

Fremont – Winema National Forest  
Silver Lake Ranger District  
and  
Bureau of Land Management  
Lakeview Resource Area

2011 *Astragalus lemmonii* Survey

Field Survey Report

October 12, 2011



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## **Introduction:**

In 2009 *Astragalus lemmonii* was discovered at Halfway Lake on Silver Lake District of the Fremont-Winema National Forest. Previous to the discovery, this rare plant was considered extirpated from the state of Oregon by the Oregon Natural Heritage Information Center (ORNHIC). The purpose of the field survey was to determine the abundance, distribution and habitat condition of *Astragalus lemmonii*.

Potential habitat (approximately 1,500 acres) was initially identified using Geographic Information System (GIS) image files and soil layers, as well as local knowledge of the area. Little is known about this species in Oregon. As anticipated, an additional 1,500 acres of potential habitat was added as new information was gathered. Overall, 3,065 acres were surveyed during the 2011 field season. According to literature, this plant is found in moist places within Great Basin sagebrush scrub communities. More specifically in moist, grassy, sedgy, or rush flats bordering streams and lake shores; vernal moist summer-dry alkaline meadows, seeps, marshes and swamps; and occasionally found in non-wetlands. The characteristic bloom period for this species is May through early August. Survey work began the last week of June.

## **Survey Methods:**

A Focused, Intuitive Controlled survey was conducted for each polygon visited. This is considered to be the most efficient method of surveying for threatened, endangered, and sensitive plants. Potentially suitable habitat had already been identified. The area was visually inspected and a complete species list was recorded onto the appropriate survey forms. If the targeted plant was found, distribution was determined, while a Global Positioning System (GPS) waypoint and habitat notes were recorded on the appropriate Element Occurrence or Subpopulation Form.

## **Results:**

The majority of the originally scheduled survey polygons were on the Bureau of Land Management (BLM) Lakeview Resource Area. These included polygons 1, 4, 5, 8-11, 14-34 (refer to Map #1 and Map #2 at the end of the document). Of these, polygon 4 was not visited due to access issues as fire season progressed. Also, polygons 31 and 34 were not visited due to hot, dry conditions and scorched condition of plants in the field at that time. Polygons added, or refined on the original map were: polygons 36-41. The majority of polygons on the BLM were in locations with seasonally wet, shallow basins. Plants within and surrounding these basins evidenced more wetland species than surrounding areas. Many of them had one or more manmade waterholes constructed on the site. Some of these had water in them at the time of visit, others were dry. This was noted on the survey form. No populations of *Astragalus lemmonii* were found on BLM lands.

Survey polygons of Forest Service land were: 2, 3, 6, 7, 12, and 13 (refer to Map #1 and Map #2 at the end of the document). Of these, polygon 2 was not surveyed (deemed unlikely in the field) and polygon

7 was a cinder pit that was not potential habitat. Polygons added were: 42-59. Due to the fact that the original population was found around the perimeter of Halfway Lake (a shallow, seasonally wet lake), several more lakes were added for survey on Forest Service lands. Most of the additional lakes were seasonally wet, with the exception of Thompson Reservoir which has year round water. The area surveyed around Thompson Reservoir was the southern, marshy perimeter. All populations and subpopulations of *Astragalus lemmonii* discovered during the 2011 field season were found on National Forest System lands.

Upon completion of surveys, 54.1 acres of occupied *Astragalus lemmonii* habitat had been documented (refer to Map #3 at the end of the document). The original population found in 2009 was discovered around Halfway Lake (see Photo #1). During the latter part of this year a more extensive survey was conducted in the vicinity of Halfway Lake, revealing an expanded main population and subpopulations for a total of 31.0 acres of occupied habitat. Within the 31.0 acres, a population estimate of 41,100 individuals was documented. A second grouping of populations and subpopulations occurred in and around Antelope Flat (see Photo #3). For this area, a total of 23.1 acres of occupied habitat and an estimated 1,200 individuals were documented.



Photo #1 - Halfway Lake – June 21, 2011

As the survey season progressed, it became obvious that soil was a key indicator for occupied *Astragalus lemmonii* habitat. Fremont Soil Resource Inventory mapping unit 14 is the mapping unit used to describe the soil type in every population or subpopulation that was found and recorded. There are approximately 2,330 acres of mapping unit 14 identified on the Fremont, all of which are located within the Silver Lake District within the south half of Township 28 South, Range 12 East and the north half of Township 28 South, Range 12 East. Of the 2,330 acres of mapping unit 14, approximately 1,335 acres are on National Forest System lands and approximately 995 acres on adjacent private land. Fremont Soil Resource Inventory (USDA Forest Service, 1979, page 23) mapping unit 14 has been described with the following characteristics:

- Very deep to extremely deep, coarse textured soils derived from lake-laid pumiceous material in old lake beds.
- Surface soil layers are thin to moderately thick and coarse textured.
- Subsoil layers are thick to very thick and coarse textured with occasional lenses of finer textured layers and weakly cemented hardpan.
- Typically occurs on broad upland basins in old lakebeds.
- Slopes are flat and are less than 5 percent.
- Ranges in elevation from 4500 to 5500 feet and supports big sage, rabbitbrush, lupine, sedges, Idaho fescue, and grasses.
- pH ranges from 6.5 to 7.5.

The Fremont Soil Resource Inventory discusses some hydrological components to mapping unit 14 (pages 142-182). The soil is well to moderately drained. Permeability is rapid (5-20 inches/hour) in the surface soils and usually rapid or very rapid in the subsoils. The Fremont Soil Resource Inventory also discusses and displays the depth to the restrictive layer in each soil mapping unit. The restrictive layer is defined as the distance from the soil surface to a layer in the soil that is highly restrictive to drainage, water transmission or root growth. Compared to surrounding soils, mapping unit 14 has 2 to 3 times the depth to the restrictive layer. The depth to the restrictive layer for mapping unit 14 is the same as its depth to bedrock, meaning there is no discontinuity or stratification layer within the soil. A water yield class of 1 has been given to mapping unit 14 (pages 195-197), indicating these soils have a high water detention storage capacity and a low rate of runoff. This soil type is also described as having a seasonably high water table (page 228-231). In essence, because water stays in place for a longer period due to the restrictive layers that lie below the high capacity storage layer, this may result in an extend growing period for the plant.

The description mentioned above fits observations of occupied *Astragalus lemmonii* habitat on the Fremont-Winema National Forest. Occupied habitat ranged in elevation from 4,800 feet to 5,000 feet. Slope was generally from 0 to 5 percent. All of the occupied habitats exist within non-timbered areas dominated by big sagebrush. The surrounding areas fit into the ponderosa pine/big

sagebrush/bunchgrass classification. All of the occupied habitats discovered in 2011, with the exception of the area immediately adjacent to Halfway Lake, are similar in habitat and associated species. Some of the plant species common to all populations include: *Artemisia tridentata*, *Camissonia tanacetifolia*, *Chrysothamnus viscidiflorus*, *Lupinus lepidus*, *Equisetum laevigatum*, *Achillea millefolium*, *Astragalus purshii*, *Polycytenium fremontii*, *Muhlenbergia filiformis*, *Blepharipappus scabra*, *Epilobium brachycarpum*, and *Potentilla gracilis*. The area bordering Halfway Lake is unique because this is the only occupied habitat where surface water is retained for a portion of the year. Plants were also much denser in this area and it is assumed that it was a result of extended moisture (see Photo #2).



Photo #2 – *Astragalus lemmonii* in surrounding vegetation.

*Astragalus lemmonii* was abundant in the area immediately surrounding Halfway Lake, in spite of the fact that it was almost a sod layer. Early season grazing occurs in this area and reduces grass cover and shading, which could be a factor in allowing the species to compete in denser vegetation. Some of the associated species for this particular area are: *Achillea millefolium*, *Agrostis scabra*, *Antennaria rosea*, *Artemisia tridentata*, *Distichlis spicata*, *Epilobium brachycarpum*, *Muhlenbergia filiformis*, *Argentina anserina*, *Camissonia tanacetifolia*, *Juncus balticus*, *Orthocarpus luteus*, *Pyrrcoma hirtus lanulosa* and *Astragalus purshii*. As we surveyed out away from the lake edge, it was obvious that plant numbers were reduced in the more “upland” environment (see Photo #3). It is believed the reduction in numbers

is due to less water availability on an extended basis. This was evidenced by the gradual change in plant species and numbers as we moved out of the lake basin.



Photo #3 – Example of a more “upland” habitat for *Astragalus lemmonii* taken on October 18, 2011.

It appeared that *Astragalus lemmonii* fared better in more stable soils where there was a mixture of other plants, grasses or sedges to hold the soil. It exhibits prostrate to procumbent form and appeared not to do as well in loose, soft, moveable soils where there was a potential to be buried. We noted that the plant did not seem to grow where there was tall, perennial grass such as Fescue, or where there was an understory of fescue within Ponderosa pine or Juniper stands. However, it grew profusely in some places interspersed with Great Basin sagebrush. Throughout the season, from late June until early October we were able to find plants that still had live green parts or were wholly green, even when most of the plants nearby had been dried for quite some time. We found the occasional flowering plant even into late September (see Photo #4).



Photo #4 – *Astragalus lemmonii* still green around Halfway Lake on October 18, 2011.

Disturbances were noted during the surveys. Cattle grazing occurred in all documented *Astragalus lemmonii* populations. Cows were seen in and around Halfway Lake during almost every visit until early fall. Based on tracks seen, ATV use occurred in and around Halfway Lake. Off road use by a full sized vehicle was also noted in late summer during one of the early season hunts. The tracks were seen on the eastern edge of the lake and continued to the south.

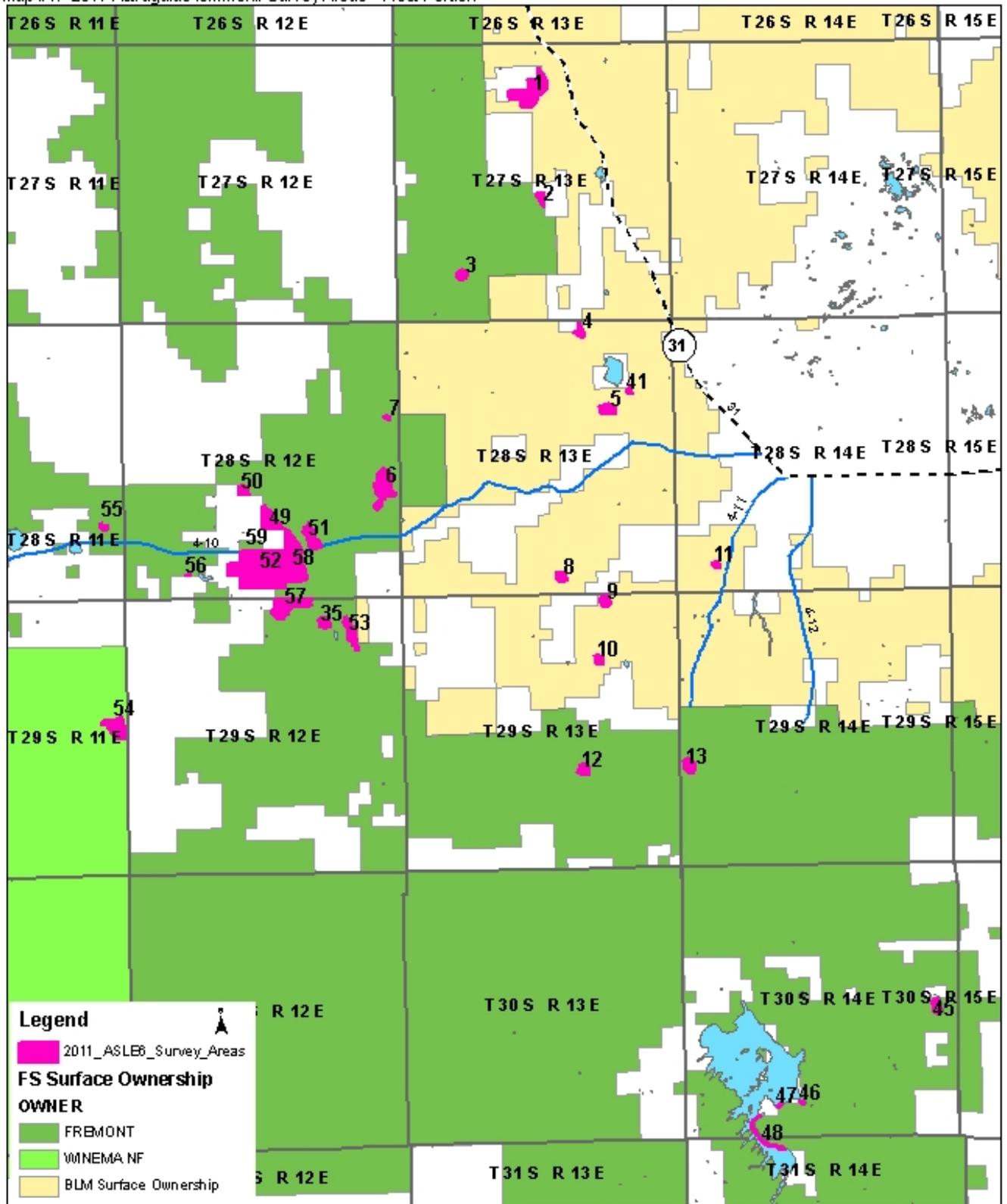
It is unknown what impacts, if any, these disturbances have on this plant. Two monitoring cages have been installed in the vicinity of Halfway Lake. One is located on the northern edge of Halfway Lake, and one is to the south in the more “upland” portion of one of the subpopulations. Continued observation within these cages should give us further information on the impacts of disturbance on *Astragalus lemmonii*.

Of the 1,335 acres of mapping unit 14 on National Forest System lands, approximately 70 percent of the acres were surveyed in 2011. It is unknown if there is a similar soil type that can support habitat for this plant. Further investigation should to be done to determine if there is a similar soil type on Bureau of Land Management lands, or the same soil type on adjacent forests that may support additional populations of *Astragalus lemmonii*.

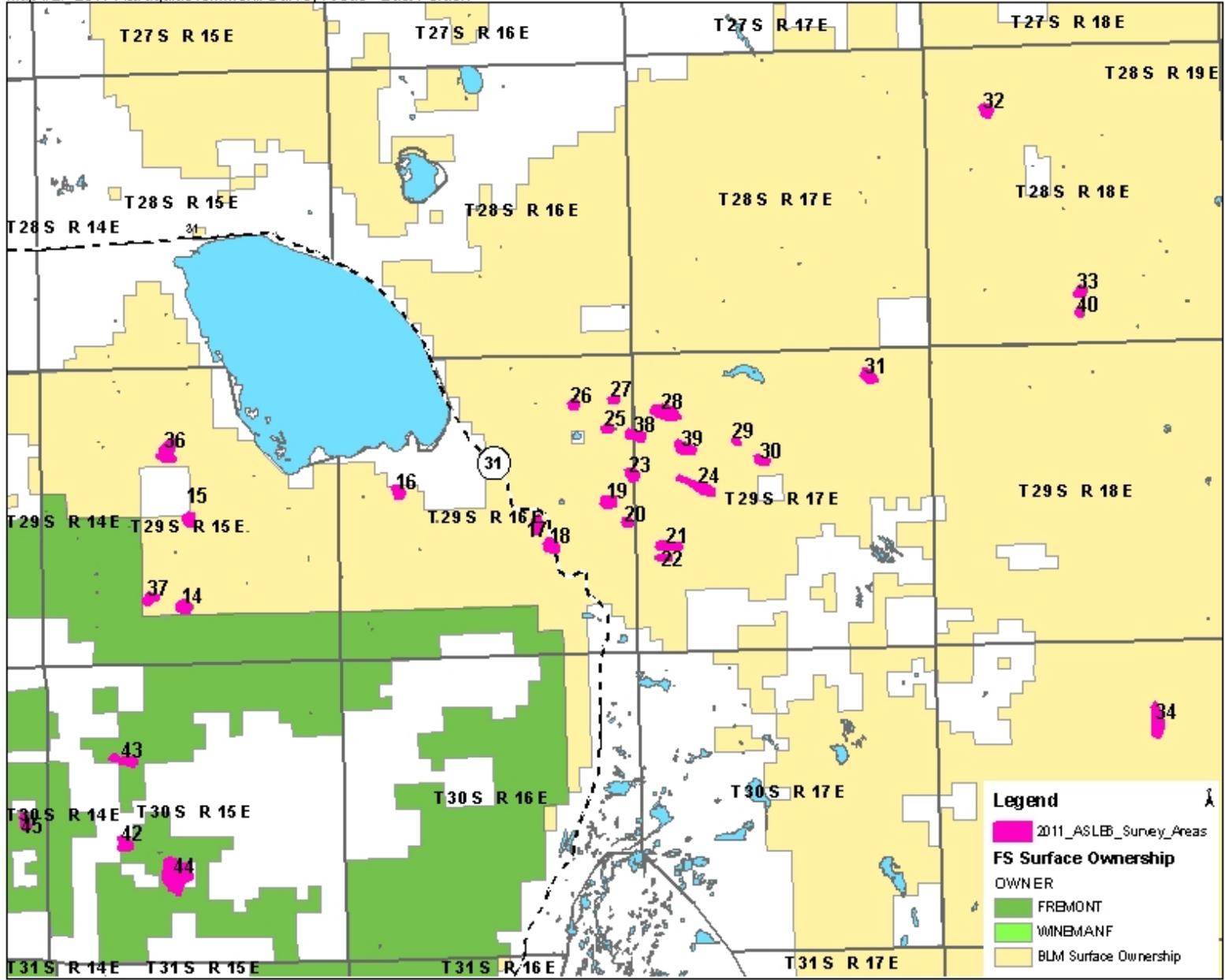
**Reference:**

USDA Forest Service. 1979. Soil Resource Inventory, Fremont National Forest. Pages 23, 123, 143-147, 193-197 and 228-231.

Map #1: 2011 Astragalus lemmonii Survey Areas - West Portion



Map #2: 2011 Astragalus lemmonii Survey Areas - East Portion



Map #3: Astragalus lemmonii

