

A Survey and Seed Bulking  
of Historic and  
Known Populations of  
*Limnanthes floccosa* ssp. *grandiflora*



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Note: On accompanying maps extant populations are colored green and extirpated populations are colored red.

## Introduction

*Limnanthes floccosa* Howell (Limnanthaceae) is a highly polymorphic annual herb that mainly inhabits vernal pools and seasonally wet meadows throughout south-central Oregon and northeastern California. Currently, taxonomists and floras recognize five subspecies of *L. floccosa* (Arroyo 1973; Ornduff 1993; Oregon Flora Project 2008): *L. floccosa* ssp. *floccosa*, *L. floccosa* ssp. *californica* Arroyo, *L. floccosa* ssp. *bellingermana* (Peck) Arroyo, *L. floccosa* ssp. *grandiflora* Arroyo, and *L. floccosa* ssp. *pumila* (Howell) Arroyo. With the exception of *L. f.* ssp. *floccosa* all subspecies of *L. floccosa* are legally considered rare by state and/or federal agencies (USFWS 2006; ORNHIC 2007).

All members of the genus *Limnanthes* (meadowfoam) are of particular interest due to the usefulness of the oil produced from their seeds. Unlike common seed oils, species of the *Limnanthes* genus produce a very long chain seed oil with novel physical and chemical characteristics, making it extremely stable at high temperatures and pressures (Miller et al. 1964; Isbell 1997). These qualities have made the oil an attractive alternative for sperm whale oil (Gentry and Miller 1965) which has been banned in the United States since 1972. Meadowfoam oil has commercial potential as raw material for many products, including lubricants, cosmetics, waxes and polymers (Meadowfoam 2008). Research on commercial meadowfoam seed oil production began in the late 1950s. As a result meadowfoam, *L. alba* X *L. floccosa* ssp. *grandiflora* cultivars, has been grown on a limited scale for more than 25 years in Oregon. Meadowfoam has an important potential role as a rotation crop in the Willamette Valley of Oregon and is primarily grown by grass seed producers.

*Limnanthes floccosa* ssp. *grandiflora*, a state of Oregon endemic, is an ORNHIC List 1 taxon with a G4T1/S1 ranking indicating it is critically imperiled throughout its range/critically imperiled in Oregon. In addition, *L. f.* ssp. *grandiflora* is listed as endangered both at the federal and state level (ORNHIC 2007). This taxon is restricted to the Agate Desert region, north of Medford, in Jackson County, Oregon, with an historic range that may have been as large as 130 km<sup>2</sup> (Currin et al. 2004). Its current range, because of human development, is much smaller (Figure 1). While ORNHIC (2007) and the Oregon Flora Project (2008) list 20 site observations of this taxon, the last vouchered herbarium specimen collected of *L. f.* ssp. *grandiflora* dates over 30 years ago, to 1975 (*Graham 45 (OSC)*).

### **Survey of *Limnanthes floccosa* ssp. *grandiflora* populations**

While several *L. f.* ssp. *grandiflora* sites have, and are, visited annually, many have not been surveyed in several decades. In the worst case, one site had not been visited since 1927. In order obtain a reasonable estimate of current *L. f.* ssp. *grandiflora* numbers, and extant populations, all currently known and historically recorded sites were visited during spring 2008. Locations were obtained from the Oregon Natural Heritage Information Center, the Herbarium at Oregon State University, the Oregon Flora Project, the United States Fish and Wildlife Service and the Oregon Department of Transportation.

In total, 30 sites were visited. Among these sites, 20 contained a population of *L. f.* ssp. *grandiflora* (Figure 2). At 9 sites no *L. f.* ssp. *grandiflora* was found and presumed extirpated. One reported site was not visited. At each site the number of plants were counted directly (small populations) or estimated by counting plants within ten randomly placed ten meter square

quadrants. The average number of plants in a quadrant was then used to estimate the population size as a whole. In total, the number of plants found during this survey numbered ~126,650.

A detailed GIS shape file of extant and extirpated populations has also been created and submitted with this report.

### **Seed bulking**

As part of the recovery plan for listed species of the Rogue Valley vernal pool and Illinois Valley wet meadow ecosystems, seed bulking of native vernal pool plant species is critically needed. These seeds will be used for future augmentation at existing vernal pools, as well initial and or continual seeding, after the creation of new vernal pools.

In light of the risk of harvesting seed from existing populations of *Limnanthes floccosa* ssp. *grandiflora*, seed bulking was accomplished through growing plants from seeds previously collected, in a controlled greenhouse setting. Seeds have been packaged in envelopes which contain one gram of seeds per envelope (~110 seeds). Each envelope has been labeled with the seed source location and generation (collected from the field, F1 or F2). In total, 50 grams (~5500 seeds) have been packaged. These seeds have been deposited at the Berry Botanical Garden in Portland, Oregon for long term storage and experimentation.

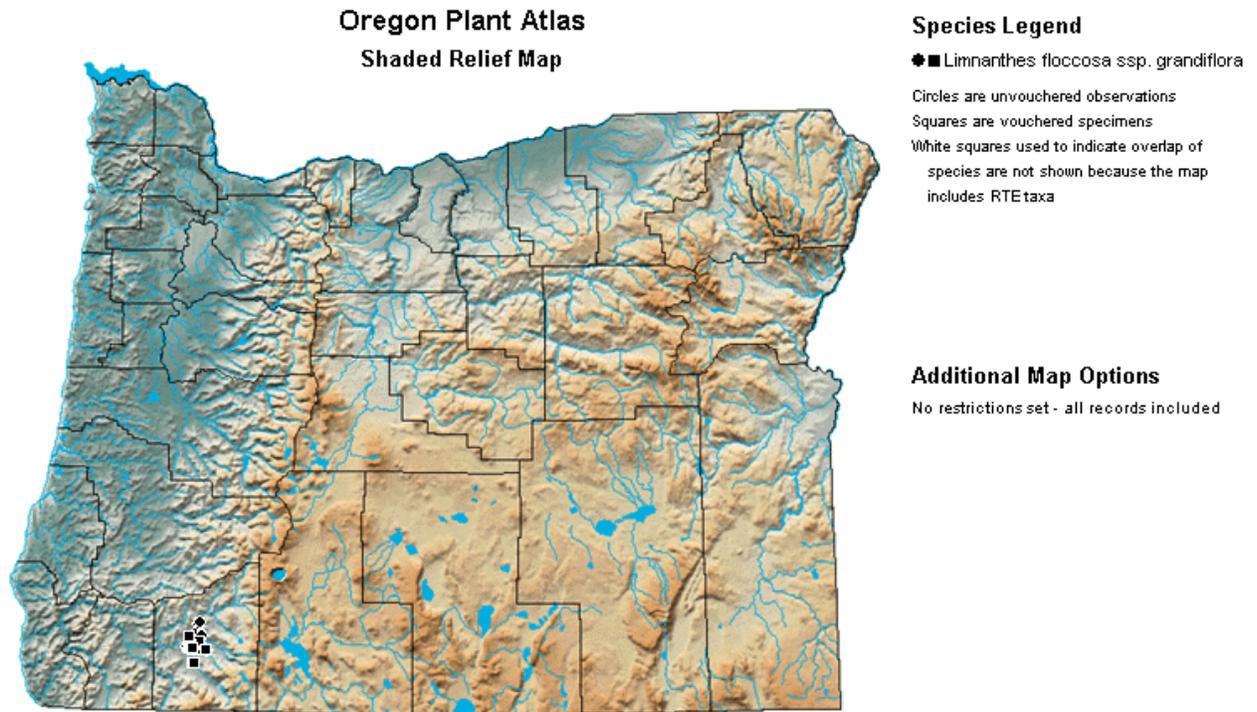


Figure 1. General distribution of LIFLGR (Courtesy Oregon Flora Project).

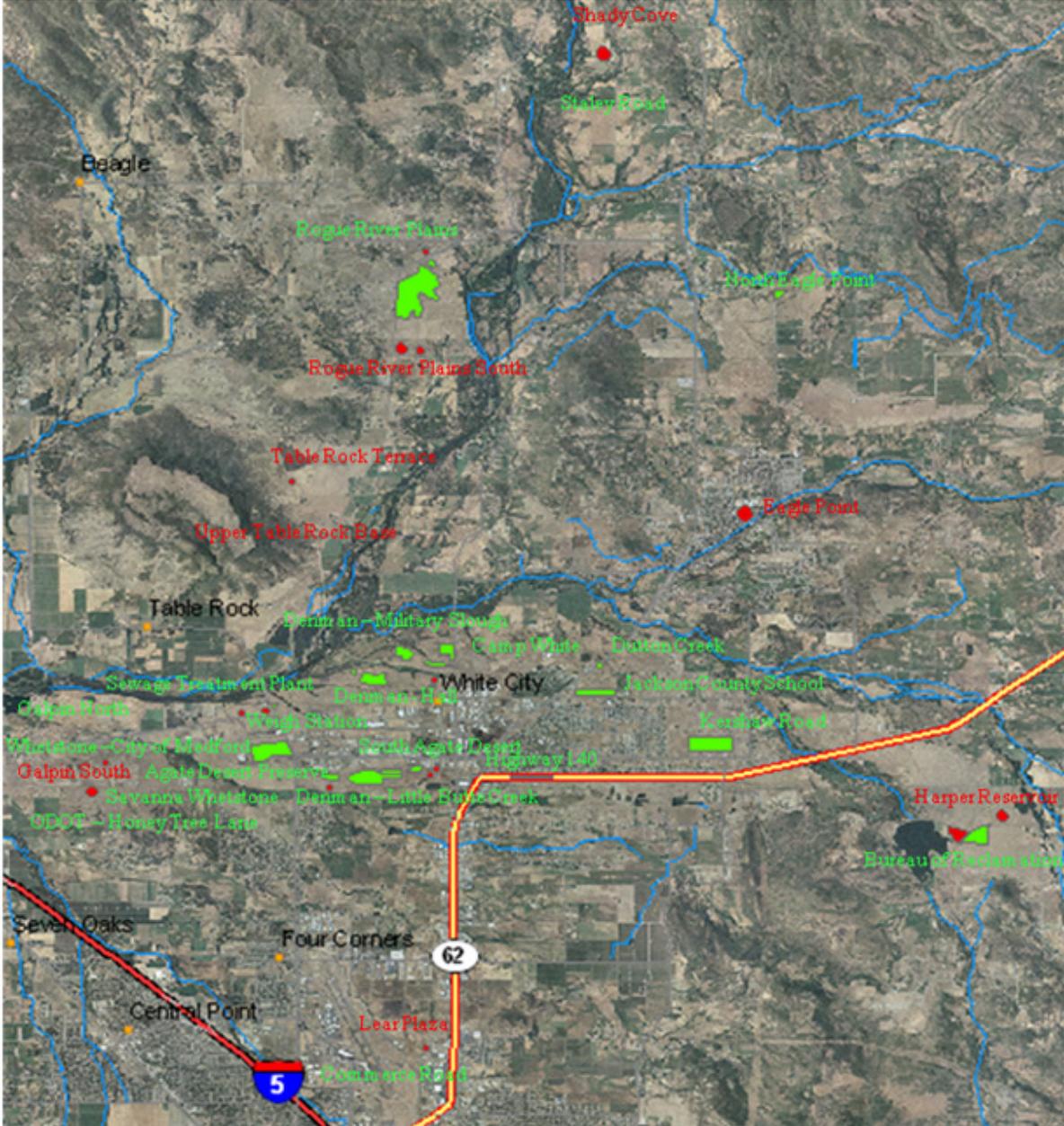


Figure 2. Current and historical locations of LIFLGR.

## Staley Road Site (ORNHIC #19)

Ownership: Private

Access: This site is located on Staley Road which is privately owned. Prior permission is needed use this road and access this site.

Number of plants: ~1500

GPS: Center: 42.5452 122.8319

Outline: 42.5448 122.8326, 42.5454 122.8325, 42.5455 122.8314

Notes: This site is located on a private ranch. All access must be obtained through the ranch manager. Currently, the ranch manager is not allowing any access to the property, for unexplained reasons. It is suggested that any future attempts to gain access be made through the owner directly. While LIFLGR plants adjacent to Staley Road were confirmed during this survey, whether more plants are to be found on the surrounding property is currently unknown. This is the most northern known extant population of LIFLGR.



Figure 3. Habitat at the Staley Road site.



Figure 4. Map of the Staley Road site.

## **North Eagle Point Site (ORNHIC # 21)**

Ownership: Private

Access: Park at corner of Reese Creek and Ball Roads.

Number of plants: ~200

GPS: Center: 42.5138 122.7963

Outline: 42.5122 122.7973, 42.5146 122.7970, 42.5146 122.7927

Notes: The plants in this population are mainly clustered along the edges of Reese Creek and Ball Roads, although scatted LIFLGR plants are found within the perimeter.



Figure 5. Habitat of the North Eagle Point site.



Figure 6. Map of the North Eagle Point site.

## **Rogue River Plains Site (ORNHOC #17)**

Ownership: Private/Nature Conservancy

Access: A locked gate to this site is located east of Modoc Road on Sams Valley Highway.

Number of plants: ~5,000

GPS: Center: 42.5141 122.8637

Outline: 42.5094 122.8670, 42.5158 122.8666, 42.5198 122.8604, 42.5095 122.8624

Notes: This site is privately owned (the owner lives on the property) but managed by the Nature Conservancy. Prior to entering permission should be obtained through the land owner or the Nature Conservancy.



Figure 7. Habitat of the Rogue River Plains site.



Figure 8. Map of the Rogue River Plains site.

## **Sewage Treatment Plant Site (ORNHIC #18)**

Ownership: Private

Access: Park along Table Rock or Kirtland Roads and climb over fence.

Number of plants: 0 (western populations) ~100 (eastern population)

GPS: Western populations: Centers: 42.4352 122.8973; 42.4359 122.8916

Eastern population: Center: 42.4365 122.8891

Outline: 42.4371 122.8898, 42.4370 122.8888, 42.4365 122.8893

Notes: LIFLGR populations likely extirpated due to over grazing. The remaining population is also grazed, but appears stabile.



Figure 9. Habitat of the Sewage Treatment Plant site.



Figure 10. Map of Sewage Treatment Plant site.

## **Weigh Station Site (ORNHIC #18)**

Ownership: Jackson County

Access: Park at the weigh station located at the corner of Kirtland and table Rock Roads.

Number of plants: ~400

Notes: The majority of LIFLGR plants at this site are located over a buried gas pipeline, the construction of which had created a series of artificial vernal pools.



Figure 11. Habitat of the Weigh Station site.



Figure 12. Map of the Weigh Station site.

## **Agate Desert Preserve Site (ORNHIC #18)**

Ownership: The Nature Conservancy

Access: Park along either Antelope or Table Rock Roads and climb over fence.

Number of plants: ~50,000

GPS: Center: 42.4283 122.8894

Outline: 42.4260 122.8935, 42.4276 122.8862, 42.4299 122.8873, 42.4292, 122.8936

Notes: Throughout this location, LIFLFL can also be found, often sympatric with LIFLGR.



Figure 13. Habitat at the Agate Desert Preserve site.



Figure 14. Map of Agate Desert Preserve population.

## South Agate Desert Site (ORNHIC #18)

Ownership: City of Medford

Access: Park along Antelope or Table Rock Roads and climb over fence.

Number of plants: ~50

GPS: Centers: Extant: 42.4266 122.8880

Extirpated: 42.4265 122.8898

42.4267 122.8866

42.4232 122.8888

Notes: While most populations of LIFLGR have likely extirpated due to grazing, one small remnant population remains at this site.



Figure 57. Habitat of the South Agate Desert site.

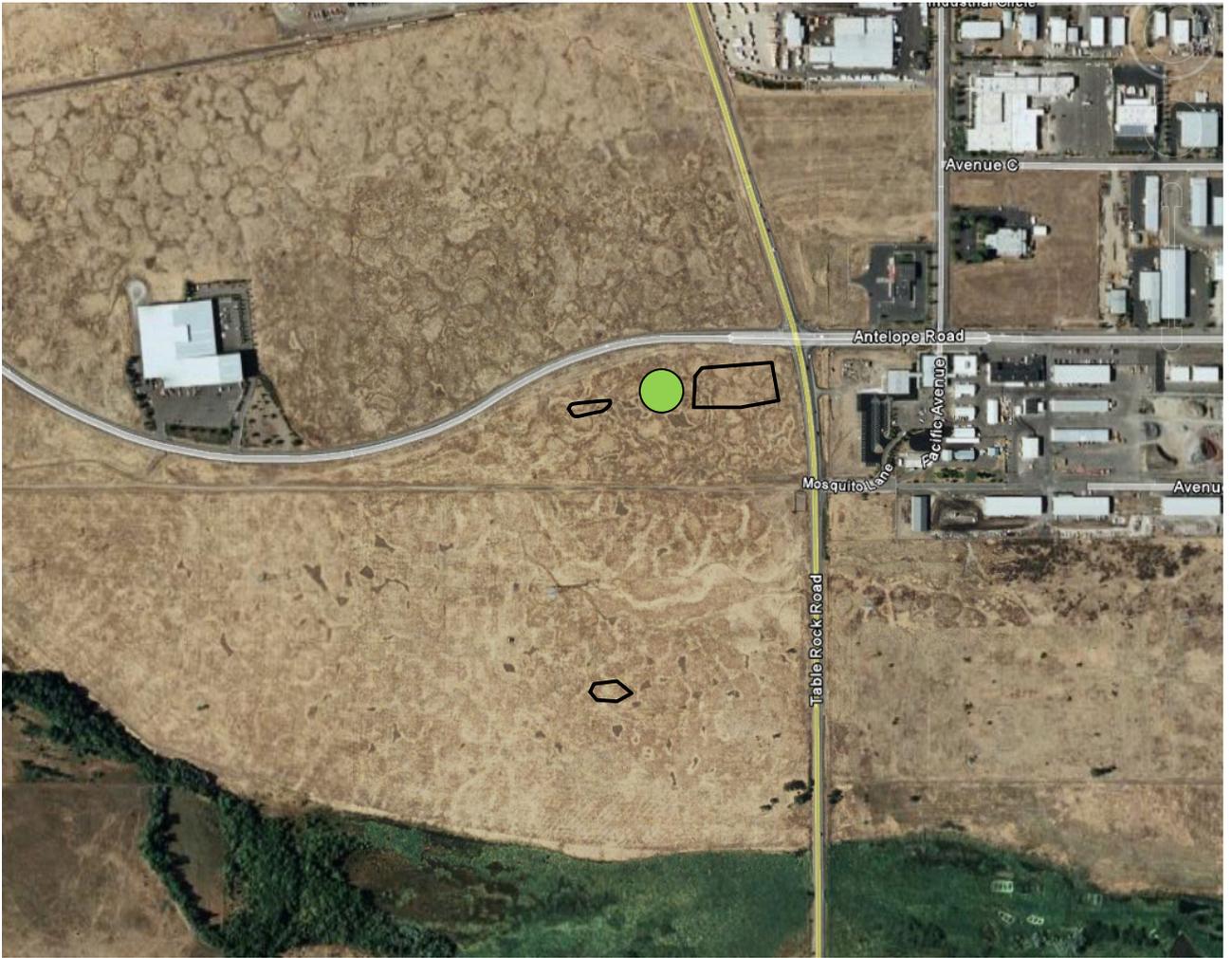


Figure 58. Map of Agate Desert South populations

## Savanna Whetstone Preserve (ORNHIC #1)

Ownership: The Nature Conservancy

Access: Park at gate located on Newland Road.

Number of plants: ~1000

GPS: Centers: 42.4200 122.9070; 42.4218 122.9060; 42.0800 122.9051

Notes: The small populations of LIFLGR within this preserve are currently threatened by encroachment of *Ceanothus*, which may eventually eliminate most existing vernal pools.



Figure 15. Habitat at the Savanna Whetstone Preserve. Note the encroaching *Ceanothus*.



Figure 16. Map of the Savanna Whetstone Preserve populations.

## **Galpin North Site (ORNHIC #12)**

Ownership: Private

Access: Park near end of Traux Road.

Number of plants: ~200

GPS: Center: 42.4288 122.9234 (extant population); 42.4264 122.9208 (extirpated population)

Notes: Previously reports record LIFLGR in the southern section of this site. No LIFLGR was found in this region during this survey. One small population was found in the northern section of this site, however.



Figure 17. Habitat of the northern section of the Galpin North site.



Figure 18. Map of the Galpin North site.

## **Whetstone – City of Medford Site (ORNHIC #11)**

Ownership: City of Medford

Access: Park east of Traux Road along Newland Road. Climb over fence.

Number of plants: 25

GPS: Center: 42.4237 122.9124

Notes: This site has 15 vernal pools in good condition, but only one currently supports LIFLGR. This site has evidence of past grazing activity which may have contributed to a decline in LIFLGR numbers.



Figure 19. Habitat to the Whetstone – City of Medford site.



Figure 20. Map of the Whetstone – City of Medford site.

## **ODOT – Honey Tree Lane Site (No ORNHIC number)**

Ownership: State of Oregon (ODOT)

Access: Park at the end of Honey Tree Lane. Access property near an abandoned mid-70's Ford Mustang.

Number of plants: ~50

GPS: Center: 42.4160 122.9101

Notes: While this site has numerous vernal pools, most are shaded by oaks and/or buck-brush, thus not ideal LIFLGR habitat. Only two pools at this site currently support LIFLGR.



Figure 21. Habitat at the ODOT – Honey Tree Lane site.



Figure 22. Map of the ODOT – Honey Tree Lane Site.

## **Denman Wildlife Area – Military Slough Site (ORNHIC #10)**

Ownership: State of Oregon

Access: Park in parking lot at end of Touvelle State Park Road.

Number of plants: ~6000

GPS: Center: 42.4417 122.8693

Outline: 42.4416 122.8808, 42.4436 122.8748, 42.4404 122.8592, 42.4393 122.8747

Notes: Among the three Denman sites, this location has the largest number of LIFLGR plants. The northern section of this location has a number of “artificial” vernal pools that have good potential for restoration attempts.



Figure 23. Habitat of the Denman Wildlife Area – Military Slough site.



Figure 24. Map of the Denman Wildlife Area – Military Slough site.

## **Denman Wildlife Area – Hall Site (ORNHIC #9)**

Ownership: State of Oregon

Access: Park in turn-off south of Avenue A.

Number of plants: ~8000

GPS: Center: 42.4236 122.8715

Outline: 42.4234 122.8816, 42.4252 122.8624, 42.4219 122.8636

Notes: Much of this site has been altered by past excavating and “restoration” activities. Among the three Denman sites, this site may hold the least potential for current restoration attempts.



Figure 25. Habitat at the Denman Wildlife Area – Hall site.



Figure 26. Map of the Denman Wildlife Area – Hall site.

## **Denman Wildlife Area – Little Butte Creek Site (ORNHIC #10)**

Ownership: State of Oregon

Access: Park off either Touvelle or Agate Roads.

Number of plants: ~2500

Notes: Although, among the three Denman sites, this site has the least number of LIFLGR plants, the vernal pools have been the least disturbed by excavating and other anthropomorphic causes.



Figure 27. Habitat of the Denman Wildlife Area – Little Butte Creek site.



Figure 28. Map of the Denman Wildlife Area – Little Butte Creek site.

## **Dutton Creek Site (No ORNHIC number)**

Ownership: State of Oregon (ODOT)

Access: Park at the southeast corner of Dutton Road and Wilson Way. Climb over fence.

Number of plants: ~100

GPS: Center: 42.4114 122.8295

Notes: This small population is found in wet southwest corner of this site.



Figure 29. Habitat at the Dutton Creek site.



Figure 30. Map of the Dutton Creek site.

## **Camp White Site (ORNHIC #2)**

Ownership: Private

Access: Park at the west end of West Dutton Road. Walk west to the vernal pools.

Number of plants: ~100

GPS: Center: 42.4471 122.8462

Outline: 42.4465 122.8460, 42.4467 122.8479, 42.4472 122.8485, 42.4472 122.8456

Notes: Although this site contains twelve vernal pools, all in good physical condition, only the two easternmost pools contain LIFLGR. Most of this site has been altered by previous excavation and road building, presumably during the 1940's when Camp White was an active military base.



Figure 31. Habitat of the Camp White site.



Figure 32. Map of the Camp White site.

## **Jackson County School Site (No ORNHIC number)**

Ownership: Jackson County

Access: Park in high school parking lot located south of avenue H. Climb over fence surrounding the population.

Number of plants: ~50,000 plants

GPS: Center: 42.4394 122.8303

Outline: 42.4388 122.8337, 42.4401 122.8336, 42.4400 122.8268, 42.4387 122.8269

Notes: This and the Agate Desert population represent the largest existing populations of LIFLGR.



Figure 33. Habitat of the Jackson County School site.



Figure 34. Map of the Jackson County School site.

## Highway 140 Site (ORNHIC #22)

Ownership: State of Oregon (ODOT)

Access: Park along Highway 140.

Number of plants: 100

GPS: Center: 42.4233 122.8406

Notes: One small population of LIFLFL was found at this site. This road side is heavily populated with *Vinca*. Furthermore, the hydrology and landscape of roadside appear to be less than ideal LIFLGR habitat. On the north side of roadside fence several small remnant populations of LIFLGR remain, but are threatened by encroaching non-native species.



Figure 35. LIFLFL found at the Highway 140 site.



Figure 36. The Highway 140 site. Note the dense purple *Vinca* population.



Figure 37. Map of the Highway 140 site.

## **Kershaw Road Site (ORNHIC #20)**

Ownership: Private

Access: This entire site is surrounded by private residences. No land owners approached near this site allowed access through their property. Access can tentatively be had through the property of one of the numerous abandoned residences, but is not recommended.

Number of plants: ~1000

GPS: Center: 42.4290 122.8113

Notes: This site is has, and continues, to receive damage as a result of ATV's, as well as ordinary passenger vehicles being driven off road. This site is also used as an unofficial "dump" by local residents. Within this site a dog/chicken fighting "arena" existed as of spring 2008. Local residents are likely to confront and physically threaten any personnel attempting future survey work. Any future work should only be attempted with great caution and/or appropriate protective measures.



Figure 38. Habitat of the Kershaw Road site. Note dog/chicken fighting "arena" in background.

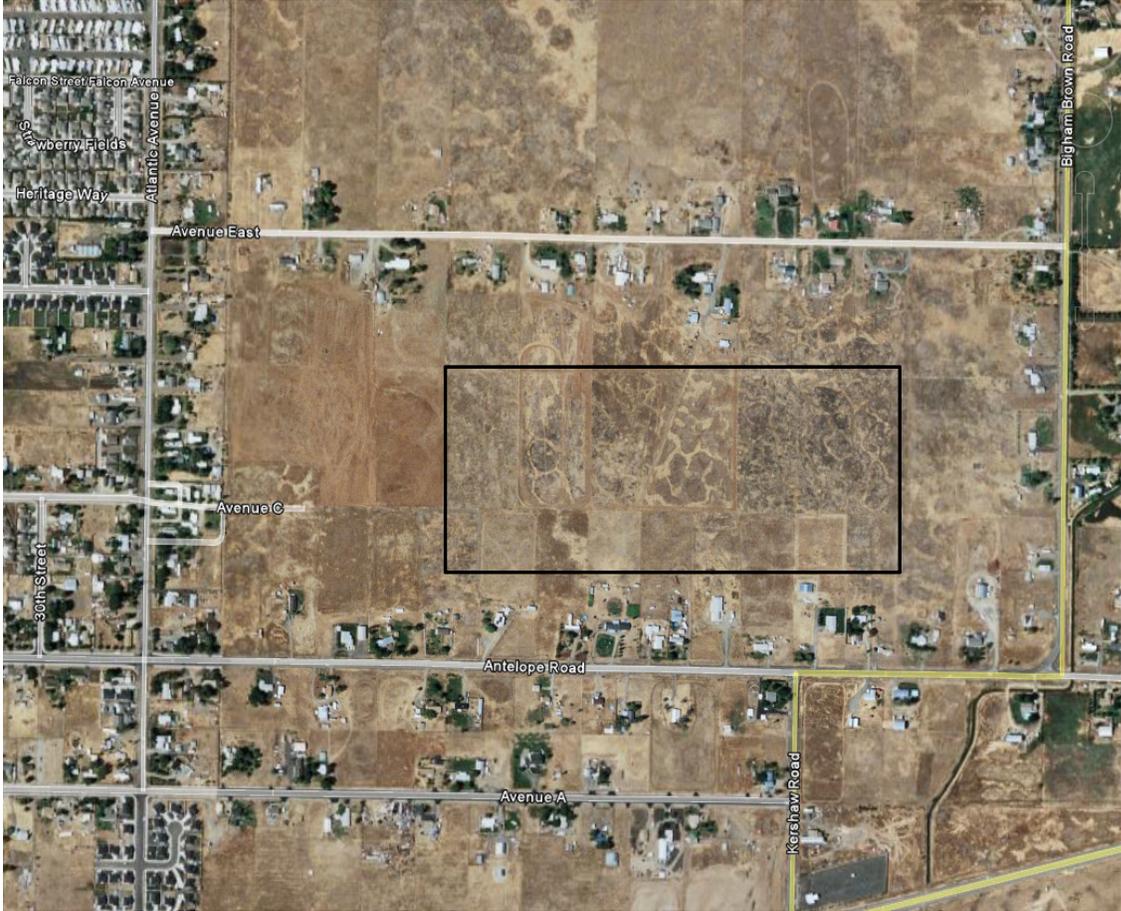


Figure 39. Map of Kershaw Road site.

## **Bureau of Reclamation Site (No ORNHIC number)**

Ownership: Federal

Access: Park at gate located northwest off Dry Creek Road.

Number of plants: ~300

GPS: Center: 42.4124 122.7596

Outline: 42.4113 122.7623, 42.4142 122.7579, 42.4111 122.7596

Notes: While LIFLGR was not found on the western portion of this site, several vernal pools in good condition exist for possible restoration attempts.



Figure 40. LIFLGR found at the Bureau of Reclamation site.



Figure 41. Habitat at the Bureau of Reclamation site.



Figure 42. Map of the Bureau of Reclamation site.

## Commerce Road Site (No ORNHIC number)

Ownership: Private

Access: Park at turn-around at end of Commerce Road.

Number of Plants: 8

GPS: Center: 42.3698 122.8637

Notes: As a commercial lot, this site has been leveled, thus eliminating all but one shallow vernal pool. This site has also been, and continues to be, heavily damaged by ATV's and off road vehicles. This population represents the southern most distribution of LIFLGR.



Figure 43. Habitat of the Commerce Road site. Note the damage done by vehicles.



Figure 44. Map of Commerce Road site.

## Shady Cove Site (ORNHIC #15)

Ownership: Private

Access: Via a private road west of Highway 62.

Number of plants: unknown

GPS: Center: 42.5841 122.8255

Notes: This site was not visited during the course of survey. At this time, the status of the reported LIFLGR populations is unknown.



Figure 45. Map of the Shady Cove site.

## **Eagle Point Site (ORNHIC #7)**

Ownership: Private

Access: Park in the vicinity of Royal Avenue and Reese Creek Roads.

Number of plants: 0

GPS: Center: 42.4764 122.7968

Notes: This area has been converted into subdivision housing. No potential habitat for LIFLGR remains.



Figure 46. Site of the former Eagle Point population.



Figure 47. Map of the Eagle Point site.

## Harper Reservoir Site (ORNHIC #3)

Ownership: Private

Access: Park at corner of Meridian and East Antelope Roads.

Number of plants: 0

GPS: Center: 42.4161 122.7553

Notes: This LIFLGR population has likely been extirpated due to heavy grazing.



Figure 48. Habitat at the Harper Reservoir site.



Figure 49. Map of the Harper Reservoir site.

## **Rogue River Plains South Site (ORNHIC #16, 18)**

Ownership: Private

Access: Park near corner of Modoc Road and Glass Lane.\

Number of plants: 0

GPS: Centers: 42.5044 122.8659; 42.5028 122.8623

Notes: This site had been heavily grazed. No LIFLGR was found.



Figure 50. Habitat of the Rogue River Plains South site.



Figure 51. Map of the Rogue River Plains South site.

## Upper Table Rock Base Site (No ORNHIC number)

Ownership: BLM

Access: Upper Table Rock trail head, located west off Modoc Road.

Number of plants: 0

GPS: Center: 42.4669 122.8825

Notes: The plants in this population are a dwarfed form *Limnanthes floccosa* ssp. *floccosa*. They should not be easily confused with *L. f.* ssp. *grandiflora* or *L. f.* ssp. *pumila*.



Figure 52. Example of the “dwarf” LIFLFL plants found at the Upper Table Rock Base site.

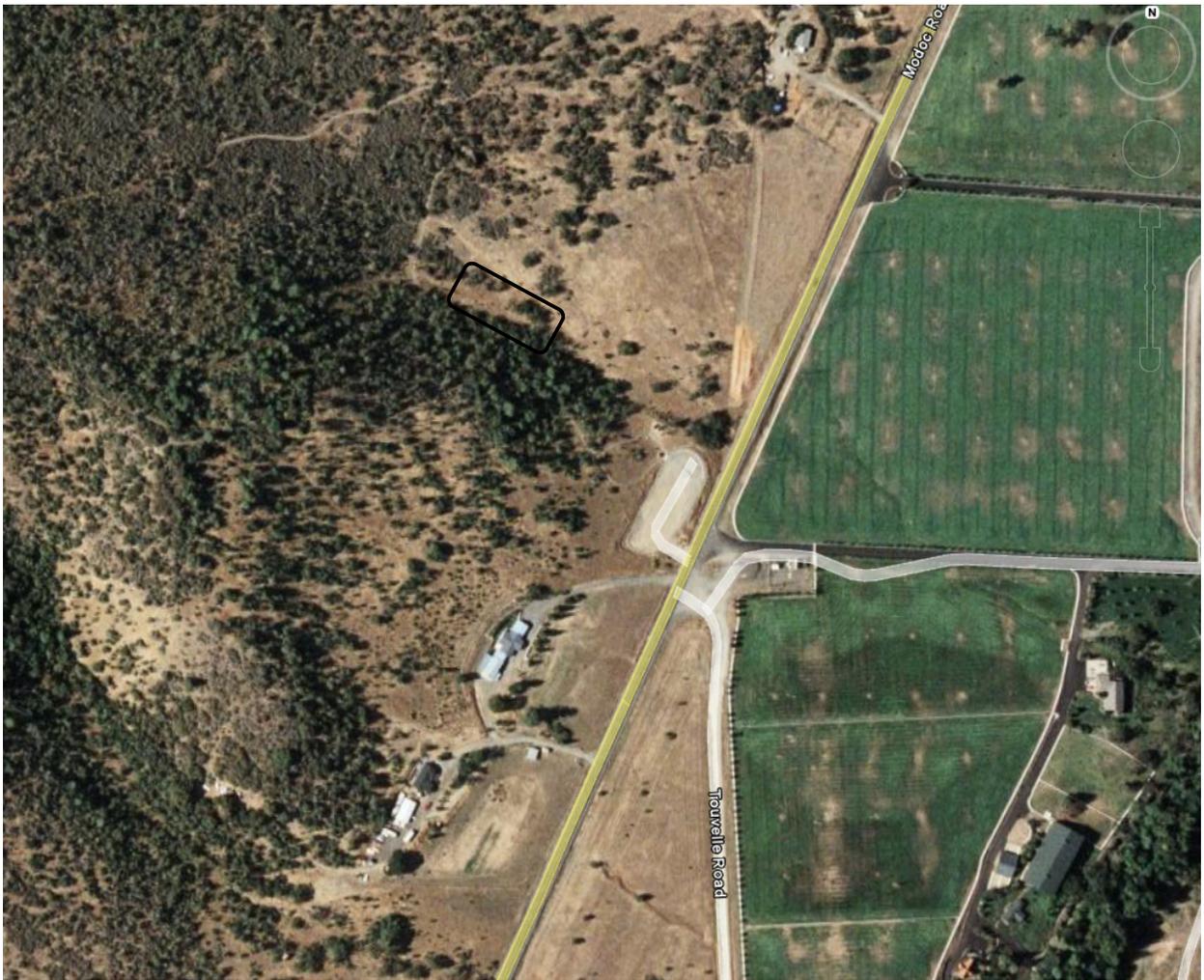


Figure 53. Map of the Upper Table Rock site.

## **Table Rock Terrace Site (ORNHIC #14)**

Ownership: Private

Access: Park on side of Antioch Road.

Number of plants: 0

GPS: Center: 42.4787 122.8870

Notes: This site had been heavily grazed. This may have contributed to the extirpation of LIFLGR at this site.



Figure 54. Habitat of the Table Rock Terrace site.

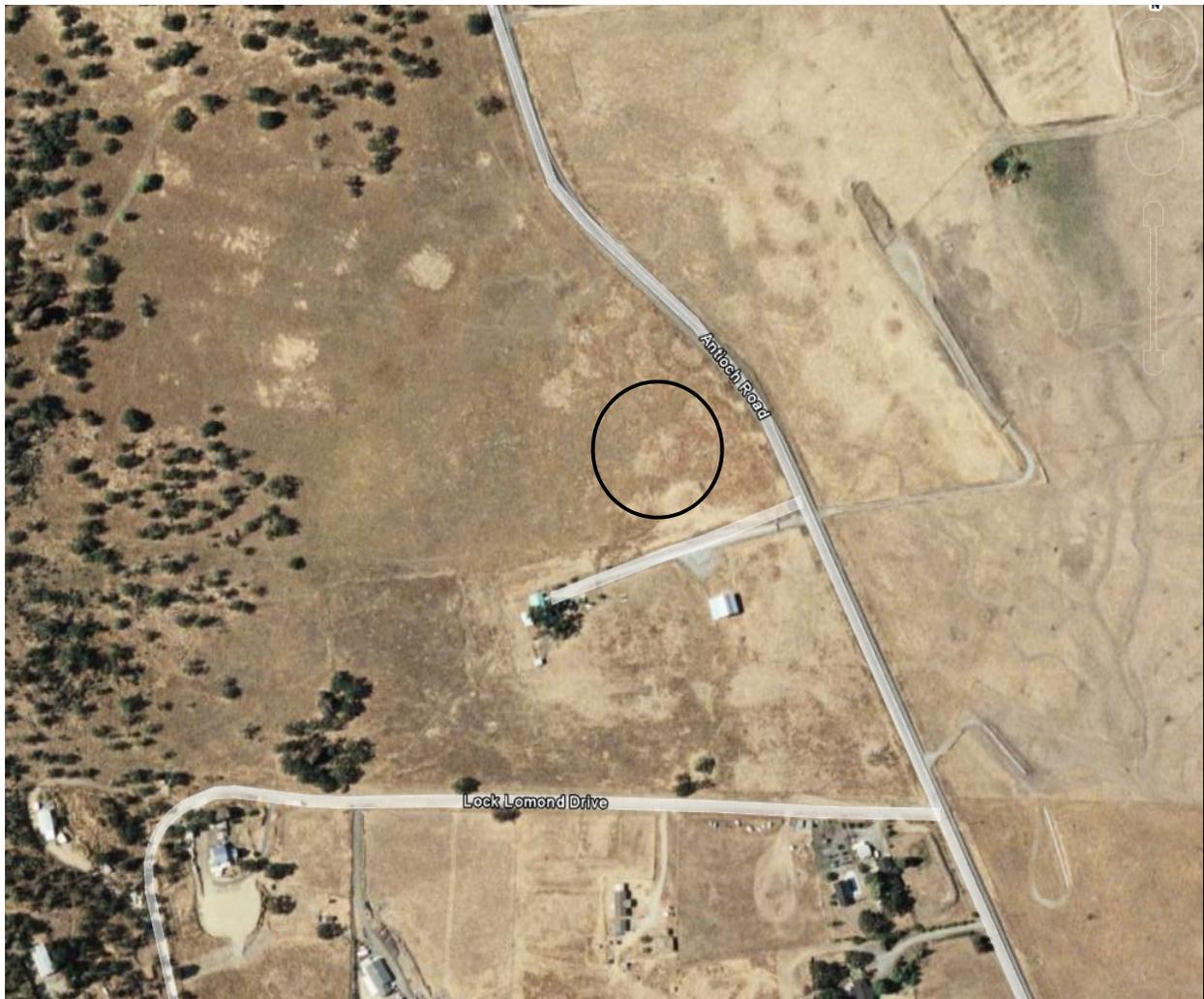


Figure 55. Map of the Table Rock Terrace site.

## **Galpin South Site (ORNHIC #12)**

Ownership: Private

Access: Park near intersection of Newland and Traux Roads.

Number of plants: 0

GPS: Center: 42.4209 122.9237

Notes: While this site has numerous vernal pools, the area has been heavily grazed. This may account for the current absence of LIFLGR.



Figure 56. Habitat at the Galpin South site.



Figure 57. Map of the Galpin South site.

## **Lear Plaza Site (No ORNHIC number)**

Ownership: Private

Access: Park on Lear Way roadside between Cardinal Avenue and Commerce Drive.

Number of plants: 0

GPS: Center: 42.3722 122.8613

Notes: This area has been heavily disturbed by leveling and ditch building. No vernal pools or suitable LIFLGR habitat exist at this location any longer.



Figure 58. Habitat at the Lear Plaza site.



Figure 59. Map of the Lear Plaza site.

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