

**BIOLOGICAL ASSESSMENT**  
for the  
**ARCATA RAIL WITH TRAIL  
CONNECTIVITY**

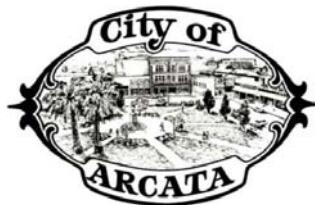
Humboldt County, California



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**ARCATA RAIL WITH TRAIL  
CONNECTIVITY**

Humboldt County, California

Prepared for:



**July 1, 2010**

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## 1.0 SUMMARY

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 physically separated from motorized vehicular traffic by an open space or barrier.

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 three transportation arteries: the North Coast Railroad Authority's railroad right of way, a portion of the Highway 101 corridor and also segments of City-owned road right of way.

Sixteen federally-listed plant and animal species (eg., two plants, six fish, six birds and one mammal) were identified in the Arcata North and Arcata South quadrangles. It was determined that eight species have Low or No potential to occur, and eight species have Moderate to High potential to occur within the project corridor's action area.

Critical habitat exists within the project study area for tidewater goby, chinook salmon, coho salmon, cutthroat trout, steelhead, green sturgeon and eulachon.

Due to the nature of the project, there is a **potential for adverse effects** to some species and their habitats; however, mitigation measures will be implemented to ensure that the project avoids and minimizes any adverse effects.

It was determined that the beach layia and western lily have Low or No potential to occur, and coho salmon, cutthroat trout, steelhead, chinook salmon, tidewater goby, coastal eulachon, green sturgeon have Moderate or High potential to occur within the project corridor's action area.

Some populations of tidewater goby have been found in some of the sloughs and channels associated with the trail project.

Due to the nature of the project, there is a **potential for adverse effects** to some species and their habitats; however, avoidance measures have been applied through project design and further mitigation measures will be implemented to ensure that the project minimizes any adverse effects. These mitigative measures are described as conservation measures within the project description and they are specifically ascribed to address potential impacts to the range of plants, animals, birds and fishes that occur within the project area.

Since no habitat occurs within the study area to support beach layia or western lily, the project will have "**no effect**" on these plants. The project "**may affect, but is not likely to adversely affect**" the green sturgeon, chinook salmon, steelhead, cutthroat trout, eulachon, coho salmon and the tidewater goby as long as the detailed conservation measures are upheld during the project construction. Long term effects or changes in the project vicinity and the habitats for sensitive species are not expected.

## **2.0 INTRODUCTION**

### **2.1 Purpose and Need**

The purpose of this Biological Assessment is to assess the effects of the City of Arcata's Rails with Trails Connectivity project on plant and animal species that are federally-listed as endangered, threatened, and proposed, as well as candidate species and their critical habitats.

This Biological Assessment is needed to meet the requirements of Section 7 of the federal Endangered Species Act (ESA) of 1973, which requires consultation with the United States Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration's Fisheries Service formerly referred to as National Marine Fisheries Service (NOAA Fisheries) for projects that may affect federally-listed plant and animal species. A separate state Biological Assessment was completed for California state-listed plant and animal species.

### **2.2 Location**

The Rail with Trail Connectivity project begins in the City of Arcata, in Humboldt County, California. The 4.5-mile alignment begins at Arcata's Larson Park in the north and runs south through the City of Arcata generally paralleling the NCRA railroad corridor near Foster Avenue, Alliance Road, and L Street within the City. South of Samoa Boulevard, the trail continues to parallel the railroad corridor, terminating south of Arcata at Bracut Industrial Park on the west side of Route 101. The northern 3.25 miles of the project are located in the City of Arcata and the southern 1.25 miles of the project are located in the County of Humboldt south of the City of Arcata. The project is entirely west of Route 101.

### **2.3 Project Action Area**

NOAA Fisheries regulations (50 CFR Part 402) define an "Action area" as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action". For this project, the overall action area consists of the combined action areas for the proposed corridors for the trail alternatives and equipment access roads and staging areas to the east of the trail corridor. Based upon project details and expected noise and construction disturbance factors, the terrestrial action area includes the project footprint and an area within 0.25 miles around the footprint (Attachment B Segment Maps). The assessment's aquatic action area includes: the sloughs or ditches for approximately 300 feet upstream and 300 feet downstream from the water crossing, and the substrate, bank and marsh areas to 0.25 miles west of the trail corridor. This includes all upland, riparian and aquatic areas affected by site preparation, construction, and site restoration design criteria. Individual action areas also include riparian areas, banks, and the stream channel in an area extending no more than 300 feet upstream and 300 feet downstream from the action footprint, generally no more than an additional 150 feet, where aquatic habitat conditions will be temporarily degraded until site restoration is complete.

Essential features of the adult and juvenile anadromous fish migratory corridor, rearing areas or residence, in the case of more localized populations of tidewater goby, include: substrate, water quality, water temperature, water velocity, cover/shelter, food, space, and safe passage

conditions. The construction activities required for the proposed trail potentially and temporarily affect the following essential features: water quality, substrate, water temperature, sound quality, space. The increase in impervious surface and addition of new piles in the channel banks required after the trail is constructed potentially affect the following essential features: water quality and physical habitat.

For this project vicinity, the “in water work window” for the majority of sensitive listed aquatic and terrestrial species was defined as July 1 through September 1 for it is the time of least activity of listed species relative to their respective life stages as discussed in Section 3.0 of this assessment (M. van Hattem, California Department of Fish and Game, Personal Communication, 2010).

## **2.4 Project Description**

The proposed Arcata Rail with Trail Connectivity Project involves construction and operation of an approximately 4.5 mile long Class I, ADA accessible, non-motorized multiuse trail, which is a paved or unpaved non-motorized facility physically separated from motorized vehicular traffic by an open space or barrier.

The proposed project corridor would run from northern Arcata, down through the City and the Arcata Marsh, and along the eastern edge of Humboldt Bay south to the Route 101 and Bracut intersection. The existing corridor includes three transportation arteries: the North Coast Railroad Authority’s railroad right of way, a portion of the Route 101 corridor and also segments of City-owned road right of way.

The trail will consist of asphalt paving for the trail surface with gravel used for the shoulders. The trail will predominately be 8-10’ wide with 2 foot shoulders on either side, but can be up to approximately 30 feet. The width of the project consists of three elements: 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.

A complete project description is provided in Attachment A.

## **2.4. Background**

The City of Arcata currently has 20 miles of off-road trails and 16 miles of bike lanes. Although the City’s active non-motorized transportation system is institutionally established, there are several large gaps that make the City difficult to navigate for pedestrians and bicycles. In 2004, the City drafted the Arcata Pedestrian and Bicycle Master Plan, in which over 35 miles of projects were developed to meet the increasing local demand for non-motorized alternatives and connectivity to and from the Pacific Coast and Humboldt Bay.

The railroad right-of-way owned by the North Coast Railroad Authority (NCRA), which travels through the center of the City of Arcata on a north/south axis, was identified in the 2004 Master Plan as a corridor of significant potential for a non-motorized trail. This portion of the NCRA corridor passes through several City parks, across commercial areas within the City, across primary city streets and a state highway (SR255), through the City of Arcata Marsh and Wildlife

Sanctuary, adjacent to the public works yard and wastewater treatment plant (WWTP) yard, and along the Eureka-Arcata Safety Corridor and Caltrans right-of-way.

A Bay Trail Feasibility Study further studied the feasibility of a trail between Arcata and Eureka and presented alternative alignments and sections for trail construction. The 2007 Study covered a large portion of the current project including the section from South I Street in Arcata to the Bracut Intersection along Highway 101 on the Eureka-Arcata Corridor.

In 2009, the City received grant funding from the California Coastal Conservancy (CCC) to complete planning, engineering design, and permitting for a “Rails-with-Trails” facility (the proposed project). “Rails-with-Trails” is an arrangement in which an established shared-use trail runs parallel to a rail line that is either functional or has the capacity to become functional in the future. In such projects, the trail is designed and developed to operate in the railroad right-of-way in such a way as to avoid interference with the functionality of the adjacent rail line.

### **Relationship to Railroad**

In 1975, the railroad in the study area shipped 65,000 cars or almost 200 cars per day. However, rail usage dropped dramatically in the following decade as the Humboldt County timber industry declined. In 1989, the North Coast Railroad Authority (NCRA) was formed by the California Legislature under the North Coast Railroad Authority Act to ensure continuation of railroad service in Northwestern California. By 1997, the railroad was running only three to four trains per week. In 1997, severe winter storms caused substantial rock slides and erosion, damaging much of the NCRA’s tracks and infrastructure. This included tunnel closures on the NCRA line at the Eel River Canyon, which cut off the north end of the line from the rest of the NCRA track system. Since 1997, the NCRA has been engaged in trying to obtain federal and state funds to reopen the line. Though the tracks have not been in use for over 13 years, the NCRA maintains the stance that rail service will be restored in portions of the project area.

In May of 2009, in anticipation of the proposed project, the NCRA released Policy 0907 – “Trail Projects on the NWP Line Rights-of-Way: Design, Construction, Safety, Operations, and Maintenance Guidelines.” This document outlines the NCRA’s policies on “Rails-with-Trails” projects and provides uniform and consistent standards on NCRA’s rights-of-way for the design, construction, safety, operations, and maintenance of Rails-with-Trails Projects.

### **Alignment Selection**

The following details the process through which alignment options were generated and the preferred alignment selection process.

- Concept for alignment generally followed railroad alignment through City or as developed in the Bay Trail Feasibility Study.
- During field reconnaissance, areas were identified that could accommodate a trail with less construction impacts to the environment and/or improved ease of construction.
- The project area was divided into segments and sub-segments for purposes of identification and evaluation.

- At least two alignment options (often three) through each segment were identified for evaluation.
- The potential alignment options were presented to the City of Arcata, steering team, and stakeholders.
- Comments were received from the City of Arcata, steering team, and stakeholders regarding the various alignment options within each segment.
- A decision matrix was developed which rated alignment alternatives for environmental and other trail considerations.
- A “Selected Alignment” was chosen with City of Arcata taking into consideration input by stakeholder group and steering team.
- The “Selected Alignment” was presented at a public meeting to receive input and to incorporate public comments as appropriate.

### **Steering Team and Stakeholders**

Open communication with key stakeholders is essential to a successful project and meeting the project schedule. This project has many key stakeholders with their own individual goals that are necessary to accomplish the overall project objective. For this project, the key stakeholders were included as part of the team and were engaged in the process as needed to meet individual and collective needs. Stakeholders included local environmental group representatives, agency representatives, citizen groups, project consultants, project applicant, community members, chamber of commerce, trail advocates, and rail proponents.

## **3.0 METHODS**

### **3.1 Survey Methods**

A Natural Features Inventory (NFI) of the project corridor consisted of the following biological and botanical sub-tasks:

- 1) Reviewed lists provided by the U.S. Fish and Wildlife Service and National Marine Fisheries Service of Federal special-status species (FWS, 2010a); and,
- 2) Conducted reconnaissance-level botanical and wildlife investigations.

Site visits were conducted to generally identify/map habitat types and significant sensitive wildlife areas within the potential trail alignment options from the Skate Park on Sunset Avenue/Jay Street to Bracut Industrial Park on Route 101. The reconnaissance field work was conducted on December 1-2, 2009, by Winzler & Kelly scientists Mr. Gary Lester (Biologist/Botanist) and Ms. Lia Webb (Soil Scientist/Plant Ecologist). Additionally, special-status species that have potential to exist at the project site (FWS, 2010a; and FWS, 2010b) based on presence of habitat were searched for during the reconnaissance level survey.

### **3.2 Evaluation Methods**

Factors considered in evaluating project impacts included the species' dependence on specific habitat components removed or modified, the abundance and distribution of habitat, habitat components in the project vicinity, distribution and population levels of the species (if known), the possibility of direct impact to fish, the degree of habitat impact, and the potential for mitigation of adverse effects. The analysis used the methods outlined in "*Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale*" (NMFS, 1996) to determine the potential for project impacts on water quality, and in-stream and riparian habitat quality.

This document assesses the environmental baseline for the watershed, discusses how the proposed action would affect the environmental baseline conditions, and uses that information in a dichotomous key to arrive at a determination of effect.

## **4.0 ENVIRONMENTAL DESCRIPTION**

### **4.1 Baseline Conditions**

The project study area 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. 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 Brainard's Slough. The trail terminates at the Highway 101 entrance to the Bracut Industrial Park.

#### **Human Environment**

The project area has a long history of human disturbance, and the selected alignment passes by and through neighborhoods, commercial and industrial areas, public parks, road rights-of-way and public facilities. At numerous locations, the alignment is crossed by public roadways and driveways. Several segments of the alignment are currently used for access and there are several instances of encroachment by adjacent uses. The portion of the alignment from Alliance Avenue to Samoa Boulevard has the most human development and is expected to receive the highest level of use.

### *Railroad Right-of-Way and Railroad Facilities*

The railroad right-of-way within the project area is approximately 43-47 feet wide. The facilities within this ROW include the railroad track, which in some areas is dilapidated with missing tracks and/or ties. The shoulders on either side of the railroad tracks are generally gravel, pavement, or soil with some sporadic vegetation. There are existing volunteer trails throughout this corridor.

### *Land use*

All existing City land use designations and zones permit trail development. In addition to railroad and street rights-of-way, the project passes through City parks, private property, and the Arcata Marsh and Wildlife Sanctuary.

## **Physical Environment**

The physical elements of the environment that occur within the project study area include geology and soils, topography, water quality, floodplains and hydrology.

Most of the project area consists of human-altered soils from cut and fill for road development, railroad development, berm/dike installation and manipulation, agricultural uses, urban development, and wastewater treatment infrastructure. Few natural soil conditions were noted except in the area of Shay Park. Much of the vegetation has similarly been altered from long-term land uses and consists of many non-native and disturbance-oriented species. The natural hydrology is assumed to have been altered in agricultural areas from historical dike construction and conversion of land to agricultural and urban uses. Site hydrology is also assumed to be historically altered from road and infrastructure installation along the Route 101 corridor and near the Arcata WWTP and within the Arcata Marsh.

### *Topography, Geology and Soils*

The northern half of the study area is within the City of Arcata and through relatively flat developed lands. The southern half of the project area is along the shoreline of Humboldt Bay, thus it is flat and subject to seismic forces and liquefaction. The principal soil is coarse to fine grained alluvium consisting mostly of unconsolidated, coarse-to-fine-grained sand and silt (alluvium) typically found on coastal plains, valley bottoms and along river flood plains. This material exhibits potential for liquefaction during earthquakes of sufficient magnitude and duration. Liquefaction is the loss of strength that can occur in loose, saturated soil during or following seismic shaking. The loss of strength is due to the tendency of loose soils to contract and compress when shaken. In a seismic event, liquefaction can produce a number of ground effects, including lateral spreading, boils, ground lurching, and settlement of the fill material. In the vicinity of Bracut, the soil primarily consists of non-marine sandstone with clay and gravel (Hookton Formation). The sandstone is usually 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 may be pockets of non-native marine deposits and sand indicative of fill that was brought in to construct embankments for the railroad and for the highways.

### *Flood plain*

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) indicate portions of the project area and adjacent lands lie within both Zone A and Zone C designated Floodplains. Zone A is defined as "*Areas of 100-year flood; Base Flood Elevations and flood hazard factors not determined.*" Zone C is defined as "*Areas of Minimal Flooding-Outside of the 100-year Base Floodplain Area.*" The FEMA Flood Insurance Rate Maps showing the project limits are included in a 2003 floodplain report. FEMA maps showing floodplains in relation to Route 101 can also be viewed at <http://msc.fema.gov/webapp/>.

Field Code Changed

The California State Reclamation Board defines a designated floodway to mean either: (1) the channel of the stream and that portion of the adjoining floodplain reasonably required to provide passage of a base flood or (2) the floodway between existing levees as adopted by the California State Board or the Legislature. FEMA Floodway Maps for the project study area do not include any designated floodways within the project limits. Jacoby Creek, upstream from Old Arcata Road, is designated as a Floodway. However, downstream of the Old Arcata Road Bridge is listed as a Zone A Floodplain. No other floodways near the project have been established.

The floodplain areas for the Jacoby Creek/Gannon Slough watershed were calculated to be approximately 371 hectares (916 acres).

Except for the segments between Larson Park and the southern extent of urban development in the City of Arcata (Segment 1.0 to 5.1), the proposed trail would be within the FEMA Zone A floodplain. The water crossings at Segments 6.1 through 7.4 are all below mean high tide (8.0 feet elevation North American Vertical Datum).

### *Water Quality*

The Pacific Coastal 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 good soil infiltration. The lower watershed is flat, with a slightly higher concentration of development, good vegetative cover, and less permeable soils. The current land uses in the majority of the project vicinity are: pasturelands for grazing cattle; wildlife refuges; sporadic agriculture structures and homes; and, businesses.

Project receiving water bodies include: 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; and, Arcata Bay. However, due to existing earth dikes and site elevations, the trail alignment area is unlikely to drain to the slough channel to the east of the highway. 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 and waters are renowned for salmon and steelhead fishing.

### **Biotic Environment**

The biotic environmental setting within the project study area includes wetlands, sloughs and ditches; and natural communities including aquatic, riparian and upland habitat.

The Humboldt Bay Area, which includes Arcata Bay, provides habitat for a large diversity of native aquatic and terrestrial animal species. The City of Arcata 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, 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). Gannon Slough could potentially serve as migration corridors for fish, such as salmon, that move between salt and freshwater to complete their life history. This slough 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.

Disturbed sites were found throughout the study area dominated by non-native vegetation with well drained soils or compacted engineered fill. Upland areas on the field map are represented by areas not identified as wetlands. Man-made freshwater areas (including wastewater treatment ponds) parallel the railroad tracks through the Arcata Marsh.

Narrow, tree-dominated cover occurs parallel or adjacent to the tracks and adjacent to palustrine emergent wetlands. Riparian understory consisted typically of perennial wetland herbaceous species. These areas contain potential habitat for nesting birds. The adjacent riparian habitat nearest Shay Park has a high potential for migratory bird use.

Drainage ditches exist on the east side of the railroad tracks between Bracut and the Arcata Wastewater Treatment Plant. The ditches are often dominated by herbaceous perennial wetland species, and have been classified as Palustrine Emergent Wetlands. These ditches currently lack vegetation. The ditch that runs parallel along the east side of the railroad tracks widens and opens to a cattail marsh at the south end of G Street. Saltwater marshes exist on the lower end of Butcher Slough and brackish areas associated with some portions of the ditch on the east side of the tracks between the Arcata Wastewater Treatment Plant and Bracut.

On the west side of the tracks along the margin of the bay, there exists dense, low salt marsh cover with scattered open mud with potential open wading bird foraging habitat. This entire area was classified as estuarine intertidal emergent due to proximity to the bay margin and the predominantly vegetated nature of the area.

Significant wetland features within the project area that lacked vegetation and were either at the bay margin or considered backwater, were mapped as mudflats. No vegetation was identified within these areas. Where significant vegetation was present, areas were classified as estuarine intertidal emergent wetlands.

## 4.2 Listed Species

Inquiry results showed that there are 16 federally-listed as Endangered, Threatened, Proposed and Candidate plant and animal species, as well as Critical Habitat distinctions that may be present in the project area (Table 1). Species information was obtained from the Arcata Fish and Wildlife Service field office's online species list search page for Arcata North and Arcata South quadrangles (FWS, 2010b). As can be seen in Table 1, the search of federally-listed species resulted in two plants, six fish, six birds, and one mammal that may be present in Arcata's Rail with Trail Connectivity action area.

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**Table 1.** Plant and animal species federally-listed as Endangered, Threatened, Proposed and Candidate as well as Critical Habitats within the Arcata North and Arcata South quadrangle maps (FWS 2010a), covering the Rail with Trail Connectivity project area.

Scientific Name	Common Name	Federal Status	Critical Habitat	Potential to Occur
<b>Plants</b>				
<i>Lilium occidentale</i>	Western lily	E	N	Low
<i>Layia carnosa</i>	Beach layia	E	N	None
<b>Fish</b>				
<i>Acipenser medirostris</i> *	Green sturgeon, southern DPS	T	Y	High
<i>Eucyclogobius newberryi</i>	Tidewater goby	E	Y	High
<i>Oncorhynchus kisutch</i> *	S. OR/N. CA coho salmon	T	Y	High
<i>Oncorhynchus mykiss</i> *	N. CA steelhead	T	Y	High
<i>Oncorhynchus tshawytscha</i> *	CA coastal chinook salmon	T	Y	High
<i>Thaleichthys pacificus</i> *	Southern eulachon DPS	T	N	Low
<b>Birds</b>				
<i>Brachyramphus marmoratus</i>	Marbled murrelet	T	Y	Low
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	T	Y	None
<i>Coccycuza americanus</i>	Western yellow-billed cuckoo	C	N	Low
<i>Phoebastria albatrus</i>	Short-tailed albatross	E	N	None
<i>Strix occidentalis caurina</i>	Northern spotted owl	T	Y	Low
<i>Synthliboramphus hypoleucus</i>	Xantus's murrelet	C	N	None
<b>Mammals</b>				
<i>Martes pennanti</i>	Fisher, west coast DPS	C	N	None

**KEY:**

(PT) Proposed Threatened as likely to become endangered within the foreseeable future

(E) Endangered Listed in the Federal Register as being in danger of extinction

(T) Threatened Listed as likely to become endangered within the foreseeable future

(C) Candidate which may become a proposed species

Critical Habitat: Y = Designated, P = Proposed, N = None Designated

\* Denotes a species Listed by the National Marine Fisheries Service

### 4.3 Critical Habitat

Critical Habitat designated within the project area:

Critical habitat was designated for the **green sturgeon** southern DPS, effective November 9, 2009 (74 FR 52300). Critical habitat for this ESU includes coastal waters north of Monterey Bay, California and certain coastal bays and estuaries, including Humboldt Bay.

Critical habitat was designated for the **tidewater goby** effective March 3, 2008 (73 FR 5920). Humboldt Bay is included within the area designated as Critical Habitat.

Critical Habitat was designated for the **coho salmon**, Southern Oregon/Northern California ESU, effective June 4, 1999 (64 FR 24049). All accessible rivers, estuaries and tributaries in Humboldt Bay are included in the area designated as Critical Habitat for this ESU.

Critical Habitat was designated for the Northern California **steelhead** ESU, effective March 17, 2000 (65 FR 7764). Estuarine areas of Humboldt Bay, Jacoby Creek and Brainard's Slough, are included within the area designated as Critical Habitat for this ESU.

Critical Habitat was designated for the California coastal **chinook** salmon effective March 17, 2000 (65 FR 7764). Estuarine areas of Humboldt Bay, Jacoby Creek and Gannon Slough are included within the area designated as Critical Habitat for this California coastal ESU.

Critical Habitat designated, but none within the project area:

Critical Habitat was designated for the **marbled murrelet**, effective June 24, 1996 (61 FR 26256). There are no areas in the vicinity of Humboldt Bay or the City of Acrata that are designated as Critical Habitat.

Critical Habitat was designated for the **western snowy plover**, on October 31, 2005 (70 FR 56970). The areas designated as Critical Habitat do not include any portions within Humboldt Bay, but do include the Pacific coast-side length of the southern spit of Humboldt Bay.

Critical Habitat was designated for the **northern spotted owl**, effective February 14, 1992 (57 FR 1796). There are no areas in the vicinity of Humboldt Bay or the City of Acrata that are designated as Critical Habitat.

### 4.4 Species Information

The following are descriptions, life histories and occurrence data for each of the listed plant and animal species in [Table 1](#).

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#### PLANTS

**Western lily**      (*Lilium occidentale*)  
Federal Status:      Endangered  
Critical Habitat:      N/A

The western lily is an annual herb found within 4 miles of the northern California and southern Oregon coast, including the Humboldt Bay headlands. It grows up to 5 feet in height with long and pointed leaves, whorled or single, along an unbranched stem. It occurs on the edges of sphagnum bogs, ephemeral ponds and small channels in forest openings, and it may also occur in coastal dune, prairie and scrub where there is ample moisture from ocean fog. Western lily is mainly hummingbird pollinated; secondarily by bee. There are currently less than 30 known small and isolated populations (FWS, 2010b).

Shoots typically begin in March and April. In June or July the green buds usually turn red for 3-5 days, spend 1-2 days opening, with the open, nodding flowers lasting 7-10 days. New plants often only have one flower, and older plants may produce more flowers if the habitat permits. Flower stalks remain standing with fruit capsules maturing over 40-50 days. Non-flowering plants can live for many years under closed-canopy forests. Each fall, the plant dies back and remains dormant as an underground rhizome/bulb until the following spring (FWS, 2010a).

The main threats to the western lily are habitat loss due to mid- to late- plant succession, hydrological/wetland modifications, development and grazing. Horticultural plant collection also contributes to the species decline (FWS, 2010b).

#### Occurrence data

The western lily has little or no potential to occur within the project corridor, as there is no preferred habitat of coastal bluff scrub and prairies or openings in coast coniferous forests. The freshwater marshes and swamps of the Arcata WWTP may provide marginal habitat, but ground-level botanical surveys conducted in December 2009 and January 2010 did not reveal any occurrences (Winzler & Kelly, Natural Features Inventory 2010).

<b>Beach layia</b>	<i>(Layia carnosa)</i>
Federal Status:	Endangered
Critical Habitat:	N/A

The beach layia is a 6 in. tall (up to 16 in. across) succulent, annual bulbiferous herb found in coastal sand dune systems, ranging from 0-100 feet in elevation. The number of flower and seed heads range from one to more than 100. It colonizes semi-stabilized, sparsely-vegetated and open wind-blown dune areas with moving sand. The species also occurs adjacent to trails and roads, often colonizing areas of newly disturbed bare ground and sand. It prefers open sites, as it does not survive long under high vegetative cover. Humboldt County is thought to contain the largest populations and amount of occupied habitat of the beach layia (FWS, 2010b).

The beach layia blooms in spring and completes its life cycle before the dry summer, dispersing its seeds via wind during late spring and early summer. It germinates during the rainy season between fall and winter. Local population distributions shift with wind erosion and dune stabilization patterns. Invasion and shading by non-native species largely contribute to the species decline (FWS, 2010b).

### Occurrence data

The beach layia has little to no potential to occur within the project corridor as there is no open dune habitat. The length of the Route 101 corridor (segments 7.2-7.9) is regularly mowed as part of highway maintenance, further limiting the possibility of this species. Edges of existing trails may provide marginal layia habitat, but ground-level botanical surveys did not reveal any occurrences.

## **FISH**

### **Green sturgeon      (*Acipenser medirostris*)**

Federal Status:

Threatened

Critical Habitat:

Designated within the project area

The green sturgeon Southern Distinct Population Segment (DPS) was listed as threatened on April 7, 2006 (71 FR 17757). Tagging or genetics data are needed to identify an individual fish to DPS (NMFS, 2005).

The Southern DPS is known to breed only in the upper Sacramento River. Spawning occurs in late spring and early summer. Eggs are broadcast-spawned and externally fertilized in relatively fast water flows in depths greater than 3 inches, and usually in deep pools (Moyle, 2002). Silt is known to prevent the eggs from adhering to each other. Female green sturgeon produce 60,000 to 140,000 eggs. Larvae grow quickly, reaching a length of 74 mm within 45 days after hatching (Deng, 2000), 300 mm by one year, and 600 mm by two years (Nakamoto et al., 1995). Juveniles are thought to spend one to three years in freshwater before entering the ocean (Nakamoto et al., 1995), where they disperse widely. At maturity, (15 to 30 years for males and 17 to 40 years for females) green sturgeon return to freshwater spawning grounds. Spawning is thought to occur every three to five years. Juveniles that are smaller than 300 mm are not tolerant of salinity, and would not be expected to occur in Humboldt Bay

The green sturgeon is a primitive fish that is a benthic feeder that feeds on small fish. It is found in estuaries, lower reaches of large rivers, and salt or brackish waters off river mouths. It is a demersal species that prefers saline waters and during high freshwater inflow, it may move out of the area. The green sturgeon is a long-lived fish that can reach lengths of up to 7 feet.

A number of threats have been identified for the green sturgeon Southern DPS, including impassable barriers (dams), adult migration barriers, insufficient flow, increased temperatures, juvenile entrainment, exotic species, poaching, pesticides and heavy metals, and local harvest (NMFS, 2005). According to NMFS (2005), “the principal threat to this DPS comes from the reduction of green sturgeon spawning area to a single population in the Sacramento River.”

### Occurrence data

The majority of Green sturgeon detections in Humboldt Bay are of the Southern DPS from the Sacramento River (Pinnix, 2010). There are much smaller numbers of Northern DPS green sturgeon, which tend to stay in closer proximity to their known breeding areas in the Klamath and Rogue Rivers. No tagged sturgeon has been found in southern Humboldt bay in four years of monitoring, but many occur in the north Bay. A hot spot is in the northeast part of the Bay, near an offshore feature known as “Sand Island” with over 220,000 pit tag detections here in two years, presumed to be repeat detections of a much smaller number of fish (Pinnix, 2010). Detections at other North Bay locations tend to be less than 250.

**Tidewater goby** (*Eucyclogobius newberryi*)

Federal Status: Endangered  
Critical Habitat: Designated within the project area

The tidewater goby is generally found in fresh or low salinity (brackish) water (less than ten parts per thousand) of shallow (less than one meter) lagoons, coastal wetlands, and lower stream reaches where the water is fairly still but not stagnant. The preferred habitat for both spawning (usually occurs spring to early summer) and juveniles is slack, shallow water, seasonally disconnected from the ocean or tidally muted lagoons, estuaries, and sloughs. High-water refugia for juveniles and adults include “perched” habitats, off-channel sloughs, and pockets of still water.

Threats at numerous sites with suitable habitat in Humboldt Bay include operation of tide gates to control water flow, grazing, oil spill contamination, contamination from adjacent paper and lumber mill sites, highway construction and maintenance, alteration of stream flood flows, and possibly sedimentation.

The Primary Constituent Elements (PCEs) for tidewater goby are 1) Persistent, shallow (~0.1-2m), still to slow moving water with 0.5-20 ppt salinity; 2) Silt, sand and mud substrates that can be used for burrows; 3) Vegetative protection of submerged and emergent species (e.g. *Potamogeton pectinatus*, *Ruppia maritima*, *Typha latifolia*, and *Scirpus* spp.); and 4) Sandbar(s) that close (fully or partially) an estuary or lagoon during late spring to fall for stable salinity and water flow (NMFS, 2008).

Occurrence data

Currently, the tidewater goby is known to occur in Humboldt Bay. Occurrence data for tidewater goby do not exist for all of the waterbodies in the project area, but they are assumed to be present in all shallow, brackish, slow-moving waters that are hydrologically connected with main channels at high tide around Humboldt Bay (FWS, 2008).

Two tidewater goby were captured in March 2010 in Jacoby Creek. The Route 101 ditch in this vicinity was reported to have had tidewater gobies in 2004 (while none were observed in cursory 2006 or 2007 investigations, where salinity was 0 ppt) (Gilroy, 2007). Gobies have been found at the northeastern shore of Arcata Bay, at the mouth of the Jacoby Creek, Gannon Slough, Rocky Gulch (near Brainard's Slough) (Wallace, pers. com., April 27, 2010). A tidewater goby observation was recorded in 1982 for Arcata Marsh/Klopp Lake (Humboldt State University

Fisheries Museum). Surveys conducted in tributary ditches to Butchers Slough (lower Jolly Giant Creek) in 2002 found no tidewater gobies. In July 2005, a population of tidewater goby was discovered in Gannon Slough, near Jacoby Creek, during surveys related to a restoration project.

**Coho salmon** (Southern Oregon/Northern California) (*Oncorhynchus kisutch*)

Federal Status: Threatened

Critical Habitat: Designated within the project area

The Southern Oregon/Northern California coho salmon (Southern Oregon/Northern California ESU) was federally listed as a threatened species by NMFS (62 FR 33038; dated June 18, 1997) and is also listed as threatened by the State of California. This ESU is defined as all coho salmon naturally produced in streams between Cape Blanco in southern Oregon and Punta Gorda in northern California, Humboldt County.

Marine invertebrates, such as copepods, euphausiids, amphipods, and crab larvae, are the primary food when coho first enter salt water. Fish represent an increasing proportion of the diet as coho salmon grow and mature.

In the Southern Oregon/Northern California Coast ESU, the decline of coho salmon has been attributed to several human-caused factors such as: habitat degradation (i.e. increased water temperatures, pesticides, non-point source runoff, etc.); harvesting of trees; water diversions; and artificial propagation of salmon. These factors, in turn, exacerbate the adverse effects of the natural environmental variability from drought and poor ocean conditions. Coho salmon spawn in coastal streams in fall or winter, and remain in fresh water for about a year.

Occurrence data

Coho spawn in all of the Humboldt Bay tributary watersheds, and juveniles and yearlings spend various amounts of time in the freshwater/estuary transition zone, averaging about a month but up to two months, with spring being the heaviest time of use (Wallace, 2010). Recorded observations of coho have been made at Jolly Giant Creek, Gannon Slough, Jacoby Creek and Brainard's Slough .

**Steelhead** (Northern California) (*Oncorhynchus mykiss*)

Federal Status: Threatened

Critical Habitat: Designated within the project area

The Northern California steelhead (Northern California ESU) is listed as a threatened species (65 FR 36074; August 7, 2000). This coastal steelhead ESU occupies river basins from Redwood Creek in Humboldt County, California to the Gualala River near the Mendocino/Sonoma County line, inclusive. In the Northern California ESU, the decline of steelhead has been attributed to factors such as: watershed disturbances, including logging on steep slopes, grazing, road building; water diversions; and severe habitat degradation caused by timber harvest and intensive agricultural practices, resulting in decreased flows, loss of riparian habitat, channel widening, and increased water temperatures. Despite this decline, north coast rivers and streams

have the greatest amount of steelhead habitat in the State and most abundant populations of steelhead (i.e. Klamath- Trinity River system).

Steelhead is the anadromous form of rainbow trout, although steelhead is more similar to Pacific salmon than trout in their ecological requirements. Therefore, steelhead is also known as "Pacific salmon." Unlike salmon, steelhead do not necessarily die after spawning, steelhead juveniles typically have a longer fresh water rearing requirement, and both adults and juveniles are much more variable in the amount of time spent in fresh and salt water.

Steelhead typically migrate to the marine environment after spending one to three years in fresh water. In the marine environment, steelhead typically rear for one to three years prior to returning to fresh water to spawn primarily as three- and four-year olds. "Half-pounders", which are sexually immature steelhead that return to fresh water after spending less than a year in the ocean, are unique to this ESU.

The Northern California ESU includes both winter and summer steelhead. Summer steelhead populations (i.e. in Smith, Klamath, Trinity, Mad, and Eel Rivers and Redwood Creek) are not as abundant, and runs in many streams consist of less than 100 fish. As with the Klamath River, some of the larger rivers in this ESU have migrating steelhead year-round, and seasonal runs have been named (i.e. Klamath, Mad, and Eel support a sizeable fall-run of steelhead that migrate into fresh water from late summer through fall). Generally, in this ESU, steelhead are winter-run returning to fresh water from August through June, spawning from December through April, with peak spawning in January in the larger basins, and late February and March in the smaller coastal basins.

#### Occurrence data

The Humboldt Bay estuary is used for rearing and migration of this steelhead ESU, although very limited numbers of steelhead have been recorded in various locations in northeast Humboldt Bay. Direct observations have been made at Jolly Giant Creek (only a few individuals found in various surveys throughout the 1990s), Gannon Slough, Jacoby Creek (several recorded each year since February, 2007). Very few steelhead have been caught in Brainard's Slough—several in fall 2005 (Gilroy, 2005), but only one recorded each year since 2007 (Wallace, 2007).

#### **Chinook salmon (CA coastal)      (*Oncorhynchus tshawytscha*)**

Federal Status:      Threatened

Critical Habitat:      Designated within the project area

The California coastal chinook salmon (Southern Oregon/California Coastal ESU) was listed by the Federal Government as a threatened species on September 16, 1999 (64 FR 50394) and reaffirmed on June 28, 2005 (70 FR 37160). California coastal chinook salmon are a distinct population of chinook salmon that reside from Redwood Creek in Humboldt County, south through the Russian River in Sonoma County. Overall, they spawn and rear in coastal and interior rivers in Northern California and Southern Oregon, and forage in vast nearshore and marine zones of the Northern Pacific Ocean.

California coastal chinook salmon spawn and rear in coastal and interior rivers in Northern California and Southern Oregon. Ocean-type chinook (fall run) rear for less than one year in

freshwater, while stream-type chinook (spring run) remain in freshwater for one year or more before emigrating to forage in coastal and marine zones of California and Oregon for two to five years (Healey, 1991). Currently, only fall-run chinook appear to be extant in the DPS (NMFS, 2007).

The destruction and modification of historic spawning habitat, including areas now inaccessible because of dams or other barriers, has been an important contributor to historic declines. Land use activities (logging, road construction, streambank alterations, etc.), water diversions and overutilization for recreational purposes are also major factors of decline. Native predation and genetic integrity are important, but not considered primary factors of decline.

The main limitations to this chinook ESU are low abundance, low distribution and negative population trends. The uncertainty of the data is also considered a risk. Fish passage barriers, over-harvesting, floodplain connectivity and function, as well as stream flow and predation are considered moderate to very high threats to this ESU.

#### Occurrence data

The range of California coast chinook includes all of Humboldt Bay. However, the very limited data on occurrences within Humboldt Bay suggest presence only in Jacoby Creek and Gannon Slough (PGE, 2005). No recent chinook observations exist for Jolly Giant Creek (a high school biology class recorded chinook in 1975). There are many recorded observations for nearby Freshwater Creek to the south, which shows a positive trend of approximately 20 to over 100 individuals from 1994 to 2001, including a large number of hatchery fish (Good *et al.*, 2005).

#### **Southern eulachon DPS      (*Thaleichthys pacificus*)**

Federal Status:      Threatened  
Critical Habitat:      None designated

The southern DPS of this small, anadromous smelt was federally-listed as a threatened species effective May 17, 2010 (75 FR 13012). The species occurs from Alaska south to northern California.

Spawning occurs in the lower reaches of streams from December to June. Juveniles move fairly quickly into estuarine areas, and then into deeper offshore waters up to 180 meters in depth. At any given time most of their adult population would be expected to inhabit deeper waters beyond Humboldt Bay, and any fish present would most likely be active in the mid-water column.

Climate related changes in ocean conditions have been identified as the most significant threat to the species, with dams and overfishing noted as lesser threats. There is very little information available on the distribution or abundance of this species, but northern California populations have been dramatically reduced in size since the 1970s (Drake *et al.*, 2010).

#### Occurrence data

Recent occurrence data for eulachon in northern California are limited. In May 1977 one report states that adult eulachon spawning in Jacoby and Jolly Giant Creeks were “rare” (Jennings,

1996). Other past reports stated that Eulachon have either not been observed (Eldridge and Bryan, 1972) or are occasionally present in Humboldt Bay tributaries, but have been reported within the Bay itself (Barnhart *et al.*, 1992). Lack of long-term monitoring of eulachon has made it difficult to determine abundance. Historically, most large spawning runs in California occurred in the Klamath River and occasionally in the Mad River and Redwood Creek, and the Eulachon Biological Research Team indicated that large, noticeable runs of eulachon are not currently spawning in northern California Rivers (Drake *et al.*, 2010).

## BIRDS

### **Marbled murrelet** (*Brachyramphus marmoratus*)

Federal Status: Threatened

Critical Habitat: Designated, but outside of the project area

The marbled murrelet is a small seabird about 10 in. in length. Its range extends from the central California coast to the Gulf of Alaska and the Aleutian Islands.

Marbled murrelets spend the majority of their lives in the near-shore marine environments. They are usually found within 1.2 miles of the shore and prefer to forage along rocky coastal areas. They feed by diving up to 100 ft. for small fish and invertebrates, generally in waters up to 240 ft. deep, but may also forage on rivers and inland lakes. Marbled murrelets nest inland, usually in the canopy of large diameter trees (>30 in.), typically in coastal redwood and Douglas-fir forests. Because they do not build nests, they are dependent on the presence of suitable nesting platforms large enough to incubate their single egg clutch. Suitable nesting platforms can include large or forked, moss-covered limbs, mistletoe infections, and other tree deformities. Nesting occurs from late March to late September, with highest activity in mid-April to mid-July. Although adequate nesting habitat may occur in younger forests, it typically occurs in large forest stands greater than 200-years-old. While one parent is on the nest, the other is foraging at sea. Incubation usually takes 30 days and chicks fledge in 27 to 40 days. After the chick has hatched both parents go to sea to forage, usually returning with a single fish in the early morning or late evening hours (FWS, 1997; 2010b; NatureServe, 2009).

Proximity of nesting habitat to foraging habitat is an important factor in determining murrelet distribution. Typically, concentrations of murrelets in the marine environment occur just offshore from large tracts of mature and old growth forests. In coastal areas, adjacent extensive clear clear-cutting means marbled murrelets are usually absent. Likewise nesting usually occurs in proximity to adequate foods sources, and murrelet nesting sites are limited to a narrow swath of forest not usually greater than 30 mi. from the coast (FWS 1997, 2010b).

Loss of habitat due to timber harvesting is a major contributor to the species decline. Further, edge effects resulting from clear-cuts adjacent to nest sites may contribute to increased predation rates, as forest edges are preferred by many murrelet predators including jays, crows, ravens, accipiters, squirrels, marten, and fisher. Marbled murrelet populations are considered to be highly sensitive to forest fragmentation, and are nearly absent from much of their historic range. Other threats include gill-net fishing, marine pollution and disease (FWS, 1997; 2010b).

### Occurrence data

The marbled murrelet has low potential to occur in the project area. While there is no suitable nesting habitat in the project area, Critical Habitat does occur approximately eight miles to the south and 15 miles to the east. The possibility of murrelets flying over the project area to/from nesting and foraging sites cannot be ruled out.

### **Western snowy plover** (*Charadrius alexandrinus nivosus*)

Federal Status: Threatened  
Critical Habitat: Designated, but outside of the project area

The snowy plover is a small, 6 in. long, light colored shorebird. It is distinguishable from other shorebirds by its black beak, dark bars on either side of its breast, and dark ear patches. Two distinct breeding populations of snowy plovers are known: the Pacific coast population, and an interior population. The Pacific coast population nests in coastal areas of California, Mexico, Oregon, and Washington (FWS, 2007; 2010b).

The Pacific coast population of western snowy plover nests on beaches from the central Washington coast to the tip of the Baja Peninsula, Mexico. It prefers to nest on sand spits, dune-backed beaches, un-vegetated beach strands, and open areas near river mouths and estuaries, where vegetation and driftwood are sparse or absent. The breeding season of the Pacific coast western snowy plover lasts from mid-March through mid-September. Wintering areas are usually similar to those used for nesting. Clutches tend to be three eggs and are laid in scrapes or depressions in the sand (FWS, 2007; 2010b).

Small invertebrates comprise the bulk of the snowy plover's diet. Pacific coast snowy plovers commonly forage amongst piles of beached kelp and in the wet sand of the intertidal zone. Above the high tide line, they feed in dry sandy areas, salt pans, spoil sites, and along the edges of salt marshes and ponds (FWS, 2007; 2010b).

Poor reproductive success and the long-term loss of suitable habitat are responsible for the decline of snowy plovers along the Pacific coast. To maintain a stable population it is estimated that western snowy plovers must fledge 0.8 young per nesting female. At many coastal sites, human disturbance, predation, and inclement weather have caused reproductive success to fall well below this level. Furthermore, loss of nesting resulting from the invasion of European beachgrass and urban development have led to declines in both wintering and nesting populations of western snowy plovers along the pacific coast (FWS, 2007; 2010b).

Coastal populations of the Western snowy plover were listed as threatened in 1993. More recently, the FWS identified Critical Habitat components essential for the primary biological needs of foraging, nesting, rearing of young, roosting, and dispersal, or the capacity to develop those habitat components. The primary constituent elements exist in areas that support or have the potential to support intertidal beaches (between mean low and mean high tide), associated dune systems, and river estuaries. Important components of the beach/dune/estuarine ecosystem include surf-cast kelp, sparsely-vegetated foredunes (beach area immediately in front of a sand dune), interdunal flats (flat land between dunes), spits, washover areas, blowouts (a hole or cut in

a dune caused by storm action), intertidal flats, salt flats, flat rocky outcrops, and gravel bars (FWS, 2007; 2010b).

#### Occurrence data

The western snowy plover has no potential to occur along the project corridor, as it requires open sand dune habitat. The trail corridor does not pass through or near any open sand dune habitat. The closest plover occurrences are on Clam Beach toward the north and along the coast-side southern spit of Humboldt Bay.

#### **Western yellow-billed cuckoo** (*Coccyzus americanus*)

Federal Status: Candidate  
Critical Habitat: None designated

The western yellow-billed cuckoo is a slim and long-tailed bird, about one-foot long with a slightly down-curving bill. West of the Rocky Mountains it is considered a distinctly different population.

This species breeds and nests in open deciduous woodlands and riparian (cottonwood and willow) woodlands, while preferring to nest 3-10 feet above ground in a dense understory. They may also nest in orchards and thickets and forage in forests, woodlands or scrub habitats.

Western yellow-billed cuckoo mostly eat caterpillars and other insects as well as some fruits, small lizards, frogs and other bird eggs (NatureServe, 2009).

Predation of adult western yellow-billed cuckoo by raptors is known, as is predation of eggs by jays, chipmunks and others (NatureServe, 2009).

#### Occurrence data

While there are no occurrences of western yellow-billed cuckoo in the project area in the CNDB, the riparian forest with thick understory of Shay Park may offer marginally suitable habitat. The trail alignment has been moved to the north and west of Shay Park to avoid direct impacts to the riparian and forested areas.

#### **Short-tailed albatross** (*Phoebastria albatrus*)

Federal Status: Endangered  
Critical Habitat: None designated

The short-tailed albatross is a large bird, approximately 3 feet in length and a wingspan over 7 feet. Their historic foraging range was in the temperate and subarctic North Pacific Ocean and the Bering Sea. Nesting is known to have occurred on islands in Japan and Taiwan, with possible nesting on Midway Atoll in the Hawaiian archipelago. At present, 80-85% of short-tailed albatross nest and breed on Torishima Island off southeastern Japan. During the non-breeding season, their range extends along the Pacific Rim from southern Japan up to the Aleutian Islands, while juveniles may continue down to northern California. Short tailed

albatross can be considered coastal, near-shore species, but they primarily occur farther out along continental shelf edges (FWS, 2008b; FWS, 2010b, NatureServe, 2009).

Typically, short-tailed albatross eggs are laid each year from late October to November. Chicks hatch in December and January and fledge in late May to June. Most adult birds tend to remain in the coastal breeding waters of Japan until April, once the chicks are nearly fully grown. The colony may then disperse in spring and summer to forage in the Aleutian Islands and the Gulf of Alaska through September. They spend the majority of their time foraging in the Alaskan and Russian continental shelf waters. The majority of the colony returns to Torishima Island in October to nest. Short-tailed albatross prefer to nest on isolated offshore islands, away from humans (FWS, 2008b; 2010b; NatureServe, 2009).

Historically, commercial harvest was the main factor that led to the endangerment of the short-tailed albatross, which no longer occurs. Current threats include volcanic activity on their nesting islands, monsoon rains, global climate change, fishing operations in Japan, Russia and the United States, ocean waters contaminated with myriad pollutants, predation and competition (FWS, 2008b).

#### Occurrence data

The short-tailed albatross has very little potential to occur along the trail corridor. Most individuals of this species do not migrate much down the pacific coast from the Aleutian Islands, and those that do primarily occupy the deeper marine environment near the continental shelf.

#### **Northern spotted owl** (*Strix occidentalis caurina*)

Federal Status: Threatened

Critical Habitat: Designated, but outside of the project area

The northern spotted owl is medium-sized, dark brown with white spots on the head and chest and dark brown eyes set in prominent facial disks. The owl's range is from southwestern British Columbia to Marin County, California (NatureServe, 2009; FWS 2010b).

Spotted owls tend to require an old-growth forest structure with large trees (dbh >30 in.) to provide a moderate to high canopy closure (60-90%). A multi-layered, multi-species sub-canopy cover with large cavity trees, large snags, fallen trees as well as an open understory are needed for nesting, roosting and foraging. However, they may be found in younger forests with similar structural characteristics of older forests, particularly along the coast of northern California redwood and mixed conifer-hardwood forests. A mosaic of old-growth habitat mixed with other forest successional stages may benefit the northern spotted owl more than large homogenous old-growth forests. Predictable availability of prey is an important factor in spotted owl occurrence. In 1992, nearly 7 million acres of Critical Habitat Units were identified in Washington (2.2 M), Oregon (3.3 M) and California (1.4 M) (FWS, 2008c).

Northern spotted owls reach sexual maturity after two years, and pair up in a monogamous relationship. Females lay from 1-4 eggs per clutch, not always successfully, and do not nest

every year. They are mostly nocturnal, hunting for rodents including, northern flying squirrels, woodrats, voles, mice, rabbits, birds and sometimes insects (FWS, 2010b; 2008b).

Historically, threats to the northern spotted owl were largely due to lost suitable habitat from logging, as well as from wildfires, volcanic eruptions and disease. Current threats still include timber harvesting and wildfires, as well as competition from the barred owl and predation. New potential threats may come from West Nile virus, sudden oak death and loss of genetic variation due to the recent genetic bottleneck (FWS, 2008c).

#### Occurrence data

The northern spotted owl has very little potential to occur along the trail corridor. The relatively young, but established mixed forest of Shay Park does not provide the suitable habitat complexity of moderate to high canopy cover of large, mature trees with an open understory with large snags and fallen trees. Further, the trail alignment was routed outside of the forested areas of Shay Park to avoid and minimize direct take of riparian, forested habitat.

#### **Xantus's murrelet** (*Synthliboramphus hypoleucus*)

Federal Status: Candidate  
Critical Habitat: None designated

The Xantus's murrelet is a small black and white bird with a thin black bill, black back and white wing linings that can be seen while flying.

This murrelet nests on rocky offshore islands on the ground, in rock crevices, under dense bushes, or in other secretive dark areas where the eggs are hidden from view. Usually a female nests in the same site in successive years. They mostly forage in the pelagic zone, 15-90 miles offshore near the continental slope. After breeding, they disperse by mid-July to rear the juveniles out at sea and are not usually found near their nesting islands. Xantus's murrelets forage for invertebrates and fish during the day and return to their nesting colony at night. (NatureServe, 2009).

#### Occurrence data

The Xantus's murrelet has no potential to occur along the trail corridor, as it breeds and nests on offshore islands and forages out at sea near the continental shelf.

## **MAMMALS**

#### **Fisher, West Coast DPS** (*Martes pennanti*)

Federal Status: Candidate  
Critical Habitat: None designated

The fisher is a terrestrial, forest-dwelling mammal of the weasel family. It has a broad head with a flat, pointed muzzle. Its legs are short, body long with a long, bushy tail. Its fur is usually light to dark brown, but the face and neck may be lighter gray.

Fishers live primarily in late-successional coniferous or mixed conifer-deciduous forests with a dense overstory. They prefer large interior areas of forests, and generally do not use areas with little forest cover or where humans have caused major disturbance. Fishers are often found in riparian areas, which are protected from logging and have more complex forest structure with more snags and large woody debris. Fallen logs, snags and large hollow trees (dbh < 20 in.) appear to be important habitat components for fishers, as they use these areas as den sites. They may use younger forests if it provides similar habitat structure. Fishers are active day and night. They mostly eat rodents, squirrels, hares and other small mammals, but also birds, carrion and fruit (NatureServe, 2009).

Forest loss and fragmentation due to logging, development, recreation and wildfires are the main causes of fisher declines. Predation, vehicle mortalities and poaching are other threats to their survival. Some reintroductions have been successful, and there are efforts to reintroduce fishers along the Pacific coast. Conservation measures for the northern spotted owl and marbled murrelet will also favor fishers (NatureServe, 2009).

#### Occurrence data

The fisher has little to no potential to occur along the trail corridor. The relatively young, but established mixed forest of Shay Park does not provide suitable habitat of interior areas of complex, late-successional conifer or mixed conifer forests or riparian areas where humans have not caused major disturbances. Further, the trail alignment was routed outside of the forested areas of Shay Park to avoid and minimize direct take of riparian and forested habitat.

## **5.0 POTENTIAL EFFECTS AND MITIGATION**

Based on the project description, precautionary measures incorporated into the project design and with the proposed conservation measures, the project is not likely to adversely affect listed endangered, threatened, or sensitive species or their habitat.

### **5.1 Direct Effects**

Direct effects of the proposed project are those immediate impacts resulting from construction. Potential direct effects of the proposed project to listed fish species and their habitats are typically related to habitat loss and noise from earthwork and bridge piling installation. Direct effects to non-aquatic plants and animal species are expected to be temporary and of limited magnitude. The new trail will follow existing dirt trails, existing paved areas and within, or adjacent to, existing railroad and highway right-of-ways; thus, the direct removal of specific plant or animal species or suitable habitat will be minor.

#### *Direct effects to fish*

Federally-listed fish species are known to use the brackish sloughs and tributaries of Butcher Slough, Gannon Slough, Jacoby Creek and Brainard's Slough in Humboldt Bay (segments 6.1, 7.2, 7.4 and 7.8, respectively). Some salmonids are also thought to use the recently daylighted Jolly Giant Creek in Arcata (segment 3.1) as suitable habitat has been identified.

Without mitigation, tidewater goby, green sturgeon, coho, chinook, steelhead, and eulachon could be adversely affected during bridge construction and work at tide gates. The resource agencies have been consulted regarding measures that will be taken to avoid and minimize harm to listed species during construction (D. Woodbury, NOAA Fisheries; S. Kramer, FWS; pers. com., June 2010). These measures are listed as conservation measures within the project description in Attachment A. Any direct impacts to fish are temporary, short-term, that would be incurred during construction.

#### Water Quality Effects

Water quality forms a major component of salmonid habitat. The condition and quality of the water that the fish encounter on their migration is extremely important, and can determine such things as feeding and breeding success rates, disease levels, growth rates, and predation rates. Major elements of water quality critical to salmon consist of turbidity/sediment levels, chemical contamination, and temperature. Fine sediments can reduce prey detection, alter trophic levels, reduce oxygen along the substrate, smother redds, and damage gills, as well cause other deleterious effects.

The presence of construction equipment near/above/within streams and estuarine environments creates the potential for introducing new suspended sediment loads and toxic materials from ground disturbance, accidental spills, or mechanical failure.

#### Noise Effects

Vibration and noise impacts from driving bridge piles into the shore will occur in segments 3.1, 6.1, 7.2, 7.4, 7.6 and 7.8; and below mean high tide at segment 7.2. The 12-inch steel pile can be expected to produce a maximum sound level of 208 dB Peak, 191 dB RMS and 175 dB SEL for a single strike. CalTrans (pers. com., 2003) has measured the sound energy emanating from driving 12-inch diameter steel piles to range between 180 – 190 dB, and 14-inch diameter steel piles to range between 195 and 200 dB. Although, vibratory driving has been shown to be 10 – 20 dB lower than impact driving steel piles of similar diameter (CalTrans personal communication, 2003); this type of pile driver is difficult to use in the Humboldt Bay substrate. In other locations in Humboldt Bay, vibratory pile drivers have been used successfully for wood or steel piles. (West Coast Contractors, Personal Communication, June 2010). Installing the piles using a vibratory pile driver is recommended if the geology bears allows it, as vibratory pile drivers lower the magnitude of the risk of harm to all aquatic species.

Non-lethal injuries can occur to salmonids that are exposed to vibration and noise impacts. The body of literature on barotrauma comes primarily from experiments made using vibration that relate to the turbine related noise in major hydroelectric dams; however, the symptoms could potentially be similar, but to a lesser extent, in fish that are exposed to pile drivers in aqueous

environments. The symptoms of barotrauma are loss of equilibrium and either or both swimbladder rupture and burping of swimbladder air. For the majority of fish that showed loss of equilibrium following rapid decompression, the condition persisted for at least two hours. Loss of equilibrium results in aberrant swimming behavior and most likely other motor and sensory impairment that probably reduces the ability of fish experiencing this condition to avoid predation. Burping of air from the swim bladder during decompression and resulting negative buoyancy would likely motivate these fish to move to the surface to refill their swimbladders where they would experience increased exposure to predation. Potentially more serious is swimbladder rupture where persistent negative or positive buoyancy might result. Persistent negative buoyancy is one of the two possible consequences of a ruptured swimbladder where the rupture prevents the fish from filling its swim bladder to recover buoyancy control. Persistent positive buoyancy is a condition created when air from a ruptured swim bladder is retained within the abdomen of a fish. Air entrained in the body cavity cannot be expelled and causes the fish to lose control of buoyancy. Any persistent condition leading to loss of control of buoyancy would likely have consequences for general fitness as well as increased risk of predation (Brown, R.S. *et al.*, 2007).

Listed fish species are known to use the brackish sloughs and tributaries of Butcher Slough, Gannon Slough, Jacoby Creek, Old Jacoby Creek and Brainard's Slough in Humboldt Bay (segments 6.1, 7.2, 7.4, 7.6 and 7.8, respectively). Some salmonids are also thought to use the recently daylighted Jolly Giant Creek in Arcata (segment 3.1) as suitable habitat has been identified.

Segment 7.2 (Gannon Slough) will involve driving bridge piles below mean high tide. This crossing will cause direct, temporary impacts that may affect all listed fish species. Construction activities will take place below the mean high tide during the lowest tides to minimize the in-water work; however, bottom substrates will be disturbed for installation of four to 6 piles at each water crossing.

Any in-water activities have the potential to increase suspended sediment loads; affect temperature; and contribute chemicals, contaminants or nutrients from bank erosion and increased turbidity. During piling installation and bridge construction, noise and vibrations may cause an incidental take by preventing listed fish species from migrating and rearing through that segment.

Segments 3.1, 6.1, 7.2, 7.4, 7.6 and 7.8 will drive piles into the shore near the water's edge causing vibration and noise impacts. This activity has the potential to result in an incidental take of listed fish species by temporarily harassing their foraging, breeding or migrating behaviors.

Potential in-water and nearshore impacts such as disruption of habitat, potential for loss of vegetated inshore areas for juvenile nursery and adult feeding areas could alter normal feeding and passage activities for anadromous fishes such as Chinook, salmon, steelhead, coho salmon, eulachon. Table 2 identifies the essential features that could potentially lead to effects on the listed species; pathways are identified for each water crossing. The effects would primarily be temporary and localized and cease after piles were installed and bridges were completed. [Impacts to salmonids can be avoided through use of work period restrictions. However, tidewater gobies could occur in lower Gannon Slough at any time of year.](#)



**Table 2. Direct/Indirect Effects of Proposed Action on Individuals and Critical Habitat**

WATERWAY AND TRAIL SEGMENT							
DIRECT/INDIRECT EFFECTS	<i>Jolly Giant</i>	<i>Butcher Slough</i>	<i>Gannon Slough</i>	<i>Jacoby Creek</i>	<i>Old Jacoby Creek</i>	<i>upland trail alignment</i>	<i>Brainard's Slough</i>
	<b>Segment 3.1</b>	<b>Segment 6.1</b>	<b>Segment 7.2</b>	<b>Segment 7.4</b>	<b>Segment 7.6</b>	<b>Segment 7.7</b>	<b>Segment 7.8</b>
<b>Potential Fish Occurrence</b>	<i>Acipenser medirostris</i>	Tidewater goby	<i>Acipenser medirostris</i>				
	Green sturgeon	<i>Oncorhynchus kisutch</i>	Green sturgeon				
	<i>Oncorhynchus kisutch</i>	<i>Eucyclogobius newberryi</i>	<i>Eucyclogobius newberryi</i>	<i>Eucyclogobius newberryi</i>	<i>Eucyclogobius newberryi</i>		<i>Eucyclogobius newberryi</i>
	S. OR/N. CA coho salmon	Tidewater goby	Tidewater goby	Tidewater goby	Tidewater goby		Tidewater goby
	<i>Oncorhynchus mykiss</i>	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>		<i>Oncorhynchus kisutch</i>
	N. CA steelhead	S. OR/N. CA coho salmon		S. OR/N. CA coho salmon			
	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus mykiss</i>	<i>Oncorhynchus mykiss</i>	<i>Oncorhynchus mykiss</i>	<i>Oncorhynchus mykiss</i>		<i>Oncorhynchus mykiss</i>
	CA coastal chinook salmon	N. CA steelhead	N. CA steelhead	N. CA steelhead	N. CA steelhead		N. CA steelhead
		<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>		<i>Oncorhynchus tshawytscha</i>
		CA coastal chinook salmon		CA coastal chinook salmon			
		<i>Thaleichthys pacificus</i>	<i>Thaleichthys pacificus</i>	<i>Thaleichthys pacificus</i>	<i>Thaleichthys pacificus</i>		<i>Thaleichthys pacificus</i>
		Southern eulachon DPS	Southern eulachon DPS	Southern eulachon DPS	Southern eulachon DPS		Southern eulachon DPS
<b>Impact to Habitat</b>							
Loss of habitat (indirect/direct)	sf of upland; no direct effects	sf of slough substrate	sf of ditch filled	sf of slough substrate			
Increased Infrastructure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Physical barriers or access through adjacent habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fragmentation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Impact to Individuals (incidental take, harm, harass)</b>							
Noise during construction	upland habitat; no piers needed in water or shoreline	Vibratory pile driver; 4 piles	N/A	Vibratory pile driver; 4 piles			
Light during construction	night construction very limited	N/A	night construction very limited				
Increased predation	N/A	possible	possible	possible	possible	N/A	possible
<b>Water Quality</b>							
Temperature	potential temperature increase from increased surface water runoff	potential temperature increase from increased surface water runoff	potential temperature increase from increased surface water runoff	potential temperature increase from increased surface water runoff	potential temperature increase from increased surface water runoff	N/A	potential temperature increase from increased surface water runoff
Sediment/Turbidity	grading, erosion potential	N/A	grading, erosion potential				
<b>Recovery units/constituent elements of critical habitat</b>							
substrate	sf of upland; no direct effects	sf of slough substrate	sf of ditch filled	sf of slough substrate			
off-channel habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A
refugia or pools quality or frequency	N/A	N/A	N/A	N/A	N/A	N/A	N/A
streambank condition	Piles	Piles	Piles	Piles	Piles	N/A	Piles
floodplain connectivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A
watershed condition	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Interrelated and Interdependent effects</b>	none	none	none	none	none	none	none
<b>Cumulative Effects (state and private actions)</b>			Gannon Slough Tidegate Replacement	Jacoby Creek Restoration, Caltrans bridge Hwy 101			

### Direct Effects to Critical Habitat for Fish Species

Segment 7.2 (Gannon Slough) is the only location that will involve driving bridge piles below mean high tide. This crossing will cause direct, temporary impacts that may affect any listed fish species in the area. Construction activities in-water will be confined to the period of time when the aquatic species are least active, July 1 through August 31. During construction approximately twenty to fifty square feet (SF) of substrate, i.e., 5 – 10 SF within each slough crossing, will be excavated and 0.01 acre of an existing ditch will be filled (see Table 2 Critical Habitat substrate). This activity will increase suspended sediment loads temporarily but it will not affect temperature or cause any contaminants or nutrients to increase.

During piling installation and bridge construction, noise and vibrations may cause an incidental take by preventing listed fish species from migrating and rearing through that segment.

Spawning habitat in the Gannon Slough substrate will be lost to allow for the pile installations.

Segments 6.1, 7.2, 7.4, 7.6 and 7.8 will drive piles into the shore near the water's edge causing vibration and noise impacts. This activity has the potential to result in an incidental take of listed fish species by temporarily harassing their foraging, breeding or migrating behaviors.

### Construction Activities Along the Shorelines

The tidewater goby has the additional potential of occurring in segment 7.7, where direct, permanent impacts may occur along the roadside backwater/saltwater ditch. This ditch will be partially filled by the trail. Construction will be planned to take place only during a low-low tide when the fish have moved out of the waterway. Prior to construction a biological monitor will be on site to observe the water fluctuation in the ditch and to ascertain the behavior of any tidewater goby and other fishes. Should tidewater gobies be found to remain in the system and are present in the small pools that may remain at low tide, an alternate isolation plan would be employed. In that event, exclusion fencing would be placed prior to and during construction to keep equipment out of the tide pools and other sensitive areas. These exclusion areas would be monitored by a biologist during the entire trail installation to assure that it is effectively functioning to isolate the tidewater gobies from the construction activity. Standard best management practices will be used for site clearing, grading, erosion control and revegetation of any cleared shoreline and upland areas.

Anticipated project impacts will be temporary and minor, and limited to a small area. The proposed extension will not result in a longer overall work window; the biological assessment anticipated 2 ½ to 3 months of work, and with the extension in place work will still be contained within a 2-month period. Thus, ESA listed steelhead, coho, eulachon, and green sturgeon are not likely to be adversely affected by this project.

### Effects Due to Tidegate Work

Segments 7.6 and 7.8 currently have large culverts and tide gates that prevent upstream movement of fish. The project proposes to replace these tide gates with new ones with a fish door, which will open up habitat and should have a net benefit to listed fish species.

#### *Direct effects to birds*

Potential direct effects to marbled murrelets' foraging strategy could come from noise disturbances; however, the ambient-level noise from freeway traffic on Route 101 is substantial. The response to noise disturbances would be to forage away from the project site while construction occurs. Any flight patterns to/from inland nesting locations could temporarily change to avoid the noise disturbances.

Construction of the trail above Shay Park will create noise impacts from large trucks, grading and paving, so any yellow-billed cuckoo using Shay Park at the time of construction may temporarily leave the area until the construction disturbances have moved beyond the park.

## 5.2 Indirect Effects

Indirect effects of the project are those impacts from a project that are expected to occur later in time. Impacts could be both short- and/or long-term in nature. Short-term risks to aquatic species could include temporary increases in turbidity, the threat of construction-related hazardous materials entering a waterbody, and/or disturbance from a variety of construction-related activities (including embankment construction, material placement, filling, etc.).

The new trail will be a paved, impervious surface, which will increase runoff and erosion to adjacent soils. Long-term use of the trail will increase pedestrian and bicycle traffic. Increased human use into an area could potentially result in increased harassment or stress to listed species over the long-term.

Long-term, the bridges at segments 3.1, 6.1, 7.2, 7.4, 7.6 and 7.8 will cause shading over the water, which will have the minor benefit of providing protection from avian predators. Conversely, the bridges will also increase access to humans for fishing or other activities that could potentially result in a take to listed fish.

After the trail is built, the added impervious surface will increase stormwater runoff and erosion that will drain to open ditches, which along the Route 101 corridor, will eventually flow into the sloughs as they currently do. This runoff may also be a slightly warmer temperature than would be if this water was allowed to infiltrate into the ground first.

## 5.3 Cumulative Effects

Cumulative effects are those combined effects from all public or private, past, present, and reasonably foreseeable future projects that occur in the vicinity of the Rail with Trail Connectivity project.

- Caltrans is expected to replace their Route 101 bridge over Jacoby Creek at segment 7.4. This bridge replacement will include space for the pedestrian trail.
- Chevron dredging planned for 2011 of the deep water channel Humboldt Bay (Chevron, 2009).
- Restoration project is proposed for the Jacoby Creek area (S. Kramer, FWS, pers. com., June 2010).
- U.S. Army Corps of Engineers periodic dredging of harbor mouth
- [Chevron dredge, planned for 2011. Last event was 03 or 04](#)

- Jacoby Creek lower drainage restoration/improvements by City of Arcata—approved and currently being implemented
- McDaniel Slough, City of Arcata restoration project currently under way

Martin Slough, planned by RCAA, proposed restoration for 2011, removal of tide gate, regarding of banks, revege. Will be doing a BA (WK will) beginning in August

#### **5.4 Mitigation and Conservation Measures**

Mitigation and conservation measures are intended to minimize or avoid environmental impacts to listed species or critical habitat. Various divisions and departments of the state and federal government may agree upon additional conservation measures. These agreements are not contractually binding, but may be made a condition of the resulting Letter of Concurrence or Biological Opinion.

##### **Avoidance and Minimization**

During alternative selection for the project, the trail alignment was rerouted outside the forested areas of Shay Park to avoid and minimize removal of trees in the riparian habitat.

All construction in or near waterways will be performed during the recommended in-water work period of July 1 to August 30 (M. van Hattem, CDFG, pers. com., June 2010).

Protection of fish by isolating them during construction is a primary mitigation. The ditch in Segment 7.7 will be partially filled in during construction; therefore, this segment will be examined by a fisheries biologist prior to construction and any fish present will be secured with a fike net and or seine and excluded from the water column during construction.

Listed plants were not found in the project area during the field surveys; however, they may occur in the areas that would be disturbed during construction and may not have been seen because it was past the flowering season. To err on the side of caution, it would be important to conduct a botanical field review just prior to project construction. If any of the listed plants are found, the plant community would be flagged in the field. Then to protect any sensitive plants during construction if the community is so broad that it cannot be avoided, the applicant will place protective pads or rubber sheets on top of the stands of Lyngbye's sedge where equipment access is required. This mitigative action would prevent the equipment tracks/wheels from rutting and compressing the soil and uprooting or destroying the sedges.

Other conservation measures and best management practices for the construction activities in or near the waterways, sloughs and ditches are described as part of the project description in Section 5.0 of Attachment A. Based on the project description, precautionary measures incorporated into the project design and with the proposed conservation measures, the project is not likely to adversely affect listed endangered threatened or sensitive species or their habitat.

## 6.0 DETERMINATIONS OF EFFECT

### 6.1 Species Determinations

The Arcata Rail with Trail Connectivity project will have “**No Effect**” on the following species, which are not believed to occur in the project area:

- Western lily
- Beach layia
- Short-tailed albatross
- Xantus's murrelet (Candidate)
- Fisher (Candidate)

The project “**May Affect, Not Likely to Adversely Affect**” the following species. Concurrence is requested for these findings.

- Green sturgeon (southern DPS)
- Tidewater goby
- Coho salmon (southern Oregon/northern California)
- Steelhead (northern California)
- Chinook salmon (California coastal)
- Eulachon (southern DPS)
- Western snowy plover
- Marbled murrelet
- Western yellow-billed cuckoo
- Northern spotted owl

The project “**May Affect, Likely to Adversely Affect**” the following species. Concurrence is requested for these findings.

Tidewater goby

### 6.2 Critical Habitat Determinations

The project will have “**No Effect**” on Critical Habitat for the following species:

- Marbled murrelet
- Western snowy plover
- Northern spotted owl

The project “**May Affect, Not Likely to Adversely Affect**” Critical Habitat for the following species. Concurrence is requested for these findings.

- Green sturgeon (southern DPS)
- Tidewater goby

Coho salmon (Southern Oregon/Northern California ESU)  
Steelhead (northern California ESU)  
Chinook salmon (California coastal ESU)

## 7.0 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act mandates inter-agency cooperation in achieving protection, conservation, and enhancement of Essential Fish Habitat (EFH). EFH designations serve to highlight the importance of habitat conservation for sustainable fisheries and sustaining valuable fish populations. EFH relates directly to the physical fish habitat and indirectly to factors that contribute to degradation of this habitat. Important features of marine EFH that deserve attention are adequate water quality, temperature, food source, water depth, and cover/marine vegetation. EFH has been designated for adult and juvenile coho and chinook under the Act. EFH for coast groundfish and pelagic species also exists throughout the marine environment.

Numerous studies have demonstrated that land use activities associated with road construction and urban development have significantly altered the quality and quantity of salmonid habitat. Impacts of concern associated with these activities include alteration of stream bank and channel morphology, alteration of stream water temperatures, alteration of the magnitude and timing of annual stream flow patterns, elimination of spawning and rearing habitat, fragmentation of available habitats, elimination of downstream recruitment of spawning gravels and large woody debris, removal of riparian vegetation resulting in increased erosion, and degradation of water quality.

Freshwater spawning habitat requirements and rearing are very similar for steelhead and coho. Steelhead depend on an abundance of cool (4.4° C to 12.8° C) and well oxygenated water with spawning occurring in suitable gravels ranging from 6 to 100 mm. Breeding locations typically occur in streambed gravels just upstream from riffles. In addition to physical streambed requirements for spawning, salmonids require an adequate food supply for growth and survival of young fish. The aquatic insects that serve as the major sources of food inhabit the part of the streambed that requires a perennial flow of cool, highly oxygenated water. Overhanging vegetation is also a source of food. No spawning or breeding habitats exist at the project site for the coho or other salmonids due to the saltwater nature of the site.

Requirements for estuarine and oceanic juvenile chinook salmon include well-oxygenated water (lethal at <2mg/L) with temperatures of 0-26° Celsius (optimum of 12-14° C). Juveniles prefer water column depth of 30 to 80 meters. Requirements for adult chinook salmon include well-oxygenated (>5 mg/L) water with temperatures of 0-16° Celsius (optimum of <14° C). Mature chinook reside for the most part at depths greater than 30 meters, based on commercial fishery trolling Requirements for marine juvenile coho salmon include well-oxygenated (>5 mg/L) water with temperatures of less than 15° Celsius. Juveniles prefer water column depth of less than 10 meters. Some of the waterways the trail will be crossing contain habitat that will be used for fish migration.

Riparian vegetation is an important habitat feature because it serves to stabilize banks (which reduces sedimentation), provide shade (which helps to maintain cool water), and provide a

source of food (falling invertebrates). The waterway crossings along segment 7 are between the railroad ROW and Route 101, which are routinely kept clear of large, shade-producing riparian vegetation.

Important features of marine EFH that deserve attention are adequate water quality, temperature, food source, water depth, and cover/marine vegetation, all for purposes of fish migration and juvenile rearing habitat. Driving piles into the substrate below MHT can produce a suspended sediment plume that remains for varying durations of time. Resultant reduction in photosynthesis could indirectly affect EFH productivity. The reduced photosynthesis could result in a disruption to food source and feeding habits for fish that utilize the EFH. Turbidity issues would be addressed by securing a Water Quality Certification from RWQCB (pending) and with the BMPs prescribed in this document. No significant impacts to water quality (including temperature), food sources, water depths, or vegetation (riparian or marine) are expected to occur as a result of the proposed project. No effects on fish abundance, health, or long-term sustainability of groundfish, pelagics, or salmon fisheries are expected to result from the proposed bridge and trail construction activities.

## 8.0 LITERATURE CITED

Barnhart, R. A., M. J. Boyd, and J. E. Pequegnat, 1992. *The ecology of Humboldt Bay, California: An estuarine profile*. U.S. Fish and Wildlife Service Biol. Rep. No. 1.

Brown, R.S., T.J. Carlson, A.E. Welch, J.R. Stephenson, C.S. Abernathy, C.A. McKinstry and M. H. Theriault, 2007. *Assessment of Barotrauma Resulting from Rapid Decompression of Depth-Acclimated Juvenile Chinook Salmon Bearing Radio Telemetry Transmitters*. Prepared for the U.S. Army Corps of Engineers USDOE Contract DE-AC05-76RLO1830 Pacific Northwest National Laboratory

California Native Plant Society (CNPS), 2010. *Inventory of Rare and Endangered Plants* (online edition, v7-10a). Sacramento, CA. Arcata North and South Quadrangles. Accessed April 1, 2010 from <http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi/BrowseAZ?name=quad>.

Chevron, 2009. *Biological Assessment for the Longfin Smelt: Maintenance Dredging, Chevron Eureka terminal*. Eureka, California. Chevron Products Company. December, 2009.

Deng, X., 2000. *Artificial reproduction and early life stages of the green sturgeon (Acipenser medirostris)*. Unpubl. PhD thesis. University of California, Davis.

Drake, J., R. Emmet, K. Fresh, R. Gustofson, M. Rowse, D. Teel, M. Wilson, P. Adams, E. Spangler, and R. Spangler, 2010. *Status Review Update for Eulachon in Washington, Oregon, and California*. Eulachon Biological Review Team, January 20, 2010.

Eldridge, M. B., and C. F. Bryan, 1972. *Larval fish survey of Humboldt Bay, California*. U.S. Dept. Commer., NOAA Tech. Rep. NMFS-SSRF-665.

Gilroy, M., 2005. *Stream Channel Dewatering and Fish Relocation Monitoring Datasheet for Rocky Gulch/Creek*. Aug 23 – Oct 16, 2005. U.S. Fish & Wildlife Service, Arcata.

Gilroy, M., 2007. *Tidewater Goby Survey Field Note for Lake Earl/Tolowa, Klopp Lake, McDaniel Slough, Hwy 101 ditch, Jacoby Creek*. U.S. Fish & Wildlife Service, Arcata. June 15, 2007.

Goldsmith, M., 2006. *Gannon Slough Initial Data Summary Report: Survey for the Tidewater Goby (Eucyclogobius newberryi) and Monitoring of Outflow Velocity*. U.S. Fish and Wildlife Service, Arcata Office. May 15, 2006.

Good, T.P., R.S. Waples, and P. Adams (editors), 2005. *Updated status of federally listed ESUs of West Coast salmon and steelhead*. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-66, 598 p.

Healey, M.C., 1991. *Life History of Chinook Salmon (Oncorhynchus tshawytscha)*. In: *Pacific Salmon Life Histories* (Ed. by Groot, C. & Margolis, L.). UBC Press. Vancouver, BC. pp. 311-393.

Jennings, M. R., 1996. *Past occurrence of eulachon, Thaleichthys pacificus, in streams tributary to Humboldt Bay, California*. Calif. Fish Game 82(6):147–148.

Moyle, P. B., 2002. *Inland fishes of California*. Univ. California Press, Berkeley.

Field Code Changed

Nakamoto, R. J., T. T. Kisanuki, and G. H. Goldsmith, 1995. *Age and growth of Klamath River green sturgeon (Acipenser medirostris)*. U.S. Fish and Wildlife Service, Project #93-FP-13. 20p.

NMFS (National Marine Fisheries Service), 1996. *Making endangered species act determinations of effect for individual or grouped actions at the watershed scale*. NMFS, Environmental and Technical Services Division, Habitat Conservation Branch.

NMFS, 2005. *Green sturgeon (Acipenser medirostris) status review update*. Biological Review Team, Santa Cruz Laboratory, Southwest Fisheries Science Center.

NMFS, 2007. *Federal Recovery Outline for the Evolutionarily Significant Unit of California Coastal Chinook Salmon*. Prepared by the National Marine Fisheries Service, Southwest Regional Office.

NMFS, 2009. National Oceanic and Atmospheric Administration (NOAA). *Endangered and Threatened Wildlife and Plants: Final Rulemaking To Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon; Final Rule*. 52300 - Federal Register, Vol. 74, No. 175. October 9, 2009.

NOAA Fisheries. 2005. Endangered and threatened species: Designation of Critical Habitat for seven evolutionarily significant units of Pacific salmon and steelhead in California; Final rule. Federal Register 70: 52847-52627.

NatureServe, 2009. *NatureServe Explorer: An online encyclopedia of life* [web application]. Version 7.1. NatureServe, Arlington, Virginia. Accessed April, 2010 from <http://www.natureserve.org/explorer>.

Field Code Changed

Pacific Gas and Electric Company (PGE), 2005. *Biological Assessment for the Pacific Gas and Electric Company G/L 137B Gannon Slough Erosion Control Project, Humboldt County*. Prepared in Chico, California.

Pinnix, B., 2010. "Green Sturgeon Monitoring in Humboldt Bay." Presented at the Humboldt Bay Symposium, April 23, 2010. Eureka, CA.

Shaffer, H. B., G. M. Fellers, S. R. Voss, C. Oliver, and G. B. Paul, 2004. *Species boundaries, phylogeography and conservation genetics of the red-legged frog (Rana aurora/draytonii) complex*. Molecular Ecology 13:2667-2677.

US Fish and Wildlife Service (FWS), 1997. *Recovery Plan for the Threatened Marbled Murrelet in Washington, Oregon, and California*. Portland, OR.

FWS, 2002. *Recovery Plan for the California Red-legged Frog (Rana aurora draytonii)*. Portland, Oregon. viii + 173 pp. [http://ecos.fws.gov/docs/recovery\\_plan/020528.pdf](http://ecos.fws.gov/docs/recovery_plan/020528.pdf)

Field Code Changed

FWS, 2006. *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California, July 26, 2006*. Arcata Fish and Wildlife Office.

FWS, 2008. *Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Tidewater Goby (Eucyclogobius newberryi); Final Rule*. 5920 - Federal Register, Vol. 73, No. 21. January 31, 2008.

FWS, 2008b. *Short-Tailed Albatross Recovery Plan*. Anchorage, AK, 105 pp.

<http://endangered.fws.gov/recovery/Index.html#plans>

Field Code Changed

FWS, 2008c. *Final Recovery Plan for the Northern Spotted Owl*. Portland, OR. xii + 142 pp.

<http://www.fws.gov/pacific/ecoservices/endangered/recovery/NSORecoveryPlanning.htm>

Field Code Changed

FWS, 2007. *Recovery Plan for the Pacific Coast Population of the Western Snowy Plover*.

California/Nevada Operations Office. Sacramento, CA.

FWS, 2010a. Listed/Proposed Threatened and Endangered Species for the Arcata North  
(Document number: 447951613-112238) and Arcata South (Document number: 447951613-  
112051) Quads. Reviewed on: April 12, 2010 (expires: October 8, 2010).

<http://www.fws.gov/arcata/specieslist/search.asp>

Field Code Changed

FWS, 2010b. Plant and Animal Species Information. Arcata Fish and Wildlife Office,  
Endangered Species Program. Accessed April, 2010 from

<http://www.fws.gov/arcata/es/listedspecies.html>

Field Code Changed

Wallace, M., 2007. *Field Note, Rocky Gulch, Thence Humboldt Bay*. Feb-Jul 2007. U.S. Fish &  
Wildlife Service, Arcata.

Wallace, M., 2010. "Juvenile Coho Salmon use of the Tidal Portions of Humboldt Bay  
Tributaries." Presented at the Humboldt Bay Symposium, April 23, 2010. Eureka, CA.

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