A VEGETATION DESCRIPTION OF THE LOWER ROCKY GULCH RESTORATION PROJECT AREA, HUMBOLDT COUNTY, CALIFORNIA.

PREPARED FOR:

ALDARON LAIRD
TRINITY ASSOCIATES
814 13TH ST
ARCATA, CA 95521

January 30, 2004

PREPARED BY:

MCBAIN AND TRUSH, INC.
P.O. BOX 663
ARCATA, CA 95518

TABLE OF CONTENTS

TABLE OF CONTENTS i
LIST OF FIGURES ii
LIST OF TABLES ii
1 BACKGROUND 1
2 VEGETATION DESCRIPTION METHODS 1
3 DESCRIPTION OF SITE VEGETATION 1
3.1 Salt Marsh Habitats 1
3.1.1 Saltgrass 2
3.1.2 Pickleweed-Saltgrass 2
3.1.3 Hairgrass-Pickleweed-Saltgrass 2
3.1.4 Cordgrass 2
3.1.5 Cordgrass-Saltgrass 3
3.2 Brackish Marsh Habitats 3
3.2.1 Hairgrass 3
3.2.2 Lyngbye's Sedge 3
3.3 Freshwater Marsh Habitats 3
3.3.1 Cattail 3
3.4 Grazed Wetland Habitats 4
3.4.1 Inundated Pasture 4
3.4.2 Juncus 4
3.4.3 Juncus Pasture 4
3.5 Willow Swamp Habitats 5
3.5.1 Hooker Willow 5
3.6 Riparian Woodland Habitats 5
3.6.1 Red Alder 5
3.6.2 Red-Alder Hooker willow 5
3.7 Upland Habitats 5
3.7.1 Coastal Redwood 6
3.7.2 Coyotebush 6
3.7.3 California Blackberry 6
3.7.4 Himalaya Berry 6
3.7.5 Monterey Pine 6
3.8 Other Habitats 6
3.8.1 Human disturbance 6
3.8.2 Open water 6
4 PRESENCE OF SPECIAL STATUS SPECIES 7
5 PLANT SPECIES LIST 7
6 REFERENCES 7

LIST OF FIGURES

Figure 1. Inventory of biological habitats occurring within the Rocky Gulch Project vicinity, mapped in December 2003.

Figure 2. Inventory of cover types occurring within the Rocky Gulch Project vicinity, mapped in December 2003.

LIST OF TABLES

Table 1. Summary of cover types mapped with the Rocky Gulch project area and their relationship to other habitat classifications identified by previous research.

Table 2. List of plant species observed by Mad River Biologists, 2001 during plant surveys for the Mad River Pipeline Rehabilitation Project. This is a list of plants expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993). The listing written in bold red indicates an exotic plant.

1 BACKGROUND

In December 2003, an inventory was made of vegetation within the Rocky Gulch project area. Using vegetation inventory we developed maps of the project area showing different habitat classes (Figure 1) and cover types (Figure 2), and described the vegetation. The vegetation inventory and description was performed at the request of Aldaron Laird, Trinity Associates for the purpose of providing addition site information.

2 VEGETATION DESCRIPTION METHODS

We developed a site base map using 2001 CALTRANS aerial photographs to perform a detailed field based vegetation inventory for the lower Rocky Gulch project area. We scanned black and white non-ortho rectified 2001 aerial photographs at the original 1:4,200 scale and overlaid the project boundary. The basemaps were scaled to 1:1,200 and plotted on 18 in. by 24 in. sheets and laminated for use in the field.

Vegetation is "all the plant species in a region, and the way they are arranged" and usually appears as a mosaic of numerous, definable plant stand types (Saywer and Keeler-Wolf 1995). The dominant plant species in the canopy defines the stand type, such that if there is a discernable shift in species dominance within the canopy, there is also a corresponding shift in stand type. A vegetation classification system utilizing stand types was used to assign cover attributes to vegetated polygons during the inventory (Saywer and Keeler-Wolf 1995). Unvegetated polygons were assigned a cover attribute based on visible substrate and level of human disturbance. A cover attribute is the same as a cover type. Cover types include those vegetated stand types but also unvegetated areas (Table A). Cover types defined during the inventory were related to other classification systems used during other local inventories (Eicher 1987, Shapiro 1980, Jones and Stokes 2001).

We mapped cover types using an intensive site vegetation inventory during December 2003. A field based inventory ensured a highly detailed and accurate vegetation map. A riparian botanist conducted the field inventory which consisted of walking the entire site and visiting each distinct cover type. Polygon boundaries were drawn around discreet cover types and a cover attribute assigned. Plant stands were the smallest vegetation units mapped. Mapped plant stands were no smaller than 100 ft^2 and included all salt, brackish, and freshwater wetlands, and adjacent upland plant stands within the project boundary.

Two maps showing site vegetation were created from the field inventory (Figure 1 and Figure 2). We created a map of the vegetation using wetland habitat classes developed by Shapiro (1980). The wetland habitat classification lumps marsh related cover types into salt, brackish, and Freshwater emergent classes (Figure 1, Table 1). The wetland habitat class map illustrates the site vegetation at a coarser scale. A second map using cover types mapped in December 2003 was also produced (Figure 2). The cover type based map is used to illustrate vegetation, particularly wetlands, at a greater detail. The habitat class based map is useful for NEPA/CEQA compliance purposes, while a cover type map based on species dominance is useful for assessing vegetation quality at the site.

3 DESCRIPTION OF SITE VEGETATION

We mapped twenty two cover types within the Rocky Gulch project area in December 2003 (Table 1). Mapped cover types were related to the wetland habitat classes developed by Shapiro (1980) and are briefly described within the respective wetland habitat class.

3.1 Salt Marsh Habitats

Salt marshes are plant dominated intertidal habitats. Salinity can vary greatly within these habitats (40-100ppt), but of all mapped habitat classes, salinity is highest in this class (Zedler 2001). Plant species occurring in this habitat are salt tolerant and able to withstand frequent and prolonged inundation. Less than 10% of the original salt marsh coverage around Humboldt Bay remains, making the remaining salt marshes uncommon and important species reserves (USFWS 1992). The salt marsh habitat class begins below mean lower low water (MLLW) and continues to the extreme high water tidal elevation (EHW). We mapped five cover types within the salt marsh habitat class that make up 53.1% of the project area (Figure 1).

Within the salt marsh habitat class three special status plant species could potentially occur: Humboldt Owls Clover (*Castilleja ambigua* ssp. *Humboldtiensis*), Point Reyes Bird Beak (*Cordylanthus maritimus*), and Lyngbye's sedge (*Carex lyngbyei*). We will use a floristic survey using the Nelson method of intuitive control to assess the presence of these species at a seasonally appropriate time. Descriptions of specific cover types that comprise this habitat class follows.

3.1.1 Saltgrass

Saltgrass (*Distichlis spicata*) dominates this cover type and may grow by itself in extensive patches. This cover type is commonly associated with high elevation salt marshes. Saltgrass is considered a facultative wetland indicator (Reed 1988), other species that may commonly occur as associates (but not co-dominants) in this cover type are: pickleweed (*Salicornia virginica*), fleshy Jaumea (*Jaumea carnosa*), and dense flowered cordgrass (*Spartina densiflora*). The saltgrass cover type makes up 11.9% of the project area (Figure 2). The species richness in this cover type is typically low.

3.1.2 Pickleweed-Saltgrass

Pickleweed (*Salicornia virginica*) and saltgrass (*Distichlis spicata*) co-dominate this cover type. This cover type is commonly associated with high elevation salt marshes. Pickleweed is an obligate wetland indicator species (Reed 1988) and saltgrass is considered a facultative wetland indicator. Other species that may commonly occur as associates (but not co-dominants) in this cover type are: spear oracle (*Atriplex patula*), spearscale (*Atriplex triangularis*), sea lavender (*Limonium californicum*), fleshy Jaumea (*Jaumea carnosa*), seaside arrowgrass (*Triglochin maritima*) and dense flowered cordgrass (*Spartina densiflora*). The pickleweed - saltgrass cover type makes up 6.8% of the project area (Figure 2). This cover type has a high species richness and many native species.

3.1.3 Hairgrass-Pickleweed-Saltgrass

Coastal hairgrass (*Deschampsia caespitosa* ssp. *caespitosa*), pickleweed (*Salicornia virginica*) and saltgrass (*Distichlis spicata*) all co-dominate this cover type. This cover type is commonly associated with high elevation salt marshes. Pickleweed is considered an obligate wetland indicator, coastal hairgrass is considered a wet/facultative wetland indicator and saltgrass is considered a facultative wetland indicator (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: spear oracle (*Atriplex patula*), spearscale (*Atriplex triangularis*), sea lavender (*Limonium californicum*), fleshy Jaumea (*Jaumea carnosa*), seaside arrowgrass (*Triglochin maritima*) and dense flowered cordgrass (*Spartina densiflora*). The hairgrass - pickleweed - saltgrass cover type makes up 2.3% of the project area (Figure 2). This cover type has the highest species richness and the most native species of all salt marsh components.

3.1.4 Cordgrass

Dense-flowered cordgrass (*Spartina densifolia*) dominates this cover type. Dense-flowered cordgrass is not native to Humboldt Bay and considered invasive, growing in dense monotypic stands. This cover type is commonly associated with mid to high elevation salt marshes. Dense-flowered cordgrass is considered an obligate wetland indicator (Reed 1988), other species that may infrequently occur in this cover type are: pickleweed (*Salicornia virginica*), spear oracle (*Atriplex patula*), spearscale (*Atriplex triangularis*), sea lavender (*Limonium californicum*), fleshy Jaumea

(*Jaumea carnosa*), and seaside arrowgrass (*Triglochin maritima*). The cordgrass cover type makes up 0.3% of the project area (Figure 2). The species richness in this cover type is typically low.

3.1.5 Cordgrass-Saltgrass

Dense-flowered cordgrass (*Spartina densifolia*) and saltgrass (*Distichlis spicata*) co-dominate this cover type. Dense-flowered cordgrass is not native to Humboldt Bay and considered invasive, growing in dense monotypic stands. This cover type is commonly associated with low elevation salt marshes. Dense-flowered cordgrass is considered an obligate wetland indicator and saltgrass is considered a facultative wetland indicator (Reed 1988), other species that may infrequently occur as associates (but not co-dominants) in this cover type are: pickleweed (*Salicornia virginica*), spear oracle (*Atriplex patula*), spearscale (*Atriplex triangularis*), sea lavender (*Limonium californicum*), fleshy Jaumea (*Jaumea carnosa*), and seaside arrowgrass (*Triglochin maritima*). The cordgrass - saltgrass cover type makes up 31.8% of the project area (Figure 2). The species richness in this cover type is typically low.

3.2 Brackish Marsh Habitats

Brackish marshes are plant dominated intertidal habitats with suppressed salinities. Salinity can vary greatly within these habitats (0.5-30ppt), but salinity is depressed because of freshwater influence (Zedler 2001). The brackish marsh habitat class begins at mean higher high water (MHHW) and may continue past the extreme high water tidal elevation (EHW) to where salinity is no longer present. We mapped two cover types within the brackish marsh habitat class that make up 1.3% of the project area (Figure 1).

3.2.1 Hairgrass

Coastal hairgrass (*Deschampsia caespitosa* ssp. *caespitosa*), dominates this cover type. This cover type is commonly associated with high elevation salt marshes where freshwater dilutes salinity. Coastal hairgrass is considered a wet/facultative wetland indicator (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: Lyngbye's sedge (*Carex lyngbyei*), pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), sea lavender (*Limonium californicum*), seaside arrowgrass (*Triglochin maritima*) and dense flowered cordgrass (*Spartina densiflora*). The hairgrass cover type makes up 1.3% of the project area (Figure 2).The species richness in this cover type is typically low.

3.2.2 Lyngbye's Sedge

Lyngbye's sedge (*Carex lyngbyei*) dominates this cover type. This cover type is commonly associated with high elevation salt marshes where freshwater dilutes salinity. Lyngbye's sedge may grow in dense monotypic stands and is considered an obligate wetland indicator (Reed 1988). Lyngbye's sedge is a CNPS List II plant (CNPS 2001a). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: coastal hairgrass (*Deschampsia caespitosa* ssp. *caespitosa*), small fruited bulrush (*Scirpus microcarpus*), and *Scirpus robustus*. This cover type has the highest species richness and the most native species of all salt marsh components. The Lyngbye's sedge cover type makes up 0.0% of the project area (Figure 2).The species richness in this cover type is typically low.

3.3 Freshwater Marsh Habitats

Freshwater marshes are plant dominated non-tidal freshwater habitats. There is no salinity associated with freshwater marshes. Freshwater marshes occur within the water along the margins of seasonal and perennial freshwater bodies to a depth of 6 feet. All freshwater emergent cover types are dominated by obligate wetland indicator species. We mapped one cover type within this habitat that make up 0.5% of the project area (Figure 1).

3.3.1 Cattail

Cattails (*Typha latifolia*) dominate this cover type. This cover type is commonly associated with perennial freshwater bodies. Cattails may be considered invasive, growing in dense monotypic stands.

Cattail is an obligate wetland indicator species (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: hardstem bulrush (*Scirpus acutus*), common threesquare (*Scirpus pungens*), water plantain (*Alisma plantago-aquatica*), water parsley (*Oenanthe sarmentosa*), pacific rush (*Juncus effusus*) and yellow pond lily (*Nuphar luteum*). The cattail cover type makes up 0.5% of the project area (Figure 2). The species richness in this cover type is typically low.

3.4 Grazed Wetland Habitats

Grazed wetlands are plant dominated non-tidal freshwater habitats. These wetlands are agriculturally valuable. There is no salinity associated with grazed wetlands. Grazed wetlands dominate the majority of the non-tidally influenced project area. All grazed wetland cover types are dominated by obligate wetland indicator species. We mapped three cover types within this habitat that make up 28.1% of the project area (Figure 1).

3.4.1 Inundated Pasture

Various native and grass species dominate this cover type. This cover type is grazed and is associated with inundated grazed pastures. Common rushes are all wet facultative wetland indicator species (Reed 1988), and many of the grass species are also obligate and wet facultative wetland indicator species (Table1). Species that may commonly occur as associates (or as co-dominants) in this cover type are: velvet grass (*Holcus lanatus*), annual bluegrass (*Poa annua*), water fox tail (*Alopecurus geniculatus*), sweet vernal grass (*Anthoxanthum odoratum*), annual ryegrass (*Lolium* sp.), colonial bent grass (*Agrostis capillaries*), creeping bent grass (*Agrostis stolonifera*), dandelion (Taraxacum officinale), perennial trefoil (*Lotus corniculatus*), buttercup (*Ranunculus repens*), curly dock (*Rumex crispus*), creeping white clover (*Trifolium repens*), and pacific silverweed (*Potentilla anserina*). The inundated pasture cover type makes up 0.8% of the project area (Figure 2).The species richness in this cover type is typically high, though many of the associated species are introduced, invasive exotic species.

3.4.2 Juncus

Common rush species (*Juncus effusus* and *Juncus natans*) dominate this cover type. This cover type is commonly associated with infrequently inundated meadows and grazed pastures. Common rushes are all wet facultative wetland indicator species (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: velvet grass (*Holcus lanatus*), annual bluegrass (*Poa annua*), water fox tail (*Alopecurus geniculatus*), sweet vernal grass (*Anthoxanthum odoratum*), annual ryegrass (*Lolium* sp.), colonial bent grass (Agrostis tenuis), creeping bent grass (*Agrostis stolonifera*), dandelion (Taraxacum officinale), perennial trefoil (*Lotus corniculatus*), buttercup (*Ranunculus repens*), curly dock (*Rumex crispus*), creeping white clover (*Trifolium repens*), and pacific silverweed (*Potentilla anserina*). The Juncus cover type makes up 7.5% of the project area (Figure 2).The species richness in this cover type is typically high, though many of the associated species are introduced, invasive exotic species.

3.4.3 Juncus Pasture

Common rush species (*Juncus effusus* and *Juncus natans*) and various grass species dominate this cover type. This cover type is grazed and is commonly associated with infrequently inundated meadows and grazed pastures. Common rushes are all wet facultative wetland indicator species (Reed 1988), and many of the grass species are also obligate and wet facultative wetland indicator species (Table1). Species that may commonly occur as associates (some as co-dominants) in this cover type are: velvet grass (*Holcus lanatus*), annual bluegrass (*Poa annua*), water fox tail (*Alopecurus geniculatus*), sweet vernal grass (*Anthoxanthum odoratum*), annual ryegrass (*Lolium* sp.), colonial bent grass (*Agrostis capillaries*), creeping bent grass (*Agrostis stolonifera*), dandelion (*Taraxacum officinale*), perennial trefoil (*Lotus corniculatus*), buttercup (*Ranunculus repens*), curly dock (*Rumex crispus*), creeping white clover (*Trifolium repens*), and pacific silverweed (*Potentilla anserina*). The Juncus pasture cover type makes up 19.7% of the project area (Figure 2). The species richness in this

cover type is typically high, though many of the associated species are introduced, invasive exotic species.

3.5 Willow Swamp Habitats

Willow swamps are woody plant dominated non-tidal freshwater habitats. There is no salinity associated with willow swamps. Willow swamps occur where seasonal and perennial freshwater bodies pond. Willow swamps are dominated by wet facultative wetland indicator species. We mapped one cover type within this habitat that makes up 5.6% of the project area (Figure 1).

3.5.1 Hooker Willow

Hooker willow (*Salix hookeriana*) dominates this cover type. This cover type is commonly associated with perennial freshwater, brackish, and seasonal freshwater wetlands. Hooker willow is a wet facultative wetland indicator species (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: red alder (*Alnus rubra*), Sitka willow (*Salix sitchensis*), small fruited bulrush (*Scirpus microcarpus*), cascara (*Rhamnus purshiana*), California blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus discolor*), water plantain (*Alisma plantago-aquatica*), yellow skunk cabbage (*Lysichiton americanum*), and water parsley (*Oenanthe sarmentosa*). The Hooker willow cover type makes up 5.6% of the project area (Figure 2). The species richness in this cover type is typically low.

3.6 Riparian Woodland Habitats

Riparian woodlands are woody plant dominated terrestrial freshwater habitats. Riparian woodlands occur along the margins of streams, and freshwater bodies (both perennial and seasonal) where the groundwater is sufficiently in excess of local precipitation. Riparian woodlands are most often dominated by wet facultative wetland indicator species. We mapped two cover types within this habitat that make up 4.6% of the project area (Figure 1).

3.6.1 Red Alder

Red alder (*Alnus rubra*) dominates this cover type. This cover type is commonly associated with perennial freshwater, brackish, and seasonal freshwater wetlands. Red alder is a wet facultative wetland indicator species (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: Hooker willow (*Salix hookeriana*), small fruited bulrush (*Scirpus microcarpus*), cascara (*Rhamnus purshiana*), California blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus discolor*), water plantain (*Alisma plantago-aquatica*), yellow skunk cabbage (*Lysichiton americanum*), water parsley (*Oenanthe sarmentosa*), and stinging nettle (*Urtica dioica*). The red alder cover type makes up 0.2% of the project area (Figure 2). The species richness in this cover type is typically low.

3.6.2 Red-Alder Hooker willow

Red alder (*Alnus rubra*) and Hooker willow (*Salix hookeriana*) dominate this cover type. This cover type is commonly associated with perennial freshwater, brackish, and seasonal freshwater wetlands. Hooker willow and red alder are wet facultative wetland indicator species (Reed 1988). Other species that may commonly occur as associates (but not co-dominants) in this cover type are: Sitka willow (*Salix sitchensis*), small fruited bulrush (*Scirpus microcarpus*), cascara (*Rhamnus purshiana*), California blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus discolor*), water plantain (*Alisma plantago-aquatica*), yellow skunk cabbage (*Lysichiton americanum*), and water parsley (*Oenanthe sarmentosa*). The red alder - Hooker willow cover type makes up 4.4% of the project area (Figure 2). The species richness in this cover type is typically low.

3.7 Upland Habitats

Upland cover types are plant dominated non-wetland habitats. These cover types are not inundated for any length of time and have groundwater supplied by local precipitation alone. Upland cover types may have some wetland indicator species but the majority of plants with these cover types are

facultative wetland or upland plants. We mapped five cover types within this habitat that make up 2.3% of the project area (Figure 1).

3.7.1 Coastal Redwood

Coast redwood (*Sequoia sempervirens*) dominates this cover type. Other species that may commonly occur as associates (but not co-dominants) in this cover type are: Douglas iris (*Iris douglasii*), redwood oxalis (*Oxalis oregana*), evergreen huckleberry (*Vaccinium ovatum*), sword fern (*Polystichum munitum*), and salal (*Gaultheria shallon*). The coastal redwood cover type makes up 1.2% of the project area (Figure 2). Species richness in this cover type is typically low.

3.7.2 Coyotebush

Coyotebush (*Baccharis pilularis* var. *consanguine*) dominates this cover type. Other species that may commonly occur as associates (but not co-dominants) in this cover type are: Sitka spruce (*Picea sitchensis*), Himalayan berry (*Rubus discolor*), velvet grass (*Holcus lanatus*), annual bluegrass (*Poa annua*), sweet vernal grass (*Anthoxanthum odoratum*), annual ryegrass (*Lolium* sp.), dandelion (*Taraxacum officinale*), perennial trefoil (*Lotus corniculatus*), and curly dock (*Rumex crispus*). The Coyotebush cover type makes up 0.9% of the project area (Figure 2).The species richness in this cover type is typically high for upland habitats in the project area.

3.7.3 California Blackberry

California blackberry (*Rubus ursinus*) dominates this cover type. This cover type occurs as isolated monotypic stands through the project site. The California blackberry cover type makes up 0.0% of the project area (Figure 2). No other species occur within this patch type.

3.7.4 Himalaya Berry

Himalayan blackberry (*Rubus discolor*) dominates this cover type. This cover type occurs as isolated monotypic stands through the project site. The Himalaya berry cover type makes up 0.3% of the project area (Figure 2). No other species occur within this patch type.

3.7.5 Monterey Pine

Monterey pine (*Pinus radiata*) dominates this cover type. The occurrence of Monterey pine is isolated to a road embankment at the downstream end of the project site and was planted by the landowner for privacy. The Monterey pine cover type makes up 0.0% of the project area (Figure 2). Monterey pine is native to California but not this region.

3.8 Other Habitats

These habitats include all unvegetated cover types. The cover type classification is independent of hydrology with the exception of the open water cover type. We two cover types within this habitat that make up 4.5% of the project area (Figure 1).

3.8.1 Human disturbance

At the time of the inventory, the Eureka pipeline project had recently finished construction at the project site. Human disturbance at the site is related to areas where construction activities have occurred within the last year and plant cover has not returned. The human disturbance cover type makes up 1.7% of the project area (Figure 2).

3.8.2 Open water

Open water cover type has no associated plants and occurs as large locations of standing water within the project site. Because the inventory was completed in a wet period of the year it is anticipated that these open water areas are seasonal and would not exist during dry times of the year (e.g., summer, fall). The open water cover type makes up 2.8% of the project area (Figure 2).

4 PRESENCE OF SPECIAL STATUS SPECIES

The intensive field based vegetation survey conducted in December 2003 was not intended to document the occurrence of special status plants within the project area. The project area is in close proximity to documented populations of Humboldt Bay Owls clover (Castilleja ambigua ssp. Humboldtiensis) and Point Reyes Bird Beak. (*Cordylanthus maritimus ssp. palustris*) at the Bracut Marsh Restoration Project and the Jacoby Creek National Wildlife refuge Salt Marsh. It is reasonable to expect that these plant species might occur within the project site, though improbable due to the restriction of incoming seed sources by tide gate structures. Lyngbye's sedge is known to occur at the site (Mad River Biologists 2001)

Evaluating whether special status plant species occur within the project area will be performed when these special status species are flowering and readily detectable, in early June 2004. A qualified botanist will visit the site and perform a complete floristic survey of the site and utilize the Nelson method of intuitive control for the special status plant species (CDFG 2000, CNPS 2001b). An intuitive control search relies on the special status plants affinities for particular environments and common plant associates for constraining the search to those areas on the site where these special status plants are likely to occur.

5 PLANT SPECIES LIST

A preliminary plant list was prepared relying on observations made during a previous floristic survey of Rocky Gulch and adjacent areas (Table 2, [Mad River Biologists 2001]). The previous floristic survey did not extensively investigate the salt marsh portions of the Rocky Gulch project area. The preliminary plant list included with this report will not take the place of a comprehensive floristic survey preformed in the future; the list includes those plants that can be reasonably expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993).

6 REFERENCES

California Department of Fish & Game. 2000. *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened and Endangered Plants and Natural Communities*. The Resources Agency, Sacramento, CA.

California Native Plant Society. 2001a. *Inventory of Rare and Endangered Plant. Sixth Edition*. California Native Plant Society, Sacramento, CA.

California Native Plant Society. 2001b. *CNPS Botanical Survey Guidelines*. California Native Plant Society, Sacramento, CA.

City of Eureka. 2002. City of Eureka Mad River Water Pipeline Rehabilitation Project, Chapter 4, DEIR and FEIR, SCH No. 2001012088. Eureka, CA.

Eicher, A.L. 1987. *Salt Marsh Vascular Plant Distribution in Relation to Tidal Elevation.* M.A. Thesis. Humboldt State University, Arcata, CA.

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

Jones & Stokes. 2001.*Humboldt County, Old Arcata Road Widening, and Rehabilitation Project, Chapter 4, DEIR, and FEIR*. Prepared for County of Humboldt, Eureka, CA.

Jones & Stokes. 2001. *Humboldt County, Old Arcata Road Widening, and Rehabilitation Project, Natural Environmental Study Report.* Prepared for County of Humboldt, Eureka, CA.

Mad River Biologists.2001. *Rare Plant Assessment for the City of Eureka Mad River Pipeline Rehabilitation Project, Humboldt County California.* Prepared for Roberts Environmental Consulting. Davis, CA.

NMFS and USFWS. 2003. NMFS and USFWS Biological Opinion and Formal Consultation, City of Eureka Mad River Water Pipeline Rehabilitation Project. Arcata, CA.

Reed, P.B. Jr. 1988. *National List of Plant Species That Occur in Wetlands: California (Region 0).* U.S. Fish and Wildlife Service Biological Report 88(26.10). USFWS, Washington DC.

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

Shapiro and Associates. 1980. *Humboldt Bay Wetlands Review and Baylands Analysis; Volume III: Habitat Classification and Mapping Appendices*. Prepared for: US Army Corps of Engineers, San Francisco, CA.

Thomas R. Payne & Assoc. and Mad River Biologists. 2001. City of Eureka Mad River Water Pipeline Rehabilitation Project, Chapter 4, DEIR, SCH No. 2001012088, Appendix D, Biological Studies. Eureka, CA.

USFWS. 2003. USFWS Biological Opinion and Formal Consultation, Old Arcata Road Widening and Rehabilitation Project, Humboldt County. Arcata, CA.

USFWS. 2003. USFWS Biological Opinion and Formal Consultation, City of Eureka Mad River Water Pipeline Rehabilitation Project. Arcata, CA

Zedler, J. B. (ed.) 2001. *Handbook for Restoring Tidal Wetlands*. CRC press. Boca Raton, FL.

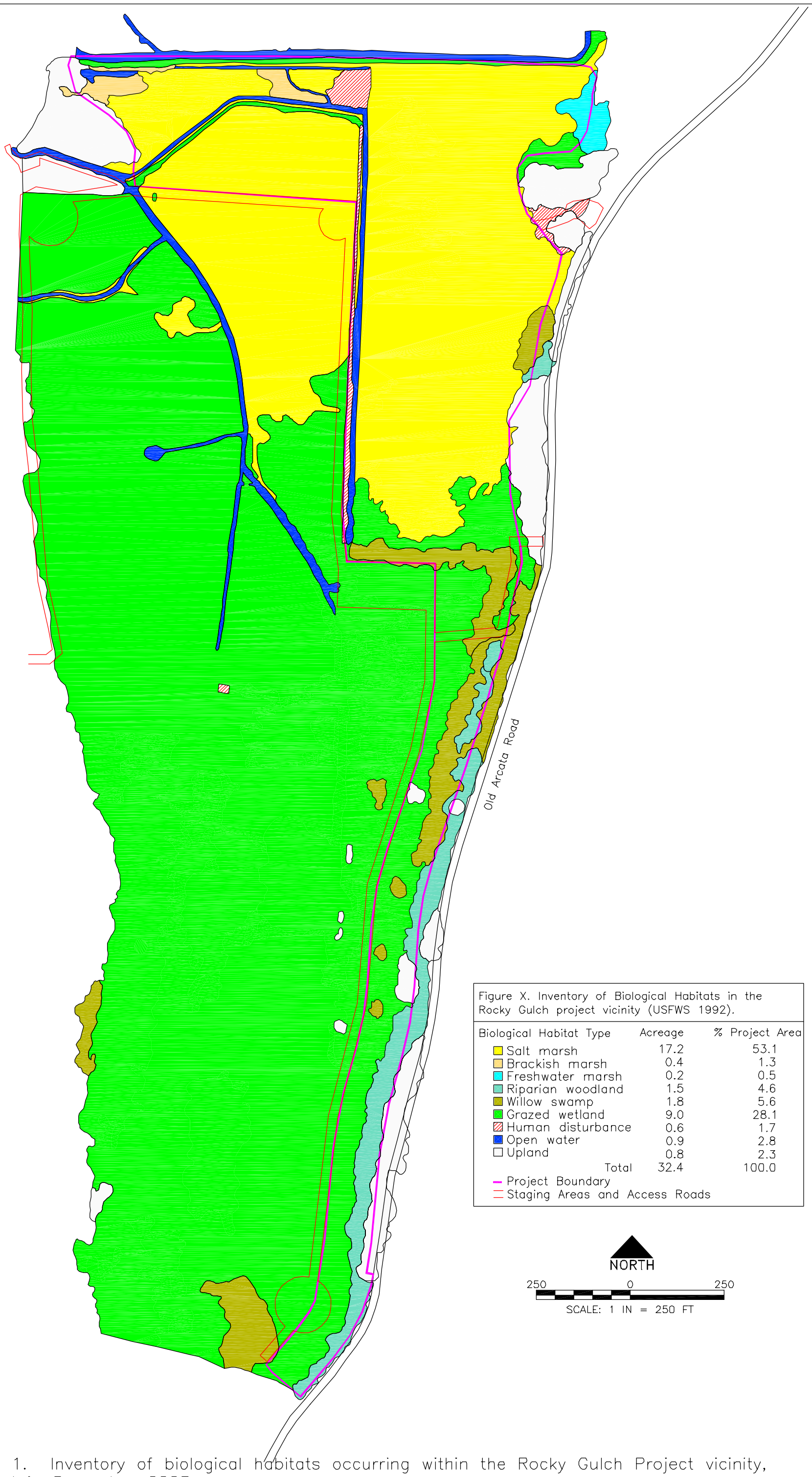
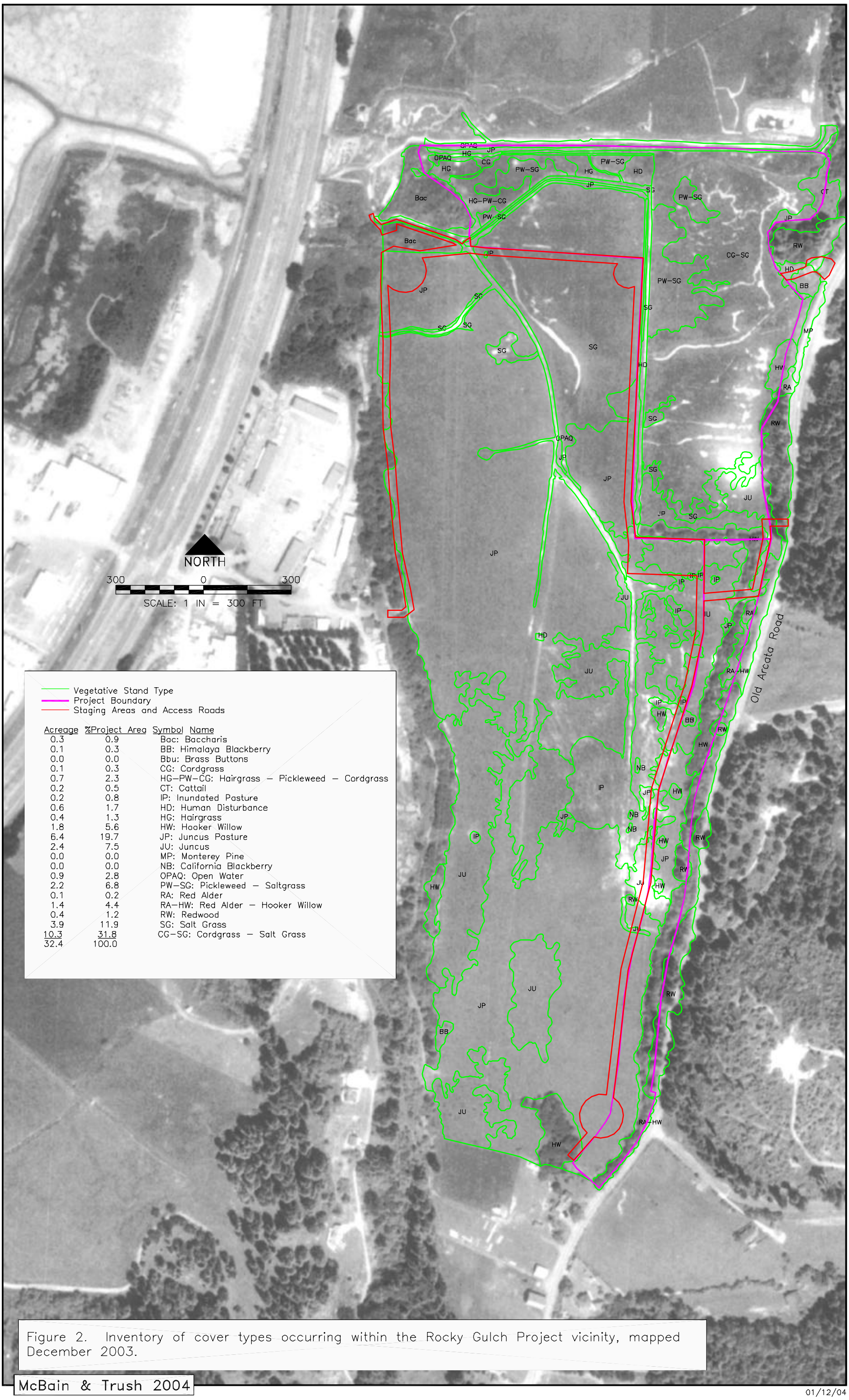


Figure X. Inventory of Biological Habitats in the Rocky Gulch project vicinity (USFWS 1992).

Biological Habitat Type	Acreage	% Project Area
Salt marsh	17.2	53.1
Brackish marsh	0.4	1.3
Freshwater marsh	0.2	0.5
Riparian woodland	1.5	4.6
Willow swamp	1.8	5.6
Grazed wetland	9.0	28.1
Human disturbance	0.6	1.7
Open water	0.9	2.8
Upland	0.8	2.3
Total	32.4	100.0

Project Boundary
Staging Areas and Access Roads

Figure 1. Inventory of biological habitats occurring within the Rocky Gulch Project vicinity, mapped in December 2003.



Acreage	%Project Area	Symbol	Name
0.3	0.9	Bac	Baccharis
0.1	0.3	BB	Himalaya Blackberry
0.0	0.0	Bbu	Brass Buttons
0.1	0.3	CG	Cordgrass
0.7	2.3	HG-PW-CG	Hairgrass – Pickleweed – Cordgrass
0.2	0.5	CT	Cattail
0.2	0.8	IP	Inundated Pasture
0.6	1.7	HD	Human Disturbance
0.4	1.3	HG	Hairgrass
1.8	5.6	HW	Hooker Willow
6.4	19.7	JP	Juncus Pasture
2.4	7.5	JU	Juncus
0.0	0.0	MP	Monterey Pine
0.0	0.0	NB	California Blackberry
0.9	2.8	OPAQ	Open Water
2.2	6.8	PW-SG	Pickleweed – Saltgrass
0.1	0.2	RA	Red Alder
1.4	4.4	RA-HW	Red Alder – Hooker Willow
0.4	1.2	RW	Redwood
3.9	11.9	SG	Salt Grass
10.3	31.8	CG-SG	Cordgrass – Salt Grass
32.4	100.0		

Figure 2. Inventory of cover types occurring within the Rocky Gulch Project vicinity, mapped December 2003.

McBain & Trush 2004

01/12/04

Table 1. Summary of cover types mapped with the Rocky Gulch project area and their relationship to other habitat classifications identified by previous research.

FIELD CODE	***STAND TYPE***	***BIOLOGICAL HABITATS (USFWS 1992)***	***HABITAT CLASS (Shapiro 1980)***	***BIOLOGICAL COMMUNITY (Jones and Stokes 2001)***	***PLANT ASSOCIATION (Eicher 1987)***
BAC	Baccharis	N/A	N/A	Coastal scrub	N/A
BB	Himilaya berry	N/A	Agriculture	Coastal scrub	N/A
Bbu	Brassbuttons	N/A	Salt marsh: pickleweed-saltgrass	N/A	N/A
CG-PW-SG	Cordgrass-Pickleweed-Saltgrass	Salt marsh	Salt marsh: cordgrass	N/A	Mixed marsh
CG-SG	Cordgrass-Saltgrass	Salt marsh	Salt marsh: cordgrass	N/A	*Spartina* marsh
CL	Carex lyngbeii	Brackish marsh	Brackish marsh: Lyngby sedge	N/A	N/A
CT	Cattail	Freshwater marsh	Freshwater marsh	Freshwater marsh	N/A
IP	Inundated pasture	Grazed wetland	Agriculture	Coastal prairie- seasonal wetland	N/A
HD	Human disturbance	N/A	Urban	N/A	N/A
HG	Hairgrass	Brackish marsh	Brackish marsh: hairgrass	Freshwater marsh	N/A
HG-PW-SG	Hairgrass-Pickleweed-Saltgrass	Salt marsh	Salt marsh: pickleweed-saltgrass	Freshwater marsh	Mixed marsh
HW	Hooker willow	Willow swamp	Deciduous forest	Riparian forest	N/A
JP	Juncus pasture	Grazed wetland	Agriculture	Coastal prairie- seasonal wetland	N/A
JU	Juncus	Grazed wetland	Agriculture	Coastal prairie- seasonal wetland	N/A
MP	Monterey Pine	N/A	N/A	N/A	N/A
NB	California blackberry	N/A	Agriculture	Coastal scrub	N/A
OPAQ	Open water		Tidal creeks and sloughs	Open water	N/A
PW-SG	Pickleweed-Saltgrass	Salt marsh	Salt marsh: pickleweed-saltgrass	N/A	*Salicornia* marsh
RA	Red alder	Riparian woodland	Deciduous forest	Riparian forest	N/A
RA-HW	Red alder-Hooker willow	Riparian woodland	Deciduous forest	Riparian forest	N/A
RW	Redwood	N/A	Evergreen forest	North Coast coniferous forest	N/A
SG	Salt Grass	Salt marsh	Salt marsh: pickleweed-saltgrass	N/A	Mixed marsh

Table 2. List of plant species observed by Mad River Biologists, 2001 during plant surveys for the Mad River Pipeline Rehabilitation Project. This is a list of plants expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993).

FAMILY	***SCIENTIFIC NAME***	***COMMON NAME***	***USFWS HYDRIC CODE***
Asteraceae	*Achillea millefolium*	yarrow	FACU
Poaceae	*Agrostis capillaries*	colonial bent	FAC
Poaceae	*Agrostis stolonifera*	creeping bent	FACW
Poaceae	*Aira caryophyllea*	silver European hairgrass	NI
Alismataceae	*Alisma plantago-aquatica*	water plantain	OBL
Betulaceae	*Alnus rubra*	red alder	FACW
Poaceae	*Alopecurus geniculatus*	water foxtail	OBL
Primulaceae	*Anagallis arvensis*	scarlet pimpernel	FAC
Asteraceae	*Anaphalis margaritacea*	pearly everlasting	
Asteraceae	*Anthemis cotula*	dog-fennel, stinkweed	FACU
Poaceae	*Anthoxanthum odoratum*	sweet vernal grass	FACU
Asteraceae	*Aster (chilensis)*	common aster	
Dryopteridaceae	*Athyrium filix-femina*	lady fern	FAC
Chenopodiaceae	*Atriplex triangularis*	spearscale	FACW
Asteraceae	*Baccharis pilularis*	coyote brush	
Asteraceae	*Bellis perennis*	English daisy	
Brassicaceae	*Brassica nigra*	black mustard	
Poaceae	*Briza maxima*	rattlesnake grass	FACU
Poaceae	*Bromus hordeaceus*	brome	FACU-
Callitrichaceae	*Callitriche sp.*	water-starwort	OBL
Asteraceae	*Chamomilla suaveolens*	pineapple weed	
Cyperaceae	*Carex Lyngbyei*	Lyngbye's sedge	OBL
Cyperaceae	*Carex obnupta*	slough sedge	OBL
Caryophyllaceae	*Cerastium glomerata*	mouse ear chickweed	FACU
Asteraceae	*Cirsium vulgare*	bull thistle	FAC
Portulacaceae	*Claytonia sibirica*	candy flower	OBL
Rosaceae	*Cotoneaster pannosa*	cotoneaster	
Asteraceae	*Cotula coronopifolia*	brass buttons	FACW+
Cyperaceae	*Cyperus eragrostis*	nutsedge, galingale	FACW
Poaceae	*Dactylis glomerata*	orchard grass	FACU
Apiaceae	*Daucus carota*	Queen Ann's lace	

Table 2 (continued). List of plant species observed by Mad River Biologists, 2001 during plant surveys for the Mad River Pipeline Rehabilitation Project. This is a list of plants expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993).

FAMILY	***SCIENTIFIC NAME***	***COMMON NAME***	***USFWS HYDRIC CODE***
Poaceae	*Deschampsia cespitosa ssp. cespitosa*	tufted hairgrass	FACW
Dipsacaceae	*Dipsacus sativus*	Fuller's teasel	
Poaceae	*Distichlis spicata*	saltgrass	FACW
Cyperaceae	*Eleocharis macrostachya*	spikerush	OBL
Onagraceae	*Epilobium ciliatum ssp. watsonii*	fireweed, willow herb	FACW
Equisetaceae	*Equisetum telmateia ssp. braunii*	giant horsetail	OBL
Asteraceae	*Erechtites minima*	fireweed	
Ericaceae	*Erica lusitanica*	heather	
Poaceae	*Festuca arundinacea*	tall fescue	FAC-
Rubiaceae	*Galium aparine*	goose grass, bedstraw	FACU
Geraniaceae	*Geranium dissectum*	geranium	
Primulaceae	*Glaux maritimus*	sea milkwort	
Poaceae	*Glyceria occidentalis*	mannagrass	OBL
Asteraceae	*Gnaphalium palustre*	cudweed, everlasting	FACW
Asteraceae	*Grindelia stricta var. stricta*	gumplant	OBL
Araliaceae	*Hedera helix*	English ivy	
Apiaceae	*Heracleum lanatum*	cow parsnip	FACU
Hippuridaceae	*Hippuris vulgaris*	mare's tail	OBL
Poaceae	*Holcus lanatus*	velvet grass	FAC
Apiaceae	*Hydrocotyle ranunculoides*	marsh pennywort	OBL
Asteraceae	*Hypochaeris radicata*	rough cat's ear	FACU*
Aquifoliaceae	*Ilex aquifolium*	american holly	
Iridaceae	*Iris pseudacorus*	yellow flag iris	OBL
Asteraceae	*Jaumea carnosa*	Jaumea	OBL
Juncaceae	*Juncus breweri*	rush	FACW*
Juncaceae	*Juncus bufonius*	toad rush	FACW+
Juncaceae	*Juncus effusus var. brunneus*	common rush	FACW+
Juncaceae	*Juncus effusus var. pacificus*	common rush	FACW+

Table 2 (continued). List of plant species observed by Mad River Biologists, 2001 during plant surveys for the Mad River Pipeline Rehabilitation Project. This is a list of plants expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993).

FAMILY	***SCIENTIFIC NAME***	***COMMON NAME***	***USFWS HYDRIC CODE***
Juncaceae	*Juncus lesueurii*	salt rush	FACW
Juncaceae	*Juncus patens*	rush	FAC
Lemnaceae	*Lemna sp.*	duckweed	OBL
Asteraceae	*Leucanthemum vulgare*	ox-eye daisy	NI
Apiaceae	*Lilaeopsis occidentalis*	Lilaeopsis	OBL
Plumbaginaceae	*Limonium californicum*	sea lavender	OBL
Linaceae	*Linum bienne*	flax	
Poaceae	*Lolium multiflorum*	Italian ryegrass	
Poaceae	*Lolium perenne*	perennial ryegrass	FAC*
Caprifoliaceae	*Lonicera involucrata*	twinberry	FAC
Fabaceae	*Lotus corniculatus*	bird's foot trefoil	FAC
Fabaceae	*Lupinus sp.*	lupine	
Araceae	*Lysichiton americanum*	yellow skunk cabbage	OBL
Rosaceae	*Malus sp.*	apple	
Fabaceae	*Mentha pulegium*	pennyroyal	OBL
Apiaceae	*Oenanthe sarmentosa*	water parsley	OBL
Poaceae	*Parapholis strigosa*	Parapholis	OBL
Scrophulariaceae	*Parentucellia viscosa*	yellow Parentucellia	
Poaceae	*Phalaris arundinacea*	reed canary grass	OBL
Plantaginaceae	*Plantago lanceolata*	English plantain	FAC-
Plantaginaceae	*Plantago major*	common plantain	FAC
Poaceae	*Poa annua*	annual bluegrass	FAC
Polygonaceae	*Polygonum arenastrum*	knotweed, smartweed	FAC
Polygonaceae	*Polygonum persicaria*	lady's thumb	FACW
Poaceae	*Polypogon monspeliensis*	annual beardgrass	FACW+
Dryopteridaceae	*Polystichum munitum*	sword fern	FACU
Potamogetonaceae	*Potamogeton foliosus*	leafy pondweed	OBL
Rosaceae	*Potentilla anserina ssp. pacifica*	silverweed, cinquefoil	OBL
Lamiaceae	*Prunella vulgaris*	self heal	FAC*

Table 2 (continued). List of plant species observed by Mad River Biologists, 2001 during plant surveys for the Mad River Pipeline Rehabilitation Project. This is a list of plants expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993).

FAMILY	***SCIENTIFIC NAME***	***COMMON NAME***	***USFWS HYDRIC CODE***
Dennstaedtiaceae	*Pteridium aquilinum*	bracken fern	FACU
Ranunculaceae	*Ranunculus repens*	buttercup	FACW
Brassicaceae	*Raphanus sativus*	radish	UPL
Rhamnaceae	*Rhamnus purshiana*	cascara	FACU*
Rosaceae	*Rosa californica*	California rose	FAC+
Rosaceae	*Rosa gymnocarpa*	wood rose	FACU
Rosaceae	*Rubus discolor*	Himalayan blackberry	FAC+
Rosaceae	*Rubus ursinus*	California blackberry	FAC+
Polygonaceae	*Rumex acetosella*	sheep sorrel	FAC-
Polygonaceae	*Rumex crispus*	curly dock	FACW-
Polygonaceae	*Rumex pulcher*	fiddle dock	FAC+
Potamogetonaceae	*Ruppia cirrhosa*	ditch-grass	OBL
Chenopodiaceae	*Salicornia virginica*	pickleweed	OBL
Salicaceae	*Salix hookeriana*	Hooker's wollow	FACW
Salicaceae	*Salix lasiolepis*	arroyo willow	FACW
Salicaceae	*Salix sitchensis*	sitka willow	FACW+
Caprifoliaceae	*Sambucus racemosa*	red elderberry	FACU
Apiaceae	*Sanicula laciniata*	Sanicle	
Cyperaceae	*Scirpus cernuous*	Scirpus	OBL
Cyperaceae	*Scirpus microcarpus*	small flowering bulrush	OBL
Cyperaceae	*Scirpus robustus*	Scirpus	OBL
Taxodiaceae	*Sequoia sempervirens*	coastal redwood	
Asteraceae	*Silybum marianum*	milk thistle	
Poaceae	*Spartina densiflora*	dense-flowered cord grass	OBL
Caryophyllaceae	*Spergula arvensis ssp. arvensis*	stickwort, stanwort	
Caryophyllaceae	*Spergularia macrotheca var. macrotheca*	sand-spurrey	FAC+
Caryophyllaceae	*Spergularia rubra*	ruby sand-spurry	FAC-
Lemnaceae	*Spirodela polyrrhiza*	duckmeat	OBL
Lemnaceae	*Spirodela punctata*	duckmeat	OBL
Fabaceae	*Trifolium dubium*	little hop clover, shamrock	FACU*

Table 2 (continued). List of plant species observed by Mad River Biologists, 2001 during plant surveys for the Mad River Pipeline Rehabilitation Project. This is a list of plants expected to occur in the Rocky Gulch Project Area. Common names and taxonomy are taken from Hickman, (1993).

FAMILY	***SCIENTIFIC NAME***	***COMMON NAME***	***USFWS HYDRIC CODE***
Fabaceae	*Trifolium hirtum*	rose clover	
Fabaceae	*Trifolium pratense*	red clover	FACU+
Fabaceae	*Trifolium repens*	white clover	FAC
Juncaginaceae	*Triglochin concinna*	slender arrow-grass	OBL
Juncaginaceae	*Triglochin maritima*	seaside arrow-grass	OBL
Scrophulariaceae	*Triphysaria versicolor ssp. versicolor*	Triphysaria	
Typhaceae	*Typha latifolia*	broad-leaved cattail	OBL
Urticaceae	*Urtica dioica*	stinging nettle	FACW
Scrophulariaceae	*Veronica americana*	American brooklime	OBL
Scrophulariaceae	*Veronica persica*	Persian speedwell	
Fabaceae	*Vicia sativa ssp. nigra*	narrow-leaved vetch	FACU
Poaceae	*Vulpia myuros*	Vulpia	FACU*

OBL- Obligate wetland plant species; occurs almost always (estimated probability >99%) under natural conditions in wetlands
FACW- Facultative wetland plant species; Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
FAC- Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
FACU- Facultative upland plant species; Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
UPL- Obligate upland plant species; Occur in wetlands in other regions, but occurs almost always (estimated probability >99%) under natural conditions in non-wetlands in this region.