



**Humboldt
Redwood™**

Rare Plants Annual Report 2013

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This report was prepared by the Botany staff of the Forest Sciences 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 2013 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 3,725 acres, and over 136 miles of roads (including 16.4 miles of road surveyed for *Montia howellii*), altogether totaling over 4,346.8 acres. This year on HRC property we found 17 new occurrences of six of our Special Status plant species, which represent 10 new populations, bringing the total number of rare plant populations on HRC land to 151. 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 54 occurrences of eight 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 2008 to 2013 and *Montia howellii* road surveys (MOHO Research) from 2005 to 2013. 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 16.4 miles of roads for *Montia howellii* in 2013. 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 five of these “open” sites were visited in 2013.

Proposed Changes for 2013

CNPS has recently changed their rare plant ranking process, and has replaced CRPR 2 with CRPR 2A and CRPR 2B. HRC updated our Special Status Plant List to include these new ranks.

This season we have changed the way in which we calculate and report total plant numbers for each Special Status species on HRC property. Please refer to the Data Management and Analysis Method section for a detailed description of this change.

The current property-wide mitigation for *Astragalus agnicidus* is a 25-foot equipment limitation zone (ELZ) and no-herbicide buffer on known roadside occurrences. Other occurrences require site-specific consultation with CDFW. We propose expanding the property-wide mitigation to include all occurrences.

In 2014 HRC would like to propose a move towards reducing the amount of paper used in our reporting procedures. With CDFW approval, HRC will agree to continue to create survey reports as usual. The reports will be placed in Section V of the THP document. The enforceable language and botanical restrictions maps will be placed in Section II if the report is completed prior to THP submittal, otherwise they will be included as amendments to the THP document. HRC shall report surveys with Negative (no plant detections), Programmatic (species that have property-wide agreements or pre-existing mitigation), or No Impacts (plants are more than 50 feet from operations) results **once a year in our annual report** that is delivered to CDFW each December. HRC shall not mail or email these reports to CDFW individually unless specifically requested. HRC shall report positive findings with site-specific mitigation proposals to CDFW with an email containing the report in PDF format for review and comment.

HRC has added one species to our Special Status Plant List. *Moneses uniflora* (woodnymph) was recently changed from CRPR 4 to CRPR 2B.2. The nearest known location for this species is approximately 30 miles north of HRC ownership within Humboldt Lagoons State Park.

INTRODUCTION

HRC employees, foresters, and forestry contractors conducted plant habitat assessments and seasonally appropriate floristic plant surveys in 2013 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, and monitoring conducted in the year 2013 and fulfills HRC's HCP reporting requirements for rare plants (section 6.12.1, Item 5). It also summarizes ongoing research projects.

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 2013 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, S2.3, 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>Coptis laciniata</i> Oregon goldentread	G4G5, S3, CRPR 2B.2	Yes
<i>Epilobium oreganum</i> Oregon fireweed	G2, S2, CRPR 1B.2	Unknown
<i>Erythronium oregonum</i> giant fawn lily	G5, S2.2, CRPR 2B.2	Presumed
<i>Erythronium revolutum</i> coast fawn lily	G4, S2S3, CRPR 2B.2	Yes
<i>Gilia capitata</i> ssp. <i>pacifica</i> Pacific gilia	G5T3T4, S2.2?, CRPR 1B.2	Yes
<i>Glyceria grandis</i> American manna grass	G5, S2, CRPR 2B.3	Unknown
<i>Iliamna latibracteata</i> California globe mallow	G3, S2.2, CRPR 1B.2	Unknown
<i>Juncus supiniformis</i> hair-leaved rush	G5, S2.2?, 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, S3.3, CRPR 2B.2	Unknown
<i>Montia howellii</i> Howell's montia	G3G4, S3, CRPR 2B.2	Yes
<i>Noccaea fendleri</i> ssp. <i>californicum</i> Kneeland Prairie pennycress	G5?T1, S1.1, FE, CRPR 1B.1	Adjacent
<i>Packera bolanderi</i> var. <i>bolanderi</i> seacoast ragwort	G4T4, S3, CRPR 2B.2	Yes
<i>Piperia candida</i> white-flowered rein orchid	G2, 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. <i>patula</i> Siskiyou checkerbloom	G5T2, S2.2 CRPR 1B.2	Yes
<i>Sidalcea oregana</i> ssp. <i>eximia</i> 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; California Rare Plant Rank (CRPR) 1B: rare, threatened, or endangered in California and elsewhere; CRPR 2B: rare, threatened, or endangered in California, but more common elsewhere.

¹ California Native Plant Society (CNPS 2013) 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 2013 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>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, S4.1, 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> Methuselah's beard lichen	G4, S4.2	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. Surveys are of moderate to high intensity and intuitively controlled, sampling the identified habitats.

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 a 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 2013 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 monitoring of *Montia howellii* was suspended in 2003 in favor of a property-wide mitigation 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 an 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 plants (CRPR 1 and 2) 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 4³ 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 the surveyor, survey area, and dates of the survey. The

³CRPR 4: Plants of limited distribution.

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 data stored in ArcGIS coverage allows for analysis based upon additional parameters. This “spatial” 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 road surveys.

During analyses for surveys and research we process data utilizing both point and polygon (created from point) 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.

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 2013, covering a total of approximately 4,346.8 acres, including 136.4 miles of roads. Most of the assessment and survey acres were associated with THP preparation or operational needs such as THP completions and were inspected between April and July (Table 3). We also located several Special Status plants during non-THP related projects such as trail maintenance or wildlife monitoring activities.

We located 17 new occurrences totaling approximately 1,857 plants of six of the species on our Special Status Plant List and 54 occurrences of eight of the species on our Watch List during the 2013 survey season (Table 4, Appendix 2: 2013 Plant Detections, and Appendix 5: Rare Plant Detections and Rare Plant Road Surveys maps).

Table 3. 2013 Assessed/surveyed acres by month.

Year	Month	Unit Survey Acres	Road Survey Acres	Total Acres
2013	January	0	11.6	11.6
2013	February	0	3.4	3.4
2013	March	59.3	31.0	90.3
2013	April	1293.1	182.3	1475.4
2013	May	1096.6	172.1	1268.7
2013	June	751.1	125.6	876.7
2013	July	498.6	55.3	553.9
2013	August	16.6	0	16.6
2013	September	9.9	0	9.9
Total 2013 Survey Acres		3,725.2	581.3	4,306.5*
2013	Howell's montia Surveys			39.8
Total 2013 Survey/Assessment Acres				4,346.8

*This value is generated in ArcGis by creating polygons from survey route data. Total 2013 project acres from database records are approximately 5,566. Some portions of projects were surveyed in previous years or have future surveys planned. Our survey efforts cover over 80% of all planned project acres, not including roads.

Table 4. Summary of 2013 Special Status Plant detections and property-wide totals.

Species	2013 occurrences	New populations	Total populations ⁴	# new plants	Total plants*
<i>Astragalus agnicidus</i>	0	0	2	0	2,255
<i>Carex arcta</i>	0	0	3	0	55
<i>Coptis laciniata</i>	1	1	2	1,000	1,100
<i>Erythronium revolutum/oregonum</i>	1	1	27	16	7,249
<i>Gilia capitata ssp. pacifica</i>	3	1	19	330	13,982
<i>Montia howellii</i> ⁵	1	1	40	50	32,122
<i>Packera bolanderi var. bolanderi</i>	4	3	36	209	6,591
<i>Piperia candida</i>	7	3	13	252	938
<i>Sidalcea malvaeflora ssp. patula</i>	0	0	9	0	2,731
Totals	17	10	151	1,857	67,023

*Total plant count is tally of original occurrence data and subsequent revisit counts, from Microsoft Access Database.

⁴ 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".

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 2013.

In 2013 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 2013.

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 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

Moneses uniflora (woodnymph) is a small flowering plant in the Ericaceae family that was previously included on our watch list of CRPR 4 plants. This species has recently been changed from a CRPR 4 to a CRPR 2B.2 species and as such is now a priority for survey and mitigation efforts. HRC has updated our plant lists to reflect this change (see Table 1 on page 4 and Table 2 on page 5).

CNPS has changed their rare plant ranking to replace CRPR 2 with CRPR 2A and CRPR 2B. HRC has updated our Special Status Plant List to include these new rank codes. CNPS describes the changes and rationale on their website:

“In order to better define and categorize rarity in California's flora, the CNPS Rare Plant Program and Rare Plant Program Committee have developed the new California Rare Plant Ranks (CRPR) 2A and CRPR 2B. CRPR 2B contains all of the plants formerly included on CRPR 2, and are defined as plants that are rare in California, but are more common outside of the state's boundaries. CRPR 2A includes a small number of plants formerly included on CRPR 1A, which are presumed extirpated in California, but more common elsewhere. These new ranks help further clarify that CRPR ‘2’ plants are more common outside of California, while emphasizing that CRPR ‘1’ plants are rare throughout their entire range.

Furthermore, with the addition of CRPR 2A, the definition of 1A has been revised to only include plants that are presumed extinct or are extirpated in California, and are rare elsewhere. It is also hoped that the clarification provided by these new ranks will help spur efforts to search for and document plants that are considered extirpated in California.

At the same time, the newly named CRPR 2B (formerly CRPR 2) further delineates its parallels with CRPR 1B; emphasizing the importance of protecting plants that are rare in California, regardless of how common they may be elsewhere. California state laws, namely the California Environmental Quality Act (CEQA), clearly indicate that the evaluation of a plant or animal's rarity is restricted to its range and abundance within the borders of California. As a result, CRPR 2B plants are afforded the same consideration in the evaluation of a project's environmental impacts as CRPR 1B plants. From a practical perspective, it is imperative that we protect the diversity of our own state's flora and help maintain genetic diversity and evolutionary processes regardless of jurisdictional boundaries”.

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 2013 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 largest of the two counties (CNDDDB RareFind, November 2012).

The 2 populations⁶ 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 G3⁷, S3⁸, and is a CRPR 1B.1⁹.

It is described as occupying disturbed areas in the broadleaved upland forest and North Coast coniferous forest (CNPS 2013, Baldwin 2012)) and open soil in woodland (Baldwin 2012). On HRC land it is typically found in mixed conifer 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.

⁶ 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”.

⁷ 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.

⁸ 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.

⁹ CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere.

METHODS

Survey Methods

We conduct surveys¹⁰ 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 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 2,255 total individual plants (Table 4, page 11).

Effectiveness Monitoring Results

No Humboldt milk-vetch sites were visited for effectiveness monitoring during the 2013 survey season.

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

¹⁰ Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

plants that emerge the summer 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 (see Table 4, page 11) are now calculated from occurrence and revisit data contained in our Access database. The apparent decrease shown between 2012 and 2013 is due to a correction in how that number was calculated

(see Data Management and Analysis Methods in the Introduction). 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 to improve 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 two 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 propose expanding the agreement to include all 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 2013). 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 G5¹¹, S1¹², and is a CRPR 2B.2¹³.

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 surveys¹⁴ 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.

¹¹ G5: Secure- Common; widespread and abundant

¹² S1: Critically Imperiled- Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

¹³ CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

¹⁴ Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

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. We did revisit one occurrence of *Carex arcta* to verify the presence of the species. Details of that visit are given in Table 5 and discussed below. There are currently three populations of *Carex arcta* on HRC managed lands with a total of 55 individual plants (see Table 4, page 11).

Table 5. *Carex arcta* site revisits.

Occurrence ID	THP	Unit	Township	Range	Section	Original Quantity	2013 Quantity	Mitigation
469	NA	NA	2N	2E	33	5	15	None-No Ops Area

DISCUSSION

Our database contains 3 records for northern clustered sedge on HRC property; one of these was considered unverified until this season. The occurrence at the pond near Redwood House (occurrence 469) was not documented with either photos or specimens when originally found. HRC has surveyed the pond area several times in the past few years and we were unable to find *Carex arcta*, although several other *Carex* species were present. Heavy cattle grazing at the site makes identification difficult. This site was revisited in 2013 and a specimen of *Carex arcta* was detected. The site was still heavily grazed, and the specimen was small and almost prostrate (likely the reason it escaped herbivory), but did show all necessary characters to confidently key it to the species level. Population numbers were estimated by counting grazed plants with similar foliage and stature as compared to the keyed specimen and other *Carex* species on site

(including *C. subfusca*, *C. leptopoda*, and *C. obnupta*). HRC will continue to maintain this site and provide protection measures during HCP covered activities as needed. HRC does not provide a cattle grazing permit for this area, but cattle belonging to a neighboring landowner trespass onto HRC land.

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. The Redwood House Ranch located adjacent to HRC property on Redwood House Road (near occurrence 469) contains several large man-made stock ponds that contain year-round water and represent excellent potential habitat for *Carex arcta*, making it a strong possibility to detect more occurrences in that area. However, this habitat is located off of HRC property and at this time HRC has neither the right nor reason to survey that potential habitat.

COPTIS LACINIATA (OREGON GOLDTHREAD)

INTRODUCTION AND SUMMARY

Coptis laciniata Gray is a low growing, evergreen-leaved member of the buttercup family (Ranunculaceae). The species has golden yellow stolons, delicate flowers that bloom in early spring (March-April), and small, dark green, leathery, toothed leaves that remain year-round.

Suitable habitat for this species is described as wet to mesic sites, seeps, meadows, and stream banks in coniferous forest (CNPS 2013, Hickman 1993, Baldwin 2012), associated with redwood and Douglas-fir forests. In California this species is found in Mendocino, Humboldt, Del Norte, and Siskiyou counties at elevations from near sea level to 1,000 meters (3,281 feet) (CNPS 2013). *Coptis* can also be found in Oregon and Washington (CNPS 2013, Hickman 1993, Baldwin 2012).

Oregon goldthread is ranked G4G5¹⁵, S3¹⁶, and is a CRPR 2B.2¹⁷.

Surveys for this species began in 2007 and it was not until 2009 that we found an occurrence on HRC lands. All locations on HRC property are included on the maps in Appendix 5.

METHODS

Survey Methods

We conduct focused surveys for *Coptis* during the documented blooming period from March through April; however *Coptis* is generally in an identifiable condition outside of the recorded blooming period. The fruit and dehisced capsules are also persistent and, if present, easy to identify throughout the year. The leaves are evergreen and identifiable year-round but could easily be overlooked or mistaken for other low-lying herbaceous species, especially as other plants tend to grow over the top of *Coptis* as the season progresses. Care must be taken when surveying suitable habitat outside of the blooming period.

¹⁵ G4: Apparently secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors. G5: Secure- Common; widespread and abundant

¹⁶ S3: 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.

¹⁷ CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

Mitigation Methods

Known occurrences of *Coptis laciniata* are not included in or adjacent to any areas with potential impacts from timber operations or other activities. HRC has not yet implemented mitigation at either known site. In general our mitigation will consist of avoidance and minimization of impacts. All mitigations will be reviewed by CDFW on a site-specific basis until a better understanding of the species' distribution and response to mitigation measures can be developed.

RESULTS

Survey and Mitigation Results

There is one newly detected population of *Coptis laciniata* on HRC lands this year (Table 6). This robust occurrence is located along Lawrence Creek just north of the confluence with Booth's Run Creek. Plants are located on the banks just above the ordinary high water mark and likely within a zone of inundation during high water events. Stream banks are composed of mossy rocks and large woody debris with a dense canopy overhead. Some plants are located within man-made erosion control and bank stabilization features (logs and rocks cabled together and tied into the bank) installed in the late 1990's for restoration of salmonid habitat. This new site is approximately 6 miles north of a historic site (1915) on Lawrence Creek at the confluence with Yager Creek. There are now two populations of *Coptis laciniata* known to exist on lands managed by HRC with approximately 1,100 individual plants (see Table 4, page 11).

Table 6. 2013 *Coptis laciniata* locations, numbers, and mitigations.

Occurrence ID	THP	Unit	Township	Range	Section	Quantity	Mitigation
1711	NA	NA	3N	2E	4	1,000	None-No Ops Area

DISCUSSION

CNDDDB contains a record of *Coptis laciniata* found in 1915 "at the confluence of Yager and Lawrence Creeks." This area has been surveyed and no plants were found there, but the location of the historical record is not certain and much has changed on the landscape since that time. The original record dates from when that area was accessed for timber harvest by railroad and much of the timber was either old growth or newly clear-cut. Contemporary detections of this species on HRC land are found in the same watershed complex, but much further upstream.

More occurrences will have to be located and the site characteristics examined within the context of modern timber management before any conclusions about the distribution and management of this species on HRC lands can be made. Further survey of similar habitats within the Yager, Booth's Run, and Lawrence Creek drainages are planned if time and staffing allow.

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 2013), 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 G4¹⁸, S3¹⁹, and is a CRPR 2B.2²⁰.

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 populations²¹; 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

¹⁸ G4: Apparently secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors.

¹⁹ S3: 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.

²⁰ CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

²¹ 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".

to reach a 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. Another round of plot data was taken this year, and we will collect data for at least one more year before analyzing and reporting the results.

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 surveys²² 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 collected 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

²² Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

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

RESULTS

Survey and Mitigation Results

Table 7 shows locations and numbers of plants found during the 2013 survey season along with the mitigation applied to each occurrence. 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 7. 2013 *Erythronium revolutum* locations, numbers, and mitigations.

Occurrence ID	THP	Unit	Township	Range	Section	Quantity	Mitigation
1657	13-035 Mountain View	1	4N	2E	25	16	None-No Ops Area

We did not revisit any *Erythronium* sites this year during seasonal THP surveys. There are currently 27 known populations of *Erythronium* on HRC property with approximately 7,249 individual plants (see Table 4, page 11)

Research Results: Erythronium revolutum Response to Herbicide Application

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 (2013). 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 2013, Hickman 1993).

Pacific gilia is ranked G5T3T4²³, S2.2?²⁴, and is a CRPR 1B.2²⁵.

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 surveys²⁶ 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.

²³ 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.

²⁴ S2.2?: 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.

²⁵ CRPR 1B.2: Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in CA.

²⁶ Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

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 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 three new occurrences of *Gilia capitata ssp. pacifica* during the 2013 survey season (Table 8). We did not re-visit any known occurrences of Pacific gilia this year. There are currently 19 known populations of Pacific gilia on HRC property with approximately 13,982 individual plants.

Table 8. 2013 *Gilia capitata ssp. pacifica* locations, numbers, and mitigations.

Occurrence ID	THP	Unit	Township	Range	Section	Quantity	Mitigation
1701	Corral Rock Pit	NA	1S	1W	14	180	None-No Ops Area*
1702	Corral Rock Pit	NA	1S	1W	15	100	None-No Ops Area
1703	Corral Rock Pit	NA	1S	1W	15	50	None-No Ops Area

*Area was surveyed in preparation for future activities, when project specifics are known a mitigation plan will be created.

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 2010). It also occurs in western Oregon, Washington and southern British Columbia (CNPS 2010, 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 2013). 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 G3G4²⁷, S3²⁸, and is a CRPR 2B.2²⁹.

Surveys for this species began in 1999 and it was found that same year. Population counts shown in Table 4 (page 11) 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 that is located along

²⁷G3G4: 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.

²⁸S3: 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.

²⁹CRPR 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in CA.

a rocked road between the Bear Creek and Greenlaw Creek drainages (occurrence 1655). This new occurrence is not located directly adjacent to any known occupied road segments and represents a new population.

All active locations on HRC property are presented on the maps in Appendix 5. This year we “lost” one *H. montia* occurrence due to a recordkeeping error. Occurrence 534, originally detected in 2003, was an *Usnea longissima* site discovered during a survey for *Montia howellii*; the occurrence was mislabeled in the GIS and database records and was thought to be a *Montia. howellii* site until earlier this year when a question about the occurrence from CNDDDB staff sparked a review. We found the original survey documentation and verified that the site should be labeled as an *Usnea longissima* occurrence and have corrected the error in our records.

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 and population numbers remain fairly stable. 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 11 (in Site Revisits, below) and in Appendix 8.

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 2004-2013 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 2013 (Riverside, Cummings Creek, Wrigley Road, Newman Creek, and Jordan Creek). We will continue to examine several of these occupied road areas annually to follow trends in population numbers related to impacts of winter road use.

RESULTS

Survey and Mitigation Results

Table 9 shows location and plant numbers of the new site found in 2013. There are currently 40 known populations of Howell's montia located on HRC property, with approximately 32,122 individual plants (see Table 4, page 11).

Table 9. 2013 *Montia howellii* new occurrence location, numbers, and mitigation.

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
1655	13-033 The Bear	1N	1E	36	50	MOHO Programmatic

Research Results

Winter Road Use (Open Roads)

Population numbers at the “Open Road” sites have fluctuated, sometimes greatly, from year to year, and 2013 was no different (Table 10).

The numbers at Wrigley Road have remained constant 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 since last year, but continued impacts to that population are likely due to unrestricted and abundant use of the area by motor vehicle recreationists.

The population at Upper Newman Creek has been in decline for a number of years and last year 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 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.

Table 10. 2013 *Montia howellii* plant numbers (Open Roads).

Location	Road Number	Occurrence IDs	2005	2007	2008	2009	2010	2011	2012	2013
Wrigley*	U11	374, 563, 564	152	1,598		1,323	1,765		2,861	2,950
Jordan Creek*	A51.19	351	16,284	18,066		13,047	†		4,456	4,250
Riverside	L46	163		511		294	336	312	3	99
Cummings Creek	L33	40		821	702	350	585	19	308	165
Upper Newman Creek	C07.2327	82		49	47	47	1		0	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.

Site Revisits

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 2013 plants were found in areas where the previous count was zero (e.g. occurrences 82 and 846, Table 11). 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 2013 finds. The roads surveyed in 2013 are included on the Rare Plant Road Survey Map also located in Appendix 5. Table 11 shows the details of the sites revisited in 2013.

Table 11. 2013 *Montia howellii* site revisits.

Occurrence ID	Township	Range	Section	Previous Year	Previous Quantity	2013 Quantity	Mitigation
14	1N	2E	5	2012	128	187	MOHO Programmatic
34	1N	2E	8	2012	0	0	MOHO Programmatic
40	2N	2E	29	2012	308	165	MOHO Programmatic
55	1N	1E	36	2012	35	600	MOHO Programmatic
56	1S	2E	6	2012	1	0	MOHO Programmatic

Occurrence ID	Township	Range	Section	Previous Year	Previous Quantity	2013 Quantity	Mitigation
68	2N	2E	27	2012	160	87	MOHO Programmatic
82	1S	3E	20	2012	0	17	MOHO Programmatic
83	1N	1E	19	2012	37	358	MOHO Programmatic
84	1N	1E	31	2012	3	1	MOHO Programmatic
90	1S	3E	6	2012	3,000	3,024	MOHO Programmatic
100	1N	1E	19	2012	0	0	MOHO Programmatic
107	1N	1W	15	2010	0	0	MOHO Programmatic
114	1N	2E	8	2012	8	1	MOHO Programmatic
144	1N	1E	34	2012	5,072	5,000	MOHO Programmatic
156	1S	2E	5	2012	2,386	2,768	MOHO Programmatic
163	1N	2E	6	2012	3	99	MOHO Programmatic
235	1N	1E	19	2012	0	0	MOHO Programmatic
236	1N	2E	6	2012	8	310	MOHO Programmatic
237	1N	2E	9	2012	0	0	MOHO Programmatic
351	1N	1E	26	2012	4,456	4,250	MOHO Programmatic
352	1S	2E	13	2012	7	31	MOHO Programmatic
354	1N	1W	25	2012	0	0	MOHO Programmatic
367	1S	3E	17	2010	0	0	MOHO Programmatic
368	1S	3E	16	2010	7,583	7,076	MOHO Programmatic
370	1N	2E	5	2011	0	0	MOHO Programmatic
374	4N	1W	25	2012	2,861	2,950	MOHO Programmatic
378	3N	2E	3	2012	97	89	MOHO Programmatic
532	1S	3E	17	2010	1	0	MOHO Programmatic
537	2N	2E	31	2012	31	45	MOHO Programmatic
553	1S	2E	5	2012	1	0	MOHO Programmatic
554	1S	2E	5	2012	0	0	MOHO Programmatic
555	2N	1E	36	2012	523	330	MOHO Programmatic
556	2N	2E	31	2009	0	0	MOHO Programmatic
558	1N	2E	8	2012	0	0	MOHO Programmatic
559	2N	2E	29	2012	1	0	MOHO Programmatic
560	2N	2E	30	2011	0	0	MOHO Programmatic
561	1N	1E	19	2010	0	0	MOHO Programmatic
565	1S	3E	17	2010	773	0	MOHO Programmatic

Occurrence ID	Township	Range	Section	Previous Year	Previous Quantity	2013 Quantity	Mitigation
566	1S	3E	17	2010	1,346	100	MOHO Programmatic
567	1S	3E	17	2010	958	60	MOHO Programmatic
568	1S	3E	17	2008	77	0	MOHO Programmatic
569	1S	3E	16	2010	544	0	MOHO Programmatic
570	1S	3E	16	2010	16,877	132	MOHO Programmatic
571	1S	3E	8	2012	4	0	MOHO Programmatic
797	1N	2E	9	2012	8	11	MOHO Programmatic
841	1N	1E	19	2012	0	0	MOHO Programmatic
843	1N	1E	19	2012	35	169	MOHO Programmatic
844	1S	2E	5	2012	3	0	MOHO Programmatic
845	1S	2E	5	2012	0	0	MOHO Programmatic
846	1S	2E	5	2012	0	4	MOHO Programmatic
847	1S	2E	5	2012	0	0	MOHO Programmatic
848	1S	3E	16	2010	102	10	MOHO Programmatic
849	1S	3E	16	2008	17	120	MOHO Programmatic
850	1S	3E	17	2010	1,369	80	MOHO Programmatic
880	1N	1E	34	2007	12	0	MOHO Programmatic
881	1N	1E	34	2007	2,000	1,000	MOHO Programmatic
883	2N	2E	31	2012	0	0	MOHO Programmatic
884	2N	1E	36	2012	3	0	MOHO Programmatic
888	1S	3E	16	2007	300	0	MOHO Programmatic
1135	4N	1E	4	2011	350	89	MOHO Programmatic
1250	2S	2E	10	2010	3,000	3,500	MOHO Programmatic
1628	1N	2E	1	2012	5	15	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 or deer trails in suitable habitat adjacent to occupied roads. In 2013 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 have declined due to two factors. In some cases new occurrences located between known sites caused previously separated populations to merge. This year HRC conducted an audit of all site revisits and sites that have had zero plants in the last three visits were changed to “inactive” status and are no longer counted toward total populations or total plant numbers for this species. The number of populations decreased due to designating these “inactive” sites in 2013. 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.

Additionally, total plant numbers across the property for 2013 (see Table 4, page 11) have been calculated using a database records query described in Data Management and Analysis Methods, (page 8) instead of including counts derived from the methodology that was used in previous years. Total plant numbers reported in the past were calculated by a summation of all occurrences and were not corrected by data obtained from monitoring or research projects. This monitoring data was reported to the appropriate agencies and used in management decisions but was never used to update the tables presented in the annual report. For the past several seasons HRC has been revisiting a large portion of our known occurrences of *Montia howellii* to establish a more realistic plant number estimate and determine activity of sites not visited recently. The results reported this year represent a more accurate view of this species on HRC property.

In areas of little or no road use, vegetative competition by grasses and herbs appears to be the primary agent in lowering the Howell’s montia population numbers. We have observed that roads left unused and undisturbed will eventually be covered with other species, reducing the potential Howell’s montia habitat available. We have observed that heavily rocked roads which are regularly 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

Conversely, 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.

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 from 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 (2013) 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 G4T4³⁰, S3³¹, and is a CRPR 2B.2³².

We began surveys for seacoast ragwort in 2003. By the end of 2004 we had located 14 occurrences grouped into 13 populations³³. All locations on HRC property are included on the map in Appendix 5. There are nearby off-property occurrences in Grizzly Creek State Park and near Kneeland Airport. The population summary given in Table 4 (page 11) includes only plants on HRC property.

³⁰ G4T4: Apparently secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors.

³¹ S3: 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.

³² CRPR 2B.2: Rare or endangered in California, more common elsewhere; fairly threatened in CA.

³³ 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".

METHODS

Survey Methods

We conduct surveys³⁴ for seacoast ragwort from May through July and focus our attention on steep bluffs, cliff faces, and cut banks often associated with a watercourse or road.

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

Table 12 shows locations and numbers of plants found during the 2013 survey season along with the mitigation applied to each occurrence. All of the survey reports state that the plants were found on steep cliff faces, bluffs, or cut banks.

Table 12. 2013 *Packera bolanderi* var. *bolanderi* locations, numbers, and mitigations.

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
1661	13-047 Hely 13	2N	2E	33	7	50' NoCut-ELZ*
1662	13-047 Hely 13	2N	2E	33	2	None-No Ops Area
1712	2013Rarefind	2N	2E	9	100	None-No Ops Area
1713	2013Rarefind	4N	2E	14	100	None-No Ops Area

*ELZ – Equipment Limitation Zone

This year we revisited one known occurrence during THP surveys (Table 13). There are currently 36 populations of seacoast ragwort known to exist on HRC property with approximately 6,591 total individual plants.

³⁴ Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

Table 13. 2013 *Packera bolanderi* var. *bolanderi* site revisits.

Occurrence ID	THP	Township	Range	Section	Unit	2005 Quantity	2013 Quantity*	Mitigation
742	12-126 Strong Armed	1N	2E	7	1	299	39	None-No Ops Area

*Not all sites associated with this occurrence were revisited

DISCUSSION

Prior to 2007 most of the known occurrences of seacoast ragwort on our ownership were in the Van Duzen watershed. During the 2007 field season we found occurrences in the Sequoia watershed (Eel River) around the Dyerville Loop area. In 2008 we located additional occurrences in the Dyerville Loop area and in the upper reaches of the Stitz Creek watershed, also on the Eel River. This year we found four new occurrences of *Packera bolanderi* var. *bolanderi*. Two of these new occurrences are located in the Fox Creek watershed and are located in amongst known occurrences. We also located two new occurrences located away from known populations. 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. Both of these new occurrences represent new populations on HRC property and are also the first known occurrences of this species in these drainages on HRC property. There is a known off-property occurrence along Mountain View Road east of the Kneeland Airport (Mad River watershed).

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. We have also documented occurrences from the Nanning and Stitz drainages, and from both the Kneeland area and near the top of Taylor Peak on the eastern and western boundaries of our property, respectively. The occurrences on Kneeland and Taylor Peak are relatively small and seemingly isolated from the larger populations mentioned above. This year’s detection in the Yager Creek watershed is interesting. It was located during surveys for yellow-legged frogs (*Rana boylei*) in Class II tributaries to Yager Creek. In future surveys, for botany and other species, HRC staff

will pay close attention to this area to see if this is an isolated occurrence or part of a larger population.

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 (2013) 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 2013, UDSA 2010).

White flowered rein orchid is ranked G3?³⁵, S2³⁶, and is CRPR 1B.2³⁷.

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 populations³⁸; we now know of thirteen populations. All locations on HRC property are included on the map in Appendix 5.

METHODS

Survey Methods

We conduct surveys³⁹ for *Piperia candida* between May and September. Besides *Piperia candida*, we have also found *Piperia transversa*, *Piperia elegans*, and *Piperia elongata*. We conduct early surveys in March through May to identify *Piperia* populations from the leaves. At

³⁵ 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.

³⁶ 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.

³⁷ CRPR 1B.2: Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in CA.

³⁸ 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".

³⁹ Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

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.

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 with a strong hardwood component. The sites are xeric and mostly on or near old skid trails or roads. Most of the sites are south-facing.

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 may mature at different times. For example, we have found *P. elegans* with *P. elongata* 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 14 shows locations and numbers of plants found during the 2013 survey season along with the mitigation applied to each occurrence. This year HRC botany staff documented seven new occurrences of *Piperia candida*, representing three new populations on HRC property. In addition to the verified *P. candida* sites HRC staff also detected two occurrences of *Piperia* sp. that did not bloom in 2013. Without positive identification, both sites received mitigation buffers. One occurrence was located in the The Bear THP (1-13-033HUM). In this THP a standard 50 foot no cut and equipment exclusion buffer was installed prior to operations. A second *Piperia* sp. occurrence was detected within Unit 3 of the Cornucopia THP (1-12-106HUM). This site received a site-specific mitigation buffer consisting of a 50 foot equipment exclusion zone with single tree selection and no site prep or herbicide treatments. Both The Bear and Cornucopia THPs will be revisited in 2014 to attempt to identify the species. There are

currently 13 known *Piperia candida* populations on HRC property with approximately 938 total individual plants among them.

Table 14. 2013 *Piperia candida* locations, numbers, and mitigations.

Occurrence ID	Project Name	Township	Range	Section	Quantity	Mitigation
1660	13-035 Mountain View	4N	2E	25	82	Site Specific
1663	Long Reach	1S	1W	21	65	50' NoCut-EEZ*
1664	Long Reach	1S	1W	21	40	50' NoCut-EEZ
1665	Long Reach	1S	1W	21	30	50' NoCut-EEZ
1666	Long Reach	1S	1W	21	3	50' NoCut-EEZ
1667	Long Reach	1S	1W	21	20	50' NoCut-EEZ
1668	Long Reach	1S	1W	21	12	50' NoCut-EEZ

* EEZ Equipment Exclusion Zone

Effectiveness Monitoring Results

Dunlap Brown THP1-11-054HUM and Boot Legger THP1-11-045HUM

Both the Dunlap Brown and Boot Legger THPs contained occurrences of *Piperia* that had not yet been identified to species but were included in mitigation buffers during operations. Operations at both locations have been completed and the buffers were intact and site conditions were as expected post harvest. The Boot Legger THP contains two sites; both were included in 50 foot no-cut and equipment exclusion zones and additionally were located adjacent to RMZ buffers for Class II streams. Revisits were done in 2013 for species verification. The plants did not flower in 2013 and no ID was possible. Disturbance at those locations is minimal and plants were found to be in the same condition as they were during seasonal surveys. The Dunlap Brown THP also contains one occurrence of the genus *Piperia*. This site was included in a site – specific mitigation package which consisted of a 25 foot equipment exclusion zone, selective retention of screen trees, and the exclusion of herbicide while providing a minimized cable

yarding corridor through the site. HRC agreed to remove slash and debris generated by cable yarding from the zone once operations had been concluded. Harvest was completed early in 2013 and HRC staff visited the site and removed slash and debris from the site by hand. Revisits to the site later in the year were completed and the single plant came up and flowered in 2013. The plant in the Dunlap Brown THP was easily identified as *Piperia elongata*. Pictures of the plant and post-harvest site conditions are available upon request. Further mitigation and monitoring efforts for this site are not planned. The Boot Legger THP will be visited again in 2014. No *Piperia* sites will be included as occurrences in our database or GIS until the ID is verified.

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 2001), open coastal forest generally less than 700 meters (2,300 feet) in elevation (Hickman 1996), broadleaved upland forest (CNDDDB Rare Find, November 2008), 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 2013). HRC botanists have found Siskiyou checkerbloom along grassy roadsides, in prairies, and at the prairie interface with redwood or mixed evergreen forests.

Siskiyou checkerbloom is ranked G5T2⁴⁰, S2.2⁴¹, and is a CRPR 1B.2⁴².

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 surveys⁴³ for Siskiyou checkerbloom during its floristic season, May through June.

We focus our survey efforts in areas of preferred habitat for this species such as grassy roadsides, meadows, and edges of forest stands.

⁴⁰ 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).

⁴¹ 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.

⁴² 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 2013 survey season. No known *Sidalcea* sites were re-visited during the 2013 survey efforts. There are currently 9 known populations of Siskiyou checkerbloom on lands managed by HRC with approximately 2,731 total individual plants among them.

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. The Siskiyou checkerbloom exists in open meadows and prairies. Grazing animals help maintain the open prairie 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.

⁴³ Survey methods follow Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).

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 2013), 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 33 species on these CRPR lists that are known or are likely to occur on HRC ownership (see Introduction, Table 2).

During 2013 HRC botanists found 54 occurrences of eight 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.

2013 COMPREHENSIVE REFERENCE LIST

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