Appendix F:

Botanical Survey

MOODY FLATS QUARRY PROJECT

Botanical Survey Report

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Table of Contents

Section 1 Introduction **1**

Section 2 Study Area **1**

Section 3 Environmental Setting **2**
3.1 Vegetation Communities 2

Section 4 Study Methodology **5**
4.1 Existing Information 5
4.2 Field Investigation 6

Section 5 Results and Discussion **6**
5.1 Special-Status Plants 6
5.2 Invasive Plants 7

Section 6 References **7**
6.1 Literature Cited 7

Figures

Figure 1 Project Location Map 9
Figure 2 Special Status Plant Locations 10

Appendices

Appendix A CNDDB Query Results
Appendix B U.S. Fish and Wildlife Service Species List
Appendix C Northern Clarkia Site Data

Section 1 Introduction

North State Resources, Inc. (NSR) conducted a protocol-level botanical survey on the 3-M Company Redding Property in the spring and early summer of 2010. This report includes a study methodology, a description of the natural environment, a list of the special-status plant species potentially occurring in the study area, and a list of all plants observed during the surveys.

Section 2 Study Area

The 3-M Company Redding property is located near Mountain Gate approximately five miles north of Redding, Shasta County, California. The property is located west of Interstate 5, south of Lake Shasta, and north of the City of Shasta Lake.

The 3-M Company Redding property encompasses approximately 1,940 acres. The proposed Moody Flats Quarry project area encompasses approximately 802 acres; which includes proposed quarry pits, aggregate plants, an overburden storage area, a processing plant, a stockpiling and load out area, and associated infrastructure. The botanical survey study area (study area) encompasses the entire 3-M Company Redding property, including the proposed Moody Flats Quarry project area. A map of the study area is presented as Figure 1.

The study area is located north of the City of Shasta Lake and south of Lake Shasta. The study area includes the headwaters of the Moody and Rancheria Creek watersheds, which flow southwesterly to West Fork Stillwater Creek. The watershed of an unnamed tributary in the western portion of the study area flows southwesterly to Churn Creek. The headwaters of Salt Creek also originate in the study area. Elevations in the study area range between 820 feet and 2,500 feet above mean sea level. The average annual rainfall in the study area is approximately 63 inches. Air temperatures range between an average January high of 52 degrees Fahrenheit (ºf), and an average July high of 95 ºf. The year-round average high is approximately 72 ºf (Western Regional Climate Center 2010).

The study area is undeveloped and there are many two-track roads and off-highway vehicle trails scattered throughout. Fire-lines were built along the ridge tops in the western portion of the study area due to a wildfire that occurred in 2007. Many of these areas are recovering and vegetation is beginning to re-colonize.

Two parcels totaling approximately 40 acres located at the northeastern portion of the study area are not included in this survey effort. These parcels were obtained in summer 2012, beyond the flowering season, which prohibited the possibility of performing a protocol-level botanical survey.

Section 3 Environmental Setting

3.1 Vegetation Communities

NSR classified vegetation habitats during concurrent biological investigations of the study area in 2010 following the descriptions provided in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Eleven habitats were mapped in the study area: annual grassland, barren, blue oak woodland, blue oak-gray pine, fresh emergent wetland, mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, valley oak woodland, and valley-foothill riparian. Approximately 90 percent of the study area was characterized as montane hardwood-conifer, montane hardwood, blue oak-gray pine, and mixed chaparral habitats. Detailed descriptions for all habitat types in the study area are provided below. Plant taxonomy follows Hickman (1993).

Annual Grassland

Annual grassland occurs in the eastern portion of the study area and in the Moody Flats area west of the railroad tracks. It is generally characterized by a dense herbaceous layer of annual grasses and forbs dominated by yellow star-thistle *(Centaurea solstitialis),* slender wild oat *(Avena barbata),* rose clover *(Trifolium hirtum),* storks bill *(Erodium botrys),* winter vetch *(Vicia villosa),* medusahead *(Taeniatherum caput-medusae),* ripgut brome *(Bromus diandrus),* and soft chess *(B. hordeaceus).*

Seasonal wetlands including seep-springs, vernal swales, and intermittent pools occur in the annual grassland habitat. These features are inundated for long duration during the growing season supporting vegetation adapted to living in moist or wet conditions. These wetlands are dominated by a variety of grasses and forbs based on the length of saturation or inundation. Dominant species occurring in these features include Mediterranean barley *(Hordeum marinum* ssp. *gussoneanum),* Italian ryegrass *(Lolium multiflorum),* iris leaved juncus *(Juncus xiphioides),* dense sedge *(Carex densa),* dallis grass *(Paspalum dilatatum),* and sweet vernal grass *(Anthoxanthum aristatum).*

Barren

Barren habitat occurs as open areas created by significant roads and fire lines, the railroad corridor, and rock outcrops. Roads and fire lines mapped as barren predominantly occur in the western portion of the study area. The railroad corridor bisects the mid- to eastern portion of the study area and rock outcrops occur along the ridgelines in the west and northern portions of the study area. Barren habitat exhibits sparse to no vegetation. Re-colonization of vegetation in fire lines is beginning to occur.

Blue Oak Woodland

Blue oak woodland occurs in the eastern most corner of the study area. It is characterized by a moderate overstory of blue oak *(Quercus douglasii)* with a dense herbaceous understory. Species occurring in the adjacent annual grassland also occur in blue oak woodland and include slender wild oat, rose clover, storks bill, winter vetch, ripgut brome, and soft chess.

Blue Oak-Gray Pine

Blue oak-gray pine occurs mainly in the lower, moderately sloped portions of the study area. It occurs in the western portion of the study area in valleys generally along stream corridors and over a ridge in the north-central portion of the study area. A dense to moderately dense overstory with a dense to moderately dense understory characterizes the blue oak-gray pine habitat. Several oak species are present in this habitat type and herbaceous cover varies from dense to sparse depending on the canopy closure. Dominant overstory species include blue oak, California black oak *(Q. kelloggii),* valley oak *(Q. lobata),* interior live oak *(Q. wislizenii),* and gray pine *(Pinus sabiniana).* Oracle oak *(Quercus* x *morehus),* a hybrid of California black and interior live oak is also common in the overstory. Common shrubs observed in this habitat include white leaf manzanita *(Arctostaphylos viscida),* buck brush *(Ceanothus cuneatus),* poison oak *(Toxicodendron diversilobum),* coffee berry *(Rhamnus californica),* deer brush *(Ceanothus integerrimus),* and California buckeye *(Aesculus californica).* Common grasses and forbs observed in this vegetation habitat include pussy ears *(Calochortus tolmiei),* Pacific hounds tongue *(Cynoglossum grande),* slender wild oat, and soaproot *(Chlorogalum pomeridianum).* Lianas of Dutchman's pipe *(Aristolochia californica)* and chaparral clematis *(Clematis lasiantha)* shroud shrubs and often grow into the tree canopy.

Fresh Emergent Wetland

Fresh emergent wetlands are uncommon in the study area, but occur in the pond in the southern portion of the study area and in a small, excavated channel along the railroad tracks in the southeastern portion of the study area. Small intermittent pools in the annual grassland habitat also contain fresh emergent vegetation. Emergent wetland vegetation dominates these wetlands due to perennial or nearly perennial inundation. Common species include pale spike rush *(Eleocharis macrostachya),* broad-leaf cattail *(Typha latifolia),* and pondweed (*Potamogeton* sp.).

Mixed Chaparral

Mixed chaparral occurs on exposed slopes throughout the study area. This habitat is typically characterized by dense shrub stands. Dominant species include whiteleaf manzanita, buckbrush, toyon *(Heteromeles arbutifolia),* California buckeye, Brewer's oak *(Quercus garryana* var. *breweri),* California bay *(Umbellularia californica),* interior live oak, Lemmon's ceanothus *(Ceanothus lemmonii),* birchleaf mountain mahogany *(Cercocarpus betuloides),* holly-leaf redberry *(Rhamnus ilicifolia),* yerba santa *(Eriodictyon californicum),* and poison oak. Few herbaceous plants occur in this habitat and include soaproot, goosegrass *(Galium aparine),* and hedgehog dogtail *(Cynosurus echinatus).*

Montane Hardwood-Conifer

Montane hardwood-conifer occurs on the slopes throughout the main portion of the study area and is characterized by a dense hardwood canopy interspersed with conifers. The dominant hardwood is California black oak with interior and canyon live oak *(Q. chrysolepis)* associates. Individuals or stands of gray pine or ponderosa pine (*Pinus ponderosa*) occur in this habitat type. Understory species are generally dense and include whiteleaf manzanita, buck brush, interior live oak, canyon live oak, California buckeye, western redbud *(Cercis occidentalis),* and California bay. Forbs and grasses occur in a sparse to moderate herbaceous layer dominated by pussy ears, soaproot, hound's tongue, and slender wild oat.

Montane Hardwood

Montane hardwood occurs on the slopes in the northern and western portions of the study area and is characterized by a dense overstory of California black oak. The understory is often sparse due to a typically dense canopy. Associated species include canyon live oak, poison oak, soaproot, California buckeye, and California bay.

Ponderosa Pine

Ponderosa pine occurs primarily in the northwestern portion of the study area, although there are also small stands occurring toward the southern portion. Ponderosa pine is sparsely to moderately dispersed throughout the canopy with California black oak as a common hardwood associate. Dense stands of whiteleaf manzanita, buck brush, and Brewer's oak are also present in the understory. Understory plants are sparse and include soap root, poison oak, and narrow-leaved sword fern *(Polystichum imbricans).*

Valley Oak Woodland

Valley oak woodland is located in the level, lower elevation areas in the eastern portion of the study area. It occurs between Moody and Rancheria Creeks east and west of the railroad tracks. This habitat is characterized by a dense overstory dominated by valley oak. Blue, California black, and interior live oaks also occur intermittently. Moderate to dense patches of shrubs occur in the understory and include California buckeye, coffee berry, snowdrop bush, and western redbud. Lianas of California grape *(Vitis californica)* grow into the upper canopy. Forbs and herbs occur in dense patches where openings in the canopy occur. Dominant herbaceous species include hedgehog dogtail, torilis *(Torilis arvensis),* and European hairgrass *(Aira caryophyllea).*

Valley Foothill Riparian

Valley foothill riparian occurs as thin stringers and large patches along most stream corridors in the study area. It also occurs around the southern edge of the pond in the southern portion of the study area. In valley foothill riparian associated with streams, it is characterized as a sparse overstory of Fremont cottonwood *(Populus fremontii),* big leaf maple *(Acer macrophyllum),* or white alder *(Alnus rhombifolia),* and a fairly dense mid-story and herbaceous layer. The mid-story is dominated by willows including arroyo willow *(Salix lasiolepis),* narrow-leafed willow *(S. exigua),* red willow *(S. laevigata)* western choke cherry *(Prunus virginiana),* and spice bush *(Calycanthus occidentalis).* Brambles of Himalayan blackberry *(Rubus discolor)* and California blackberry *(R. ursinus)* often engulf broader, low-gradient riparian areas. Lianas of California grape grow into the canopy. Other species include California buttonwillow *(Cephalanthus occidentalis),* American dogwood *(Cornus sericea),* California ash *(Fraxinus dipetala),* and mugwort *(Artemisia douglasiana).*

Section 4 Study Methodology

4.1 Existing Information

For the purpose of this evaluation, special-status plant species include plants that are (1) listed as threatened or endangered under the California Endangered Species Act (CESA) or the federal Endangered Species Act (ESA); (2) proposed endangered or threatened by the U.S. Fish and Wildlife Service (USFWS); (3) designated as rare by the California Department of Fish and Game (CDFG); (4) state or federal candidate species for listing as threatened or endangered; and/or (5) have a California Rare Plant Rank (CRPR) of 1A, 1B, 2, 3, or 4 (CDFG 2010a).

Special-status species potentially occurring in the project area were determined through database searches using California Natural Diversity Database (CNDDB), the USFWS database of federally protected species, and the CNPS *Electronic Inventory* (California Native Plant Society 2010); and review of related environmental documents and technical studies. The potential for special-status species to occur in the study area was assessed based on (1) the habitat requirements and distribution of special-status plants known to occur in the region and (2) the habitats present in the study area. The parameters for each of these queries are described below, and the resulting target list for the study area is presented in Appendix A. Each potentially occurring target species was rated using a low-medium-high designation based on the likelihood to occur in the study area. Specific habitat attributes, geographic setting, nearest known habitats/occurrence and other factors (e.g., observation) were used to derive the likelihood designation.

Using the CNDDB, a search of recorded accounts of special-status plants was conducted for the *Project City, California,* and *Shasta Dam, California,* 7.5-minute USGS topographic quadrangles (California Department of Fish and Game 2010b). The CNDDB is a database consisting of historical observations of special-status plant species, wildlife species, and natural plant communities. Because the CNDDB is limited to reported sightings, it is not a comprehensive list of species that may occur in a particular area. However, it is useful in refining the list of special-status species that have the potential to occur in the study area.

The USFWS maintains a database that lists federally protected species for each USGS quadrangle in the jurisdiction of the Sacramento USFWS office. The current USFWS list of endangered and threatened species that may occur, or be affected by projects in the *Project City, California,* and *Shasta Dam, California,* 7.5-minute USGS topographic quadrangles and in Shasta County were reviewed (U.S. Fish and Wildlife Service 2010).

A database search was also performed for the study area using the CNPS *Electronic Inventory,* which allows users to query the *Inventory of Rare and Endangered Plants of California* using a set of search criteria (e.g., quad name, habitat type) (California Native Plant Society 2010). The criteria used for the CNPS query included all CNPS List 1A, 1B, 2, 3, and 4 plants (which coincides with the CRPR list) occurring in Shasta County in annual grasslands, chaparral, cismontane woodland, lower montane coniferous forest, marshes and swamps, meadows and seeps, valley and foothill grasslands, riparian woodland, and riparian scrub habitats between elevations of approximately 800 and 2,500 feet.

4.2 Field Investigation

The botanical survey was conducted in general accordance with the California Department of Fish and Game (CDFG) *Protocols for Surveying and Evaluating Impacts to Special Status Plant Populations and Natural Plant Communities* (California Department of Fish and Game 2009). Mr. Paul Kirk, NSR staff botanist, served as the lead investigator for the botany surveys. Ms. Heather Kelly, NSR staff biologist, provided additional field assistance. The botanical survey was conducted by walking meandering transects that covered all habitat types in the study area. The survey intensity was increased in microhabitats (e.g., rocky outcrops near ridgelines and riparian corridors) that are known to have a greater potential for the presence of special-status plants. All habitat types were visited twice in order to observe the early- and late-season blooming plants. The botanical surveys were conducted on 19, 22, 23, 28, 29 April, and 10, 11, 15, 17, 18, 21, 22, 25, 28, 30 June 2010. Approximately 98 person-hours of field survey time were expended during those dates. The timing of the botanical surveys coincided with the blooming period(s) for potentially occurring special-status plants in the study area and provides a comprehensive survey effort for these species.

The botany surveys were conducted using Hickman (1993) as the standard reference for taxonomy and identification; and to confirm designation as a native or non-native species. Additionally, all non-native plant species were reviewed to determine their status as invasive plants (i.e., noxious weeds) according to the ratings in the *California Invasive Plant Inventory* produced by California Invasive Plant Council (Cal-IPC 2006). Cal-IPC categorizes non-native invasive plants into three categories of overall negative ecological impact in California: High, Moderate, and Limited. The occurrence and distribution of invasive plants found in the study area with a rating of High is included the Results.

Section 5 Results and Discussion

5.1 Special-Status Plants

A list of all plants observed during the survey is included as Appendix B. One special-status plant species, northern clarkia (*Clarkia borealis* ssp. *borealis*), was observed in the study area. Two separate occurrences of northern clarkia were observed in the northwest portion of the study area along rocky slopes within montane hardwood habitat (Figure 2). A nearby reference location of northern clarkia (CNDDB occurrence #4) that was in bloom was also visited to confirm identification of the two occurrences observed in the study area. The southern occurrence (Figure 2, occurrence #1) consisted of approximately 250 individuals spread over approximately 100 feet along both sides of a dirt-bike trail on a northwest facing slope near the top of the ridgeline. Occurrence #2 was comprised on approximately 25 plants. Approximately two-thirds of these northern clarkia plants were in flower on 25 June 2010.

Northern clarkia is an annual herb in the evening-primrose family (Onagraceae). This subspecies is a California endemic, restricted to the southern Cascade Range, and occurs in openings in gray pine and black oak woodlands at elevations between 1,300 to 4,400 feet. The large majority of known occurrences are located in Shasta County in the vicinity of Lake Shasta. Outlier populations occur in

Trinity County east of Clare Engle Lake, and in Siskiyou County near Dunsmuir. The nearest recorded northern clarkia location occurs approximately 2.5 miles northeast of the study area near Lake Shasta. Northern clarkia is currently holds a CRPR of 1B.3. Site information and photos of the northern clarkia are included in Appendix C.

5.2 Invasive Plants

Six non-native invasive plants with a Cal-IPC rating of High occur within the study area: red brome (*Bromus madritensis* ssp. *rubens*), cheatgrass (*Bromus tectorum*), yellow starthistle, medusahead Himalaya blackberry, and French broom (*Genista monspessulana*). All of these invasive plants, except Himalaya blackberry and French broom, occurred within areas mapped as annual grassland habitat and within some of the annual grassland included in other habitat types (e.g. blue oak woodland, valley oak woodland, and mixed chaparral). Yellow starthistle and medusahead were the most abundant of these invasive plants in the annual grassland. Himalaya blackberry was abundant in the western portion of the study area along the banks of the intermittent stream that runs along the length of the Digger Bay Road and around the pond that is part of this same drainage along the southwestern study area boundary. French broom was present along the dirt road near the pond near the southwestern study area boundary. Italian plumeless thistle (*Carduus pycnocephalus*) has a Cal-IPC rating of Moderate and was common in the annual grassland habitat east of the railroad tracks. The Cal-IPC ratings (High, Moderate, and Limited) of all invasive plants observed at the study area are noted in Appendix B.

Section 6 References

6.1 Literature Cited

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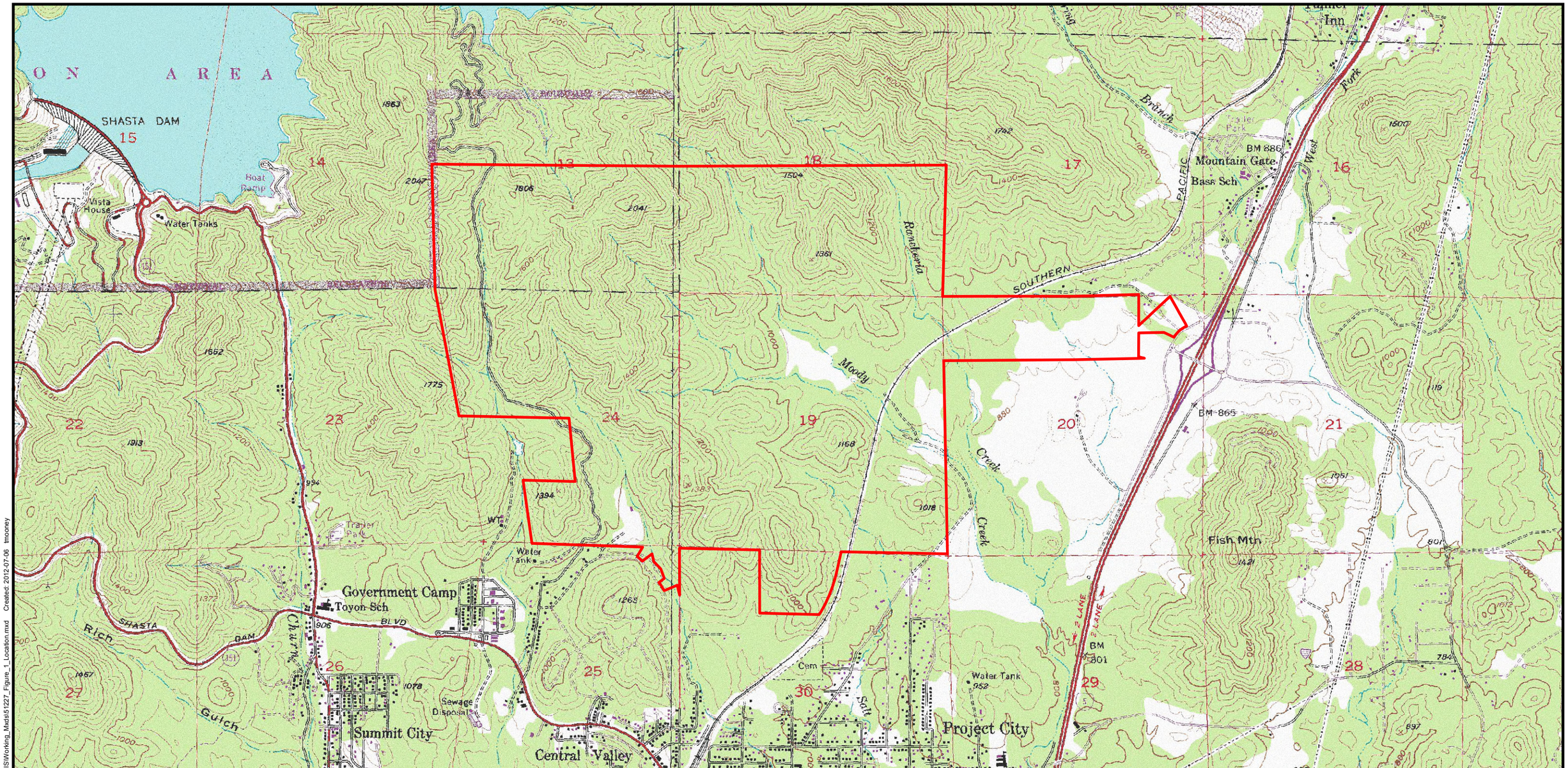


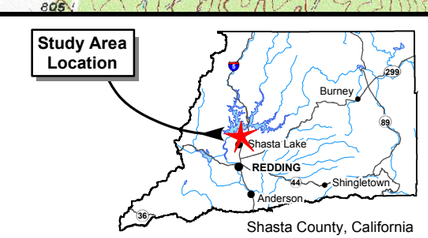
Study Area (1940.33 acres)

Public Land Survey:
Township: 33N
Range: 04W
Sections: 17, 18, 19, 20, 30
Range: 05W
Sections: 13, 14, 23, 24, 25

USGS 7.5 Quads:
Project City - 1969
Shasta Dam - 1969

N

0 1,500 3,000 6,000 Feet



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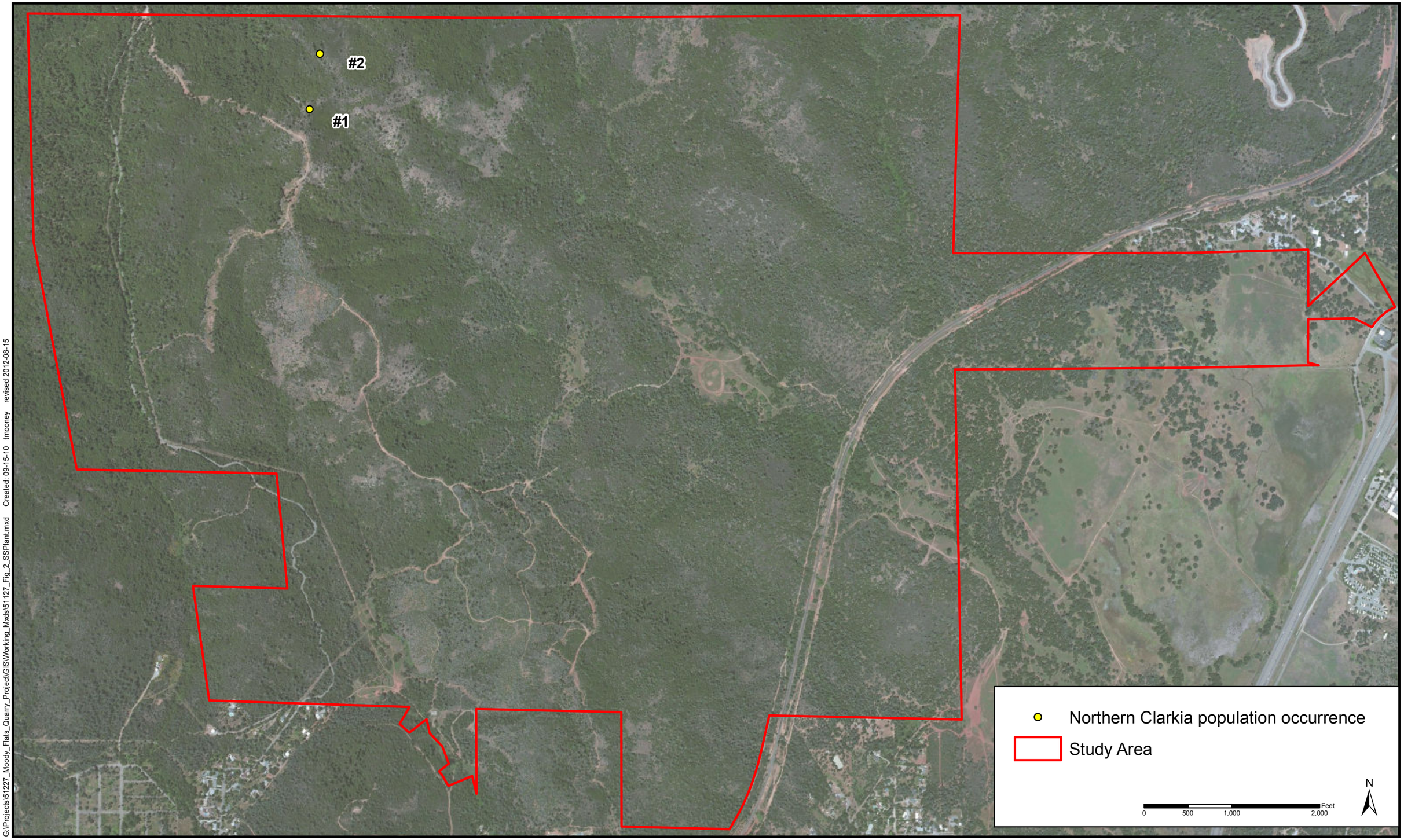
Moody Flats Quarry Project

Figure 1
Project Location Map



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Moody Flats Quarry Project

Figure 2
Special Status Plant Locations

Appendix A

Special-Status Plants Potentially Occurring in the Study Area

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Federal or State Listed				
Boggs lake hedge-hyssop *Gratiola heterosepala*	—/E/1B.2	Vernal pools and lake margins; elevation 10-2,375 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the study area.	Low
Greene's tuctoria *Tuctoria greenei*	E/R/1B.1	Vernal pools; elevation 30-1,070 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the study area.	Low
Slender Orcutt grass *Orcuttia tenuis*	T/E/1B.1	Vernal pools; elevation 35-1,760 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the study area.	Low
Other Special-Status Species				
Shasta eupatory *Ageratina shastensis*	—/—/1B.2	Chaparral and lower montane coniferous forest, rocky, often carbonate; elevation 400-1,800 meters	Potentially occurring in chaparral, montane hardwood-conifer, and ponderosa pine habitats in the study area. Known from Shasta Lake.	Medium
Henderson's bent grass *Agrostis hendersonii*	—/—/3.2	Valley and foothill grassland, vernal pools/ vernally mesic; elevation 70-305 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the study area. Known from occurrences in the Redding area, and Ingot.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Sanborn's onion *Allium sanbornii* var. *sanbornii*	—/—/4.2	Chaparral, cismontane woodland, and lower coniferous forest (usually serpentinite, gravelly soils); elevation 260-1,510 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, ponderosa pine, blue oak-gray pine, and montane hardwood habitat types with serpentine, gravelly soils occurring in the study area. Known from Oasis Road.	Medium
Slender silver moss *Anomobryum julaceum*	—/—/2.2	Broadleaved upland forest, lower montane coniferous forest, north coast coniferous forest/damp rock and soil outcrops; elevation 100-1000 meters	Potentially occurring in montane hardwood-conifer, ponderosa pine, and montane hardwood habitats present in the study area. Known from Whiskeytown environmental camp.	Low
Shasta County arnica *Arnica venosa*	—/—/4.2	Cismontane woodland and lower coniferous forest; elevation 400-1,490 meters	Potentially occurring in montane hardwood-conifer, ponderosa pine, blue oak-gray pine, and montane hardwood habitats occurring in the study area.	High
Marbled wild-ginger *Asarum marmoratum*	—/—/2.3	Lower montane coniferous forest; elevation 200-1,800 meters	Potentially occurring in montane hardwood-conifer and ponderosa pine habitats occurring in the study area. Known from the Sacramento River Canyon.	Medium

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Depauperate milk-vetch *Astragalus pauperculus*	—/—/4.3	Chaparral, cismontane woodland and valley and foothill grassland; vernally mesic, volcanic elevation 60-1,120 meters	Potentially occurring in mixed chaparral, montane hardwood, montane hardwood-conifer, blue oak-gray pine, and annual grassland habitats with seasonally mesic environments occurring in the study area. Known from Oasis Road.	Medium
Thread-leaved beakseed *Bulbostylis capillaries*	—/—/4.2	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; elevation 395-2,075 meters	Potentially occurring in meadows and seeps occurring in ponderosa pine and montane hardwood-conifer habitats occurring in the study area.	Low
Callahan's mariposa lily *Calochortus syntrophus*	—/—/1B.1	Cismontane woodland and valley and foothill grassland; vernally mesic; elevation 525-855 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, blue oak-gray pine, blue oak woodland, and annual grassland occurring in the study area. Known from Whitmore near the Buckhorn CDF station.	Low
Butte County morning-glory *Calystegia atriplicifolia* ssp. *buttensis*	—/—/4.2	Chaparral, lower montane coniferous forest, rocky, roadside; elevation 600-1,524 meters	Potentially occurring in montane hardwood-conifer, ponderosa pine, and mixed chaparral habitats occurring in the study area. Known from the Roaring Creek area.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Buxbaum's sedge *Carex buxbaumii*	—/—/4.2	Bogs and fens; meadows and seeps; marshes and swamps; elevation 3-3,300 meters	Potentially occurring in perennial and seasonal wetlands occurring in annual grassland, fresh emergent wetlands, and valley foothill riparian habitats occurring in the study area.	Low
Bristly sedge *Carex comosa*	—/—/2.1	Coastal prairie, marshes and swamps, valley and foothill grasslands; elevation 0-625 meters	Potentially occurring in perennial and seasonal wetlands occurring in annual grassland, fresh emergent wetlands, and valley foothill riparian habitats occurring in the study area. Known from Big Bend and Fall River Mills.	Low
Brown fox sedge *Carex vulpinoidea*	—/—/2.2	Marshes and swamps (freshwater), riparian woodland; elevation 30-1,200 meters	Potentially occurring in vernal swales and seasonal wetlands in the study area.	Medium
Pink creamsacs *Castilleja rubicundula* ssp. *rubincundula*	—/—/1B.2	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland; elevation 20-900 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, blue oak-gray pine, blue oak woodland and annual grasslands occurring in the study area. Known from Gas Point Road in Cottonwood.	Low
Shasta clarkia *Clarkia borealis* ssp. *arida*	—/—/1B.1	Cismontane woodland and lower coniferous forest; elevation 490-595 meters.	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area. Known from Ingot.	High

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Northern clarkia *Clarkia borealis* ssp. *borealis*	—/—/1B.3	Chaparral, cismontane woodland, and lower coniferous forest; elevation 400-1,340 meters.	**Present on site.** Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area. Known from Gray Rocks, 2.5 miles northeast of the study area.	High
Serpentine collomia *Collomia diversifolia*	—/—/4.3	Chaparral, cismontane woodland, serpentinite, rocky or gravelly; elevation 300-600 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Castlegar hawthorn *Crataegus castlegarensis*	—/—/3	Riparian woodland, moist rocky loam; elevation 0-975 meters	Potentially occurring in valley foothill riparian habitat and along streams throughout the study area. Known from northeastern Shasta County.	Low
Silky cryptantha *Cryptantha crinita*	—/—/1B.2	Cismontane woodland, lower montane coniferous forest, riparian scrub, riparian woodland, valley and foothill grassland/gravelly streambeds; elevation 85-300 meters	Potentially occurring in gravelly streambeds within all habitats in the study area. Known to occur 2.7 miles southeast of the study area.	High
California lady's slipper *Cypripedium californicum*	—/—/4.2	Bogs and fens, lower montane coniferous forest, seeps and streambanks, usually serpentinite; elevation 30-2,750 meters	Potentially occurring in valley foothill riparian and seeps and springs occurring throughout the site.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Clustered lady's slipper *Cypripedium fasciculatum*	—/—/4.2	Lower montane coniferous forest and north coast coniferous forest, usually serpentinite seeps and streambanks; elevation 100-2,435 meters	Potentially occurring in valley foothill riparian and seeps and springs occurring throughout the site.	Low
mountain lady's slipper *Cypripedium montanum*	—/—/—4.2	Broadleafed upland forest, cismontane woodland, lower montane coniferous forest, and north coast coniferous forest; elevation 185-2,225 meters	Potentially occurring in montane hardwood-conifer, montane, hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Norris' beard moss *Didymodon norrisii*	—/—/2.2	Cismontane woodland and lower montane coniferous forest; elevation 600-1,973 meters	Potentially occurring in montane hardwood-conifer, montane, hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Tripod buckwheat *Eriogonum tripodum*	—/—/4.2	Chaparral, cismontane woodland, often serpentinite; elevation 200-1,600 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane, hardwood, and ponderosa pine, blue oak-gray pine habitats occurring in the study area. Known nearby occurrence on Oasis Road, south of Shasta Lake.	Medium
Butte County fritillary *Fritillaria eastwoodiae*	—/—/3.2	Chaparral, cismontane woodland and lower montane coniferous forest, openings, sometimes serpentinite; elevation 50-1,500 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane, hardwood, and ponderosa pine, blue oak-gray pine habitats occurring in the study area.	Medium

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*	—/—/1B.1	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools/ vernally mesic; elevation 35-1020 meters	Potentially occurring in seasonal wetlands in annual grassland habitats in the study area	Medium
Santa Lucia dwarf rush *Juncus luciensis*	—/—/1B.2	Chaparral, great basin scrub, lower montane coniferous forest, meadows and seeps, vernal pools; elevation 300-2,040 meters	Potentially occurring in seasonal wetlands in annual grassland habitat occurring in the study area. Known from 2 occurrence in southeastern Shasta County.	Low
Legenere Legenere limosa	—/—/1B.1	Vernal pools; elevation 1-880 meters	Potentially occurring in seasonal wetlands in annual grassland habitats in the study area	Low
Dubious pea Lathyrus sulphureus var. argillaceous	—/—/3	Cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest; elevation 150-305 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Medium
Broad-lobed leptosiphon *Leptosiphon latisectus*	—/—/4.3	Broadleaved upland forest and cismontane woodland; elevation 170-1,500 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Cantelow's lewisia *Lewisia cantelovii*	—/—/1B.2	Broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest, mesic, granitic, sometimes serpentinite seeps; elevation 330-1,370 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area. Known from the Sacramento River.	Medium
Howell's lewisia *Lewisia cotyledon* var. *howellii*	—/—/3.2	Broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest; elevation 150-2,010 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Redwood lily *Lilium rubescens*	—/—/4.2	Broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest, north coast coniferous forest, upper montane coniferous forest, sometimes serpentinite, sometimes roadsides; elevation 30-1,715 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*	—/—/1B.2	Cismontane woodland, meadows, and seeps, mesic; elevation 290-1,100 meters	Potentially occurring in seasonal wetlands in annual grassland and blue-oak gray pine habitats occurring in the study area. Known from Ingot area.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Woolly meadowfoam *Limnanthes floccosa* ssp. *floccosa*	—/—/4.2	Chaparral, cismontane woodland, valley and foothill grassland, vernal pools; elevation 60-1,095 meters	Potentially occurring in seasonal wetlands in annual grassland and blue-oak gray pine habitats occurring in the study area. Known from eastern Shasta County.	Low
Tehama navarretia *Navarretia heterandra*	—/—/4.3	Valley and foothill grassland, vernal pools, mesic; elevation 30-1,010 meters	Potentially occurring in seasonal wetland in annual grassland and blue oak gray pine habitats in the study area.	Low
Awl-leaved navarretia *Navarretia subuligera*	—/—/4.3	Chaparral, cismontane woodland, lower montane coniferous forest, rocky, mesic; elevation 150-1,100 meters	Potentially occurring in seasonal wetlands and seeps and springs in chaparral, montane hardwood, montane hardwood-conifer, ponderosa pine, and blue-oak gray pine habitats occurring in the study area.	Low
Shasta snow-wreath *Neviusia cliftonii*	—/—/1B.2	Cismontane woodland, lower coniferous forest, and riparian woodland, often streamsides, sometimes carbonate, volcanic, or metavolcanic; elevation 300-560 meters.	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, blue oak-gray pine, and valley foothill riparian habitats occurring in the study area. Known to occur 1.7 miles northeast of the study area.	Medium
Thread-leaved beardtongue *Penstemon filiformis*	—/—/1B.3	Cismontane woodland, lower montane coniferous forest, rocky; elevation 450-1,830 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area. Known from the Sacramento River.	Medium

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Narrow-petaled rein orchid *Piperia leptopetala*	—/—/4.3	Cismontane woodland, lower coniferous forest, upper montane coniferous forest; elevation 380-2,225 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Bidwell's knotweed *Polygonum bidwelliae*	—/—/4.3	Chaparral, cismontane woodland, valley and foothill grassland, volcanic; elevation 60-1,200 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, blue oak-gray pine and annual grassland habitats occurring in the study area.	Low
Nuttall's ribbon-leaved pondweed *Potamogeton epihydrus* ssp. *nuttallii*	—/—/2.2	Marshes and swamps, shallow freshwater; elevation 369-2,172 meters	Potentially occurring in fresh emergent wetlands in the study area.	Low
Eel-grass pondweed *Potamogeton zosteriformis*	—/—/2.2	Marshes and swamps, freshwater; elevation 0-1,860 meters	Potentially occurring in fresh emergent wetlands in the study area.	Low
Hoary gooseberry *Ribes roezlii* var. *amictum*	—/—/4.3	Broadleaved upland forest, cismontane woodland, lower montane coniferous forest, upper montane coniferous forest; elevation 120-2,300 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the study area.	Low
Sanford's arrowhead *Sagittaria sanfordii*	—/—/1B.2	Marshes and swamps, shallow freshwater; elevation 0-650 meters	Potentially occurring in fresh emergent wetlands in the study area.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Marsh skullcap *Scutellaria galericulata*	—/—/2.2	Lower montane coniferous forest, meadows and seeps, marshes and swamps, mesic; elevation 0-2,100 meters	Potentially occurring meadows and seeps in montane hardwood-conifer and ponderosa pine habitats in the study area.	Medium
Canyon Creek stonecrop *Sedum paradisum*	—/—/1B.3	Broadleaved upland forest, chaparral, lower montane coniferous forest, granitic, rocky; elevation 300-1,900 meters	Potentially occurring in rocky outcroppings in montane hardwood-conifer, montane hardwood, ponderosa pine, and chaparral habitats occurring in the study area.	Medium
English Peak greenbriar *Smilax jamesii*	—/—/1B.3	Broadleaved upland forest, lower montane coniferous forest, marshes and swamps, north coast coniferous forest, upper montane coniferous forest, streambanks and lake margins; elevation 580-2,500 meters	Potentially occurring in marshes and swamps and along stream margins in montane hardwood-conifer, montane hardwood, valley foothill riparian, and ponderosa pine habitats occurring in the study area. Known from Iron Canyon east of Shasta Lake.	Low
Obtuse starwort *Stellaria obtusa*	—/—/4.3	Lower montane coniferous forest, riparian woodland, upper montane coniferous forest, mesic, streambanks; elevation; 150-2,135	Potentially occurring along stream margins in valley foothill riparian, and ponderosa pine habitats occurring in the study area.	Low
Long-fruit jewel flower *Streptanthus longisiliqus*	—/—/4.3	Cismontane woodland and lower montane coniferous forest, openings; elevation 715-1500 meters	Potentially occurring in marshes and swamps and along stream margins in montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the study area.	Low

Special-Status Plant Species Potentially Occurring in the Project Area

Common Name *Scientific Name*	Current Status[1] (Fed/State/CRPR)	General Habitat Description	Comments	Potential Occurrence Rank
Slender false lupine *Thermopsis gracilis* var. *gracilis*	—/—/4.3	Chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, north coast coniferous forest, sometimes roadsides; elevation 100-1,615 meters	Potentially occurring in meadows and seeps in mixed chaparral, montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the study area.	Medium
Cylindrical trichodon *Trichodon cylindrica*	—/—/2.2	Broadleaved upland forest, meadows and seeps, upper montane coniferous forest, sandy, exposed soil, road banks; elevation 50-2,002 meters	Potentially occurring on sandy exposed soil in meadows and seeps in montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the study area.	Low
Siskiyou false-hellebore *Veratrum insolitum*	—/—/4.3	Chaparral and lower montane coniferous forest, clay; elevation 45-1,635 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the study area.	Low
Oval-leaved viburnum *Viburnum ellipticum*	—/—/2.3	Chaparral, cismontane woodland, and lower montane coniferous forest; elevation 215-1400 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the study area. Known from Jones Valley area.	High

[1]Status Codes: Federal and State: E = Endangered; T = Threatened.

California Rare Plant Rank:
1B Plants rare, threatened, or endangered in California and elsewhere.
2 Plants rare, threatened, or endangered in California but more common elsewhere.
3 Plants about which we need more information, review list.
4 Plants of limited distribution, a watch list.
Modifiers
.1 Seriously endangered in California.
.2 Fairly endangered in California.
.3 Not very endangered in California.

Appendix B

Plants Observed in the Study Area

Plants Observed at the Moody Flats Study Area, Shasta County, California
Survey Dates: April 19, 22, 23, 28, 29, 2010; June 10, 11, 15, 17, 18, 21, 22, 25, 28, 30, 2010

Scientific Name	Common Name	Family	Native/Non-native[1]
Acer macrophyllum	bigleaf maple	Aceraceae	Native
Achillea millefolium	yarrow	Asteraceae	Native
Achnatherum lemmonii	lemmon's needlegrass	Poaceae	Native
Adiantum jordanii	California maiden-hair	Pteridaceae	Native
Aesculus californica	California buckeye	Hippocastanaceae	Native
Agoseris grandiflora	large-flowered agoseris	Asteraceae	Native
Agoseris retrorsa	spear-leaved agoseris	Asteraceae	Native
Aira caryophyllea	silver European hairgrass	Poaceae	Not native
Allium amplectens	paper onion	Liliaceae	Native
Allium falcifolium	sickle-leaf onion	Liliaceae	Native
Alnus rhombifolia	white alder	Betulaceae	Native
Amsinckia menziesii var. intermedia	common fiddleneck	Boraginaceae	Native
Anagallis arvensis	scarlet pimpernel	Primulaceae	Not native
Anthemis cotula	dog-fennel	Asteraceae	Not native
Anthoxanthum aristatum	annual vernal grass	Poaceae	Not native
Anthoxanthum odoratum	sweet vernal grass	Poaceae	Cal-IPC Moderate
Antirrhinum cornutum	spurred snapdragon	Scrophulariaceae	Native
Apocynum androsaemifolium	mountain dogbane	Apocynaceae	Native
Arctostaphylos viscida	white leaf manzanita	Ericaceae	Native
Aristolochia californica	pipevine	Aristolochiaceae	Native
Artemisia douglasiana	mugwort	Asteraceae	Native
Asarum hartwegii	wild-ginger	Aristolochiaceae	Native
Asclepias speciosa	showy milkweed	Asclepiadaceae	Native
Asparagus officinalis ssp. officinalis	asparagus	Liliaceae	Not native
Aspidotis densa	Indian’s dream	Pteridaceae	Native
Avena barbata	slender wild-oat	Poaceae	Cal-IPC Moderate
Baccharis salicifolia	mule fat	Asteraceae	Native
Barbarea orthoceras	winter cress	Brassicaceae	Native
Barbarea verna	scurvy grass	Brassicaceae	Not native
Berberis aquifolium	Oregon-grape	Berberidaceae	Native

Plants Observed at the Moody Flats Study Area, Shasta County, California
Survey Dates: April 19, 22, 23, 28, 29, 2010; June 10, 11, 15, 17, 18, 21, 22, 25, 28, 30, 2010

Scientific Name	Common Name	Family	Native/Non-native[1]
Brickellia californica	California brickellbush	Asteraceae	Native
Briza maxima	rattlesnake grass	Poaceae	Cal-IPC Limited
Briza minor	small quaking grass	Poaceae	Not native
Brodiaea californica	California brodiaea	Liliaceae	Native
Bromus carinatus	California brome	Poaceae	Native
Bromus diandrus	ripgut brome	Poaceae	Cal-IPC Moderate
Bromus hordeaceus	soft brome	Poaceae	Not native
Bromus madritensis ssp. rubens	foxtail chess	Poaceae	Cal-IPC High
Bromus tectorum	cheat grass	Poaceae	Cal-IPC High
Callitriche trochlearis	water-starwort	Callitrichaceae	Native
Calochortus superbus	yellow mariposa	Liliaceae	Native
Calochortus tolmiei	pussy ears	Liliaceae	Native
Calycanthus occidentalis	spicebush	Calycanthaceae	Native
Calystegia occidentalis	western morning glory	Convolvulaceae	Native
Cardamine oligosperma	little western bittercress	Brassicaceae	Native
Cardamine pachystigma var. *pachystigma*	rock toothwort	Brassicaceae	Native
Carduus pycnocephalus	Italian plumeless thistle	Asteraceae	Cal-IPC Moderate
Carex feta	greensheath sedge	Cyperaceae	Native
Carex densa	dense sedge	Cyperaceae	Native
Castilleja applegatei ssp. *pinetorum*	pine wavy-leaf paintbrush	Scrophulariaceae	Native
Castilleja attenuata	valley tassels	Scrophulariaceae	Native
Castilleja campestris	vernal pool indian paintbrush	Scrophulariaceae	Native
Ceanothus cuneatus	buck brush	Rhamnaceae	Native
Ceanothus integerrimus	deer brush	Rhamnaceae	Native
Ceanothus lemmonii	Lemmon's ceanothus	Rhamnaceae	Native
Centaurea melitensis	tocalote	Asteraceae	Not native
Centaurea solstitialis	yellow star-thistle	Asteraceae	Cal-IPC High
Cephalanthus occidentalis var. californicus	California button willow	Rubiaceae	Native
Cerastium glomeratum	sticky mouse-eared chickweed	Caryophyllaceae	Not native

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Scientific Name	Common Name	Family	Native/Non-native[1]
Cercis occidentalis	western redbud	Fabaceae	Native
Cercocarpus betuloides	alder-leaf mountain mahogany	Rosaceae	Native
Chlorogalum angustifolium	narrow-leaved soap plant	Liliaceae	Native
Chlorogalum pomeridianum	soaproot	Liliaceae	Native
Cicendia quadrangularis	timwort	Gentianaceae	Native
Clarkia borealis ssp. *borealis*	northern clarkia	Onagraceae	Native
Clarkia purpurea ssp. *quadrivulnera*	purple clarkia	Onagraceae	Native
Clarkia rhomboidea	diamond clarkia	Onagraceae	Native
Claytonia perfoliata	miner's lettuce	Portulacaceae	Native
Clematis lasiantha	pipestems; chaparral clematis	Ranunculaceae	Native
Collinsia tinctoria	tincture plant	Scrophulariaceae	Native
Cornus sericea	American dogwood	Cornaceae	Native
Cryptantha milobakeri	Milo Baker's cryptantha	Boraginaceae	Native
Cynoglossum grande	pacific hounds tongue	Boraginaceae	Native
Cynosurus echinatus	hedgehog dogtail	Poaceae	Not native
Cyperus eragrostis	tall flatsedge	Cyperaceae	Native
Darmera peltata	Indian rhubarb	Saxifragaceae	Native
Delphinium nudicaule	red larkspur	Ranunculaceae	Native
Dichelostemma capitatum	blue dicks	Liliaceae	Native
Dichelostemma ida-maia	firecracker flower	Liliaceae	Native
Dichelostemma multiflorum	round-toothed ookow	Liliaceae	Native
Dodecatheon hendersonii	Henderson’s shootingstar	Primulaceae	Native
Eleocharis acicularis	needle spikerush	Cyperaceae	Native
Eleocharis macrostachya	common spikerush	Cyperaceae	Native
Elymus glaucus	blue wildrye	Poaceae	Native
Eremocarpus setigerus	turkey mullein	Euphorbiaceae	Native
Eriodictyon californicum	yerba santa	Hydrophyllaceae	Native
Eriogonum nudum	naked eriogonum	Polygonaceae	Native
Eriophyllum lanatum	woolly sunflower	Asteraceae	Native
Erodium botrys	long-beaked stork's bill	Geraniaceae	Not native
Erodium cicutarium	red-stemmed filaree	Geraniaceae	Cal-IPC Limited

Plants Observed at the Moody Flats Study Area, Shasta County, California
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Scientific Name	Common Name	Family	Native/Non-native[1]
Eryngium castrense	coyote thistle	Apiaceae	Native
Eschscholzia caespitosa	tufted eschscholzia	Papaveraceae	Native
Ficus carica	common fig	Moraceae	Cal-IPC Moderate
Filago gallica	Narrow-leaved filago	Asteraceae	Not native
Fraxinus dipetala	California ash	Oleaceae	Native
Galium aparine	goose grass	Rubiaceae	Native
Galium porrigens var. *tenue*	narrow-leaved climbing bedstraw	Rubiaceae	Native
Gastridium ventricosum	nit grass	Poaceae	Not native
Genista monspessulana	French broom	Fabaceae	Cal-IPC High
Geranium dissectum	cut-leaved geranium	Geraniaceae	Not native
Gilia capitata	blue field-gilia	Polemoniaceae	Native
Gilia tricolor	birds eyes	Polemoniaceae	Native
Gratiola ebracteata	bractless hedge-hyssop	Scrophulariaceae	Native
Grindelia camporum	great valley gumweed	Asteraceae	Native
Heteromeles arbutifolia	toyon	Rosaceae	Native
Hieracium albiflorum	white-flowered hawkweed	Asteraceae	Native
Hordeum brachyantherum	meadow barley	Poaceae	Native
Hordeum marinum ssp. *gussoneanum*	Mediterranean barley	Poaceae	Not native
Hordeum murinum	wall barley		Not native
Hypericum concinnum	gold-wire	Hypericaceae	Native
Hypericum perforatum	klamathweed	Hypericaceae	Cal-IPC Moderate
Hypochaeris glabra	smooth cat's-ear	Asteraceae	Not native
Juncus capitatus	leafy bracted dwarf rush	Juncaceae	Not native
Juncus effusus	common bog rush	Juncaceae	Native
Juncus uncialis	twelfth rush	Cyperaceae	Native
Juncus xiphioides	iris-leaved rush	Juncaceae	Native
Keckiella lemmonii	lemmon's keckiella	Scrophulariaceae	Native
Lactuca saligna	narrow-leaved wild-lettuce	Asteraceae	Not native
Lactuca serriola	prickly lettuce	Asteraceae	Not native
Lagophylla dichotoma	forked hareleaf	Asteraceae	Native

Plants Observed at the Moody Flats Study Area, Shasta County, California
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Scientific Name	Common Name	Family	Native/Non-native[1]
Lagophylla glandulosa	glandular hareleaf	Asteraceae	Native
Lathyrus hirsutus	caley pea	Fabaceae	Not native
Lathyrus latifolius	everlasting sweet pea	Fabaceae	Not native
Leontodon taraxacoides	hawkbit	Asteraceae	Not native
Lepidium nitidum	shining pepper grass	Brassicaceae	Native
Lithophragma bolanderi	Bolander's woodland star	Saxifragaceae	Native
Lithophragma campanulatum	bell-shaped woodlandstar	Saxifragaceae	Native
Lolium multiflorum	Italian ryegrass	Poaceae	Cal-IPC Moderate
Lomatium dissectum	fern-leaved lomatium	Apiaceae	Native
Lomatium triternatum	lewis' lomatium	Apiaceae	Native
Lonicera interrupta	chaparral honeysuckle	Caprifoliaceae	Native
Lotus humistratus	short-podded lotus	Fabaceae	Native
Lotus micranthus	small-flowered lotus	Fabaceae	Native
Lotus pinnatus	pinnate-leaved lotus	Fabaceae	Native
Lotus purshianus var. *purshianus*	Spanish clover	Fabaceae	Native
Lupinus bicolor	miniature lupine	Fabaceae	Native
Luzula comosa	hairy wood rush	Juncaceae	Native
Lythrum hyssopifolium	hyssop loosestrife	Lythraceae	Cal-IPC Limited
Madia elegans	common madia	Asteraceae	Native
Madia exigua	threadstem madia	Asteraceae	Native
Madia minima	oppositeleaved tarweed	Asteraceae	Native
Marah watsonii	taw manroot	Cucurbitaceae	Native
Marrubium vulgare	horehound	Lamiaceae	Not native
Medicago polymorpha	California burclover	Fabaceae	Cal-IPC Limited
Melica californica	California melic	Poaceae	Native
Mentha spicata var. *spicata*	spearmint	Lamiaceae	Not native
Micropus californicus	slender cottonweed	Asteraceae	Native
Mimulus guttatus	seep monkey flower	Scrophulariaceae	Native
Mimulus kelloggii	Kellogg’s monkey flower	Scrophulariaceae	Native
Mimulus layneae	layne's monkey-flower	Scrophulariaceae	Native
Minuartia douglasii	Douglas’ sandwort	Caryophyllaceae	Native

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Scientific Name	Common Name	Family	Native/Non-native[1]
Monardella sheltonii	Shelton's coyote mint	Lamiaceae	Native
Monardella villosa	coyote mint	Lamiaceae	Native
Montia fontana	water chickweed	Portulacaceae	Native
Nassella cernua	nodding needlegrass	Poaceae	Native
Nassella pulchra	purple needlegrass	Poaceae	Native
Navarretia intertexta	interwoven navarretia	Polemoniaceae	Native
Navarretia tagetina	marigold navarretia	Polemoniaceae	Native
Nemophila heterophylla	variable-leaved nemophila	Hydrophyllaceae	Native
Odontostomum hartwegii	Hartweg's doll's lily	Liliaceae	Native
Panicum capillare	witchgrass	Poaceae	Native
Pedicularis densiflora	Indian warrior	Scrophulariaceae	Native
Pellaea mucronata	bird's-foot fern	Pteridaceae	Native
Penstemon azureus	azure penstemon	Scrophulariaceae	Native
Pentagramma triangularis	gold-backed fern	Pteridaceae	Native
Perideridia kelloggii	Kellogg's yampah	Apiaceae	Native
Petrorhagia dubia	grass pink	Caryophyllaceae	Not native
Phacelia egena	rock phacelia	Hydrophyllaceae	Native
Phleum pratense	timothy	Poaceae	Not native
Phlox gracilis	slender phlox	Polemoniaceae	Native
Pinus sabiniana	gray pine	Pinaceae	Native
Plagiobothrys hispidus	bristly popcorn flower	Boraginaceae	Native
Plagiobothrys nothofulvus	rusty popcorn flower	Boraginaceae	Native
Plantago erecta	erect plantain	Plantaginaceae	Native
Plantago lanceolata	English plantain	Plantaginaceae	Cal-IPC Limited
Plantago patagonica	patagonia plantain	Plantaginaceae	Native
Poa annua	annual blue grass	Poaceae	Not native
Poa bulbosa	bulbous bluegrass	Poaceae	Not native
Poa secunda	one-sided blue grass	Poaceae	Native
Polygala cornuta	sierra milkwort	Polygalaceae	Native
Polygonum arenastrum	common knotweed	Polygonaceae	Not native
Polygonum lapathifolium	willow weed	Polygonaceae	Native

Plants Observed at the Moody Flats Study Area, Shasta County, California
Survey Dates: April 19, 22, 23, 28, 29, 2010; June 10, 11, 15, 17, 18, 21, 22, 25, 28, 30, 2010

Scientific Name	Common Name	Family	Native/Non-native[1]
Polypodium glycyrrhiza	licorice fern	Polypodiaceae	Native
Polypogon maritimus	Mediterranean beard grass	Poaceae	Not native
Polystichum imbricans	narrow-leaved sword fern	Dryopteridaceae	Native
Populus fremontii ssp. *fremontii*	Fremont cottonwood	Salicaceae	Native
Potentilla glandulosa	sticky cinquefoil	Rosaceae	Native
Prunella vulgaris	self-heal	Lamiaceae	Native
Prunus virginiana var. *demissa*	western choke-cherry	Rosaceae	Native
Pseudotsuga menziesii var. *menziesii*	Douglas-fir	Pinaceae	Native
Psilocarphus oregonus	Oregon woolly marbles	Asteraceae	Native
Psilocarphus tenellus var. *tenellus*	slender woolly marbles	Asteraceae	Native
Pteridium aquilinum var. *pubescens*	western bracken fern	Dennstaedtiaceae	Native
Quercus chrysolepis	canyon live oak	Fagaceae	Native
Quercus douglasii	blue oak	Fagaceae	Native
Quercus garryana var. *breweri*	blue oak	Fagaceae	Native
Quercus kelloggii	black oak	Fagaceae	Native
Quercus lobata	valley oak	Fagaceae	Native
Quercus x *morehus*	oracle oak	Fagaceae	Native
Quercus wislizenii	interior live oak	Fagaceae	Native
Ranunculus muricatus	prickle-seeded buttercup	Ranunculaceae	Not native
Ranunculus occidentalis	western buttercup	Ranunculaceae	Native
Ranunculus pusillus	low buttercup	Ranunculaceae	Native
Rhamnus ilicifolia	holly-leaf redberry	Rhamnaceae	Native
Rhamnus purshiana	cascara	Rhamnaceae	Native
Rhamnus tomentella	hoary coffeeberry	Rhamnaceae	Native
Rhus trilobata	skunkbrush	Anacardiaceae	Native
Rosa californica	California rose	Rosaceae	Native
Rubus armeniacus (R. discolor)	Himalaya blackberry	Rosaceae	Cal-IPC High
Rubus ursinus	California blackberry	Rosaceae	Native

Plants Observed at the Moody Flats Study Area, Shasta County, California
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Scientific Name	Common Name	Family	Native/Non-native[1]
Rumex crispus	curly dock	Polygonaceae	Not native
Rumex salicifolius	willow dock	Polygonaceae	Native
Salix exigua	narrow-leaved willow	Salicaceae	Native
Salix laevigata	red willow	Salicaceae	Native
Salix lasiolepis	arroyo willow	Salicaceae	Native
Sanicula bipinnatifida	purple sanicle	Apiaceae	Native
Scleranthus annuus ssp. *annuus*	knawel	Caryophyllaceae	Not native
Scutellaria antirrhinoides	snapdragon skullcap	Lamiaceae	Native
Scutellaria siphocampyloides	curve-flowered skullcap	Lamiaceae	Native
Sedum spathulifolium	broad-leaved stonecrop	Crassulaceae	Native
Selaginella hansenii	spike moss	Selaginellaceae	Native
Senecio aronicoides	California ragwort	Asteraceae	Native
Senecio vulgaris	old man of spring	Asteraceae	Not native
Sherardia arvensis	field madder	Rubiaceae	Not native
Sisyrinchium bellum	blue-eyed-grass	Iridaceae	Native
Smilax californica	California greenbriar	Liliaceae	Native
Solanum parishii	parish's nightshade	Solanaceae	Native
Sonchus tenerrimus	slender sow thistle	Asteraceae	Not native
Spergularia rubra	ruby sandspurry	Caryophyllaceae	Not native
Spiranthes romanzoffiana	hooded ladies-tresses	Orchidaceae	Native
Stachys ajugoides	ajuga hedge nettle	Lamiaceae	Native
Stellaria media	common chickweed	Caryophyllaceae	Not native
Streptanthus tortuosus	mountain jewelflower	Brassicaceae	Native
Symphoricarpos albus var. *laevigatus*	snowberry	Caprifoliaceae	Native
Taeniatherum caput-medusae	medusahead	Poaceae	Cal-IPC High
Thalictrum fendleri	Fendler's meadow-rue	Ranunculaceae	Native
Thysanocarpus curvipes	fringepod	Brassicaceae	Native
Torilis arvensis	field hedge-parsley	Apiaceae	Cal-IPC Moderate
Toxicodendron diversilobum	poison oak	Anacardiaceae	Native
Tragopogon dubius	goat's beard	Asteraceae	Not native

Plants Observed at the Moody Flats Study Area, Shasta County, California
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Scientific Name	Common Name	Family	Native/Non-native[1]
Trientalis latifolia	starflower	Primulaceae	Native
Trifolium hirtum	rose clover	Fabaceae	Not native
Trifolium subterraneum	subterranean clover	Fabaceae	Not native
Trifolium variegatum	white-tipped clover	Fabaceae	Native
Triteleia hyacinthina	white brodiaea	Liliaceae	Native
Umbellularia californica	California bay	Lauraceae	Native
Verbascum blattaria	moth mullein	Scrophulariaceae	Not native
Verbena lasiostachys	western vervain	Verbenaceae	Native
Vicia sativa	spring vetch	Fabaceae	Not native
Vicia villosa	winter vetch	Fabaceae	Not native
Vitis californica	California wild grape	Vitaceae	Native
Vulpia myuros	rattail fescue	Poaceae	Not native
Woodwardia fimbriata	giant chain fern	Blechnaceae	Native
Wyethia angustifolia	narrow-leaved mules ears	Asteraceae	Native
Wyethia mollis	woolly mule's-ears	Asteraceae	Native
Zigadenus venenosus var. venenosus	death-camas	Liliaceae	Native

[1] Native status of plants is based on The Jepson Manual (Hickman 1993). Additionally, Cal-IPC rating is shown in bold for non-native plants included in the California Invasive Plant Inventory (Cal-IPC 2006).

Appendix C

Northern Clarkia Site Data

Northern Clarkia; Habit.

Northern Clarkia; Detail

North State Resources, Inc.

SPECIAL-STATUS PLANT OCCURRENCE FORM

Scientific name: Clarkia borealis **Occurrence #:** 1

Surveyor(s): P. Kirk **Date:** 6/25/10 **Site Visit #:** 2

LOCATION

Site(s) name: Moody Flats **County:** Shasta

USGS Quad(s): **T.** **R.** **S.**

Location (directions, landmarks, etc.): along a narrow motorcycle trail that runs along N-facing side of E-W ridge; ~400 m E of intermittent stream that drains N-ward into Shasta Lake.

UTM Zone 10 (NAD ~~27~~ 83): **Easting** 0552151 **Northing** 4507169 **GPS Model** Garmin 60 (gp392)

OCCURRENCE

Number of Plants: ~250 **Pop'n Size** (Area): 40 m x 2 m

Description (phenology, age class, density, etc): Plants along dirt-bike (motorcycle) trail near top of ridge; ~ rectangle of 40 m x 2 m. 2/3 of plants in flower, 1/3 in bud. Fruits immature.

Suitability for Restoration:

Camera ID NSR Olympus #871 **Photo #:** 015 - 019

Voucher Specimen - Collector: P. Kirk **Stored at:** NSR Chico

HABITAT

Elevation: **Aspect:** NW **% Slope:** 15

Topography (macro/micro): Trail is near top of the ridge; ~~north~~ very steep (>100%) below trail.

Description (microhabitat, plant associates, etc.): ~~Occurrence is~~

Occurrence is within a Mixed Chaparral community that is dominated by Arctostaphylos manzanita. The hillside is very rocky; and there is a large outcrop (5 m x 8 m) within the occurrence area. The Clarkia does not grow on the outcrop itself. The tallest Clarkia borealis individuals grow in the shade of Quercus chrysolepis. ~~and at all~~

Soil inventory type (Order/Source):

Soil Texture: **Geologic Substrate:**

QA/QC _____ Data Entry _____

Site Name: Moody Flat

Date: 6/25/10

Occurrence #: 1

SPECIAL STATUS PLANT OCCURRENCE FORM

clarkia borealis

SITE QUALITY

Overall site/occurrence quality/viability (circle one): Excellent Good Fair Poor

Surrounding Land Use:

Visible Disturbance: Narrow motorcycle trail

Threats: Off-road vehicles

Comments/Rationale (e.g., noxious weeds):

ASSOCIATED PLANTS LIST

TREES	SHRUBS	HERBS
Pinus sabiniana	*Arctostapylos viscida	Eriophyllum lanatum
Quercus chrysolepis	Cercocarpus betuloides	Lomatium dissectum
	Ceanothus cuneatus	Allium falcifolium
	Rhamus ilicifolia	Galium porrigens
	Toxicodendron diversilobum	
	Clematis lasiantha	
	Lonicera interrupta	