-1394045.21845
WAYPOINT	314	45.3243467	-117.1954779	5312068.36180	-1394038.37598
WAYPOINT	315	45.3243502	-117.1954909	5312069.07653	-1394039.27065
WAYPOINT	316	45.3243455	-117.1955178	5312069.21681	-1394041.53133
WAYPOINT	321	45.3243909	-117.1955502	5312075.04592	-1394042.45498
WAYPOINT	320	45.3243886	-117.1955448	5312074.66058	-1394042.11068
WAYPOINT	319	45.3243693	-117.1955479	5312072.60698	-1394043.03343
WAYPOINT	318	45.3243633	-117.1955525	5312072.05541	-1394043.60586
WAYPOINT	317	45.3243447	-117.1955352	5312069.56826	-1394042.91677
WAYPOINT	308	45.3242147	-117.1955208	5312054.84115	-1394046.38465
WAYPOINT	307	45.3242115	-117.1954752	5312053.35253	-1394042.94286
WAYPOINT	306	45.3241503	-117.1954714	5312046.49553	-1394044.80963
WAYPOINT	305	45.3241623	-117.1954318	5312046.83290	-1394041.29551
WAYPOINT	295	45.3240856	-117.1953925	5312037.37944	-1394040.94588
WAYPOINT	294	45.3240837	-117.1953885	5312037.06596	-1394040.70063
WAYPOINT	293	45.3240837	-117.1953899	5312037.10135	-1394040.81134
WAYPOINT	292	45.3241457	-117.1952838	5312041.31175	-1394030.34754
WAYPOINT	291	45.3241408	-117.1952905	5312040.93074	-1394031.03818
WAYPOINT	296	45.3241191	-117.1953243	5312039.37507	-1394034.44500
WAYPOINT	322	45.3243936	-117.1955410	5312075.11347	-1394041.64112
WAYPOINT	297	45.3241229	-117.1953252	5312039.82461	-1394034.38038
WAYPOINT	299	45.3241524	-117.1952881	5312042.15975	-1394030.44344
WAYPOINT	304	45.3241737	-117.1953863	5312046.96078	-1394037.35080
WAYPOINT	501	45.3254745	-117.1951975	5312186.01973	-1393976.67777
WAYPOINT	302	45.3241943	-117.1953809	5312049.09508	-1394036.20033
WAYPOINT	301	45.3241960	-117.1953719	5312049.06608	-1394035.43881
WAYPOINT	300	45.3241533	-117.1952918	5312042.34454	-1394030.70146
WAYPOINT	298	45.3241269	-117.1953419	5312040.67460	-1394035.54204
WAYPOINT	323	45.3243912	-117.1955349	5312074.70124	-1394041.24698
WAYPOINT	324	45.3243719	-117.1955241	5312072.29217	-1394041.08804
WAYPOINT	325	45.3243723	-117.1955098	5312071.98349	-1394039.96219
WAYPOINT	348	45.3208279	-117.1938751	5311639.51842	-1394037.69932
WAYPOINT	347	45.3208305	-117.1939214	5311640.95760	-1394041.21560
WAYPOINT	346	45.3208313	-117.1939391	5311641.49322	-1394042.57149
WAYPOINT	345	45.3211073	-117.1936628	5311665.10382	-1394011.27825
WAYPOINT	344	45.3235017	-117.1951959	5311967.93816	-1394046.24241

WAYPOINT	349	45.3208307	-117.1938576	5311639.38691	-1394036.23577
WAYPOINT	343	45.3238825	-117.1953305	5312013.38682	-1394043.28388
WAYPOINT	350	45.3202053	-117.1934210	5311559.39218	-1394024.28614
WAYPOINT	352	45.3197456	-117.1931859	5311502.72104	-1394022.19153
WAYPOINT	357	45.3197174	-117.1930515	5311496.25867	-1394012.70253
WAYPOINT	356	45.3197229	-117.1930673	5311497.26479	-1394013.74311
WAYPOINT	355	45.3197300	-117.1930817	5311498.40877	-1394014.60901
WAYPOINT	354	45.3197417	-117.1931049	5311500.27493	-1394016.00810
WAYPOINT	353	45.3197618	-117.1931239	5311502.97256	-1394016.78056
WAYPOINT	351	45.3197440	-117.1932480	5311504.09090	-1394027.08439
WAYPOINT	290	45.3241362	-117.1952979	5312040.61597	-1394031.77983
WAYPOINT	342	45.3239222	-117.1953159	5312017.40369	-1394040.74031
WAYPOINT	340	45.3239841	-117.1953108	5312024.12405	-1394038.16018
WAYPOINT	330	45.3243908	-117.1951844	5312065.92227	-1394013.93943
WAYPOINT	329	45.3244649	-117.1952605	5312076.00821	-1394017.25513
WAYPOINT	328	45.3248842	-117.1953621	5312124.87683	-1394010.36567
WAYPOINT	327	45.3249276	-117.1953880	5312130.32106	-1394010.85118
WAYPOINT	326	45.3244247	-117.1954338	5312075.87826	-1394032.18494
WAYPOINT	331	45.3243851	-117.1951863	5312065.33815	-1394014.28423
WAYPOINT	341	45.3239513	-117.1953214	5312020.76540	-1394040.14107
WAYPOINT	332	45.3243850	-117.1951931	5312065.50050	-1394014.82268
WAYPOINT	334	45.3242914	-117.1952206	5312055.83765	-1394020.27411
WAYPOINT	339	45.3240055	-117.1952874	5312025.90105	-1394035.57544
WAYPOINT	338	45.3240543	-117.1952220	5312029.66420	-1394028.75454
WAYPOINT	337	45.3241464	-117.1952368	5312040.21388	-1394026.65712
WAYPOINT	336	45.3241505	-117.1952635	5312041.33444	-1394028.59676
WAYPOINT	335	45.3242199	-117.1953839	5312052.00410	-1394035.53008
WAYPOINT	333	45.3243876	-117.1951942	5312065.81502	-1394014.81582
WAYPOINT	358	45.3187366	-117.1926769	5311378.52757	-1394018.13310
WAYPOINT	289	45.3241369	-117.1953304	5312041.49839	-1394034.28539
WAYPOINT	287	45.3241056	-117.1953546	5312038.63707	-1394037.28114
WAYPOINT	241	45.3236907	-117.1953655	5311993.06216	-1394052.78399
WAYPOINT	242	45.3236996	-117.1954137	5311995.23670	-1394056.23002
WAYPOINT	240	45.3236689	-117.1953391	5311989.98695	-1394051.49741
WAYPOINT	238	45.3236586	-117.1954063	5311990.52277	-1394057.10333
WAYPOINT	239	45.3236516	-117.1954407	5311990.60975	-1394060.02813
WAYPOINT	243	45.3237085	-117.1954199	5311996.38147	-1394056.39692
WAYPOINT	244	45.3237242	-117.1954220	5311998.16877	-1394056.01301
WAYPOINT	245	45.3237164	-117.1954214	5311997.29001	-1394056.23630
WAYPOINT	250	45.3237868	-117.1955103	5312007.28812	-1394060.68352
WAYPOINT	249	45.3237801	-117.1954923	5312006.09834	-1394059.51445
WAYPOINT	248	45.3237737	-117.1954688	5312004.80861	-1394057.91071
WAYPOINT	247	45.3237493	-117.1954179	5312000.83403	-1394054.80111
WAYPOINT	246	45.3237444	-117.1954100	5312000.10054	-1394054.35840
WAYPOINT	237	45.3236608	-117.1953991	5311990.59288	-1394056.46135
WAYPOINT	236	45.3236598	-117.1953937	5311990.34744	-1394056.07834
WAYPOINT	235	45.3236337	-117.1953469	5311986.29185	-1394053.35553
WAYPOINT	234	45.3236175	-117.1953385	5311984.29390	-1394053.26712
WAYPOINT	224	45.3212835	-117.1939291	5311691.21202	-1394025.81820

WAYPOINT	223	45.3212749	-117.1939315	5311690.32760	-1394026.30965
WAYPOINT	222	45.3212771	-117.1939362	5311690.68540	-1394026.59834
WAYPOINT	221	45.3212776	-117.1939269	5311690.50893	-1394025.85555
WAYPOINT	225	45.3212772	-117.1939311	5311690.56802	-1394026.19673
WAYPOINT	251	45.3237845	-117.1955393	5312007.75105	-1394063.02758
WAYPOINT	226	45.3212789	-117.1939362	5311690.88987	-1394026.53300
WAYPOINT	228	45.3213928	-117.1938174	5311700.51010	-1394013.25225
WAYPOINT	233	45.3225035	-117.1948422	5311848.80109	-1394053.92270
WAYPOINT	232	45.3224835	-117.1948740	5311847.39008	-1394057.11147
WAYPOINT	231	45.3224348	-117.1948111	5311840.43905	-1394053.92351
WAYPOINT	230	45.3214004	-117.1938207	5311701.43486	-1394013.23772
WAYPOINT	229	45.3213934	-117.1938105	5311700.41297	-1394012.69292
WAYPOINT	227	45.3213859	-117.1938136	5311699.65488	-1394013.19471
WAYPOINT	252	45.3237960	-117.1954882	5312007.75567	-1394058.63243
WAYPOINT	253	45.3237965	-117.1953881	5312005.31705	-1394050.81184
WAYPOINT	254	45.3238204	-117.1953780	5312007.70473	-1394049.17737
WAYPOINT	277	45.3239222	-117.1954409	5312020.51979	-1394050.49004
WAYPOINT	276	45.3238957	-117.1954116	5312016.86121	-1394049.13901
WAYPOINT	275	45.3238932	-117.1954512	5312017.57158	-1394052.31827
WAYPOINT	274	45.3238759	-117.1955092	5312017.10843	-1394057.45117
WAYPOINT	273	45.3238049	-117.1954975	5312008.96996	-1394059.04349
WAYPOINT	278	45.3239145	-117.1955034	5312021.22585	-1394055.63765
WAYPOINT	272	45.3237925	-117.1955011	5312007.68834	-1394059.76332
WAYPOINT	279	45.3239586	-117.1954317	5312024.31965	-1394048.48328
WAYPOINT	281	45.3239536	-117.1954814	5312025.00245	-1394052.53668
WAYPOINT	286	45.3241084	-117.1953952	5312039.96501	-1394040.34980
WAYPOINT	285	45.3240924	-117.1954313	5312039.09364	-1394043.72525
WAYPOINT	284	45.3240031	-117.1954747	5312030.30053	-1394050.26675
WAYPOINT	283	45.3240117	-117.1954529	5312030.71245	-1394048.26266
WAYPOINT	282	45.3240028	-117.1954461	5312029.56072	-1394048.04730
WAYPOINT	280	45.3239703	-117.1954500	5312026.06474	-1394049.50322
WAYPOINT	288	45.3241107	-117.1953447	5312038.95650	-1394036.32919
WAYPOINT	271	45.3238772	-117.1954034	5312014.61176	-1394049.15934
WAYPOINT	269	45.3237943	-117.1955084	5312008.06452	-1394060.26953
WAYPOINT	259	45.3238607	-117.1954262	5312013.35495	-1394051.51940
WAYPOINT	258	45.3238568	-117.1954267	5312012.93880	-1394051.68849
WAYPOINT	257	45.3238542	-117.1954236	5312012.57644	-1394051.54566
WAYPOINT	256	45.3237621	-117.1953102	5311999.56716	-1394045.95122
WAYPOINT	255	45.3238162	-117.1953785	5312007.25610	-1394049.37060
WAYPOINT	260	45.3238726	-117.1954318	5312014.81705	-1394051.52815
WAYPOINT	270	45.3237879	-117.1955228	5312007.71958	-1394061.61805
WAYPOINT	261	45.3238804	-117.1954686	5312016.59588	-1394054.12102
WAYPOINT	263	45.3237998	-117.1955153	5312008.84889	-1394060.61606
WAYPOINT	268	45.3237876	-117.1954308	5312005.39866	-1394054.45158
WAYPOINT	267	45.3237812	-117.1954422	5312004.96876	-1394055.56860
WAYPOINT	266	45.3237735	-117.1954935	5312005.39499	-1394059.84065
WAYPOINT	265	45.3237822	-117.1955127	5312006.83917	-1394061.03583
WAYPOINT	264	45.3237840	-117.1955159	5312007.11293	-1394061.22159
WAYPOINT	262	45.3238096	-117.1954896	5312009.29194	-1394058.26344

WAYPOINT	359	45.3187785	-117.1926370	5311382.16545	-1394013.54176
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WAYPOINT	361	45.3187926	-117.1927044	5311385.40072	-1394018.29925
WAYPOINT	454	45.3207222	-117.1930608	5311607.54629	-1393977.94002
WAYPOINT	455	45.3207084	-117.1931302	5311607.74696	-1393983.83973
WAYPOINT	453	45.3207205	-117.1930539	5311607.18918	-1393977.46290
WAYPOINT	451	45.3207094	-117.1930532	5311605.94016	-1393977.80446
WAYPOINT	452	45.3207188	-117.1930238	5311606.24492	-1393975.17889
WAYPOINT	456	45.3208101	-117.1930163	5311616.15552	-1393971.36393
WAYPOINT	457	45.3207772	-117.1931288	5311615.31665	-1393981.29874
WAYPOINT	458	45.3207913	-117.1931692	5311617.88055	-1393983.95117
WAYPOINT	463	45.3217819	-117.1931425	5311726.70544	-1393946.88378
WAYPOINT	462	45.3217883	-117.1931437	5311727.43887	-1393946.75080
WAYPOINT	461	45.3214070	-117.1931309	5311684.98008	-1393959.22347
WAYPOINT	460	45.3208548	-117.1931899	5311625.41982	-1393983.32762
WAYPOINT	459	45.3208406	-117.1931737	5311623.43973	-1393982.56309
WAYPOINT	450	45.3206741	-117.1930395	5311601.69856	-1393977.97916
WAYPOINT	449	45.3206609	-117.1930329	5311600.07914	-1393977.92778
WAYPOINT	448	45.3206550	-117.1930336	5311599.44021	-1393978.19640
WAYPOINT	447	45.3206587	-117.1930226	5311599.57335	-1393977.21029
WAYPOINT	437	45.3206446	-117.1930195	5311597.93796	-1393977.45963
WAYPOINT	436	45.3206391	-117.1930702	5311598.59913	-1393981.60608
WAYPOINT	435	45.3206275	-117.1930614	5311597.09202	-1393981.33060
WAYPOINT	434	45.3206568	-117.1930822	5311600.85277	-1393981.91540
WAYPOINT	433	45.3206557	-117.1930704	5311600.43119	-1393981.04211
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WAYPOINT	464	45.3217845	-117.1931456	5311727.07004	-1393947.03366
WAYPOINT	439	45.3206065	-117.1930034	5311593.32257	-1393977.55096
WAYPOINT	441	45.3205998	-117.1930268	5311593.16376	-1393979.61172
WAYPOINT	446	45.3205623	-117.1930157	5311588.74664	-1393980.07194
WAYPOINT	445	45.3206072	-117.1930727	5311595.13267	-1393982.92951
WAYPOINT	444	45.3206077	-117.1930749	5311595.24425	-1393983.08807
WAYPOINT	443	45.3206060	-117.1930702	5311594.93087	-1393982.77830
WAYPOINT	442	45.3205946	-117.1930583	5311593.37416	-1393982.25228
WAYPOINT	440	45.3205982	-117.1930201	5311592.83192	-1393979.14887
WAYPOINT	465	45.3217745	-117.1931444	5311725.92704	-1393947.29151
WAYPOINT	466	45.3217762	-117.1931475	5311726.20080	-1393947.47729
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WAYPOINT	490	45.3250103	-117.1950691	5312131.51718	-1393983.06343
WAYPOINT	489	45.3250192	-117.1950700	5312132.52154	-1393982.82149
WAYPOINT	488	45.3250202	-117.1950553	5312132.26562	-1393981.63583
WAYPOINT	360	45.3187839	-117.1926515	5311383.11914	-1394014.48310
WAYPOINT	486	45.3250236	-117.1950395	5312132.24315	-1393980.28876
WAYPOINT	491	45.3250102	-117.1950681	5312131.48232	-1393982.98865
WAYPOINT	485	45.3250609	-117.1950544	5312136.73737	-1393980.13442
WAYPOINT	492	45.3250089	-117.1950717	5312131.42393	-1393983.31666
WAYPOINT	494	45.3250075	-117.1950686	5312131.19858	-1393983.12230
WAYPOINT	499	45.3254573	-117.1951449	5312182.80817	-1393973.18096
WAYPOINT	498	45.3254566	-117.1951375	5312182.55047	-1393972.63003

WAYPOINT	497	45.3254570	-117.1951030	5312181.72961	-1393969.93215
WAYPOINT	496	45.3251489	-117.1951305	5312148.36971	-1393982.95663
WAYPOINT	495	45.3251257	-117.1950682	5312144.25260	-1393978.92086
WAYPOINT	493	45.3250064	-117.1950700	5312131.10466	-1393983.27434
WAYPOINT	484	45.3250680	-117.1950465	5312137.32593	-1393979.26231
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WAYPOINT	470	45.3218492	-117.1931398	5311734.06909	-1393944.30032
WAYPOINT	469	45.3218526	-117.1931361	5311734.35424	-1393943.88522
WAYPOINT	468	45.3218143	-117.1931451	5311730.34673	-1393945.94358
WAYPOINT	473	45.3218747	-117.1931438	5311736.99420	-1393943.71100
WAYPOINT	483	45.3250691	-117.1950436	5312137.37538	-1393979.00161
WAYPOINT	474	45.3218830	-117.1931578	5311738.25838	-1393944.50319
WAYPOINT	476	45.3218824	-117.1931335	5311737.58060	-1393942.63764
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WAYPOINT	480	45.3250740	-117.1950969	5312139.25086	-1393982.98306
WAYPOINT	479	45.3251056	-117.1951054	5312142.95439	-1393982.52719
WAYPOINT	478	45.3251927	-117.1950036	5312150.04397	-1393971.51714
WAYPOINT	477	45.3218765	-117.1930897	5311735.83975	-1393939.42753
WAYPOINT	475	45.3218580	-117.1931497	5311735.29695	-1393944.75781
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WAYPOINT	384	45.3190658	-117.1926908	5311415.25404	-1394007.59281
WAYPOINT	385	45.3193248	-117.1927483	5311445.31225	-1394002.92920
WAYPOINT	383	45.3190540	-117.1926914	5311413.97119	-1394008.05343
WAYPOINT	381	45.3189156	-117.1927367	5311399.79473	-1394016.47293
WAYPOINT	382	45.3189284	-117.1927304	5311401.05602	-1394015.52935
WAYPOINT	386	45.3193668	-117.1927203	5311449.25572	-1393999.26373
WAYPOINT	387	45.3194527	-117.1928070	5311460.91112	-1394002.98651
WAYPOINT	388	45.3197145	-117.1927706	5311488.94540	-1393990.90272
WAYPOINT	393	45.3198483	-117.1928387	5311505.42588	-1393991.48517
WAYPOINT	430	45.3206324	-117.1930657	5311597.73890	-1393981.49856
WAYPOINT	391	45.3198268	-117.1928451	5311503.20592	-1393992.74884
WAYPOINT	390	45.3198212	-117.1928420	5311502.50754	-1393992.70561
WAYPOINT	389	45.3197101	-117.1927710	5311488.46404	-1393991.09263
WAYPOINT	380	45.3189561	-117.1927450	5311404.48746	-1394015.69354
WAYPOINT	379	45.3189262	-117.1927459	5311401.20153	-1394016.81573
WAYPOINT	378	45.3188121	-117.1926858	5311387.09556	-1394016.15839
WAYPOINT	377	45.3187491	-117.1926494	5311379.22281	-1394015.54767
WAYPOINT	367	45.3188805	-117.1927530	5311396.33023	-1394018.98419
WAYPOINT	366	45.3188332	-117.1927376	5311390.71163	-1394019.45443
WAYPOINT	365	45.3188360	-117.1926947	5311389.95062	-1394016.01693
WAYPOINT	364	45.3188357	-117.1926964	5311389.96374	-1394016.15711
WAYPOINT	363	45.3188328	-117.1927004	5311389.73808	-1394016.56781
WAYPOINT	368	45.3189024	-117.1928051	5311400.04651	-1394022.27743
WAYPOINT	394	45.3198702	-117.1928434	5311507.96322	-1393991.08513
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WAYPOINT	371	45.3189151	-117.1927823	5311400.87565	-1394020.04624
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WAYPOINT	375	45.3188393	-117.1926090	5311388.18431	-1394009.21225
WAYPOINT	374	45.3189103	-117.1927336	5311399.13393	-1394016.41768
WAYPOINT	373	45.3188762	-117.1927237	5311395.11755	-1394016.85117
WAYPOINT	372	45.3189080	-117.1927728	5311399.85277	-1394019.55928
WAYPOINT	370	45.3189009	-117.1927889	5311399.47559	-1394021.06253
WAYPOINT	395	45.3198741	-117.1928436	5311508.40267	-1393990.95846
WAYPOINT	392	45.3198261	-117.1928413	5311503.03594	-1393992.47231
WAYPOINT	397	45.3198328	-117.1928384	5311503.70654	-1393992.01310
WAYPOINT	419	45.3205358	-117.1929994	5311585.41486	-1393979.73934
WAYPOINT	420	45.3205620	-117.1930390	5311589.29097	-1393981.90113
WAYPOINT	418	45.3202579	-117.1928914	5311552.01300	-1393981.12868
WAYPOINT	415	45.3199784	-117.1927595	5311517.83220	-1393980.72067
WAYPOINT	396	45.3198415	-117.1928389	5311504.68166	-1393991.74447
WAYPOINT	421	45.3205619	-117.1931138	5311591.14379	-1393987.73352
WAYPOINT	422	45.3205376	-117.1930760	5311587.51823	-1393985.65064
WAYPOINT	423	45.3206224	-117.1930378	5311595.94047	-1393979.67484
WAYPOINT	428	45.3206248	-117.1930460	5311596.41385	-1393980.22994
WAYPOINT	427	45.3206279	-117.1930354	5311596.49111	-1393979.29005
WAYPOINT	426	45.3206142	-117.1930626	5311595.65125	-1393981.89929
WAYPOINT	425	45.3206060	-117.1930648	5311594.79707	-1393982.35959
WAYPOINT	424	45.3206103	-117.1930550	5311595.03452	-1393981.44069
WAYPOINT	414	45.3200046	-117.1927201	5311519.74753	-1393976.71590
WAYPOINT	413	45.3200346	-117.1927327	5311523.37092	-1393976.64599
WAYPOINT	417	45.3202505	-117.1928902	5311551.15935	-1393981.30092
WAYPOINT	411	45.3200057	-117.1928230	5311522.43262	-1393984.70319
WAYPOINT	402	45.3199097	-117.1928010	5311511.26973	-1393986.38316
WAYPOINT	412	45.3200333	-117.1927308	5311523.18357	-1393976.54000
WAYPOINT	400	45.3199477	-117.1927833	5311515.03237	-1393983.65374
WAYPOINT	399	45.3198740	-117.1928154	5311507.69108	-1393988.76590
WAYPOINT	398	45.3197996	-117.1928465	5311500.23975	-1393993.81957
WAYPOINT	403	45.3198694	-117.1928874	5311508.97555	-1393994.54280
WAYPOINT	404	45.3198932	-117.1928883	5311511.61919	-1393993.77021
WAYPOINT	401	45.3199176	-117.1927988	5311512.09318	-1393985.92581
WAYPOINT	406	45.3199045	-117.1928787	5311512.63100	-1393992.62534
WAYPOINT	405	45.3198989	-117.1928909	5311512.32279	-1393993.76881
WAYPOINT	410	45.3199907	-117.1928290	5311520.92527	-1393985.70391
WAYPOINT	362	45.3188320	-117.1926949	5311389.51939	-1394016.16933
WAYPOINT	409	45.3199784	-117.1928346	5311519.70142	-1393986.57022
WAYPOINT	408	45.3199587	-117.1928332	5311517.49073	-1393987.16149
WAYPOINT	407	45.3199302	-117.1928175	5311513.94814	-1393986.93919
WAYPOINT	007	45.3256030	-117.1978226	5019140.16560	484497.11397
WAYPOINT	008	45.3256250	-117.1978526	5019142.61544	484494.76894
WAYPOINT	009	45.3256210	-117.1978586	5019142.17222	484494.29764
WAYPOINT	010	45.3257630	-117.1978166	5019157.93944	484497.62781
WAYPOINT	011	45.3258420	-117.1978896	5019166.72989	484491.92855
WAYPOINT	012	45.3258420	-117.1978906	5019166.73008	484491.85018
WAYPOINT	013	45.3260140	-117.1976486	5019185.79164	484510.86194

WAYPOINT	014	45.3228070	-117.1960686	5018829.21177	484633.81486
WAYPOINT	020	45.3238460	-117.1928846	5018944.03573	484883.62595
WAYPOINT	021	45.3238460	-117.1928846	5018944.03573	484883.62595
WAYPOINT	022	45.3238420	-117.1928866	5018943.59173	484883.46815
WAYPOINT	023	45.3238120	-117.1928296	5018940.24823	484887.92727
WAYPOINT	024	45.3238030	-117.1928216	5018939.24689	484888.55183
WAYPOINT	025	45.3237910	-117.1928026	5018937.91020	484890.03768
WAYPOINT	026	45.3237710	-117.1927856	5018935.68514	484891.36465
WAYPOINT	027	45.3237060	-117.1927376	5018928.45505	484895.10914
WAYPOINT	028	45.3237060	-117.1927366	5018928.45487	484895.18751
WAYPOINT	029	45.3237090	-117.1927356	5018928.78796	484895.26668
WAYPOINT	030	45.3237060	-117.1927336	5018928.45430	484895.42262
WAYPOINT	031	45.3236920	-117.1927446	5018926.90106	484894.55683
WAYPOINT	032	45.3236930	-117.1927396	5018927.01121	484894.94895
WAYPOINT	033	45.3236660	-117.1927286	5018924.00962	484895.80385
WAYPOINT	034	45.3236660	-117.1927336	5018924.01056	484895.41199
WAYPOINT	035	45.3236580	-117.1927326	5018923.12162	484895.48824
WAYPOINT	036	45.3236550	-117.1927366	5018922.78909	484895.17396
WAYPOINT	037	45.3236390	-117.1928016	5018921.02378	484890.07564
WAYPOINT	038	45.3236390	-117.1928006	5018921.02359	484890.15401
WAYPOINT	039	45.3236500	-117.1926686	5018922.22088	484900.50181
WAYPOINT	040	45.3236280	-117.1926776	5018919.77850	484899.79064
WAYPOINT	041	45.3225260	-117.1923156	5018797.28555	484927.86848
WAYPOINT	042	45.3236940	-117.1923056	5018927.04103	484928.96190
WAYPOINT	043	45.3237530	-117.1923846	5018933.61034	484922.78630
WAYPOINT	044	45.3237700	-117.1923686	5018935.49593	484924.04474
WAYPOINT	045	45.3240270	-117.1924396	5018964.06029	484918.54865
WAYPOINT	046	45.3240280	-117.1924456	5018964.17250	484918.07870
WAYPOINT	047	45.3241080	-117.1924206	5018973.05532	484920.05917
WAYPOINT	048	45.3245840	-117.1924296	5019025.93758	484919.48014
WAYPOINT	049	45.3246050	-117.1924196	5019028.26867	484920.26940
WAYPOINT	050	45.3246200	-117.1923966	5019029.93077	484922.07587
WAYPOINT	001	45.3240038	-117.1921213	5311946.82693	-1393788.78413
WAYPOINT	002	45.3206981	-117.1922416	5311584.46780	-1393914.92020
WAYPOINT	003	45.3206930	-117.1922456	5311584.00119	-1393915.40788
WAYPOINT	004	45.3206930	-117.1922449	5311583.98450	-1393915.35564
WAYPOINT	005	45.3206944	-117.1922477	5311584.21046	-1393915.52147
WAYPOINT	006	45.3206925	-117.1922396	5311583.80653	-1393914.95878
WAYPOINT	007	45.3206945	-117.1922378	5311583.97399	-1393914.74715
WAYPOINT	008	45.3206956	-117.1922327	5311583.97598	-1393914.30739
WAYPOINT	009	45.3206951	-117.1922317	5311583.89755	-1393914.25253
WAYPOINT	010	45.3206970	-117.1922338	5311584.15324	-1393914.35129
WAYPOINT	011	45.3206935	-117.1922434	5311584.01098	-1393915.21741
WAYPOINT	012	45.3206950	-117.1922405	5311584.09827	-1393914.94547
WAYPOINT	013	45.3206959	-117.1922242	5311583.79258	-1393913.63813
WAYPOINT	014	45.3206821	-117.1922218	5311582.21235	-1393913.93427
WAYPOINT	015	45.3206726	-117.1922191	5311581.09008	-1393914.06258
WAYPOINT	016	45.3190324	-117.1919149	5311392.23457	-1393948.26953
WAYPOINT	017	45.3190008	-117.1919354	5311389.25354	-1393950.98634

WAYPOINT	018	45.3189950	-117.1918987	5311387.69013	-1393948.33118
WAYPOINT	019	45.3189640	-117.1918981	5311384.25694	-1393949.37749
WAYPOINT	020	45.3189021	-117.1918859	5311377.10640	-1393950.61131
WAYPOINT	021	45.3192769	-117.1918550	5311417.76437	-1393934.96181
WAYPOINT	022	45.3192787	-117.1918414	5311417.62054	-1393933.84076
WAYPOINT	023	45.3192892	-117.1918290	5311418.46962	-1393932.50299
WAYPOINT	024	45.3193071	-117.1918708	5311421.49351	-1393935.13144
WAYPOINT	025	45.3193514	-117.1918144	5311424.97981	-1393929.16983
WAYPOINT	026	45.3193604	-117.1918399	5311426.61488	-1393930.83701
WAYPOINT	027	45.3193710	-117.1918498	5311428.02842	-1393931.23524
WAYPOINT	028	45.3193738	-117.1918591	5311428.57512	-1393931.85975
WAYPOINT	029	45.3193628	-117.1918524	5311427.18580	-1393931.72792
WAYPOINT	030	45.3193778	-117.1918343	5311428.40239	-1393929.78289
WAYPOINT	031	45.3193782	-117.1918320	5311428.38255	-1393929.59501
WAYPOINT	032	45.3193866	-117.1918239	5311429.10817	-1393928.67137
WAYPOINT	033	45.3193886	-117.1918214	5311429.26579	-1393928.39843
WAYPOINT	034	45.3193985	-117.1918408	5311430.84432	-1393929.56463
WAYPOINT	035	45.3194007	-117.1917983	5311430.03546	-1393926.17169
WAYPOINT	036	45.3193979	-117.1917939	5311429.61184	-1393925.93237
WAYPOINT	037	45.3194052	-117.1917964	5311430.48694	-1393925.86157
WAYPOINT	038	45.3194203	-117.1917991	5311432.22350	-1393925.54386
WAYPOINT	039	45.3194538	-117.1917683	5311435.15212	-1393921.95783
WAYPOINT	040	45.3194675	-117.1917722	5311436.76888	-1393921.77981
WAYPOINT	041	45.3194892	-117.1917814	5311439.38697	-1393921.72783
WAYPOINT	042	45.3195026	-117.1918128	5311441.66126	-1393923.70293
WAYPOINT	043	45.3195632	-117.1917700	5311447.28276	-1393918.22521
WAYPOINT	044	45.3207528	-117.1920348	5311585.36470	-1393896.86423
WAYPOINT	045	45.3207840	-117.1920200	5311588.44131	-1393894.60673
WAYPOINT	046	45.3207887	-117.1920056	5311588.60148	-1393893.31638
WAYPOINT	047	45.3208633	-117.1919232	5311594.79372	-1393884.25764
WAYPOINT	048	45.3209241	-117.1919643	5311602.54429	-1393885.31716
WAYPOINT	049	45.3209410	-117.1919837	5311604.88896	-1393886.23161
WAYPOINT	050	45.3209478	-117.1919876	5311605.73558	-1393886.29278
WAYPOINT	051	45.3209530	-117.1919560	5311605.52387	-1393883.65181
WAYPOINT	052	45.3193036	-117.1913692	5311408.60787	-1393896.14612
WAYPOINT	053	45.3193010	-117.1913715	5311408.37681	-1393896.41416
WAYPOINT	054	45.3193020	-117.1913754	5311408.58660	-1393896.68571
WAYPOINT	055	45.3193001	-117.1913635	5311408.07681	-1393895.82597
WAYPOINT	056	45.3193050	-117.1913582	5311408.49011	-1393895.23244
WAYPOINT	057	45.3193095	-117.1914013	5311410.06524	-1393898.43898
WAYPOINT	058	45.3193257	-117.1914102	5311412.07475	-1393898.55999
WAYPOINT	059	45.3193210	-117.1913605	5311410.31814	-1393894.85029
WAYPOINT	060	45.3193245	-117.1913487	5311410.41269	-1393893.80432
WAYPOINT	061	45.3193243	-117.1913420	5311410.21813	-1393893.29072
WAYPOINT	062	45.3193252	-117.1913266	5311409.93538	-1393892.05509
WAYPOINT	063	45.3193417	-117.1913588	5311412.56411	-1393893.98827
WAYPOINT	064	45.3193419	-117.1913554	5311412.49745	-1393893.71482
WAYPOINT	065	45.3193421	-117.1913628	5311412.70870	-1393894.28066
WAYPOINT	066	45.3193234	-117.1913224	5311409.62652	-1393891.79371

WAYPOINT	067	45.3193001	-117.1913235	5311407.09042	-1393892.70460
WAYPOINT	068	45.3192740	-117.1913482	5311404.81327	-1393895.55051
WAYPOINT	069	45.3192601	-117.1913309	5311402.84562	-1393894.69512
WAYPOINT	070	45.3192445	-117.1913444	5311401.45890	-1393896.29834
WAYPOINT	071	45.3201746	-117.1913908	5311505.41579	-1393867.06433
WAYPOINT	072	45.3209458	-117.1914160	5311591.27195	-1393841.79858
WAYPOINT	073	45.3219698	-117.1910199	5311694.58007	-1393774.74780
WAYPOINT	074	45.3219685	-117.1910228	5311694.51381	-1393775.02075
WAYPOINT	075	45.3219639	-117.1910188	5311693.90414	-1393774.87012
WAYPOINT	076	45.3219627	-117.1910198	5311693.79090	-1393774.99223
WAYPOINT	077	45.3218867	-117.1910474	5311686.08495	-1393779.82453
WAYPOINT	078	45.3218794	-117.1910486	5311685.30953	-1393780.18058
WAYPOINT	079	45.3218610	-117.1910568	5311683.47405	-1393781.46570
WAYPOINT	080	45.3218542	-117.1911075	5311683.98810	-1393785.65902
WAYPOINT	081	45.3218525	-117.1911065	5311683.77726	-1393785.63960
WAYPOINT	082	45.3218415	-117.1911057	5311682.54504	-1393785.96889
WAYPOINT	083	45.3218309	-117.1910697	5311680.47206	-1393783.54119
WAYPOINT	084	45.3218480	-117.1910563	5311682.02590	-1393781.88547
WAYPOINT	085	45.3218474	-117.1910589	5311682.02857	-1393782.11491
WAYPOINT	086	45.3218446	-117.1910432	5311681.32093	-1393780.98675
WAYPOINT	087	45.3218233	-117.1910468	5311679.05760	-1393782.01932
WAYPOINT	088	45.3218251	-117.1910403	5311679.10026	-1393781.45143
WAYPOINT	089	45.3218239	-117.1910371	5311678.88948	-1393781.23778
WAYPOINT	090	45.3218779	-117.1910167	5311684.34799	-1393777.74318
WAYPOINT	091	45.3219129	-117.1909779	5311687.24409	-1393773.48365
WAYPOINT	092	45.3218496	-117.1909708	5311680.07458	-1393775.16874
WAYPOINT	093	45.3217640	-117.1911024	5311673.89475	-1393788.45196
WAYPOINT	094	45.3217612	-117.1910997	5311673.51959	-1393788.33381
WAYPOINT	095	45.3217415	-117.1910780	5311670.80166	-1393787.33757
WAYPOINT	096	45.3195879	-117.1900850	5311408.03739	-1393785.97109
WAYPOINT	097	45.3194171	-117.1902097	5311392.26186	-1393801.72234
WAYPOINT	098	45.3190722	-117.1901359	5311352.30359	-1393808.15075
WAYPOINT	099	45.3190729	-117.1901440	5311352.58704	-1393808.75197
WAYPOINT	100	45.3190712	-117.1901414	5311352.33769	-1393808.60821
WAYPOINT	101	45.3190308	-117.1901088	5311347.06236	-1393807.49910
WAYPOINT	102	45.3190291	-117.1901065	5311346.80818	-1393807.37836
WAYPOINT	103	45.3187950	-117.1901275	5311321.45679	-1393817.27945
WAYPOINT	104	45.3191672	-117.1871889	5311289.39460	-1393575.00320
WAYPOINT	105	45.3192623	-117.1871148	5311298.06291	-1393565.86640
WAYPOINT	106	45.3192602	-117.1871175	5311297.89892	-1393566.14995
WAYPOINT	107	45.3192650	-117.1871263	5311298.64643	-1393566.66735
WAYPOINT	108	45.3192830	-117.1871681	5311301.66786	-1393569.28894
WAYPOINT	109	45.3192668	-117.1873992	5311305.63914	-1393587.88530
WAYPOINT	110	45.3192839	-117.1873944	5311307.40693	-1393586.90292
WAYPOINT	111	45.3193015	-117.1874081	5311309.69577	-1393587.35329
WAYPOINT	112	45.3193634	-117.1870940	5311308.71813	-1393560.67679
WAYPOINT	113	45.3195499	-117.1873516	5311335.74685	-1393574.17566
WAYPOINT	114	45.3196482	-117.1871761	5311342.23164	-1393557.02205
WAYPOINT	115	45.3198146	-117.1871112	5311359.01436	-1393546.08531

WAYPOINT	116	45.3198161	-117.1871150	5311359.27516	-1393546.32596
WAYPOINT	117	45.3197818	-117.1871772	5311357.02560	-1393552.38870
WAYPOINT	118	45.3197824	-117.1871881	5311357.37117	-1393553.21496
WAYPOINT	119	45.3197769	-117.1871910	5311356.83321	-1393553.63946
WAYPOINT	120	45.3197935	-117.1872040	5311358.99038	-1393554.06658
WAYPOINT	121	45.3198554	-117.1873501	5311369.46646	-1393563.27358
WAYPOINT	122	45.3199382	-117.1871971	5311374.80755	-1393548.41544
WAYPOINT	123	45.3199568	-117.1871991	5311376.91336	-1393547.91543
WAYPOINT	124	45.3199574	-117.1872025	5311377.07310	-1393548.16000
WAYPOINT	125	45.3199590	-117.1872448	5311378.30437	-1393551.40413
WAYPOINT	126	45.3199573	-117.1872512	5311378.26853	-1393551.96297
WAYPOINT	127	45.3199592	-117.1872535	5311378.53703	-1393552.07139
WAYPOINT	128	45.3199536	-117.1872696	5311378.32003	-1393553.53109
WAYPOINT	129	45.3200380	-117.1871903	5311385.67087	-1393544.36150
WAYPOINT	130	45.3200666	-117.1872681	5311390.77047	-1393549.42382
WAYPOINT	131	45.3201127	-117.1871563	5311393.08018	-1393539.07710
WAYPOINT	132	45.3202028	-117.1871635	5311403.21795	-1393536.45798
WAYPOINT	133	45.3202408	-117.1872193	5311408.81294	-1393539.46036
WAYPOINT	134	45.3202965	-117.1872183	5311414.94065	-1393537.42369
WAYPOINT	135	45.3204972	-117.1872251	5311437.28653	-1393530.86146

Appendix D

Spalding's catchfly (*Silene spaldingii*) reproductive output data 2010-2013.

Survey data for 2013 was collected on August 8th.

Survey date for 2014 was collected on August 6th.

Tag ID	Stems					Stems Browsed					Flowers					Fruits				
	2010*	2011*	2012*	2013	2014	2010*	2011*	2012*	2013	2014	2010*	2011*	2012*	2013	2014	2010*	2011*	2012*	2013	2014
1			1					0					6					4		
7				3					3					1					0	
9			1					0					51					14		
18			2					0					13					1		
19			1	2	1			0	2	1			8	6	1			3	0	0
24				3	3				0	0				15	3				0	0
28			1		1			0		0				11		7			2	0
29			1	1				1	0					26	45				15	0
38			1					0						7					3	
43				2					0						116					0
48				1					0						20					0
54				1					1						7					0
55	4	1	0			1	1	0			0	0	0			0		0		
56	1	1	1	1		0	0	0	0		3	5	6	4		3		0	0	
57	2		0			0		0			54		0			29		0		
58	1		0			0		0			13		0			12		0		
59	3	3	0	2		2	0	0	1		30	60	0	4		16		0	0	
60	1		0			0		0			9		0			5		0		
61	3		1	2		3		1	0		1		21	20		0		2	0	
62	3		1			2		0			26		47			18		5		
63	1	1	0			0	0	0			10	10	0			7		0		
64	1		1	1		0		0	1		7		13	13		6		4	0	
65	4		0			0		0			77					64		0		
66	1		0			0		0			13					0		0		
67	1		0			0		0			0		0			0		0		
68	1	1	1	1	1	0	0	0	0	0	11	7	8	10	5	2		0	0	0
70			1	1				0	0				22	34				3	22	
72				1	1				0	0				4	3				0	0
75			2	1				0	0				47	50				18	0	
76			2	1				2	1				0	10				0	0	

Spalding's catchfly (*Silene spaldingii*) reproductive output data 2010-2013.

Survey data for 2013 was collected on August 8th.

Survey date for 2014 was collected on August 6th.

77				1					0					11					0		
81				1					0					9					0		
83			1	1	1				0	0	0			15	16	7			5	0	0
84			2	1	1				0	0	0			34	30	8			10	0	0
85			1						0					9					4		
87			1	2					0	0				13	23				6	0	
90			1						1					24					18		
91			1	1	1				0	0	0			44	4	7			9	0	0
92			1	1	1				1	0	1			0	20	0			0	0	0
95				1					0					16					0		
96				1	1				1	1				0	5				0	0	
98				1	1				1	1				9	0				0	0	
99		1	1		2		?	0		2		?	29		0				0		0
100			4	4	4				0	1	0			36	46	29			1	0	0
101	1	1	1	1	2	0	2	1	1	2	50	2	0	0	0	8			0	0	0
102	1	1	0			1	0	0			13	2	0			0			0		
103	1	1	2	1		0	1	0	1		11	3	16	1		2			0	0	
104	1		2	1	1	0		0	1	1	28		48	8	4	13			32	0	4
105	1		0			1		0			3		0			0			0		
106	2		2	1		0		1	0		37		46	22		15			35	0	
107	1	1	1			0	0	1			10	12	12			6			0		
108	1		1			0		1			10		0			0			0		
109	2		2	1	1	0		0	0	0	24		29	16	9	13			26	0	0
110	1		1		1	0		0		0	9		0		5	4			0	0	
111	1	1	1	1	1	1	0	1	0	0	24	12	14	8	12	4			11	0	0
112	1	1	1	2		0	0	1	1		30	13	4	42		7			0	0	
113	2	1	2			0	1	1			17	0	27			6			5		
114	1		1			0		0			4		18			4			13		
115	1		1	1	1	0		0	0	1	17		18	19	0	13			13	0	0
116	1	1	1		1	0	0	0		0	0	10	10		10	14			7		0
117	1		1		1	0		0		0	19		2		3	7			0		0
118	1	1	1	1	1	0	0	0	0	0	14	7	5	6	5	0			0	0	0
119	1	1	1	1	1	0	0	0	0	0	15	15	23	35	17	9			11	0	0

Spalding's catchfly (*Silene spaldingii*) reproductive output data 2010-2013.

Survey data for 2013 was collected on August 8th.

Survey date for 2014 was collected on August 6th.

120	1		0			0		0			13		0			0		0	
121	2	2	2	3		2	0	1	1		3	26	63	10		1		2	0
122	2	1	0	2	2	1	0	0	0	0	3	5	0	25	17	2		0	0
123	3		0					0			0		0			0		0	
124	3		0			0		0			1		0			1		0	
125	1		0			0		0			1		0			0		0	
126	1	2	0			0	0	0			8	52	0			2		0	
127	4	4	3	7		0	4	3	4		37	42	0	163		32		0	0
128	1		0			1		0			0		0			0		0	
129	15		0			14		0			0		0			0		0	
130	5	3	3	2		0	0	0	0		67	36	33	35		17		7	0
131	1		2			0		1			0		30			0		11	
132	1	1	2			1	0	0			1	64	71			0		9	
133	2		0			0		0			8		0			7		0	
134	2		0			2		0			0		0			0		0	
135	1	1	5			1	0	2			1	6	0			0		0	
136	2	2	4			2	0	2			2	0	50			0		10	
137	1	2	2	1		0	0	1	0		30	46	37	40		6		11	0
138	3	3	0			3	0	0			0	45	0			0		0	
139				1					0					69					0
240					1					1						0			0
264					1					1						1			0
265					2					2						1			0
289					2					2						12			0
293					1					0						4			0
968		1	1		1		0	1		0		2	0		7			0	0
969		1	2	1	4		0	2	1	3		11	5	0	8			5	0
970		1	1	1	1		1	4	1	0		16	0	17	36			0	0
971		2	0				0	0				43	0					0	
972		1	0				0	0				8	0					0	
973		1	0				0	0				2	0					0	
974		1	1	1			0	1	0			5	4	13				0	0
975		1	1				0	1				6	0					0	

Spalding's catchfly (*Silene spaldingii*) reproductive output data 2010-2013.

Survey data for 2013 was collected on August 8th.

Survey date for 2014 was collected on August 6th.

976		1	1	1	1		0	0	1	0		28	61	17	28			36	0	0	
977		1	1				0	1				6	6					0			
978		1	1	1	1		0	0	0	0		7	10	16	3			1	0	0	
979		1	1		1		0	0		1		15	13		0			3		0	
980		1	2	1			1	1	1			3	30	0				0	0		
981		3	5	3			1	2	0			12	33	36				2	0		
982		1	3	1	3		0	3	0	0		6	17	31	27			7	0	0	
983		1	0	1			0	0	0			10	0	7				0	0		
984		3	1				0	1				86	36					0			
985		1	3				0	0				19	116					21			
986		1	0	3			0	0	0			15	0	42				0	0		
987			2	1			2	2	1			0	0	9				0	0		
		Stems					Stems Browsed					Flowers					Fruits				
		2010*	2011*	2012*	2013	2014	2010*	2011*	2012*	2013	2014	2010*	2011*	2012*	2013	2014	2010*	2011*	2012*	2013	2014
Averages:		1.92	1.41	1.12	1.5	1.4	0.73	0.27	0.46	0.48	0.56	14.8	17.7	15.5	22.8	7.9	6.83	No data	4.5	0.4	0.1
Totals:		100	63	102	81	51	38	14	42	26	20	764	780	1377	1230	284	355	-	405	22**	4***

* 2010-2012 data from Jocius, 2013

** see data from the September 19th survey for a more appropriate comparison

*** see data from the September 9th & 10th survey for a more appropriate comparison



Figure 11. A drying late season plant with ripe fruits.