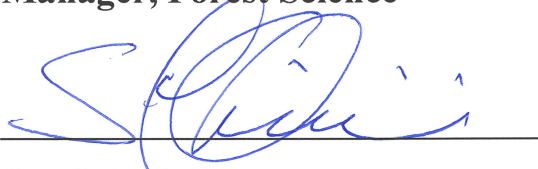

Rare Plants Annual Report
Humboldt Redwood Company LLC.

December 1, 2015



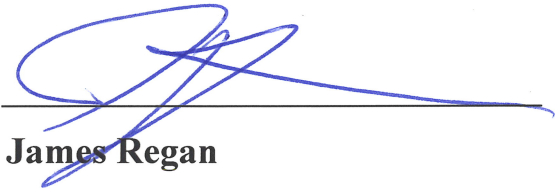
This report was prepared by the Botany staff of the Forest Science Department at Humboldt Redwood Company, LLC.

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EXECUTIVE SUMMARY

Humboldt Redwood Company, LLC (HRC) botanists, foresters, and contract foresters assessed and/or surveyed 22 projects in 2015 looking for the 26 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 2,270 acres, and 110 miles of roads, altogether totaling over 3,278 acres. This year on HRC property we found 11 new occurrences of five of our Special Status plant species, which represent 10 new populations, bringing the total number of rare plant populations on HRC land to 160. 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 24 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. Research projects, post-mitigation monitoring, and wetlands determinations for THP preparation made up the remainder of our activities.

Each Special Status plant species in this report is discussed fully in a separate section, along with reports of ongoing research if applicable. Maps of the individual species are provided in Appendix 5. Our Watch List species are presented in a brief format following the Special Status plant species discussions. 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 2015 and *Montia howellii* road surveys (MOHO Research) from 2005 to 2015. California Natural Diversity Data Base (CNDDDB) forms for the Special Status and Watch List species occurrences will be provided on CD to CNDDDB and are available to the HCP Wildlife Agencies on request.

We surveyed 10.5 miles of roads for *Montia howellii* in 2015. We documented plant locations and numbers for known sites, and discovered several newly occupied road segments adjacent to these existing seed sources. We also documented one new site on a road that had not been previously occupied. Five roads containing *Montia howellii* populations are exempt from the property-wide winter use restrictions which currently mitigate other known populations. All of

these “open” sites were visited in 2015. The results of monitoring efforts are presented in the Howell’s montia species section for review.

Proposed Changes for 2015

HRC will add *Chrysosplenium glechomifolium* (Pacific golden saxifrage) to our Watch List. This uncommon member of the saxifrage family has recently been added to the California Native Plant Societies’ (CNPS) inventory of rare and endangered plants as a California Rare Plant Rank (CRPR) 4.3. HRC is not required to conduct specific surveys for this species but will collect and distribute occurrence data if plants are found during surveys for priority plant species. Preferred habitat for this species includes streambanks and forested riparian areas. These habitats are generally afforded significant protection measures during timber harvest activities. A brief database search revealed that this species has been encountered on HRC property and was found during THP surveys in the Elk River and Freshwater watersheds. HRC plans to return to selected portions of those areas in 2016 in an attempt to locate and record these occurrences, if found.

INTRODUCTION

HRC employees, foresters, and forestry contractors conducted plant habitat assessments and seasonally appropriate floristic plant surveys in 2015 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 2015 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 CNDDDB 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 2015 field season.

Scientific Name/Common Name	Status	Presence on Ownership
<i>Astragalus agnicidus</i> Humboldt milk-vetch	G3, S3, CE, CRPR 1B.1	Yes
<i>Astragalus umbraticus</i> Bald mountain milk-vetch	G4, S2, CRPR 2B.3	Unknown
<i>Bensoniella oregona</i> bensoniella	G3, S2, CR, CRPR 1B.1	Unknown
<i>Carex arcta</i> northern clustered sedge	G5, S2, CRPR 2B.2	Yes
<i>Carex leptalea</i> flaccid sedge	G5, S1, CRPR 2B.2	Unknown
<i>Carex praticola</i> meadow sedge	G5, S2S3, CRPR 2B.2	Unknown
<i>Cornus Canadensis</i> bunchberry	G5, S2, CRPR 2B.2	Unknown
<i>Epilobium oreganum</i> Oregon fireweed	G2, S2, CRPR 1B.2	Unknown
<i>Erythronium oregonum</i> giant fawn lily	G5, S2, CRPR 2B.2	Presumed
<i>Erythronium revolutum</i> coast fawn lily	G4, S2S3, CRPR 2B.2	Yes
<i>Gilia capitata</i> ssp. pacifica Pacific gilia	G5T3T4, S2, CRPR 1B.2	Yes
<i>Glyceria grandis</i> American manna grass	G5, S2, CRPR 2B.3	Unknown
<i>Iliamna latibracteata</i> California globe mallow	G2G3, S2, CRPR 1B.2	Unknown
<i>Juncus supiniformis</i> hair-leaved rush	G5, S1, CRPR 2B.2	Unknown
<i>Kopsiopsis hookeri</i> small ground cone	G5, S1S2, CRPR 2B.3	Unknown
<i>Lilium occidentale</i> western lily	G1, S1, FE, CE, CRPR 1B.1	Unknown
<i>Moneses uniflora</i> woodnymph	G5, S3, CRPR 2B.2	Unknown
<i>Montia howellii</i> Howell's montia	G3G4, S3, CRPR 2B.2	Yes
<i>Noccaea fendleri</i> ssp. californicum Kneeland Prairie pennycress	G5?T1, S1, FE, CRPR 1B.1	Adjacent
<i>Packera bolanderi</i> var. bolanderi seacoast ragwort	G4T4, S2S3, CRPR 2B.2	Yes
<i>Piperia candida</i> white-flowered rein orchid	G3?, S2, CRPR 1B.2	Yes
<i>Polemonium carneum</i> royal sky pilot	G4, S1, CRPR 2B.2	Unknown
<i>Sanguisorba officinalis</i> great burnet	G5?, S2, CRPR 2B.2	Unknown
<i>Sidalcea malvaeflora</i> ssp. patula Siskiyou checkerbloom	G5T2, S2 CRPR 1B.2	Yes
<i>Sidalcea oregana</i> ssp. eximia coast checkerbloom	G5T1, S1, CRPR 1B.2	Unknown
<i>Sisyrinchium hitchcockii</i> Hitchcock's blue-eyed grass	G2, S1, CRPR 1B.1	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 4², Table 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 2015 field season.

Scientific Name/Common Name	Status	On HRC
<i>Astragalus rattanii</i> var. <i>rattanii</i> Rattan's milk-vetch	G4T3, S3.3, CRPR 4.3	
<i>Calamagrostis bolanderi</i> Bolander's reed grass	G3, S3.2, CRPR 4.2	
<i>Calamagrostis foliosa</i> leafy reed grass	G3, S3.2, CRPR 4.2	
<i>Carex buxbaumii</i> Buxbaum's sedge	G5, S3.2, CRPR 4.2	
<i>Castilleja ambigua</i> ssp. <i>ambigua</i> Johnny nip	G4T3T4, S3, CRPR 4.2	
<i>Collomia tracyi</i> Tracy's collomia	G3, S3.3, CRPR 4.3	
<i>Coptis laciniata</i> Oregon goldthread	G4, S3, CRPR 4.3	Yes
<i>Epilobium septentrionale</i> Humboldt County fuchsia	G3, S3.3, CRPR 4.3	
<i>Erigeron robustior</i> robust daisy	G3, S3.3, CRPR 4.3	
<i>Fritillaria purdyi</i> Purdy's fritillary	G3, S3.2, CRPR 4.3	
<i>Gilia (Navarretia) sinistra</i> ssp. <i>pinnatisecta</i> pinnate-leaved navarretia	G4G5T3, S3.3, CRPR 4.3	
<i>Hemizonia congesta</i> ssp. <i>tracyi</i> Tracy's tarplant	G5T3, S3.3, CRPR 4.3	
<i>Hosackia gracilis (Lotus formosissimus)</i> harlequin lotus	G4, S3.2, CRPR 4.2	Yes
<i>Iris longipetala</i> coast iris	G3, S3.2, CRPR 4.2	
<i>Lathyrus glandulosus</i> sticky pea	G3, S3.3, CRPR 4.3	Yes
<i>Leptosiphon (Linanthus) acicularis</i> bristly leptosiphon	G3, S3.2, CRPR 4.2	
<i>Lilium kelloggii</i> Kellogg's lily	G3, S3.3, CRPR 4.3	Yes
<i>Lilium rubescens</i> redwood lily	G3, S3.2, CRPR 4.2	Yes
<i>Lilium washingtonianum</i> ssp. <i>purpurascens</i> purple-flowered Washington lily	G4T4, S3.3, CRPR 4.3	
<i>Listera cordata</i> heart-leaved twayblade	G5, S3.2, CRPR 4.2	Yes
<i>Lycopodium clavatum</i> running-pine	G5, S3, CRPR 4.1	Yes
<i>Lycopus uniflorus</i> northern bugleweed	G5, S3.3, CRPR 4.3	
<i>Mitellastrum caulescens (Mitella caulescens)</i> leafy-stemmed mitrewort	G5, S4.2, CRPR 4.2	Yes
<i>Piperia michaelii</i> Michael's rein orchid	G3, S3.2, CRPR 4.2	
<i>Pityopus californicus</i> California pinefoot	G4G5, S3.2, CRPR 4.2	Yes
<i>Platanthera stricta</i> slender bog-orchid	G5, S3.2?, CRPR 4.2	
<i>Pleuropogon refractus</i> nodding semaphore grass	G4, S3.2?, CRPR 4.2	Yes
<i>Ribes laxiflorum</i> trailing black currant	G5, S3.3, CRPR 4.3	Yes
<i>Ribes roezlii</i> var. <i>amictum</i> hoary gooseberry	G3G4T3, S3.3, CRPR 4.3	Yes
<i>Sidalcea malachroides</i> maple-leaved checkerbloom	G3G4, S3S4.2, CRPR 4.2	Yes
<i>Usnea longissima</i> Long-beard lichen	G4, S4, CRPR 4.2	Yes
<i>Wyethia longicaulis</i> Humboldt County wyethia	G3, S3.3, CRPR 4.3	

² CRPR 4: Plants of limited distribution, a watch list.

We report these occurrences to CNDDDB at the end of each year along with the new and updated occurrences of our Special Status plants. Our purpose in reporting CRPR 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). The primary vegetation types on the ownership, called “series” by Sawyer and Keeler-Wolf (1995), are Redwood, Douglas-fir, Douglas-fir/Tan oak, Tan oak, Mixed oak, and Mixed conifer. There are also smaller areas of several different grassland, riparian and wetland vegetation series.

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” (CDFG 2009). 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 needs 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 2015 at any particular site are described in the individual species sections.

EFFECTIVENESS MONITORING METHODS

Mitigation measures are based on reasonable assumptions about the impacts of operations and the environmental needs of the species, and are put in place prior to THP operations.

Effectiveness monitoring consists of one or more post-impact visits to determine if the mitigation measures were effective in reducing impacts to less than significant levels. Appendix 3 provides a historical summary of the events which triggered these THP-specific monitoring visits. The monitoring methods used depend on the circumstances of the species at each location, and are described in the individual species sections. THP-specific survey and monitoring of *Montia howellii* was suspended in 2003 in favor of a property-wide mitigation and monitoring agreement (see Appendix 4).

RESEARCH METHODS

Research methods and procedures are detailed in the research plans on file in HRC's Botany Office and described briefly in the appropriate species chapters in this report.

DATA MANAGEMENT AND ANALYSIS METHODS

HRC botany staff collect data during a variety of activities (e.g. plant surveys, plant monitoring, habitat assessments, research projects, and species site evaluations). This data is then stored in two interconnected systems, a Microsoft Office Access relational database and ESRI ArcGIS coverage. During the planning and operations of activities on the HRC ownership we can query this information to determine if surveys have been conducted, when surveys were conducted, and whether or not populations of Special Status (CRPR 1 and 2) or Watch List (CRPR 4) plants were found within a given area.

All species presented in this report have been analyzed based on data from both storage systems. We present data generated from ArcGIS and the Access database in tables provided within the text or in an appendix, as well as on the accompanying maps.

Beginning in 2005 we expanded our baseline data gathering effort to include ecological data at plant occurrence locations, and in 2006 we began documenting CRPR 4 plants in the same way as Special Status plants. In 2010 we began recording more detailed descriptions of survey coverage in ArcGIS, which now include lines and polygons attributed with the surveyor, survey area, and dates of the survey. The use of handheld GPS recorders to track survey routes has been

instrumental in streamlining this process. These changes give us the ability to more accurately report our day-to-day and month-to-month survey efforts.

Most data is stored and managed in the Access database and linked to its associated activity (e.g. rock pit, THP, or road building project). The spatial data stored in ArcGIS coverage allows for analysis based upon additional parameters. This data is stored in the form of points that represent an individual plant or a plant population location, polygons that represent survey coverage, and linear data that represents survey routes and road survey coverage.

During analyses for surveys and research we process data utilizing both point and polygon data. We can conduct analyses utilizing point data against other parameters to describe location proximity. For example, we can analyze a specific plant site or group of sites against parameters such as watercourses (e.g. type, length and frequency), timber harvest restriction areas (e.g. no-cuts, selective entry bands [SEBs], and silviculture prescription type), or locations of other Special Status plant sites, in order to better understand and manage these populations.

Prior to 2013, total plant numbers for each species were kept in a Microsoft Office Excel spreadsheet and were essentially a summation of occurrences discovered each year added to the totals from the previous years' surveys. If a particular plant site was revisited for monitoring or research purposes that data was kept in separate files for that particular project. Results of research and monitoring were presented in our Annual Reports but the results were seldom used to adequately correct total plant numbers in the Access database.

For the past several seasons HRC staff have been keeping records of all site revisits, not just those associated with a research or monitoring project. We now treat all revisits just as we do new occurrences and store the data in our Access database. Therefore, the total plant counts reported from 2013 forward are calculated with a database query that sums the plant numbers from each occurrence of a species. When an occurrence has a record of a revisit the query uses the *latest plant count for that occurrence* in the calculation, essentially replacing the original count with the revisit count.

In most cases this system works very well. Problems arise when plant occurrence numbers are linked to many points in the GIS system; this happens when large, widely spread plant groups or

populations are recorded as one occurrence number. In an attempt to show the spatial extent of these large occurrences, maps were populated with many points of the same occurrence number. In the database, the occurrence is one record; in GIS and in the field this occurrence may consist of many distinct groups of plants. When the occurrence is revisited it is unlikely that the entire occurrence is re-counted, but nonetheless the counts actually obtained are recorded in the database. This creates a problem when the new query is run, because the new “partial” count revisit recorded in the database will replace the original count for the whole occurrence, potentially creating a false downward trend for that occurrence.

Moving forward we will, to the extent feasible, revisit entire occurrences during follow-up surveys, and when creating new points in GIS we will divide large groups of plants into multiple occurrences so that revisits for monitoring will be more easily recorded and more accurately reported.

This year HRC has joined our data systems with Mendocino Redwood Company (MRC) and going forward will be keeping all botanical data gathered during surveys from both companies in the same database and GIS system. Additionally, both companies are working to support an online webGIS system for fast and easy viewing of occurrence data without the need for desktop GIS software.

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 CNDDDB meaning of “occurrence.”

RESULTS

SURVEY RESULTS

We assessed and/or surveyed 22 projects for Special Status plants in 2015, covering a total of approximately 3,278 acres; including 110 miles of roads (this includes 10.5 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 or wildlife monitoring activities.

We located 11 new occurrences totaling approximately 1,068 plants of five of the species on our Special Status Plant List and 24 occurrences of nine of the species on our Watch List during the 2015 survey season (Appendix 2: 2014 Plant Detections, Appendix 5: Rare Plant Detections and Rare Plant Road Surveys maps, and Table 4 below).

Table 3. 2015 Assessed/surveyed acres by month.

Year	Month	Unit Survey Acres	Road Survey Acres	Total Acres
2014	December		25	25
2015	January		12	12
2015	March	152	110	262
2015	April	492	126	618
2015	May	511	108	619
2015	June	405	60	465
2015	July	573	55	628
2015	August	587	32	619
2015	November		5	5
Total 2015 Survey Acres		2,720	533	3,253
2015	Howell's montia Surveys			25
Total 2015 Survey/Assessment Acres				3,278*

*This value is generated in ArcGIS by creating polygons from survey route data. Total 2015 project acres from database records are approximately 4,459. 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. Summary of 2015 Special Status Plant detections and property-wide totals.

Species	2015 occurrences	New populations	Total populations ³	# new plants*	Total plants**
<i>Astragalus agnicidus</i>	0	0	2	0	7,667
<i>Carex arcta</i>	0	0	3	0	55
<i>Erythronium revolutum/oregonum</i>	1	1	28	36	6,685
<i>Gilia capitata ssp. pacifica</i>	1	1	21	408	14,490
<i>Montia howellii</i>	1	2	40	2	32,570
<i>Packera bolanderi</i> var. <i>bolanderi</i>	2	0	36	40	6,966
<i>Piperia candida</i>	6	6	21	582	1,726
<i>Sidalcea malvaeflora ssp. patula</i>	0	0	9	0	2,663
Totals	11	10	160	1,068	72,822

*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.

The CNDDDB 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 CNDDDB office no later than the last week of December 2015.

In 2015 we also revisited known Special Status plant locations either for monitoring, or for new THP layout. These revisits are documented in each species chapter and also in Appendix 7 at the end of this report. All revisited sites have been documented on a CNDDDB report form and will be sent along with the new occurrence reports by the end of December 2015.

EFFECTIVENESS MONITORING RESULTS

HRC conducts voluntary 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

³ Populations are defined as groups of the species separated by at least a quarter-mile from other such known groups, equivalent to CNDDDB definition of “occurrence”.

visits. Results from effectiveness monitoring visits are included in the appropriate individual species sections.

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 will add *Chrysosplenium glechomifolium* (Pacific golden saxifrage) to our Watch List. This uncommon member of the saxifrage family has recently been added to the CNPS inventory of rare and endangered plants as a CRPR 4.3. HRC is not required to conduct specific surveys for this species but will collect and distribute occurrence data if plants are found during surveys for priority plants.

***ASTRAGALUS AGNICIDUS* (HUMBOLDT MILK-VETCH)**

INTRODUCTION AND SUMMARY

Astragalus agnicidus Barneby is a coarse leafy perennial herb of the Fabaceae (pea family) which blooms in the summer to early fall. The geographical distribution of this species in California includes the outer North Coast ranges in Mendocino and Humboldt counties (Hickman 1993). It ranges in elevation from 180 to over 800 meters (635 to 2,624 feet, CNPS 2014 and HRC data). It is known from several locations in Mendocino County but from only two watersheds in Humboldt County; the populations on HRC land are by far the larger of the two counties (CNDDDB RareFind, November 2014).

The 2 populations on HRC property are the most northerly occurrences known of this California endangered species. These populations are very close to each other in the Larabee Creek drainage, and may actually be part of a single population. When future disturbance occurs to adjacent areas containing a seed bank, new groups of plants may fill in the gaps and we may find that the spatial distinction between these existing populations disappears.

Humboldt milk-vetch is a California State Endangered Species, ranked G3⁴, S3⁵, and is a CRPR 1B.1⁶.

It is described as occupying disturbed areas in the broadleaved upland forest and North Coast coniferous forest (CNPS 2014, Baldwin 2012)) and open soil in woodland (Baldwin 2012). On HRC land it is typically found in mixed North Coast coniferous forest with a tanoak component on recently disturbed sites.

Surveys for Humboldt milk-vetch began in 1999, and the species was first located during the 2000 floristic season. All locations on HRC property are included on the map in Appendix 5.

⁴ G3: Vulnerable-At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

⁵ S3: Vulnerable-Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

⁶ CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere.

METHODS

Survey Methods

We conduct surveys for Humboldt milk-vetch in THP units and along roads in suitable habitats on the portions of the property where a mixed evergreen forest with redwood, Douglas-fir and tanoak predominates.

Mitigation Methods

HRC and CDFW have agreed to a property-wide mitigation (25 foot equipment exclusion zone) for known roadside occurrences of *Astragalus agnicidus*, documented in a letter from CDFG to PALCO dated February 7, 2005 (Appendix 4). Occurrences that are not located on a roadside are currently mitigated on a site-specific basis through consultation with CDFW.

RESULTS

Survey and Mitigation Results

We found no new occurrences of Humboldt milk-vetch this year. To date there are two populations of *Astragalus agnicidus* on property managed by HRC with roughly 7,667 total individual plants (Table 4).

Effectiveness Monitoring Results

This year we did not revisit any *Astragalus agnicidus* sites for effectiveness monitoring. HRC botany staff will be revisiting several occurrences during monitoring of the PBL THP 1-14-149HUM during the next several years. The mitigation plan in the THP calls for effectiveness monitoring visits for at least three years after completion of harvest or roadwork. HRC plans to conduct timber harvest operations within this THP in 2016 and completed a small amount of the planned roadwork in 2015. A visit for refreshing mitigation buffers and to record post roadwork plant numbers will be done in 2016 with additional visits to follow in 2017, 2018, and 2019.

DISCUSSION

Astragalus agnicidus is a short-lived perennial (Pickart et al. 1992) endemic to mixed evergreen forests in Humboldt and Mendocino counties, California. We speculate that the population exists

largely as seeds which can remain dormant for decades (Bencie 1997; Decker et al. 2002; Pickart et al. 1992). We have observed that these seeds can rapidly populate an area with new plants following disturbance which removes overlying vegetation and exposes mineral soil.

Management of this species may need to include periodic disturbance of the soil to allow new plants to replenish the seed bank (Hiss and Pickart 1992). To avoid impacting the flush of young plants that emerge after harvest, reforestation activities should be conducted the same year as harvest (Renner et al, 2009).

All known populations occur on lands managed for timber harvesting. The results of the 5-year study completed in 2008 (Renner et al, 2009) at the Larabee South site, the “George” THP, and other THP-specific effectiveness monitoring projects strongly suggest that populations of *Astragalus agnicidus* cannot be sustained long term without mineral soil disturbance. Even with adequate protection during operations plant numbers tend to decline as competing shrub and herbaceous plant species fill in the understory and overstory tree canopy shading increases. Regardless of whether the plants are managed with no-impact protection, minor impacts from canopy removal, or are fully impacted by operations, and regardless of the type of reforestation activities, whether pile burning alone, pile burning and herbicides, or no site prep at all, plant numbers declined sharply unless maintained by continued disturbance (Renner et al, 2009). We have noted in all our monitoring efforts that *Astragalus* seedlings are robust and prolific in areas that contained a burn pile from the previous harvest. We therefore theorize that a closely monitored prescribed burn may be the best alternative to herbicides or mechanical site manipulation for the maintenance of this species.

Harvest methodologies, including selection, group selection, and variable retention will not likely change this pattern. Group selection and variable retention allow for larger openings and more soil disturbance than single tree selection and could allow more *Astragalus* plants to germinate and/or spread, with the potential outcome of a higher volume of viable seed in the replenished seed bank. Additionally, selection harvest methodologies generally call for larger THPs with more roads and skid trails (in ground-based yarding units), again allowing for more soil disturbance, canopy reduction, and potentially more suitable habitat for the germination of *Astragalus* plants. Current management practices are to slash-pack skid trails after operations to

protect soils from erosion and loss of fertility. Deep slash packing may diminish *Astragalus* germination, but at this time the effects of slash-packing are unknown.

Plant number estimates for populations on HRC property (Table 4) are now calculated from occurrence and revisit data contained in our Access database. Most *Astragalus* on HRC property are recorded in GIS as widely scattered points with the same occurrence ID, and during revisits the entire occurrence was generally not re-counted. The database query for total plant numbers does not allow for a partial re-count but replaces the plant numbers for the entire occurrence with the partial count. Going forward, HRC will make changes to our record keeping improving the quality and reliability of this calculation. By making efforts to revisit and count plants at all mapped points associated with a particular occurrence ID, the new query will accurately update plant numbers for the entire occurrence. When new occurrences are detected HRC will break them into logical spatial groups and give each group a unique occurrence ID, allowing each to be revisited, re-counted, updated and reported individually. We plan on conducting an inventory survey of all *Astragalus* occurrences over the next several seasons in an effort to update all occurrences and establish an accurate total plant count for the property. This inventory survey will also aid in re-mapping and verifying activity of these occurrences.

The current property-wide mitigation agreement covers only known roadside occurrences. We believe that the best management for this species is to avoid existing plants when possible, but to allow silviculture techniques which expose mineral soil in order to facilitate germination of seeds stored in the seed bank. Herbicide use should be avoided where plants are present.

CAREX ARCTA (NORTHERN CLUSTERED SEDGE)

INTRODUCTION AND SUMMARY

Carex arcta Boott is a mid- to late-summer (June-August) blooming member of the Cyperaceae (Sedge family). The geographical distribution of this species in California is centered in Mendocino, Humboldt, and Del Norte counties (Mason 1957). This species also extends north to British Columbia and east to the Atlantic coast (Munz and Keck 1970).

Its preferred habitats are wetlands, swamps, sphagnum bogs and marshes from sea-level to elevations of around 1,400 meters (4,600 feet), usually associated with Douglas-fir and North Coast coniferous forests and woodlands (Munz and Keck 1970, Mason 1957, Hickman 1993, Baldwin 2012, CNPS 2014). On HRC land it is typically found in Redwood forest, Douglas-fir forest or woodland (sometimes with a hardwood component) in areas of periodic inundation and typical wetland characteristics, such as marshes or ponds.

Northern clustered sedge is ranked G5⁷, S2⁸, and is a CRPR 2B.2⁹.

Surveys for this species began in 2002, and it was first located during the same floristic season. No new occurrences were located this year. All locations on HRC property are included on the maps in Appendix 5.

METHODS

Survey Methods

From June until August, we conduct surveys for northern clustered sedge where suitable wetland habitats exist on the property. Outside of the appropriate floristic season, we assess project areas for suitable habitat characteristics and if present, we delineate the habitat and complete seasonal surveys prior to any operations in that area.

⁷ G5: Secure- Common; widespread and abundant

⁸ S2: Imperiled-Imperiled in the state because of rarity due to the very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

⁹ CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

Mitigation Methods

A mitigation that we used in the past to protect this species from potential adverse impacts consisted of a 50-foot no-cut equipment exclusion zone (ELZ) placed around the population (1 site). *Carex arcta* sites are generally contained in Class II wetlands which already receive protection under the California Forest Practice Rules and HRC's HCP watercourse prescriptions. These measures provide adequate protection for *Carex arcta* without the need for additional mitigation.

RESULTS

Survey and Mitigation Results

We did not find any new occurrences of northern clustered sedge this year. There are currently three populations of *Carex arcta* on HRC managed lands with a total of 55 individual plants (Table 4).

Effectiveness Monitoring Results

We did not re-visit any sites for effectiveness monitoring in 2015. HRC plans on visiting all three of our known locations during the 2016 floristic season.

DISCUSSION

The habitat for this species in bogs and wetlands is already excluded from management and harvest activities. Surveyors examine areas 50 feet into the large buffers protecting wetland habitat and seldom enter the wetland itself. This is one possible reason for the low number of detections on HRC lands. If more is to be learned about the presence of this species, specific surveys of suitable habitats would have to be done outside of the normal THP surveys.

***ERYTHRONIUM REVOLUTUM* (COAST FAWN LILY)**

INTRODUCTION AND SUMMARY

Erythronium revolutum Smith is a small pink-flowered bulbiferous member of the Liliaceae (lily family) which blooms in the spring. The geographical distribution of this species in California encompasses Sonoma, Mendocino, Humboldt, Del Norte, Trinity, Tehama, and Siskiyou counties (CNPS 2014), from near sea level to over 1,600 meters (5,249 feet). It also occurs in western Oregon, Washington and southern British Columbia (Hitchcock 1973).

Its preferred habitats are moist Douglas-fir and mixed evergreen forests and woodlands, and it can be found along stream banks and other obviously wet or moist locations as well as places that are well shaded but not otherwise distinctly moist. On HRC land it is typically found in Douglas-fir forest or woodland with a hardwood component on northerly-facing slopes in shade.

Coast fawn lily is ranked G5¹⁰, S2S3¹¹, and is a CRPR 2B.2¹².

Surveys for this species began in 2001, and it was first located during the 2002 floristic season. By the end of the 2005 season, we reported 29 populations; however, during a GIS quality control exercise, we found that several of these occurrences and populations were not on HRC land but had been previously included in our Access and GIS databases. In addition, properties sold in 2006 contained three populations. During the 2007 flowering season we re-visited several *Erythronium* populations that were originally reported as *Erythronium revolutum* based on plants found while in vegetative condition, in order to verify the identification. We determined that four occurrences were actually *E. californicum* and we corrected our database accordingly. We also found that some populations had white-flowered plants. In 2008 we conducted a research project to determine if white flowered forms of *E. revolutum* were in fact *E. Oregonum*, a white-flowered species more common in Oregon and Washington. We were unable to reach a

¹⁰ G5: Secure- Common; widespread and abundant

¹¹ S2S3: Imperiled-Vulnerable: Imperiled in the state because of rarity due to the very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province. Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

¹² CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

definitive conclusion and until such time as we are sure of the taxonomy, we will continue to record and report both white and pink forms as *E. revolutum*.

We are continuing the research project examining the effect on *E. revolutum* of hack-and-squirt (“frilling”) herbicide treatment applied to hardwood overstory trees at a population near Kneeland, CA. Experimental treatments were initiated in 2007 and we will be monitoring the permanent plots every other year for at least 10 years post treatment.

There are currently 28 known populations of *Erythronium* on HRC property with approximately 6,685 individual plants (Table 4)

All locations of *E. revolutum* (including potential *E. oregonum*) on HRC property are shown on the maps in Appendix 5.

METHODS

Survey Methods

In late March through mid-May, we conduct surveys for coast fawn lily in suitable habitats of the portions of the property where Douglas-fir and tanoak predominate.

Mitigation Methods

HRC and CDFW have agreed that the property-wide consultation and mitigation (50 foot no-cut and equipment limitation zone) for *Erythronium revolutum*, documented in a letter from CDFG to PALCO dated February 27, 2006 will remain in effect (Appendix 4). We are currently treating all *E. revolutum*-like plants, regardless of flower color, as *E. revolutum* for mitigation purposes.

Research Methods: Erythronium revolutum Response to Herbicide Application

Beginning in 2003, portions of the *E. revolutum* population in the Kneeland area found during surveys for the Moore’s THP 1-01-359HUM have been the focus of research aimed at better understanding this species’ response to timber harvest practices. We are collecting data to assess the effects to *E. revolutum* of hardwood over-story removal by “frilling” (direct application of herbicide to the cambium layer). We established permanent research plots and collected several years of baseline data before the first herbicide application. We began the first round of application to a portion of the management plots in the fall of 2007, and completed the

treatments in November 2008. We notified CDFW prior to these applications. Research protocols and maps are available upon request.

RESULTS

Survey and Mitigation Results

We located one new occurrence of *Erythronium revolutum* during the 2015 season (Table 5). All known populations are in Douglas-fir-and-hardwood dominated habitats. The largest occurrences found to date on HRC property are in the Kneeland area, discovered in 2002.

Table 5. *Erythronium revolutum* locations, numbers, and mitigations

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
4091	West Nelson	1S	1E	17	36	50' No Cut-ELZ

Effectiveness Monitoring Results

We did not revisit any *Erythronium* sites this year during seasonal THP surveys.

Research Results: Erythronium revolutum Response to Herbicide Application

Another round of data collection was completed for this project in 2015. This project requires additional visits for data collection. Results will be presented once data collection and appropriate analyses are complete.

DISCUSSION

We continue to find *Erythronium* in the predicted habitat type of mixed conifer and hardwood with rocky, well drained, soils either in shady sites or adjacent to watercourses. Based on the limited results of post-impact monitoring, it appears that this species can tolerate some level of disturbance, but maintaining shaded conditions, and avoiding direct mechanical impact to individual plants is important.

We have not resolved the taxonomic confusion between *E. revolutum* and *E. oregonum* resulting from the white and pink color forms co-mingling in the same population, first-discussed in the 2008 Rare Plant Report. Until we are able to consult with a taxonomist familiar with the species, we will consider the data analysis to be “on hold.”

GILIA CAPITATA SSP. PACIFICA (PACIFIC GILIA)

INTRODUCTION AND SUMMARY

Gilia capitata Sims ssp. *pacifica* V. E. Grant is an annual herb in the Polemoniaceae (Phlox family). The tiny blue-violet flowers, present from April to August, are clustered into heads atop a 25-50 cm stem, with cauline and basal leaves that are twice-pinnate. Pacific gilia habitat is coastal bluffs and prairies up to 1330 meters (4,364 feet) according to CNPS (2014). The second edition of the Jepson Manual (Baldwin 2012) notes that the subspecies usually occurs at less than 400 meters (1,312 feet). Our highest occurrence is at approximately 896 meters (2,940 feet).

Pacific gilia occurs in Mendocino, Humboldt, and Del Norte counties in California, and extends into Oregon (CNPS 2014, Hickman 1993).

Pacific gilia is ranked G5T3T4¹³, S2¹⁴, and is a CRPR 1B.2¹⁵.

Surveys for Pacific gilia began in 2001 and it was detected on the property the following year. All locations on HRC property are included on the map in Appendix 5.

METHODS

Survey methods

Prior to field surveys we utilize aerial photographs to delineate possible Pacific gilia habitat (prairies) within and adjacent to proposed THP units. We conduct field surveys during the floristic season, May through August.

Mitigation methods

Currently, our mitigation for Pacific gilia consists of avoidance. We place an equipment limitation zone (ELZ) around the population so that direct impacts to plants are minimized while allowing use of existing roads which pass through the ELZ. ELZ buffers vary in size depending

¹³ G5T3T4: G rank refers to the species as a whole; T rank refers to the subspecies rank. At this time Pacific gilia is ranked between T3T4. T3: Vulnerable- At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. T4: Apparently secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors.

¹⁴ S2: Imperiled-Imperiled in the state because of rarity due to the very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province. There is still some uncertainty to this ranking.

¹⁵ CRPR 1B.2: Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in CA.

on the nature of the harvest methods and proximity to the Pacific gilia site. In most cases, Pacific gilia sites are easily avoided as the habitat type occurs in areas that are usually not incorporated into a harvesting plan. Potential impacts from road construction are avoided when feasible by altering road placement or use. Pacific gilia sites on HRC land seem to persist in their pre-harvest numbers after operations have ceased, although this information is anecdotal from a few locations and re-counts have not been conducted on most of the known sites.

RESULTS

Survey and Mitigation Results

We found one new occurrence of *Gilia capitata* ssp. *pacifica* during the 2015 survey season (Table 6). We did not re-visit any known occurrences of Pacific gilia this year. There are currently 21 known populations of Pacific gilia on HRC property with approximately 14,490 individual plants.

Table 6. 2015 *Gilia capitata* ssp. *pacifica* locations, numbers, and mitigations.

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
4098	West Nelson	1S	1E	20	408	None – No Ops Area

Effectiveness Monitoring Results

We did not re-visit any Pacific gilia sites for effectiveness monitoring during the 2015 season.

DISCUSSION

We have found Pacific gilia on HRC property in expected habitat types, such as prairies in the coastal mountains. Aerial photos continue to be a valuable tool for predicting potential habitat in the field.

***MONTIA HOWELLII* (HOWELL'S MONTIA)**

INTRODUCTION AND SUMMARY

Montia howellii S. Watson is a tiny winter-growing annual recently placed in the family Montiaceae (miner's lettuce family). Germinating when the cold rains arrive in late fall, it grows through the early spring, flowers from March to May, then sets seed and quickly disappears. The current geographical distribution of this species in California is Humboldt County and the very western edge of Trinity County (CNPS 2014). It also occurs in western Oregon, Washington and southern British Columbia (CNPS 2014, Hitchcock 1973). It has been reported from near sea level to about 835 meters (2,740 feet, CNPS 2013).

Its preferred habitats are vernal wet, compacted soils (Hickman 1993, Baldwin 2012), meadows and seeps, vernal pools, and vernal mesic areas in the North Coast coniferous forest (CNPS 2014). On HRC land, it is found on roads, roadsides, skid trails, turnouts, landings, grazed meadows, and other areas where compacted soils maintain a vernal wet area and competing vegetation is minimal during its growing season. It is always associated with disturbance.

Howell's montia is ranked G3G4¹⁶, S3¹⁷, and is a CRPR 2B.2¹⁸.

Surveys for this species began in 1999 and it was found that same year. Population counts shown in Table 4 are from "active" sites; places where plants have not been located for several successive years are not included.

The spread of plants from known populations has generally resulted in our total population count decreasing, as previously separate "populations" have merged. In the case of newly occupied road sections that we found this year, most were likely the result of spread from nearby established populations, or seed banks; therefore we recorded them as part of previously documented occurrences. However, this year we found one new occurrence on a road that we

¹⁶G3G4: Judged to be between G3 and G4; G3: Vulnerable- At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. ; G4: Apparently secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors.

¹⁷S3: Vulnerable- Vulnerable in the state due to a restricted range, relatively few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

¹⁸CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

had previously thought was unoccupied and is not located adjacent to a known occupied road section.

All active locations on HRC property are presented on the maps in Appendix 5. Inactive sites are not mapped here or used in population totals but are still maintained in our GIS mapping and given the same mitigation as active sites during roadwork and harvest operations in the hope that any latent seed sources left onsite will be properly protected should they sprout and again become active occurrences.

On 23 May 2003 a property-wide mitigation and monitoring agreement went into effect. At that time all THP-specific monitoring efforts ended. All monitoring conducted through 2004 was described in the HRC “Rare Plant Annual Report 2004.” A research project begun in 2005 replaced surveys and monitoring for this species. In summary, the project results indicate that maintaining populations of this species can be compatible with active forest management. Where ongoing disturbance to populations from summer road maintenance and use occurs, conditions favorable to Howell’s montia have been preserved. As part of our Howell’s montia management strategy, we avoid heavy road rocking, excavation, and deep grading where plants are known to occur, since these activities can alter the microsite conditions or bury the seed bank. The research paper was included in the 2011 Rare Plants Annual Report and is available upon request.

Beginning in 2008 we have documented all of our revisits to known occupied sites, not just those sites included in the ongoing research project. All revisited occurrences are listed in Table 9 and in Appendix 7.

METHODS

Mitigation methods

HRC and CDFW have agreed that the property-wide consultation and mitigation for *Montia howellii*, documented in a letter from CDFG to PALCO dated February 27, 2006, will continue in effect. This consultation, which restricts road use by heavy equipment in the winter and grading in the summer, was amended by agreement on March 17, 2010 to change the seasonal effective dates of the mitigation measures from January 1 through May 31 to December 1 through May 1. The revised property-wide mitigation was incorporated into all THPs going

forward and the date has been changed on all rare plant caution signs along occupied roads. Copies of this and all property-wide consultations are available in Appendix 4.

Research Methods

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 2004-2015 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 all five of these roads in 2015 (Riverside, Cummings Creek, Wrigley Road, Newman Creek, and Jordan Creek). We will continue to examine these occupied road areas to follow trends in population numbers related to impacts of un-mitigated winter road use.

RESULTS

Survey and Mitigation Results

Table 7 shows location and plant numbers of the new sites found in 2015. There are currently 40 known populations of Howell's montia located on HRC property, with approximately 32,570 individual plants (Table 4).

Table 7. 2015 *Montia howellii* new occurrence locations, numbers, and mitigations.

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
4160	2015 MOHO	4N	1E	12	2	MOHO Programmatic

Research Results

Winter Road Use (Open Roads)

Population numbers at the "Open Road" sites have fluctuated, sometimes greatly, from year to year (Table 8, Figure 1).

The numbers at Wrigley Road have declined after the dramatic increase following some light grading and road maintenance that was conducted there in 2011.

The Jordan Creek site is maintaining high numbers but much of the habitat is gradually becoming overgrown with grasses and weedy forbs. This site is on the route to an active hydrology sampling station and the habitat is maintained by winter visits to that station and by occasional use of the road for access by public utilities to the power lines running overhead.

Riverside has rebounded from a low several years ago, but continued impacts to that population are likely due to unrestricted and abundant use of the area by motor vehicle recreationists. Portions of the nearby (unoccupied) road system are scheduled to be used as a helicopter service landing, log decking, and loading area during upcoming THP operations as early as 2016.

The population at Upper Newman Creek has been in decline for a number of years and in 2012 we were unable to locate any plants in the previously occupied road segments. The road does still contain habitat for Howell’s montia and in 2013 and 2015 we found 17 plants in a turnout. This occurrence was detected in 2000 during surveys for the Upper Newman 18 THP 1-99-454HUM and estimated to contain more than 7,000 plants. The road has been used in several harvest plans since that time and is also used by an adjacent landowner who has deeded access to their property. HRC does not fully control the use or maintenance of this road and the habitat has been used by the in-holder without regard to season or impact to the plants. This road will be surveyed again in the hope that the population may be able to re-establish itself from a stored seed bank, if available.

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

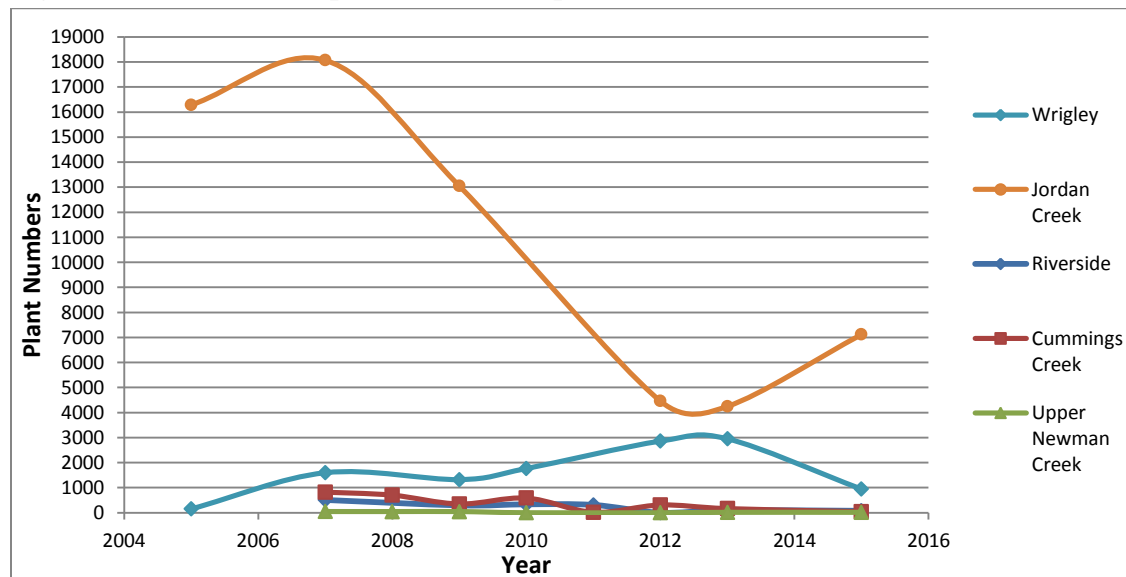


Table 8. *Montia howellii* plant numbers (Open Roads).

Location	Road Number	Occurrence IDs	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015
Wrigley*	U11	374, 563, 564	152	1,598		1,323	1,765		2,861	2,950		943
Jordan Creek*	A51.19	351	16,284	18,066		13,047	†		4,456	4,250		7,119
Riverside	L46	163		511		294	336	312	3	99		77
Cummings Creek	L33	40		821	702	350	585	19	308	165		42
Upper Newman Creek	C07.232 7	82		49	47	47	1		0	17		17

* Both of these “open roads” were also included in the 10 road areas monitored for the research project.

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

Effectiveness Monitoring Results

After concluding the six-year research project in 2010, in 2011 we began revisiting occurrences that were not included in the study and had not been revisited in up to ten years. Many of these sites have not had recent disturbance and have declining numbers. Where numbers increased, there had been recent road use or road work. In 2015 plants were found in areas where the previous count was zero (e.g. occurrences 34, 564, 571, and 884; Table 9). As in previous years we found that several of the original populations have expanded spatially (total numbers may not have increased), some have contracted (as portions became inactive), and some have migrated into previously unoccupied road areas since the last time they were counted and mapped (if plants in original location are no longer active). Newly occupied road segments are shown on the map of active sites in Appendix 5 and are coded as 2015 finds. The roads surveyed in 2015 are included on the Rare Plant Road Survey Map also located in Appendix 5. Table shows the details of the sites revisited in 2015.

Table 9. 2015 *Montia howellii* site revisits.

Occurrence ID	Township	Range	Section	Original Quantity	Previous Quantity	2015 Quantity	Mitigation
7	4N	1E	3	1	0	0	MOHO Programmatic
34	1N	2E	8	214	0	80	MOHO Programmatic
40	2N	2E	29	10,150	165	55	MOHO Programmatic
55	1N	1E	36	10	165	18	MOHO Programmatic
68	2N	2E	27	15	37	3	MOHO Programmatic
82	1S	3E	20	7,143	17	17	MOHO Programmatic

Occurrence ID	Township	Range	Section	Original Quantity	Previous Quantity	2015 Quantity	Mitigation
83	1N	1E	19	348	358	264	MOHO Programmatic
100	1N	1E	19	150	0	0	MOHO Programmatic
114	1N	2E	8	15	1	0	MOHO Programmatic
156	1N	2E	5	1,500	2,768	3,367	MOHO Programmatic
163	1N	2E	6	1,230	99	77	MOHO Programmatic
235	1N	1E	19	20	0	0	MOHO Programmatic
236	1N	2E	6	1,499	310	14	MOHO Programmatic
237	1N	2E	9	200	0	0	MOHO Programmatic
293	2N	2E	30	190	689	71	MOHO Programmatic
351	1N	1E	26	10,000	4,250	7,119	MOHO Programmatic
374	4N	1W	25	160	2,950	915	MOHO Programmatic
378	3N	2E	2	1,000	89	459	MOHO Programmatic
537	2N	2E	31	1,766	45	20	MOHO Programmatic
555	2N	1E	36	600	330	1568	MOHO Programmatic
556	2N	2E	31	50	0	0	MOHO Programmatic
558	1N	2E	8	30	0	0	MOHO Programmatic
559	2N	2E	29	1	2	4	MOHO Programmatic
562	3N	2E	2	500	0	0	MOHO Programmatic
563	4N	1W	25	100	970	2	MOHO Programmatic
564	4N	1W	25	150	0	26	MOHO Programmatic
571	1S	3E	8	134	0	130	MOHO Programmatic
797	1N	2E	9	12	11	19	MOHO Programmatic
841	1N	1E	19	1	0	0	MOHO Programmatic
843	1N	1E	19	15	169	37	MOHO Programmatic
883	2N	2E	31	1	0	0	MOHO Programmatic
884	2N	1E	36	16	0	23	MOHO Programmatic
1628	1N	2E	1	5	30	12	MOHO Programmatic
1655	1N	1E	36	50	7	4	MOHO Programmatic

DISCUSSION

The vast majority of Howell's montia populations on HRC land are associated with roads. Plants are also occasionally found on skid trails or along cow, elk, or deer trails in suitable habitat adjacent to occupied roads. In 2015 we again encountered road segments with previously mapped locations which did not support plants, and we found previously unoccupied roads now containing active populations. Most of the newly occupied road segments appear to be sourced

from known nearby populations. We have noted similar temporal and spatial changes every year since 2004 when we began returning to known locations.

In addition to spatial and temporal movement, strong annual number fluctuations occur in *Montia howellii* populations. We do not know what causes these fluctuations, although we suspect road use is the most significant factor, based on the research data we have collected. Timing and amount of early winter and early spring rains may also influence observed numbers.

This year total population numbers (Table 4) have increased by two due to two factors. In one case a new occurrence (#4160) located away from known sites has created a new population. In another case an occurrence that had been inactive for several years was re-activated by recent roadwork and timber harvest activities (occurrence #34, Unit 2 of the Strong Armed THP 1-12-126HUM).

Each year HRC conducts an audit of all site revisits and sites that have had zero plants in the last three visits are changed to “inactive” status and are no longer counted toward total populations or total plant numbers for this species. Inactive sites are not removed from our records. Mitigation and monitoring efforts continue to be enforced as future operations in those areas could potentially re-activate those sites.

In areas of little or no road use, vegetative competition by grasses and herbs appears to be the primary agent in causing Howell’s montia occurrences to become inactive. We have observed that roads left unused and undisturbed will eventually be covered with other species, reducing the potential Howell’s montia habitat available. Conversely, we have observed that heavily rocked roads which are regularly used and maintained by grading are also less likely to contain plants, even though other conditions may be favorable. HRC continues to upgrade, maintain, and storm-proof roads as required by the HCP Aquatic Conservation Plan. As more roads achieve a well-drained condition, the overall amount of potential Howell’s montia habitat may be reduced, although we suspect that some percentage of roads on HRC property will always be seasonal, native soil roads and contain adequate habitat for Howell’s montia

Roads occupied by Howell’s montia which get light grading and summer use after the plants have set seed typically have sustained populations regardless of whether or not winter use is

restricted to light vehicles. HCP wet weather road restrictions aid in protecting occurrences on seasonal roads.

The pattern of widely fluctuating plant numbers at individual locations that we have documented is likely to continue within the context of HRC's property-wide landscape planning. In this system, units of marketable timber within larger "block" areas are considered available for harvest planning on a 20-year rotation, with operations occurring within the block in five out of the 20 years. Individual roads may be in use for one to several years in the 5-year period. After use, many of the seasonal native-surface roads are closed and crossings are pulled, rather than leaving culverts in place; these roads won't be re-opened until the next cycle of activity. Where Howell's montia occurs on these roads, the populations will almost certainly decline until the next harvest cycle. We have documented that the plants return and spread when the habitat is again made suitable as a result of disturbance, and assume that the plants come from dormant seeds in the soil. Our landscape-wide monitoring plan for Howell's montia will continue to document these fluctuations in numbers.

***PACKERA BOLANDERI* VAR. *BOLANDERI* (SEACOAST RAGWORT)**

INTRODUCTION AND SUMMARY

Packera bolanderi A. Gray, W. A. Weber, and A Love var. *bolanderi* is a perennial herb of the Asteraceae (sunflower family). Seacoast ragwort is 1-5 dm tall with dark green pinnately lobed foliage and showy, yellow radiate flower heads. Habitat is described as wet cliffs, coastal forest, less than 300 meters (984 feet) elevation (Baldwin 2013). Other references include coastal strand, north coast scrub; coastal headlands, bluffs and prairies; and moist (wet) slopes in mixed evergreen/Douglas-fir/Redwood forest types usually associated with streams, rivers, or seeps. According to CNPS (2014) the elevation range is from 30 to around 650 meters (98 to 2,132 feet); however on HRC we have found it up to 911 meters (2,989 feet). It occurs in Mendocino, Humboldt, and Del Norte counties in California, and extends north to Oregon and Washington.

Seacoast ragwort is ranked G4T4¹⁹, S2S3²⁰, and is a CRPR 2B.2²¹.

We began surveys for seacoast ragwort in 2003. By the end of 2004 we had located 14 occurrences grouped into 13 populations. All locations on HRC property are included on the map in Appendix 5. There are nearby off-property occurrences in Grizzly Creek State Park, Dyerville Loop Road area, and near Kneeland Airport. The population summary given in Table 4 includes only plants on HRC property.

METHODS

Survey Methods

We conduct surveys for seacoast ragwort from January through August and focus our attention on steep bluffs, cliff faces, and cut banks often associated with a watercourse or road.

¹⁹ G4T4: Apparently secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors.

²⁰ S2S3: Imperiled-Vulnerable: Imperiled in the state because of rarity due to the very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province. Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

²¹ CRPR 2B.2: Rare or endangered in California, more common elsewhere; fairly threatened in CA.

Mitigation Methods

HRC and CDFW have agreed that the property-wide consultation and mitigation (50 foot no-cut and equipment limitation zone) for *Packera bolanderi* var. *bolanderi* documented in a letter from CDFG to PALCO dated February 27, 2006 will remain in effect (Appendix 4).

RESULTS

Survey and Mitigation Results

We located two new occurrences of seacoast ragwort during the 2015 season (Table 10). These were located near known occurrences for this species and did not result in any new populations on HRC property. There are currently 36 populations of seacoast ragwort known to exist on HRC property with approximately 6,966 total individual plants.

Table 10. *Packera bolanderi* var. *bolanderi* locations, numbers, and mitigations

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
3954	Griz 14 15-027	1N	2E	1	25	None - No Ops Area
4110	Westside	1N	1E	1	15	50' No Cut-ELZ

Effectiveness Monitoring Results

This year we revisited three known occurrences during monitoring for effectiveness of mitigation measures (Table). The site located in the Redfoxx THP was given a site specific avoidance buffer that protected the plants while allowing for roadwork, crossing installation, equipment passage, timber hauling, and subsequent road and crossing decommissioning. The plants and their associated habitat remain intact post operations and plant numbers have gone up since the original detection. The occurrence within the Bruno THP was given the programmatic mitigation for avoidance during timber harvest. Harvest occurred on three sides of the buffer while the last side of the buffered area was located adjacent to a watercourse and the programmatic buffer merged with the stream management buffer to create a contiguous area of protection that was avoided during the timber harvest activities. The buffers were intact post-harvest and plant numbers are up from the original detection. The final site (occ. 619) was visited during seasonal survey efforts for preparation of the “Westside” THP. Plant numbers were less than originally reported although no evidence of impacts was found and the flag line installed to buffer the occurrence during the previous harvest was intact.

Planned monitoring for seacoast ragwort found in the Strong Armed (1-12-041HUM) and Shively 12 (1-12-126HUM) THPs has not yet taken place because operations have not been completed in those areas. The Shively 12 THP unit containing the occurrence is unharvested at this time and due to operational difficulties the project may be infeasible. Monitoring of this site will remain on hold until harvest operations are conducted. Harvest on the Strong Armed THP occurred this year (2015) and a first round of effectiveness monitoring is planned for the 2016 field season.

Table 11. 2015 *Packera bolanderi* var. *bolanderi* site revisits.

Occurrence ID	Project Name	Township	Range	Section	Unit	Previous Quantity	2015 Quantity	Mitigation
1354	11-082 Redfoxx	2N	2E	27	1	36	72	Site-Specific
754	12-062 Bruno	2N	2E	33, 14	1	26	120	50' No Cut and ELZ
619	Westside	1N	1E	7	NA	52	32	50' No Cut and ELZ

DISCUSSION

Most of the known occurrences of seacoast ragwort on our ownership are in the Van Duzen watershed. We have also found occurrences in the Sequoia watershed (Eel River) around the Dyerville Loop area and in the upper reaches of Stitz and Nanning Creeks, also tributaries to the Eel River. From the map included with this report (Appendix 5) it is evident that two areas (HRC lands along the Van Duzen River and the Dyerville Loop area on the Eel River) are *Packera* “hot-spots.” These two areas contain the bulk of all *Packera* findings on HRC lands. In 2013 we found one new occurrence in the Blue Slide Creek drainage within the Mad River watershed north of the Kneeland Airport and one new occurrence in the Yager Creek watershed. Taylor Peak on the eastern boundaries of our property contains a single occurrence un-associated with a watercourse. The occurrences on Kneeland and Taylor Peak are relatively small and seemingly isolated from the larger populations mentioned above.

Based on our post-impacts monitoring of a few known occurrences, it appears seacoast ragwort populations can withstand at least some level of disturbance – not surprising when one considers its common habitat is unstable slopes and road cuts. However, we do not know the extent to which the population numbers may fluctuate naturally. To put our monitoring results into perspective, we would need to monitor nearby, non-impacted occurrences as a comparison.

***PIPERIA CANDIDA* (WHITE FLOWERED REIN ORCHID)**

INTRODUCTION AND SUMMARY

Piperia candida R. Morgan & J. Ackerman is a perennial herb of the Orchidaceae (orchid family). The white flowered rein orchid is 10-60 cm tall with 2-3 basal leaves approximately 3 cm by 10 cm, which do not generally persist after anthesis. The inflorescence is typically one-sided and may have as many as 100 flowers. Flowers are predominantly white with a green midvein on the upper sepal. Other parts of the flower may have some hints of green also. Coleman (1995) describes the habitat as coniferous and mixed evergreen forest, in dense shade to full sun and from gravel bars to flat terrain or steep hillsides in elevations from near sea level to 1,200 meters (3,937 feet). CNPS (2014) has records as high as 1,310 meters (4,298 feet). It occurs in coastal California from the San Francisco Bay Area, northward to Alaska (CNPS 2014, UDSA 2010).

White flowered rein orchid is ranked G3?²², S2²³, and is CRPR 1B.2²⁴.

We began surveys for *Piperia* in 2008 but have records of it from surveys in 2004 and 2005. In 2008 we located five occurrences grouped into four populations; we now know of 21 populations. All locations on HRC property are included on the map in Appendix 5.

METHODS

Survey Methods

We conduct surveys for *Piperia candida* between May and September. Besides *Piperia candida*, we have also found *Piperia transversa*, *Piperia elegans*, *Piperia unalacensis*, and *Piperia elongata*. We conduct early surveys in March through May to identify *Piperia* populations from the leaves. At that time we make an estimate of population size and extent but we must revisit the sites as late as August and September to identify the species.

²² G3?: Vulnerable- At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. There is still some uncertainty to this ranking.

²³ S2: Imperiled-Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

²⁴ CRPR 1B.2: Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in CA.

Mitigation Methods

We have developed mitigation for this species through consultation with CDFW on a site-specific basis. Protective measures can include a variety of options to reduce impacts to a less than significant level, but generally consist of selective tree retention and an equipment exclusion or limitation buffer. We give all *Piperia* plants in vegetative condition the same protection measures as for *P. candida* until we can make a positive identification to species.

RESULTS

Survey and Mitigation Results

We continue to find *Piperia candida* in areas that are predominately Douglas-fir forest or mixed Douglas-fir/Redwood forest types with a strong hardwood component. The sites are xeric to mesic and mostly on or near old skid trails or roads, although, occurrences are also found within and directly adjacent to Class II and Class III watercourses

We found that the different *Piperia* species on our property may occupy the same habitat and grow in close proximity to each other although they mature at different times. For example, we have found *P. elegans* with *P. elongata*, *P. unalacensis* with *P. transversa*, and *P. transversa* with *P. candida*. *P. candida* is the only *Piperia* species for which HRC is required to provide mitigation during covered activities.

Table 12 shows locations and numbers of plants found during the 2015 survey season along with the mitigation applied to each occurrence. This year HRC botany staff documented six new occurrences of *Piperia candida*, representing six new populations on HRC property. In addition to the verified *P. candida* sites HRC staff also detected several occurrences of *Piperia* sp. that did not bloom in 2015. These sites will be revisited in the next appropriate season to determine the exact species. Without positive identification, sites will receive mitigation buffers during any activities that have the potential to significantly impact the plants. Buffers will remain in place until the species is identified as other than *P. candida* and the need for mitigation is removed or through consultation a site specific mitigation agreement is reached. There are currently 21 known *Piperia candida* populations on HRC property containing approximately 1,726 individual plants among them. No *Piperia* sites will be included as occurrences in our database or GIS until the species is verified.

Table 12. 2015 *Piperia candida* locations, numbers, and mitigations.

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
3987	BR 15 15-085	1S	1E	7	5	50' No Cut-EEZ*
4086	Harmonica Creek	1S	1E	20	98	50' No Cut-ELZ**
4087	Harmonica Creek	1S	1E	20	32	50' No Cut-EEZ
4088	Harmonica Creek	1S	1E	29	58	50' No Cut-EEZ
4095	West Nelson	1S	1E	17	301	50' No Cut-EEZ
4097	West Nelson	1S	1E	16	88	50' No Cut-ELZ

*EEZ Equipment Exclusion Zone

**ELZ – Equipment Limitation Zone

Effectiveness Monitoring Results

During previous survey seasons an unidentified member of the genus *Piperia* was detected in Unit 6 of the Crazy Horse THP (1-14-110HUM). A standard 50 foot no cut and equipment exclusion buffer was installed prior to operations. This site was revisited in 2015 and found to be *P. transversa*. Operations at the site had already been completed and the mitigation buffer was effective at minimizing impacts to both the plant and associated habitat.

Additionally, a revisit for monitoring was conducted within Unit 1 of the Mountain View THP (1-13-035HUM) on an occurrence of *P. candida* located on the prism and side slopes of an existing rocked haul road (Table 13). Timber harvest has not yet begun on this plan but roadwork including rocking and upgrading of stream crossings did occur in 2014. The sites were protected by a site-specific mitigation agreement with provisions included to minimize and or avoid impacts to these plants during truck traffic. Protection measures included installation of a fence-like barrier around a portion of the occurrence with instructions to minimize rocking and grading of the occupied road segments. Truck traffic was restricted until after the blooming season for these plants. Timber marking around the site was completed during an on-site consultation with CDFW and seeks to provide effective retention of shade trees, minimizes potential for disturbance of *Piperia* plants, and allows for the removal of some merchantable timber.

Table 13. 2015 *Piperia candida* site revisits.

Occurrence ID	Project Name	Unit	Township	Range	Section	Previous Quantity	2014 Quantity	Mitigation
1660	13-035	1	4N	2E	25	82	137	Site-Specific

DISCUSSION

Piperia plants have to reach full anthesis before we can determine the species. We have observed that *Piperia* plants may not show leaves every season and not every plant with leaves will bloom in a given year. Blooming plants have often lost their leaves before a positive identification can be made, which makes it hard to determine population size and boundaries if the survey is only conducted when flowers are present.

***SIDALCEA MALVAEFLORA* SSP. *PATULA* (SISKIYOU CHECKERBLOOM)**

INTRODUCTION AND SUMMARY

Sidalcea malvaeflora (D.C.) Benth. ssp. *patula* C.L. Hitchcock is a perennial herb of the Malvaceae (mallow family). It is 50 to 90 cm tall with long trailing rhizomes and rose-pink flowers. Lower leaf blades are crenate to shallowly lobed and upper leaf blades are generally deeply lobed.

Habitat for the species includes North Coast coniferous forest, coastal prairie (CNPS 2014), open coastal forest generally less than 700 meters (2,300 feet) in elevation (Hickman 1996), broadleaved upland forest (CNDDDB Rare Find, November 2014), along the coast on stable dunes and sea bluffs, sunny openings of foothill woodland (Smith and Wheeler 1992), and Redwood Forest plant communities (Munz and Keck 1970). It occurs in Mendocino, Humboldt, and Del Norte counties in California, and north into Oregon (CNPS 2014). HRC botanists have found Siskiyou checkerbloom along grassy roadsides, in prairies, and at the prairie interface with Redwood or mixed evergreen forest types.

Siskiyou checkerbloom is ranked G5T2²⁵, S2²⁶, and is a CRPR 1B.2²⁷.

Surveys for Siskiyou checkerbloom began in 1999, and it was found that same year. All locations on HRC property are included on the map in Appendix 5.

METHODS

Survey Methods

We conduct surveys for Siskiyou checkerbloom during its floristic season, May through August. We focus our survey efforts in areas of preferred habitat for this species such as grassy roadsides, meadows, and edges of forest stands.

²⁵ G5T2: Critically Imperiled- At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. (The T rank reflects the global condition of the subspecies, the G rank to the species including all subspecies).

²⁶ S2: Imperiled-Imperiled in the state because of rarity due to the very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

²⁷ CRPR 1B.2: Rare, threatened, or endangered in California and elsewhere; fairly threatened in CA.

Mitigation Methods

The mitigation method used follows CEQA guidelines and consists of avoidance and minimization of impacts by using no-cut and equipment exclusion zones (EEZ) or equipment limitation zone (ELZ) buffers. All mitigations are site-specific, requiring concurrence from CDFW.

RESULTS

Survey and Mitigation Results

There were no new detections of *Sidalcea malvaeflora* ssp. *patula* on HRC lands during the 2015 survey season. There are currently 9 known populations of Siskiyou checkerbloom on lands managed by HRC with approximately 2,663 total individual plants among them.

Effectiveness Monitoring Results

No Siskiyou checkerbloom sites were revisited during the 2015 survey season. HRC plans to conduct monitoring on four occurrences in 2016. The first planned monitoring will include occurrences 162 and 908 which are located along Riverside Road, a county access road in the Van Duzen River area. At this site in 2014 CalFire hand crews cleared roadside vegetation for fuels reduction. HRC botanists met with CalFire prior to the operation and agreed on a short set of mitigations in order to reduce impacts to the plants and habitat on site at the time. CalFire agreed to conduct their operation after the blooming season for the plants, not to apply herbicide, and to restrict weed whacking of grassy roadsides to leave at least 8-10 inches of vegetation (no whacking to bare dirt) in order to avoid impacts to checkerbloom rhizomes and prostrate stems. It is hoped that the work will aid this occurrence by reducing competition, opening up suitable habitat, and spreading/sowing checkerbloom seed. HRC also plans on conducting a monitoring visit to Siskiyou checkerbloom occurrences 1 and 1152 located along Monument Road west of the towns of Scotia and Rio Dell. At this site HRC has a ranch lease that allows for the grazing of cattle and monitoring visits are planned to ensure the sites remain active and viable during the life of the lease.

DISCUSSION

All of HRC's survey reports describe the areas where we have found Siskiyou checkerbloom as meadow habitat, roadsides, or in openings or at the edges of Douglas-fir or mixed evergreen forests. Other than roadsides, these habitats are not typically impacted during timber harvesting operations. The potential impacts to this plant on HRC land arise primarily from re-establishment of conifer stands, road building, and road maintenance. Grazing has the potential to impact individual plants but could maintain the habitat. Grazing animals help maintain the open prairie and keep competition from grasses down, but plants found in grazed fields are often located along fence lines and in amongst shrubs and woody debris where it may be difficult for cattle to impact individual plants.

We currently survey in designated harvesting plan areas and along appurtenant roads, so there are areas of suitable habitat on the property that have not been or are not likely to be surveyed. Because of this, there may be more populations on our land than the nine populations we have recorded. There is abundant habitat off HRC property, so we believe it is likely there are more populations in California than shown in the CNPS and CNDDDB records.

CALIFORNIA NATIVE PLANT SOCIETY (CNPS) WATCH LIST PLANTS

INTRODUCTION AND SUMMARY

In 2006 HRC botanists began to voluntarily document plants ranked as CRPR 4, which are “plants of limited distribution, a watch list” (CNPS 2014), and CRPR 3, “plants of problematic taxonomy and about which we need more information.” This was modified in 2010 to include only CRPR 4 plants. There are approximately 34 species on these CRPR lists that are known or are likely to occur on HRC ownership (see Introduction, Table 2).

During 2014 HRC botanists found 24 occurrences of nine of these species (see Appendix 2: Plant Detections). 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 CNDDDB.

METHODS

Survey Methods

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

Mitigation Methods

CRPR 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 CDFG and CNDDDB 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 CNDDDB 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.

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