FINAL REPORT

2006 FIELD SURVEYS ON ROGUE RIVER-SISKIYOU FOREST

For the rare plant *Lupinus tracyi* (Tracy's Lupine)

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INTRODUCTION

Field surveys for the rare plant *Lupinus tracyi* (Tracy's lupine) were conducted by Forest Service botanists and a contractor in late June through mid-August, 2006. The work was funded by the Region's Interagency Special Status/Sensitive Species Inventory and Conservation Program. Some objectives of the project were to:

- Determine the distribution and abundance of this rare lupine after all known Oregon occurrences burned in the 2002 Biscuit Fire. Compare with the distribution and abundance known before the fire.
- Re-evaluate occupied post-fire habitat characteristics, compared to those described in the 1990 draft species management guide for this species.
- See if this lupine re-appeared out of the soil seedbank in the Snowcamp/Gamelake area where Lila Leach made the first Oregon collection(s) in 1929.

Some additional project "goals" are described in the background section below.

In addition to the field surveys, a baseline genetics investigation was envisioned and included in the original project proposal (estimated to cost 20% of the funds received). Our Forest was not able to organize this part of the project. A decision was then made to use those funds to look for Tracy's lupine in additional suitable habitat areas that had not previously been searched.

BACKGROUND

Before the 2002 Biscuit Fire, Oregon occurrences of this species had dwindled to about 15 patches, 2000 individuals, on approximately 200 acres strung out along 13 miles of the Josephine/Curry County line, on granitic or dioritic soils. All known extant Oregon occurrences were on Illinois Valley Ranger District. The population at the first documented Oregon collecting location (Lila Leach 1929, in Curry County, Gold Beach Ranger District, between Snowcamp and Game Lake) had apparently disappeared. Another Leach collection (1930, Josephine County, Free and Easy Trail) had not been positively re-located.

In California, Tracy's lupine is considered uncommon, found in Del Norte, Humboldt, Siskiyou and Trinity Counties. It is on List 4 (watch list) of the California Native Plant Society's Inventory of Rare and Endangered Plants of California (sixth edition, 2001).

A draft species management guide for Tracy's lupine was produced by Oregon Natural Heritage Program (ONHP) in 1990. This lupine obviously benefits from some level of disturbance and canopy opening (Kagan, 1990). However, no documented observations of response to fire had been made before the 2006

field surveys. Based on habitat observations and interpretations of stand characteristics at occupied sites, it was considered likely that periodic fire is beneficial to this species.

All known Oregon occurrences burned in the 2002 Biscuit Fire. No assessment of the effects of the fire on Tracy's lupine had been made before the 2006 field surveys. There was speculation that Tracy's lupine populations might greatly expand as a result of the fire, or that it might arise from the soil seedbank where it had not been previously known to occur. A goal of the 2006 field surveys was to clarify the true extent of Tracy's lupine in Oregon. Since the burned lupine habitat is expected to again change over time, the 2006 field surveys were also intended to provide a baseline against which future searches and monitoring efforts can be compared.

The Biscuit post-fire recovery plan NEPA decision authorizes intensively-managed "fuel management zones" (FMZs) along the ridges that harbor most known populations. The Forest felt a need to learn more about Tracy's lupine after the fire, to help determine the mitigation details that would maintain its viability during FMZ construction and maintenance. This was another goal of the 2006 field surveys.

METHODS

All previously reported sites were re-visited. Numbers of individual plants were counted or estimated and the current extent of the populations was mapped as accurately as possible. Habitat characteristics were noted. General observations about the fire's effects on habitat and associated vegetation were made. Rare Plant Sighting Reports were filled out for each occurrence re-located or encountered. Maps of survey routes were kept.

Areas in the general vicinity of known populations, with granitic or dioritic parent material, above 3000 ft. elevation, with at least some pre-fire openings, were delineated using GIS and pre-fire aerial photos. These areas were searched during the field work to see if additional occurrences could be found.

RESULTS

Figure 1 shows all Oregon locations of *Lupinus tracyi* known to be extant following the Biscuit Fire and the 2006 field surveys. Completed rare plant sighting forms for each occurrence, with more detailed maps, are included in this report in the pages that follow. In most cases, the maps attached to these sighting forms are more precise than those available before the 2006 field surveys.

Maps (and accompanying forms in some cases) showing survey routes are also included in this report, after the sighting forms. These are included as a record of areas searched, hopefully useful to future investigators wondering what areas may yield additional occurrences.

One small new occurrence was found in an entirely new area west of Baldface Creek. There was only a small amount of suitable habitat here. Significantly, there has never been any human disturbance, and no landslide or other evidence of natural earth-moving at this site or even in the surrounding area.

Two other new, or perhaps re-discovered, occurrences were found along Trail 1124 south of Cold Springs. Because they are closer to the route once known as the "Free and Easy Trail", these are perhaps more likely to be where Lila Leach made her 1930 collection, than the known sites north of Canyon Peak previously

assumed to be her collecting site. None of these locations, however, closely match what is assumed to be that old route, and none are in Josephine County though the Curry/Josephine county line is very near.

The 2006 field surveys also yielded additional lupine patches in the vicinity of previously known occurrences. Though they allowed us to draw extensions of known populations, these are not considered truly new occurrences.

When conducting field work for the 1990 draft species management guide, Jimmy Kagan searched and was unable to find Lila Leach's collecting location between Game Lake and Snow Camp. Our contractor likewise searched and was unable to locate Tracy's lupine in this area during our 2006 post-fire field surveys.

Besides the historic collecting site between Game Lake and Snow Camp, and the continued ambiguity regarding Lila Leach's collecting location along the "Free and Easy Trail", two other previously-reported occurrences could not be re-located during the 2006 field surveys. One of these was a tiny occurrence near Hungry Hill reported in 1991 with 3 plants in a 2' X 3' area. It was small enough that it could have disappeared at any time for a variety of reasons. The other was on the road to Buckskin Peak at T40S, R10W, Section 26, NE ¼ of the SE ¼. This was originally mapped by Jimmy Kagan, Wayne Rolle, and Anita Seda at different times and estimated by Kagan to have up to 200 plants. During the 2006 field surveys we could not find Tracy's lupine at the mapped location though it was found very nearby, with considerably fewer individuals. It is not known if the original mapping was off by a quarter or half-mile or if there has been a real shift in actual location and numbers of individuals.

The 2006 field surveys confirmed that all known occurrences and all of the most-promising potential habitat was burned by the Biscuit Fire at varying intensities. In most cases, the overstory was totally or partly opened up by the fire. Anecdotally, serious canopy closure/shading was occurring at most Tracy's lupine locations before the fire. At almost all locations, Tracy's lupine now has enough light to support it for a number of decades.

When comparing the location and extent of known occurrences before and after the Biscuit Fire, there is little evidence, and no reason to believe, that *Lupinus tracyi* germinated and grew from the soil seedbank at previously-unknown locations. Most lupine plants occurred where they had previously been reported. The few new sites found and extensions of previously mapped areas are judged to be the result of increased search effort, rather than truly new emergences or extensions.

When comparing the numbers of individual lupine plants at known occurrences before and after the Biscuit Fire, there is no clear pattern. Based on population estimates in old and new sighting reports, there is evidence of an increased number of individuals in the northern cluster of occurrences. And there is evidence of a decreased number of individuals in the southern cluster of occurrences.

Observers have always noticed a strong correlation of Tracy's lupine occurrences with previous physical disturbance (roadbeds, roadcuts, roadsides, trailsides, tractor-logged areas). Partly this is simply a function of where the openings are in an otherwise dense shady forest. However, natural openings not associated to some degree with roads, trails, or tractor-logged areas were not previously known to support Tracy's lupine in Oregon. The 2006 field surveys re-affirmed that post-fire Tracy's lupine is still strongly correlated with previous physical disturbance. Plants can be found fairly frequently up to 100 feet away from their "core" road or trail or logged area, if the vegetation is open and enough light comes through the canopy. But the disturbed road, trail, or logged area appears to be the source from which the other plants have spread. During the 2006 field surveys, at least one new occurrence and a couple significant "extensions" of existing

occurrences were found in areas that had clearly never been affected by previous human disturbance. This was reassuring evidence that *Lupinus tracyi* is native to Oregon and not introduced from California, inadvertently or otherwise, by loggers or miners in past decades.

The strict correlation of Oregon's Tracy's lupine with granitic or dioritic parent material was re-affirmed during the 2006 field surveys.

CONCLUSIONS

Lupinus tracy is truly rare in Oregon, with limited habitat and a very limited distribution.

Lupinus tracyi occupies more or less the same sites post-fire as it did before the fire.

Periodic fire, intense enough to cause mortality in the canopy layers, creates or maintains natural openings and canopy gaps beneficial to *Lupinus tracyi*. Although it is not clear if Tracy's lupine appreciates full sun, it is clear that it cannot tolerate complete shade for many years.

Lupinus tracyi in Oregon does not rely on a soil seedbank to get through long periods of habitat unsuitability. Fire, logging, and/or physical soil disturbance may be necessary to return habitat to an earlier and more favorable successional stage.

The habitat characteristics and ecological relationships described in the 1990 draft species management guide are accurate and still applicable post-fire.

Most populations are small enough that individuals should be protected during construction and maintenance of FMZs. But the vegetation density and structure planned in the FMZs, and the general habitat disturbance needed to accomplish it, may contribute to the well-being of Tracy's lupine where it occurs in the FMZs.

A field trial within one of the larger occurrences, to test the response of Tracy's lupine to physical soil disturbance (including some destroyed plants), could help determine if protecting existing lupine plants in the smaller occurrences is really a prudent mitigation during FMZ construction and other activities.

A methodology for monitoring *Lupinus tracyi* populations in Oregon could reasonably consist of periodic visits to known occurrences, censuses or estimates of individuals, area (acreage) measurements or estimates, and canopy cover measurements or estimates. Over time, the findings from these repeat visits could help determine any need for active intervention on behalf of Tracy's lupine in Oregon.

REFERENCES

California Native Plant Society (CNPS). 2001. Inventory of Rare and Endangered Plants of California, sixth edition.

Kagan, Jimmy. 1990. Draft Species Management Guide For *Lupinus tracyi*. Unpublished document, prepared under agreement for Siskiyou National Forest, by Oregon Natural Heritage Program.

Appendix – Photos and text by Maureen Jules, botanist at Illinois Valley Ranger District

Lupinus tracyi June 28th, 2006 south of Babyfoot Lake

L. tracyi has distinctive glaucous cauline leaves on purple tinged stems

The yellow faced bumble bee (*Bombus vosnesenkii*) was the only insect visitor I observed on *L. tracyi* during 2006 field observations.

The population boundaries of *L. tracyi* which I relocated (originally mapped by Jimmy Kagen 1990) matched the original delineation almost perfectly. No population expansion or contraction could be detected in many of the sites revisited. Interestingly, there is a strong correlation between *L. tracyi* occurrence and roads, trails, old mining sites and tractor logged areas. Suitable habitat appears to be disturbed granodioritic soils with low overstory canopy cover.

Four years prior to 2006 field surveys, the 2002 Biscuit fire created suitable habitat adjacent to known *L. tracyi* populations. Population expansion into newly created habitat, for the most part, was not observed.

Likewise, we observed that *L. tracyi* did not emerge from the soil seed bank following the 2002 Biscuit fire.

Revegetation patterns on granodiorte varies tremendously throughout the Biscuit fire. At this site (near Buckskin Peak *L. tracyi* metapopulation) Chinquapin (*Chrysolepis chrysophylla)* nearly reached its former height just four years following the fire, leaving only small pockets of suitable habitat for *L. tracyi*.

In many areas on granodiorite, pre-burn shrub density likely limited the abundance of habitat for *L. tracyi*.

At this site, small manzanita (*Arctostaphylos* sp.) emerge from seed in between aggressive stump sprouting shrubs.

The fact that Wayne Rolle found a single new *L. tracyi* occurrence far from any human disturbance (road, trail, mining claim…or so he claimed), dispelled my suspicion that *L. tracyi* had been introduced from Humboldt County, CA on the equipment of early miners. I still suspect that the soil seed bank is important to the survival of the species. Perhaps the seeds are buried so deeply that it takes more than a fire to release the seed bank for germination…or the seed coat is so tough that scarification, not just fire is needed (apparently it may take a road or a mine or timber harvest activity…grinding & heavy soil disturbance….or maybe rodent consumption or deer/elk herd trampling would do?).

In conclusion, field work makes office bound over-whelmed botanists look and feel very happy.