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September 21, 2016

Nona Chiariello
Jasper Ridge Biological Preserve
Stanford, CA 94305

Re: Memorandum report: *Lessingia hololeuca* at Jasper Ridge Biological Preserve

Dear Nona,

On September 20, 2016, members of the Jasper Ridge Oakmead Herbarium team (Diane Renshaw, John Rawlings, Alice Cummings, and Rebecca Reynolds) revisited the population of *Lessingia hololeuca*, woolly-headed lessingia, in the vicinity of the Sun Field Station. The purpose of our visit was to confirm the continued presence of *L. hololeuca*, and to assess potential impacts that might be associated with increased vehicle use and/or improvements to an existing roadway that passes through the *L. hololeuca* habitat *en route* to the top of the Searsville Dam.

BACKGROUND

Lessingia hololeuca Greene, woolly-headed lessingia, is an annual herb in the Asteraceae; habitats include coastal scrub, chaparral, grasslands, roadsides, occasionally serpentine or alkali soil (Baldwin et al., 2012). *L. hololeuca* is classified as a List 3 rare plant by the California Department of Fish and Wildlife Natural Diversity Database (CNDDDB, 2016). List 3 plants are those for which more information is needed to more completely evaluate rarity and/or threat (CNPS, 2016; CNDDDB 2016).

As you know, Jasper Ridge Biological Field Station (JRBP) staff and researchers have been aware of and concerned about the local occurrence of this taxon since or before the initial construction phase of the Sun Field Station in 2001 (email from Nona Chiariello to Rebecca Young and Philippe Cohen, 9 May 2001). More recently, the plants growing near the field station and in the serpentine grassland near the Escobar Gate were mapped in detail by the JRBP herbarium team, and California Natural Diversity Database (CNDDDB) rare plant occurrence forms have been filed with California Department of Fish and Wildlife (CDFW) (Barry, 2012a).

The herbarium team mapped and counted individual *L. hololeuca* plants at Jasper Ridge in 2012 in a variety of microhabitats, including serpentine grassland, along the packed dirt of foot paths, along and within dirt roads used by vehicles, adjacent to gravel roadways, and in disturbed annual grassland. At many of these locations the plant is associated with disturbance. Near the field station it grows in areas subject to vehicle and other human activity: along and within dirt roads, in a patch of disturbed annual grassland (locally known

as the Searsville Lake overlook) that is periodically impacted by vehicle activity and foot traffic, and adjacent to but not within the graveled surface of the primary access road to the field station (Barry, 2012b).

The scientific staff and the herbarium group at JRBP have informally monitored the *L. hololeuca* populations for some years, and have noted that the local *L. hololeuca* populations can fluctuate with time, appearing in new spots and disappearing from others.

L. hololeuca appears to be associated with disturbed areas at JRBP, but that does not necessarily mean that it inherently prefers or requires disturbed habitats. Anthropogenically disturbed areas can mimic areas of natural disturbance (slides, erosion, animal trails, e.g.) to which certain plants are uniquely adapted. Disturbance can discourage colonization by many herbaceous annuals and may provide something of a competitive advantage for this species of *Lessingia*. In other, undisturbed locations at JRBP (serpentine grassland), *L. hololeuca* also thrives; undisturbed serpentine soils with their limiting nutrient content may similarly reduce competition from other annual species.

L. hololeuca is a late-blooming annual that produces fruit at the end of the summer (July - October). Between the time the plant germinates in the spring and sets seed it is particularly vulnerable to disturbance. Once seed has been produced and distributed, the plant habitat appears to tolerate moderate activity that can disturb but does not unduly disrupt or bury the soil surface and the seed bank that it contains.

FINDINGS

On September 20, 2016, the herbarium team walked the previously-mapped areas near the Sun Field Station, in the non-native grassland overlooking Searsville Lake. We paid particular attention to the presence of plants growing in and along the two packed dirt roads/trails that lead from Road G down to the top of the dam. At the time of the survey there were a still few plants in bloom and easily identified, and many more dried stalks of plants that had finished flowering. We observed (but did not count) *L. hololeuca* plants throughout the area we had mapped in 2012, including individual plants growing along and within both of the dirt roads/trails. There were more plants growing within the dirt road/trail closer to the lake than in the parallel dirt road/trail to the west.

Our conclusion is that the sensitive plant mapping done in 2012 accurately reflects the general boundaries and current abundance of the *L. hololeuca* population at this particular location.

IMPACTS

Based on our observations, it is our opinion that increased vehicle use in the vicinity of this known *L. hololeuca* population could lead to significant impacts on the plants:

1. Unregulated movement of vehicles outside the existing disturbance footprint of the dirt road/trails could directly disrupt and/or destroy existing *L. hololeuca* plants and their habitat.
2. Grading, road widening, placement of gravel or other roadway paving, drainage improvements, side casting of fill, placement of overburden, construction staging, or other

changes to the existing disturbance footprint of the dirt roads/trails could damage or destroy existing *L. hololeuca* plants and habitat.

3. Increased vehicle and foot traffic on the existing dirt roads/paths or elsewhere in wet weather when soils are saturated could create excessive rutting, increase erosion, and significantly disrupt the *L. hololeuca* seed bank and habitat that occurs within the existing, unimproved roadway and in the adjacent areas.

4. Increased vehicle and foot traffic on the existing dirt roads/paths and adjacent habitat areas during the spring and summer months could directly impact germinating seedlings and plants before they produce seed, reducing the reproductive potential for the population.

IMPACT AVOIDANCE

If there is an increase in vehicle traffic to the upper dam area through the *L. hololeuca* area, impacts may be avoided or minimized by the following measures:

1. Restrict all vehicle and foot traffic to the existing dirt road/path disturbance footprint. The boundaries of the existing dirt road/path should be clearly marked in the field by the JRBP herbarium team or staff scientists prior to the start of site preparation or construction. The designated work area shall be clearly marked on all construction documents, and monitored during the increased activity period.

2. If safety improvements must be made to the existing dirt roads/paths to accommodate increased vehicle use, these improvements shall avoid increasing the roadway width; improvements shall avoid placing gravel or other surface material on the roadbed; avoid placement of side cast material or other fill on the adjacent sensitive plant habitat; avoid digging, ditching, and additional disturbance outside the existing dirt road/paths. Exceptions to these measures shall be reviewed with the JRBP science staff and may be allowed on an individual basis.

3. During wet weather when soils are saturated, protective construction mats shall be used in the designated roadway as needed to minimize rutting and erosion from vehicle use. Foot traffic shall be restricted to existing paths and non-saturated soils.

4. Vehicle activity and foot traffic shall avoid all areas outside the designated work areas during the spring and summer months so as to avoid damage to actively growing *L. hololeuca* plants.

5. Any new parking and staging areas associated with the increased vehicle use shall be located elsewhere, outside the sensitive plant area.

6. Roadway flagging, improvements, and vehicle activity shall be monitored periodically by JRBP staff or docent volunteers. Violations of protective measures and the discovery of any unforeseen impacts to the sensitive plant area shall be communicated to a designated project manager and resolved to the mutual satisfaction of the involved parties.

Adherence to these measures will avoid or reduce impacts to a less than significant level.

Please let me know if you have any questions or require additional information. Thank you for giving us the opportunity to contribute information and to participate in the planning process for this project.

Best regards,



Diane L. Renshaw

Jasper Ridge Oakmead Herbarium Team

REFERENCES:

- Baldwin, B. G. et al. 2012. The Jepson Manual: vascular plants of California, second edition. U. C. Press, Berkeley.
- Barry, Terri. 2012a. California Native Species Field Survey Forms for *Lessingia hololeuca*, woolly-headed lessingia, occurrences at the Leslie Shao-Ming Sun Field Station, Jasper Ridge Biological Preserve. Multiple forms submitted to CNDDDB, 8/14/2012.
- _____. 2012b. *Lessingia hololeuca* survey at Jasper Ridge Biological Preserve. Undated memorandum report that accompanied CNDDDB field form submittal, 8/14/2012.
- California Department of Fish and Wildlife, Natural Diversity Database (CNDDDB). 2016. Special vascular plants, bryophytes, and lichens list. Quarterly publication, July 2016.
- California Native Plant Society (CNPS) Rare Plant Program. 2016 Inventory of Rare and Endangered Plants (online edition, v-8-02). California Native Plant Society, Sacramento, CA. <http://www.rareplants.cnps.org/detail/1325.html> [accessed 21 September 2016].