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WETLAND AND HABITAT MITIGATION AND MONITORING PLAN CITY OF ARCATA RAIL-WITH-TRAIL CONNECTIVITY PROJECT HUMBOLDT COUNTY, CALIFORNIA

March 2011

Applicant:

City of Arcata
736 F Street
Arcata, CA 95521

Prepared for:

U.S. Army Corp of Engineers
Northern Field Office
U.S. Army Corp of Engineers
601 Startare Drive, Eureka CA 95501

Prepared by:

Winzler & Kelly
633 Third Street
Eureka, CA 95501

Updated by City of Arcata
February 2013

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CITY OF ARCATA
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Prepared for:
U.S. Army Corp of Engineers
Northern Field Office
U.S. Army Corp of Engineers
601 Startare Drive, Eureka, CA 95501
(707) 443-0855 (phone); (707) 443-7728 (fax)
Mr. Kelley Reid

Applicant:
City of Arcata
736 F Street
Arcata, CA 95521
(707) 825-2154 (phone)
Ms. Karen Diemer, Environmental Services Deputy Director

Prepared by:
Winzler & Kelly
633 Third Street
Eureka, CA 95501-0417
(707) 443-8326

_____
Lia Webb
Soil Scientist / Plant Ecologist
ARCPACS #327914, PWS #1993

Reviewed by:

_____
Misha Schwarz
Senior Scientist
ARCPACS

March 2011

Updated by Julie Neander - Environmental Programs Manager - City of Arcata
February 2013

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1.0 INTRODUCTION

1.1 Responsible Parties

The applicant is the City of Arcata. The City has identified several potential mitigation sites owned or held in trust by the City. The applicant contact for the City of Arcata is Ms. Karen Diemer, Environmental Services Deputy Director, 736 F Street, Arcata, CA 95521, (707) 825-2154.

This Wetland and Habitat Mitigation and Monitoring Plan (WMMP) has been prepared by Winzler & Kelly, 633 Third Street, Eureka CA, 95501. The lead author is Lia Webb, Certified Professional Soil Scientist and Professional Wetland Scientist. The applicant's designated agent contact and project manager is Mr. Merritt Perry, Winzler & Kelly, (707) 443-8326. The plan has been reviewed and updated by the City of Arcata in February 2013 to identify the potential mitigation sites and provide detail on those sites.

1.2 Summary

Figure 1 (Appendix A) provides a map of the project vicinity and Figures 2-1 through 2-28 includes map series showing the Project Study Boundary (PSB), Figure 3 provides reference locations for basis of wetland mitigation design, and Figure Series 4 provides the existing wetland conditions. The proposed project footprint is provided on Figure Series 5 and project details and design of the selected alignment are highlighted in Figure 6. Figures are attached in Appendix A and tables referred to herein are included in Appendix B. A list of acronyms utilized herein is included in Table 1 (Appendix A).

The proposed Arcata Rail-with-Trail Connectivity Project involves construction, operation, and maintenance of an approximately 4.5 mile long Class I, ADA accessible, non-motorized multiuse trail. The proposed project corridor would run from northern Arcata at Larson Park (near Sunset Avenue and the Arcata Skate Park), through the City of Arcata and the Arcata Marsh, and along the eastern edge of Humboldt Bay south to the Highway 101 and Bracut intersection. The existing corridor includes several transportation arteries: the North Coast Railroad Authority's railroad right of way, a portion of the Highway 101 corridor and segments of City-owned road rights-of-way.

Portions of the proposed project could require filling of wetlands as well as potential for indirect impacts to immediately adjacent wetlands and/or coastal resources/habitats (for purposes of project planning and in order to encompass all potential impacts to wetlands, an indirect impact area has been estimated to have allowance of areas within 5-feet of the proposed trail and fill slope footprint, and these areas if impacted will be restored to pre-project conditions). As well, the project anticipates unavoidable impacts to coastal riparian habitat and multiple mapped populations of two CNPS-listed plant species: Humboldt Bay owl's clover (*Castilleja ambigua* ssp. *humboldtiensis*) and Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*).

The portions of the trail corridor north of 8th Street within City of Arcata limits are not in the Coastal Zone. The lands south of 8th Street in Arcata are within the Coastal Zone and the Coastal Commission can exert primary permitting authority for this area. Section 30233(a) of the California Coastal Act states that, "The diking, filling and dredging…of wetlands…shall be limited to the following: …(5) Incidental public service purposes… (8) nature study…or similar resource-dependent activities." The filling of wetlands for this project supports local habitat

goals and State coastal policies as the project provides access, recreation, nature study and enjoyment, and environmental education for coastal resource areas along the project alignment. In addition, the project will provide safer routes for pedestrian and bicycle use. The proposed project will result in direct and indirect impacts to margins of existing low to high quality wetland areas (palustrine and estuarine). The filling of wetlands for public access/trail has been minimized in extent and will provide for recreational and educational enjoyment of the natural setting along the margin of the bay (thereby providing a resource-dependent activity); therefore, it is concluded that the project is consistent with Section 30233 of the Coastal Act.

2.0 PROPOSED PROJECT REQUIRING MITIGATION

The purpose of the project is to construct, operate, and maintain an approximately 4.5 mile long Class I, ADA accessible, non-motorized multiuse trail within the rail corridor. As identified in the City of Arcata Pedestrian and Bicycle Master Plan Update (City of Arcata, 2010), development of the rail corridor as a non-motorized transportation route is important for providing increased connectivity between several important Arcata destinations. The proposed project is also consistent with the goals and objectives outlined in the Humboldt Bay Trail Feasibility Plan (Alta, 2007) and the Completing the California Coastal Trail report (California Coastal Conservancy, 2003) completed pursuant to 2001 California Senate Bill 908.

2.1 Location

Figure 1 (Appendix A) provides a vicinity map of the project site. The project study boundary is linear, spanning approximately 4.5 miles between Larson Park in the north (near the City of Arcata Skate Park on Sunset Avenue) and Bracut Industrial Park in the south.

Figures 2-1 through 2-28 (Appendix A) display the extents of the Project Study Boundary (PSB). The PSB was developed to identify the boundaries within which a topographic survey would be conducted and the following items would be studied in the field: cultural/historic resources, areas of potential hazardous contamination, sensitive habitats, wetlands, and other Waters of the U.S./State. The extents of the study area were defined during the alignment selection phase of the project to cover areas where it was anticipated the trail might have been designed and constructed. The northern and southern extents and a general corridor for the project were established early in the alignment selection process, but several parallel alignment options were considered through the length of the project. For instance, in some areas the trail could have been placed east of the railroad tracks, west of the railroad tracks, or along the edge of parallel roadways. In such a scenario, the study area would need to cover the extents of all three alignment options as well as adjacent lands that could be temporarily utilized during installation or for fill to bring the trail up to grade. Therefore, in some locations the PSB is wide or branched because many viable options were feasible, while in other locations the study area is relatively narrow because a very limited set of practical options existed. In most cases, the study area was drawn to allow for flexibility in final design of the project's footprint. Since the study area boundary varies in width throughout its length, it is not further described here and Figures 2-1 through 2-28 (Appendix A) should be referred to for the various widths of the study boundary.
It should be noted that the PSB was expanded in some cases during the data collection phases to capture the edge of wetlands/habitats if it appeared that resource data in specific areas had potential implications for the project. However, in most cases data was only collected within the

predefined study area which had been drawn with the intent of capturing all areas of anticipated potential impacts. Another important note regarding the study is the relationship of the final "impact zone" of the project and the areas of temporary impacts in comparison to the study area. The project's "impact zone" is the calculated area of permanent ground disturbance associated with the footprint of the trail, cut slopes, fill prisms, and the footprints of structural elements (e.g. bridge footings). Areas of temporary impacts consist of staging areas and areas of temporary construction impacts.

The northern portion (approximately 2/3) of the proposed project alignment is located in the City of Arcata (extends to southern bank of Gannon Slough) and the southern portion of the project site is located in the County of Humboldt. The project alignment runs through the City of Arcata generally paralleling the NCRA railroad corridor near Foster Avenue/Jolly Giant Creek, Alliance Road, and L Street within the City of Arcata. South of Samoa Boulevard, the trail alignment continues adjacent to the railroad to the Arcata Marsh. Within Arcata Marsh, the proposed trail alignment is located predominantly on existing Marsh trails. Once crossing Butcher Slough at the Arcata Wastewater Treatment Plant, the trail alignment leaves the Marsh and continues parallel to the railroad tracks adjacent to South G Street. The trail continues south beyond the Arcata City Limits parallel to the railroad tracks between Highway 101 and Humboldt Bay, crossing Gannon Slough, Jacoby Creek, Old Jacoby Creek, and Rocky Gulch. The trail terminates at the Highway 101 entrance to the Bracut Industrial Park. The specific alignment of project segments are described in detail below.

Parcels associated with the planned project, including property ownership, rights-of-ways, and adjacent parcels are listed in Table 2, Appendix B.

2.2 Project Features

2.2.1 Trail Footprint

Trail surfacing will consist of 2-inch Hot Mix Asphalt Paving (HMA) for the traveled way with gravel used for the shoulders. Trail sub-surfacing will generally consist of compacted aggregate base with an approximate depth of six to twelve inches.

The project footprint ranges in width from 12 feet to approximately 30 feet that includes the paved tread surface, the trail's shoulders, and (in some cases) a fill prism designed to bring the trail surface to a required grade or elevation. Immediately north of the Gannon Slough Bridge there will be an interpretive sign and USFWS viewing platform for the Humboldt Bay Wildlife Refuge, operated by the USFWS. The USFWS plans to include water access abilities at this location since it would be a short walk from the G Street intersection and would allow an alternate water access location for hunters.

2.2.2 Fencing and Barriers

Fencing and/or physical barriers will be installed under the following five conditions:

(1) in locations in which the trail is within the Railroad Right-Of –Way, in which case the fence will be placed between the trail and the railroad tracks,
(2) where the edge of the trail is less than 5 feet from the edge of the travel way of a road, in which case the fence will be placed between the trail and the road,

(3) in cases in which the trail is less than 30-feet from the edge of the travel way of Route 101 (i.e. within the CalTrans "Clear Recovery Zone"), in which case the fence will be placed between the trail and Route 101,
(4) along the edges of bridges and boardwalks, and/or
(5) areas in which a vertical clearance equal to or greater than 30 inches separates the surface of the trail and the adjacent ground surface (e.g. at the edge of retaining walls).

In areas falling under condition #1, the barrier will likely consist of a four-foot high wooden split-rail fence with posts ten feet on center or black vinyl coated chain link fencing. In areas falling under condition #2, the barrier will consist of a physical barrier separation such K-rail, fencing, guardrail, or shrubs. In areas falling under condition #3, the barrier will consist of a physical barrier separation such as k-rail, fencing, shrubs, or guardrail, where there is danger of motorist encroachment. In areas falling under conditions #4 and #5, the barrier will consist of wooden or metal bridge railings.

2.2.3 Landscape Architecture

Landscaping of the trail is not anticipated due to the existing natural setting of the site. Where adjacent native vegetation is disturbed it will be replaced, and areas will be revegetated using native seed mix and/or a sterile quick grow species. A landscape architecture firm has been contracted to design visual elements of the trail and will include landscaping with locally appropriate species, such as native species and native allies.

2.2.4 Bridges, Culverts, and Other Water Crossings

Several areas within the potential project boundaries are defined as "Waters of the U.S./State," including Jolly Giant Creek (at Shay Park), Butcher Slough, Gannon Slough, Jacoby Creek, Old Jacoby Creek, and Brainard's Slough, and as such require water crossings. Following is a summary of the water crossings that are part of the proposed project. Tables 3 (Appendix B) summarizes overall project impacts to Waters of the U.S./State and habitats, and Table 4 summarizes the number of piles (if any), type of bridge crossing, and square feet of shaded substrate impact (unvegetated channel bottom/bed/bank below 8.0 feet NGVD) associated with each of the new crossings.

- Jolly Giant Creek (Segments 2 and 3.1): Jolly Giant Creek is in a culvert for much of the area through the City of Arcata. In the immediate vicinity of the proposed trail alignment, the creek was day lighted/restored (1997) as well as through Shay Park (former lumber deck) along the RR ROW. The creek was also day lighted for a short segment on the west side of Alliance (referred to as Stonehenge). This creek is not tidally influenced and as such the limits of agency jurisdiction is defined at the Ordinary High Water Mark (OHWM). A new 23 foot bridge will be installed at the project's crossing of the creek, though no piles are necessary for this crossing and will have no direct impacts below the OHWM. Shading of the water will occur under the bridge deck. Additionally, some willows may be impacted in order to allow a right-angle trail crossing of the track.
- Arcata Marsh Berm Bridge (Segment 5.1): This water crossing is at a location in which the City of Arcata recently created a berm around a constructed brackish wetland. The proposed bridge spans a large drainage channel, allowing the project to go from the elevated railroad prism to the elevated top of the berm. This drainage channel is not tidally influenced. The bridge consists of four equally-sized bridge decks totaling a 93

foot span. Each of the four bridge decks rests on concrete footings that directly impact wetlands. This bridge will not require the installation of new piles (see Table 4, Appendix B). Shading of the wetland under the bridge deck will occur and has been calculated as a permanent wetland impact.

- Butcher Slough (Segment 6.1): This water crossing is at an existing bridge near the City of Arcata waste water treatment plant (WWTP). The water under the bridge is tidally influenced (brackish) and receives up-gradient freshwater inputs from Jolly Giant Creek. Several utility pipes are attached to the bridge, including the City's primary sanitary sewer conveyance pipeline which is welded to the underside of the bridge. To avoid altering the existing bridge (and related pipelines), a new 72-foot span bridge is proposed adjacent to the existing bridge to accommodate appropriate widths for both bicycle and pedestrian traffic. This bridge will require the installation of four new piles, none of which are proposed within the water (i.e., below 8.0 feet NAVD) (see Table 4, Appendix B). Pile driving near water's edge will be necessary, which will result in elevated noise within the waterbody during project implementation. Shading of the water will occur under the bridge deck.
- Gannon Slough (Segment 7.2): Gannon Slough has two tide gates upstream from the project (approximately 550' and approximately 1,250') that control water that enter the slough from the City of Arcata and surrounding pasturelands. The water around the project is free-flowing. This open water slough is considered potential habitat for tidewater goby. Currently, two Caltrans bridges span the water, as well as an existing railroad bridge. As a part of the proposed project, a new bridge with 180 foot span is proposed between the westernmost Caltrans bridge and the railroad bridge. This proposed bridge will require the installation of 16 new piles, 13 of which are proposed within the water (i.e., below 8.0 feet NAVD) (see Table 4, Appendix B). Pile driving near water's edge will be necessary for the other three piles, which will result in elevated noise within the water body during project implementation. Shading of the water will occur under the bridge deck.
- Jacoby Creek (Segment 7.4): Jacoby Creek flows freely into Arcata Bay. Currently there is a railroad bridge and a CalTrans Highway 101 bridge that both cross this creek/tidal estuary that free-flows to the ocean. The Caltrans bridge is being replaced as part of the Highway 101 improvement project, and as analyzed in a DEIR (Caltrans, 2007). The proposed Caltrans bridge includes pedestrian/bicycle crossing as part of the highway improvements. Therefore, the proposed Rail-with-Trail project will utilize the upgraded bridge that Caltrans is constructing and will not require additional work within Jacoby Creek crossing. No additional piles in water are required. Piles may be necessary adjacent/above the HTL in order to tie to the Caltrans bridge.
- Old Jacoby Creek (Segment 7.6): Old Jacoby Creek flows under the highway and is controlled by a tide gate with a large culvert. The water is tidally influenced and is potential habitat for tidewater goby. The new bridge will span approximately 124 feet. This bridge will require the installation of six new piles, two of which are proposed within the water (i.e., below 8.0 feet NAVD) [Table 4, Appendix B]. Pile driving near water's edge will be necessary for the other four piles, which will result in elevated noise within the water body during project implementation. Shading of the water will occur under the bridge deck.

- Brainard's Slough (Segment 7.8): Formed from the Washington Gulch and Rocky Gulch drainages, confluence of which is on the east side of the freeway before crossing under 101 via a single reinforced box culvert, then under the tracks via two 48-inch corrugated metal pipe culverts. There is one tide gate at the location where the box culvert dumps out on the west side of the freeway between the freeway and the tracks. A new bridge with 148 foot span is planned. This bridge will require the installation of six new piles, five of which are proposed within the water (i.e., below 8.0 feet NAVD) [Table 4, Appendix B]. Pile driving near water's edge will be necessary for the other pile, which will result in elevated noise within the water body during project implementation. Shading of the water will occur under the bridge deck.

Design standards for the project require a 2% cross slope, except along cut sections where uphill water must be collected in a ditch and directed to a catch basin, in which case water is directed under the trail in a drainage pipe of suitable dimensions. Culverts may be necessary under the new trail bed or possibly under the railroad in order to direct runoff to drainage facilities such as existing ditches and City stormwater system. Project stormwater and drainage is further discussed below.

2.2.5 Drainage and Stormwater

The existing drainage system along the western edge of Highway 101 between the Jacoby Creek outlet and the Brainard Slough outlet consists of a drainage ditch which lies between the edge of the highway and the existing railroad track prism on the western side of the ditch. The proposed trail would extend from the railroad prism into a portion of the existing drainage ditch, resulting in less available drainage ditch volume for storm discharges. To evaluate the potential impacts of the decrease in drainage capacity, a hydrologic and hydraulic analysis of the drainage ditch along Highway 101 was completed (W&K, 2010).

2.2.6 Earthwork, Cut/Fill, and Grading

Filling of the area adjacent to the railroad prism will be necessary in many locations to reach an appropriate grade for the trail. In some areas minor grading may be necessary such as in the marsh on existing trails, cut bank along Alliance Road, and for the connection to Larson Park.

Generally, in areas where the trail is adjacent to the existing railroad fill prism, additional clean fill from local sources will be imported and placed to establish the necessary grade of the trail. The trail will be constructed at or below level of the existing railroad prism to keep the amount of fill needed to a minimum.

2.2.7 Construction Staging, Storage, and Access

Equipment and materials used in the construction of the project will be stored on site within the limits of disturbance or in upland areas specifically designated by the City. Areas designated by the City for staging will not require any clearing or grubbing for use as a staging area. See Figures 4-1 through 4-28 (Appendix A). Staging areas, storage, and equipment parking will not occur within watercourse bed/bank, or channel. Access to the trail segments along the Highway 101 corridor will be from the edge of pavement and staging would be conducted on the grassy shoulder, and where encroachment permit from Caltrans is secured, the paved shoulder could be used as well. In the area south of Samoa Boulevard where a boardwalk/bridge will traverse from the railroad bed across existing wetlands to join with the existing Arcata Marsh berm with an

existing trail will require special precaution to reduce temporary impacts to wetlands. Equipment staging and access will be necessary within the wetland area, although the size of the temporary impact area will be minimized by storing supplies and equipment in upland areas. Minimization measures will include the placement of construction fabric and protective pads (metal/wood/rubber sheets) on top of the wetlands where equipment access/staging is required to present the equipment tracks/wheels from rutting and compressing the soil and uprooting or destroying existing wetland vegetation. The area will additionally be revegetated with native wetland plants where bare ground is observed.

The project staging areas have been defined in areas adjacent to the proposed trail and will not require additional temporary construction access routes.

2.2.8 Permits / Approvals

A series of permit procedures, environmental compliance documents, and agency approvals are expected for implementation of the proposed project, as listed below.

A. U.S. Army Corp of Engineers (COE)

- ***Section 10 and Section 404 Permit*** — The proposed project requires authorization from the U.S. Army Corps of Engineers (COE) under Section 10 of the Rivers and Harbors Act of 1899 for activities below the Mean High Water (MHW) which is 6.4 feet MLLW (6.0 NAVD) for the project vicinity; and under Section 404 of the Clean Water Act for activities below the High Tide Line (HTL) which is estimated to be approximately 8.8 MLLW (8.2 NAVD) for the project vicinity. The proposed project also requires authorization from the COE under Section 404 of the Clean Water Act for activities impacting non-tidal wetlands.
- ***NOAA Fisheries*** — As part of the COE permit process, the COE will consult directly with NOAA Fisheries for potential effects to federally listed species under Section 7 of the Endangered Species Act (ESA). A Federal Biological Assessment (BA) will be prepared for use in the Informal or Formal consultation process between COE and NOAA.
- ***U.S. Fish and Wildlife Service (FWS)*** — The COE will consult directly with FWS for potential effects to federally listed species under Section 7 of the ESA. The Federal BA will address species of concern for the FWS, potential FWS issues/topics of concern, and will be provided to FWS for review and use in the consultation process with the COE.
- ***Wetland Mitigation and Monitoring Plan (WMMP)*** — This document is required as part of the permitting process for temporary and permanent fill activities of wetlands or Waters of the U.S.

B. Federal Highway Administration (FHWA) — NEPA Environmental Assessment (EA)

C. California Regional Water Quality Control Board (RWQCB)

- ***Water Quality Certification, Section 401***
- ***Stormwater Pollution Prevention Plan (SWPPP)*** — is necessary to encompass all ground disturbing activities (since greater than 1.0 acre of disturbance is anticipated), and should be prepared to include the WMMP site(s).

D. California Department of Fish and Game (DFG)

- ***Lake and Streambed Alteration Agreement*** — Section 1600 Permit

- ***State of California Biological Assessment*** —DFG is responsible for state listed species under the California Endangered Species Act (CESA). As such, a focused study has been prepared to evaluate potential impacts to the listed (June 25, 2009) longfin smelt (*Spirinchus thaleichthys*). Consultation regarding state listed species will occur between the Applicant and DFG regarding potential effects to this species.
- ***Consistency Determination (CD)*** — If deemed necessary, if NOAA Fisheries chooses to issue a Biological Opinion regarding Coho salmon (both State and Federally listed), pursuant to the Section 7 ESA consultation the applicant will request a CD under Section 2080.1 of the Fish and Game Code from DFG.

E. Humboldt Bay Harbor, Recreation and Conservation District — Permit

F. California Coastal Commission — A Coastal Development Permit (CDP) will be requested from the Commission that consolidates the permit process for areas within the Coastal Zone with both City and Commission primary jurisdiction.

F. City of Arcata

- ***CEQA Initial Study / Mitigated Negative Declaration*** — The City of Arcata is the lead agency under CEQA.
- ***Coastal Development Permit (CDP)*** — The City will be building the trail in two phases. Phase I is located in City of Arcata jurisdiction and the City will be requesting a City CDP for Phase I. For Phase II which will be built when funds are available the City will apply for a State CDP for the portions of the project in Coastal Commission primary jurisdiction.
- ***City Grading Permit*** — City of Arcata requires a permit application for project ground-disturbing activities within City limits.

G. County of Humboldt

- ***County Grading Permit*** — The County requires a grading plan for project ground-disturbing activities that are outside the City of Arcata limits and thus in jurisdiction of the County. This will be addressed in Phase II of the project.
- ***Humboldt County Encroachment Permit***

H. California Department of Transportation (Caltrans) — Encroachment Permit

3.0 MITIGATION DESIGN

3.1 Location of Wetlands Within Study Area

Approximately 90 % of the project wetland impacts (in acres) are within the Coastal Zone either within areas of City of Arcata or Coastal Commission Primary jurisdiction. A summary of wetland and habitat areas mapped in the project vicinity is provided in Table 3 (Appendix B) as well as the anticipated wetland impacts, as displayed in Figure 4 (Appendix A).

3.2 Basis of Design

The filing of wetlands will be mitigated in multiple locations, to consist of the following:

- Wetland mitigation will occur on-site.
- Restoration is proposed onsite and along adjacent wetlands and/or sensitive coastal habitats. Restoration activities include invasive species removal and improvement of habitat value/functions of existing habitats and wetland areas. The estuarine planting plan below includes replacement of estimated impacts to CNPS-listed species at a 1:1 ratio (in conjunction with onsite seeding). These restoration activities are not considered a part of

the wetland mitigation. However, the restoration activities are considered beneficial activities and are partial justification for the replacement ratios of mitigation proposed below.

- Areas adjacent to the trail shall be selected for establishment of target plant species, to be grown from seed collected from plants species within two-miles of impact area.
- The onsite Palustrine and brackish ditch that runs the length of Highway 101 corridor between the existing railroad berm and edge of highway pavement will be relocated towards the highway. The relocation of the ditch and subsequent re-planting cannot result in any tall woody vegetation due to CalTrans requirements for 30-foot safety buffer adjacent to highway lanes. The relocated ditch has been designed to hold seasonal water and will replace an unspecified amount of Palustrine and brackish habitat. Because the relocated ditch will be at a slightly higher elevation and because in some cases the location of the new ditch has been delineated as existing wetlands, this area has not been included in the wetland replacement calculations for required mitigation for the project. It should be noted that the replaced ditch will likely provide onsite replacement of approximately 2,000-4,000 square feet of Palustrine and brackish ditch. However, this number is not calculated as or considered as mitigation.
- This City is proposing two options for on-site mitigation for palustrine impacts - **Option 1** will replace palustrine wetlands at a 1:1 replacement ratio to ensure no net loss of wetlands. This 1:1 ratio is expected to cause little to no temporal loss of wetlands as the wetlands to be impacted (and created) are herbaceous requiring only one or two years to be re-established. **Option 2** would replace a lesser amount of palustrine wetlands and a greater ratio of higher value estuarine wetlands since the majority of the impacted palustrine wetlands are former tide lands that were originally estuarine wetlands.
- The City is proposing two options for on-site mitigation for estuarine impacts. **Option 1** will be at a 1:1 replacement ratio to ensure no net loss of wetlands and **Option 2** will replace a greater ratio of estuarine wetlands and a lesser ratio of palustrine wetlands as noted above. Restoration of tidal wetlands done in adjacent areas has developed good cover in less than two years therefore this 1:1 ratio is expected to cause little to no temporal loss of wetlands as the tidal wetlands to be impacted (and created) should require only one or two years to be re-established.
- Several locations for wetland mitigation have been identified and will be finalized after agency consultation and approval of the locations and the proposed mitigation ratios.
- Mitigation sites for mitigation of palustrine wetlands are described below as Potential Areas #1 - 5. The Proposed Rail-Trail Mitigation Sites, Appendix A Figure 7, shows the potential mitigation sites being considered.
- Mitigation sites for mitigation of estuarine wetlands are described below as Potential Sites #3-5. The Proposed Rail-Trail Mitigation Sites, Appendix A Figure 7, shows the potential mitigation sites being considered.
- Enhancement of existing estuarine habitat is proposed through control of invasive Spartina on 3.3 acres of existing salt marsh habitat adjacent to the trail corridor at the Arcata Marsh and Wildlife Sanctuary. This area is also designated on the Proposed Rail-Trail Mitigation Sites Figure 7.
- Potential indirect impacts to adjacent wetland areas will be restored through revegetation within an approximately 5-foot buffer/construction temporary impact allowance.

- Potential impacts to riparian vegetation have been calculated based on potential direct impacts to riparian (vegetation removal/trimming) and indirect impacts such as planned activities within the drip line of existing vegetation. Direct impacts to riparian vegetation have been minimized. Direct and indirect impacts will be mitigated at a 1:1 replacement ratio. This will consist of both onsite and offsite riparian creation. On site riparian replacement will occur next to the trail where there is room. Off site riparian creation will occur along Janes Creek in areas currently lacking riparian cover. To reduce temporal loss of riparian the City began revegetation efforts along Janes Creek in 2012 and is continuing this work in 2013.

3.3 Characteristics of Reference Sites

Two sites are referenced for the basis-of-design of the mitigation area(s) to provide existing conditions of wetlands to be impacted.

Reference Site #1

A reference site for replacement of Palustrine wetlands consists of wetlands adjacent to restored stream channel of Jolly Giant Creek within Shay Park. Easy access to reference wetlands is from the Shay Park entrance off Alliance at the railroad crossing and below the High School. From here to the north along the berm, where trail is proposed, several small yet good quality Palustrine emergent wetlands exist between the toe of slope of the berm and nearby creek channel. These reference wetlands are ideal since they were created/restored from historic log deck. Because the wetlands to be impacted lack riparian overstory for the most part, the replacement wetlands will mimic this Reference site. The wetlands that are to be filled as a part of the project, are mainly a monoculture of non-native grasses, whereas the mitigation site is proposed to contain a wider diversity of plant species. See Figure 3, Appendix A.

Reference Site #2

For estuarine intertidal emergent wetland reference site, an area north of Gannon Slough within and adjacent to the trail footprint where some salt marsh will be impacted, has been designated as a reference site for basis of design for replacement estuarine wetlands to be created (Figure 3, Appendix A).

3.4 Jurisdictional Areas

On December 2 and 4, 2009, reconnaissance-level wetland and habitat mapping was conducted within the potential alignment options. On January 20th, 21st, 25th, 26th, March7th, and April 25th, 2010, a wetland delineation was conducted within potential alignments of the proposed project from Larson Park (City of Arcata) south to Bracut (County of Humboldt). The anticipated project impacts are summarized in Table 3, Appendix B.

The wetland delineation determined the extent of wetlands based on one-parameter approach in areas that are within the Coastal Zone (south of 8th Street) and based on two-parameter approach in areas within the City of Arcata that are not in the Coastal Zone (see Figure Series 2). As well, the delineated wetland boundary lines are consistent with Army Corp of Engineers (COE) wetland definition (three-parameter approach), except in a few cases noted below (i.e., one-parameter riparian areas that do not qualify as three-parameter COE wetlands). The wetland delineation procedure was completed pursuant to the U.S. Army Corps of Engineers (COE) 1987

Wetland Delineation Manual; the *Regional Supplement to the COE Wetland Delineation Manual: Western Mountains, Valleys, and Coastal Regions* (COE, 2006); and California Coastal Commission (CCC) guidance for wetland delineation (1994). The Project study Boundary (PSB) was determined to consist of a total of 16 jurisdictional wetland areas (palustrine emergent, estuarine intertidal emergent salt marsh , estuarine emergent-ditch), five (5) "Other Waters of the U.S./State (Tidal)", one (1) "Water of the U.S./State (non-tidal)", and 10 ditches (potentially jurisdictional).

The wetland delineation field work effort included verification of habitat mapping that was conducted during the reconnaissance-level site survey. Figures presenting limits of investigation defined as the Project Study Boundary (PSB) are provided as map Series 2 (Figures 2-1 through 2-28); and field work results are provided as map series 4 (Figures 4-1 through 4-28) in Appendix A. Because of the number of figures necessary to map a project of this length, the map series are not consecutive.

The following wetland types were mapped within the project study boundary (PSB), as shown on Figure Series 4 (Maps 4-01 through 4-28). Wetland acreages based on jurisdictional area and anticipated impacts are summarized in Table 3 (Appendix B). Impacts associated with the construction of the project are divided into four categories: (1) permanent ground impacts (a.k.a. "impact zone), (2) permanent shading impacts to vegetated wetland areas (associated with elevated structures/bridge), (3) temporary impacts associated with construction staging areas, and (4) other potential temporary construction impacts that could occur within estimated five-foot construction area along trail footprint. Figures 4-1 through 4-28 display a summary of the final design of the trail, including the footprint of the trail surface, impact zone, and areas of temporary impacts. The project area of impact is the calculated area of permanent ground disturbance to wetlands/Waters of the U.S. and State associated with the footprint of the trail, cut slopes, anticipated fill prisms, piles and pile caps for bridges. Shading impacts are defined as existing vegetated wetland areas over which a bridge or structure is proposed but in which the ground is not permanently disturbed yet vegetated wetland areas could be impacted to varying degrees due to shading. Staging areas are locations in which construction equipment and materials will be temporarily stored during construction. Other indirect construction impact area has been included in calculation of area of potential impact, and consist of a five-foot area around the direct impact footprint in which temporary construction impacts could potentially occur and where revegetation will occur where/if deemed necessary. Construction staking will limit the area of temporary construction impacts. The wetland impacts requiring mitigation are presented in Table 3 (Appendix B), and a summary of proposed mitigation based on anticipated unavoidable impacts is provided below:

Wetland Type	Option 1 Replacement Ratio	Option 1 Replacement Acreage	Option 2 Replacement Ratio	Option 2 Replacement Acreage	Mitigation Site Notes
Palustrine	1:1	1.35	0.3:1	0.41	Additional 0.14 AC riparian planted along Janes creek for 1:1 replacement of riparian vegetation.

Estuarine	1:1	0.42	3.21:1	1.35	Includes: 541 SF (0.01 AC) Humboldt Bay owl's clover; 895 SF (0.02 AC) Point Reyes Bird's beak **Enhancement through Spartina control on 3.3 acres adjacent to the proposed trail provides 7.85:1 enhancement ratio**.
Overall	1:1	1.77	1:1	1.77	
	AC = acres SF = square feet Notes: Option 2 Estuarine replacement ratio of up to 3.21:1 and enhancement ratio of 7.85:1 will compensate for assumed wetland mitigation requirements if it is determined that indirect shading impacts must be mitigated. 1. Estuarine mitigation site will include replacement of sensitive plants at a 1:1 ratio to compensate for direct impacts from construction should any impacts occur.				

Palustrine Emergent

Palustrine Emergent wetlands are freshwater wetlands present within vegetated freshwater ditches, springs, and seeps in the City of Arcata, seasonal high groundwater, compacted areas near Shay park and other former industrial/commercial properties within urban limits of the City. As well, some ditches that act as stormwater conveyance, but which have extensive wetland vegetation, hydric soils, and hold persistent seasonal water, have been classified as Palustrine emergent, particularly when there is limited signs of being man-made or directly part of City street stormwater conveyance system. This wetland type includes the Palustrine ditch located along the Highway 101 corridor between the railroad bed and the highway edge of pavement. Representative vegetation consists of:

- arroyo willow (*Salix lasiolepis*))[FACW] or Hookers willow (*Salix hookeriana*)[FACW]
- Baltic rush (*Juncus balticus*) [OBL]
- California blackberry (*Rubus ursinus*) [FACW]
- fringed willowherb (*Epilobium ciliatum*) [FACW]
- Himalayan blackberry (*Rubus discolor)* [FACW]
- reed canary grass (*Phalaris arundinacea*) [FACW]
- soft rush (*Juncus effuses*) [OBL]
- tufted hairgrass (*Deschampsia cespitosa*) [FACW]

Riparian (One-Parameter)

Scattered small areas of one-parameter riparian areas (lack wetland soils and hydrology) are present adjacent to palustrine emergent wetland mapped within the rail corridor. These are considered Coastal Commission jurisdictional where mapped within the Coastal Zone (City or Commission primary jurisdiction). These areas were characterized as habitat type where not in the coastal zone and not accompanied by wetland hydrology or soils (for example Shay Park) and would thus be defined as non-wetland and receive protection only based on habitat designation. The riparian areas consist of tree-dominated cover that occurs parallel or adjacent to the tracks and in some cases adjacent to palustrine emergent wetlands. Where the over story riparian vegetation is within a mapped wetland, the area is mapped as three-parameter wetlands. Where the riparian drip line extends beyond the mapped palustrine emergent wetlands, the one-parameter riparian is mapped separately as a habitat when not in the Coastal Zone (upland soils and hydrology but with riparian over story). The adjacent riparian habitat nearest Shay Park has a high potential for migratory bird use. Shay Park provides habitat in for California Species of

Special Concern such as Willow Flycatcher, Yellow-breasted Chat, Yellow Warbler, Warbling Vireo, and Black-capped Chickadee.. Typical vegetation within these areas consists of the following species:

- *Alnus rubra*—red alder
- *Salix lasiolepis*—arroyo willow or *Salix hookeriana* Hookers willow
- *Crataegus douglasii*—Douglas's hawthorn
- *Myrica californica*—wax myrtle
- *Rubus ursinus*—California blackberry
- *Ranunculus repens*—creeping buttercup
- *Athyrium filix-femina*—lady fern
- *Rumex crispus*—curly dock

Estuarine Intertidal Emergent (Salt marsh)

These areas are present at the margins of Humboldt Bay, Butcher Slough, Gannon Slough, and Jacoby Creek, and are subject to tidal inundation with some fresh water influence when located within tidal parts of creek mouths/estuaries. These areas are exposed at low tides and even some high tides depending on elevation. This wetland type contains herbaceous, salt-tolerant hydrophytes forming moderate to dense cover. This habitat is usually found in sheltered margins of bays, lagoons, and estuaries. The hydric soils are subject to regular tidal inundation by salt water for at least part of each year. In the Project Study Area, these wetlands have the following typical vegetation:

- cordgrass (*Spartina densiflora*)
- marsh rosemary (*Limonium californicum*) [FACW]
- pickleweed (*Sacracornia pacifica*) [OBL]
- seashore saltgrass (*Distichlis spicata*) [FACW]
- spear oracle *(Atriplex patula*)
- tufted hairgrass (*Deschampsia cespitosa*) [FACW]
- Baltic rush (*Juncus balticus*) [OBL]or Dune Rush (*Juncus lescurii)* [FACW]

Jaumea (*Jaumea carnosa*) and arrow-grass (*Triglochin maritima*) are also known to be present in prime salt marsh habitat in the Humboldt Bay area, but due to the season that the wetland delineation and habitat mapping was conducted, coupled with the marginal to moderate quality salt marsh observed, these species were not documented. Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. humboldtiensis), Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. palustris) [both CNPS List 1B.2], and Lyngbye's sedge (*Carex lyngbyei*), are also associated with the Estuarine Intertidal Emergent (Salt marsh) wetland community. Although these plants were not identified at the site during wetland delineation field effort (incorrect season for protocol-level surveys), subsequent species-specific surveys mapped these plants in the project vicinity (results presented in section below).

Estuarine Emergent (Ditch)

These areas are isolated from direct tidal influence and are connected to the Palustrine emergent ditch that runs the length of the Highway 101 corridor between the railroad bed and east towards the edge of pavement. Some portions of the Palustrine ditch receive subsurface saltwater infiltration, have remnant saline conditions, or receive only occasional saltwater input during

high-tide storm events. In any case, occasional areas of the ditch are classified as Estuarine Emergent wetland based on vegetation, but are considered marginal/non-habitat for the CNPS-listed salt marsh plant species, and as such has been designated has a separate wetland habitat type, although according to FWS designation (Cowardin, 1979) this area keys out to Estuarine Emergent. Vegetation within the ditch supports some brackish species but has limited diversity, and consists of the following species:

- pickleweed (*Sacracornia pacifica*) [OBL]
- seashore saltgrass (*Distichlis spicata*) [FACW]

Ditch

These areas consist of City of Arcata stormwater conveyance ditches that in many cases are established with Palustrine emergent vegetation and meet the City of Arcata definition for two-parameter wetlands. The ditches were observed to have ephemeral water only that was directly related to storm events. In some cases where ditches are unvegetated and do not hold seasonal wetland hydrology, these areas would not meet City of Arcata wetland definition. The ditches are unlikely COE jurisdictional based on man-made nature of the ditches and absence of permanent or seasonal wetland hydrology.

OHWM

Jolly Giant Creek is the one non-tidal water (besides wetlands) in the PSB, and as such is mapped/defined at the Ordinary High Water Mark (OHWM)

Other Waters of the U.S. (Tidal)

Other Waters of the U.S. (Tidal) are defined at the HTL and tidal areas that lack vegetation) present in the sloughs in and adjacent to the trail corridor. These areas are present within the tidal portion of Humboldt Bay, Butcher Slough, Gannon Slough, Jacoby Creek, Brainard's Slough, and Old Jacoby Creek, and are subject to both tidal inundation with some fresh water influence. However, they are partially exposed or submerged within the channels at low tides. The area lacks vegetation, including eel grass, salt marsh species, etc.

3.5 Aquatic Functions

The project site spans an approximately 4.5 mile corridor and aquatic functions vary widely through this area. Shay Park within the City of Arcata limits as well as the Arcata Marsh provide high-quality wildlife habitat, stormwater filtration, groundwater recharge, flood retention, sensitive plant habitat. Within the Project Study Boundary (PSB) for the corridor, expansive adjacent wetland areas provide even higher wetland functions and values.

3.6 Hydrology and Topography

The Humboldt Bay region experiences a cool maritime climate with a seasonal distribution of precipitation. The average annual rainfall for this area is approximately 1,000-mm (forty-inches) per year. The upper watershed consists of mountainous terrain. There is a high amount of vegetative cover, with minimal development and generally good soil infiltration. The lower watershed is flat, with a slightly higher concentration of development, good vegetative cover, and less permeable soils. A Floodplain Report (Caltrans, 2003) was prepared for the Highway 101 corridor and provides additional information on the regional hydrology.

Project area potential receiving water bodies include (from north to south) as shown on Figures 4-1 through 4-28 (Appendix A) include: Jolly Giant Creek (at Shay Park), Gannon Slough; Jacoby Creek; Old Jacoby Creek; Brainard's Slough (which Rocky Gulch and Washington Gulch flow into); an unnamed drainage channel parallel and to the east of Route 101 (herein referred to as the Route 101 slough); a drainage ditch parallel and between the RR ROW and Route 101; and, Humboldt Bay. Due to existing earth dikes, the highway, and site elevations, the trail alignment area is unlikely to drain to the slough channel to the east of the highway. Each of these Waters are described in more detail below:

- Jolly Giant Creek is in a culvert for much of the area through the City of Arcata. In the immediate vicinity of the proposed trail alignment, it has been restored along the Shay Park and RR ROW, and for a short segment on the west of Alliance (referred to as Stonehenge).
- Butcher Slough is tidally influenced (brackish) and outlets to Humboldt Bay near City Wastewater Treatment Plant and receives up-gradient freshwater inputs from creeks.
- Gannon Slough flows under Highway 101 and the railroad just north of Jacoby Creek outlet. It originates about two miles north in Arcata and extends south along the east side of the northbound 101 segment, until reaching the under-crossings and outlet. Gannon Slough has several tributary streams (Beith, Campbell, and Grotzman Creeks). There are tide gates (upgradient of Highway 101 and railroad bridges) controlling waters that enter the slough from the City of Arcata and surrounding pasturelands.
- Jacoby Creek flows freely into Arcata Bay, just north of the Bayside Cutoff. The creek originates in the Coast Range just southwest of Kneeland and flows northwest for approximately ten miles to the outlet.
- Old Jacoby Creek flows under the highway and is controlled by a tide gate.
- Brainard's Slough is formed from the Washington Gulch and Rocky Gulch drainages, confluence of which is on the east side of the freeway before crossing under 101 via a single reinforced box culvert, then under the tracks via two 48-inch corrugated metal pipe culverts. There is one tide gate at the location where the box culvert dumps out on the west side of the freeway between the freeway and the tracks.
- Humboldt Bay is adjacent to the project alignment. The project anticipates potential impacts to these Waters (defined by the COE at a minimum, as further detailed below, as all areas below the High Tide Line, that is 8.0 foot contour NAVD88 at this site) and adjacent Estuarine Intertidal Emergent (Salt marsh) wetlands that are associated with the tidal waters of Humboldt Bay. These tidal-dependent wetland areas are present at the margins of Humboldt Bay as well as other areas with tidal influence such as Butcher Slough, Gannon Slough, and Jacoby Creek. The salt marsh habitat is found in sheltered margins of bays, lagoons, and estuaries. These areas are exposed at low tides and in some locations at high tides depending on elevation. The hydric soils are subject to regular subsurface tidal inundation by salt water for at least part of each year. In some areas, salt marsh habitat may persist where salt input is indirect, such as from salt spray or remnant soil conditions. The salt marsh habitat corresponds to optimum elevation generally between Mean Low High Water (MLHW) and Mean High High Water (MHHW), or defined at the High Tide Line (HTL), and can vary above and below these levels depending on site-specific conditions and variability in remnant soil conditions and influence of salt spray. Previous Army COE permit applications maps the HTL for the nearby Arcata Marsh to be approximately 8.8 feet MLLW which equates to 8.2 feet

NAVD88 (calculated average conversion factor for MLLW to NAVD88 of [-]0.60 based on three area NOAA benchmarks). For the Arcata trails project, the HTL was mapped as the 8.0 foot contour (NAVD88 datum) based on project topographic survey within the trail alignment and highway/railroad right-of-ways. Within the Project Study Boundary (PSB), limits of vegetated salt marsh are mapped both below and above the 8.0 foot NAVD88 elevation. All areas below 8.0 foot elevation (NAVD88 datum) are COE jurisdictional, whether classified as "Other Waters of the U.S." (Tidal) when unvegetated, or classified as Estuarine Intertidal Emergent (Salt marsh) wetland.

Beneficial uses are critical to water quality management in California. State law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to): "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" [Water Code Section 13050(0)]. Protection and enhancement of existing and potential beneficial uses are the primary goals of water quality planning. The most sensitive beneficial uses from the standpoint of water quality management are municipal, domestic, and industrial supply, recreation, and uses associated with maintenance of resident and anadromous fisheries. The North Coast Region's rivers/water's are renowned for salmon and steelhead fishing.

3.7 Soils and Substrate

The project area is along the shoreline of the Humboldt Bay, thus it is flat and subject to seismic forces and liquefaction. The principal underlying soil is coarse to fine grained alluvium consists mostly of unconsolidated, coarse-to-fine-grained weathered sand and silt (alluvium) typically found on coastal plains, valley bottoms and along river floodplains. In the vicinity of Bracut, the soil primarily consists of non-marine sandstone with clay and gravel (Hookton Formation). The sandstone is typically medium-grained, well sorted, and poorly cemented. Minor beds of well-rounded pebbles and cobbles of chert, quartz, and green stone are also present. Elsewhere in the corridor there are areas of non-native marine deposits and sand indicative of fill that was brought in to construct embankments for the railroad and for the highways.

3.8 Vegetation and Habitat

3.8.1 Wildlife Habitat

The Humboldt Bay Area, which includes Arcata Bay, provides habitat for a large diversity of native aquatic and terrestrial animal species. The urban development and the railroad tracks and Highway 101 each limit the diverse and abundant habitat for use by wildlife species. Mammal species present in the vicinity include: black-tailed deer, gray fox, coyote, raccoon, fisher, river otter, rodents, weasels, skunks, and bats. Bird species include waterfowl (e.g. ruddy duck), shorebirds (e.g. snowy egret, black crowned night heron, dunlin/sandpiper), birds of prey (e.g. northern harrier), and songbirds (marsh wren, savannah sparrow). Creeks and sloughs in the project area could potentially serve as migration corridors for fish, such as salmon, that move between salt and freshwater to complete their life history. The sloughs also potentially provides resting and feeding habitat for migratory waterfowl and shorebirds. The brackish waters of the sloughs, drainage ditches, and the lower reaches of the streams provide potential habitat for special status species such as coastal cutthroat trout, southern Oregon/northern California Coho salmon, northern California steelhead, California Coastal Chinook salmon, and tidewater goby.

Existing study results from three years of surveys conducted by Humboldt State University (wildlife department) of roosting Dunlin (*Calidris alpina*) document the presence of several shorebird roosting locations along the railroad alignment between Arcata and Bracut and several more beyond that towards Eureka (particularly at the intersection/corner of the levee at Bracut). The actual railroad alignment is potentially used for roosting mostly during high tides when more preferred locations are unavailable along the Bay margin. Additionally, according to Dr. Mark Colwell (pers. comm., August 8, 2009, Humboldt State University), radio tracking studies show that the same roosting location is not often repeatedly used by the same bird; thus, cumulative impacts to shorebird roosting in the Humboldt Bay region could be more of a concern than individual impacts to a single roosting location. Winzler & Kelly biologist conducted multiple field visits during high tide events to evaluate the use of the proposed trail alignment and to identify shorebird roosting locations along the railroad alignment (Winzler & Kelly, 2010). The biologist did not observe use of the roosting locations on the railroad alignment other than piles that are away from the railroad bed and within the intertidal zone. One rocky RSP area was mapped during the reconnaissance survey, near Bracut, where evidence of shorebird use was observed along the high tide line. This area was confirmed to be used at least on occasion by shorebirds for roosting based on observation made during wetland delineation field work of January 2010. The area consists of rocky RSP material likely placed to stabilize the toe of slope along the railroad bed. The identified shorebird roosting locations will not be removed by the proposed trail alignment and is on the west side of the railroad alignment and separated from the proposed trail location. Shorebird use of the railroad alignment within the project footprint does not appear to be frequent based on high-tide site visits along the margin of the bay.

3.8.2 Sensitive Species

The terrestrial habitats surrounding the trail corridor have limited potential to support special status animal species because of the proximity to Highway 101 and the ongoing noise, high level vehicular presence, and ongoing road maintenance activities. None of the special status terrestrial animal species from the region have been documented within the corridor and these species are not likely to occur because of the lack of suitable habitats.

Special status fish species such as tidewater goby, southern Oregon/northern California Coho salmon, California coastal Chinook salmon, eulachon, longfin smelt, and coastal cutthroat trout are known to use the tributaries in Arcata and Humboldt Bay. Therefore, the sloughs, streams, and ditches located immediately adjacent to the alignment are potentially utilized by these fish species. See Figures 3-1 through 3-28 (Appendix A).

On May 28 and July 17th, 2010, Winzler & Kelly conducted focused site-specific and seasonally appropriate botanical survey for CNPS-listed plant species: Humboldt Bay owl's clover (*Castilleja ambigua* ssp. *humboldtiensis*), Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*), Canadian sandspurry (*Spergularia canadensis* var. *occidentalis*), and Lyngbye's sedge (*Carex lyngbyei*), all CNPS listed plants associated with the Estuarine Intertidal Emergent (Salt marsh) community. On May 28, 2010, an estimated 29,000 plants of Humboldt Bay owl's clover were located at approximately 17 different sites from the Arcata Marsh project area (Figure 4-14) to Brainard's Slough (Figure 4-26), including Figures 4-18, 4-19. 4-20, 4-21 and 4-22. During the May 2010 survey it was determined that is was too early for seasonal appropriate surveys of Pt. Reyes bird's beak due to the late arrival of spring. On July 21, 2010, a second site

visit was conducted by Winzler & Kelly to evaluate possible presence of Point Reyes bird's beak. This survey resulted in estimated 35,734 Point Reyes bird's beak plants being mapped within 20 locations. Most Point Reyes bird's beak individuals were found in the high salt marsh west of the tracks. Two populations were observed east of the tracks at the Gannon Slough crossing (similar to the owl's clover). Lyngby's sedge was mapped near the Gannon Slough crossing in areas that had previously been mapped along the Highway 101 corridor for CalTrans-related project(s). No individuals of Canadian sandspurry were detected and this species is not expected in the project corridor as it is more of a dune mat-related species. It should be noted that the proposed project does not necessarily impact all of the above mapped plant individuals, and potential impacts are discussed in Section 4.0. Specifically, impacts to known populations of Lyngby's sedge have been avoided. Summary of results of plant surveys and wetland delineation is presented in Table 3 (Appendix B). Plant-specific details for sensitive listed plants that may be impacted by the proposed project are provided below.

Humboldt Bay owl's clover (*Castilleja ambigua* ssp. *Humboldtiensis):*

Listing Status

Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2 (CNPS 2010)

Morphology and Flowering

Humboldt Bay owl's clover is an annual, green-root hemiparasitic herb (dicot) in the figwort family (Scrophulariaceae). Leaves: 10-50 mm, lanceolate to ovate, lobes 0 to 5; inflorescences: 3 to 12 cm in length, 3 to 4 cm wide, often dense; bracts: 15 to 25 mm in length, oblong to ovate, tipped pink to rose purple, rounded to truncate; flower: calyx 12 to 20 mm, divided ½ in front and on sides, ⅔ in back, lobes linear; corolla: 14 to 25 mm, pale yellow or rose purple, beak 4 to 5 mm, straight, puberulent, lower lip 3 to 4 mm, pouches 3 to 7 mm wide, 1 to 2 mm deep, generally purple-dotted at base, teeth 2 to 3 mm; stigma generally ± exserted; fruit: 8 to 12 mm (Hickman, 1993). Humboldt Bay owl's clover generally flowers from spring to mid-summer (mid-May through mid-June) (Pickart 2001) August).

Habitat, Distribution, and Ecology

Humboldt Bay owl's clover is endemic to California, and although more common historically, is currently known to exist only in Marin, Humboldt and Mendocino counties in coastal salt marshes and swamps at elevations generally from 0 to 34 feet msl. Humboldt Bay owl's clover does not appear to be host-specific, as it grows in conjunction with several common salt marsh plants including: pickleweed (*Sarcocornia pacifica*), salt grass (*Distichlis spicata*) and fleshy jaumea (*Jaumea carnosa*). It may also be found in conjunction with invasive cordgrass (*Spartina densiflora*), although it remains unclear whether this is parasitism relationship. Because Humboldt Bay owl's clover is a green-root hemi-parasite, it requires sufficient vegetative cover by suitable host species to facilitate establishment and maintenance of viable populations.

Reproduction and Propagation

Humboldt Bay owl's clover exhibits only sexual reproduction (i.e., reproduction via seed). Therefore, propagation is limited to seed collection and germination. Seed collection should occur in the late summer after seeds reach maturity but before seed drop occurs. Mature seed pods are dark brown in appearance, while the seeds themselves are grey to brown, small and

slightly spongy at maturity. Seed pods should be rubbed over a screen to separate seeds from pod debris. Resultant seeds should be stored under cool dry conditions until ready for germination.

Threats

Non-native plant invasion and loss of salt marsh habitat threaten existing populations of Humboldt Bay owl's clover.

Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*):

Listing Status

Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2 (CNPS, 2010)

Morphology and Flowering

Point Reyes bird's beak is an annual, green-root hemiparasitic herb (dicot) in the figwort family (Scrophulariaceae). Plant: 10-40 centimeters in height, gray-green, glaucous, often tinged purple, generally ± short-hairy; stem: branches 0 to few, ascending, more or less central spike; leaf: 5 to 25 mm ± linear-lanceolate, entire; inflorescence: spike, 20 to 90 mm, many flowered and dense, outer bract leaf-like, inner bract notched 15 to 30 mm; flower: calyx 15 to 25 mm corolla 15 to 25 mm, white to cream, puberulent, lips pale to brownish or purplish red, middle lobe of lower lip erect, stamens 4, anther sacs 2 (lower pair) or 1 (upper pair); seeds: 10 to 20, 2 to 3 mm ± reniform, deeply netted, dark brown (Hickman, 1993). Point Reyes bird's beak generally flowers from June to mid-September.

Habitat, Distribution and Ecology

Point Reyes bird's beak prefers salt marsh habitats slightly above the mean high tide mark. Preferential habitats are generally sandy substrates covered by a layer of organic silt, soil salinities within the range 34 to 55 ppt and greater than or equal to 70% vegetative cover (CPC, 2010). Point Reyes bird's beak occurs only in coastal salt marshes and swamps at elevations of generally 0 to 34 feet msl, but as noted prefers the high marsh setting. It was once common along the coastal regions of California, but is now confined to 23 USGS quadrangles in Humboldt, Marin, San Francisco and Sonoma counties, listed as endangered in Oregon and presumed extirpated from Alameda, Santa Clara and San Mateo counties in California.

Point Reyes bird's beak does not exhibit host specificity but it is generally associated with the following plant species: pickleweed (*Sarcocornia pacifica*), salt grass (*Distichlis spicata*), Western marsh rosemary (*Limonium californicum*), tufted hairgrass (*Deschampsia cespitosa*) and fleshy jaumea (*Jaumea carnosa*) (Kaye et al., 1991). Therefore, maintaining a high degree of vegetative cover by the before-mentioned species is necessary for establishing and maintaining viable populations of Point Reyes bird's beak.

Reproduction and Propagation

Point Reyes bird's beak exhibits only sexual reproduction. Therefore, propagation is limited to seed collection and germination. In its natural habitat, seeds germinate after winter rains have reduced local soil salinities below 12 ppt (CPC, 2010). The potential exists, as a result, for germination success to be increased when soil salinities are significantly less than what

may be associated with populations of adult plants. As with other hemiparasitic species a host, a host is not required for germination of Point Reyes bird's beak. However, it is unknown how long after germination that Point Reyes bird's beak requires a connection with live roots of a host plant (Kaye, 1991).

Threats

Non-native plant invasion, changes in local hydrologic regime, livestock grazing, off-road vehicular traffic and trampling from foot traffic threaten existing populations of Point Reyes bird's beak (CNPS, 2009).

4.0 PROPOSED MITIGATION SITES

4.1 Site Selection Process and Ownership Status

After reviewing possible onsite mitigation areas along the entire trail alignment, on site mitigation areas were selected to provide maximum benefit where in kind replacement wetland restoration can occur adjacent to and/ or connect to existing functional estuarine and palustrine wetlands. Subject to state and federal agency approval the City has proposed two restoration scenarios. Both scenarios provide for 1:1 overall replacement for the total acres of wetlands impacted and an additional 7.85:1 enhancement ratio for estuarine wetlands.

4.2 Location and Description

The City has currently identified 5 potential mitigation areas to replace wetlands impacted by trail development. The potential mitigation wetlands are designed to meet applicable regulatory agency (FWS, USACE and DFG) requirements and the mitigation outlined in the *Draft Mitigated Negative Declaration for the Arcata Rail with Trail Connectivity Project*. During the regulatory review and approval process additional areas may be identified that are better suited to mitigate the impacted wetland areas. The final determination for mitigation sites will (1) create comparable on-site wetlands on a 1:1 replacement in area and quality for impacted palustrine and estuarine wetlands; (2) include an option, subject to review and approval by the regulatory agencies, to replace higher value estuarine wetlands at a greater ratio than 1:1 and lower value palustrine wetlands at a lower ratio than 1:1; (3) include an estuarine wetland enhancement ratio of 7.85:1 (4) include a revegetation plan that reflects the native plant species typically found in the wetland types to be mitigated; and (5) include maintenance of the wetlands for a minimum of 5 years, including the replanting of any dead or dying plants within the new wetlands.

Development of on-site mitigation wetlands will be timed to prevent impacts to any sensitive plant or animal species that may be present in adjacent wetlands by surveying for sensitive species and/or working during low tide.

The potential mitigation areas were selected for the following reasons:

1. The sites are owned or controlled by the City of Arcata
2. Site control could be obtained for sites not currently controlled by the City.
3. The areas can be restored to provide seasonal palustrine and estuarine habitat.

4. The sites are well-suited to serve as mitigation for the project because they are adjacent to existing well-established wetlands at the Arcata Marsh and Wildlife Sanctuary and the previously restored Butcher Slough area.
5. The sites have soil types similar to the wetlands to be filled as part of the project.
6. The sites can replace the wetlands to be impacted for the project and/or replace a greater amount of estuarine wetlands to provide higher quality wetland habitat.
7. Adjacent sites contain examples of estuarine plant community types targeted for mitigation
8. The sites contain degraded areas with opportunities to create or expand natural community types.
9. Opportunities for invasives removal or control are available within the sites.
10. Upland and wetland portions of the sites will be mapped or and a jurisdictional determination and approval of wetland mapping results can be secured by the City.
11. The site were selected because they are adjacent to existing wetlands and can be relatively easily converted to wetlands. The basis of design is to connect the newly created wetlands with existing wetlands. The sites' wetland mitigation areas will function similarly as the wetlands to be impacted by the project and under Option 2 will provide substantially higher biological functions and values (by creating additional estuarine wetland to replace low quality palustrine wetlands).

Proposed Mitigation Areas #1and #2 – 0.41 acres: Palustrine Wetland Mitigation Sites

Areas #1 and #2 create a total of 0.41 acres of seasonal palustrine wetlands (APN 503-241-001 - 0.24 acres and APN 503-241-005 - 0.17 acres) adjacent to the trail alignment as it crosses South I Street at the Arcata Marsh and Wildlife Sanctuary (AMWS). Mitigation area #1and #2 are located at the AMWS on an abandoned industrial parcel that formerly housed a lumber mill. The proposed restoration areas appear to have been lumber storage areas. Currently the area consists of undefined fill. The areas area bordered to the east by a trail and to the west by South I Street. Directly north is another parcel owned by the City of Arcata where additional mitigation is proposed (Area #3) Butcher Slough is approximately 32 to 80 feet east of these sites which are currently unutilized and house no structures. Through the use of historical aerial photographs, portions of these areas are noted to have been formerly for lumber storage adjacent to a rail line that ran through this and the adjacent parcel to the north. Phase I and II work done for the City of Arcata on the adjacent parcel to the north (APN 502-232-013) found no information that lumber was treated on the property and did not identify contaminated sites near the proposed mitigation areas. The City of Arcata Butcher Slough Restoration Project EIR (May 1984) tested water quality for metal in the mill pond to the east and did not detect copper, chromium, nickel or lead.

Based on successful wetland restoration work completed nearby (South I Street wetland located across the street from this site) mitigation will be successful if the mitigation wetlands are excavated approximately two to three feet below existing grade to an approximate elevation of seven feet. Seasonal palustrine habitat created the first year will be available immediately. The maturity of the seasonal palustrine habitat will occur in approximately two to five years. Seasonal standing water created within the wetland mitigation area will host a diversity of

invertebrates that will in provide a food source for larger species in the vicinity. Seasonal open water can provide habitat for migrating birds in the spring and fall.

Mitigation Area #3 – 0.72 acres: Palustrine or Estuarine Wetland Mitigation

Site control for this area has not been obtained. The City is working to obtain site control. If site control can be obtained, this site can be restored to either palustrine emergent or estuarine habitat or a combination of the two. If site control cannot be obtained the City will identify and obtain site control for another site that will provide comparable mitigation in area and value to meet the mitigation outlined in the *Draft Mitigated Negative Declaration for the Arcata Rail with Trial Connectivity Project* and this mitigation plan.

Based on successful wetland restoration work completed for the earlier Butcher Slough restoration project, estuarine mitigation will be successful if the mitigation wetlands include a connection to Butcher Slough and are excavated approximately 2 to 3 feet below existing grade to an approximate elevation of 6.9 to 8.0 feet NAVD 88 (7.5-8.6 MLLW) to provide habitat for Humboldt Bay owl's clover (*Castilleja ambigua ssp. humboldtiensis*) [CNPS List 1B.2] and Point Reyes bird's beak *(Cordylanthus maritimus ssp. palustris*) [CNPS List 1B.2]

Alternatively the site could be excavated two to two and a half feet below grade to create palustrine wetlands.

Phase I and II work done for the City of Arcata on this parcel (APN 502-232-013) did identify contamination on this parcel but did not identify contaminated sites near the proposed mitigation areas. A leaking underground storage tank was remediated and that case was closed in 2000. Early work to restore estuarine habitat along Butcher slough did not find any contamination during excavation adjacent to this area.

Mitigation Area #4: Estuarine or Palustrine Wetland Mitigation

This area can be restored to either palustrine emergent or estuarine habitat or a combination of the two.

Based on successful wetland restoration work completed for the earlier Butcher Slough restoration project, estuarine mitigation will be successful if the mitigation wetlands include a connection to Butcher Slough and are excavated approximately 2.5 to 3.5 feet below existing grade to an approximate elevation of 6.9 to 8.0 feet NAVD 88 (7.5-8.6 MLLW) to provide habitat for Humboldt Bay owl's clover (*Castilleja ambigua ssp. humboldtiensis*) [CNPS List 1B.2] and Point Reyes bird's beak *(Cordylanthus maritimus ssp. palustris*) [CNPS List 1B.2]

Alternatively the site could be excavated two to two and a half feet below grade to create palustrine wetlands.

Mitigation Area #5: Estuarine or Palustrine Wetland Mitigation

This area can be restored to either palustrine emergent or estuarine habitat or a combination of the two.

Based on successful wetland restoration work completed along other areas of Butcher Slough, , estuarine mitigation will be successful if the mitigation wetlands include a connection to Butcher Slough and are excavated approximately 2.5 to 3 feet below existing grade to an approximate elevation of 6.9 to 8.0 feet NAVD 88 (7.5-8.6 MLLW) to provide habitat for Humboldt Bay owl's clover (*Castilleja ambigua ssp. humboldtiensis*) [CNPS List 1B.2] and Point Reyes bird's beak *(Cordylanthus maritimus ssp. palustris*) [CNPS List 1B.2]
Alternatively the site could be excavated two to two and a half feet below grade to create palustrine wetlands.

4.3 Jurisdictional Areas

Potential Mitigation Areas #1 & #2

These areas are former log storage areas and are presumed to be upland. A wetland delineation will be done for this area to verify uplands status for final determination of created wetland area available at this site.

Potential Mitigation Area #3

Prior wetland delineation on this site prepared by NRM in 2002 titled *South I Street Mill Reuse Project Wetland Delineation*, shows that the proposed mitigation areas are uplands based on ACOE soil, vegetation, and hydrology parameters. The areas are also upland under the City of Arcata two parameter wetland requirements. If site control can be obtained, this site has the potential to expand in area should other proposed areas not meet upland requirements.

Potential Mitigation Area #4

Prior to work at this site a wetland delineation will be prepared to insure this area is upland habitat. A wetland delineation will be done for this area to verify uplands status for final determination of created wetland area available at this site.

Potential Mitigation Area #5

This area consists of gravel fill that has been colonized by coyote brush and is upland. Soils and vegetation on the site indicate the entire site is upland. A wetland delineation will be done for this area to verify uplands status for final determination of created wetland area available at this site.

4.4 Aquatic Functions

The sites are located at or adjacent to the Arcata Marsh and Wildlife Sanctuary and Butcher Slough which flows to Humboldt Bay. Other than for limited groundwater recharge, the aquatic function of the site is relatively low. The areas do not contain surface water. Mapped existing wetlands and proposed new mitigation wetlands both serve functions of coastal habitat for wildlife.

4.5 Hydrology and Topography

Topographic surveys have not been completed for the sites. Descriptions of topography are estimates based on site visits and California Coastal Conservancy Coastal LiDAR flattened DEM completed between 2009 and 2011. All areas have very limited topography, with an estimated four to five foot topographic variation within the site and no greater than a 3% slope, with estimated elevations ranging from 8 to 12 feet above mean sea level (msl). The sites are poorly drained and contain no flowing surface water.

4.6 Soils and Substrate

Site soils are classified as Residential, Business and Industrial areas in *Soils of Western Humboldt County California*, 1965. Updated information was not available on the NRCS WEbSoil Survey site. Much of this area is former tide lands and most likely contains soils consisting primarily of silty clay loam, is poorly drained and typically found near salt marshes and/or coastal areas.

4.7 Vegetation

Wildlife use consists primarily of commonly occurring land birds found in coastal Humboldt County. No raptor nests or threatened or endangered bird or mammal species were observed at the sites. No rare, threatened or endangered plants were identified within the potential mitigation areas. The existing willow habitat adjacent to some of the sites may be suitable for California Species of Special Concern, Willow Flycatcher, Yellow-breasted Chat, Warbling Vireo, Yellow Warblers and Black-capped chickadees. However, this potential habitat will not be disturbed during the creation of the mitigation wetlands. Adjacent freshwater wetlands may be suitable for Northern red-legged frog. Direct impact to this species is not expected since proposed mitigation is in uplands.

4.8 Present and Historical Uses of Proposed Mitigation Areas

Potential Mitigation Site #1

City of Arcata historic aerial photographs of the mitigation areas were reviewed for the years 1948, 1958, 1970, and 1988. It is evident from the photos that mitigation areas 1, 2, 3, and 5 were filled as early as 1948. These areas were used for lumber storage for mill operations. A building existed adjacent to area #3 in 1958. In 1988 a second building was built near this area. Mitigation area #5 had a building on it in 1970 but by 1988 the building was gone. Mitigation area #4 was filled by 1970 and additional fill was placed there in 1988.

In the 1980s the property containing sites 1, 2 4, and 5 was deeded to the State of California and legislation transferred control of the property to the City of Arcata. Since that time, theses sites have been incorporated into the Arcata Marsh and Wildlife Sanctuary and significant portions of these parcels have already been restored to freshwater and estuarine habitat. Area 3 was purchased by the City of Arcata for redevelopment. Areas adjacent to Butcher Slough were restored to estuarine wetlands in 2003. The proposed mitigation area would add to these restored wetlands.

4.9 Present and Proposed Uses of Mitigation Areas

The areas surrounding mitigation areas 1, 2 and 4 consist of the Arcata Marsh and Wildlife Sanctuary, and the Marsh Commons Housing site. Mitigation area 3 is located at a former industrial site adjacent to Butcher Slough. Area 5 is adjacent to South G St. and an unnamed drainage to Butcher Slough.

4.10 Compensation Ratios

The projects mitigation ratio is proposed to be 1 to 1 with additional enhancement of estuarine habitat at a ratio of 7.85:1. Mitigation Option 1 would replace both palustrine and estuarine habitat at a 1 to 1 ratio. Option 2 provides a lesser replacement ratio for palustrine (0.3:1) and a higher ratio (3.21:1) to create/restore a larger area of higher quality estuarine habitat. Much of the palustrine wetland impacts are to areas close to Humboldt Bay that were originally estuarine habitat.

4.11 Long-term Goals

The primary goal of the mitigation is to create 1.77 acres of a self-sustaining Palustrine Emergent and Estuarine wetland habitat to compensate for the potential impacts to wetlands associated with the project. Other goals of the wetland mitigation are to:

1. Maintain or restore native biodiversity, resulting in a net gain of good quality wetland habitat;
2. Maintain, restore, or mimic ecological processes, to the extent practical;
3. Improve the aquatic functions of the existing wetlands areas by focusing on improving plant diversity and cover and increasing the size of existing wetland habitat;
4. Provide groundwater recharge;
5. Permit slow surface flow;
6. Filter surface runoff;
7.

4.13 Target Aquatic Functions

The target aquatic function of the proposed wetland mitigation areas is to create self-sustaining Palustrine and Estuarine Emergent wetlands with enhanced ecological value over current conditions. Improved functions include water filtration, enhanced wildlife habitat, increased plant diversity, and groundwater recharge.

4.14 Target Hydrology and Topography

The proposed palustrine mitigation areas will be graded below average seasonal high groundwater to provide seasonal saturation to support hydrophytic vegetation types typically present in seasonal wetlands typical of the area.

The proposed estuarine mitigation areas will be graded to create high salt marsh habitat consistent with elevations preferred by Humboldt Bay owl's clover and Pt Reyes Bird's beak.

4.15 Target Vegetation and Habitat

Target plant community types to be created are Palustrine Emergent Wetlands (freshwater marsh seasonal wetland). Specific species have been selected and are included in the planting plan (Table 5, Appendix B). Given that the areas were converted to active lumber storage beginning in 1948, the creation of wetlands at these sites is habitat restoration.

5.0 IMPLEMENTATION PLAN

5.1 Site Preparation

5.1.1 Overview

Palustrine Emergent wetlands are proposed to be created through minor excavation. Estuarine wetlands (encompasses minimum of 0.01 acres of Humboldt Bay owl's clover habitat and 0.02 acres of Point Reyes Bird's beak habitat) are proposed to be created through minor excavation adjacent to existing tidal areas.

5.1.2 Grading Implementation

Using created/ restored freshwater wetlands located adjacent or near the proposed mitigation wetland areas as reference, it is assumed that the average grading depth for palustrine wetlands will be two to three feet below existing ground surface will be adequate to create seasonal wetland characteristics, although this could vary. A grading schematic with cross sections of the created wetland area will be developed in conjunction with federal and state agency consultation and approval.

For estuarine wetlands exaction will be to the depth required to created high salt marsh habitat between 8.3 and 7.5 MLLW. Reference elevations will be established in adjacent tidal wetlands' that provide the desired habitat. A grading schematic with cross sections of the created wetland area will be developed in conjunction with federal and state agency consultation and approval.

5.1.3 Avoidance Measures

Grading limits will be clearly defined and identified to prevent damage to existing wetlands. If needed, exclusion fencing will protect good quality habitat including existing wetlands. Access routes for equipment will be limited to upland areas. Existing pavement and existing compacted gravel surfaces will be used for construction staging. The area of temporary disturbance is not expected to exceed the excavation area. Temporary disturbances area, if any, will be revegetated with native species. Significant disturbance beyond the mitigated wetlands is not likely.

5.1.4 Soil Disposal

Soil generated during wetland mitigation implementation will be removed from the wetland mitigation footprint and stockpiled in an upland area for onsite reuse for trail construction and/or disposal if onsite reuse is not designated.

5.1.5 Soil Treatment

No soil treatment is planned.

5.1.6 Invasive Plant Control

Invasive species are defined as those listed by the California Invasive Species Council (Cal-IPC) with a rating of high or moderate, or any Tier 1 or Tier 2 invasive species listed in the Water Board's Fact Sheet for Wetland projects (RWQCB, 2009). Because site excavation will inadvertently remove much of the vegetation within the mitigation footprint, it is not expected that invasive species control will be necessary prior to project implementation. If species are

found during the five-year monitoring species specific strategies will be implemented for their control/removal.

5.1.7 Construction Monitor

The City and regulatory agencies will determine whether a monitor is necessary. If needed, a professional biologist familiar with the mitigation/monitoring plan and with the project site will supervise selected site phases of wetland mitigation construction. The project Biologist will have authority to suggest methods to equipment operators and will submit a summary report to the COE documenting construction observation and problems that arise, if any, during construction.

5.2 Planting/Seeding Plan

The palustrine wetland mitigation areas will be planted according to the planting plan shown in Table 5 (Appendix B). The planting areas within the planting plan correspond with the following areas:

1. Wetland – the area that counts as wetland mitigation acreage consists of the flat bottom portion of the wetland as well as the lower 1/3 of the 3:1 side slope area. Slough sedge (*Carex obnupta*) and soft stem rush (*Juncus effuses*) will be planted mid slope to the bottom of the slope and across the bottom portion of the mitigation area, clumped in groups around the edge of the wetland (it as anticipated these plants will naturally colonize into the central portion of the wetland as well as provides for some open water areas). Native willow(s) (Salix sp.) will be intermixed in the mid slope of the mitigation area.

Bare soil areas outside of the wetland creation area and within 5-feet of trail footprint impact shall be covered with maximum of 4 inches of sterile rice straw (to protect the area from erosion and reduce revegetation by non-native weedy species) and seeded with sterile seed and/or native seed mix recommended in Table 5 (or equal substitute).

Species should be planted in the late fall or early winter, when the plants are dormant, and after the rains have begun. Table 5 (Appendix B) presents specific species to be planted, recommended plant spacing, and approximate number of each species. Planting estimates/recommendations are based on potential wetland impact calculations and a proposed 1:1 replacement ratio for palustrine wetlands. If Option 2 is chosen the number of plants will be reduced accordingly

Estuarine mitigation areas will be planted according to the planting plan provided in Table 5 (Appendix B). Area up to 8.0 feet NAVD88 will be considered new wetland mitigation area and will be planted with the proposed wetland plants (Table 5) and will include the sensitive plant strategies provided below. The side slopes above 8.0 feet NAVD88 will be planted with a mix of salt tolerant perennials. The top of slopes will be planted with *Deschampsia cespitosa*. Because populations of Humboldt Bay owl's clover and Point Reyes bird's beak are both annuals, trail work will be timed to avoid impacts to these species. However, if these plants are impacted, a conservation and reintroduction strategy is provided below.

Humboldt Bay owl's clover:

An estimated 29,000 individual Humboldt Bay owl's clover within 17 populations (approximately 30,789 square foot area, or 0.7 acres) were mapped within the project general vicinity during 2010 sensitive species surveys (Winzler & Kelly, 2010). Of these, approximately 0.01 acres (541 square feet) have impacts which are unavoidable with project installation (although some of these impacts are calculated within the indirect/temporary impact area of five feet of trail footprint and can be avoided in the planted have completed their annual cycle and dropped their seeds. To anticipate worst-case scenario with full impact, the average density of identified plants is calculated from 2010 survey results to be approximately 1.1 plants per square foot (SF). Therefore, it is estimated that approximately 541 individual plants could be impacted by the proposed project within the actual footprint and potential 5 foot temporary adjacent construction zone.

Salvage of the population anticipated to be impacted has been considered. The salvage process would require collecting the plant and the surrounding soil in order to adequately capture the seed bank. If populations are growing in an areas dominated by a dense-flowered cordgrass (*Spartina densiflora*), salvage should be discounted as an option for population replacement. Dense-flowered cordgrass is an invasive perennial that competes with native salt marsh species and typically invades salt marsh habitats to form dense mono-specific stands. It can spread both by seed and by vegetative means and is difficult to eradicate once it establishes. Control activities for *Spartina densiflora* are currently underway along the proposed trail alignment, and recent removal activities were noted during the project botanical surveys (Winzler & Kelly, 2010).

Strategy

If plant and soil salvage cannot be implemented, the following a multi-tiered restoration strategy will be employed to re-establish impacted or extirpated populations post construction:

(1) Avoiding disturbance to existing populations of Humboldt Bay owl's clover to maintain functioning population structure and genetically-diverse source material for the recovery of impacted populations post construction. Avoidance measures include avoiding direct impacts during project planning and avoiding construction staging and access in areas of known populations wherever feasible. Temporary construction exclusion fencing should be installed around the perimeter of the known populations onsite and to demark known populations within 50 feet of project site that will not be directly impacted.

(1) Identification of sites within the project area or at selected estuarine wetland mitigation site with suitable elevations and tidal exchange for Humboldt Bay owl's clover reintroduction and/or natural recruitment.

(2) Collection of seed from known populations of Humboldt Bay owl's clover to provide locally-sourced material for nursery propagation and reintroduction post-construction, if deemed necessary. Seed should be collected at maturity in late summer and stored under appropriate conditions until ready for propagation. Adequate seed should be

left in collecting areas to maintain the existing population. Because of the need for multiple growing seasons to establish sufficient host species cover and also due to variability in annual seed viability, it is recommended that seed be collected from remaining populations during multiple growing seasons to ensure that adequate and viable seed is available for propagation and reintroduction. Propagated replacement plants can be used to establish in-kind replacement population at similar sites in the project vicinity, or once the vegetative state of the impact site attains sufficient vegetative cover for Humboldt Bay owl's clover; the species can then be reintroduced within the immediate area of impact. Suitable host plants growing at or above 7.5 ft MLLW in the project corridor and/or at the Mitigation areas will need to be identified prior to the planting of any seedlings to increase the potential for individual plant success. Once suitable marsh elevations and host plants are established, 60% of the seedlings should be planted and 40% held in the nursery as a contingency. If planted seedlings do not successfully establish the plants held in reserve will be used as replacement plantings or to provide seed for future plantings.

(3) Sufficient vegetative cover of salt marsh host plants is required for establishing Humboldt Bay owl's clover. Realizing that it may take approximately 2 to 5 years for such vegetative cover to establish, Humboldt Bay owl's clover may be propagated with a range of possible salt marsh host plants that also typically occur at or above 7.5 ft MLLW to increase the likelihood for successful establishment once field conditions are suitable for reintroduction. Assumed host plants include pickleweed and salt grass.

(4) Active replanting/reintroduction of Humboldt Bay owl's clover in areas located in high marsh at or above 7.5 ft MLLW (Eicher, 1987). Areas of known occurrence impacted during site construction, as well as areas where Humboldt Bay owl's clover exists but which will not be impacted by site construction, will serve as reference areas.

Point Reyes bird's beak

An estimated 35,734 individual Point Reyes bird's beak were mapped within 20 populations (approximately 7,045 square feet, or 0.16 acres) within the project area during 2010 sensitive species surveys (Winzler & Kelly, 2010). Of these, approximately 0.02 acres (895 square feet) have impacts which are unavoidable unless trail construction occurs after the plants have dropped their seed and senesced. Some of these impacts are calculated within the indirect/temporary impact area of five feet of trail footprint. The calculated average density from identified plants would be 5/SF. An estimated maximum of 4,500 individual plants could be impacted by the proposed project within the actual footprint and potential 5 foot temporary adjacent construction zone. Prior to construction another survey will be conducted to determine population size. Because Point Reyes bird's beak is a green-root hemi-parasite like Humboldt Bay owl's clover, the protocol for conservation of the former is similar, notably the need for salvaging and relocating populations identified within areas with definite project construction impacts.

Strategy

(1) Minimize disturbance to existing populations of Point Reyes bird's beak to maintain functioning population structure and genetically-diverse source material for the recovery of impacted populations post construction. Minimize direct impacts during project planning and avoiding construction staging and access in areas of known populations wherever feasible. Environmentally exclusion fencing should be installed in construction area within 50 feet of known populations that will not be directly impacted.

(2) Salvage individuals and populations in areas with definite construction impacts. As part of the salvaging process, as much adjacent soil as possible should be captured to minimize transplant stress and to retain naturally-deposited seed bank. The soil captured in the salvage process should be evaluated periodically so that seed-bank recruits can be adequately maintained either for containerized seedling transplants or grown to maturity onsite to provide subsequent seed production.

(3) Identify sites within the project area and/or at mitigation areas with suitable elevation and tidal regime for Point Reyes bird's beak reintroduction and/or natural recruitment. Such areas could include areas of known occurrence impacted during site construction, as well as areas where Point Reyes bird's beak currently exists (including nearby sites that do not lie within the project footprint). Suitable host plants will need to be identified prior to the planting of seedlings to increase the potential for re-introduction success.

(4) Because sufficient vegetative cover is required for establishing Point Reyes bird's beak, and realizing that it may take approximately 2 to 5 years for such vegetative cover to establish, it would be useful for the plant propagation of Point Reyes bird's beak (if conducted) to occur with a range of possible salt marsh host plants to increase the likelihood for successful establishment once field conditions are sufficient for reintroduction.

(5) Seed collection and propagation methodologies similar to that described for Humboldt Bay owl's clover could be implemented and followed, if deemed necessary or if out of interest of project Applicant.

5.2.2 Sources and Storage

Plants will be purchased from nurseries and will be grown from local stock (within approximately 15 miles of project). The nursery should be selected well in advance so that adequate quantities and sizes of species will be available at time of planting.

All plants should be obtained from a nursery in a minimum of ½ gallon pots to ensure healthy establishment, with the exception of the willows. Willow cuttings for the mitigation area can be gathered onsite or within 10 square miles and planted with adherence to the following directions.

Willow Planting Instructions:

Willow (Salix sp.) cuttings can be taken from large vigorous-growing shrubs and trees from December 15 through February 1 (when plants are dormant) prior to bud swelling. The willow-cutting source shall be within a 15-mile radius of the project area. Length of cuttings shall be 3

feet with a minimum ¾ inch diameter at the base and maximum of 3 inches. It is recommended that the bottom of the willow cuttings be cut at a 45-degree angle in order to keep track of the correct orientation of the cutting and to facilitate planting. Cuttings shall be placed in a bucket filled with water prior to planting to avoid desiccation. Willow cuttings shall be placed with the basal 2/3 of the slip in the ground, with approximately 10-12 inches above the soil surface. If holes are dug or augured for the willows the soil shall be tampered around each willow slip so no air void occurs.

5.2.3 Plant Sizes and Estimated Number of Installed Plants

The Planting Plan (Table 5, Appendix B) provides estimated quantity and size of each species based on acreage of area to be replaced and enhanced. In some cases, particularly for sensitive plant reintroduction, multiple strategies are proposed. In some cases such as erosion control and revegetation, a native seed mix has been recommended along with pound per acres typical for restoration projects.

5.2.4 Rooted Material Planting Methods and Protections

Planting holes should be dug to twice the size of the root ball. The holes will be refilled with native soil and gently tamped to reduce air pockets.

5.3 Water Supply and Irrigation

Soil should be moist before plant installation begins. Planting and seeding should be timed with natural rainfall. If precipitation is insufficient following the planting, supplemental watering once every approximately 10 to 15 days may be necessary to promote deep root growth and target species establishment.

5.4 Implementation Schedule

The anticipated schedule is as follows:

Task		Date
1	Grade/excavate mitigation area(s)	May - October
2	Place wetland plants in mitigation area(s)	October - December
3	Complete and submit record drawings	December
4	Monitor wetland success for 5 years from initial approval of plant installation	5 years

6.0 SUCCESS CRITERIA

The following performance standards are recommended for mitigation areas and are intended to be measurable by systematic monitoring methods, presented below. At the end of five years, the mitigation area(s) should consist of self-sustaining Palustrine Emergent Wetlands with enhanced ecological function over current conditions. Variation in success criteria for salt marsh conditions may be applicable due to variation in habitat structure, and additional criteria (presence/absence) for special plant species is provided below. Annual monitoring will occur for five years after the wetland mitigation area is planted and plant installation is accepted/approved. Success criteria are provided below, with the yearly criteria to be met based on a reasonably paced progress towards final success criteria.

Wetland Habitat Success Criteria

Year 1: 25% or greater absolute cover of wetland plant species. No large unvegetated bare spots or erosional areas.
Year 2: 40% or greater absolute cover of wetland plant species. No large unvegetated bare spots or erosional areas.
Year 3: 60% or greater absolute cover of wetland plant species. No large unvegetated bare spots or erosional areas.
Year 4: 75% or greater absolute cover of wetland plant species. No large unvegetated bare spots or erosional areas.
Year 5: 80% or greater absolute cover of wetland plant species. No large unvegetated bare spots or erosional areas.
*Note: Uneven vegetative cover success criteria between monitoring years is recommended to allow for slow growth rates of newly-planted material, and accelerated growth rates and natural spread of plants outward from planted material in subsequent years after establishment.

Plant Presence/Absence

Humboldt Bay owl's clover and Point Reyes bird's beak. The presence of established and functioning populations of Humboldt Bay owl's clover and Point Reyes bird's beak equal to or exceeding the population size existing within the project area prior to construction will be used as the primary indicators of successful rare plant mitigation. If Point Reyes bird's beak and Humboldt Bay owl's clover is not found during project pre-construction monitoring, then monitoring and the associated success criteria will not be required for these species.

7.0 MONITORING

Monitoring methods will be similar all mitigation areas.

7.1 Hydrology and Soils Monitoring Methods

Evaluation of the seasonal wetlands will consist of recording the limit of inundation and recording water levels within 10 days of a January storm event during a normal (or wetter) precipitation year. Precipitation and weather conditions will be documented. In the event of prolonged drought, extension of the monitoring period or other appropriate adaptive management may be proposed.

7.2 Vegetation Monitoring Methods

7.2.1 Photo-Monitoring

Permanent photodocumentation points will be established within the mitigation areas. A minimum of one photopoint per mitigation area will be established. GPS coordinates will be obtained for each photopoint, and the points included on a GIS map of the site. Photos shall be taken from the same location in the same direction. Photos of sampling locations shall be taken to document the percent vegetative cover and will be included with the annual report, as deemed necessary.

Photographs will be taken throughout the monitoring period, during each monitoring event. One photograph will be taken from each monitoring point. Photos will be taken with a digital camera with a moderate wide angle lens (approximately 35mm focal length if a full-frame sensor, approximately 24mm focal length if a DX sensor, at the widest setting if a consumer-level digital

camera with a built in zoom). The make and model of camera and type and focal length of lens will be noted in monitoring documentation. Photographs will be taken from eye level, ideally from a tripod with the height noted and consistent from year to year.

7.2.2 Vegetation Monitoring Transects and Quadrats

Each season during June, July, or August, five dominant plants in each sample plot shall be identified to species, and percent cover of hydrophytic vegetation shall be noted. Annual sampling plots will be located at even intervals along transect(s). The coverage of up to ten random plots (based on size of mitigation area) shall be averaged and compared to the Annual Performance Criteria. One meter square quadrants will be used. Monitoring events will be recorded on current COE wetland botanical data sheets. Plot locations shall be recorded using GPS and mapped in GIS, compass bearings noted, and photographs taken of each transect. Vegetation monitoring will be conducted at each plot. Data to be collected for each plot will include:

- Absolute cover of vegetation present will be recorded. Estimates will be included of bare earth within each quadrant.
- Absolute cover of native and non-native species within each plot will be recorded.
- Absolute percent cover of target invasive plants will be recorded.
- Total number of plants (species richness), and total number of native vs. non-native plants will be recorded.
- A photograph will be taken at each plot and provided electronically and as part of annual monitoring reports.

In addition to quantitative data collected at each plot, qualitative evaluation will be documented each year of monitoring. These general site assessments are intended to help determine if data from sampling transects is an accurate representation of site conditions, to help assess the overall functioning of the site as a whole, and also to help identify localized or low-level trends such as new invasive species formations, localized changes in species abundance, and other changes that might be overlooked if only transect data are analyzed.

During the same timeframe as the monitoring, the vegetation monitor will walk the entire site and record vegetation data by habitat type and by strata. The monitor will record the same types of data as at the plots, including recording species present, and estimating absolute cover.

Results should be similar if plots adequately represent habitat variability. If results vary widely, and vary year after year, additional sampling locations may be added or substituted for the original sampling transects, as long as the overall number of transects remains the same.

The following observations will be documented during the site assessment:

- Mortality (presence/absence) of planted vegetation and progress relative to success criteria.
- Species richness. This general site data will be used for calibrating similar data taken at transects, and is not intended for comparison with success criteria. Data will also help to evaluate whether invasive or non-native species are outcompeting native plants, and whether more active management might be required.

- Average height of dominant or target plant materials. This information will be used to assess overall health and not for comparison to success criteria.
- Other site characteristics, including patterns of plant die-offs, erosion, hydrological issues, trespass, herbivory or grazing pressure, or other land use issues. This information is intended for use in recommending management actions as necessary.

Qualitative Score for Assessing the Health and Vigor of Planted Stock

Score	Description of Score
Excellent	No evidence of stress; minor pest or pathogen damage may be present. No chlorotic leaves, no or very minor herbivory (browse). Evidence of new growth, flowering, seed set on majority (greater than 75 %) of plants observed.
Good	Some evidence of stress. Pest or pathogen damage present, few chlorotic leaves (> 5%), minor evidence of herbivory (browse). Evidence of new growth, flowering, seed set on most (greater than 50%) of plants observed.
Fair	Moderate level of stress; high levels of pest or pathogen damage, some chlorotic leaves (> 10%), some herbivory damage (few snapped leaves, stems, wear mamrks etc.). Evidence of new growth, flowering, seed set on some (less than 50%) of plants observed.
Poor	High level of stress; high levels of pest or pathogen damage, many chlorotic leaves (> 30%), severe herbivory damage (massive forage damage, main stems/leaves stripped etc.). No evidence of new growth, flowering, or seed set, or only a few plants (less than 25%) with these characteristics.

Plant Presence/Absence

The presence/absence of Humboldt Bay owl's clover will be determined by counting the number of individuals occurring in existing populations documented prior to site construction and in populations planted (i.e., re-introduced) or recolonizing post-construction. A similar strategy will be employed for Point Reyes bird's beak in the event it is observed prior to or during site construction. Once host plant vegetative cover is sufficient to support the re-introduction and/or natural colonization of Humboldt Bay owl's clover and Point Reyes bird's beak, monitoring should include counts of known populations at the project site, including pre-existing, re-introduced, and naturally colonized.

7.3 Monitoring Schedule

Generally, the vegetation communities at the mitigation site(s) shall be monitored annually at least once during period of June through August. Evaluation of the hydrology will occur within 10 days of a January storm event during a normal (or wetter) precipitation year. Some flexibility to account for annual variation in weather conditions is acceptable for both monitoring events.

Monitoring of vegetation will be completed during the performance period. After the performance period (typically five years), ongoing site inspection should occur for general parameters including observations of invasive non-native plants, and signs of erosion or vandalism.

8.0 MAINTENANCE DURING MONITORING PERIOD

The following maintenance strategies may be necessary during the monitoring period.

8.1 Processes

The community types present at the mitigation areas could provide habitat for sensitive as well as more common species. Created and enhanced habitats have been designed to be as self-sustaining as possible. However, natural ecosystems are dynamic and subject to change over time. This is especially true in modern fragmented urban preserves, where the vast landscapes and ecological processes which once maintained a habitat mosaic may have been partially or completely disrupted. Natural processes include flood and drought, fog, fire, wind, disturbance by burrowing animals, and grazing.

As a result of human-induced change, management is usually required to maintain preserves and prevent gradual degradation, at least during five-year monitoring period or until natural balance is reached within the new habitat. The following discussion identifies approaches to longer term maintenance after the end of the construction and planting period.

8.2 Inspection Activities and Frequencies

The following inspections will be generally performed on an annual basis at the time of mitigation monitoring. Field notes will document whether conditions are normal or abnormal and the annual monitoring report will recommend remedial actions to address any significant issues. The annual monitoring should note whether within each habitat type, the following conditions are observed:

1. Is erosion control in place and functioning properly?
2. Are planting areas exhibiting excessive water or drought stress (too much or too little water as evidenced by leaf wilt, leaf drop, plant die off, etc?
3. Is there any presence of new or reestablished populations of invasive plants? Pioneer populations of invasives (previously unidentified at the site, such as fennel, pampas grass, etc.) should be treated immediately upon detection. Existing invasive plant populations (i.e. Himalayan Blackberry), or others, are to be managed under an adaptive management plan if reestablishment or continued predominance is detected.
4. Is there a distinctive pattern of plant die off (i.e., all species of a single plant or a cluster of plants within a small area)?

8.3 Remedial Actions (Adaptive Management)

Monitoring and maintenance will respond with adaptive management procedures, recommended on a case-by-case basis, to address any issues identified at the site. Remedial actions could include one or more of the following activities (not exclusive):

1. Weeding around planting sites to reduce competition from non-native grasses and forbs;
2. Supplemental watering;
3. Additional erosion control;
4. Additional invasive plant control;

5. Supplemental replacement plantings (may be in-kind, or if a particular species is not doing well at the site, a suitable replacement species can be supplemented for original plant species);
6. Hydrologic modification or minor regrading and supplemental planting

8.3.1 Initiating Procedures

Standards for when to implement remediation will apply if the percent cover in any monitoring year (averaged over sample plots) is 15% below the target level described under "Annual Success Criteria" or if final criteria are not met. If annual performance criterion are not met, a report shall be prepared analyzing the cause of failure and, if necessary, proposing remedial action for agency approval.

8.3.2 Replanting

Replanting would be recommended if it is deemed that no other procedure could be employed to restore the target habitat to meet monitoring criteria.

8.3.3 Regrading

Regrading could be recommended if it is deemed that no other procedure could be employed to restore the target habitat to meet monitoring criteria.

8.3.4 Hydrologic Modification

Additional/subsequent hydrologic modification(s) are not expected to be necessary beyond excavation of the ground surface to a level that supports seasonal standing water.

8.4 Invasive Species Control

8.4.1 Predators

None are anticipated based on past experience with restoration near these sites.

8.4.2 Vegetation

Invasive species for palustrine wetlands includes Himalayan Blackberry, which will be eliminated within the mitigation footprint during grading. Invasive species for the estuarine areas include spartina densiflora. For all the mitigation areas, green machines and mowers can be used to weed around the plantings as needed. The weed management, if deemed necessary, should be done at least once a year in late summer until plantings are established. Machinery should not be used at the site during wet conditions. Machine mowing should not occur in flat bottom portions of mitigation areas due to the sensitive nature of the area and perennial wetland species recommended for this area, unless specifically prescribed as an adaptive management strategy by project biologist. The reasoning for this limitation is that machine mowers could damage perennial wetland plantings (e.g. *Juncus* sp., *Carex* sp., etc) as well as pioneer wetland species that may be establishing at the site.

Invasive species control could require repeated effort for several years and possibly throughout the monitoring period. Specific needs will be identified based on each year of monitoring, and documented in annual reports. Appropriate control methods will be utilized depending on the species, the abundance and distribution of the species, and the location within the site and relative to wetlands or other sensitive resources. Adaptive management is emphasized wherein various strategies will be employed depending on site-specific conditions and invasive species

issues at the time of management/maintenance activity. Publications on invasive species control may be referenced when identifying appropriate methods for use within a habitat enhancement site.

8.5 Maintenance Schedule

Maintenance will be conducted annually, during the dry season unless another time of year is more appropriate to avoid disturbance to sensitive species, habitats, or resources. Weed management may be necessary once a year in late summer until desired species is established. If timing of maintenance needs to be modified, the rationale for the decision will be documented in annual reports.

9.0 MONITORING REPORTS

9.1 Record Drawings

At completion of site grading and planting, record drawings should be prepared and provided to appropriate agencies. Drawings will show, at a minimum, post-grading surface contours, typical cross-sections, and limits of each habitat or planting zone.

9.2 Annual Reports

Annual reports of monitoring results will be submitted to the U.S. Army Corps of Engineers (Northern Field Office, 601 Startare Drive, Eureka, CA, 95501), California Coastal Commission, and the Environmental Services Department of the City of Arcata (735 F Street, Arcata, CA 95521, Attention Mark Andre). The reports will assess attainment of yearly target criteria and progress toward final success criteria. If final success criteria are met early, then a request for early completion of permit requirements will be made. Photographs of restoration areas shall be included in annual reports, as necessary, to document site conditions.

9.3 Due Dates

Record drawings should be available within 120 days after the completion of construction and planting activities. The first annual report shall be delivered by December 31 of the year following the first growing season after planting, with a report provided by December 31 of each subsequent year until the end of the 5-year monitoring period.

10.0 CONTINGENCY MEASURES

10.1 Initiating Procedures

If an annual performance criterion (averaged over sample plots) is not met for any year, or if final criteria are not met, a report shall be prepared analyzing the cause of failure and, if necessary, proposing remedial action for approval. Potential remedial actions include but are not limited to replanting, modifying management strategies or methods, providing additional offsite mitigation or extending the monitoring period.

10.2 Contingency Funding Mechanism

City of Arcata is responsible for funding any adaptive management or additional measures which are determined necessary and with which the appropriate agencies concur.

11.0 COMPLETION OF MITIGATION RESPONSIBILITIES

11.1 Notification

When performance criteria have been met, the applicant will notify the North Coast District of the U.S. Army Corps of Engineers, California Coastal Commission, and the City of Arcata will be provided within the accompanying annual report.

11.2 Agency Confirmation

Upon notification of completion, the agencies identified above may concur based on written documentation or, at their discretion, may request a site visit to observe the completed project.

12.0 LONG TERM MANAGEMENT

12.1 Property Ownership

The mitigation areas will remain in the ownership/control of the City of Arcata.

12.2 Management Plan

Once released from permit requirements, the mitigation areas will be maintained by the City as a part of their annual management plan. A description of anticipated future management needs, formulated after consideration of mitigation monitoring results and any necessary adaptive management during the monitoring period, will be included in the final annual report.

13.0 REFERENCES

Bergvall, M. 1991. The presence of root haustoria on seedlings of two hemiparasitic annual plants, *Cordylanthus maritimus* ssp. *palustris* and *Orthocarpus castillejoides* var. *humboldtiensis* on the Lanphere-Christensen Dunes Preserve marsh mainland and island. Senior thesis, Biology Department, Humboldt State University, Arcata, California.

Bivin, M.M., Eicher, A.L., and Miller, L.M. 1991. A life history study of Humboldt Bay owl's clover (*Orthocarpus castillejoides* var. *humboldtiensis)* and Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*) on the North Spit of Humboldt Bay. Unpublished report, Humboldt County Department of Public Works, Eureka, California.

Brian, N. 2001. Monitoring report of *Cordylanthus maritimus* ssp. *palustris* (Point Reyes Bird's-Beak) at the North Spit, Coos Bay, Oregon. Bureau of Land Management, Coos Bay District Office. Unpublished report. p.35.

California Coastal Act, 1976. http://www.coastal.ca.gov/coastact.pdf.

California Coastal Commission, 1994. Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone. http://www.coastal.ca.gov/wetrev/wettitle.html.

California Department of Fish & Game, 2009. California Natural Diversity Data Base. Arcata South Quad, April 2009.

Chuang, TI, LR Heckerd. 1971. Observations of root-parasitism in Cordylanthus (Scrophulariaceae). American Journal of Botany. 59; 258-265.

City of Arcata, 2000. *Arcata General Plan: 2020 and Local Coastal Land Use Plan*. October 4.

City of Arcata, 1984, Butcher Slough Wetalnds Restoration Project Final EIR. May.
City of Arcata, 2003. Draft Arcata Pedestrian and Bicycle Master Plan Update. September.
City of Arcata, 2004. Land Use Code, Public Review Draft. April.
CNPS, 2010. *Inventory of Rare and Endangered Vascular Plants of California.* Accessed: http://www.cnps.org/cnps/rareplants/locally_rare.php. California Native Plant Society (CNPS).
Cowardin, 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. United States Fish and Wildlife Service, FWS/OBS 79/31, 1979.
CPC, 2010. *Center for Plant Conservation Collection*. Accessed: http://www.centerforplantconservation.org/collection/cpc_viewprofile.asp?CPCNum=1055. Center for Plant Conservation (CPC)
Eicher, A.L. 1987. *Salt marsh vascular plant distribution in relation to tidal elevation, Humboldt Bay, California*. M.A. thesis, Humboldt State University, Arcata, California.
Food and Agriculture, CA Department of, 2009. *Encycloweedia: Notes on Identification, Biology, and Management of Plants Defined as Noxious Weeds by California Law*. CA.
GretagMacbeth, 2000. *Munsell Soil Color Charts*.
Harris, S.W., 1998. Birds of Northwestern California, Third edition. Humboldt State University Press, Arcata, CA.
Hickman, J., 1993. *The Jepson Manual.* University of California Press, Berkeley and Los Angeles, California.
Innovative Technical Solutions, 2002, *South I Street Mill Reuse Project Wetland Delineation,* NRM August.
Kaye, T. 1991. Population Monitoring and Habitat Analysis for Salt Marsh Bird's Beak, *Cordylanthus maritimus* ssp. *palustris*. Bureau of Land Management, Coos Bay District and the Oregon Department of Agriculture, Plant Conservation Biology Program. Unpublished Report. p.40.
Kaye, TN, B Meinke, S Massey, R. Frenkel. 1991. *Cordylanthus maritimus* ssp. *palustris* inventory and habitat analysis. BLM and Oregon Department of Agriculture, 90-2. Unpublished report on file at ODA. p.40.
McLaughlin, J. and F. Harradine, 1965. *Soils of Western Humboldt County, California,* University of California Davis Department of Soils and Plant Nutrition in cooperation with County of Humboldt, California. November.
National Weather Service Forecast Office, Eureka. http://www.weather.gov/climate/index.php?wfo
Pickart, 2001. *The Distribution of Spartina densiflora and Two Rare Salt Marsh Plants in Humboldt Bay, 1998-1999*. U.S. Fish and Wildlife Service (FWS), Humboldt Bay National Wildlife Refuge, Arcata, CA. February.
Soil Survey Staff, Keys to Soil Taxonomy, 5th Edition, SMSS Technical Monograph No. 19, Blacksburg, Virginia, 1992.
University of California, 1965, *Soils of Western Humboldt County California,* Department of Soil and Plant Nutrition, Nov. 1965.
United States Department of Agriculture, Changes in Hydric Soils of the United States, Federal Register, Vol. 60, No. 37, February 24, 1995.
United States Department of Agriculture, Natural Resources Conservation Service, Field Indicators of Hydric Soils in the United States, 2006.

United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey, Humboldt County, Central Part, California (CA-600), http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm. 2009.

United States Department of the Army Corps of Engineers, 2006. Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region. J. S. Wakeley, R. W. Lichvar, and C. V. Noble, eds. Army Engineer Research and Development Center, U.S. Army Corps of Engineers (COE). Draft for Peer Review and Field Testing, September 15, 2006.

United States Department of the Army Corps of Engineers, Wetlands Delineation Manual, Tech. Rep 4-87-1987.

United States Department of the Interior, National List of Plant Species that Occur in Wetlands, California (Region O), Bio. Rep. 88 (26.20) 1988.

U.S. Fish and Wildlife Service, 2009. Listed/Proposed Threatened/Endangered Species for the Arcata South Quad, Arcata Field Office, Arcata, CA.

USFWS, 2006. Listed/Proposed Threatened and Endangered Species for the Arcata South, Arcata North Quadrangles (Candidates Included). United States Fish and Wildlife Service (USFWS), Arcata, California September 2009.

Winzler & Kelly, 1998, *Phase I Site Assessment Beaver Lumber Property, 46 South I Street*, April.

Winzler & Kelly, 2010. *Wetland Delineation and Habitat Mapping for Arcata Rail-with-Trail Connectivity Project*. July.

Appendix A
Figures

Appendix B
Tables