
Year End Report for the 2023 Botanical Survey Season



Photo Caption: A bumblebee harvesting the plunders of the robust false lupine flowers.

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Year End Report for the 2023 Botanical Survey Season

Prepared for:

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EXECUTIVE SUMMARY

Green Diamond Resource Company (GDRCo) botanical technicians surveyed a total of 36 timber harvest plans covering approximately 6,294 acres. A total of 32 plans were surveyed to completion; 2 plans were initiated in 2022 and completed in 2023; and 2 plans were initiated in 2023 and will be completed in 2024. The 2023 floristic survey season commenced on February 27th and concluded on August 30th with an estimated 126 field days. A total of 105 new California Rare Plant Rank (CRPR) 1 and 2 BotID#s were generated from THP and non-THP surveys, representing nine taxa. A total of 104 new CRPR 3 and 4 BotID#s representing thirteen taxa were generated from THP and non-THP surveys as a part of a continued commitment to collecting spatial data and habitat data for uncommon species. There was one new population of a state listed species, *Bensoniella oregana*, discovered during the 2023 season. No federally listed plant species were found following our surveys.

Within the Coastal Lagoons and Little River Botanical Management Area (CL/LR BMA), 8 harvest plans were reviewed and 5 received surveys in unique habitats. Running pine (*Lycopodium clavatum*) was the most prevalent uncommon plant encountered in the harvest plans, with a few occurrences of seaside bittercress (*Cardamine angulata*) detected as well.

Two days were spent during the second week of March in the Salmon Creek tract monitoring existing populations of *Montia howellii*. Snow showers occurred during late February and early March, making it difficult to survey for the plants in higher elevation areas of the tract. Plants were seen along the visible stretches of the road prism.

A summary data set for all occurrences has been prepared and will be submitted to the CNDDDB. This summary will include 209 field survey forms for all CRPR taxa discovered in 2023, 181 follow-up forms for 23 taxa, and the corresponding location data in ESRI File Based Geodatabase (FBGDB) format.

The Botany Department continues to work on and incorporate existing goals into a new goal set to start in 2024 following the creation of the County Line Botanical Management Area.

- Inclusion of the County Line Botanical Management area into the Sensitive Plant Conservation Plan.
 - The County Line BMA was approved and signed by CDFW in the fall.
 - Two new THPs have been laid out within the County Line BMA. One will be exempted from floristic surveys and the other project contains one unit within the *Piperia candida* study zone, so the THP will receive partial surveys.
 - A poster highlighting the County Line BMA was presented at the Northern California Botanists Symposium in January of 2024.

- Plan for Botanical Management Area development in the short and long term.
 - Early stages of planning started later in 2023. Planning and collaboration with CDFW will start in early 2024.

- Develop Property-Wide Programmatic Agreements for *Astragalus umbraticus* and *Thermopsis robusta*. If time allows, create programmatic agreements for *Sidalcea malviflora subsp. patula*.
 - Property-Wide Programmatic Agreements for these species have been outlined and discussion with CDFW will occur in 2024.

RESULTS OF SPECIAL STATUS PLANT POPULATION SURVEYS

Exhibited in the following tables are the records of new plant populations in 2023 for California Rare Plant Ranks 1-4. There are two main sections, separated by detections made within and outside of active THPs. For clarity, plant findings that are associated with THPs that are still in need of complete surveys are not recorded in the tallies for the year.

Rare and Uncommon Species Associated with THPs

Rare Species – CRPR 1 and 2 Detections

| CRPR | Scientific Name | Common Name | Code | Detections (BotID#s) | Number of Projects |
|-------|--------------------------------------|----------------------------|--------|----------------------|--------------------|
| 1B.1 | <i>Bensoniella oregona</i> | Bensoniella | BEOR | 1 | 1 |
| 2B.2 | <i>Cardamine angulata</i> | seaside bittercress | CAAN | 5 | 3 |
| 2B.2 | <i>Erythronium revolutum</i> | coast fawn lily | ERRE | 10 | 1 |
| 1B.2 | <i>Gilia capitata ssp. pacifica</i> | Pacific gilia | GICAPA | 1 | 1 |
| 2B.2 | <i>Montia howellii</i> | Howell's montia | MOHO | 10 | 3 |
| 2B.2 | <i>Monotropa uniflora</i> | ghost pipe | MOUN | 66 | 5 |
| 1B.2 | <i>Piperia candida</i> | white flowered rein orchid | PICA | 4 | 2 |
| 1B.2 | <i>Piperia candida (unconfirmed)</i> | white flowered rein orchid | PICAU | 1 | 1 |
| Total | | | | 98 | 14 |

Uncommon Species – CRPR 3 and 4 Detections

| CRPR | Scientific Name | Common Name | Code | Detections (BotID#s) | Number of Projects |
|-------|--------------------------------------|---------------------------|-------|----------------------|--------------------|
| 4.3 | <i>Chrysosplenium glechomifolium</i> | Golden saxifrage | CHGL | 15 | 6 |
| 4.2 | <i>Coptis laciniata</i> | Oregon goldthread | COLA | 3 | 3 |
| 4.3 | <i>Lathyrus glandulosus</i> | sticky pea | LAGL | 3 | 1 |
| 4.3 | <i>Lilium kelloggii</i> | Kellogg's lily | LIKE | 1 | 1 |
| 4.2 | <i>Listera cordata</i> | heart-leaved twayblade | LICO | 26 | 14 |
| 4.1 | <i>Lycopodium clavatum</i> | running pine | LYCL | 9 | 6 |
| 4.2 | <i>Mitellastrum caulescens</i> | leafy-stemmed miterwort | MICAU | 10 | 5 |
| 4.3 | <i>Oxalis suksdorfii</i> | Suksdorf's wood sorrel | OXSU | 2 | 2 |
| 4.2 | <i>Pityopus californicus</i> | California pinefoot | PICAL | 8 | 5 |
| 4.3 | <i>Ribes laxiflorum</i> | trailing black currant | RILA | 13 | 6 |
| 4.2 | <i>Sidalcea malachroides</i> | maple-leaved checkerbloom | SIMA | 1 | 1 |
| 4.2 | <i>Usnea longissima</i> | Methuselah's beard lichen | USLO | 10 | 3 |
| Total | | | | 101 | 21 |

* The Hunter Ranch THP (CDF#1-23-00189-HUM) was split into two projects in our database due to the major changes that occurred with the plan. The original four units were dropped after we had completed the spring surveys due to wildlife conflicts. The findings for the Hunter Ranch THP are included in the species counts above. Findings for the Hunter Ranch "II" THP, which received summer surveys but still needs spring surveys in 2024, are not included in this year's annual report but will be reflected in next year's annual report once the project is complete.

Detections of Potentially Rare Species

The Botany Department seeks to visit THPs during the peak blooming window for species of special concern so there is a positive species ID with presented floral characteristics. There are a few reasons as to why plant populations are recorded as an unidentified species, such as herbivory or immaturity. It is common for *Erythronium* and *Piperia* populations to be detected in early spring and require a follow-up visit to determine if it is rare or not based on specific species level identifiers. Though the identification process may prove to be challenging as it may take years to complete because some plants require a few years to develop floral parts that are vital for identification.

Surveys completed in 2023 found 27 new potentially rare plant populations in 6 different THPs: Boulder Bottoms 2022, Madrone 200, Bolster Deuce, Thin Devil Thin, Peacock, and Martin Creek 2021. Three of the plant populations were provided mitigations while the remaining were not. The majority of *Piperia sp.* populations started to produce an inflorescence late in summer, indicating that they were not *P. candida*, so they were not provided protection. The *Prosartes sp.* population in the Peacock THP will be revisited in 2024 to confirm the ID.

| Scientific Name | Common Name | Code | Detections (BotID#s) | Number of Projects |
|------------------------|-------------|------|----------------------|--------------------|
| <i>Erythronium sp.</i> | fawn lily | ERSP | 1 | 1 |
| <i>Piperia sp.</i> | rein orchid | PISP | 25 | 5 |
| <i>Prosartes sp.</i> | fairy bells | PROS | 1 | 1 |

Non-Rare Species Detections

Erythronium californicum proved to be quite abundant in the Hunter Ranch and Martin Creek 2021 THPs this year, as were several species of *Piperia*. These areas of the property are higher in elevation, hosting a hotter and drier environment than most of the property. The rare species of these genera tend to taper off in these dryer areas and the non-rare species become more abundant.

| Scientific Name | Common Name | Code | Detections (BotID#s) | Number of Projects |
|--|-------------------------------|--------|----------------------|--------------------|
| <i>Erythronium californicum</i> | California fawn lily | ERCAL | 20 | 3 |
| <i>Piperia elongata</i> | dense-flower rein orchid | PIELO | 2 | 2 |
| <i>Piperia transversa</i> | green stripped Piperia | PITR | 3 | 2 |
| <i>Piperia unalascensis</i> | Alaska rein orchid | PIUN | 2 | 1 |
| <i>Sidalcea asprella ssp. asprella</i> | Sierra foothills checkerbloom | SIASAS | 6 | 2 |

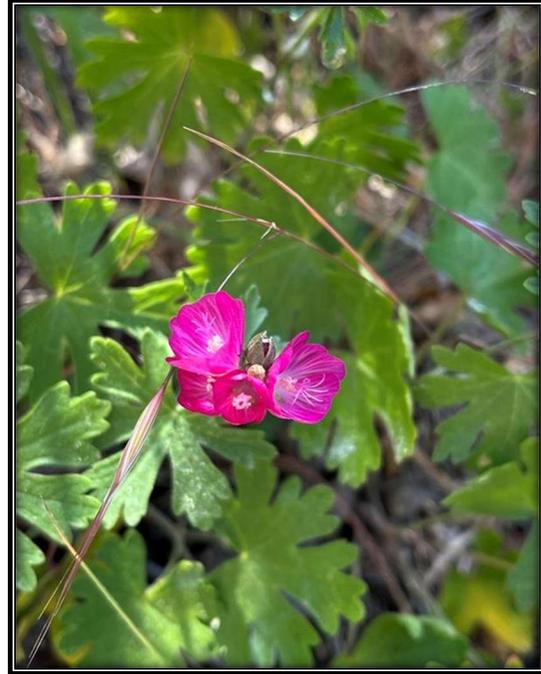


Photo caption: *Piperia elongata* inflorescence gleaming in the warm August sun (left). *Sidalcea asprella* subsp. *asprella* seen thriving in a recently clearcut stand. Hundreds of plants occupied the site in a unit adjacent to the Madrone 200 THP (CDF#1-23-00034-HUM) (right).

Rare and Uncommon Species Not Associated with THPs (Incidental Detections)

There are several rare and uncommon plant populations that are detected every year on various parts of the property that are not associated with THPs. The Botany Department still records and submits data for these populations to the CNDDDB.

Rare Species – CRPR 1 and 2 Detections

| CRPR | Scientific Name | Common Name | Code | Detections (BotID#s) |
|------|------------------------------|--------------------------|-------|----------------------|
| 2B.3 | <i>Astragalus umbraticus</i> | Bald Mountain milk-vetch | ASUM | 1 |
| 2B.2 | <i>Erythronium oregonum</i> | giant white fawn lily | ERORL | 2 |
| 2B.2 | <i>Erythronium revolutum</i> | coast fawn lily | ERRE | 2 |
| 2B.2 | <i>Montia howellii</i> | Howell’s montia | MOHO | 1 |
| 2B.2 | <i>Monotropa uniflora</i> | ghost pipe | MOUN | 1 |
| 1B.2 | <i>Iliamna latibracteata</i> | California globe mallow | ILLA | 1 |

Uncommon Species – CRPR 3 and 4 Detections

| CRPR | Scientific Name | Common Name | Code | Detections (BotID#s) |
|------|-------------------------|------------------------|------|----------------------|
| 4.2 | <i>Coptis laciniata</i> | Oregon goldthread | COLA | 1 |
| 4.2 | <i>Listera cordata</i> | heart-leaved twayblade | LICO | 1 |

Detections of Potentially Rare Species

| Scientific Name | Common Name | Code | Detections (BotID#s) |
|------------------------|-------------|------|----------------------|
| <i>Erythronium sp.</i> | fawn lily | ERSP | 5 |

Non-Rare Species Detections

| Scientific Name | Common Name | Code | Detections (BotID#s) |
|---------------------------------|------------------------|-------|----------------------|
| <i>Erythronium californicum</i> | California fawn lily | ERCAL | 1 |
| <i>Piperia transversa</i> | green stripped piperia | PITR | 1 |



Photo caption: Members of the crew observing the newly emerged population of *Iliamna latibracteata* alongside a unit that was clearcut the year prior (left). Stunning group of *Erythronium oregonum* in peak bloom (right).

COASTAL LAGOONS AND LITTLE RIVER BOTANICAL MANAGEMENT PLAN STATUS

GDRCo and CDFW agreed that the long-term survey protocol for THPs within the Coastal Lagoons and Little River BMA, effective 2009, is as follows:

1. RPFs shall conduct focused surveys for all THPs within the Coastal Lagoons and Little River BMA. RPFs shall be responsible for reporting the presence of any unique, high quality, sensitive plant habitat within their project area, e.g. bogs, well developed lakes or ponds, coastal prairie or large mossy boulders or rock outcrops. When *Lycopodium clavatum* is encountered within THP areas, voluntary, non-enforceable PPMs will be applied. These PPMs include establishing ELZs for select populations and retaining non-merchantable trees. If other sensitive species are observed, the RPF will consult with GDRCo botany staff.

2. *Botanical technicians shall survey unique, high quality sensitive plant habitats within THPs as identified by RPFs. If sensitive species are discovered appropriate PPMs shall be applied.*
3. *Botanical technicians shall monitor a subset of L. clavatum populations on a yearly basis. Initially, monitoring activities will focus on pre- and post-harvest monitoring of populations protected with voluntary, internal PPMs that were implemented for plans submitted after July 8, 2008. Revisions to internal PPMs may be made based on monitoring results.*
4. *Botanical technicians will survey unique or high-quality habitats outside of THPs when they are identified. The intent is to find and survey areas within the BMA that have the greatest likelihood of supporting sensitive species, regardless of whether the habitat would ever be impacted by timber harvest operations.*

Summary of THP activity and survey coverage in the CL/LR BMA since adoption of the Botanical Management Plan (BMP) in 2008.

| Year | THP acres in BMA | BMA acres surveyed | BMA acres exempt from survey |
|---------------|------------------|--------------------|------------------------------|
| 2008 | 3,029 | 1,219 | 1,810 |
| 2009 | 670 | 76 | 594 |
| 2010 | 3,813 | 109 | 3,704 |
| 2011 | 1,975 | 52 | 1,923 |
| 2012 | 893 | 1 | 892 |
| 2013 | 1,811 | 52 | 1,759 |
| 2014 | 2,185 | 137 | 1,620 |
| 2015 | 2,625 | 148 | 2,374 |
| 2016 | 1,594 | 109 | 1,485 |
| 2017 | 1,857 | 204 | 1,654 |
| 2018 | 2,344 | 807 | 1,537 |
| 2019 | 1,138 | 273 | 865 |
| 2020 | 1,262 | 60 | 1,202 |
| 2021 | 762 | 60 | 702 |
| 2022 | 905 | 14 | 891 |
| 2023 | 797 | 88 | 709 |
| Totals | 27,660 | 3,124 | 23,721 |

Three new THPs were surveyed partially within the Coastal Lagoons and Little River BMA by the Botany Department in the 2023 field season to assess potential habitat for rare plants. Surveys were focused on wetland features and major water courses with Sitka spruce present, looking for habitat that could host *Cardamine angulata* or *Moneses uniflora*. Twelve new plant populations were recorded following the surveys in the BMA. There were two populations of *Cardamine angulata*, one population of *Coptis laciniata*, two populations of *Listera cordata*, four populations of *Ribes laxiflorum* and three populations of *Lycopodium clavatum*. Both populations of *Cardamine angulata* will receive programmatic protections and two out of the three *Lycopodium clavatum* populations will be mitigated with an Equipment Exclusion Zone (EEZ).

COUNTY LINE BOTANICAL MANAGEMENT AREA

On October 27th CDFW signed the County Line Botanical Management Area and Botanical Management Plan. This agreement streamlines survey requirements for THP assessment, outlines annual monitoring of known sensitive plant occurrences, and guides survey efforts to high quality habitats outside of the THP framework. Below are the specific provisions outlined in the CLBMA:

Survey protocols in the BMA

Botanical surveys of new Timber Harvest Plans (THP) within the County Line BMA will be focused on areas where habitat for sensitive plants occur *AND* where there is potential for adverse effects. Areas devoid of suitable habitat and/or lacking potential for adverse effects will not receive botanical surveys.

Pre-survey review (THP specific scoping):

Thorough office review using an extensive botanical database and Geographic Information system (GIS) of each THP in the BMA will be performed to determine the potential presence of suitable sensitive plant habitat in the harvest plan area. Factors considered include: (1) habitats and special survey areas present in the THP area (e.g., *Monotropa uniflora* survey area, *Piperia candida* survey area, rock outcrops, etc.), and (2) forest composition (e.g., *Picea sitchensis* dominated stands). Forestry staff will assist with identifying these areas, since they have first exposure to and intimate on-the-ground knowledge of the THP area.

Survey efforts

THP level surveys will be limited to areas of high potential for target species *AND* potential for adverse effects. A summary list of habitats that will receive focused surveys in the County Line BMA is given below:

- Stands that have a significant component of *Picea sitchensis* will be surveyed for *Moneses uniflora*. Stands will meet this threshold when at least 50% of the basal area of the stand is made up of *P. sitchensis*. All portions of the THP area that meet this threshold will be surveyed for *M. uniflora*. Default plant protection measures will be implemented if this plant is observed.
- The ridgeline area between Tectah/Johnsons Creeks and Mettah Creek along the southeastern boundary of the BMA will be surveyed for *Piperia candida*. Any THP unit located in this region will be surveyed for *P. candida*. If detected, plants will be protected under GDRCo's property-wide consultation for the species.

- The general area surrounding the pocket of *Monotropa uniflora* populations occurring in the northern part of the BMA will receive surveys – this area is bounded by Omagar Creek to the East, North Fork Ah-Pah Creek to the South, and Tarup Creek to the West and North. If detected, plants will be protected under GDRCo’s Property Wide Consultation for the species.
- Rock outcrops to be utilized as a rock source that have not received botanical surveys in the past.

Reporting

Reporting on each THP will follow GDRCo’s reporting requirements as outlined in the SPCP (GDRCo 2008) and applicable property-wide consultation requirements for sensitive species: *Cardamine angulata* (2018), *Erythronium revolutum* (2018), *Monotropa uniflora* (2007), and *Piperia candida* (2020). A discussion describing the level of survey effort for each THP will be included in the standard report. This discussion will include a summary of the habitat assessment and a rationale for the level of survey effort focused in that area.

Monitoring of sensitive plants in the County Line BMA

Monitoring efforts in the BMA will focus on two key areas: Focused surveys outside of previously assessed areas and monitoring of known populations. Reporting on monitoring efforts in the BMA will be included in GDRCo’s year-end report to CDFW.

In-lieu of full THP level surveys in the BMA, GDRCo botanists will conduct focused surveys in high quality habitats that lack survey coverage. This proactive survey effort will allow us to effectively survey areas that may never be assessed for Timber Harvesting Plans and will lead to a greater understanding of the distribution of sensitive plants in the BMA. The level of time dedicated to this effort will be related to the number of THPs in the BMA in any given year. For example, if there is one THP in the BMA, there will be at least one person-day dedicated to the effort in that survey season. High quality habitats are somewhat limited in this BMA, therefore, focused monitoring efforts will cease when botany staff cover all quality habitats. Below are sensitive plants and associated habitat that may be among those surveyed outside of the THP process:

- Class I, and large Class II watercourses may be surveyed for the presence of *Cardamine angulata*, *Erythronium revolutum* and *Packera bolanderi* var. *bolanderi* (See Risk Analyses section for details).
- Wet areas (e.g., swamps, bogs, ponds, etc.) may be surveyed for a suite of wetland associated species (See Risk Analyses section).
- Rock outcrops that may be utilized as rock source and cut banks associated with riparian areas may be surveyed for *Erythronium revolutum* and *Packera bolanderi* var. *bolanderi* (See Risk Analyses section for details).

In addition to the monitoring efforts above, each year the GDRCo botany department will revisit and monitor a selection of known sensitive (CRPR list 1 or 2) plant populations within the BMA on GDRCo ownership. Currently there are three sensitive species occurring on the ownership within the BMA. These follow-up visits will monitor

the effectiveness of GDRCo's plant protection measures imposed for each population, as well as serving as indicators for the species well-being throughout the area. Effort will be made to revisit a diversity of populations over time (See Appendix E for an overview of Annual Monitoring and Survey Commitments)

- *Erythronium revolutum* populations will be revisited at a rate of at least one per year.
- *Cardamine angulata* populations will be revisited at a rate of at least two per year.
- *Monotropa uniflora* populations will be revisited at a rate of at least three per year.

Two new THPs have been laid out within the County Line BMA. One will be exempted from floristic surveys and the other project contains one unit within the *Piperia candida* study zone, so the THP will receive partial surveys. Summary of THP activity, survey coverage, and annual monitoring in the CLBMA will be reported annually.

GDRCo botanists attended the 2024 Northern California Botanists Symposium and presented a poster outlining the development and conservation measures of the County Line Botanical Management Area. Below is an abstract from that effort:

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Landscape level botanical management in an industrial timberland environment: development of the County Line Botanical Management Area.

For over two decades, Green Diamond Resource Company (GDRCo) has conducted pre-disturbance floristic surveys for Timber Harvesting Plans (THPs), covering more than 160,000 acres, or nearly 40% of the current ownership. The overarching goal of GDRCo's Sensitive Plant Conservation Plan (SPCP) is to utilize this vast dataset to effectively manage special status plant species at a landscape level, rather than on a project-by-project basis. To achieve this, Botanical Management Areas (BMAs) are established and paired with region-specific Botanical Management Plans (BMPs), outlining compatible land management practices and plant protection measures for the sensitive plants known to occur in these areas. In 2023, GDRCo collaborated with the California Department of Fish and Wildlife (CDFW) to develop the County Line Botanical Management Area (CLBMA), spanning approximately 54,000 acres in the Coastal Klamath region of Northwest California. The CLBMA is an ideal candidate for landscape-level management for several reasons: (1) The area has a relatively predictable forest type, (2) it has been extensively surveyed by GDRCo botanists, (3) there are relatively few special status plant species known to occur in the area. A thorough scoping effort and accompanying risk analysis was performed for the CLBMA, leading to the development of a suite of conservation measures as a BMP. These measures include THP level surveys, annual monitoring of known special status plant occurrences, and yearly surveys of high-quality habitat outside of project areas. Ultimately, this proactive approach to rare plant management will allow for more focus to ongoing projects that conserve known sensitive botanical resources.

YEAR END MITIGATION SUMMARY

Survey efforts in 2023 yielded 97 new BotID#s for confirmed CRPR List 1 and 2 species. Many of these populations were mitigated to keep the entire population protected from impacts due to timber harvest operations. There were many new *Monotropa uniflora* detections made this year. Programmatic protection measures were provided as feasible to the most robust, healthy populations. An ample percentage of populations occur within the riparian corridors, so they will be protected by default within the Riparian Management Zone (RMZ) buffers.

Four populations of *Erythronium revolutum* were not afforded programmatic protection measures due to operational logistics. *E. revolutum* populations nearly completely occupied the unit they were in, so the most robust populations were provided with protection in the unit while the smaller populations were not. The Botany Department will continue to monitor these sites and observe the overall health and success of these populations with the protection measures provided.

Table: Summary of Plant Protection Measures for 2023 Season

| Code | Species | Common Name | Mitigation Used | Total Populations | Mitigated Populations |
|--------|-------------------------------------|----------------------------|----------------------------------|-------------------|-----------------------|
| BEOR | <i>Bensoniella oregana</i> | Bensoniella | Avoidance | 1 | 1 |
| CAAN | <i>Cardamine angulata</i> | Seaside bittercress | Programmatic | 7 | 7 |
| ERRE | <i>Erythronium revolutum</i> | Coast fawn lily | 25' EEZ, Avoidance, Programmatic | 14 | 10 |
| ERSP | <i>Erythronium sp.</i> | fawn lily | Avoidance | 1 | 1 |
| GICAPA | <i>Gilia capitata var. pacifica</i> | pacific gilia | Avoidance ELZ | 1 | 1 |
| LYCL | <i>Lycopodium clavatum</i> | Running pine | Programmatic | 9 | 3 |
| MOUN | <i>Monotropa uniflora</i> | Ghost pipe | Other, Programmatic, Avoidance | 76 | 23 |
| MOHO | <i>Montia howellii</i> | Howell's montia | Other, Programmatic | 15 | 15 |
| PICA | <i>Piperia candida</i> | White-flowered rein orchid | Programmatic | 1 | 1 |
| PISP | <i>Piperia sp.</i> | rein orchid | 50 ft. buffer | 25 | 3 |
| PROS | <i>Prosartes sp.</i> | fairy bells | Avoidance | 1 | 1 |
| THRO | <i>Thermopsis robusta</i> | robust false lupine | Avoidance | 1 | 1 |

MONITORING AGREEMENTS

THP Monitoring Agreements

The following summaries are specifically for binding monitoring agreements that have been made with CDFW during consultation for proposed mitigations in select THPs. Voluntary monitoring efforts are described in detail in this report, as well (see Follow-up Visits section of report).

Bald Mountain milkvetch (Astragalus umbraticus)

Hereunder are the project names and BotID#s associated with the monitoring agreements for that project for this species.

Big Prairie (2018) THP (CDF#1-17-137H): BotID#1361, BotID#1362, and BotID#35361

Tully Creek East THP (CDF#1-17-143H): BotID#398, BotID#31592, BotID#35667, BotID#35668

Outer Hancorne (2018) THP (CDF#1-17-144H): BotID#1789

Big Prairie (2018) THP

The three *Astragalus umbraticus* populations (BotID#1361, BotID#1362, and BotID#35361) associated with the Big Prairie (2018) THP (GDRC# 51-1702) that had received limited protections during road maintenance in 2018 and 2020 have been sustaining their numbers since the initial flush of new plants post-disturbance. BotID#1361 has continued to increase in size while BotID#1362 and BotID#35361 have slightly declined in size. The populations consisted of mostly large, mature, reproductive plants with few seedlings.

BotID#1361 and BotID#1362 were both originally detected in 2006. The populations began to decline in numbers over the course of 10 years as the brush and vegetation outcompeted the plants. Plant protection measures for these two populations consisted of limitations to grading depth and reducing the movement of spoils. These protections were tailored to promote a disturbance event and keep seeds on site. After road maintenance and harvesting occurred in 2018, the populations had an initial drop in individuals, but the following year had a huge flush of seedlings. BotID#1361 went from 3 individuals pre-disturbance to 410 the following year. The population has now remained consistent at around 400 individuals for the past 4 years. The slight decline in population size may be influenced by competitive interactions of scotch broom growing on a section of the road that the population occupies. BotID#1362 was last recorded with 125 individuals in 2013, then it expanded to 500 individuals in 2017, 2 years after road maintenance had occurred. The population now stands at 480 individuals in 2023, after having its largest population size of 1,000 plants in 2020. BotID#1362 received further disturbance in 2020 with the Tully Thin THP (GDRC#51-2001) (CDF#1-20-00085-HUM), which may explain a decrease in population size.

BotID#35361 was detected in 2018 with 18 individuals on a brushed over road segment. The population was not provided with any protection measures for the Big Prairie (2018) THP. Road maintenance in 2019 led to a total

of 25 individuals in 2020, which then exploded into a flush of 900 individuals in 2021. The population now stands at a whopping 1,750 individuals in 2023. Recent controlled pile burning and road maintenance near the population have promoted a flush of new seedlings to sprout, creating a great expansion in the total area occupied by the population. All three of the populations associated with this THP continue to receive periodic disturbance allowing them to persist on the landscape. Encroaching vegetation remains the biggest threat to the populations, but with periodic soil disturbance and a steady seed bank established, the species will continue to persist on the landscape.

Tully Creek East THP

Four populations (BotID#398, BotID#31592, BotID#35667 and BotID#35668) are associated with the Tully Creek East THP (GDRCo# 51-1706). Three of those populations occur on the appurtenant BH-1900 road system: BotID#398, BotID#35667, and BotID#35668. Road maintenance was permitted to occur throughout the populations, but spoils generated from road grading were kept within the population boundaries. The units appurtenant to the BH-1900 were harvested in 2021, with roadwork occurring in 2019 and in 2020. Monitoring efforts of the populations to assess their response to standard road maintenance activities have shown positive results.

BotID#398 was first detected in 2001 with 283 plants. The population size fluctuated over the next 18 years until roadwork commenced in 2019. 125 plants were seen the following year. Following more road use and road grading, the population declined down to 30 plants in 2022. In 2023, an impressive 420 plants were observed by two surveyors. There is a large flush of seedlings on the western side of the road, with mature plants in the center of the road. BotID#35668 just south of this population had a similar result. The population started out with 62 plants in 2018. Following road grading and use in 2019, the population declined to 18 plants up until 2023, when 80 plants were seen. The population is now growing on both sides of the road, expanding to the outboard slope. BotID#35667 located at the gate to the BH-1900 has returned to its original size of 10 plants. Several seedlings were tucked beneath a regenerating Douglas fir just in front of the gate along with two mature plants on the slope in full flower.

On a different appurtenant road to the plan, the BH-2700, BotID#31592 continues to be monitored as well. It was first detected in 2015 in association with the Annual Work Plan. The road work at that site was completed in 2020, bringing the population from 25 plants in 2018 to 12 in 2020. A flush of seedlings was seen in 2021, bumping the population size to 90 individuals. In 2022 the population doubled in size to 196 individuals composed mostly of large, flowering plants. In 2023, 135 plants were seen with about half of them in bloom. No protection measures were ever provided to the population, and it has been shown that the disturbance to the site has been beneficial to the health of the population.



Photo Caption: A massive ASUM from BotID#398 observed growing in the center of recently maintained BH-1900 road.

Outer Hancorne (2018) THP

BotID#1789 was first detected in 2001 in association with the N#356/51-0110 (CDF#1-01-130H) but didn't have a record created in our database until 2007. Notes from 2001 state that the plants were growing near the end of a spur road off the Hancorne-100, with more plants seen further down the road. The total number of individuals was never recorded during the initial detection. In 2018 there were no plants observed during a follow-up visit in association with a new THP, Outer Hancorne (2018) (CDF#1-17-144H). The road has become overgrown with *Arctostaphylos columbiana* and *Rubus ursinus*. Given the dense shrub cover, no protection measures were applied to this population in hopes that the disturbance and clearing of vegetation may cause new seeds to germinate. In 2019 and in 2020, no plants were seen, and no roadwork had been conducted. In this year's visit, roadwork appeared to have taken place in the last year or two, giving rise to 4 young individuals. Competing vegetation has begun to grow in but isn't impacting the population yet. Seeing how quickly other vegetation is growing in and given the immaturity of the population, it may not have many years to set seed before being outcompeted. But with regular intervals of disturbance, this population would have a higher chance of survival.



Photo Caption: A young Bald Mountain milkvetch, BotID#1789, seen in the lower left-hand corner amongst the many manzanita sprouts in the recently graded road prism.

Flaccid sedge (Carex leptalea)

BotID#30010 was first detected in 2010 in accordance with the CR-1700 (2012) THP (CDF#1-10-137H). An estimated population count of 20 plants was recorded growing on the appurtenant CR-1000.78R road. The plants were seen growing along the margins of the road, directly at a road point. Both sides of the road were saturated or had pooled water and were receiving light from the adjacent clearcut. The plants on the outboard edge of the road were protected with a 25' ELZ to allow for equipment to access the stand adjacent to it for operations while reducing direct impact to the population. Operations occurred in the late summer to allow for the road to dry as much as possible for greater soil stability. No rock could be applied to the road surface, nor could the graded material be laid atop the population. In 2011, prior to road work, the crew returned to the site and removed *Cortaderia jubata* from the population area by shovel. This relieved some of the competition from the grass, but grading from the road work was predicted to help remove some of the larger plants from the road prism.

The population did not receive a formal follow-up report until 2022, though it likely was revisited post operations for the CR-1700 (2012) THP. 63 plants were observed, most being mature and flowering, growing in the center of the road. The plant count was a best estimate given that the *C. jubata* was dense along the edges of the road and its long leaves draped over the area where young plants were observed growing. This population is now associated with the CR1000/1900 THP (CDF# 1-21-00143-HUM), growing on the road appurtenant to unit B. An ELZ was placed along the extent of the population, about 25' long by 10' wide. The surface of the road was graded to level out water bars, then laid over the population was fabric and then rock to establish a stable running surface. The rock and fabric were removed once timber harvest operations for unit B were complete. Photos were taken from the northern and southern end of the population to document changes in the habitat and establish the response of the population to the disturbance.



Photo Caption: Before impact (left) and after initial impact (right), looking south from the northern end of the population.



Photo Caption: Before impact (left) and after initial impact (right), looking north from the southern end of the population.

Initial impact to the site cleared the road prism of all vegetation and trimmed the pampas grass back a few feet. Water pooling on the road surface is a good sign that the drainage of the road prism was not altered. Revisiting the site one-year post disturbance brought on some exciting finds. Three young flaccid sedge plants were seen growing at the northern edge of the population area. The plants were small, but one had a single inflorescence present. As seen in the photos below, many small plants have emerged across the site, especially on the northern side of the population area (left photo). It was difficult to determine if the small blades emerging through the soil were very young *C. leptalea* plants or if they were a species of *Eleocharis*. Future visits will help determine the identity of the young plants.



Photo Caption: One year post impact, looking south (left) and looking north (right). Young flaccid sedge plants (center) seen coming back to the site.

Ghost pipe (Monotropa uniflora)

The start of the monitoring study effort for the population of ghost pipe in the Winchuck 2022 THP (CDF# 1-22-00145-DEL) has commenced. In collaboration with CDFW botanist Bianca Hayashi, a study and monitoring effort was implemented for the 10-acre population, BotID#37136, that was detected in 2022 during surveys for the Winchuck 2022 THP. The population occurs in unit C, which is a 77-acre unit composed of a young 30-year-old *Sequoia sempervirens* and *Pseudotsuga menziesii* var. *menziesii* mixed stand. Cut-to-length thinning operations for this unit began in the fall of this year and will be completed by early 2024.

Providing programmatic protection measures to the 10-acre population would consume nearly half of the unit and create conflict with operation logistics. Instead, a 2-acre area of the population received a 66' No-Harvest buffer while the rest of the population area would receive no protection. This unique protection buffer in pairing

with the thinning operations gave rise to an opportunity to study the effects that different types of silviculture have on the species.

It will be a six yearlong study, starting the year before timber harvest occurs and then monitoring the population yearly for five years after timber harvest has occurred. The study will document the changes in tree composition and monitor the recovery of ghost pipe in the five years following disturbance. This study will give us an idea of how well *Monotropa uniflora* responds to thinning operations.

This year we established a series of 15 plots across the population area in both the protected and non-protected areas. Data recorded at each plot included: a count of all conifer stems, measuring the diameter at breast height (DBH) of each conifer, and a count of ghost pipe stems, if present. The plots have a 25' radius, utilizing a tree as the plot center. Photos were taken at each plot in all four cardinal directions to document the changes that will occur over the five years. The crew looks forward to monitoring the first year post-harvest to assess the immediate response to thinning operations.

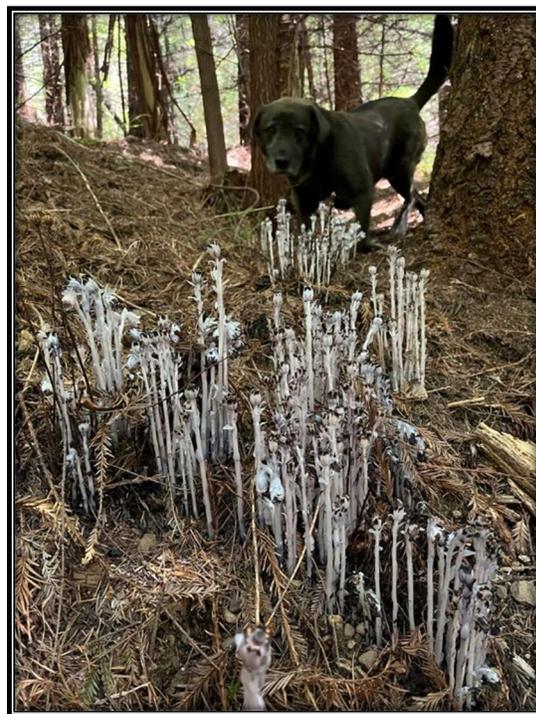
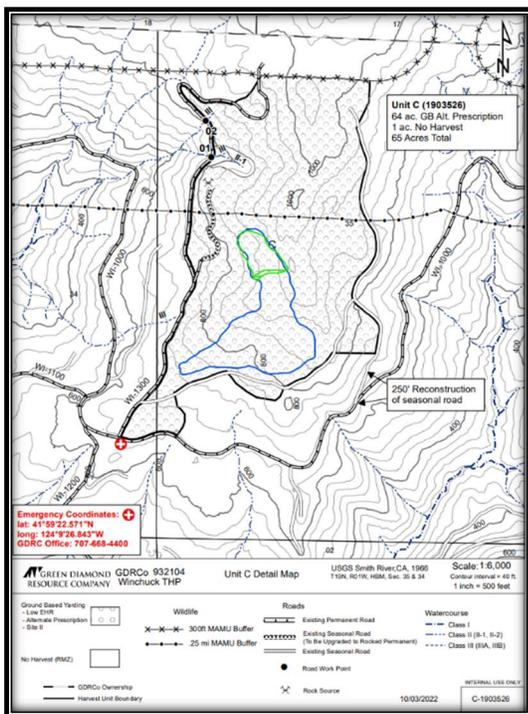


Photo Caption: Unit C of the Winchuck 2022 THP (GDRC#932104) with the area covered by BotID#37136 outlined in blue and the area of the population receiving protection outlined in green (left). Hans and his trail of maturing ghost pipe plants at one of the plots (right).

Robust false lupine (Thermopsis robusta)

Hereunder is the project name and BotID# of the species which is included in the special monitoring agreements made with CDFW.

High Prairie Combo 19 THP (CDF# 1-20-00012-HUM): BotID#1898

BotID#1898 was initially detected in 2008 during surveys for High Prairie 2008 THP. The population was a small bunch of just 3 plants that resided on the side of the HP300 road. Avoidance protection measures were put in place and the population was provided plant buffer flagging. The population size varied between 2 to 4 plants and were observed on both sides of the road margin in following visits.

Avoidance protections for this population were reestablished in 2019 in association with the High Prairie Combo 19 THP. Notes regarding the population in 2019 mentioned how the plants were being outcompeted by other vegetation and had suffered from having brush piled on top of them after recent road clearing. To reduce these impacts, the remaining plants were protected with an Equipment Exclusion Zone (EEZ) where the plants occurred and demarcated with 3 painted t-posts. Harvest activities were still permitted to occur immediately adjacent to and surrounding the plants, with the prospect that the disturbance may increase habitat for expansion.

During a 2022 visit, the population was recorded at 15 individuals, with nearly 75% of those being seedlings. Harvest operations completely avoided the protected cluster of plants on the east side of the HP300 road. On the west side, the proposed road HP-390 road was constructed, and a new flush of plants was found in the disturbed habitat. All together the plants were in excellent condition. The older, previously existing plants were robust and were successfully reproductive.

The expansion did not stop there; by 2023 the population had doubled in size with a remarkable 30 plants. The larger mature plants were still present and clearly thriving as they were in full flower. The remaining plants were the seedlings growing on the road prism and on the road edge. Effective mitigation efforts to avoid disrupting the population played a crucial role in conserving these individuals until the opportune moment to ignite the seed bed. The plants will presumably continue to thrive in this newly disturbed habitat.



Photo Caption: BotID#1898 putting on a full display with vibrant yellow inflorescences in full bloom.

Spotted Knapweed Monitoring at Sweet Flat, Mad River

In 2013 the GDRCo botany department began collaborating with the Humboldt County Department of Agriculture to monitor and remove spotted knapweed (*Centaurea stoebe*) from the gravel bars along the Mad River near the City of Blue Lake. Spotted knapweed was initially detected in 2013 along the Mad River at three locations south of the Mad River Hatchery. One of these locations is at “Sweet Flat” which is best accessed from private GDRCo roads.

In 2014, the site was surveyed, and no plants were detected. The gravel bars along the river were surveyed to the south of the site and no other populations were detected in these regions either. The site was surveyed in 2015 and one population was detected and removed; the gravel bars along the river were surveyed to the south of the site again and no additional plants were detected. In 2016 the botany crew removed approximately one hundred spotted knapweed plants and disposed of them offsite. Plants have been removed every year since with some variability in the number of plants found. Thirty plants were removed in 2017, fifty in 2018, four in 2019, six in 2020, thirty-four in 2021, twenty-nine in 2022, and thirty-three were observed and removed in 2023. Additionally, there is an infestation of yellow star thistle (*Centaurea solstitialis*) at this site that was first detected in 2016 and has been variably present over the years, as with the spotted knapweed. There are several known infestations of yellow star thistle throughout the watershed. It is assumed that the low water conditions and higher than average temperatures associated with the drought cycle may be contributing to increased suitability for invasive species infestations. Due to the riparian nature of the habitat, there is no plan to use herbicides in treating this site.

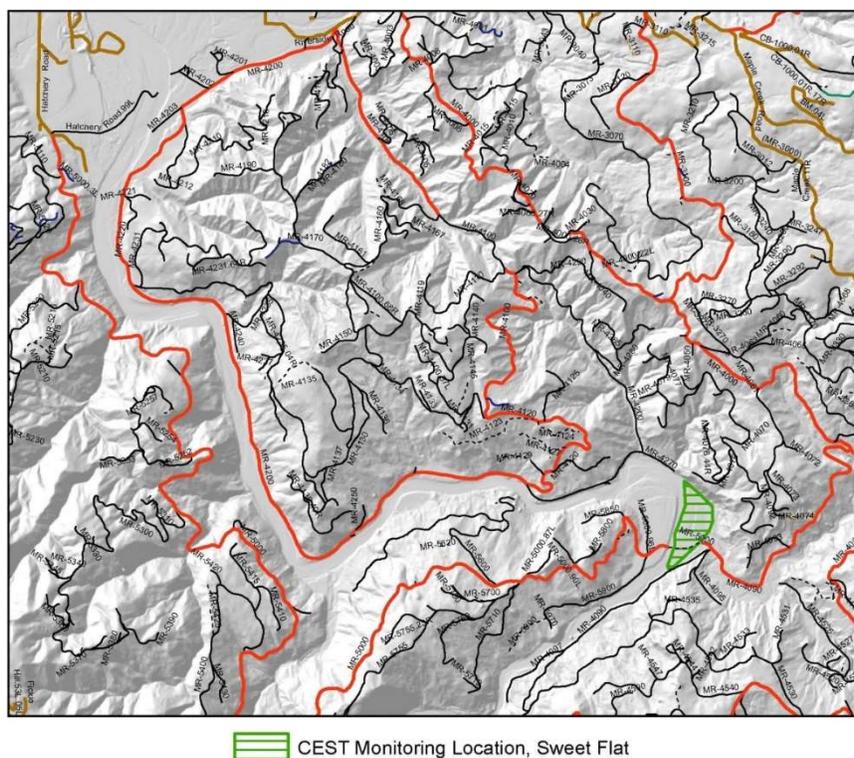


Figure 1. Location of *Centaurea stoebe* removal efforts at Sweet Flat, Mad River

A new population was detected on the property in 2022 along the BL-1000, on the ridge above Big Lagoon. The population is growing in an old log staging area where the railroad used to pass through to transport logs. The railroad has been removed and now exists as a rocky road that is actively used. The population was first detected on a small pile of rock next to the road and was later found to be quite expansive throughout the old staging area and along the sides of the road. The area is a square feature in the landscape, hardpacked with coarse rock preventing any trees from growing in it. Moss, sparse grass, and a few shrubs have established themselves in the staging area, along with *Centaurea stoebe*. The plants remain small and stunted until the gravel road, where they have grown large in the soil castings.

Since the staging area is owned by California State Parks, we had to reach out and get their concurrence for the treatment of the infestation. With their collaboration, the population was sprayed with herbicide in May 2023 by our IFM department. A survey of the site in spring of 2024 will determine if the herbicide treatment was effective or not.

FOLLOW UP VISITS

The follow-up section of this report has been expanded upon to describe in more detail some of the specific responses we have observed in a variety of species over the years. The following populations revisited are not included in formal monitoring agreements per consultation with CDFW.

Benson's saxifrage (Bensoniella oregana)

BotID#204 was initially observed with 30 plants during surveys for the 2001 Upper Wiggins. The population received programmatic mitigations and the road was to be abandoned. In 2011, the population was expected to be impacted by road work in association with North Wiggins THP. To mitigate the impact on the population, botanists moved the plants to two separate locations along a creek uphill. Over the course of time the population has adapted to its new location, experiencing some fluctuations, which is normal for plant populations. In 2023, 43 plants were counted across the 3 locations. 36 plants were in the original location, one transplant location had 3 plants while there were 4 plants in the second upstream transplant location. Remarkably the plants have persisted in all locations.

BotID#31673 was discovered in 2015 for the Wiggins North with 100 plants that were protected due to their streamside location. In 2018, the plants were observed to be stable and occupying the same amount of space, although there were indications that vegetation was encroaching into the mapped polygon. A recent visit in 2023 revealed that the dense vegetation had consumed a portion of the population's polygon. Despite this, 20 plants were still detectable, albeit more cryptic.

BotID#30329 was observed in 2012 in the Little Boulder Creek THP with 5 plants associated with a tiny creek that occurs on both sides of the road and the plants were given a 50' buffer. The population experienced gradual growth in the years following its detection. In 2021, an adjacent landowner rocked the road to combat the mucky conditions and buried a portion of the plants. A total of 4 plants persisted. Plant protection measures were redefined for this population during the same year for the Snow Camp Lake THP so that there was a 75-foot no-harvest EEZ. During visits in the two years after the rocking, the plants have rebounded to 5 individuals in 2022 and 6 in 2023. Flowers and fruits were observed during both recent visits. Ongoing monitoring of this population will be conducted to record recovery and growth.

| Total Known BEOR Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 18 | 3 | 3 |

Seaside bittercress (*Cardamine angulata*)

Three populations of seaside bittercress were revisited in association with new THPs. BotID#35250 was detected in 2017 with a population of 200 plants. The plants were visited this year to do a quick check to see if the population was extant late in the summer, and healthy plants were observed. BotID#36053 was found in 2019 with a robust population of 1,000 plants. In 2022 and in 2023, the population size dropped to 500 plants and has remained steady. BotID#35248 grew greatly in size from 8 plants in 2017 to 75 plants in 2023.

| Total Known CAAN Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 66 | 3 | 3 |



Photo Caption: Cardamine angulata nearly blending in with the Oxalis oregana.

Bear sedge (*Carex arcta*)

A pond associated with the 2014 Fern Prairie THP was found to host BotID#31166. 15 plants were observed in the center of the pond, where they were well within the RMZ and protected by default. During 2023 surveys for Xmas Rock THP, botanists observed the plants to be prospering with 18 individuals. Protection measures will continue to be in effect.

| Total Known CAAR Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 7 | 1 | 1 |

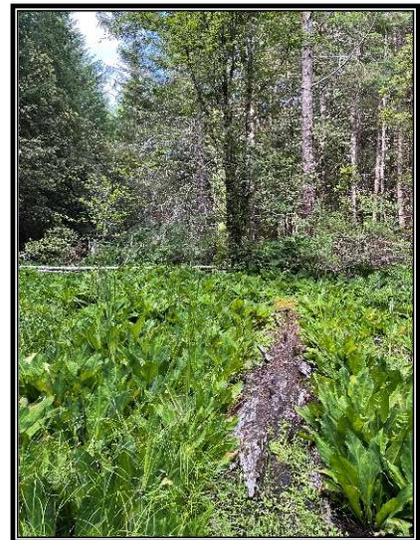


Photo Caption: The dense inflorescences of Carex arcta (left). The vibrant pond that accommodates BotID#31166 (right).

Bunchberry (Cornus unalaschkensis)

In association with the recent Wiggins North II THP (CDF#1-23-00034-HUM), three populations of bunchberry were revisited. BotID#30487 and BotID#31706 were known to exist along the watercourses in unit A. BotID#30487 was detected in 2009 but didn't have a record created in the database until 2012. It started with a rough count of 50 plants on the edge of the Roddiscraft Bog and has now grown to 400 plants, expanding further along the edge of the bog. The plants are healthy, robust, and flowering despite the competition with *Calamagrostis* and *Gaultheria*. BotID#31706 was detected in 2016, growing along a seepy area next to the class II watercourse on the southwestern side of the Wiggins North II unit A. It has grown from 100 plants in 2016 to 500 plants in 2023.

In unit B, BotID#31555 and BotID#31658 were known to occur along the class II watercourse. BotID#31555 was first detected in 2016 with an estimated 500 plants spreading across the edge of the creek in many patches. In 2023, the population has declined in size to 100 plants. Dense cover of *Gaultheria shallon* was observed at this occurrence and competitive interactions may be reducing bunchberry abundance. BotID#31658 was detected in 2016 with roughly 75 plants. Plants were not observed this year which might be due to prolonged snowpack. During the visit, many plants were beginning to emerge, and the bunchberry plants could have been overlooked due to immaturity. All the populations will be protected with avoidance in the current THP.



| Total Known COCAN Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|--|------------------------------|---------------------------------------|
| 25 | 4 | 3 |

Photo Caption: Small spots of white pop-out amidst the densely vegetated bog edge, brought on by hundreds of blooming plants from the BotID#30487 population in early summer.

Giant white fawn lily (Erythronium oregonum)

In 2016, BotID#31738 was discovered on a cutbank during surveys for the Tully Creek THP. Initial observations tallied 50 plants, and the population has thrived since then, reaching an impressive 90 plants in 2023. The success of plant protection measures on the cutbank has facilitated the expansion of this population, and there are optimistic expectations for its continued growth. An incidental detection in 2019 led to the identification of

BotID#36223, with around 200 plants counted in the population. A revisit in 2023 revealed the population's excellent health, with 100 plants observed, some in full bloom.

| Total Known EROR Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 7 | 2 | 2 |



Photo Caption: BotID#31738 glowing amidst the cloudy sky and dark shrubbery.

Coastal fawn lily (Erythronium revolutum)

Twenty-seven populations of *Erythronium revolutum* were revisited this year. Twenty-four of the populations were extant. Fifteen of the populations received programmatic protections, eight received avoidance or other protection measures, and four received no protection.

The blooming window was delayed by about two weeks property-wide due to snowstorms in the early spring months, the populations held up well and patiently awaited warmer weather.

A majority of the populations have slightly decreased in population size and/or stayed consistent since their original detection. It is difficult to truly make the determination that populations may be in decline as estimates can be variable. This variation is especially true with populations that cover large areas. Most populations that appear to be declining may actually be steady in size but are being misrepresented in the follow-up visit. A few of the populations followed-up on in 2023 are truly in decline, like BotID#29823. It started as a population of 7 plants in 2010 and now has declined to a single plant that was showing signs of sun stress due to the decrease in canopy cover. This population did not receive any protection measures. BotID#31181 has also been experiencing a decline due to changes in habitat. In 2014, 38 plants were seen. By 2023, only 2 plants were found, also showing signs of sun stress. This population received programmatic mitigation. Wind-felled trees within the

buffer, encroaching grass, and ungulate traffic have disrupted the habitat and are the likely cause for the population decline.



Photo Caption: BotID#30011 (left) peeping through a fresh layer of snow. BotID#29823 (right) adapting to less canopy cover.

On the other side of things, major growth and expansion has also been at play. BotID#29740 has expanded from 33 plants in 2009 to 75 plants in 2023. A population from the early years of the botany program, BotID#71 was detected in 2004 on a cutbank along a public road with approximately 10 plants, though the actual number was not recorded at the time. In 2013 the population was recorded to have 70 plants. Now, an estimated 200 plants occupy the site. Many young, single-leaved plants as well as mature, flowering plants.

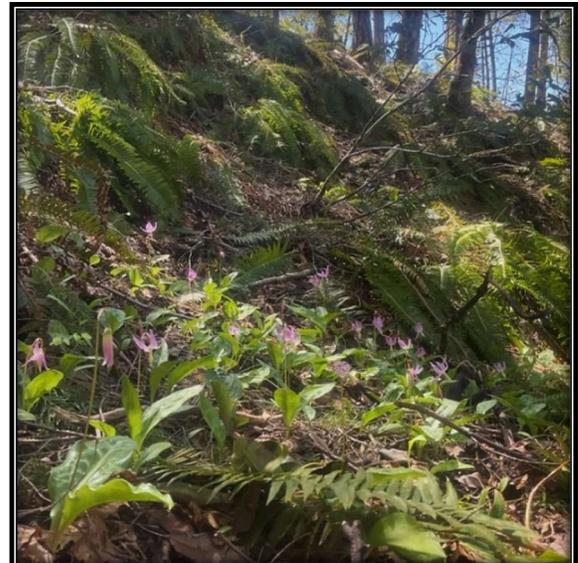


Photo Caption: BotID#71 (left) dense with young plants. BotID#35779 (right) is thriving in the smattering of light.

| Total Known ERRE Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 382 | 27 | 24 |

In addition to the *E. revolutum* follow-ups, an effort to resolve twenty-three populations of unidentified occurrences of *Erythronium* was made. Of the twenty-three populations, only twelve were extant. Seven populations were found in bloom, and they were able to be identified to species. Two of which turned out to be *E. revolutum* and three were *E. oregonum*.

Only five of these populations received programmatic protection. All five that were protected were seen this year. Two received avoidance, and neither were found despite their habitat being intact. Sixteen received no protections, allowing for a change in habitat, either from road maintenance, road construction, timber harvesting, or vegetation encroachment. Seven of the unprotected populations sixteen populations were seen this year.

| Total Known ERSP Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) | Identified to <i>Erythronium revolutum</i> | Identified to <i>Erythronium oregonum</i> | Identified to <i>Erythronium californicum</i> |
|---------------------------------------|------------------------------|---------------------------------------|--|---|---|
| 65 | 23 | 12 | 2 | 3 | 2 |

Pacific blue field gilia (Gilia capitata ssp. pacifica)

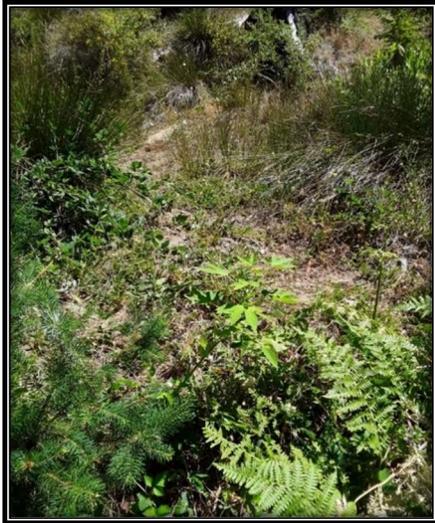
BotID#29933 was initially found in 2010 during surveys for Graham Ridge 11 THP. The population started strong with a reported 2000 individuals. Currently, the population has grown to roughly 4500 flowering plants. This remarkable expansion is an indicator of the effectiveness of the avoidance mitigations implemented.

BotID#37213 was a population of 50 flowering plants detected in 2022 on Powerline Road (SC2200). No mitigations were given to the population since it was not associated with any THPs. On a recent revisit this year, the population was observed as plants were just reemerging, boasting 30 plants. It is anticipated that this number has grown even larger as the blooming season progressed.

| Total Known GICAPA Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---|------------------------------|---------------------------------------|
| 16 | 2 | 2 |

California globe mallow (Iliamna latibracteata)

The surprise population found by a CDFW botanist during a PHI, BotID#36837, continues to persist on the landscape though it is facing some challenges. The population has been in a slow decline since its discovery in 2021. It has gone from 4 individuals in 2021 to 2 in 2023. The surrounding vegetation is dense because of the constant supply of water from the seep, which in turn is beginning to outcompete the plants. The young stand that was clear-cut in 2013 is also regenerating and starting to crowd the habitat. It has not been seen in flower since 2021, likely due to being grazed by cattle. Road maintenance does not appear to have disturbed the population.



| Total Known ILLA Populations on GDRCo | Populations Revisited (2022) | Populations Found to be Extant (2022) |
|---------------------------------------|------------------------------|---------------------------------------|
| 4 | 1 | 1 |

Photo Caption: A young California globe mallow (seen in the center of the photo) surrounded by regenerating vegetation in the recent clear-cut stand, BotID#36837.

Running pine (*Lycopodium clavatum*)

A group of nine *Lycopodium clavatum* populations were visited by botanists in 2023. All nine of these populations were initially observed during different survey years, the oldest being from 1998 and the most recent from 2022. A portion of the locations no longer had the species present, but a handful locations were still prospering. One of the largest populations seen in 2023 was first recorded an astonishing 16 years ago.

Of the six populations that were not detected, two of them never had plant protection measures. The remaining either had plant buffers or were meant to be avoided. One population (BotID#31152) was protected in an RMZ which evidently flooded and degraded the area. BotID#30483 lost suitable habitat due to dense *Toxicodendron diversilobum* growth. The remaining two populations (BotID#1927 and BotID#654) were initially detected and granted protection 15 and 18 years ago. The absence of these two was a mystery to botanists as the habitat was noted to still be suitable.

BotID#30382, initially found in 2012 during surveys for the East Fork Thin, received a 25-foot plant protection measure for its impressive 13 mat cluster. A follow-up in early spring recorded the presence of 23 healthy individual mats, emphasizing the positive impact of protective measures.

BotID#37038 is a newer discovery from 2022 during surveys for CR 2000/2900 Thin. The plant, occupying a modest habitat area, experienced impacts from harvest operations. However, a revisit in 2023 showcased its resilience, as the plant not only persisted but also displayed vigorous new growth.

BotID#1499 is a robust population, discovered in 2007 during surveys for CR 1200 THP. The plant was programmatically protected within a wildlife tree clump. A recent visit in 2023 revealed the population's impressive vitality, with stems and cones in full display. Some areas were so densely populated that the plant grew on top of itself.



| Total Known LYCL Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 1013 | 9 | 3 |

Photo Caption: BotID#1499 overruns the herbaceous layer on the forest floor.

Howell's montia (Montia howellii)

Fifteen populations of *M. howellii* were revisited in 2023. Ten of the fifteen populations revisited were found to be extant. Of those that were not seen, encroachment of vegetation was the likely culprit to the disappearance of the populations. The ten populations that were seen were in good health but were typically declining in size due to encroaching vegetation, increased sunlight, or frequent disturbance. BotID#36770 was first detected in 2021 with an estimated 1,000 plants growing in a pullout along Maple Creek Road. In 2022, an estimated 450 plants were seen. Operations had occurred in the last 6 months in the unit adjacent to the pullout, creating some disturbance to this pullout as it was utilized for timber harvesting. In 2023, the population was reported to have stayed the same size with regular vehicle disturbance seen. Some populations like BotID#36222 have increased in size due to ungulate traffic crossing the population area. The population went from 50 plants in 2020 to 200 plants in 2023, now expanding further down the road.

| Total Known MOHO Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 97 | 15 | 10 |

Ghost pipe (Monotropa uniflora)

Forty-eight populations of *Monotropa uniflora* were followed-up and thirty-four were positively observed in 2023. Eight of those populations that were not detected had no plant protection measures. The remaining six were given plant protection measures - five populations were protected in the RMZ, while one was protected in the forest interior. The population in the interior (BotID#36586) and three in the RMZ (BotID#36327, BotID#419, and BotID#464) were noted to have poor site quality. BotID#36503 was on the edge of an RMZ which appears to

have been impacted by a mess of wind-intolerant trees that fell following their exposure from the clear cut on the other side of the riparian buffer. The remaining population (BotID#29578) has an enigmatic ending since the habitat was observed to be excellent.

Out of the 34 extant populations, 91% were provided plant protection measures, while only 3 populations did not have any plant protections. Among the longstanding communities is BotID#463, initially recorded in 2002 for the North #409 THP. Eight clumps were protected by extending the WLPZ out to encompass the population. A recent visit found the habitat intact after an astonishing 21 years. Six healthy clumps were observed during this visit.

Similarly, surveys for Hunter West THP in 2021 identified BotID#36946 in the forest interior with 4 clumps, programmatically protected. A revisit in 2023 witnessed a significant expansion, with 29 observed clumps. Another success story unfolded with BotID#36947, initially recorded for the Lower Hunter THP in 2021 with one clump, programmatically protected in the forest interior. By 2023, the population size had notably increased to 13 clumps.

In contrast, BotID#31312 was not provided any mitigations when it was discovered in 2015 with one clump. Despite the absence of protective measures, a revisit in 2023 revealed the persistence of the population with one large clump.

| Total Known MOUN Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 1112 | 48 | 34 |



Photo Caption: These nodding stems from BotID#36326 form just 1 of the 18 clumps found in the protected population from 2020.

Bolander's ragwort (Packera bolanderi)

In 2020, a historic population from 1911 was rediscovered and revealed a thriving population of 1000 individuals in their streamside habitat (BotID#36681). The plants were flourishing naturally, and no mitigations were deemed necessary since the population was not linked to a THP and it had default protection within the RMZ. In 2023, the population was observed to be stable and maintained its impressive size.

| Total Known PABO Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 22 | 1 | 1 |

White flowered rein orchid (*Piperia candida*)

BotID#30506 has remained a mystery since it was detected in 2013 along a public roadside cutbank. When found, it was assumed to be *P. candida* (unconfirmed) due to the leaf morphology, but over the last ten years it has yet to produce an inflorescence. The population appears to be struggling beneath a mat of *Whipplea modesta* and *Rubus ursinus* as the population size has decreased from 20 plants in 2013 to 7 in 2023. On the other hand, BotID#36196 has been confirmed to *P. candida*, starting with a hefty 48 plants in 2019. This year, only 5 plants were seen. The reason for the decline is unknown.

| Total Known PICA Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---------------------------------------|------------------------------|---------------------------------------|
| 97 | 2 | 2 |

Rein orchid (*Piperia* sp.)

Nine unidentified *Piperia* species were revisited in 2023 and one was keyed out to *Piperia elongata*. Even though the remaining nine species didn't present a clear inflorescence for identification, they were observed through vegetative growth. Botanists eagerly anticipate the next visit, hoping to unravel the mystery surrounding these resilient populations.

| Total Known PISP Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) | Identified to <i>Piperia elongata</i> |
|---------------------------------------|------------------------------|---------------------------------------|---------------------------------------|
| 238 | 9 | 5 | 1 |

Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula*)

Four populations of *S. malviflora* subsp. *patula* were revisited this year. All four populations were extant and doing well. In the Wiggins tract, BotID#30127 and BotID#30128 were both detected in 2011, growing along the edge of the grassland. Both were seen in flower and were believed to be *S. malviflora* subsp. *patula*. In 2023, both populations were seen with 25% of plants in flower and the species was confirmed. In a different area of the Wiggins tract, the ID of BotID#35122 has remained a mystery. The population was discovered in 2017 during surveys for the Knutz Creek (2017) THP (CDF# 1-16-084-HUM). 100 plants were seen but were not in flower, so an ID to species could not be made. Despite this the population was recorded as *S. malviflora* subsp. *patula* and was provided with a 50' no-harvest buffer. In 2018, the population was seen in flower and floral characteristics seemed to align with *S. asprella* subsp. *nana*, but without seeds that ID could not be confirmed. The population has not flowered since, despite being revisited in 2019, 2020, 2022, and in 2023. The population is robust and stands at an estimated 70 plants, but heavy shade in the habitat may be the cause for a lack of flowering plants.

| Total Known SIMAPA Populations on GDRCo | Populations Revisited (2023) | Populations Found to be Extant (2023) |
|---|------------------------------|---------------------------------------|
| 17 | 5 | 5 |

HABITAT IMPROVEMENT PROJECTS

Scotch Broom (*Cytisus scoparius*) Removal

The preservation of the botanically unique Christmas Prairie Lake continues for the fifth year in a row working on the removal of Scotch broom (*Cytisus scoparius*) from the margins of the lake. The botany crew spent one day removing the invasive weed through hand pulling and the use of weed wrenches. All the plants seen this year were young sprouts. The population hasn't expanded beyond the original extent, showing that the crews' efforts have been successful. With several more years of physical removal, the population may begin to deplete as the seed bank is being exhausted.

During the monitoring of *Astragalus umbraticus* on Williams Ridge, sites cleared of Scotch broom in last year's habitat improvements were checked up on. There were no large Scotch broom plants seen among the populations, only young sprouts in some of the areas where Scotch broom had been the thickest. The *Astragalus umbraticus* populations seemed to be benefiting from the lack of competition and increased light from removal of the invasive species.

The botany crew will continue to remove Scotch broom from the property in areas of high ecological importance such as Christmas Prairie Lake and around known sensitive plant occurrences.



Photo caption: A young fawn spotted while the crew removed scotch broom (left). A view of Christmas Prairie Lake with a crew member pulling young scotch broom plants next to the decaying pile of scotch broom pulled from the last several years (right).

PROPERTY-WIDE SUMMARY TABLE FOR 2023 FLORISTIC SURVEYS

| THP Name | GDRCO THP # | CalFire THP # | IN CLLR BMA? | Quad | Elevation (ft) | Survey Acres | Field Work Date(s) | Field Survey Hours | Survey Rate (ac/hr) | CRPR 1-2 Rare/Sensitive Sp. (mitigated) | CRPR 3-4 Uncommon Species |
|-----------------|-------------|----------------|--------------|-------------------------------|----------------|--------------|---|--------------------|---------------------|---|---------------------------|
| John Hancorne | 512201 | 1-23-00182-HUM | No | Bald Hills | 1300-2540 | 6.68 | 6/21 (grassland survey) | 2.75 | 2.43 | ERRE | Negative |
| Tectah 180 | 562103 | 1-23-00074-HUM | No | Holter Ridge | 1100-2200 | 1 | 5/17 (road survey) | 0.25 | 4 | PISP | LICO, PICAL |
| Surpur Bear 23 | 562201 | 1-23-00125-HUM | No | Holter Ridge, Ah Pah Ridge | 400-1800 | 234.5 | 4/6, 7/5, 7/6, 7/17 | 35.25 | 6.65 | Negative | Negative |
| Ah Pah Pah | 562302 | 1-23-00123-HUM | No | Ah Pah Ridge | 320-1480 | 253 | 4/13, 4/28, 5/22, 5/24, 5/26, 5/30 | 37.5 | 6.75 | CAAN | PICAL |
| SF Ah Pah | 562303 | 1-23-00092-HUM | No | Holter Ridge, Ah Pah Ridge | 400-2000 | 233.5 | 6/7, 6/13, 7/13 | 30 | 7.78 | Negative | PICAL |
| Sturgeon Hole | 612301 | - | No | Fern Canyon, Ah Pah Ridge | 160-1600 | 337 | 5/16, 7/31, 8/7, 8/9, 8/14, 8/15 | 38 | 8.87 | CAAN | MICAU, PICAL, RILA |
| Drury 3 Pack | 662201 | 1-23-00091-DEL | No | Fern Canyon | 400-800 | 94 | 5/31, 6/1, 6/14 | 15.25 | 6.16 | CAAN | CHGL, RILA, SIMA |
| H-510 | 712202 | - | No | Childs Hill | 500-1800 | 157 | 4/4, 7/10, 7/25 | 21.25 | 7.39 | MOUN | LICO |
| W-100 | 712301 | 1-24-00009-DEL | No | Childs Hill, Requa | 40-1400 | 239 | 8/16, 8/17 | 18.75 | 12.75 | Negative | CHGL, RILA |
| Beaver Slide | 852201 | 1-23-00002-DEL | No | Klamath Glen | 800-2400 | 219 | 2022: 6/27, 7/5, 7/11, 7/14, 7/25 2023: 4/4 | 32.75 | 6.69 | Negative | PICAL, PLRE |
| Rough and Rowdy | 932201 | 1-23-00015-DEL | No | Smith River | 0-1800 | 57.5 | 2022: 8/3 2023: 4/5, | 8.5 | 7.76 | Negative | Negative |
| WI 700 | 932202 | 1-23-00081-DEL | No | Smith River | 280-1240 | 159.5 | 7/11, 7/12 | 25.25 | 6.32 | MOUN | Negative |
| Rowdy Scraps | 932203 | 1-23-00035-DEL | No | High Divide | 600-1800 | 181 | 6/27, 6/28, 6/29 | 27.75 | 6.52 | MOUN | LICO, OXSU, USLO |

| | | | | | | | | | | | |
|-------------------------|--------|----------------|----|--|-----------|--------|--|-------|-------|---------------------------------------|------------------------------------|
| Dominie Thin | 932301 | 1-23-00144-DEL | No | High Divide, Smith River | 0-1200 | 471 | 8/2, 8/3, 8/8, 8/9, 8/10 | 44.25 | 10.64 | MOUN | OXSU |
| Peacock | 942301 | 1-23-00082-DEL | No | Hiouchi | 0-1400 | 213.5 | 4/5, 8/1, 8/8, 8/9,8/10 | 35.75 | 5.97 | GICAPA, MOUN, PRPA | USLO |
| Oregon 23 | 992201 | - | No | Mount Emily, Fourth of July Creek | 0-1000 | Exempt | - | - | - | - | - |
| Hunter Ranch II | 032202 | 1-23-00189-HUM | No | Mad River Buttes | 2520-3200 | 95 | 6/22, 6/23, 7/10, 9/6 | 22.75 | 4.18 | GICAPA, PISP | Negative |
| Boy Scout 23 | 072201 | 1-23-00049-HUM | No | Hydesville | 120-560 | 189.43 | 4/25, 4/26 | 16.5 | 11.48 | Negative | LICO |
| Boulder Bottoms 2022 | 172201 | 1-23-00033-HUM | No | Mad River Buttes, Maple Creek | 320-1280 | 159 | 3/15, 3/29, 4/10, 4/11, 4/12, 5/2, 5/25, 6/6, 7/20 | 61.25 | 2.6 | ERRE, MOHO, PISP | LICO, MICAU |
| Wiggins North II | 172202 | 1-23-00053-HUM | No | Maple Creek | 2040-4170 | 159.1 | 2022: 9/29 2023: 4/27, 5/9, 5/10, 5/15, 5/18, 5/19, 6/19, 6/26, 7/14 | 62.75 | 2.54 | BEOR, COCAN, ERRE, MOHO, SIMAPA | LICO, MICAU, PLRE |
| Madrone 200 | 172203 | 1-23-00034-HUM | No | Mad River Buttes | 320-1280 | 122.5 | 4/7, 4/20, 4/21, 5/2, 5/9, 6/8, 6/15 | 46.5 | 2.63 | ERSP, PISP | LICO |
| Bolster Deuce | 172204 | 1-23-00014-HUM | No | Goodman Prairie Creek | 2180-2600 | 65 | 3/17, 4/3, 4/17, 6/8, 6/15 | 33.25 | 1.95 | ERRE, MOHO, PISP | Negative |
| McKay Gate | 192201 | 1-23-00019-HUM | No | Arcata South, Eureka, Fields Landing | 40-320 | 202.5 | 3/16, 3/17, 3/20, 3/21 | 26.5 | 7.64 | Negative | CHGL, LICO, LYCL, RILA, SIMA |
| Thin Devil Thin | 222201 | 1-23-00112-HUM | No | Mad River Buttes | 560-1680 | 230.5 | 3/22, 3/23, 3/24, 4/3, 4/14, 6/14, 7/20 | 21 | 10.98 | MOHO, PISP | LICO, LYCL, MICAU |
| Dolf Prairie 23 | 262102 | 1-22-00194-HUM | No | Blue Lake, Lord Ellis Summit, Korbel | 800-2900 | 314 | 4/16, 4/22, 4/28, 5/3, 5/6, 5/25, 6/6, 6/7, 6/21, 6/30 | 84.5 | 3.72 | PICA | LAGL, LICO, LIKE, USLO |
| Xmas Rock | 272301 | 1-23-00179-HUM | No | Lord Ellis Summit, Maple Creek | 1000-2340 | 348 | 7/7, 7/18, 7/24, 7/28 | 34.75 | 10.01 | Negative | Negative |
| Fernwood Gully | 272302 | 1-23-00129-HUM | No | Maple Creek | 2300-3100 | 153.5 | 6/20, 7/3 | 13.75 | 11.16 | THRO | Negative |

| | | | | | | | | | | | |
|--------------------|--------|----------------|--------|---|-----------|--------|-----------------------------|-------|-------|----------|-------------------------|
| Essex Holmes | 362201 | 1-23-00064-HUM | No | Arcata North | 100-500 | 131.5 | 3/13, 3/14 | 16.75 | 7.85 | Negative | CHGL, LICO, LYCL, MICAU |
| Denman North | 402301 | 1-23-00127-HUM | No | Blue Lake | 400-1600 | 192.5 | 6/5, 6/14 | 13.5 | 14.26 | Negative | COLA, LICO, PICAL |
| Northfork 23 | 422201 | 1-23-00055-HUM | Yes/No | Blue Lake | 760-3360 | 198.5 | 3/28, 3/31, 4/12, 4/13, 5/2 | 18.25 | 10.88 | Negative | COLA, LICO, LYCL |
| White Bull | 432203 | 1-23-00001-HUM | Yes | Rodgers Peak | 40-580 | 30 | 4/14 | 2.75 | 10.91 | Negative | Negative |
| Tip Top Ridge Thin | 432204 | 1-23-00016-HUM | Yes/No | Arcata North, Blue Lake | 1230-2020 | 138 | 3/14, 3/21, 3/24 | 9.5 | 14.53 | Negative | COLA, LICO, LYCL, MICAU |
| Little Diamond | 472202 | 1-23-00109-HUM | Yes | Rodgers Peak | 100-500 | Exempt | - | - | - | Negative | LYCL |
| Raven Ridge | 472203 | 1-23-00068-HUM | Yes | Trinidad, Crannell | 300-700 | 8.3 | 5/8 (creek survey) | 4.25 | 1.95 | Negative | LYCL, RILA |
| Spruce Willis | 472301 | 1-23-00102-HUM | Yes | Rodgers Peak | <3000 | Exempt | - | - | - | Negative | Negative |
| Cable Maple | 472303 | 1-23-00124-HUM | Yes | Rodgers Peak, Crannell | <3000 | Exempt | - | - | - | Negative | LYCL |
| Gray Pitcher | 472304 | 1-23-00173-HUM | Yes | Crannell, Trinidad, Rodgers Peak, Panther Creek | 40-2160 | 1.95 | 7/28 | 3 | 0.65 | CAAN | RILA |
| Red Panther | 482201 | 1-23-00089-HUM | No | Panther Creek | 480-2460 | 191 | 3/27, 3/30, 3/31 | 21.5 | 8.88 | Negative | LICO |
| AWP 2023 | - | - | - | - | - | - | 5/4, 8/24, 8/29 | 3 | - | Negative | LADE |

Light green highlight: surveys initiated in 2022 and completed in 2023. Light grey highlight: surveys initiated in 2023 and status pending results of 2024 surveys.

Key to species abbreviations and CRPR Status

| | | |
|---|--|---|
| BEOR: <i>Bensoniella oregona</i> (CRPR 1B.1) | LAGL: <i>Lathyrus glandulosus</i> (CRPR 4.3) | PISP: <i>Piperia</i> species |
| CAAN: <i>Cardamine angulata</i> (CRPR 2B.1) | LICO: <i>Listera cordata</i> (CRPR 4.2) | PLRE: <i>Pleuropogon refractus</i> (CRPR 4.2) |
| CHGL: <i>Chrysosplenium glechomifolium</i> (CRPR 4.3) | LIKE: <i>Lilium kelloggii</i> (CRPR 4.3) | PRPA: <i>Prosartes parvifolia</i> (CRPR 1B.2) |

COCAN: *Cornus unalaschkensis* (CRPR 2B.2)

COLA: *Coptis laciniata* (CRPR 4.2)

ERRE: *Erythronium revolutum* (CRPR 2B.2)

ERSP: *Erythronium* species

GICAPA: *Gilia capitata* ssp. *pacifica* (CRPR 1B.2)

LADE: *Lathyrus delnorticus* (CRPR 4.3)

LYCL: *Lycopodium clavatum* (CRPR 4.1)

MICAU: *Mitellastrum caulescens* (CRPR 4.2)

MOHO: *Montia howellii* (CRPR 2B.2)

MOUN: *Monotropa uniflora* (CRPR 2B.2)

OXSU: *Oxalis suksdorfii* (CRPR 4.3)

PICAL: *Pityopus californicus* (CRPR 4.2)

RILA: *Ribes laxiflorum* (CRPR 4.3)

SIMA: *Sidalcea malachroides* (CRPR 4.2)

SIMAPA: *Sidalcea malviflora* ssp. *patula* (CRPR 1B.2)

THRO: *Thermopsis robusta* (CRPR 1B.2)

USLO: *Usnea longissima* (CRPR 4.2)

PROGRAM GOALS FOR 2024

- Development of additional Botanical Management Areas with paired Botanical Management Plans to cover remaining GDRCo ownership in Humboldt and Del Norte Counties.
- Poster presentations at Nor Cal Botanists Symposium
 - *Piperia* morphological study
 - *Thermopsis robusta* Case study