Rare Plants Annual Report

Humboldt Redwood Company LLC.

December 31, 2020

This report was prepared by the Botany staff of the Forest Science Department at Humboldt Redwood Company, LLC.

Manager, Forest Science

Sal Chinnici

HRC Lead Botanist

James Regan

Cover Photo: seacoast ragwort (*Packera bolanderi* var. *bolanderi*) in the Van Duzen Watershed

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Humboldt Redwood Company, LLC (HRC) botanists, foresters, and consultants assessed and/or surveyed 27 projects in 2020 looking for the 28 species of rare or uncommon "sensitive" plants on our Special Status Plant List. These projects consisted primarily of Timber Harvesting Plan (THP) units covering approximately 6,961.5 acres. Botanical survey coverage during the 2020 survey season was approximately 4,430.1 acres with 154.6 miles of surveyed roads (includes 13.8 miles of road surveyed for Howell's montia), altogether totaling 5,146.1 acres. This year on HRC property we found 14 new occurrences of six of our Special Status plant species, which represent six new populations, bringing the total number of rare plant populations detected on HRC land to 181. We reduced impacts to these occurrences to less than significant levels by implementing a variety of mitigation methods, in consultation with the California Department of Fish and Wildlife (CDFW), and established buffers around sensitive plant occurrences as needed in conjunction with the use of herbicides in regeneration forestry. We documented 36 occurrences of nine species that are on our Watch List (not rare but of limited distribution in California), which were found incidental to surveys for Special Status plants.

Maps of the individual species are provided in Appendix 5. Accompanying this report is a Rare Plant Detections Map showing all active plant occurrences on HRC land, and a Rare Plant Road Surveys Map which shows total road survey coverage (cut bank and fill slope surveys) from 2010 to 2020 and *Montia howellii* road surveys (MOHO Research) from 2005 to 2020. California Natural Diversity Data Base (CNDDB) forms for the Special Status and Watch List species occurrences will be provided on CD to CNDDB and are available to the HCP Wildlife Agencies on request.

We surveyed 13.8 miles of roads for *Montia howellii* in 2020. We documented plant locations and numbers for known sites and discovered several newly occupied road segments adjacent to these existing occurrences. Five roads containing *Montia howellii* populations are exempt from the property-wide winter use restrictions which currently mitigate other known populations. One of these "open" sites was visited in 2020 (Wrigley Rd). The results of monitoring efforts are presented in the summary tables below and are included in tables found in Appendix 7.

Proposed Changes for 2021

HRC does not propose any significant changes to the Rare Plant Program for the 2021 survey season.

INTRODUCTION

HRC employees, foresters, and consultants conducted plant habitat assessments and seasonally appropriate floristic plant surveys in 2020 on timberlands owned by Humboldt Redwood Company, LLC. We conducted the surveys and habitat assessments to comply with the California Environmental Quality Act (CEQA) and HRC's Habitat Conservation Plan (HCP) "Conservation Plan for Sensitive Plants" (§6.12.1). This section requires that the presence of rare plant species be determined through field surveys conducted during planning of covered activities including, but not limited to, development of THPs, planning for new road construction, and development of quarries or borrow pits. Company employees and forestry contractors delineated potential rare plant habitat, and a qualified botanist verified the habitat determinations and performed a seasonally appropriate survey if potential habitat was present.

The procedures that we follow provide a high probability that rare plants are discovered during planning. When plants are found, mitigation measures are applied to reduce impacts to a level that is less than significant; these measures are reviewed by CDFW and include avoidance of herbicide application to these plants.

This report summarizes the results of surveys, mitigations, research, and monitoring conducted in the year 2020 and fulfills HRC's HCP reporting requirements for rare plants (section 6.12.1, Item 5).

SPECIAL STATUS PLANTS

We conducted floristic surveys to look for the plants on HRC's current Special Status Plant List (Table 1). This list includes vascular plants which are of limited abundance in California and are known or believed to occur in Humboldt County. We report the results of our surveys to CNDDB annually (both new occurrences and updates to previously reported occurrences). The list was derived from the following sources in consultation with CDFW and the United States Fish and Wildlife Service (USFWS):

- Federally listed or proposed threatened or endangered plants
- California state listed or proposed rare, threatened or endangered plants
- CDFG Natural Diversity Database, Special Vascular Plants, Bryophytes, and Lichens

- California Native Plant Society (CNPS) species with California Rare Plant Rank (CRPR) 1A, 1B, 2A, and 2B.[1]

Table 1. HRC's Special Status Plant List for the 2020/2021 field season.

Scientific Name/Common Name	Status	**Presence on Ownership**
Astragalus agnicidus Humboldt milk-vetch	G2, S2, CE, CRPR 1B.1	**Yes**
Astragalus umbraticus Bald mountain milk-vetch	G4, S2, CRPR 2B.3	Unknown
Bensoniella oregona bensoniella	G3, S2, CR, CRPR 1B.1	Unknown
Cardamine angulata seaside bittercress	G4G5, S3, CRPR 2B.2	Unknown
***Carex arcta* northern clustered sedge**	G5, S1, CRPR 2B.2	**Yes**
Carex leptalea flaccid sedge	G5, S1, CRPR 2B.2	Unknown
Carex praticola meadow sedge	G5, S2, CRPR 2B.2	Unknown
Cornus canadensis bunchberry	G5, S2, CRPR 2B.2	Unknown
Epilobium oreganum Oregon fireweed	G2, S2, CRPR 1B.2	Unknown
***Erythronium oregonum* giant fawn lily**	G4G5, S2, CRPR 2B.2	**Presumed**
***Erythronium revolutum* coast fawn lily**	G4G5, S3, CRPR 2B.2	**Yes**
***Gilia capitata* ssp. *pacifica* Pacific gilia**	G5T3, S2, CRPR 1B.2	**Yes**
Glyceria grandis American manna grass	G5, S3, CRPR 2B.3	Unknown
Iliamna latibracteata California globe mallow	G2G3, S2, CRPR 1B.2	Unknown
Juncus supiniformis hair-leaved rush	G5, S1, CRPR 2B.2	Unknown
Kopsiopsis hookeri small ground cone	G4?, S1S2, CRPR 2B.3	Unknown
Lilium occidentale western lily	G1, S1, FE, CE, CRPR 1B.1	Unknown
Moneses uniflora woodnymph	G5, S2, CRPR 2B.2	Unknown
***Montia howellii* Howell's montia**	G3G4, S2, CRPR 2B.2	**Yes**
Noccaea fendleri ssp. *californicum* Kneeland Prairie pennycress	G5?T1, S1, FE, CRPR 1B.1	**Adjacent**
***Packera bolanderi* var. *bolanderi* seacoast ragwort**	G4T4, S2S3, CRPR 2B.2	**Yes**
***Piperia candida* white-flowered rein orchid**	G3, S3, CRPR 1B.2	**Yes**
Polemonium carneum royal sky pilot	G3G4, S2, CRPR 2B.2	Unknown
Sanguisorba officinalis great burnet	G5?, S2, CRPR 2B.2	Unknown
***Sidalcea malvaeflora* ssp. *patula* Siskiyou checkerbloom**	G5T2, S2, CRPR 1B.2	**Yes**
Sidalcea oregana ssp. *eximia* coast checkerbloom	G5T1, S1, CRPR 1B.2	Unknown
Sisyrinchium hitchcockii Hitchcock's blue-eyed grass	G2, S1, CRPR 1B.1	Unknown
Viola palustris alpine marsh violet	G5, S1S2, CRPR 2B.2	Unknown

Abbreviations: FE, federally listed Endangered; SE, California state listed Endangered; SR, California state listed Rare; CRPR, California Rare Plant Rank; G, global rank; S, state or provincial rank.

[1] California Native Plant Society (CNPS 2014) CRPR 1A: Plants presumed extirpated in California and rare or extinct elsewhere; CRPR 1B: rare, threatened, or endangered in California and elsewhere; CRPR 2A: Plants presumed extirpated in California, but more common elsewhere; CRPR 2B: rare, threatened, or endangered in California, but more common elsewhere.

WATCH LIST PLANTS

In 2006 we developed our Watch List (CRPR 3 and 4[2]) and began recording occurrences of these plants which we encountered while conducting our operational surveys.

Table 2. HRC's Watch List Plants for the 2020/2021 field season.

Scientific Name/Common Name	Status	On HRC
***Astragalus rattanii* var. *rattanii* Rattan's milk-vetch**	**G4T3, S4, CRPR 4.3**	**Yes**
Calamagrostis bolanderi Bolander's reed grass	G4, S4, CRPR 4.2	
Calamagrostis foliosa leafy reed grass	G3, S3, CRPR 4.2	
Carex buxbaumii Buxbaum's sedge	G5, S3, CRPR 4.2	
Castilleja ambigua var. *ambigua* Johnny nip	G4T4, S3S4, CRPR 4.2	
***Chrysosplenium glechomifolium* Pacific golden saxifrage**	**G5?, S3, CRPR 4.3**	**Yes**
Collomia tracyi Tracy's collomia	G4, S4, CRPR 4.3	
***Coptis laciniata* Oregon goldthread**	**G4?, S3?, CRPR 4.2**	**Yes**
***Epilobium septentrionale* Humboldt County fuchsia**	**G4, S4, CRPR 4.3**	**Yes**
Erigeron biolettii streamside daisy	G3?, S3?, CRPR 3	
Erigeron robustior robust daisy	G3, S3, CRPR 4.3	
Fritillaria purdyi Purdy's fritillary	G4, S4, CRPR 4.3	
***Hemizonia congesta* ssp. *tracyi* Tracy's tarplant**	**G5T4, S4, CRPR 4.3**	**Yes**
***Hosackia gracilis (Lotus formosissimus) harlequin* lotus**	**G3G4, S3, CRPR 4.2**	**Yes**
Iris longipetala coast iris	G3, S3, CRPR 4.2	
***Lathyrus glandulosus* sticky pea**	**G3, S3, CRPR 4.3**	**Yes**
Leptosiphon (Linanthus) acicularis bristly leptosiphon	G4?, S4?, CRPR 4.2	
***Lilium kelloggii* Kellogg's lily**	**G3, S3, CRPR 4.3**	**Yes**
***Lilium rubescens* redwood lily**	**G3, S3, CRPR 4.2**	**Yes**
Lilium washingtonianum ssp. *purpurascens* purple-flowered Washington lily	G4T4, S3S4, CRPR 4.3	
***Listera cordata* heart-leaved twayblade**	**G5, S4, CRPR 4.2**	**Yes**
***Lycopodium clavatum* running-pine**	**G5, S3, CRPR 4.1**	**Yes**
Lycopus uniflorus northern bugleweed	G5, S4, CRPR 4.3	
***Mitellastra caulescens (Mitella caulescens)* leafy-stemmed mitrewort**	**G5, S4, CRPR 4.2**	**Yes**
Navarretia linearifolia ssp. pinnatisecta pinnate-leaved navarretia	G4G5T4, S4, CRPR 4.3	
Piperia michaelii Michael's rein orchid	G3, S3, CRPR 4.2	
***Pityopus californicus* California pinefoot**	**G4G5, S4, CRPR 4.2**	**Yes**
Platanthera stricta slender bog-orchid	G5, S3, CRPR 4.2	
***Pleuropogon refractus* nodding semaphore grass**	**G4, S4, CRPR 4.2**	**Yes**
***Ribes laxiflorum* trailing black currant**	**G5?, S3, CRPR 4.3**	**Yes**
***Ribes roezlii* var.*amictum* hoary gooseberry**	**G5T4, S4, CRPR 4.3**	**Yes**
***Sidalcea malachroides* maple-leaved checkerbloom**	**G3, S3, CRPR 4.2**	**Yes**

[2] CRPR 3: Review list, plants with uncertain taxonomy, more information needed. CRPR 4: Plants of limited distribution, a watch list.

Scientific Name/Common Name	Status	On HRC
***Astragalus rattanii* var. *rattanii* Rattan's milk-vetch**	**G4T3, S4, CRPR 4.3**	**Yes**
***Usnea longissima* Long- beard lichen**	**G4, S4, CRPR 4.2**	**Yes**
Wyethia longicaulis Humboldt County wyethia	G4, S4, CRPR 4.3	

We report these occurrences to CNDDB at the end of each year along with the new and updated occurrences of our Special Status plants. Our purpose in reporting CRPR 3 or 4 plants is to further the knowledge of California flora and provide accurate records for future decisions relating to rare plant listings and habitat protections.

SETTING

The HRC ownership is located in Humboldt County, California. The ownership totals approximately 209,300 acres and is managed primarily for timber production. The soils are largely derived from sedimentary rocks (such as claystone, mudstone, siltstone and sandstone) with scattered intrusions of metamorphosed sedimentary and ultramafic rocks. The ownership is situated in the following geographic subdivisions of the California Floristic Province: the North Coast and North Coast Ranges sub-regions of the Northwestern California region (Hickman 1993, Baldwin 2012). The primary vegetation types on the ownership, called "series" in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), and later called "Vegetation Alliances" in the Manual of California Vegetation 2nd edition (Sawyer J.O., Keeler-Wolfe T. and Evans J.M. 2009) include Redwood, Douglas-fir, Douglas-fir/Tan oak, Tan oak, Mixed oak, and Mixed conifer forests as well as smaller areas of several different grassland, scrub, riparian, and wetland vegetation alliances.

METHODS

SURVEY METHODS

HRC botanists and consultants use survey methods based on the CDFW recommended protocol for rare plant surveys, "Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities" (CDFW 2018). All surveys are floristic in nature and seasonally appropriate for the species considered, focusing not only on the predicted Special Status plants but also identifying and recording all vascular plant taxa encountered to the lowest

taxonomic level (i.e. genus or species) necessary for identification of our focus species. When we conduct field-based habitat assessments at times of the year which were not seasonally appropriate, we return to areas identified as suitable habitat for the surveyed species during the next appropriate floristic season.

MITIGATION METHODS

When we locate Special Status plants which have the potential to be adversely affected by land management activities, we adopt one or more of the following measures to avoid, minimize, and/or mitigate adverse impacts to the species to less than significant levels. These same measures are listed in CEQA, Section 15370.

- Avoid the impact altogether by not taking a certain action
- Minimize impacts by limiting the degree or magnitude of the action
- Rectify the impact by repairing, rehabilitating, or restoring the impacted environment
- Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the project
- Compensate for the impact by replacing or providing substitute resources or environments

The measures we propose take into consideration the population size, viability, and habitat requirements of the Special Status plant in relation to the proposed project activities, constraints, and scope. We achieve avoidance and minimization of impacts by several means, alone or in combination, and depending on the species may include:

- Establishing no-cut retention areas (for canopy dependent species) or equipment and site preparation limitation areas (for non-canopy dependent species) that incorporate the population.
- Designating an appropriate buffer zone according to the habitat requirements of the species and the specifics of the population at the site.
- Designating species-specific overstory canopy retention in the buffer and core areas.
- Establishing an equipment exclusion zone within the buffer and core areas.
- Directional falling of timber away from the areas.

CDFW reviews and approves all proposed mitigation measures. The measures used in 2020 at any particular site are noted on the sensitive species detections table in Appendix 2 and in the site revisit table in Appendix 7.

DEFINITION OF OCCURRENCE

Because of database limitations, HRC uses the term "occurrence" to refer to a group of plants of the same species which were discovered during a specific survey event. These may be groups of plants close together and representing a single population or part of a larger population previously discovered, or they can be widely scattered groups representing several populations. Based on this definition, an occurrence as we use it has no relationship to a "biological population," or to the CNDDB meaning of "occurrence."

RESULTS

SURVEY RESULTS

We assessed and/or surveyed 27 projects for Special Status plants in 2020, covering a total of approximately 5,146.1 acres; including 154.6 miles of roads (this includes 13.8 miles of survey for *Montia howellii*). Most of the assessment and survey acres were associated with THP preparation or operational needs such as THP completions and were inspected between March and August (Table 3). We also located several Special Status plants during non-THP related projects such as trail maintenance, hydrology, forestry, or wildlife monitoring activities. Habitat assessment visits may occur during the typical floristic period or may occur outside of those documented blooming periods. If potential sensitive plant habitat is located outside of the floristic period those areas are re-visited during the next appropriate time frame for floristic survey.

Table 3. 2020 Assessed/surveyed acres by month.

Year	Month	Unit Survey/Assessment Acres*
2019	December	0
2020	January	11.4
2020	February	92.0
2020	March	1,560.6
2020	April	1,084.5
2020	May	539.6
2020	June	222.7
2020	July	263.7
2020	August	481.8
2020	September	173.8
2020	October	0
2020	November	0
Total 2020 Unit Survey/Assessment Acres		**4,430.1**
2020	Road Survey/Assessment Acres	682.6
2020	Howell's montia Surveys	33.4
Total 2020 Survey/Assessment Acres		**5,146.1**

*This value is generated in ArcGIS by creating polygons from survey route data. Total 2020 project acres from database records are approximately 6,961.5. Some portions of projects were surveyed in previous years or have future surveys planned. December totals for previous years are included in current year survey statistics.

Table 4 includes a summary of the totals for new occurrences and populations found in 2020. These data are also included in tables in Appendix 2: 2020 Plant Detections, Appendix 5: Rare Plant Detections and Rare Plant Road Surveys maps.

Table 4. Summary of 2020 Special Status Plant detections and property-wide totals.

Species	2020 occurrences	New populations	Total populations[3]	# new plants*	Total plants**
Astragalus agnicidus	6	0	1	28	7,963
Carex arcta	0	0	3	0	55
Erythronium revolutum/oregonum	1	0	30	18	7,940
Gilia capitata ssp. *pacifica*	1	1	27	44	14,284
Montia howellii	0	0	45	0	37,873
Packera bolanderi var. *bolanderi*	3	0	36	85	11,147
Piperia candida	2	1	26	113	2,002
Sidalcea malvaeflora ssp. *patula*	1	4	13	200	3,008
Totals	**15**	**6**	**181**	**488**	**84,272**

*Totals of new occurrences only, does not include changes in known sites
**Total plant count is tally of original occurrence data and subsequent revisit counts, from Microsoft Access Database.

[3] Populations are defined as groups of the species separated by at least a quarter mile from other such known groups, equivalent to CNDDB definition of "occurrence".

The CNDDB Rare Plant Report forms corresponding to the new occurrences of Special Status plants on HRC property are provided as a CD and will be sent to the Sacramento CNDDB office no later than the last week of December 2020.

In 2020 we also revisited known Special Status plant locations either for monitoring, or for new THP layout. These revisits are documented in Appendix 7 at the end of this report. All revisited sites have been documented on a CNDDB report form and will be sent along with the new occurrence reports by the end of December 2020.

EFFECTIVENESS MONITORING

HRC conducts post-impact effectiveness monitoring of some Special Status plant sites. The purpose of effectiveness monitoring is to determine if the mitigations applied to plants at a specific site are effective at minimizing impacts on the population from covered timberland management activities (e.g. timber harvest, road building, reforestation). We also conduct post-impact monitoring where impacts may have been significant but unavoidable and the population is being monitored for the level of response. Effectiveness monitoring usually consists of one follow-up visit or, rarely, revisits over several years, conducted by a qualified botanist or plant ecologist. Appendix 3 provides a summary of the events which trigger THP-specific monitoring visits.

Five projects were visited this season for mitigation effectiveness monitoring (including yearly monitoring for Howell's montia). Results of the monitoring efforts are detailed below and included in plant detection tables and re-visit tables in Appendices 2 and 7. This section also contains details of invasive species control which took place in sensitive wetland habitats in "The Pond" THP 1-18-00167HUM.

PROPERTY-WIDE CONSULTATIONS

HRC has assumed implementation of four property-wide species-specific management agreements that were originally developed through consultation with CDFG by The Pacific Lumber Company (PALCO), the previous landowner. These species are *Astragalus agnicidus, Erythronium revolutum, Montia howellii,* and *Packera bolanderi* var. *bolanderi.* Copies of the

consultation letters are in Appendix 4. The mitigation measures provided in these agreements will likely reduce impacts for these species to a less than significant level. We will request site-specific consultations from CDFW only if we propose mitigations that deviate from these agreements at specific locations.

CHANGES TO HRC'S SPECIAL STATUS PLANT AND WATCH LISTS

HRC does not propose any changes to either the special status plant list or watch list for the 2021 survey season.

CALIFORNIA NATIVE PLANT SOCIETY (CNPS) WATCH LIST PLANTS

INTRODUCTION AND SUMMARY

In 2006 HRC botanists began to voluntarily document plants ranked as CRPR 4: "plants of limited distribution, a watch list", and CRPR 3: "plants of problematic taxonomy and about which we need more information" (CNPS 2016). There are approximately 34 species on these CRPR lists that are known or are likely to occur on HRC ownership (see Introduction, Table 2). HRC botanists have located populations of 18 of these species during surveys.

Appendices 2 and 7 contain details on newly detected occurrences as well as data for site re-visits. We record these as we would plants on our Special Status Plant List and maintain them in our database (see Data Management and Analysis Methods). We also report these plants annually to CNDDB.

METHODS

Survey Methods

These species are found incidentally during the course of our normal operational surveys.

Mitigation Methods

CRPR 3 and 4 plants are generally not considered sufficiently rare to qualify for mitigation and protection under CEQA.

Voluntary Management Plan for Lycopodium clavatum

In July 2008, *Lycopodium clavatum* was moved from CRPR 2 to CRPR 4. HRC has voluntarily implemented the following management plan for this species:

1. Humboldt Redwood Company, LLC (HRC), will report to CDFW and CNDDB all occurrences of *Lycopodium clavatum* discovered during forestry operations once a year.

2. HRC will no longer include enforceable language for the protection of this species in new THPs.

3. Where *Lycopodium clavatum* is found within a THP unit, HRC will make efforts during planning to conserve mats through silvicultural practices, such as placing retained tree clusters at the plant locations but will harvest any marketable tree that is not otherwise retained.

RESULTS

Watch list plant detections are included in Appendix 2: Plant Detections.

DISCUSSION

Our goal in surveying and reporting these occurrences is to further the knowledge of California flora and provide accurate records for future decisions concerning plant and habitat protections. Prior to 2006, watch list plants were mentioned in THP and habitat surveys but the data was not reported to CNDDB nor retained in HRC's data base. There are likely additional occurrences of these species on the property.

Maps of the watch list species on HRC property are included in Appendix 5.

EFFECTIVENESS MONITORING RESULTS

Appendix 3 contains a spreadsheet with the current monitoring schedule for sensitive plant sites.

This year several projects were scheduled for effectiveness monitoring visits including:

- Mountain View THP 1-13-035HUM (*Piperia candida*)
- PBL THP 1-14-149HUM (*Astragalus agnicidus*)
- LVD 17 THP 1-17-107HUM (*Packera bolanderi* var. *bolanderi*)
- The Pond THP 1-18-00167 (*Cortaderia jubata* removal project)
- Yearly Howell's montia monitoring (*Montia howellii*)

Results for monitoring visits are described below.

MOUNTAIN VIEW THP 1-13-035HUM

This project was originally surveyed in 2013. During surveys an occurrence of *Piperia candida* (white-flowered rein orchid, PICA 1660) was discovered situated on the running surface and cut-bank of the graveled access road. The occurrence was buffered with a 50-foot zone in which selective tree removal was allowed but road use and maintenance were limited to attempt to retain site character and plant viability while allowing timber harvest to continue. A wooden barrier was erected along the cut bank side of the road to encourage truck drivers to stay near the road center and avoid plants along the base of the cut bank. During the summer of 2014 roadwork adjacent to the site was completed and equipment and dump trucks passed through the occurrence during work. In 2015 the site was visited, and site condition was good, no observable disturbance had occurred within the protected area and plant numbers were higher than in 2013. Timber harvest on the plan began late in 2017. A visit to the site before the start of operations in 2017 was conducted and while the site seemed un-changed the plant numbers were lower than the previous year. Timber harvest lasted until July of 2018. The 2018 monitoring visit was conducted just at the cessation of timber harvest and the road segment containing *Piperia candida* was graded prior to the monitoring visit. The grading was light, and all spoils were kept on the road prism. The flagging and wooden barrier were in place and undisturbed by timber

harvest or road maintenance activity. The plant count for 2018 was rather low and most plants were either fully blooming or had senesced for the year. The wooden barrier was removed, and a small amount of woody debris was cleared from the occupied road segment. The monitoring schedule for this project calls for visits in year one and three after harvest and roadwork. Harvest was completed in 2018 and the site will be visited for a final time in 2021. Although a visit was not planned for this season (2020) the site was included in a prescribed burn and oak woodland habitat restoration effort, so the site was visited to assess impacts from those activities as well. During restoration conifer species were removed from oak stands and prairie edges adjacent to the buffered zone associated with this occurrence. A light understory fire was set in late 2019 and passed through the occupied zone. Table 5 contains plant numbers and a simple trends analysis.

Table 5. Monitoring Results – Plant Counts for PICA 1660

Species Code	Occurrence ID	2013	2015	2017	2018	2019	2020
PICA	1660	82	137	46	15	55	22
	Change in number		55	-91	-31	40	-33
	% Change		67	-66	-67	267	-60
	% Change from baseline		67	-44	-82	-33	-73

Following a decline between 2015 and 2018 plant numbers had rebounded to 33% below baseline in 2019 only to drop again in 2020 to more than 70% below baseline. Plant distribution on site has changed, with more of the extant plants located on the cut bank and at the top of the cut bank above the occupied road. Plants in the center of the road prism and closest to the travelled surface have not been re-located and may have been lost during road use and grading activities.

PBL THP 1-14-149HUM

The PBL THP 1-14-149HUM located in the Larabee watershed contains a host of historic and contemporary occurrences of *Astragalus agnicidus* (Humboldt milk-vetch, ASAG). This species appears to be closely linked with disturbance and has been known to flourish in disturbed areas after timber harvest on HRC property. Surveys for this THP were done in 2014. Additional surveys and some monitoring visits were conducted in 2015 and 2016.

The mitigation plan calls for effectiveness monitoring visits for at least three years after completion of harvest or roadwork. HRC had plans to conduct timber harvest operations within this THP in 2017 and did complete some of the planned roadwork in 2015 and 2016 but timber harvest operations did not end until 2018. The 2017 monitoring efforts focused on sections of road with recent roadwork or newly constructed road sections. It should be noted that all planned roadwork was not completed as some of the proposed road sections were found to be un-necessary for timber harvest completion and were not built. The results of the monitoring visits are shown on Table 7, these data represent re-visits to known sites within and adjacent to the mitigation monitoring sites as well as documentation of newly detected sites in areas of recent roadwork within and adjacent to the specific monitoring sites. HRC plans a final monitoring visit in 2021.

Table 6. Monitoring Results – Plant Counts for ASAG at PBL

Species Code	Occurrence ID	2012	2014	2016	2017	2019	2020	Notes
ASAG	87	0	225		14			Roadwork in 2013, not disturbed since then. Not part of THP specific monitoring, did not re-visit in 2019-2020
ASAG	115		9	4	4			Minor roadwork, plants on edge of mainline. Not part of THP specific monitoring, did not re-visit in 2019-2020
ASAG	267	0	1		5		14	Plants on edge of mainline. Not part of THP specific monitoring, incidental revisit in 2020
ASAG	271		38		106		10	Not part of THP specific monitoring, did not re-visit in 2019, 2020 visit only covers a portion along mainline road
ASAG	272	1			0	0	69	Minor roadwork, more work was planned at this location but did not occur, plants came up on adjacent new road spurs (occ. 4541)
ASAG	273	1	5		9	17	114	Plants in recently opened road and landing
ASAG	274	11	22		40	54	10	Grading and minor roadwork, new spurs contain newly occupied sections (occ. 4538, 4539, 4540, 5023, 5024)
ASAG	4532				4	3	17	New sites in areas of recent roadwork (construction or re-construction), these roads were surveyed prior to roadwork and no plants were detected at these sites.
ASAG	4533				166	12	66	New 2017
ASAG	4534				46	121	208	New 2017

Species Code	Occurrence ID	2012	2014	2016	2017	2019	2020	Notes
ASAG	4535				1			New 2017, Not part of THP specific monitoring, did not re-visit in 2020
ASAG	4536				23			New 2017, Not part of THP specific monitoring, did not re-visit in 2020
ASAG	4537				3	0	0	New 2017
ASAG	4538				21	56	55	New 2017
ASAG	4539				33	65	75	New 2017
ASAG	4540				22	35	48	New 2017
ASAG	4541				267	388	370	New 2017
ASAG	4542				17			New 2017, off road, not re-visited
ASAG	5019					14	139	New 2019
ASAG	5020					6	9	New 2019
ASAG	5023					6	10	New 2019
ASAG	5024					24	24	New 2019
ASAG	5025					5	14	New 2019
ASAG	5026					18	108	New 2019
ASAG	5027					1	1	New 2019
ASAG	5028					278	273	New 2019
ASAG	5029					1	1	New 2019
ASAG	5030					6	17	New 2019
ASAG	5342						14	New 2020, in gaps between known sites
ASAG	5343						1	New 2020, in gaps between known sites
ASAG	5344						1	New 2020, in gaps between known sites
ASAG	5345						1	New 2020, in gaps between known sites
ASAG	5346						1	New 2020, in gaps between known sites
ASAG	5347						10	New 2020, in gaps between known sites

Totals (All Sites)	**13**	**300**	**4**	**781**	**1110**	**1680**
Total (Monitoring Sites)	**13**	**27**	**0**	**628**	**1110**	**1656**

Percent Change (from 2014 baseline)	**6033%**

From the monitoring data it appears that mitigation measures were effective in reducing the impacts to this species to a less than significant level. The results indicate that plant populations within the monitored area increased by more than 6,000 percent following harvest and roadwork activities. New plants were found in areas of new road construction and in areas with significant road work and adjacent timber harvest. These occurrences continue to expand and fill in gaps

even several years after roadwork. New occurrences were often found in places that were not occupied prior to disturbance and are likely sourced from dormant seedbank either located at the site of the new occurrence or pushed in from adjacent areas during road work. HRC will continue to monitor these sites for one more year. It is likely that in an absence of new disturbance these populations will dwindle as adjacent competing vegetation increases and overstory canopy cover closes in. This "boom and bust" pattern has been documented in several other effectiveness monitoring efforts associated with this species in THPs on HRC properties in this watershed.

LVD 17 THP 1-17-107HUM

The LVD 17 THP, located in the Hely Creek planning watershed, was surveyed during the 2017 and 2018 survey seasons. The subject THP is not located on Hely Creek but is centered around an unnamed tributary to the Van Duzen River which enters from the south side of the Van Duzen across from Riverside Park. The THP contains several occurrences of the sensitive plant species *Packera bolanderi* var. *bolanderi* (seacoast ragwort, PABOBO). Two of these occurrences are in areas of proposed road work or new road construction. Occurrence 603 was found on the cut-bank of a seasonal road at the site of a steep sandstone bluff. The road at this point had partially failed and HRC road crew had to excavate into the occupied cut-bank in order to restore the road surface to a drivable width and condition. Road work took place in late 2018. The site was visited in July of 2019 and it was noted at that time that the road at that site had partially failed again. Additional road work was conducted at the site in late 2019, the plants were marked in the field and operators were instructed to avoid plants as possible and feasible. Plants at this location were positioned along the inside bank as well as on the fill slope and outboard edge of a small landing spur adjacent to the excavation. Occurrence 4742 is a small occurrence consisting of four separate clumps of plants located at the site of proposed new road construction. Construction at this location created a new road through an area with several steep bluff faces. Plants were marked prior to work and all sites were successfully avoided leaving the plants and directly adjacent habitat little changed. Road construction at this occurrence took place in late 2019. In an agreement with CDFW HRC has agreed to monitor both sites for at least two years after road work. Table 8 shows the results of monitoring efforts to date. Occurrence 603 has two groups, only one is included in this monitoring report and plant numbers reported here will

differ with numbers reported to CNDDB and numbers included in Appendix 7, which report the total of both groups.

Table 7. Monitoring Results – Plant Counts for PABOBO at LVD 17

Species Code	Occurrence ID	2004	2018	2019	2020	Notes
PABOBO	603	206	415	136	200	Roadwork in 2018 and 2019. Monitoring planned for 2020 and 2021.
PABOBO	4742		16		33	Roadwork in 2019, re-visit planned for 2020 and 2021.
PABOBO	5299				31	New site detected in 2020 located between monitoring sites, either overlooked in surveys or newly established along recently modified road.
PABOBO	5300				34	New site detected in 2020 located between monitoring sites, either overlooked in surveys or newly established along recently modified road.

	Totals	206	431	136	298
Totals (Monitoring sites)		206	431	136	233
Percent Change (Monitoring sites)					-45.9

Although plant counts show an almost 50% decrease in total plants as a result of roadwork activities this mitigation should be considered a success so far. The reduction in plants at the

occurrence 603 location was expected due to the extent of excavation and additional roadwork that was necessary to restore the road to a suitable condition for timber harvest, it is a testament to the skill of the operators involved that the occurrence was not more severely impacted. Most of the plants lost at this site were young rosettes and recently germinated plants, many of the flowering adults were retained. The work around occurrence 4742 was completed without impacts to the plants there and now the occurrence has increased in size, maybe due to increased light allowing more growth and reproduction to occur. Additionally, two new sites were found between the monitoring sites, further indication that the species at large has not been significantly impacted by the roadwork and will likely continue to exist within the area post-harvest.

MONTIA HOWELLII (HOWELL'S MONTIA, MOHO) YEARLY MONITORING

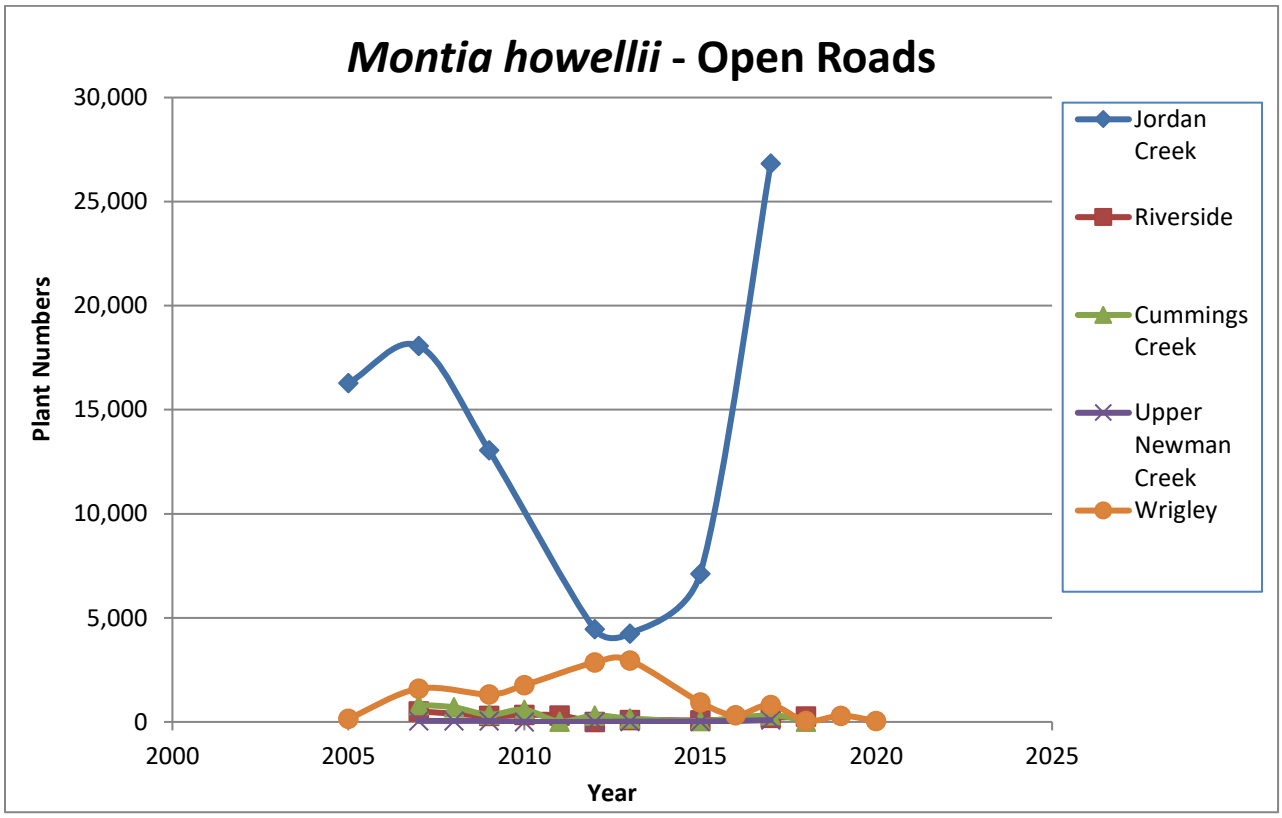
All Howell's montia sites are monitored on a five-year rotation (all known sites are visited and counted once every five years). Sites that have had roadwork or timber harvest in the previous year are generally included in the following year's monitoring to document the species response to the operational activity. General mitigation for the species includes seasonal road use and maintenance restrictions, although a sub-set of occurrences are located on the "Open Roads" which are described further below.

Winter Road Use (Open Roads)

Five roads that would ordinarily be blocked from heavy equipment traffic according to the property-wide mitigation agreement were left open during the 2004-2020 winter seasons. These roads are ones with deeded in-holding owner rights-of-way or are in areas where we are not able to restrict public access. We recorded plant numbers and mapped the locations of *Montia howellii* on one of these roads (Wrigley Road) in 2020. We will continue to examine these occupied road areas to follow trends in population numbers related to impacts of un-mitigated winter road use. All five are scheduled for a visit in 2021.

Population numbers at the "Open Road" sites have fluctuated, sometimes greatly, from year to year (

Figure 1. *Montia howellii* plant numbers (Open Roads)



Total plants at the mitigated sites (Table 10) revisited this year have decreased by 4,224 plants (-29.3%) since the last count. These are known sites that were re-visited in 2020 and do not include new occurrences found at locations that did not previously have recorded occurrences. As in the open roads the variety of values in both the plant numbers and percent change across these sites creates a large standard deviation and makes determination of significance and comparison between treatments difficult without additional analysis.

9, Figure 1).

The numbers at Wrigley Road have been in decline after an increase following some light grading and road maintenance that was conducted there in 2011. Plant numbers since that disturbance have varied and in 2019 plant numbers are up from the last count. Habitat at this site is gradually shrinking as the roadsides and landings fill in with grasses and shrubs, remaining plants are found on the edges of tire tracks from light seasonal use. This site is currently included in an open THP. Timber harvest and roadwork was largely completed during 2020. The site will be re-visited in 2021 for post-harvest assessment of changes in plant numbers and distribution.

Jordan Creek will be visited in 2021 but typically maintains high plant numbers due to traffic from contractors maintaining powerlines as well as occasional travel by HRC employees. A small amount of roadwork took place on portions of this road system in 2020. The 2021 visit will capture the results.

Riverside has fluctuated in plant numbers and spatial extent over the monitoring period, this site is used by neighbors and passersby as a route to the river bar and as a location for recreational vehicle use, often in the wet period during which Howell's montia is active. Suitable habitat is extensive at the site but only a small occupied area exists.

Cummings Creek populations have declined, presumably due to lack of use and roadwork on the occupied spur roads, which contain the bulk of the historic population in the drainage. The mainline road is well traveled but may be impacted too often throughout the year and has never held a large portion of the plant population there. Roadsides in this area are often dense with jubata grass or other competitive species leaving little habitat on roadsides outside of the vehicle tracks. This site will be visited in 2021 in preparation for a THP which may invigorate the population post-harvest.

Upper Newman Creek shows a strong increase in plant numbers from the baseline in 2005 but historically the site was much more spread out whereas now the plants are relegated to a single landing. This road is used to access a small inholding, but it is unclear if anyone has used the road in recent years. This site will be visited in 2021.

In all, the average change in plant numbers across "open road" sites show a decrease of 13.4% when comparing the latest plant counts with the baseline counts done in 2005 and 2007. Individually the sites have varied greatly.

- Wrigley Road – 66.4% decrease from baseline
- Jordan Creek – 64.7% increase from baseline
- Riverside – 48.3% decrease from baseline
- Cummings Creek – 98.5% decrease from baseline
- Upper Newman Creek – 81.6 increase from baseline

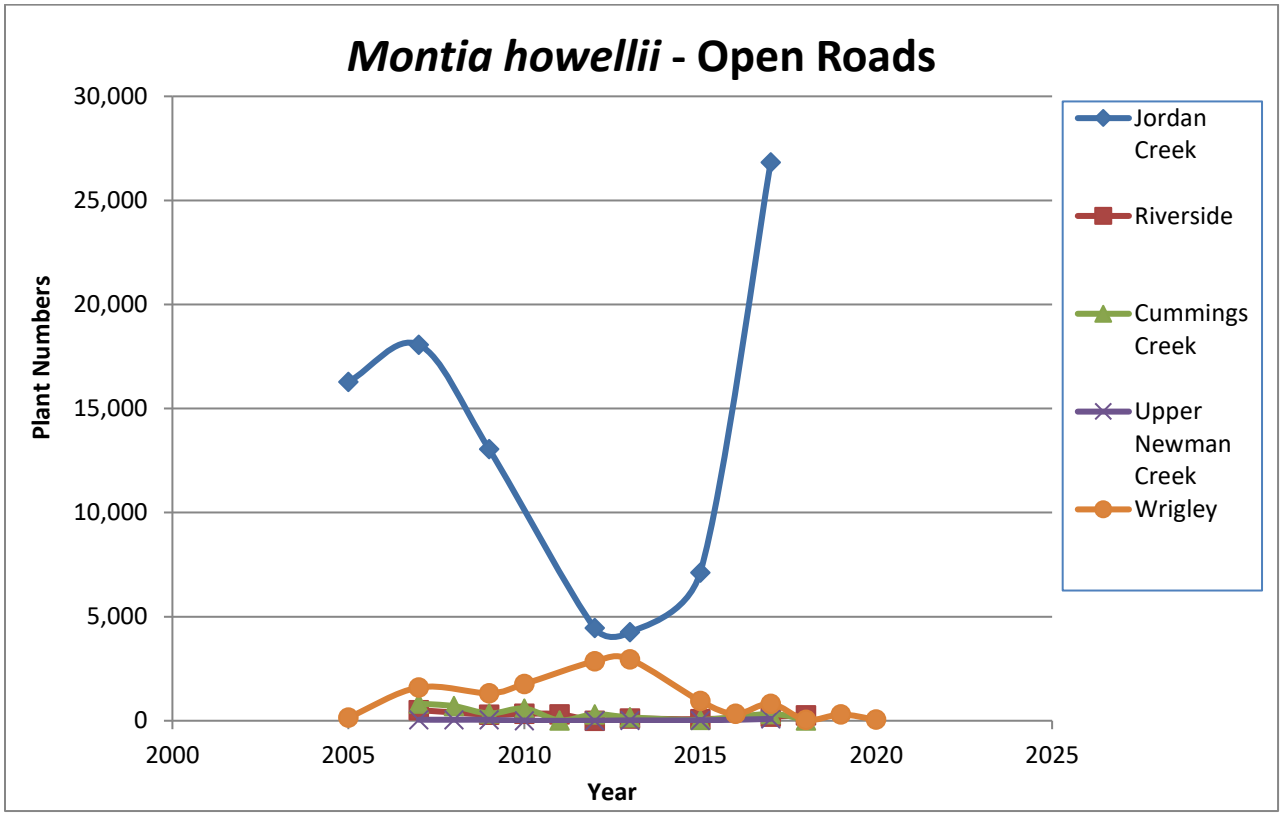
Table 8. *Montia howellii* plant numbers (Open Roads).

Location	Road	Occ IDs	2005	2007	2008	2009	2010	2011	2012	2013	2015	2016	2017	2018	2019	2020
Wrigley	U11	374, 563, 564	152	1,598		1,323	1,765		2,861	2,950	943	328	819	45	297	51
Jordan Creek	A51.19	351	16,284	18,066		13,047	†		4,456	4,250	7,119		26,825			
Riverside	L46	163		511		294	336	312	3	99	77		194	264		
Cummings Creek	L33	40		821	702	350	585	19	308	165	42		322	12		
Upper Newman Creek	C07.2327	82		49	47	47	1		0	17	17		89			

† Portions of this location were revisited coincidentally with other surveys and approximately 8,000 plants were observed.

The variety in both year-to-year plant counts within sites and therefore the change from baseline conditions between sites creates a large standard deviation in the mean of population changes (81.3%) making comparison of site and determination of significance of the change difficult to determine without additional data collection and deeper statistical analysis.

Figure 1. *Montia howellii* plant numbers (Open Roads)



Total plants at the mitigated sites (Table 10) revisited this year have decreased by 4,224 plants (-29.3%) since the last count. These are known sites that were re-visited in 2020 and do not include new occurrences found at locations that did not previously have recorded occurrences. As in the open roads the variety of values in both the plant numbers and percent change across these sites creates a large standard deviation and makes determination of significance and comparison between treatments difficult without additional analysis.

Table 9. *Montia howellii* plant numbers (Mitigated Sites).

Occurrence ID	Plant ID	Township	Range	Section	Previous Quantity	Previous Year	2020 Quantity	Change in Plant Numbers	Percent Change
14	MOHO	1S	2E	5	399	2016	156	-243	-60.9
84	MOHO	1N	1E	31	1	2016	2	1	100
90	MOHO	1S	3E	6	4140	2016	4315	175	4.2

Occurrence ID	Plant ID	Township	Range	Section	Previous Quantity	Previous Year	2020 Quantity	Change in Plant Numbers	Percent Change
144	MOHO	1N	1E	34	5931	2016	1596	-4335	-73.1
238	MOHO	2N	2E	32	7	2016	0	-7	-100
239	MOHO	2N	2E	33	0	2016	0	0	NA
296	MOHO	2N	2E	32	8	2016	0	-8	-100
312	MOHO	4N	2E	13	592	2016	542	-50	-8.4
352	MOHO	1S	2E	16	0	2017	60	60	NA
354	MOHO	1N	1W	25	0	2016	0	0	NA
536	MOHO	2S	1W	17	198	2016	90	-108	-54.5
553	MOHO	1S	2E	5	61	2016	7	-54	-88.5
554	MOHO	1S	2E	5	1	2016	39	38	3,800
844	MOHO	1S	2E	5	19	2016	160	141	742.1
845	MOHO	1S	2E	5	0	2016	0	0	NA
846	MOHO	1S	2E	5	0	2016	0	0	NA
847	MOHO	1S	2E	5	0	2016	0	0	NA
880	MOHO	1N	1E	34	10	2016	0	-10	-100
881	MOHO	1N	1E	34	800	2016	43	-757	-94.6
1135	MOHO	1N	1E	5	24	2016	0	-24	-100
1466	MOHO	2N	2E	33	0	2016	0	0	NA
1467	MOHO	2N	2E	33	0	2016	0	0	NA
1805	MOHO	1N	1E	26	303	2016	1,216	913	301.3
4160	MOHO	4N	1E	12	31	2019	17	-14	-45.2
4388	MOHO	4N	2E	23	9	2016	92	83	922.2
4743	MOHO	1S	2E	15	136	2018	245	109	80.1
5017	MOHO	3N	1E	24	1,750	2019	1,616	-134	-7.7
				Totals	**14,420**		**10,196**	**-4,224**	**-29.3**

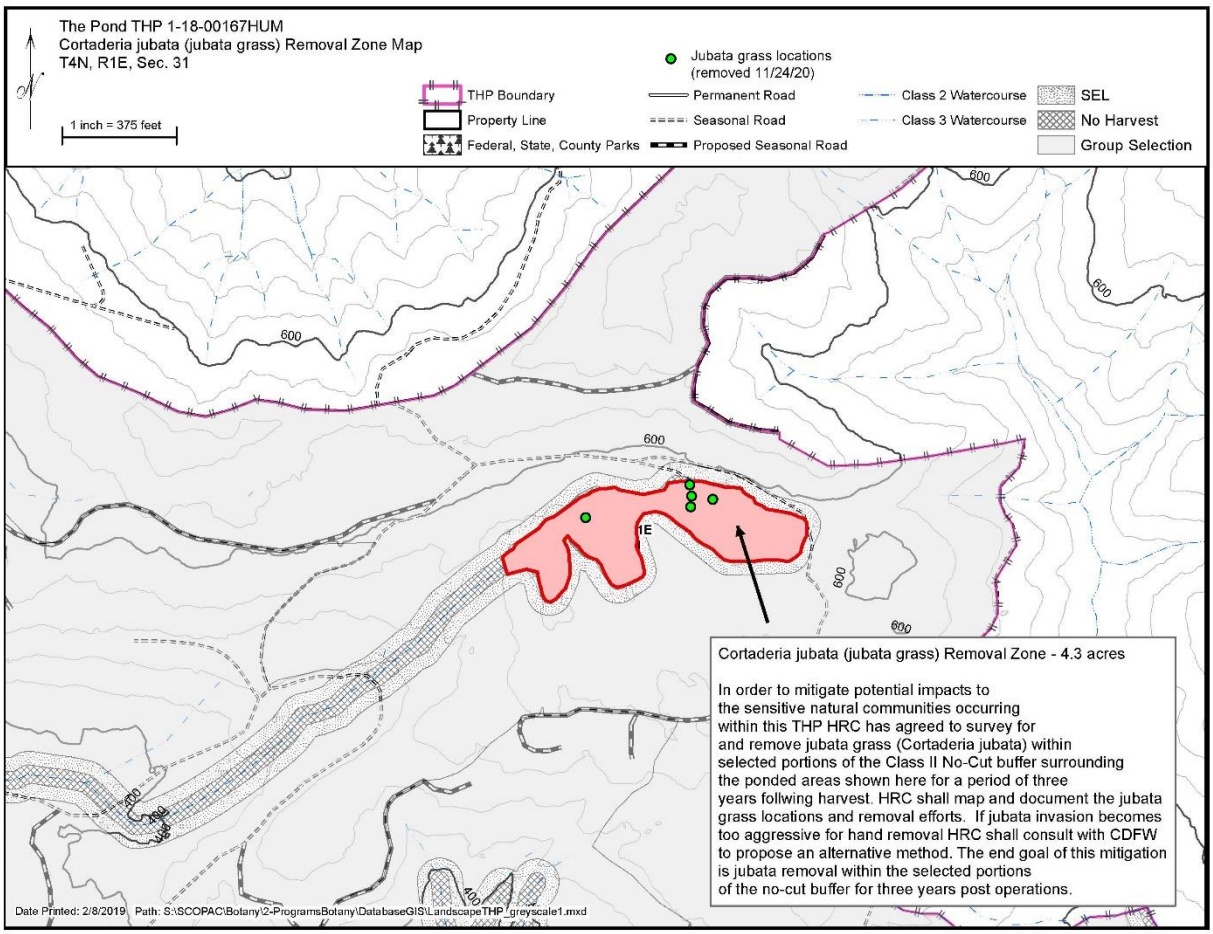
THE POND THP 1-18-00167HUM

The Pond THP is located in the Elk River watershed on a south facing slope between the South Fork Elk River and the North Fork Elk River just northwest of the Headwaters Preserve. Surveys for this harvest plan took place in 2017 and although no sensitive plant species were detected an example of a sensitive natural vegetation community in the form of a large

freshwater pond/swamp complex was located within the project area. This feature was classified as a Class II water and provided with appropriate buffers during harvest activities.

In addition to providing general watercourse protections to the feature HRC also agreed to monitor the site for the presence of the invasive plant species *Cortaderia jubata* (jubata grass) which is common to roadsides and disturbed areas in the watershed and can quickly colonize sites and outcompete native plants for space and resources. During consultation with CDFW, HRC agreed to survey for and hand remove all jubata grass present within the No-Cut buffer associated with the feature, an approximate 4.3-acre area (see Figure 2 below) for a three-year period following harvest. A survey was conducted in 2019 before harvest started and five separate locations of jubata grass infestation were located within the removal zone. Harvest was completed during the summer of 2020 and the site was again surveyed for jubata grass; plants were found in the same five locations as in 2019. A visit was conducted on 24 of November 2020 and jubata grass at all five sites (7 total plants) were dug up with hand tools and removed from the zone. The removal zone will be surveyed yearly for the next two years and all jubata grass found in the removal zone will be mapped and treated as agreed.

Figure 2. The Pond, Removal Zone, and Jubata grass locations



2020 COMPREHENSIVE REFERENCE LIST

Allen, G. and J. Antos. 1988. Morphological And Ecological Variation Across A Hybrid Zone Between *Erythronium oregonum* and *E. revolutum* (Liliaceae). Madroño, Vol. 35, No. 1, pp. 32-38.

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley.

[CDFG] California Department of Fish and Game. 2018. "Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities" State of California.

California Department of Fish and Game, California Natural Diversity Data Base (CNDDB). Rare Find Application, November 2016.

California Department of Fish and Game, Natural Diversity Database. October 2013. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. .

California Native Plant Society (CNPS). 2001. *Inventory of Rare and Endangered Plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA. x + 388pp.

CNPS, Rare Plant Program. 2016. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org

Coleman, Ronald A. 1995. The Wild Orchids of California. Comstock Publishing Associates a division of Cornell University Press. Ithaca, New York

Decker, W., B. Baxter, and G. McBride. 2002. A new location for the Humboldt milk-vetch (*Astragalus agnicidus*). California Forestry Note No. 116, California Department of Forestry and Fire Protection, Sacramento. 4 p.

Elzinga, C. L., Salzer, D. W., and Willoughby, J. W. 1998. Measuring and Monitoring Plant Populations. BLM Technical Reference 1730-1.

Green, Roger H. 1979. Sampling Design and Statistical Methods for Environmental Biologists. John Wiley & Sons, Inc. NY, NY.

Hickman, J.C., ed. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press. Berkeley, CA

Hickman, J. C., ed. 1996. *The Jepson Manual: Higher Plants of California*. University of California Press. Berkeley CA. 3rd printing with corrections.

Hiss, A., and A. Pickart. 1992. An update on the rediscovered Humboldt milk-vetch. *Fremontia*. 20: 21-22.

Hitchcock, C.L. and A. Cronquist. 1973. *Flora of the Pacific Northwest: An Illustrated Manual*. Seattle, Wash.: University of Washington Press. xix + 730 pp.

Hosmer, D. W. and S. Lemeshow. 1989. Applied logistic regression. John Wiley and Sons, New York, New York, 307pp.

Mandy Tu, Callie Hurd & John M. Randall. *Weed Control Methods Handbook: Tools & Techniques for Use in Natural Areas.* The Nature Conservancy Wildland Invasive Species Team version April 2001

Mueller-Dombois, Dieter, and Ellenberg, Heinz. 2002. *Aims and Methods of Vegetation Ecology*. The Blackburn Press. Caldwell, New Jersey.

Munz, P. A. and D. D. Keck. 1970. *A California Flora*. University of California Press. Berkeley, CA.

The Pacific Lumber Company. February 1999. Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation. Scotia, CA.

The Pacific Lumber Company. 2001. Literature Review and Analysis of Habitat Characteristics for Coast Fawn Lily (*Erythronium revolutum* Smith), Delineation of Potential Habitat on Lands Managed by the Pacific Lumber Company (PALCO). Document prepared for internal use, now under possession and control of HRC.

The Pacific Lumber Company. 2004. "Rare Plant Annual Report 2004". Report to comply with HCP requirements. (1 December 2004)

Pickart, A., A. E. Hiss, and A. W. Enberg. 1992. Return from extinction: recovery of the Humboldt milk-vetch, pp. 255-261. *In* H. M. Kerner [ed.], Proceedings of the symposium on biodiversity of northwestern California. Wildland Resources Center Report No. 29, University of California, Berkeley.

Renner, M.A., Leppig, G., Bigger, D., and Goldsworthy, E.S. 2009. "Implications of certain timberland management effects on Humboldt milk-vetch (*Astragalus agnicidus*) a state-endangered species." Poster presented at the California Native Plant Society Conservation Conference, Sacramento, CA. January 17-19, 2009.

Sawyer J.O. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation* California Native Plant Society. Sacramento, CA.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, CA. 1300 pp

Smith, G.L. and C.R. Wheeler. 1992. *A Flora of the Vascular Plants of Mendocino County, California*. University of San Francisco. San Francisco, CA.

Welch, James R., Miller, Karl V.,Palmer, Willam E., and Harrington, Timothy B. 2004. *Response of understory vegetation important to the northern bobwhite following imazapyr and mechanical treatments*. Wildlife Society Bulletin 2004, 32(4):1071-1076

USDA Plants Profile. On-line plant data base. http://plants.usda.gov. November 2016.