
BANDWIDTH IG

# National Marine Fisheries Service Biological and Essential Fish Habitat Assessment

San Francisco Bay Fiber Optic Cables Project

January 2023

Project No.: 0623691

*The business of sustainability*

ERM

**Signature Page**

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# National Marine Fisheries Service Biological and Essential Fish Habitat Assessment

## San Francisco Bay Fiber Optic Cables Project

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## Acronyms and Abbreviations

| Name | Description |
|---|---|
| § | Section |
| APN | assessor's parcel number |
| BA | biological assessment |
| BIG | Bandwidth IG, LLC |
| CFR | Code of Federal Regulations |
| dB | decibel |
| DPS | Distinct Population Segments |
| EFH | Essential Fish Habitat |
| ESA | Endangered Species Act |
| ESU | Evolutionarily Significant Unit |
| FMP | Fishery Management Plan |

| | |
|---|---|
| FR | Federal Register |
| HAPC | Habitat Areas of Particular Concern |
| HDD | horizontal directional drilling |
| LiDAR | light detection and ranging |
| LV | landing vault |
| Magnuson-Stevens Act | Magnuson-Stevens Fishery Conservation and Management Act |
| MMPA | Marine Mammal Protection Act |
| MPA | Marine Protected Areas |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| OHWM | ordinary high water mark |
| PAD-US | Protected Areas Database-United States |
| PFMC | Pacific Fishery Management Council |
| PLGR | pre-lay grapnel run |
| PTS | permanent threshold shifts |
| re 1 µPa | referenced to a pressure of 1 microPascal |
| ROV | remotely operated vehicle |
| SF Bay | San Francisco Bay |
| SPL | sound pressure level |
| TTS | temporary threshold shifts |
| USACE | United States Army Corps of Engineers |

# EXECUTIVE SUMMARY

Bandwidth IG, LLC, is proposing the installation of the San Francisco Bay (SF Bay) Fiber Optic Cables Project (Project), a pair of parallel subsea fiber optic cables crossing SF Bay between Brisbane, California, and San Leandro, California. The proposed Project would add a direct telecommunication link across SF Bay, increase telecommunications reliability, increase the diversity of telecommunication pathways, increase data transmission capacity and speeds to satisfy growing demands, and respond to increasing demand for connectivity.

This biological assessment has been prepared to facilitate consultation between the U.S. Army Corps of Engineers (USACE) and the National Marine Fisheries Service under Section 7 of the Endangered Species Act and includes an Essential Fish Habitat (EFH) Assessment to fulfill the requirements of Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act. This biological assessment analyzes the potential impacts on federally listed species and their critical habitats under National Marine Fisheries Service jurisdiction that are anticipated to result from the installation of the Project. Project effects on federally listed species and/or their critical habitats under United States Fish and Wildlife Service jurisdiction are analyzed in a separate biological assessment.

The Project proposes to install two cables parallel and in close proximity to one another from Brisbane to San Leandro across SF Bay with associated infrastructure on land above the ordinary high water mark. An approximately 66-foot by 66-foot (20-meter by 20-meter) area would be used for the following key Project components:

- Cable Landing Sites: Each cable landing site would be used as a staging area to park vehicles and store construction-related equipment for both terrestrial and marine work, as well as to perform horizontal directional drilling (HDD) to install the steel conduits.
- Landing Vaults: A single landing vault (12 feet long, 9 feet wide, and 10 feet deep [3.7 meters long, 2.7 meters wide, and 3 meters deep]) would be installed at each landing site and buried with a cast-iron vault cover (36 inches [91 centimeters] in diameter) at grade level, meaning flush with the ground. The landing vaults would provide access to the cables and steel conduits for maintenance activities. There are no aboveground structures associated with the Project.
- Western Steel Conduit: On the western side, a single 12-inch (30-centimeter) steel conduit containing two sub-ducts would be installed using HDD from an entry pit (where the landing vault would eventually be installed) and would exit within the SF Bay marine environment. This steel conduit would be between 1,300 and 2,600 feet (396 to 792 meters) long, depending on the installation method and final pipeline crossing agreement. The western steel conduit would be installed seaward of the landing vault at a minimum depth between 6.5 and 66 feet (2 and 20 meters) under the cable landing site and shoreline using the HDD construction method.
- Eastern Steel Conduits: On the eastern side, a single 12-inch (30-centimeter) steel conduit containing two sub-ducts would be installed from an entry pit, also exiting into the SF Bay. The steel conduit would be approximately 200 feet (60 meters) long. The eastern steel conduit would be installed seaward of the landing vault at a minimum depth of 6.5 feet (2 meters) under the cable landing site and shoreline using the HDD construction method.
- Fiber Optic Cables: A cable-lay vessel and jetting sled (with the help of two anchor-lay vessels) would install the cables across the majority of SF Bay. A jetting sled is a burial tool that would be deployed by the cable-lay vessel. Close to the steel conduit HDD exit points, the cables would be installed via divers (with a dive support boat) with hand-jetting techniques. Each cable would then be pulled through its own individual steel conduit (or sub-ducts on the western side) to the landing vault at each cable landing site. Following installation of the cables, the steel conduits on the eastern side

would be buried by divers with hand jetting to prevent exposure and protect the pipes and cables during low tide.

It was determined that the proposed installation of two subsea fiber optic cables crossing SF Bay **may temporarily affect, but is not likely to adversely affect** 10 federally listed species under National Marine Fisheries Service jurisdiction or species under consideration for listing: California sea lion (*Zalophus californianus*), common bottlenose dolphin (*Tursiops truncatus*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), coho salmon (Central California Coast Evolutionarily Significant Unit; *Oncorhynchus kisutch*), green sturgeon (Southern Distinct Population Segment; *Acipenser medirostris*), Pacific herring (*Clupea pallasii*), and steelhead (Central California Coast Distinct Population Segment; *Oncorhynchus mykiss irideus* pop. 8), and critical habitat for green sturgeon and steelhead. Critical habitat for green sturgeon is located throughout SF Bay, including the marine Project area, while drainages entering southern SF Bay are critical habitat for steelhead. Potential impacts on these species and critical habitat include temporary displacement to other foraging grounds or avoidance of the areas of active cable installation due to increases in noise and human activity in the action area. However, due to the temporary nature of the installation activities, permanent direct impacts on suitable habitat or critical habitat for these species is not anticipated.

In addition to critical habitat present along the marine cable route, the marine Project area and all other portions of SF Bay are also EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon. As stated for critical habitat, the impacts on EFH due to the Project **may temporarily affect, but is not likely to adversely affect** EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon.

Implementation of the mitigation measures is expected to decrease any potential impacts on federally listed species, critical habitat, and EFH.

# 1. INTRODUCTION

Bandwidth IG, LLC (BIG) is proposing the installation of the San Francisco Bay (SF Bay) Fiber Optic Cables Project (Project), two subsea fiber optic telecommunication cables crossing SF Bay between San Leandro, California and Brisbane, California (Figure 1-1). The proposed installation of the dual subsea cable system will enhance telecommunication capacity throughout the greater SF Bay Area and connected regions by:

- Adding a direct telecommunication link across SF Bay.
- Increasing telecommunications reliability.
- Increasing diversity of telecommunication pathways.
- Increasing data transmission capacity and speeds to satisfy growing demands.
- Responding to increasing demand for connectivity.

Details of the activities required to install the Project are provided in Section 1.5, Project Description. Briefly, two subsea cables are planned to be buried parallel and in close proximity to each other along the seafloor of SF Bay via a cable-lay vessel and jetting plow. Horizontal directional drilling (HDD) would occur at both landing sites in order to install steel conduits through which the cables will be pulled. Once drilling is complete, landing vaults (LVs) would be installed into the boreholes and the cables will be pulled into the steel conduits and LVs.

Aquatic construction activities are limited to the installation of the steel conduits from the ordinary high water mark (OHWM) to the HDD exit points in SF Bay on both the Brisbane and San Leandro sides and the installation and burial of the two parallel submarine fiber optic cables across SF Bay from the western HDD exit point at Brisbane to the eastern HDD exit point in San Leandro. Terrestrial construction activities are limited to excavation of the HDD entry pits and boreholes, installation of steel conduits via HDD from the boreholes to the OHWM, installation of the LVs into the HDD borehole following completion of the HDD activities, and pulling the cables from the HDD exit points into the steel conduits into the LVs.

The activities included in this biological assessment (BA) are currently estimated to be completed within an approximately 3- to 4-month period.

## 1.1 Purpose of the Biological Assessment

The purpose of this BA is to provide technical information and to review the Project in sufficient detail to determine to what extent federally threatened, endangered, or candidate species and/or their critical habitats may be affected. This BA has been prepared in accordance with the legal requirements found in Section 7(a)(2) of the Endangered Species Act (ESA) (Code of Federal Regulations, Title 50, Part 402 [50 CFR Part 402]; United States Code, Title 16, Section 1536 (c) [16 U.S.C. § 1536 (c)]) and with USACE regulation, policy, and guidance. In addition to compliance with provisions of the ESA, Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal agencies to consult with National Marine Fisheries Service (NMFS) regarding any action or proposed action that may adversely affect Essential Fish Habitat (EFH) for federally managed fish species. As such, this BA will also address potential effects of the proposed Project on EFH.

This document presents technical information upon which later decisions regarding Project impacts are developed, and is intended to support USACE's consultation with NMFS for impacts on Clean Water Act Section 404 and Rivers and Harbors Act Section 10 jurisdictional features.


**Figure 1-1**
**Marine Route of the Cable Across San Francisco Bay**

**Figure 1-1. Marine Route of the Cables Across San Francisco Bay**

## 1.2 Definitions

Definitions of key terms used throughout this BA are provided here:

- *Action area*: Area directly or indirectly affected by the proposed Project. A full description of the action area is provided in Section 1.4, Action Area.
- *Project area*: Area where proposed construction will occur, including cable installation route, HDD boreholes, and the cable landing sites with staging, access, and work areas.
- *Project vicinity*: All land within 5 miles (8 kilometers) of the study area boundary.
- *Proposed Project*: The installation and burial of two subsea fiber optic cables, the excavation of one borehole at the western landing site and up to four bore holes at the eastern landing site, HDD installation of one steel conduit containing two sub-ducts at the western landing site and up to four steel conduits at the eastern landing site, the installation of one LV into each borehole at the two landing sites, and the pulling of the two cables into the two LVs. Synonymous with “Project.”
- *Study area*: The proposed Project area plus adjacent open water areas.

## 1.3 Project Location

The Project is located in SF Bay, California and is limited to the installation and burial of two parallel submarine fiber optic cables from the western landing site in Brisbane to the eastern landing site in San Leandro.

The primary western cable landing site would be at the southern corner of Lagoon Road and Sierra Point Parkway in Brisbane, in an unoccupied area with assessor’s parcel number (APN) 005-162-430, at approximate coordinates of 37°41’22.09” N and 122°23’30.59” W. Due to the complexities of local utilities, road infrastructure, and geologic conditions at the western cable landing site, there are currently three alternative landing sites (four in total, Figure 1-2):

- West Landing Alternative 1 is at approximate coordinates of 37°41’19.42” N and 122°23’30.15” W, located 270 feet due south of the southern corner of Lagoon Road and Sierra Point Parkway in Brisbane. This alternative is also on an unoccupied area within APN 005-162-430.
- West Landing Alternative 2 is at approximate coordinates of 37°41’19.55” N and 122°23’27.62” W, located on a narrow parcel of land, within the Highway 101 right-of-way, between the Bayshore Freeway and Sierra Point Parkway in Brisbane.
- West Landing Alternative 3 is at coordinates 37°41'15.11" N and 122°23'26.23" W, located on a narrow parcel of land in between Highway 101 and Sierra Point Parkway in Brisbane.

The eastern cable landing site, located on the eastern side of SF Bay in San Leandro, is along the Bay Trail at approximate coordinates of 37°41’14.48” N and 122°10’50.82” W, west of the Tony Lema Golf Course and south of the Marina Dog Park within an unoccupied area within APN 080G-0910-001-06. An approximately 0.1-acre (400-square-meter) area would be used (Figure 1-3).

From the landing sites, the steel conduits would be installed via HDD boreholes to the HDD exit points in SF Bay. On the western side, a single 12-inch (30-centimeter) diameter steel conduit, with two sub-ducts, would be installed from an entry pit for both cables to be pulled through. The western steel conduit would be between 1,300 and 2,600 feet (396 and 792 meters) long, depending on the installation method and final pipeline crossing agreement, with the marine portion of pipe (from OHWM to HDD exit point) between approximately 900 feet and 2,200 feet (274 to 671 meters) in 5 feet (1.5 meters) water depth. The western steel conduit would be installed seaward of the landing vault at a minimum depth between 6.5 and 66 feet (2 and 20 meters) under the cable landing site, Bayshore Freeway (U.S. Highway 101),

shoreline, and a portion of the bay. On the eastern side, a single 12-inch (30-centimeter) diameter steel conduit, with two sub-ducts, would be installed from the entry pit for both cables to be pulled through. The eastern steel conduit would be installed seaward of the landing vault at a minimum depth of 6.5 feet (2 meters) under the cable landing site, shoreline, and portion of the bay. The marine portion of the steel conduit would extend approximately 25 feet (8 meters) into the bay, which can have a water depth of 0 foot (0 meter) at mean lower low water. The steel conduits on both sides of SF Bay would remain buried during installation and operation and would only be exposed to pull the cables into the steel conduits.

A marine geophysical survey of the cable route was conducted in summer 2022 (A2Sea 2022). The survey used hull-mounted multibeam echosounder and LiDAR to collect bathymetry (bay floor topography), a magnetometer, a sub-bottom profiler, grab samples, and core samples. These tools determined the bay floor make-up, which consisted of clay, clay with shells, clay with sand, sandy clay with shells, and clayey sand with shells. This information assists with the final proposed cable alignment of each of the cables to offer the best burial success. The cables would be installed in soft-bottom substrates. No hard substrate was identified in the route survey (A2Sea 2022). Additional features along the route include the following:

- **Anchorage 9:** A portion of the cable route passes through an anchorage area, referred to as “Anchorage 9,” which cannot be avoided (Figure 1-1). However, San Francisco Bar Pilots, licensed by the United States Coast Guard, confirmed that they do not anchor ships that far south, as it gets too shallow for their purposes. No vessel would be allowed to anchor in this zone except in case of emergency. Since it is expected the SF Bay cables would be charted, pilots confirmed that vessels would be able to avoid the cables.
- **Dredged Channel:** The geophysical survey identified a dredged section of SF Bay 3,064 feet (934 meters) wide and between 15.4 and 23.3 feet (4.7 and 7.1 meters) deep (A2Sea 2022). There are no records of dredging activities within this identified area within the past 10 years and this is not a USACE-designated channel. Therefore, it is assumed that this is a historical dredge channel and is not maintained. The cables would be buried across this section of the route.
- **Pipeline Crossings:** The Project would cross three pipelines in the marine environment: two Kinder Morgan pipelines close to the western shore and an abandoned Shell pipeline close to the western shore (A2Sea 2022). The Kinder Morgan pipelines would either be crossed under by the HDD steel conduit or crossed above by the fiber optic cables. If the cables are laid above the Kinder Morgan pipelines, they will likely need to be protected using concrete mattressing (or Uraduct), which are flexible strips of concrete laid over the pipeline and cables to protect them. The concrete mattressing would be approximately 20 feet long and 9 feet wide (6 meters long and 2.7 meters wide). The cables would be installed above the abandoned Shell pipeline and would likely also be protected with concrete mattressing or Uraduct or similar product. The final methodology for crossing the pipelines would be dependent upon agreement and approvals given by the pipeline owners.


**Figure 1-2**
**Western Landing Site**

**Figure 1-2. Western Cable Landing Site**


**Figure 1-3. Eastern Cable Landing Site**

## 1.4 Action Area

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.” For the purposes of this BA, the action area was defined by analyzing the potential extent of effects of the proposed Project in the context of existing infrastructure, habitat suitability, and species sensitivity to human-caused disturbance (e.g., noise levels).

The action area for this BA includes the marine portions of the Project footprint, which is the fiber optic cable route from the OHWM on the western side of SF Bay to the OHWM on the eastern side. In addition to the Project footprint, the action area includes buffers off the Project alignment to account for indirect effects on special-status species (Figure 1-4). The buffers for portions of the Project above the OHWM and below the OHWM are 500 feet (153 meters) and 1.62 nautical miles (3 kilometers), respectively. Indirect effects on species using habitats above the OHWM could include noise, light, dust, and a general increase in human-related disturbance during construction and extend out to 500 feet (153 meters) beyond the Project footprint. The 1.62-nautical-mile (3-kilometer) buffer was chosen to encompass indirect effects on marine species that could result from vessel noise and movement.

## 1.5 Project Description

### *1.5.1 Horizontal Directional Drilling*

The HDD will involve four steps: landing site set-up, entry pit excavation, HDD and steel conduit installation, and LV installation. It is estimated that these steps would take approximately 6 weeks for the western cable landing site and 3 weeks for the eastern landing site. These steps are described in more detail below.

#### *1.5.1.1 Landing Site Set-up*

The cable landing sites would be occupied from approximately 2 weeks before starting construction or installation work until approximately 2 weeks after construction or installation work ends. Equipment and materials such as backhoes, steel conduit, and HDD drilling equipment needed to install the terrestrial portions of the Project would be brought to the cable landing sites, operated from there, and stored there (Figure 1-5).

#### *1.5.1.2 Entry Pit Excavation*

At each landing site, an entry pit for the bore hole and steel conduits would be excavated, with the soil placed at another location in the cable landing site and covered. Each entry pit would measure approximately 15 feet long, 10 feet wide, and 10 feet deep (4.6 meters long, 3 meters wide, and 3 meters deep), and would be excavated in line with the HDD rig to initiate the pilot hole. The purpose of the entry pit is to capture and contain the returning drilling fluid. A slurry sump pump would be set in place next to the entry pit to pump out the returning fluid to the recycling unit for further treatment, adjustment, and reuse.

A containment pit would be used to capture the material that would be removed from the hole being drilled. This containment pit (not in the water table) would be about 4 feet (1.2 meters) deep and contain only inert materials. As the pit fills with material, the material would be loaded into a dump truck, removed from the site, and disposed of offsite per industry standards.

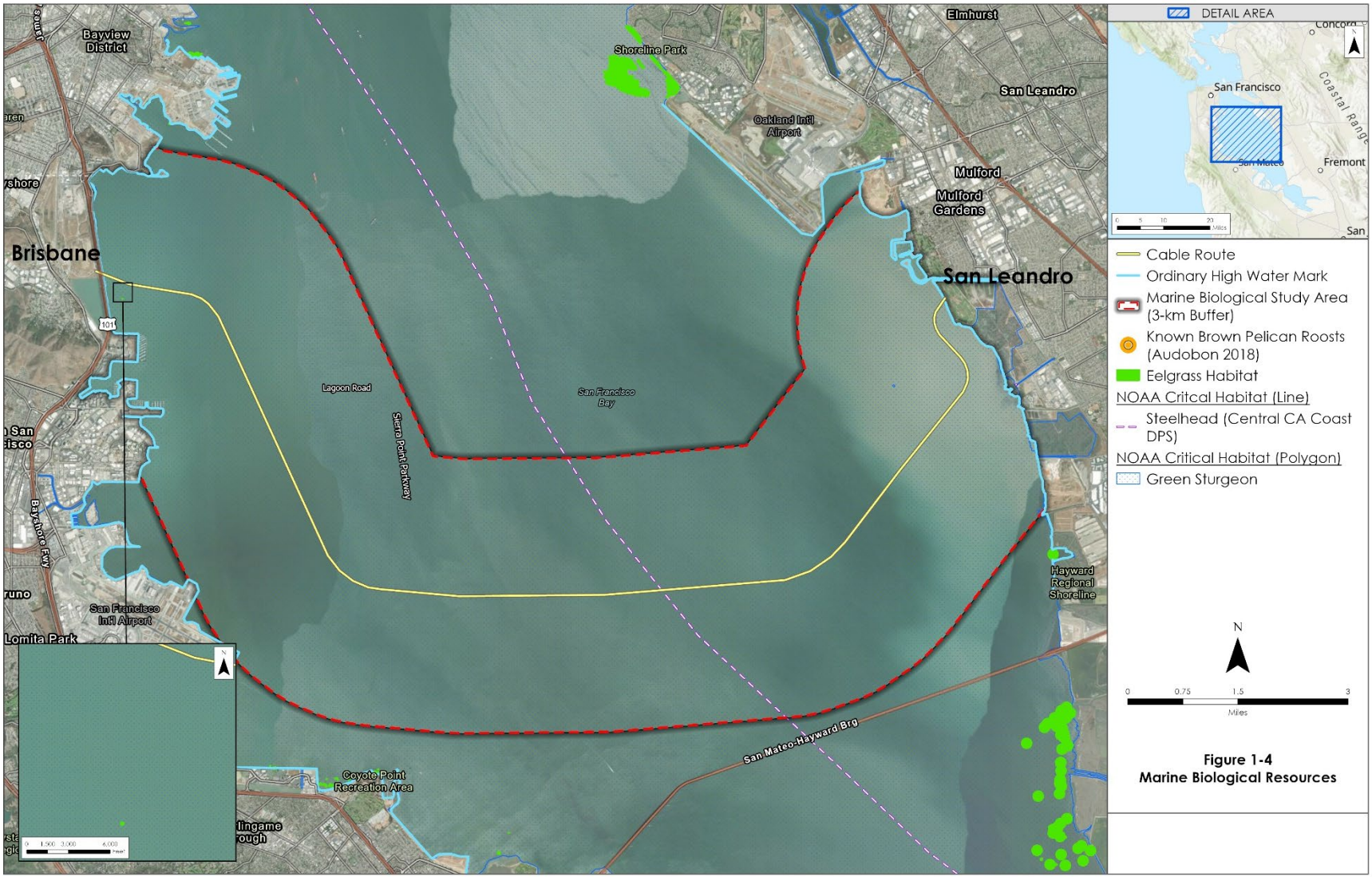


**Figure 1-4. Marine Biological Resources and Marine Biological Study Area**

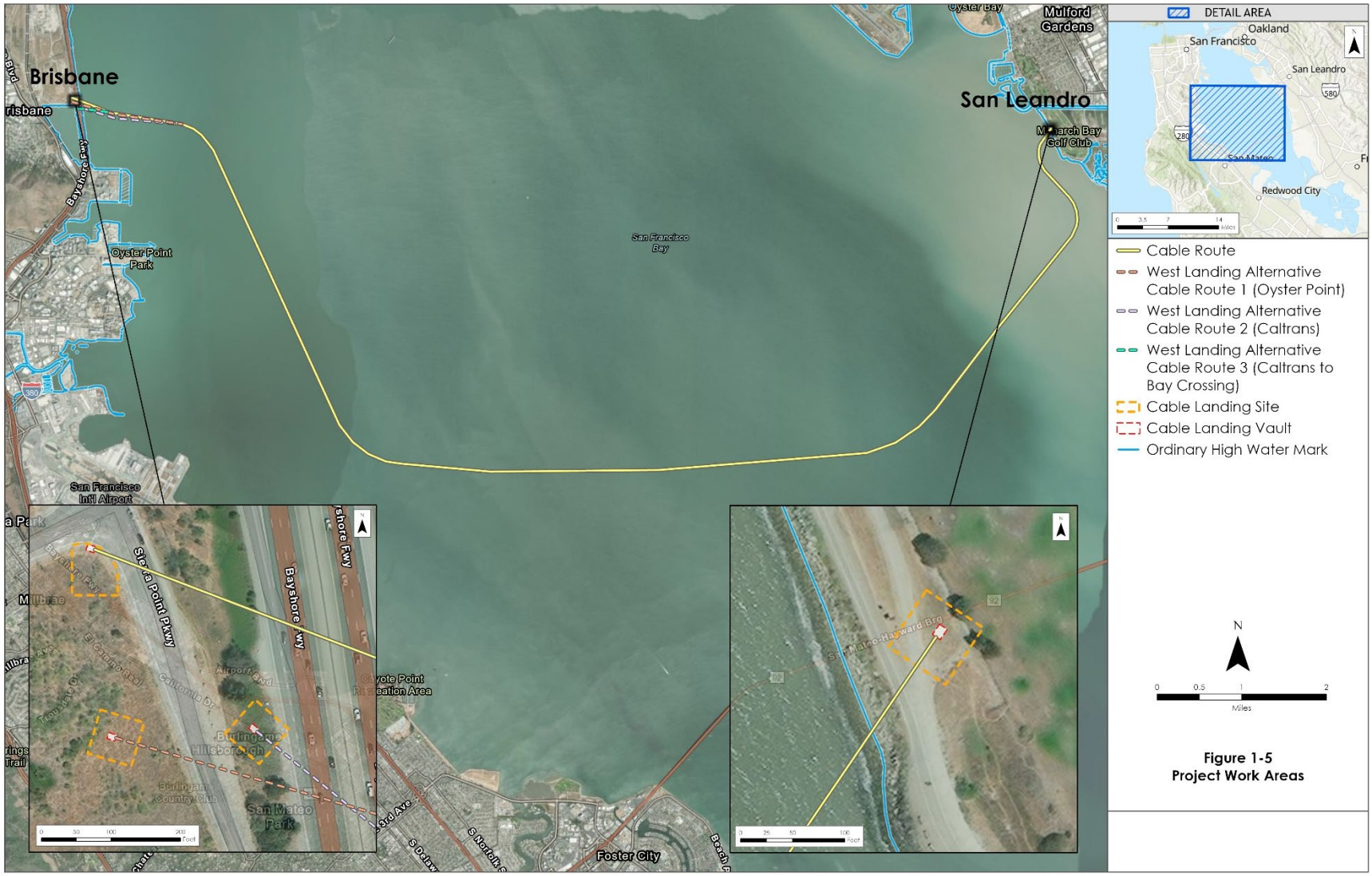


**Figure 1-5. Project Work Areas**

### 1.5.1.3 Horizontal Directional Drilling and Steel Conduits Installation

Prior to drilling activities, temporary tracking wire would be installed between the entry point on shore and the steel conduit exit points, as possible, to help guide the HDD installation. The wire would not be installed across roadways, including Highway 101. The marine portion of the tracking wire would be anchored by 18 to 22 concrete eco-blocks. The installation of the eco-blocks and tracking wire would take place simultaneously as the potholing and drilling equipment are being rigged up in the cable landing sites. The dimensions of each eco-block are 2 feet by 2 feet by 2 feet (0.6 by 0.6 by 0.6 meter). Two anchor support vessels would place the eco-blocks on the seafloor along the tracking wire's alignment. The eco-blocks would be attached to a galvanized cable and buoy ball and would be spaced approximately 300 feet (91.4 meters) apart, avoiding the Kinder Morgan pipeline identified along the cable route. The tracking wire would be strung using a dive boat and dive crew and would be strung from the entry point on shore, through the eco-blocks, around and back to the shore, approximately 10,000 feet (3,048 meters) on the western side and approximately 400 feet (122 meters) on the eastern side.

Following excavation of the entry pit, the steel conduits would be installed via HDD from the landing sites to the HDD exit points in SF Bay. The steel conduit would be advanced in 30-foot sections through the bore hole as it is created. The HDD machine would occupy the bore entry site, drilling steel casing into the ground at an angle. Once the steel conduit reaches the desired depth, the direction would level out as the drilling continues to push the steel conduit horizontally through the ground. Water would be used to drill the last 100 to 130 feet (30 to 40 meters) of each conduit. Volumes would be calculated so that water will have displaced all of the drilling fluid when the drilling assembly exits the bay floor.

Once the drilling assembly exits the seafloor, the support dive crew would be deployed to verify the steel conduit exit point. Divers would then remove excess sediment from around the end of the pipe using a jetting assembly, which would allow the pipe to terminate at the proper elevation. The drill head would remain at the steel conduit's exit point offshore (in approximately 5 feet [1.5 meters] of water depth on the western side and within the intertidal zone on the eastern side) until divers or the shore-end team would take the drill head off and install a flapper valve. The flapper valve would prevent bay water from entering the steel conduit. This process also provides a drill string, which would be used to pull the cables through the pipe. The eco-blocks and tracking wire would be removed once the HDD installations have been completed.

The western cable installation needs to cross two Kinder Morgan pipelines, bundled in the same trench (see Section 1.3, Project Location). The two alternative HDD exit points are dependent on Kinder Morgan approval and are considered in this proposed Project because approval has not yet been received. One alternative is to set the HDD steel conduit HDD exit point in SF Bay closer to shore (i.e., install a shorter steel conduit), before crossing the Kinder Morgan pipelines. The cables, when installed, would then cross above the Kinder Morgan pipelines. The second alternative is to set the HDD steel conduit exit location in SF Bay farther from shore (i.e., install a longer steel conduit), passing under the Kinder Morgan pipelines. The cables, when installed, would then enter the steel conduit prior to crossing the Kinder Morgan pipelines and would pass under the pipelines within the steel conduit.

### 1.5.1.4 Drilling Fluid Management

HDD drilling fluid, a non-toxic, inert material, typically a solution of bentonite clay and water, would be circulated into each bore hole to prevent them from caving in; the fluid would coat the wall of the bore holes to minimize fluid losses to permeable rock and soil types. Drilling fluid also serves as a lubricant for the drill head and carries the cuttings (i.e., pieces of drilled rock) back to the entry pit, where the cuttings (rock, sand, and other materials) are removed so the drilling fluid can be recirculated back into the bore hole. Drilling fluid would be used for drilling the entire bore hole except for the final approximately 100 to

130 feet (30 to 40 meters), where the drilling fluid would be changed to water; this would minimize the release of drilling fluid into the bay floor when the drill bit exits the sediment in SF Bay. Spent drilling fluid, except for that lost to the surrounding subsurface material, and cuttings would be temporarily collected at the cable landing sites and disposed of at a permitted landfill.

Given the variety of geologic conditions that may be encountered, it is possible that some of the drilling fluid may be absorbed into fractures in the surrounding subsurface material. In cases where the fracture is lateral and subterranean, lost fluid would not rise to the surface. In other cases, drilling fluid may reach the surface (e.g., if the fracture comes close enough to the surface that the pressure causes a release of drilling fluid above the sediment). This is known as an inadvertent drilling fluid release. The Project would implement a series of monitoring and management measures during HDD operations to detect and respond to a potential drilling fluid release. While drilling is taking place, the fluid system operator will monitor the volumes from the pumps and return flows from the steel conduit and alert personnel if there is a decrease in the return volume. This is the most effective and efficient way to detect a drilling fluid release.

#### *1.5.1.5 Landing Vault Installation*

Once the steel conduit has been installed, a single LV (12 feet long, 9 feet wide, and 10 feet deep [3.7 meters long, 2.7 meters wide, and 3 meters deep]) would be installed at each landing site into the HDD borehole entry pit following completion of drilling activities. Following installation, the area around the LVs would be backfilled with native soil. Once installation is complete, the only component of the LV that would be exposed is a 336 inches (91 centimeters) diameter, cast-iron LV cover at grade level or twin cover access (2 feet by 2 feet [0.6 meter by 0.6 meter]).

### *1.5.2 Cable Installation*

Installation of the fiber optic cables across SF Bay would involve a marine barge without engines and with four to six anchors as the primary cable-lay vessel, two anchor-lay vessels to support anchor movement, two guard vessels to help other marine users avoid the Project, a crew transfer vessel, and a dive support boat. The installation of the cables involves four steps: pre-lay grapnel run (PLGR), tie-in of the cables to the landing site, installation of the cables, and post-lay inspection and burial. The following sections describe these steps in more detail.

#### *1.5.2.1 Pre-Lay Grapnel Run*

Prior to installation of the cables or tie-in with the steel conduits and LVs, a PLGR would be performed along the proposed cable route. The purpose of an engineered PLGR is to clear debris on the bottom of the bay floor (e.g., discarded fishing gear) along the route where the cables would be buried. A grapnel, typically of the flatfish type, would be dragged along the cable route before cable installation to clear out the path for burying cables (Figure 1-6).

The grapnel would be attached to a length of chain to ensure that it touches the bottom of the bay floor. The anchor-lay support vessel or the dive support boat would tow the grapnel at approximately 1.2 miles per hour (approximately 1 knot per hour). The arms of the grapnel are designed to hook debris lying on the bay floor or shallowly buried to approximately 1.3 feet (0.4 meter). If debris is hooked and towing tension increases, towing would stop, and the grapnel would be retrieved by a winch. Any debris recovered during the operation would be stowed on the vessel for subsequent disposal in port. After debris removal, the grapnel would be redeployed with a suitable overlap and operations would continue.

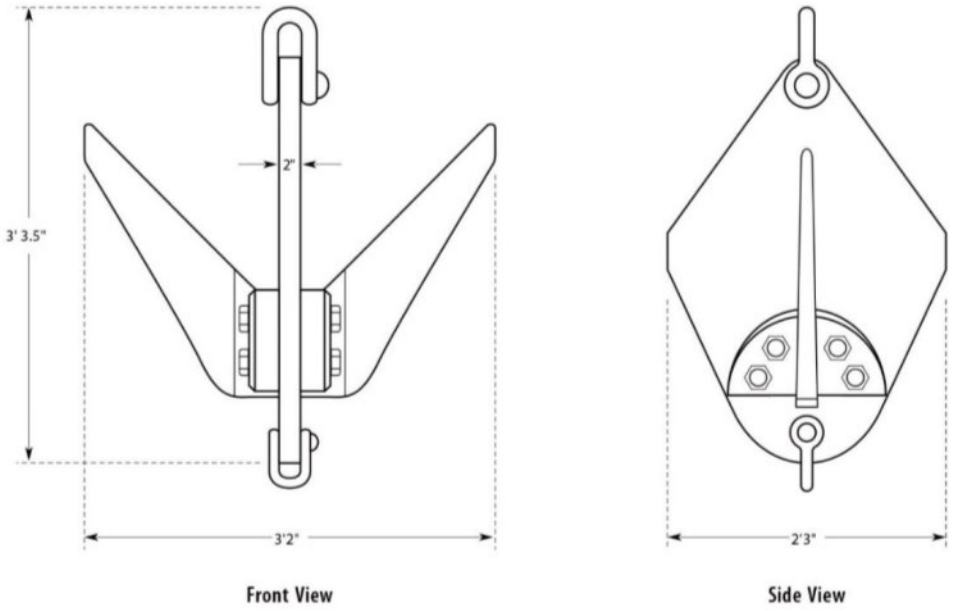


**Figure 1-6. Flat Fish Type Grapnel**

### 1.5.3 Cable Landing Tie-In

The initial plan is to work first on the west landing and tie-in with the installation barge and then lay cables along the cable route toward the eastern landing for the eastern tie-in. This direction may be reversed during the detailed planning phase.

Prior to the days of the landings, divers would locate and expose the steel conduit. For the eastern steel conduit, this would require jetting sediment around the pipe ends to expose them. On the days that cable installations begin, the cable barge would be anchored in place as close as possible to the steel conduit exit. Divers would attach the pull rope or wire from the steel conduit, through the flapper valve, to the cables on the barge. Each cable would then be pulled through the steel conduit using a 10-ton hydraulic winch and each cable would be anchored in place behind the LV using an onshore winch. Once the cables are landed and secured, a diver would swim to the cables to check on the condition of the cables on the seabed. Adjustments would be made as needed to achieve proper cable slack and placement on the seabed and to reduce and/or eliminate chafing points. Divers would then be using hand-jetting techniques to bury the cables in the vicinity of the HDD exit point, up to the point where the jetting sled can be deployed to commence burial.

### 1.5.4 Offshore Cable Installation

A specialized water-jetting sled cable burial tool would be used for cable installation and burial across SF Bay, which would simultaneously lay and bury the cables. The jetting sled burial tool would be deployed and moved by the cable-lay vessel. The sled, supported by two skids that are approximately 1.5 feet (45 centimeters) wide, would only impact the seafloor directly under the sled and where the skids touch (depressing the seabed by approximately 1 to 2 inches, dependent on sediment types). The jetting nozzle assembly (“legs” or “Jet Share”) is located between the two skids and fluidizes the sediment within a 12-inch-wide (30-centimeter) swath. Once the jetting sled is deployed to the bottom, divers would assist with loading the cables into the sled’s guidance set-up. The sled is towed behind the barge. The jets would fluidize the sediment around the cables, allowing the cables to settle into the bottom of the furrow, which would naturally close under the weight of the sediments and the sled runners, and with the

disturbed sediment settling back over the cables. Depending on bottom conditions, the cables would be buried to a depth of approximately 3 to 6 feet (1 to 2 meters).

Once the cables have been connected to the western landing vault, the cable-lay vessel would begin to move along the proposed route toward the eastern cable landing site, rolling out the cables as it goes. Travel speed would not be set since the barge would not move under its own propulsion. Instead, the barge would set anchors along the route, then be pulled to each set of anchors with support from the anchor-lay vessels. As the barge is pulled to a new set of anchors, the support vessels would move the anchors behind the barge to new locations ahead of it and set them. The jetting sled would be towed behind the barge as the barge moves along the anchor system.

On the eastern cable landing site, close to the steel conduit HDD exit points, the water may be too shallow to use the jetting sled up to the HDD exit point. In that case, the cables would be buried by divers with hand-jets. Any portions of the cables not buried by the jetting sled offshore of the OHWM would be buried using divers and a hand-jetting system.

### *1.5.5 Post-Lay Inspection and Burial*

Any areas that may not have achieved the target cable burial depth would be inspected in post-lay using divers or a small remotely operated vehicle (ROV). Any areas where remedial burial is required would use divers and a hand-jetting system.

The jetting system would loosen the bay floor sediments beneath the cables, allowing it to settle to the desired depth of 3 to 6 feet (1 to 2 meters). The disturbed sediments would settle back over the area to their original grade, leaving the cables buried. The post-lay burial of cables by divers, if needed, would disturb about 15 feet (4.6 meters) of the bay floor (not the water column).

### *1.5.6 Upland Site Restoration*

Upland site restoration would involve returning the impacted areas to preconstruction contours and elevations once backfilling and compaction around the installed LVs is completed.

# 2. LISTED SPECIES AND CRITICAL HABITAT

Federally listed threatened and endangered species under National Oceanic and Atmospheric Administration (NOAA) Fisheries (NMFS) jurisdiction and marine mammal species protected by the Marine Mammal Protection Act (MMPA) that could occur at the Project vicinity were identified from the following databases:

- California Natural Diversity Database (CNDDB 2022a): Species occurrences overlapping the proposed Project area
- NOAA Fisheries ESA Threatened and Endangered Species List (NOAA Fisheries 2022a): ESA Threatened and Endangered species under NOAA jurisdiction
- NOAA Fisheries All Species List (NOAA Fisheries 2022b): All species under NOAA jurisdiction, including marine mammals, invertebrates, and fishes
- United States Fish and Wildlife Service Information for Planning and Conservation database (USFWS 2022a): Species occurrences in the proposed Project area
- Merkel and Associates San Francisco Bay Eelgrass Inventory (Merkel and Associates 2014): Eelgrass locations in SF Bay
- San Francisco Bay Conservation and Development Commission (2020): Eelgrass locations in SF Bay
- San Francisco Estuary Institute (2021): Eelgrass habitat throughout SF Bay

Species listed in one of the above-listed queries were examined for potential habitat within the action area and are listed in Table 2-1. Critical habitat identified in the action area is also included in Table 2-1. Species for which marginal or suitable habitat was determined to be present are included in the analysis for potential effects on the species or their habitats (Table 2-2).

## Table 2-1. Special-status Species and Critical Habitat Potentially Occurring or Known to Occur in the Action Area

| Common Name | Scientific Name | Protected Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| | | | **Marine Mammals** | | |
| California sea lion | *Zalophus californianus* | MMPA Protected | Can be found foraging in coastal and offshore waters. Groups will haul out on sandy beaches, rocky coves, docks, and buoys (National Park Service 2016; NOAA Fisheries 2022b,j). | Y | Suitable habitat for all life stages is present. |
| Common bottlenose dolphin | *Tursiops truncatus* | MMPA Protected; CITES Appendix II | Preferred habitat is nearshore waters such as bays, estuaries, harbors, and gulfs, as well as coastal and offshore waters (NOAA Fisheries 2017; NOAA Fisheries 2022b,i). | Y | Suitable habitat for all life stages is present. |
| Gray whale (Eastern North Pacific DPS) | *Eschrichtius robustus* | FD; MMPA Protected; CITES Appendix I | Habitat includes shallow coastal waters for foraging and migrating, with occasional travel in open ocean waters. Species enters shallow bays and lagoons only for giving birth (NOAA Fisheries 2022a,b,m). | N | Suitable habitat is not likely present. Bays and lagoons used for birthing are located in Mexico. |
| Harbor porpoise | *Phocoena phocoena* | MMPA Protected; CITES Appendix II | Preferred habitat is nearshore and coastal waters, especially bays and estuaries (American Cetacean Society 2018; NOAA Fisheries 2022b,h). | Y | Suitable habitat for all life stages is present. |
| Harbor seal | *Phoca vitulina* | MMPA Protected | Preferred habitat is nearshore marine waters for foraging and haul out locations can include rocks, reefs, and beaches (NOAA Fisheries 2015; NOAA Fisheries 2022b,g). | Y | Suitable foraging and haul-out habitat is present. |
| Humpback whale | *Megaptera novaeangliae* | FE (Central America DPS); FT (Mexico DPS); MMPA Protected; MMPA Depleted; CITES Appendix I | Foraging and migrating occurs in offshore waters, with migrations occurring between high-latitude feeding grounds and warm-water, shallow offshore or coastal calving grounds (NOAA Fisheries 2022a,b,n). | N | Suitable habitat is not likely present. |
| Northern elephant seal | *Mirounga angustirostris* | MMPA Protected; CDFW Fully Protected | Will forage in open ocean or coastal waters and hauls out in sandy, rocky, or muddy areas to rest (NPS 2021b; NOAA Fisheries 2022b,f). | Y | Marginal foraging and haul-out habitat is present during the non-breeding season. |

| Common Name | Scientific Name | Protected Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| Northern fur seal | *Callorhinus ursinus* | MMPA Protected; CA Critically Imperiled; IUCN Vulnerable | Species prefers open water habitat and returns to land for reproduction, rest, molting, or if sick. Will forage in bays if following prey or at rookeries (CNDDB 2022a; NPS 2021a; NOAA Fisheries 2022b,e). | Y | Marginal foraging habitat is present during the breeding season. |
| Southern sea otter | *Enhydra lutris nereis* | FT; CDFW Fully Protected | Habitat includes kelp forests in rocky and sandy areas along the coast and protected bays and estuaries (CNDDB 2022a; USFWS 2022b). | N | Suitable habitat is not likely present. No kelp forests are present in SF Bay. |
| | | | **Fishes** | | |
| Chinook salmon (Central Valley Fall-Run ESU) | *Oncorhynchus tshawytscha* | CA Imperiled; AFS Vulnerable; CDFW Species of Special Concern; USFS Sensitive | Adults migrate from the ocean to cool, deep pools in tributary streams, then spawn over gravel. Juveniles then migrate to the ocean (DFG 2021; CDFW 2022e; CNDDB 2022a; NOAA Fisheries 2022a,b). | N | Suitable habitat is not likely present. No spawning tributaries are located in southern SF Bay. |
| Chinook salmon (Central Valley Late Fall-Run ESU) | *Oncorhynchus tshawytscha* | CA Imperiled; AFS Vulnerable; CDFW Species of Special Concern; USFS Sensitive | Adults migrate from the ocean to cool, deep pools in tributary streams, then spawn over gravel. Juveniles then migrate to the ocean (DFG 2021; CDFW 2022e; CNDDB 2022a; NOAA Fisheries 2022a,b). | N | Suitable habitat is not likely present. No spawning tributaries are located in southern SF Bay. |
| Chinook salmon (Central Valley Spring-Run ESU) | *Oncorhynchus tshawytscha* | FT; CA Imperiled; CESA Threatened; AFS Threatened | Adults migrate from the ocean to cool, deep pools in tributary streams, then spawn over gravel. Juveniles then migrate to the ocean (DFG 2021; CDFW 2022e; CNDDB 2022a; NOAA Fisheries 2022a,b). | N | Suitable habitat is not likely present. No spawning tributaries are located in southern SF Bay. |
| Chinook salmon (Sacramento River Spring-Run ESU) | *Oncorhynchus tshawytscha* | FT | Adults migrate from the ocean to cool, deep pools in tributary streams, then spawn over gravel. Juveniles then migrate to the ocean (DFG 2021; CDFW 2022e; NOAA Fisheries 2022a,b). | N | Suitable habitat is not likely present. No spawning tributaries are located in southern SF Bay. |
| Chinook salmon (Sacramento | *Oncorhynchus tshawytscha* | FE; CA Critically Imperiled; CESA | Adults migrate from the ocean to rivers and spawn in the upper mainstream of the river, then juveniles migrate to | N | Suitable habitat is not likely present. No spawning |

| Common Name | Scientific Name | Protected Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| River Winter-Run ESU) | | Endangered; AFS Endangered | the ocean (DFG 2021; CDFW 2022e; CNDDB 2022a; NOAA Fisheries 2022a,b). | | tributaries are located in southern SF Bay. |
| Coho salmon (Central California Coast ESU) | *Oncorhynchus kisutch* | FE; CA Imperiled; CESA Endangered; AFS Endangered | Adult habitat is open ocean waters until spawning, when they then return to clear, cold freshwater streams. Juveniles remain in these streams until large enough to migrate to the ocean (NMFS 2012; CDFW 2021; CNDDB 2022a,b; NOAA Fisheries 2022a,b,c). | Y | Suitable migratory habitat is present. |
| Green sturgeon (Southern DPS) | *Acipenser medirostris* | FT; CA Imperiled; CDFW Species of Special Concern; IUCN Near Threatened; AFS Vulnerable | Coastal or offshore waters, with feeding frequently occurring in estuaries and bays. Juveniles remain in brackish water until maturity (CNDDB 2022a; CDFW 2020; NOAA Fisheries 2022a,b,p). | Y | All SF Bay, including the action area, is critical habitat. Suitable habitat is present for juveniles and adults. |
| Pacific herring | *Clupea pallasii* | Federal Under Consideration | Non-breeding habitat is offshore coastal waters and spawning habitat is bays or estuaries with low salinity, calm waters, and vegetated or rocky substrate (CDFW 2001; NOAA Fisheries 2020d; CDFW 2019; CDFW 2022b). | Y | Suitable spawning and rearing habitat is present. |
| Steelhead (California Central Valley DPS) | *Oncorhynchus mykiss irideus* | FT; CA Imperiled; AFS Threatened | Adults migrate from the ocean to rivers and spawn, then juveniles migrate to the ocean (NMFS 2014; CNDDB 2022a; NOAA Fisheries 2022a,b,l). | N | Suitable habitat is not likely present. No spawning tributaries are located in southern SF Bay. |
| Steelhead (Central California Coast DPS) | *Oncorhynchus mykiss irideus* | FT; CA Vulnerable-Imperiled; AFS Threatened | Habitat is open ocean except when adults are spawning, which occurs in freshwater drainage systems. Juveniles spend multiple years in freshwater before migrating to the ocean (NMFS 2016; California Trout 2019; CNDDB 2022a,b; NOAA Fisheries 2022a,b,c). | Y | Drainages entering south SF Bay are designated critical habitat. Suitable migratory habitat is present in the action area. |
| **Reptiles** | | | | | |
| Green turtle (East Pacific DPS) | *Chelonia mydas* | FT | Forage in nearshore vegetated (seagrass and algae) habitats along coasts, typically in subtropical and | N | Suitable habitat is not likely present due to the lack of |

| Common Name | Scientific Name | Protected Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| | | | temperate regions (CNDDB 2022a; NOAA Fisheries 2022o; USFWS 2022a). | | vegetation along the cable route. |
| **Plants** | | | | | |
| Eelgrass | *Zostera marina* | Habitat Area of Particular Concern | Grows in muddy, sandy, or fine gravel substrates of protected shorelines, subtidal flats, and estuaries from the intertidal to depths of 20 feet (6 meters) (Central Coast Biodiversity 2014; NOAA Fisheries 2021a; San Francisco Bay Conservation and Development Commission 2020; San Francisco Estuary Institute 2021). | N | Suitable habitat is present near the eastern and western HDD exit points. However, presence is unlikely because instances of eelgrass in SF Bay are mapped and monitored. The cables were routed to avoid mapped occurrences. |

*Notes:*

*AFS = American Fisheries Society; CA = California; CDFW = California Department of Fish and Wildlife; CESA = California Endangered Species Act; CITES = Convention on International Trade in Endangered Species; DPS = Distinct Population Segment; ESU = Evolutionarily Significant Unit; FD = Federal Delisted; FE = Federal Endangered; FT = Federal Threatened; IUCN = International Union for Conservation of Nature; MMPA = Marine Mammal Protection Act; USFS = United States Forest Service*

The likelihood of each species to occur in the action area (Section 1.4) was determined based on species range, habitat, migration routes, reproductive behavior, and foraging needs using the following general categories:

- *Present:* Species are potentially present in the action area at all times of the year based on database records and species life history.
- *Seasonally present:* Species are potentially present in the action area based on database records, but are only present at certain periods of the year due to species life history.
- *Likely to occur:* The species is likely to occur in the action area. The likelihood is dependent on time of year and reproductive criteria, migration routes, food availability, and habitat suitability. Considered a high probability of occurrence.
- *Potential to occur:* The species is potentially found in the action area. This is also dependent on time of year and reproductive criteria, migration routes, food availability, and habitat suitability. Considered a moderate probability of occurrence.
- *Unlikely to occur:* The species is unlikely to be observed in the action area, due to predation, unsuitable habitat, time of year and reproductive criteria, and absence of foraging habitat.
- *Absent:* The species is not present in the action area.

Based on a review of the distribution and habitat requirements of these species and the habitat conditions within the Project area, ERM determined that 10 federally listed species or species under federal listing consideration have either been recorded in the Project vicinity or could potentially occur based on the presence of potentially suitable habitat. The habitat requirements and potential to occur in the action area are summarized in Tables 2-1 and 2-2.

## Table 2-2. Special-Status Species Under NMFS Jurisdiction with the Potential to Occur in the Action Area

| Common Name | Scientific Name | Protected Status | Sensitive Season (Location) | Distribution in California | Habitat Association | Likelihood to Occur in Project Area | Citations |
|---|---|---|---|---|---|---|---|
| **Marine Mammals** | | | | | | | |
| California sea lion | *Zalophus californianus* | MMPA Protected | Breeding: June–August (west coast, remote beaches, and islands)<br>Birth: May–June | The U.S. stock is present in California coastal waters from the U.S./Mexico border to the California/Oregon border, with breeding occurring in the Channel Islands. | Prefers nearshore coastal and offshore waters for foraging and haul out locations can include sandy or rocky beaches, coves, docks, and buoys. Breeding habitat in California is remote beaches in the Channel Islands. | Present, Likely to occur | NOAA Fisheries 2019, 2022b, 2022j |
| Common bottlenose dolphin | *Tursiops truncatus* | MMPA Protected; CITES Appendix II | Breeding: Throughout the year<br>Birth: 12 months of gestation | Occurs as both a California coastal and offshore stock. The California coastal stock is found from San Francisco to Baja California. | The California coastal stock prefers to remain within 1 kilometer of shore in shallow coastal waters, including bays, estuaries, and harbors. | Present, Likely to occur | NOAA Fisheries 2017, 2022b, 2022i |
| Harbor porpoise | *Phocoena phocoena* | MMPA Protected; CITES Appendix II | Breeding: Summer (San Francisco/Russian River stock)<br>Birth: May–July | Four stocks in California; the SF Bay/Russian River stock includes individuals from approximately Point Arena to Pigeon Point, California. | Prefers nearshore and coastal waters, especially bays and estuaries. | Present, Likely to occur | American Cetacean Society 2018; NOAA Fisheries 2020a; NOAA Fisheries 2022b,h |

| Common Name | Scientific Name | Protected Status | Sensitive Season (Location) | Distribution in California | Habitat Association | Likelihood to Occur in Project Area | Citations |
|---|---|---|---|---|---|---|---|
| Harbor seal | *Phoca vitulina* | MMPA Protected | Breeding: April–June<br>Birth: February–April | California stock found in coastal and nearshore waters along the entire coast of California. | Prefers nearshore coastal and protected waters for foraging and prefers haul out locations such as rocks, reefs, beaches, and mud flats. | Present, Likely to occur | NPS 2021c; NOAA Fisheries 2022b,g |
| Northern elephant seal | *Mirounga angustirostris* | MMPA Protected; CDFW Fully Protected | Breeding: December–March (Channel Islands, Baja California)<br>Birth: December–January | Present in California coastal waters during migration to and from rookeries in the Channel Islands and Baja California. | Prefers open water, both coastal and offshore, during the non-breeding season for foraging and during migrations, and can dive deeply for prey. During the breeding and pupping season from December–March, can be found on offshore islands. | Seasonally present, Potential to occur | NPS 2021b; NOAA Fisheries 2022b,f |
| Northern fur seal | *Callorhinus ursinus* | MMPA Protected; CA Critically Imperiled; IUCN Vulnerable | Breeding: June–October (islands off the coast of California)<br>Birth: June | Offshore waters during non-breeding season and Farallon Islands, San Miguel Islands during breeding season. | Arrive at rookery islands offshore of California from May–June and females give birth in June followed by breeding with territorial males. After breeding, females begin a foraging/nursing cycle, with foraging occurring in open waters near the rookery. All individuals leave the rookery sites in October to forage in offshore open waters. | Seasonally present, Potential to occur | CNDDB 2022a; NPS 2021a; NOAA Fisheries 2022b,e |
| **Fishes** | | | | | | | |
| Coho salmon (Central California Coast ESU) | *Oncorhynchus kisutch* | FE; CA Imperiled; CESA Endangered; AFS Endangered | Migration: September–January (upstream)<br>Spawning: November–March (rivers)<br>Juvenile Emergence and Residency: March–July for 1 year | Punta Gorda to Aptos Creek, California, as well as streams draining into the SF Bay. | Juveniles mature for 1 to 2 years in nearshore oceanic waters, including SF Bay. After maturity, migrate up freshwater rivers/streams to spawn in cold water over gravel. | Present, Potential to occur | NMFS 2012; CDFW 2021; CNDDB 2022a,b; NOAA Fisheries 2022a,b,c |

| Common Name | Scientific Name | Protected Status | Sensitive Season (Location) | Distribution in California | Habitat Association | Likelihood to Occur in Project Area | Citations |
|---|---|---|---|---|---|---|---|
| Green sturgeon (Southern DPS) | *Acipenser medirostris* | FT; CA Imperiled; CDFW Species of Special Concern; IUCN Near Threatened; AFS Vulnerable | Critical habitat throughout SF Bay<br>Spawning Migrations: February–May (into SF Bay and upstream), then Autumn (downstream)<br>Spawning: Summer (rivers)<br>Juvenile Residency: 1 year<br>Non-spawning Migrations: Summer–Autumn (Washington, Oregon, California bays), Winter–Spring (British Columbia coast) | Spawns in the Sacramento, Yuba, and Feather Rivers and resides mainly in the Sacramento and San Joaquin Delta and SF Bay. | Juveniles feed in estuaries and bays in summer and are oceanic the rest of the year. After maturity, migrate up freshwater rivers to spawn in deep, cool, fast water over hard substrate. | Present, Likely to occur | CDFW 2020; NOAA Fisheries 2020b; CNDDB 2022a; NOAA Fisheries 2022a,b,p |
| Pacific herring | *Clupea pallasii* | Federal Under Consideration; State Fishery Management Plan | Spawning: October–April (SF Bay) | Schools can be found in coastal waters along the entire coast of California. | Prefers open coastal waters during the non-breeding season and migrates into bays and estuaries during the breeding season. Juveniles remain in the bay or estuary to grow and feed before moving in coastal open waters to mature. | Seasonally present, Likely to occur | CDFW 2001, 2019, 2022b; NOAA Fisheries 2022d |
| Steelhead (Central California Coast DPS) | *Oncorhynchus mykiss irideus* pop. 8 | FT; CA Vulnerable-Imperiled; AFS Threatened | Critical habitat throughout SF Bay<br>Stream-maturing steelhead:<br>Migration: May–October (upstream);<br>Spawning: January–February (rivers);<br>Ocean-maturing steelhead:<br>Migration: December–April (upstream)<br>Spawning: January–May (rivers)<br>Both:<br>Juvenile Emergence and Residency: November–June for 1 to 3 years | Russian River to Aptos Creek, all drainages of San Francisco, San Pablo, and Suisun Bays to Chipps Island. | Adults migrate from the ocean to rivers in fall/winter and spawn in the spring. Adults may survive and migrate downstream in summer. Juveniles migrate to the ocean throughout the year. | Present, Likely to occur | NMFS 2016; CNDDB 2022a,b; NOAA Fisheries 2022a,b |

*AFS = American Fisheries Society; CA = California; CDFW = California Department of Fish and Wildlife; CESA = California Endangered Species Act; CITES = Convention on International Trade in Endangered Species; DPS = Distinct Population Segment; ESU = Evolutionarily Significant Unit; FE = Federal Endangered; FT = Federal Threatened; IUCN = International Union for Conservation of Nature; MMPA = Marine Mammal Protection Act*

## 2.1 Previous Meetings Regarding Permitting

On 9 September 2021, a pre-application meeting via Microsoft Teams was held to discuss pending applications and potential species of concern, with the following attendees:

- BIG: Andrew Munn
- ERM: Nikki Payne, Alex Grant
- USACE: Brain Matsumoto, Sarah Firestone, Kendra Spicher, Jason Chambers, Michael Orellana
- San Francisco Bay Regional Water Quality Control Board: Brain Wines, Tahsa Sturgis
- California State Lands Commission: Afifa Awan, Ken Foster, Kelly Connor, Eric Gillies
- California Department of Fish and Wildlife: Arn Aarreberg
- U.S. Environmental Protection Agency Region 9: Jennifer Siu
- California Public Utilities Commission: Connie Chen
- NOAA NMFS: Brian Meux
- U.S. Fish and Wildlife Service: Kim Squires

Mitigation measures from the above documents and suggestions provided from the interagency meeting have been proposed in this BA with adjustments as appropriate.

# 3. SPECIES' STATUS AND CRITICAL HABITAT

## 3.1 Environmental Baseline and Habitat in the Action Area

The following descriptions of the existing physical conditions and marine communities are described in relation to the action area boundaries. The action area will be used when determining potential impacts on federally protected species, as described in Section 4, Potential Impacts of the Proposed Project.

### *3.1.1 Terrestrial Communities*

The western terrestrial community from the shore of SF Bay west to the cable landing site is a riprap shoreline, followed by disturbed habitats containing upland trees and non-native annual grasses and vegetation with occurrences of coyote brush. The western cable landing site is considered disturbed, low-quality habitat dominated by non-native vegetation species.

The eastern terrestrial community from the shore of SF Bay east to the cable landing site is also a riprap shoreline, followed by approximately 3 feet (1 meter) of degraded coastal scrub between the shoreline and the Bay Trail paved pathway. East of the Bay Trail pathway, the eastern cable landing site is disturbed, low-quality habitat dominated by non-native annual grasses and some coyote brush before reaching the fence of the Tony Lema Golf Course.

Detailed descriptions of the terrestrial communities are not provided herein, as none of the species analyzed in this BA are associated with these communities. There are no federally protected species under NMFS jurisdiction within the terrestrial communities of the Project and therefore this BA does not further discuss terrestrial communities or species.

### *3.1.2 Marine Communities*

The marine portion of the Project extends from the western OHWM, where the cables would enter SF Bay, to the eastern OHWM, where the cables would exit the bay. The open water habitat along the cable route consists of the marine waters of south SF Bay, which supports native and non-native species, including fish, invertebrates, marine mammals, and seabirds. The sediment along the proposed route is a soft-bottom sediment composed of clay, clay with shells, clay with sand, sandy clay with shells, and clayey sand with shells based on the results of the geophysical survey, with no identified hard substrate areas (A2Sea 2022).

Discussion of sensitive habitats and federally listed species under NMFS jurisdiction for this Project focuses on marine habitats and species with the known occurrence or potential to occur in the action area based on habitat preference and identified habitat. Other wildlife species (i.e., ducks, gulls, terns, cormorants, waterbirds) that are not federally listed, but which are known or expected to occur in the Project area, include generalists that have adapted to human-modified landscapes throughout the SF Bay Area. These species were not analyzed for the purposes of this assessment.

## 3.2 Species Discussion

Species discussed are those identified as having potential habitat present in the action area and with some likelihood to occur.

## 3.2.1 California Sea Lion

### 3.2.1.1 Status and Life History

The California sea lion (*Zalophus californianus*) is MMPA protected throughout its range, which includes shallow waters of the eastern North Pacific Ocean from southeast Alaska to central coastal Mexico. There are five genetically distinct populations of California sea lion, including the Pacific Temperate, Pacific Subtropical, Southern Gulf of California, Central Gulf of California, and Northern Gulf of California populations. These populations have been split into three stocks based on major rookeries and international borders. The U.S. stock includes individuals found from the U.S./Mexico border to Canada and is generally comprised of the Pacific Temperate population of California sea lions, though some of the Pacific Subtropical population may spend time in U.S. waters (NOAA Fisheries 2019, 2022j).

This species can be found in coastal and offshore waters, where it forages on opportunistic prey including sardines, mackerel, rockfish, anchovies, salmon, and squid. Females generally forage within 6.2 to 62 miles (10 to 100 kilometers) from shore, while males can range up to 280 miles (451 kilometers) from shore during foraging efforts. In addition, groups and individuals will haul out on sandy beaches, rocky coves, docks, and buoys to rest (NPS 2016; NOAA Fisheries 2022j).

California sea lions migrate to rookeries annually for breeding in the summer months. The rookeries for the Pacific Temperate population are mainly located at the Channel Islands in California, but some breeding also occurs in the Coronado Islands just south of the U.S./Mexico border. At the rookery, males establish territories that may contain up to 14 females. Breeding occurs from late June to early August, with pups gestating until May to June of the following year (NOAA Fisheries 2022j). Females will nurse their pups for a few days at a time, interspersed with periods of foraging away from the rookery, for up to a year, though the female is ready to breed again 3 to 4 weeks following birth and may be pregnant while nursing her current pup (NOAA Fisheries 2022j).

### 3.2.1.2 Potential for Occurrence

The marine Project area and adjacent waters are appropriate foraging and growth habitat for California sea lions, while the shoreline at the landing sites has the potential to be used by this species for resting. Highest numbers of this species are most likely to be observed at the Project site during the winter months, while numbers may be reduced during the birthing and breeding seasons (i.e., from May to June). However, this species has the potential to be observed at, and adjacent to, the Project site at all times of the year.

## 3.2.2 Common Bottlenose Dolphin

### 3.2.2.1 Status and Life History

There are 61 known stocks of common bottlenose dolphin (*Tursiops truncatus*) in U.S. waters, all of which are protected under the MMPA. The stock potentially present in the Project area is the California Coastal Stock of Pacific common bottlenose dolphins, here referred to as bottlenose dolphins. While multiple stocks of this species are listed as MMPA Depleted in the western North Atlantic Ocean, none of the Pacific Ocean stocks have an MMPA listing besides Protected (NOAA Fisheries 2017; NOAA Fisheries 2022i).

Bottlenose dolphins can be found individually or in groups in nearshore waters such as bays, estuaries, harbors, and gulfs and open ocean waters and are generally distinguished as coastal or offshore varieties, though they are still recognized as a single species. The California Coastal Stock is typically found within coastal and nearshore waters less than 0.6 mile (1 kilometer) from shore from San

Francisco, California, to Baja California, Mexico, including within SF Bay (NOAA Fisheries 2017; NOAA Fisheries 2022i).

This species forages on a generalized diet that can consist of fishes, crustaceans, and squids, which are captured either individually or cooperatively in groups. Some recorded cooperative prey capture behaviors include the use of sand bars or seawalls to trap prey and herding prey into tight balls, which the dolphins then take turns charging through (NOAA Fisheries 2022i).

Adult bottlenose dolphins reach sexual maturity between 5 and 15 years of age and can live from 40 to 60 years old. Females generally reach sexual maturity before males and live longer. Females mate approximately every 3 to 6 years and gestation lasts for 12 months. Offspring stay with their mothers during the first 3 to 6 years of their lives and nurse for the first 20 months of life (NOAA Fisheries 2022i).

#### *3.2.2.2 Potential for Occurrence*

The marine Project area and adjacent waters are appropriate foraging, growth, and reproductive habitat for common bottlenose dolphins year-round. This species has the potential to be observed at, and adjacent to, the Project site at all times of the year.

### *3.2.3 Harbor Porpoise*

#### *3.2.3.1 Status and Life History*

The harbor porpoise (*Phocoena phocoena*) is fully protected under the MMPA throughout its range, which includes nine stocks in the Pacific Ocean, including the Morro Bay, Monterey Bay, San Francisco/Russian River, northern California/southern Oregon, northern Oregon/Washington Coast, Washington inland waters, Southeast Alaska, Gulf of Alaska, and Bering Sea stocks (NOAA Fisheries 2020a). In addition to the Pacific Ocean stocks noted here, which range along the west coast of the United States up and around the Bering Sea to Japan, populations of this species are also on both sides of the Atlantic Ocean, from North Carolina up to Greenland, across the Barents Sea, and south to West Africa (NOAA Fisheries 2022h). The San Francisco/Russian River stock of harbor porpoises in the Pacific Ocean is the stock that will be within the Project area and has been estimated at approximately 7,500 individuals in 2017 (NOAA Fisheries 2020a).

Harbor porpoises are typically seen in nearshore or coastal waters, especially bays and estuaries, where they feed on boney fishes such as herring, mackerel, and sardines, and occasionally on squid or octopus. The Pacific Ocean populations of this species, including the San Francisco/Russian River stock, are not known to migrate, though they can move from coastal to inshore waters and back depending on prey availability (American Cetacean Society 2018; NOAA Fisheries 2022h).

Though information on this species is limited, harbor porpoises are thought to reach sexual maturity at 3 to 4 years of age. Reproduction for this species is thought to occur in summer, with births occurring from May to July of the following year. Females nurse the offspring for approximately 8 to 12 months following birth (American Cetacean Society 2018; NOAA Fisheries 2022h).

#### *3.2.3.2 Potential for Occurrence*

The marine Project area and adjacent waters are appropriate foraging and growth habitat for harbor porpoises year-round, with the waters at, and adjacent to, the Project area being appropriate breeding habitat during the summer breeding season. This species has the potential to be observed at, and adjacent to, the Project site at all times of the year.

### 3.2.4 Harbor Seal

#### 3.2.4.1 Status and Life History

Harbor seals (*Phoca vitulina*) are protected under the MMPA throughout their range, which includes 16 stocks along the east and west coasts of North America, as well as populations in Europe and Asia. The California stock of harbor seals (*Phoca vitulina richardii*) is a stable population restricted to individuals found within the borders of California and is largely based on political/state boundaries since this species is generally considered non-migratory (NOAA Fisheries 2015; NOAA Fisheries 2022g).

This species is typically found near shore and at haul out (i.e., rest) locations such as rocks, reefs, beaches, and drifting ice, if present, and individuals generally only travel 15 to 31 miles (24 to 50 kilometers) from their natal habitat throughout their lives. However, some tagged individuals have been recorded traveling up to 486 miles (782 kilometers), which is thought to be a response to seasonally available food resources or to give birth (NPS 2021c; NOAA Fisheries 2022g).

Harbor seals are opportunistic generalists, preferring to consume prey that are abundant and easy to catch. This can include medium-sized fishes, octopus, squid, and crustaceans. Individuals will perform deep or shallow dives, depending on prey availability and can sleep underwater, but generally when not foraging, this species hauls out, typically in groups, with their fins and head above water to conserve heat. Harbor seals, even when resting, remain near water in case of predators (NPS 2021c; NOAA Fisheries 2022g).

The breeding season for harbor seals in California is between April and June, with pups born 10 months later, from February to April. Pups are born able to swim, can dive for multiple minutes after 2 to 3 days, and can perform longer excursions after 1 month. Females typically nurse pups for 4 to 6 weeks, with breaks for foraging, and then wean the pups before mating again (NPS 2021c; NOAA Fisheries 2022g).

#### 3.2.4.2 Potential for Occurrence

The marine Project area and adjacent waters are appropriate foraging habitat for harbor seals year-round while the shoreline at the landing sites has the potential to be used by this species for resting. Therefore, this species has the potential to be observed at, and adjacent to, the Project site at all times of the year.

### 3.2.5 Northern Elephant Seal

#### 3.2.5.1 Status and Life History

The northern elephant seal (*Mirounga angustirostris*) is an MMPA protected species throughout its range, which includes the western coast of North America and the eastern and central North Pacific Ocean. The entire species is considered a single stock, with most reproduction occurring on the Channel Islands in California and offshore islands along Baja California, Mexico (NOAA Fisheries 2022f).

Northern elephant seals spend the majority of their time, approximately 90 percent, in the water, but will haul out on sandy, rocky, or muddy coastal areas, especially offshore islands, to molt or reproduce. During the non-breeding season, males will migrate from the breeding grounds to the eastern Aleutian Islands and the Gulf of Alaska to forage while females will forage in the open ocean and coastal waters offshore of Washington and Oregon (NPS 2021b; NOAA Fisheries 2022f). This species forages on squid, octopus, bony fishes, and cartilaginous fishes, which are captured during dives that can last 1 to 2 hours or reach depths of up to 4,900 feet (1,494 meters). However, average dive depths and durations seem to be 1,000 to 2,500 feet (305 to 762 meters) for 20 to 30 minutes (NPS 2021b; NOAA Fisheries 2022f).

During the non-breeding season, northern elephant seals do have a molting period, between March and April, where they return to land to molt their old fur and some skin and grow a new coat. This process can

take between 4 and 5 weeks to complete, after which individuals then return to feeding in coastal and offshore waters (NPS 2021b; NOAA Fisheries 2022f).

From December to March, adult northern elephant seals migrate to their rookeries off southern California and Baja California where males establish territories and females give birth and breed again. Pups are born from December to January a few days after the female arrives at the rookery. The female will then nurse the pup for approximately 1 month, breed again, then leave the rookery and the pup to return to the summer feeding grounds. The weaned pups typically remain at the rookery for an additional 2 months learning to forage and swim before heading to the summer feeding grounds (NPS 2021b; NOAA Fisheries 2022f).

#### 3.2.5.2 Potential for Occurrence

The open waters within and adjacent to the Project area may provide seasonal foraging habitat for northern elephant seals while migrating to their summer foraging grounds or returning to the breeding rookeries in winter. Therefore, it may be possible for this species to be present from approximately January to April and again from November to February. This species is unlikely to be found in the Project area outside these migratory periods due to foraging and rookery locations outside the SF Bay Area.

### 3.2.6 Northern Fur Seal

#### 3.2.6.1 Status and Life History

The entire population of northern fur seals (*Callorhinus ursinus*) is protected under the MMPA. The California stock consists of approximately 14,000 individuals as of 2016 and has breeding sites at San Miguel Island in the Channel Islands and the Farallon Islands, offshore of San Francisco (NOAA Fisheries 2022e).

Northern fur seals are considered to be a pelagic species, with the majority of their time spent as solitary individuals in open ocean waters feeding as opportunistic generalists on fish and squid species. This species is typically only found onshore for reproduction, rest, molting, or if sick. While in open ocean waters, northern fur seals hunt mainly at night for open ocean species such as Pacific herring, northern anchovy, squid, capelin, Pacific sandlance, Pacific whiting, salmon, and rockfish species in California waters (NPS 2021a; NOAA Fisheries 2022e).

Adult male northern fur seals arrive at rookeries in May to June to establish and defend territories and will not leave these territories for an average of 46 days, requiring fasting and with a general loss of approximately 32 percent of their body mass (NPS 2021a; NOAA Fisheries 2022e). Females begin to arrive in June and, if previously pregnant, will give birth to 1 or 2 pups approximately 1 to 2 days after arrival at the rookery. Approximately 5 to 10 days after giving birth, the female will breed again, typically with the male on whose territory she gave birth. The female will then begin to leave the pup to forage for 3 to 10 days at a time, then return to suckle the pup. This cycle continues until the pup is weaned at approximately 4 months old; then the pups, females, and juveniles begin to leave the rookery around October to forage independently for the remainder of the year (NPS 2021a; NOAA Fisheries 2022e).

#### 3.2.6.2 Potential for Occurrence

The open waters within and adjacent to the Project area may provide seasonal foraging habitat for northern fur seals reproducing at the Farallon Islands offshore of SF Bay from May to October. This species is unlikely to be found in the Project area outside the reproductive season due to movement to more offshore habitats when not at the rookeries.

## 3.2.7 Coho Salmon - Central California Coast Evolutionarily Significant Unit

### 3.2.7.1 Status and Life History

The Central California Coast Evolutionarily Significant Unit (ESU) of coho salmon (*Oncorhynchus kisutch*) was federally listed as threatened on 31 October 1996 (*Federal Register*, Volume 61, page 56138 [61 FR 56138]) and then was reclassified as endangered on 28 June 2005 (70 FR 37160) and verified on 14 April 2014 (79 FR 20802). This ESU includes all coho salmon from the Don Clausen Fish Hatchery Captive Broodstock Program, the Scott Creek/King Fisher Flats Conservation Program, and the Scott Creek Captive Broodstock Program, as well as naturally spawned populations from rivers south of Punta Gorda, California, to Aptos Creek, California, and any tributaries draining into SF Bay (NOAA Fisheries 2021b).

Critical habitat for this species was designated on 5 May 1999 (64 FR 24049) and does not include the SF Bay or any tributaries that drain into the SF Bay (NOAA Fisheries 2021b).

Adult coho salmon return to their natal streams to spawn from September to January, typically after large storms have cleared the smaller stream mouths. Spawning occurs in clear, cold streams with stable gravel substrate from November to March. After spawning, adult coho salmon die. The eggs typically incubate from November to April and the hatchling salmon, termed alevins, remain in the interstitial spaces of the gravel for 2 to 10 weeks (CDFW 2021; NOAA Fisheries 2022c). Following emergence, which typically occurs from March to July, young salmon (now known as fry) school along stream margins to feed and grow. Once the fry grow large enough to establish individual territories, they move into deeper water and remain there to grow from July to March of the next year. After a year in freshwater, the juvenile coho salmon begin to migrate downstream to the marine environment. Migrations typically begin in late March and can last until July (CDFW 2021).

Immature coho salmon remain in inshore waters along the continental shelf, including the SF Bay, for up to 2 years, feeding, growing, and maturing, until they return to their natal streams as sexually mature adults. Some individuals will spawn after only 1 year in the ocean, but 2 years is typical (CDFW 2021).

### 3.2.7.2 Potential for Occurrence

The open waters within and adjacent to the Project area provide migratory and maturation habitat for adult Central California Coast ESU coho salmon. Adults migrating to upstream spawning habitat in south SF Bay tributaries may pass through the action area between September and January while immature individuals may migrate downstream through the south SF Bay March through July. Immature coho salmon may be found throughout the SF Bay year-round during their oceanic maturation phase.

## 3.2.8 Green Sturgeon - Southern Distinct Population Segment

### 3.2.8.1 Status and Life History

The green sturgeon (*Acipenser medirostris*) is comprised of two federally identified Distinct Population Segments (DPS): the Northern DPS and the Southern DPS. The Northern DPS spawns in the Klamath River, California, and Rouge River, Oregon. This DPS is not federally listed (CDFW 2020). The Southern DPS spawns in the Sacramento, Yuba, and Feather rivers and primarily resides in the Sacramento/San Joaquin delta. In addition, Southern DPS green sturgeon were also identified in the Stanislaus River, which may indicate spawning in the San Joaquin River system (CDFW 2020). The Southern DPS green sturgeon was federally listed as threatened on 7 April 2006 (71 FR 17757), which took effect on 6 June 2006 (NOAA Fisheries 2020b).

Critical habitat for the Southern DPS green sturgeon was designated by NMFS on 9 October 2009 (74 FR 52300) and took effect on 9 November 2009. This designation includes all waters of SF Bay Estuary, which includes the proposed Project area in the south SF Bay, and the Sacramento/San Joaquin delta (NOAA Fisheries 2020b).

The green sturgeon spends more time in the marine environment than other sturgeon species, with the majority of their time spent in coastal or offshore waters. However, this species frequently enters estuaries and bays, such as the SF Bay Estuary, to feed during the summer (CDFW 2020). Adults and juveniles are benthic feeders, with juveniles in the SF Bay Estuary known to feed on opossum shrimp (*Neomysis mercedis*) and amphipods (*Corophium* sp.) (Radtke 1966, cited in Moyle 2002).

Until maturity, green sturgeon spend summers in bays or brackish water areas feeding, then migrate to marine habitats for the remainder of the year. Once mature, which occurs at approximately 15 years of age, green sturgeon migrate from the marine environment to freshwater river systems to spawn. Migration into the freshwater system for the Southern DPS occurs from mid-February through early May and some individuals leave directly after spawning, while others spend the summer in the freshwater system and migrate downstream in autumn (CDFW 2020; NOAA Fisheries 2020b). Spawning occurs in deep, fast, cool waters in the upper Sacramento, Yuba, and Feather rivers; and after hatching, they spend approximately 1 year migrating down to the Sacramento/San Joaquin delta and estuary. Juveniles then spend an additional few years rearing in the delta or estuary before dispersing to saltwater (Beamesderfer and Webb 2002; CDFW 2020; NOAA Fisheries 2020b).

#### *3.2.8.2 Potential for Occurrence*

The submerged portion of the Project is suitable foraging habitat for adult and juvenile green sturgeon throughout the year, as well as maturation habitat for juveniles (NOAA Fisheries 2022p). Additionally, all waters of the SF Bay Estuary, including the Project site, are critical habitat for this species.

### *3.2.9 Pacific Herring*

#### *3.2.9.1 Status and Life History*

The Pacific herring (*Clupea pallasii*) in California is not an ESA-listed species, but is a state-managed commercial fishery with a fishery management plan (FMP) and historical importance, especially in SF Bay (CDFW 2022a). NMFS has been petitioned multiple times since 1999 to list various stocks (i.e., Washington, Alaska) of Pacific herring under the ESA, all of which have been determined to not be warranted at the time (NOAA Fisheries 2022d).

Pacific herring are found in offshore coastal waters during the non-breeding season in spring and summer in California. This species forages on plankton in the open ocean near upwelling zones, as well as crustaceans and small fishes, and will remain in the same school for multiple years (CDFW 2022b; NOAA Fisheries 2022d).

Once a year, from October through April (peak November through March), adult Pacific herring migrate from the open ocean to bays and estuaries to spawn, with the largest spawning aggregations in California occurring in SF Bay and Tomales Bay. Schools of Pacific herring first move into the deep water of the bays and estuaries and wait for their sexual organs to mature, which can take up to 2 weeks. Following this maturation period, adults then move into shallower areas with low salinity and calm waters to spawn over vegetated or rocky intertidal areas, or anthropogenic substrates. After spawning, adults move offshore again during the spring and summer to feed (CDFW 2019; CDFW 2022b).

Eggs hatch after 8 to 14 days, dependent on water temperature, and mainly drift with currents and tides until the yolk sac is depleted. Juvenile herring then remain in the bay or estuary through the summer

while feeding on plankton; all migrate to open ocean waters in the fall. Individuals typically begin to spawn after their second or third year (CDFW 2019).

#### 3.2.9.2 Potential for Occurrence

Intertidal habitats in SF Bay, such as at the cable landing sites, have the potential to serve as spawning habitat and egg attachment locations during the spawning season (October to April). During this time, adults and eggs have the potential to be present in the waters at, and adjacent to, the Project landing sites. The open waters within and adjacent to the Project area are suitable habitat for juvenile Pacific herring during the summer, while adults will not be present during the spring and summer months.

### 3.2.10 Steelhead - Central California Coast Distinct Population Segment

#### 3.2.10.1 Status and Life History

The Central California Coast DPS of steelhead (*O. mykiss irideus* pop. 8) was federally listed as threatened on 18 August 1997 (62 FR 43937) and the threatened status was reaffirmed on 5 January 2006 (71 FR 834) and 14 April 2014 (79 FR 20802). This DPS includes all naturally spawned anadromous populations below impassable barriers in California streams from the Russian River to Aptos Creek and the drainages of San Francisco, San Pablo, and Suisun bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin rivers. Also included in the DPS are the Don Clausen Fish Hatchery Program and the Kingfisher Flat Hatchery Program (NOAA Fisheries 2020c).

Critical habitat for this DPS was designated on 2 September 2005, with an effective date of 2 January 2006. This designation includes multiple drainages into south SF Bay, though none of these drainages are located near the Project area (NOAA Fisheries 2020c).

All Central California Coast DPS steelhead are winter-run, which typically begin their spawning migration as adults during the fall/winter, when freshwater flows are at their highest. Generally, this is between the months of December and February. Spawning occurs within a few weeks to a few months from when they enter freshwater, around February to April (McEwan and Jackson 1996; Moyle 2002; Leidy 2007). Steelhead may not die after spawning like Pacific salmon. Adults, therefore, may migrate back to the ocean and return to spawn again for multiple years. Juvenile Central California Coast DPS steelhead typically spend 2 years or up to 4 years in a freshwater river system before migrating downstream to the ocean (California Trout 2019).

#### 3.2.10.2 Potential for Occurrence

The open waters within and adjacent to the Project area provide migratory habitat for adult Central California Coast DPS steelhead. Adults migrating to and from upstream spawning habitat in south SF Bay tributaries (e.g., Coyote Creek) may pass through the action area, typically between December and April. Juveniles may migrate downstream through the south SF Bay at any time throughout the year.

## 3.3 Conservation Areas and Marine Protected Areas

Conservation areas are protected areas that are identified to conserve, protect, preserve, and/or enhance endangered, threatened, and other species and their habitats, as well as important cultural resources. In comparison, Marine Protected Areas (MPAs) are marine areas where the government has limited human activities. The U.S. national system of MPAs is governed primarily through NOAA and the Department of the Interior. These agencies are responsible for comprehensive conservation of the nation's cultural marine heritage and implementation of ecologically and economically sustainable use of the marine environment.

Two global protected area databases were analyzed to identify protected areas within the Project action area: the World Database on Protected Areas (Protected Planet 2022) and the Marine Protection Atlas (MPAtlas 2022). Protected Planet is a global protected areas database, covering both terrestrial and marine protected areas while MPAtlas focuses exclusively on MPAs.

Given below are the protected areas identified in south SF Bay closest to the cable route. However, all protected areas, including MPAs, are outside both the Project area and the action area (1.62-nautical-mile [3-kilometer]) buffer around the marine cable route). Almost the entire southern margin of SF Bay is inside the Don Edwards National Wildlife Refuge, which extends from San Mateo County to Alameda County. The proposed Project is approximately 6.6 miles (10.6 kilometers) from the nearest border of the Don Edwards National Wildlife Refuge Protected Area, which is well outside the action area. Other MPAs within SF Bay include (Figure 3-1):

- **Eden Landing Ecological Reserve**: In 1998, this area of salt ponds, diked marshes, and transitional areas was designated an ecological reserve, managed by California Department of Fish and Wildlife. The closest border of this reserve is approximately 3.3 miles (5.3 kilometers) from the proposed Project, outside the action area.
- **Bair Island State Marine Park:** This area has historically been tidal salt marsh and was designated as an ecology reserve by the Fish and Game Commission in 1986. Bair Island is composed of approximately 3,000 acres of former salt ponds. Approximately 2,000 acres are within the Bair Island Ecological Reserve on the Middle and Outer islands. The remainder of the islands are part of the Don Edwards National Wildlife Refuge (CDFW 2022c). The closest border of this reserve is approximately 6 miles (9.6 kilometers) from the proposed Project, outside the action area.
- **Redwood Shores Ecological Reserve**: This 268-acre area was designed as an ecological reserve by the Fish and Game Commission in 1976 and consists of salt marsh, levees, and mud flats (CDFW 2022d). The closest border of this reserve is approximately 5 miles (8 kilometers) from the proposed Project, outside the action area.
- **SF Bay Tidelands:** This MPA was designed in 1973 as a National Private Conservation Land. According to the U.S. Geological Survey PAD-US (USGS 2022), this MPA is managed by The Nature Conservancy and it protects the local biodiversity, with a sustainable use of natural resources. This MPA is approximately 2 miles (3.2 kilometers) north of the proposed Project, outside the action area.
- **Other Protected Areas:** Other protected areas, such as the Robert W. Crown State Marine Conservation Area and the Golden Gate National Recreation Area are more than 6.2 miles (10 kilometers) from the Project area and therefore are not included here.

According to the U.S. Geological Survey PAD-US database (2022), two local parks are located along the Alameda southern coastline in SF Bay, but neither has any known mandate for biodiversity protection:

- Crown Memorial Regional Shoreline – through Robert W. Crown Memorial State Beach and Elsie Roemer Bird Sanctuary.
- Alameda Shoreline Park – Through Bay Farm Island western shoreline.

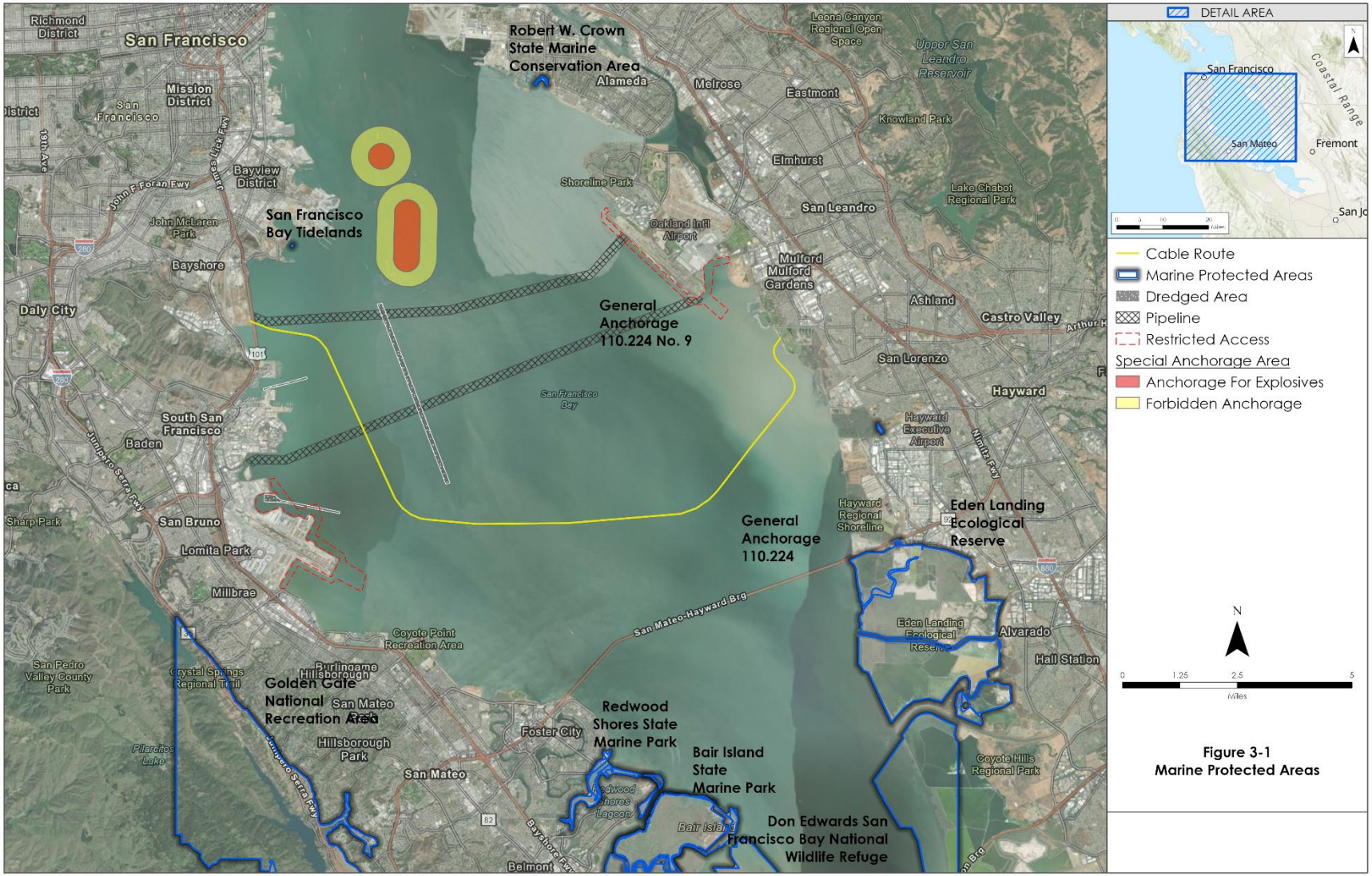


**Figure 3-1**
**Marine Protected Areas**

**Figure 3-1. Marine Protected Areas and Other Avoidance Areas in South San Francisco Bay**

## 3.4 Essential Fish Habitat

Section 3(10) of the Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Habitat Areas of Particular Concern (HAPCs) are considered a subset of EFH and are EFH areas that are stressed by development, rare, especially vulnerable to degradation from human impacts, and/or provide ecological functions for federally managed species (NOAA Fisheries 2020d).

The Pacific Fishery Management Council manages several species units in California through FMPs, which are required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), to describe and identify EFH for a fishery to minimize, to the extent practicable, adverse effects on such habitat caused by fishing (16 U.S.C. 1853; MSA 303(a)(7)). The following interpretations have been made by NMFS to clarify this definition:

- "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include historical areas if appropriate.
- "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities.
- "Necessary" means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem.
- "Spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (PFMC 2016; PFMC 2020).

SF Bay, including the marine portion of the action area, has been designated as EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon.

### *3.4.1 Pacific Coast Groundfish Fishery Management Plan*

Species covered by the Pacific Coast Groundfish FMP include more than 90 species that generally live on or near the substrate, including rockfish, flatfish, roundfish, sharks and skates, and others (PFMC 2020). Due to the wide variety of life histories covered by the species in the Pacific Coast Groundfish FMP, some of the covered species may occur along the cable route and within the marine action area.

Pacific Coast Groundfish EFH is defined as all marine waters and substrates of California "from the mean higher high water level to depths of 3,500 meters or less, or the upriver extent of saltwater intrusion…seamounts in depths greater than 3,500 meters…and areas designated as HAPCs not previously identified by the above criteria" (PFMC 2020). All of SF Bay, including the marine action area, is therefore groundfish EFH.

### *3.4.2 Coastal Pelagic Species Fishery Management Plan*

Seven commercially important stocks are managed under the Coastal Pelagic Species FMP, including four finfish species, a squid species, and eight krill species. The managed species include stocks of Pacific sardine (*Sardinops sagax*), Pacific (chub) mackerel (*Scomber japonicus*), northern anchovy (*Engraulis mordax*; Central and Northern subpopulations), jack mackerel (*Trachurus symmetricus*), market squid (*Doryteuthis opalescens*), and the following krill species: *Euphausia pacifica*, *Thysanoessa spinifera*, *Nyctiphanes simplex*, *Nematocelis difficilis*, *T. gregaria*, *E. recurva*, *E. gibboides*, and *E. eximia*. Ecosystem component species that are additionally monitored under this FMP include Pacific herring and jacksmelt (*Atherinopsis californiensis*), as well as the species that are shared between all of the Pacific Fishery Management Council's FMPs discussed in the Groundfish FMP description (PFMC 2021a). Similar to the Pacific Coast Groundfish species, the species covered by the Coastal Pelagic FMP have a

wide variety of life histories. Therefore, it is possible that some of these species may occur in SF Bay along the cable route and within the marine action area.

The definitions of EFH for the stocks managed under the Coastal Pelagic Species FMP vary based on the taxa (i.e., finfish, squid, and krill). EFH for coastal pelagic species is based on a thermal range bordered by the geographic range that these species may be found during any life stage, where coastal pelagic species have occurred historically during periods of similar environmental conditions, or where environmental conditions do not preclude colonization by coastal pelagic species (PFMC 2021a). "All marine and estuarine waters from the shoreline along the coasts of California… offshore to the limits of the exclusive economic zone and above the thermocline where sea surface temperatures range between 10 to 26 degrees Celsius…" is considered EFH for coastal pelagic species covered by this FMP (PFMC 2021a). "EFH for all species of krill extends the length of the West Coast from the shore to the 1,000 fathoms isobath and to a depth of 400 meters" (PFMC 2021a). The identification of EFH for coastal pelagic species accommodates the fact that the geographic range of the included coastal pelagic species varies widely in response to the temperature of the upper mixed layer of the ocean. All of SF Bay, including the Project area, is therefore considered EFH for coastal pelagic species based on these definitions.

### 3.4.3 Pacific Coast Salmon Fishery Management Plan

The species managed by the Pacific Coast Salmon FMP include Chinook, coho, chum (*Oncorhynchus keta*), sockeye (*Oncorhynchus nerka*), steelhead, and pink salmon (*Oncorhynchus gorbuscha*), though Chinook and coho salmon are the main target species for management due to having the largest ocean fisheries. As discussed in Table 2-1, coho salmon of the Central California Coast ESU and steelhead of the Central California Coast DPS have suitable migratory habitat within the action area and have the potential to occur during migrations to or from the ocean. The remaining salmon species are unlikely to be found within the marine action area due to the lack of spawning drainages within south SF Bay.

Pacific Coast Salmon EFH includes those waters and substrate required by salmon to support long-term sustainable salmon fisheries and salmon contributions to a healthy ecosystem. In estuarine and marine areas, Pacific Coast Salmon EFH extends from the extreme high tide line in nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (200 nautical miles or 370 kilometers) offshore of Washington, Oregon, and California north of Point Conception (PFMC 2021b). Therefore, the entire marine action area is considered EFH for Pacific coast salmon.

### 3.4.4 Habitat Areas of Particular Concern

This section provides a summary of HAPCs within the action area. While HAPC designation does not confer additional restriction or protection on an area, it does indicate areas of prioritized conservation, management, or research (NOAA Fisheries 2021c).

The NOAA Fisheries Essential Fish Habitat Mapping Tool has identified estuaries, canopy kelp, seagrass, and rocky reefs as HAPC for groundfish, while complex channels and floodplains, thermal refugia, spawning habitat, estuaries, and marine and estuarine submerged aquatic vegetation are HAPC for salmon (NOAA Fisheries 2022k). As an estuary, all of SF Bay is mapped as groundfish HAPC and, while not mapped as salmon HAPC, may still qualify. Eelgrass, which is a type of seagrass, is another HAPC located within SF Bay and is therefore discussed further below, but the cables were routed to avoid all mapped eelgrass.

#### 3.4.4.1 Eelgrass Habitat

Seagrasses are usually found in sheltered and shallow waters (up to 13 feet [4 meters] deep), such as bays and estuaries. Common eelgrass (*Zostera marina*), a species of seagrass, grows in nearshore coastal zones, estuaries, and embayments, forming beds and meadows that create nursery and foraging habitat for multiple trophic levels. Eelgrass occurs most commonly in bays and estuaries; however, a different species (*Z. pacifica*, Pacific eelgrass) can occur in habitats further offshore (Noble and Larry Paul 2012; Nielsen et al. 2018). The species found in SF Bay is common eelgrass.

Eelgrass provides refuge, foraging, and nursery ecological functions for supporting other marine life; plays a key role in nutrient cycling, entrapment, and fixation of suspended matter; stabilizes sediment; and adds oxygen into the water. These functions promote better water quality and overall ecosystem health (CDFW 2008; Obaza 2014).

Eelgrass habitat is considered EFH and an HAPC under the Magnuson-Stevens Act and the Pacific Fishery Management Council. Seagrass conservation measures are managed by NOAA Fisheries, who map and monitor seagrass extent. NOAA consultations are guided by the California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA 2014), which recommends no net loss of eelgrass habitat function for California. Any impacts on eelgrass would require post-impact surveying and compensatory mitigation.

The Project was routed to avoid mapped eelgrass in SF Bay. On the west side of SF Bay, mapped eelgrass beds are located offshore of Coyote Point Recreational Area, south of the proposed cable route (Figure 1-4; NOAA Fisheries 2022k). The closest mapped eelgrass to the cable route is one small, approximately 129 square foot (12 square meter) area of eelgrass located 1,140 feet (347 meters) from the planned cable route on the west side of SF Bay (Figure 1-4). On the east side of SF Bay, mapped eelgrass beds are located offshore of the Robert W. Crown Memorial State Beach and Bayfarm Island north of the proposed cable route and offshore of the Eden Landing Ecological Reserve south of the cable route. The closest mapped locations on the east side of SF Bay are approximately 4.1 miles (6.6 kilometers) southeast and 4.6 miles (7.5 kilometers) north of the cable route (Figure 1-4; NOAA Fisheries 2022k). All mapped locations of eelgrass are outside the Project action area.

#### 3.4.4.2 Kelp Canopy and Rocky Reefs

Both kelp canopy and rocky reefs are groundfish HAPCs managed by NOAA Fisheries. Neither of these HAPC have been identified in the Project action area (NOAA Fisheries 2022k).

## 3.5 Critical Habitat

The waters of the action area are designated critical habitat for green sturgeon (*A. medirostris*) and the Central California Coast DPS of steelhead (*O. mykiss irideus* pop. 8), which are classified as threatened species by NOAA Fisheries (Figure 1-4).

### 3.5.1 Green Sturgeon – Southern Distinct Population Segment

Critical habitat for the Southern DPS green sturgeon (*A. medirostris*) was designated by NMFS on 9 October 2009 (74 FR 52300) and took effect on 9 November 2009. This designation includes all waters of SF Bay Estuary, which includes the action area in the south SF Bay, and the Sacramento/San Joaquin delta (NOAA Fisheries 2020b).

### 3.5.2 Steelhead – Central California Coast Distinct Population Segment

Critical habitat for Central California Coast DPS steelhead (*O. mykiss irideus* pop. 8) was designated on 2 September 2005, with an effective date of 2 January 2006. This designation includes multiple drainages into the south SF Bay, though none of these drainages are near the Project area (NOAA Fisheries 2020c).

# 4. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

This section of the BA identifies potential adverse effects of the proposed Project on federally listed or candidate species under NMFS jurisdiction, critical habitat, and EFH. Potential effects on species are based on the current Project description and engineered designs, likelihood of each species to occur within the action area, and each species' biological growth, reproduction, feeding, resting, and cover requirements as appropriate. Each species is discussed, including designated critical habitat for the species within the action area (if applicable), expected or potential Project-related effects on the species, and avoidance and minimization measures proposed to avoid or reduce Project-related impacts on the species.

Project-related effects on plant and wildlife species can be direct, indirect, permanent, and/or temporary. Direct effects are those occurring within the action area during Project construction or implementation. Indirect effects are those generally occurring later in time after construction has been completed.

## 4.1 Potential Impacts

Installation, operation, and repair of the marine components of the Project have the potential to result in direct and indirect effects on the marine species or groups identified below either through interactions with species, or through habitat modification. Federally protected species that have the potential to occur and are likely to occur in the action area include species identified in Table 2-2. Potential direct impacts of the Project on these species are discussed below.

### *4.1.1 Sediment Disturbance*

Project activities have the potential to result in the temporary suspension of sediment, and disturbance of soft-bottom communities. Impacts on soft-bottom benthos may include disturbance to mobile organisms, crushing or mortality of infauna or epifauna, or the creation of localized sediment plumes; however, all of these impacts are expected to be temporary and localized along the immediate cable corridor.

Specifically, installation of the cables via jet sled and hand jetting is anticipated to have the largest impact on soft-bottom habitats, followed by the PLGR. However, disruptions of soft sediments in the bay environment during barge anchoring and grounding (if it occurs), ROV activities, operations, or abandonment also have the potential to suspend fine sediments. These activities may all affect the filtration capabilities of filter feeding benthic organisms by causing either clogging or complete burial in the localized area. Suspended sediments have the potential to reduce the affected areas' water quality including dissolved oxygen level, pH, temperature, and clarity; light penetration; feeding activity in invertebrates; scour external surfaces of benthic organisms; and clog filtration systems or digestive organs in invertebrates, or gills in fish entrained in the plume (Kerr 1995; Bell et al. 2015). There is also the potential for smothering localized depositions of demersal eggs and larvae during the construction activities or temporarily changing the available substrate suitable for deposition following construction; however, this is not expected to affect the overall functionality or health of the ecosystem. More extreme responses from fish and invertebrates are not expected with this level of construction; larger plumes of sediment can have impacts on movements, avoidance, feeding impairment, physiological changes, altered growth rates, reduced fecundity, and reduced quality of food sources (Kerr 1995).

Increased turbidity typically is restricted to the region of the water column immediately above and adjacent to the bay floor where the activity is occurring. Depending on water depth and natural wave or current energy generated through the water column, any generated turbidity plumes can be expected to dissipate quickly, and any resuspended sediments would settle to the bay floor. During ROV surveys of proposed cable routes, marine sediments frequently are disturbed by the ROV thrusters and generate similar turbidity plumes to those expected during jetting (AMS 2008, 2016). These turbidity plumes

dissipate quickly, and the resuspended sediments settle within minutes of the disturbance. Similarly, rapid settlement of sediments can be expected following cable jet sled installation activities.

Effects on soft-bottom habitats during PLGR, cable installation, ROV activities, operations, or abandonment are direct, but are anticipated to be temporary and localized. Motile invertebrates, fish, and other wildlife, including federally listed species, in the vicinity are anticipated to avoid the jet sled, grapnel, anchors, and areas of human activity, and recolonize the area after the equipment has been removed.

#### *4.1.1.1 Avoidance and Minimization Measures*

Sediment disturbance is anticipated to be a less than significant impact without avoidance and minimization measures and therefore none are proposed.

### *4.1.2 Vessel Strikes*

Vessel speed has been correlated with marine mammal and endangered species injury or mortality, where strikes are associated with a mean vessel speed of 18.1 knots (Jensen and Silber 2003; Hazel et al. 2007). However, vessel strikes are unlikely during cable installation because Project vessels would operate at low speeds (between 0.5 and 1 knot) and proceed along a predictable path. The movement and sound of the vessel could be detectible to marine mammals, giving them the opportunity to avoid Project vessels. However, the possibility remains that special-status marine species that are physically compromised due to illness, injury, or inability to perceive environmental stimuli could be struck. Strikes could also occur during resting times, or in association with curiosity and approach to the cable and support vessels. These impacts would be direct and potentially fatal. Implementation of avoidance and minimization measures will be used, as discussed below.

#### *4.1.2.1 Avoidance and Minimization Measures*

The measures identified in Section 5, Mitigation and Conservation Measures, including worker training, are recommended to avoid and minimize impacts on marine wildlife resulting from vessel strikes. Implementation of these mitigation measures will reduce potential vessel strike impacts to less than significant levels.

### *4.1.3 Noise*

The Project-related activities associated with the offshore installation of steel conduits and burial of the fiber optic cables would generate temporary and isolated non-impulsive underwater noise. The HDD method and vessel support for the landings would generate non-impulsive, continuous noise. The HDD-related activities are anticipated to occur primarily during daylight hours, although 24-hour operations could occur. Installation and burial of the cables to a depth of at least 3.3 feet (1 meter) offshore between the steel conduits would occur 24 hours a day for about 2 weeks. Peak nearshore background underwater noise levels have been reported averaging between 128 and 138 decibels (dB) (re 1 µPa at 3.3 feet [1 meter]) for nearshore coastal waters in central California (Fabre and Wilson 1997). Project-related marine activities can be expected to generate the following ranges of underwater noise:

- Cable Plowing: Studies in the North Sea assessing cable trenching and plowing projects for offshore wind farms reported peak underwater noise sound levels (sound pressure levels [SPLs]) of 178 dB (re 1 µPa at 3.3 feet [1 meter]) (Nedwell et al. 2003).
- Cable Installation and Lay Vessel: Peak underwater noise levels for cable-lay vessels have been reported to range between 170 and 180 dB (re 1 µPa at 3.3 feet [1 meter]) (Hale 2018), and between 160 and 180 dB (re 1 µPa at 3.3 feet [1 meter]) for small work vessels (Caltrans 2015), depending on the vessel size and design.

The following sections discuss the expected impact of underwater noise on fishes and marine mammals for special-status species groups expected within the Project marine study area.

### 4.1.3.1 Fishes

In the absence of formal non-impulsive, continuous noise thresholds for fishes, the established impulsive noise thresholds of 183 dB and 187 dB for fishes less than and greater than 2 grams in mass, respectively, can be used (Fisheries Hydroacoustic Working Group 2008). As detailed above, Project-related non-impulsive underwater noise levels from cable installation and cable-lay vessel operations are below these established sound criteria for acute impacts on fish. Using the 150 dB noise level established for non-lethal behavioral responses in fish (Andersson et al. 2007; Wysocki et al. 2007; Mueller-Blenkle et al. 2010; Purser and Radford 2011), it is estimated that generated underwater noise would drop to this level in less than 210 feet (64 meters) from the noise source. Furthermore, potential ambient noise levels are anticipated to be attained within 420 to 840 feet (128 to 256 meters) from the source (AMS 2020). Consequently, the non-impulsive underwater sound generated by the Project is not expected to cause any substantive impact on fishes.

### 4.1.3.2 Marine Mammals

As discussed above, Project-related work vessel activities can be expected to generate peak underwater noise levels ranging between 170 and 180 dB, based on anticipated vessel sizes. In 2018, NOAA established updated thresholds for the onset of permanent threshold shifts (PTS) and temporary threshold shifts (TTS) for impulsive and non-impulsive noise sources based on marine species hearing groups. These thresholds identify the levels at which a marine mammal is predicted to experience changes in hearing sensitivity, whether temporary or permanent, from acute exposure to loud underwater anthropogenic (human-caused) sound sources. The updated impulsive noise thresholds are dual metric, meaning whichever results in the largest isopleth for calculating PTS or TTS onset should be used. NOAA recommends that the peak SPL threshold for impulsive noise be used if a non-impulsive sound has the potential to exceed the peak SPL noise threshold associated with impulsive sounds. Therefore, the following PTS and TTS values shown in Table 4-1 were used for the Project's underwater noise analysis because the Project-related activities would create non-impulsive underwater noise that are not expected to exceed the peak SPL thresholds for impulsive sound (NOAA Fisheries 2018).

**Table 4-1. Non-Impulsive Cumulative Sound Exposure Levels for Marine Mammals**

| Marine Mammal Group | Onset of Permanent Threshold Shifts (Cumulative SEL) | Onset of Temporary Threshold Shifts (Cumulative SEL) |
|---|---|---|
| Baleen whales | 199 dB | 179 dB |
| Dolphins and toothed whales | 198 dB | 178 dB |
| Porpoises | 173 dB | 153 dB |
| True seals | 201 dB | 181 dB |
| Sea lions and fur seals | 219 dB | 199 dB |

*Source: NOAA Fisheries 2018*

*Note: dB = decibel; SEL = sound exposure level*

With the exception of the sound exposure levels established for porpoises, all NOAA-established underwater thresholds for non-impulsive sound levels (PTS and TTS) are greater than, or at the upper limit of, the underwater noise generated by cable installation equipment and vessels. For any porpoises to be affected by Project-generated underwater noise, they would need to be positioned at the noise source,

which is unlikely to occur. As discussed above for underwater noise effects on fishes, assuming a 5 to 6 dB decrease in noise level for every doubling of the distance from the noise source, cable installation underwater noise can be expected to decrease to levels less than 153 dB approximately 26 feet (8 meters) from the sound source.

The harbor porpoise is the only porpoise species determined to be present and likely to occur within the Project marine study area. It is expected that marine wildlife would avoid the immediate area where underwater noise would be generated during cable-laying activities. Sound levels generated by the Project would fall below ambient underwater noise levels beyond 105 feet (32 meters) from the cable-lay vessel or diver support boat.

Given the sources of noise already present in SF Bay, potential impacts, such as increased disruption of animal movements or other behavior from vessel presence and increased underwater noise during installation, would be temporary and localized to the immediate vicinity of the vessel. To further minimize potential impacts from noise, avoidance and minimization measures would be implemented.

#### *4.1.3.3 Avoidance and Minimization Measures*

The measures identified in Section 5, Mitigation and Conservation Measures, including worker training and a herring spawning work window, are recommended to avoid and minimize impacts on marine wildlife resulting from noise. Implementation of these mitigation measures would reduce noise impacts to less than significant levels.

### *4.1.4 Cable Entanglement*

Modern fiber optic cable installations provide low potential for exposures or suspensions of cables that could entangle marine species. Whale entanglements described in a 1957 paper raised concerns about hazards posed to marine species. The paper documented and investigated 14 instances of sperm whale entanglements with submarine cables at depths up to 3,720 feet (1,134 meters; Heezen 1957). These whale entanglements were due to telegraphic cables that were surface-laid (never buried) and did not involve modern fiber optic cables. Replacement of historical telegraphic cables with modern fiber optic cable systems and installation techniques has improved torsional and flexion characteristics in subsea cables, as compared to historical cables (Wood and Carter 2009), virtually eliminating the potential for exposed cable to entangle marine species. In addition, burying the cables to approximately 3 to 6 feet (1 to 2 meters), as would be done for this Project, would further reduce or eliminate the potential for entanglement. No mammal or wildlife entanglements have been reported in fiber optic cable systems installed in California waters since 2000 (AMS 2020).

Fishing gear snagged and sacrificed on exposed cable is another potential source of entanglement for marine species. The majority of gear that becomes snagged and thereby abandoned or sacrificed by fishermen is caught on marine debris (Laist 1997; Watters et al. 2010), not necessarily on active and maintained cables. Nevertheless, snagged nets or fishing gear may incidentally entangle marine wildlife until it is removed or recovered.

The potential for exposed cables to snag or become entangled with commercial fishing gear would be reduced by routing and installing cables with state-of-the-art cable route planning and installation techniques designed to increase burial success. The proposed route for the Project was developed based on desktop and seafloor surveys that mapped substrate types along the cable route. The cables would be buried in soft sediments to a depth of between 3 and 6 feet (1 and 2 meters) where feasible from steel conduit to steel conduit across SF Bay. In areas of hard bottom, the cables would be surface-laid with only enough slack to allow the cables to conform to the bay floor. Please note, no hard-bottom habitat was identified in the geophysical survey of the cable route (A2Sea 2022). Post-lay burial and inspection would be conducted by an ROV in accordance with the installation procedures outlined in Section 1.5.5,

Post-Lay Inspection and Burial. If areas of exposed cables are identified during the post-lay inspection survey, the segments would be reburied to a depth of 3 to 6 feet (1 to 2 meters) depth, or to the depth feasible for the substrate.

Potential impacts on special-status species due to entanglement would be direct and potentially fatal, although with proper burial, impacts due to entanglement are anticipated to be less than significant. Implementation of avoidance and minimization measures would be used, as discussed below, to further reduce potential impacts.

#### *4.1.4.1 Avoidance and Minimization Measures*

The measures identified in Section 5, Mitigation and Conservation Measures, including cable burial and gear retrieval, are recommended to avoid and minimize potential impacts on marine wildlife resulting from fiber optic cable entanglement. Implementation of these mitigation measures would reduce entanglement impacts to less than significant levels.

### *4.1.5 Contaminant Release*

Project activities require the use of vessels and equipment that have the potential to release fuel, oil, or lubricants into the marine environment. Petroleum product releases into the marine environment have the potential to impact all trophic levels and taxa of marine wildlife at some level depending on the quantity released. Accidental releases could expose marine special-status species to oil or hazardous materials, resulting in direct impacts, such as becoming oiled or sickened, or indirect impacts through destruction or degradation of habitat, food sources, or nursery grounds.

Vessels operate under strict regulatory requirements that include measures to prevent and respond to an unforeseen accident. Requirements include federal and state oil spill prevention and response requirements.

HDD of the steel conduits poses a small risk of an accidental release of drilling fluid to the marine environment. Drilling fluid is composed of water and bentonite, which is a natural marine clay. The drilling fluid is used to lubricate the bore head cutting tool and transport borehole cuttings back to shore. During the HDD process, it is possible that some bentonite drilling fluid could be released to the SF Bay floor and thus into the water column. An accidental release of drilling fluid to the bay floor could result in a temporary negative impact on the marine environment and associated marine biota. The bentonite contained in the drilling fluid could result in short-term burial and smothering of benthic epifauna and infauna, clog fish gills, and cause increased turbidity around the area of release. Since 2000, bentonite fluid has been detected in only 4 of 29 HDD-bored coastal landings for which records are available (AMS 2020). In each of these discharges, the borehole locations were suspected to be naturally fractured due to the proximity of known geologic fault lines.

In some cases, an accidental release of drilling fluid occurred just prior to the drillhead exiting the bay floor; the drilling fluid immediately was substituted for water, which curtailed any further loss of drilling fluid. Rhodamine dye, an environmentally safe fluorescent dye, is added to the drilling fluid to enable early detection of any discharge of bentonite to the marine environment by an onshore or offshore marine biological monitor. Additionally, water would be used to drill the last 100 to 130 feet (30 to 40 meters) of each steel conduit for the current Project to reduce the potential for impacts.

Contaminant releases can result in direct impacts on special-status species, which can be temporary or long-term, depending on the contaminant. Implementation of avoidance and minimization measures would be used, as discussed below, to reduce impacts to less than significant levels.

#### 4.1.5.1 Avoidance and Minimization Measures

The measures identified in Section 5, Mitigation and Conservation Measures, including preparation and implementation of an Inadvertent Return Plan and Spill Contingency and Hazardous Materials Management Plans, are recommended to avoid and minimize impacts on marine wildlife resulting from accidental fluid releases. Implementation of these mitigation measures would reduce contaminant release impacts to less than significant levels.

### 4.1.6 Lighting

Project vessels would use lighting to comply with U.S. Coast Guard regulations for navigation and safety. Artificial lighting can act as an attractant for marine species, which could interfere with feeding and spawning, and attract predators. Project vessels will not require excessive lighting, and will transit through the action area over a brief period. Therefore, the effects of vessel lighting would be localized and temporary.

#### 4.1.6.1 Avoidance and Minimization Measures

The measures identified in Section 5, Mitigation and Conservation Measures, are recommended to avoid and minimize impacts on marine wildlife resulting from lighting. Implementation of these mitigation measures would reduce lighting impacts to less than significant levels.

### 4.1.7 Ballast Water

Project vessels would not exchange ballast water within the exclusive economic zone, and would comply with applicable international standards related to ballast water exchange. Therefore, the Project would not have the potential to introduce marine invasive species in the action area, and there would be no impact on federally protected marine species in the action area as a result of introduction of marine invasive species through ballast water exchange.

#### 4.1.7.1 Avoidance and Minimization Measures

Ballast water is anticipated to be a less than significant impact without avoidance and minimization measures and therefore none are proposed.

### 4.1.8 Assessment of Impacts

The proposed Project **may affect** California sea lion, common bottlenose dolphin, harbor porpoise, harbor seal, coho salmon (Central California Coast ESU), green sturgeon (Southern DPS), and steelhead (Central California Coast DPS) regardless of when the Project activities occur. These species are known to inhabit or are likely to occur in the open waters adjacent to the Project area throughout the year. The proposed Project **may affect** northern elephant seal, northern fur seal, and Pacific herring depending on the time of Project activities because these species are only seasonally present in the action area.

After the implementation of the mitigation measures for the direct and indirect effects for this Project, the proposed Project is **not likely to adversely affect** all federally listed species likely to be present in the action area.

## 4.2 Critical Habitat

The proposed Project ***may affect*** designated critical habitat for green sturgeon (Southern DPS) and steelhead (Central California Coast DPS). Potential adverse effects associated with the Project include temporary impacts on water quality and temporary reduction in migration, resting, and foraging areas due

to noise and turbidity generated from PLGR, fiber optic cables installation, and post-lay inspection and burial (if needed) activities. Such temporary and localized impacts are not expected to adversely affect primary constituent elements of green sturgeon and steelhead (rearing and adult migration) critical habitat. As such, the proposed Project is ***not likely to adversely affect*** critical habitat for green sturgeon (Southern DPS), and steelhead (Central California Coast DPS).

#### *4.2.1.1 Avoidance and Minimization Measures*

Section 5, Mitigation and Conservation Measures, provides avoidance and minimization measures proposed to minimize potential impacts on critical habitat.

## 4.3 Essential Fish Habitat Assessment of Potential Impacts

The Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with NMFS on activities that may adversely affect EFH.

The objective of this EFH assessment is to determine whether or not the proposed action(s) “may adversely affect” designated EFH for relevant commercially, federally managed fisheries species within the proposed Project action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects on designated EFH resulting from the proposed action.

Adverse effects on EFH are defined as “any impact which reduces the quality and/or quantity of essential fish habitat… include[ing] direct or indirect physical, chemical, or biological alterations of the waters or substrate loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH” (50 CFR § 600.759). Adverse effects may also include impacts on EFH that occur outside designated EFH regions that may include site-specific or habitat-wide impacts, such as individual, cumulative, or synergistic consequences of the action.

The Pacific Coast Groundfish FMP, Coastal Pelagic Species FMP, and Pacific Coast Salmon FMP all define EFH for some portions of the water column within the marine action area (Section 3.4, Essential Fish Habitat).

The assessment of Project impacts discussed in Section 4.1, Potential Impacts, is directly applicable to a discussion of EFH impacts due to the Project. Impacts on EFH are anticipated from sediment disturbance, noise, and contaminant releases, although impacts are anticipated to be temporary, localized, and minimized with the avoidance and minimization measures provided in Section 5, Mitigation and Conservation Measures.

Likely Project activities discussed in Section 4.1, Potential Impacts, that would directly affect the identified FMP species includes turbidity caused by cable installation in soft-bottom habitats, noise, entanglement (depending on the size of entangled gear), accidental fluid releases, and lighting. These impacts are anticipated to result in temporary displacement of the FMP-managed species away from the Project activities and the temporary loss of benthic invertebrate prey species. Activities resulting in the displacement of FMP-managed species and the loss of benthic invertebrate prey species are anticipated to be temporary and limited to the area directly surrounding the cable installation route, with recolonization within a few seasons.

#### *4.3.1.1 Avoidance and Minimization Measures*

Section 5, Mitigation and Conservation Measures, provides avoidance and minimization measures proposed to minimize potential impacts on EFH.

## 4.4 Cumulative Impacts

Implementation of the avoidance and minimization measures outlined in Section 5, Mitigation and Conservation Measures, would avoid or minimize impacts on federally protected marine wildlife to the greatest extent feasible. Therefore, the Project is not anticipated to substantially contribute to cumulative impacts on marine wildlife in the action area.

# 5. MITIGATION AND CONSERVATION MEASURES

## 5.1 Avoidance and Minimization Measures

Given the potential or known occurrence of 10 federally listed species within or adjacent to the Project area (Section 1.4, Action Area), BIG would implement the following best management practices and measures presented below to avoid and minimize the effects of the proposed Project on listed species and their habitat.

At a minimum, BIG and its contractors will provide:

- **Worker Training.** A qualified biologist shall be retained to conduct mandatory contractor/worker awareness training for Project personnel. The awareness training will be provided to all personnel to brief them on the identified location of sensitive biological resources, including how to identify species (visual and auditory) most likely to be present, the need to avoid impacts on biological resources, and to brief them on the penalties for not complying with biological mitigation requirements. If new personnel are added to the Project, they shall receive the mandatory training before starting work.
- **Herring Spawning Work Window.** Work would not occur during the herring spawning period, from December 1 to March 15.
- **HDD Inadvertent Return Plan.** When using HDD equipment to install steel conduits, an inadvertent return plan will be developed which includes the following:
  - Measures to stop work, maintain appropriate control materials on the site, contain and remove drilling mud before demobilization, prevent further migration of drilling mud into the stream or waterbody, and notify all applicable authorities.
  - Control measures of constructing a dugout or settling basin at the bore exit site to contain drilling mud to prevent sediment and other deleterious substances from entering waterbodies.
  - Requirements for onshore and offshore biological monitors to monitor onshore and offshore to identify signs of an inadvertent release of drilling fluids.
  - Any abandonment contingency plans in case the HDD operations are forced to be suspended and a partially completed bore hole abandoned.
  - Complete list of the agencies (with telephone number) to be notified.
- **Spill Contingency and Hazardous Materials Management Plans.** A Spill Contingency and Hazardous Materials Management Plan will be developed for both the terrestrial and marine Project areas:
  - Terrestrial: Measures for terrestrial operations must include, but not be limited to, identifying appropriate fueling and maintenance areas for equipment, a daily equipment inspection schedule, and spill response procedures including maintaining spill response supplies on site. The terrestrial plan will identify, at a minimum, the following best management practices related to using hazardous substances:
    - Follow manufacturer's recommendations on use, storage, and disposal of chemical products used in construction.
    - Avoid overtopping construction equipment fuel gas tanks.
    - During routine maintenance of construction equipment, properly contain and remove grease and oils.

  - Conduct all equipment fueling at least 100 feet (30 meters) from wetlands and other waterbodies.
  - Properly dispose of discarded containers of fuels and other chemicals.
  - Maintain a complete list of agencies (with their telephone numbers) to be notified of potential hazardous material spills.
- Marine: For marine activities involving work vessels, the primary work vessel (cable-lay vessel) will be required to carry onboard a minimum 400 feet (122 meters) of sorbent boom, five bales of sorbent pads at least 18 inches by 18 inches square (46 by 46 centimeters), and a small powered vessel for rapid deployment to contain and clean up any small hazardous material spill or sheen on the water surface. The marine plan must provide for the immediate call out of additional spill containment and clean-up resources in the event of an incident that exceeds the rapid clean-up capability of the onsite work force.

- **Cable Burial.** The cables will be buried to approximately 3 to 6 feet (1 to 2 meters) along the length of the cable route to minimize the chance of entanglements.

### 5.1.1 EFH Conservation Measures

The following conservation measures are proposed to further minimize adverse effects on EFH:

- **Pre-lay grapnel Run.** The PLGR is anticipated, based on the geophysical survey, to be performed along the entire cable route. The PLGR would not be performed over hard-bottom substrate, but since none was identified along the route (A2Sea 2022), the entire route is expected to be run.
- **Lighting.** The number and wattage of lights would be limited to the minimum necessary for complying with U.S. Coast Guard safety and navigation standards. Searchlights may be used occasionally for short-term navigation and safety reasons.
- **Fishing Gear Retrieval.** In the event that fishermen snag and sacrifice gear on a Project cable, all feasible measures will be used to retrieve the fishing gear if doing so would not pose a risk to the cable operability or safety of the vessel and crew attempting to retrieve the snagged or sacrificed gear. NMFS will be notified within 48 hours of known gear loss or other cable entanglement. Retrieval efforts must occur no later than 6 weeks after discovering or receiving notice of the incident, unless otherwise authorized by the regulatory agencies. If full removal of gear is not feasible, as much gear as practicable will be removed to minimize harm to wildlife (e.g., fishes, birds, and marine mammals). Within 2 weeks of completing the recovery operation, a report will be provided describing (a) the nature and location of the gear (with a map), and (b) the retrieval method used for removing the entangled gear or object, or the method used for minimizing harm to wildlife if gear retrieval proves infeasible.

## 5.2 Site Restoration

The majority of Project impacts are temporary; therefore, no site restoration is proposed. The only permanent features in the action area included within this BA would be the SF Bay cables and articulated pipe installed from the HDD exit point in SF Bay to the LVs. These features would all be subsurface, minimal in width, and occur in soft-bottom areas that are expected to quickly recover and be recolonized. Therefore, a restoration plan for the proposed Project site is not necessary for this activity.

# 6. CONCLUSIONS

This BA forms the basis for the conclusions on the effects of the proposed Project on the following federally listed, NMFS jurisdictional species: California sea lion, common bottlenose dolphin, harbor porpoise, harbor seal, northern elephant seal, northern fur seal, coho salmon (Central California Coast ESU), green sturgeon (Southern DPS), Pacific herring, and steelhead (Central California Coast DPS). In addition, conclusions regarding effects on designated critical habitat for green sturgeon (Southern DPS) and steelhead (Central California Coast DPS), as well as effects on EFH (Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon), are based on the information contained herein.

The proposed installation of parallel subsea cables crossing the SF Bay from Brisbane to San Leandro **may temporarily affect** the 10 federally listed species under NMFS jurisdiction, critical habitat, or EFH at the Project site. Potential impacts on these species include temporary displacement to other foraging grounds or avoidance of active cable installation areas due to increases in noise and human activity in the action area. The Project would not result in permanent direct impacts on suitable habitat or critical habitat for these species or EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon. Due to the temporary nature of the noise and increase in human activity, the proposed Project is **not likely to adversely affect** California sea lion, common bottlenose dolphin, harbor porpoise, harbor seal, northern elephant seal, northern fur seal, coho salmon (Central California Coast ESU), green sturgeon (Southern DPS), Pacific herring, and steelhead (Central California Coast DPS). Implementation of the mitigation measures is expected to decrease any potential impacts on federally listed species.

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BANDWIDTH IG

# United States Fish and Wildlife Service Biological Assessment

San Francisco Bay Fiber Optic Cables Project

January 2023

Project No.: 0623691

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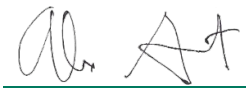
## Signature Page

January 2023

# United States Fish and Wildlife Service Biological Assessment

San Francisco Bay Fiber Optic Cables Project

Leigh Ann Boswell, PhD
Marine Biologist, Principal Consultant



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## Acronyms and Abbreviations

| Name | Description |
|---|---|
| § | section |
| AMSL | above mean sea level |
| APN | Assessor's parcel number |
| BA | biological assessment |
| BIG | Bandwidth IG, LLC |
| CDFW | California Department of Fish and Wildlife |
| CNDDB | California Natural Diversity Database |
| CNPS | California Native Plant Society |
| ESA | Endangered Species Act |
| FR | Federal Register |
| HDD | horizontal directional drilling |
| LiDAR | light detection and ranging |
| LV | landing vault |
| OHWM | ordinary high water mark |
| ppt | parts per trillion |
| SF Bay | San Francisco Bay |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |

# EXECUTIVE SUMMARY

Bandwidth IG, LLC, is proposing the installation of the San Francisco Bay (SF Bay) Cables Project (Project), a pair of parallel subsea fiber optic cables crossing SF Bay between Brisbane, California and San Leandro, California. The proposed Project would add a direct telecommunication link across SF Bay, increase telecommunications reliability, increase the diversity of telecommunication pathways, increase data transmission capacity and speeds to satisfy growing demands, and respond to increasing demand for connectivity.

This biological assessment has been prepared to facilitate consultation between the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. This biological assessment analyzes the potential impacts on federally listed species and their critical habitats, under U.S. Fish and Wildlife Service jurisdiction, that are anticipated to result from the construction activities of the proposed Project. Project effects on federally listed species and/or their critical habitats under National Marine Fisheries Service jurisdiction, essential fish habitat, or those species protected under the Marine Mammal Protection Act are analyzed in a separate biological assessment.

The Project proposes to install two cables parallel and in close proximity to one another from Brisbane to San Leandro across SF Bay with associated infrastructure on land above the ordinary high water mark. An approximately 66-foot by 66-foot (20-meter by 20-meter) area would be used for the following key Project components:

- Cable Landing Sites: Each cable landing site would be used as a staging area to park vehicles and store construction-related equipment for both terrestrial and marine work, as well as to perform horizontal directional drilling (HDD) to install the steel conduits.
- Landing Vaults: A single landing vault (12 feet long, 9 feet wide, and 10 feet deep [3.7 meters long, 2.7 meters wide, and 3 meters deep]) would be installed at each landing site and buried with a cast-iron vault cover (36 inches [91 centimeters] in diameter) at grade level, meaning flush with the ground. The landing vaults would provide access to the cables and steel conduits for maintenance activities. There are no aboveground structures associated with the Project.
- Western Steel Conduit: On the western side, a single 12-inch (30-centimeter) steel conduit containing two sub-ducts would be installed using the HDD from an entry pit (where the landing vault would eventually be installed) and would exit within the SF Bay marine environment. This steel conduit would be between 1,300 and 2,600 feet (396 to 792 meters) long, depending on the installation method and final pipeline crossing agreement. The western steel conduit would be installed seaward of the landing vault at a minimum depth between 6.5 and 66 feet (2 and 20 meters) under the cable landing site and shoreline using the HDD construction method.
- Eastern Steel Conduit: On the eastern side, a single 12-inch (30-centimeter) steel conduit containing two sub-ducts would be installed from an entry pit also exiting into the SF Bay. The steel conduit would be approximately 200 feet (60 meters) long. The eastern steel conduit would be installed seaward of the landing vault at a minimum depth of 6.5 feet (2 meters) under the cable landing site and shoreline using the HDD construction method.
- Fiber Optic Cables: A cable-lay vessel and jetting sled (with the help of two anchor-lay vessels) would install the cables across the majority of SF Bay. A jetting sled is a burial tool that would be deployed by the cable-lay vessel. Close to the HDD exit points, the cables would be installed via divers (with a dive support boat) with hand-jetting techniques. Each cable would then be pulled through its own individual steel conduit (or sub-ducts on the western side) to the landing vault at each cable landing site. Following installation of the cables, the steel conduits on the eastern side would

be buried by divers with hand-jetting to prevent exposure and protect the pipes and cables during low tide.

It was determined that the proposed installation of two subsea fiber optic cables crossing San Francisco Bay **may temporarily affect, but is not likely to adversely affect** three federally listed species under U.S. Fish and Wildlife Service jurisdiction: California Ridgway's rail (*Rallus obsoletus [longirostris] obsoletus*), California least tern (*Sterna antillarum browni*), and western snowy plover (*Charadrius nivosus nivosus*), the federal candidate longfin smelt (*Spirinchus thaleichthys*), and the federally delisted brown pelican (*Pelecanus occidentalis californicus*). Potential impacts on these species include temporary displacement to other foraging grounds due to increases in noise and human activity in the terrestrial Project action areas, as well as noise, human activity, and potential spills within the marine Project area. The Project would not result in permanent direct impacts on suitable habitat or critical habitat for these species. The Project is **not likely to affect** the federally listed California seablite (*Suaeda californica*). No critical habitat is present in the Project area or action areas. Implementation of the mitigation measures is expected to decrease any potential impacts on federally listed species.

# 1. INTRODUCTION

Bandwidth IG, LLC (BIG) is proposing the installation of the San Francisco Bay (SF Bay) Fiber Optic Cables Project (Project), two subsea fiber optic telecommunication cables crossing San Francisco Bay between San Leandro, California, and Brisbane, California (Figure 1-1). The proposed installation of the dual subsea cable system would enhance telecommunication capacity throughout the greater San Francisco Bay area and connected regions by:

- Adding a direct telecommunication link across the bay
- Increasing telecommunications reliability
- Increasing diversity of telecommunication pathways
- Increasing data transmission capacity and speeds to satisfy growing demands
- Responding to increasing demand for connectivity

Details of the activities required to install the Project are provided in Section 1.5, Project Description. Briefly, two subsea cables are planned to be buried parallel and in close proximity to each other along the bay floor of San Francisco Bay via a cable-lay vessel and jetting plow. Horizontal directional drilling (HDD) would occur at both landing sites to install steel conduits through which the cables would be pulled. Once drilling is complete, landing vaults (LVs) would be installed into the boreholes and the cables would be pulled into the steel conduits and LVs.

Terrestrial construction activities are limited to excavation of the HDD entry pits and boreholes, installation of steel conduits via HDD from the boreholes to the ordinary high water mark (OHWM), installation of the LVs into the HDD borehole following completion of the HDD activities, and pulling the cables from the HDD exit points into the steel conduits into the LVs. Aquatic construction activities are limited to the installation of the steel conduits from the OHWM to the HDD exit points in the bay on both the Brisbane and San Leandro sides, and the installation and burial of the two parallel submarine fiber optic cables across San Francisco Bay from the western HDD exit point at Brisbane to the eastern HDD exit point in San Leandro.

The activities included in this biological assessment (BA) are currently estimated to be completed within an approximately 3- to 4-month period.

## 1.1 Purpose of the Biological Assessment

The purpose of this BA is to review and analyze the proposed Project in sufficient detail to determine the extent to which it may affect federally listed species and designated or proposed critical habitat protected under the federal Endangered Species Act (ESA) of 1973. If the U.S. Army Corps of Engineers (USACE) determines that the proposed action may affect listed species or critical habitat, then, in accordance with the Code of Federal Regulations, Title 50, Part 402 (50 CFR 402), Section 7 consultation with U.S. Fish and Wildlife Service (USFWS) would be required. If the USACE determines that the proposed action is not likely to adversely affect listed species or critical habitat, and receives written concurrence from USFWS, formal consultation is not required. On behalf of BIG, this BA has been prepared for use by the USACE to determine the need for, and facilitate consultation with, the USFWS.

The regulations implementing ESA Section 7(a)(2) broadly define the scope of agency actions subject to consultation to encompass “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies” (50 CFR § 402.02). The USACE and USFWS must also consult regarding ongoing agency actions over which the federal agency retains, or is authorized to exercise, discretionary involvement or control (50 CFR § 402.03).

This BA provides the following information, per the most recent available USFWS Region 3 online guidance (USFWS 2022a) and incorporating 26 August 2019 updates to 50 CFR 402:

- A description of the proposed action, the area affected by the action, and any measures intended to avoid, minimize, or offset effects of the action;
- A map and description of all areas to be affected by the action;
- A discussion of listed species and critical habitat potentially present;
- An establishment of baseline conditions for listed species and critical habitat likely to be present;
- An analysis of the effects of the action on listed species and designated critical habitat;
- A cumulative effects assessment; and
- Determinations and conclusions.


Figure 1-1
Marine Route of the Cable Across San Francisco Bay

**Figure 1-1. Route of the Cables Across San Francisco Bay**

## 1.2 Definitions

Definitions of key terms used throughout this BA are provided here:

- *Action area*: Area directly or indirectly affected by the proposed Project. A full description of the action area is provided in Section 1.4, Action Area.
- *Project area*: Area where proposed construction would occur, including cable installation route, HDD boreholes, and the cable landing sites with staging, access, and work areas.
- *Project vicinity*: All land within 5 miles (8 kilometers) of the study area boundary.
- *Proposed Project*: The installation and burial of two subsea fiber optic cables, the excavation of one borehole at the western landing site and up to four bore holes at the eastern landing site, HDD installation of one steel conduit containing two sub-ducts at the western landing site and up to four steel conduits at the eastern landing site, the installation of one LV into each borehole at the two landing sites, and the pulling of the two cables into the two LVs. Synonymous with “Project.”
- *Study area*: The proposed Project area plus adjacent terrestrial areas.

## 1.3 Project Location

The Project is located in San Francisco Bay, California, and is limited to the installation and burial of two parallel submarine fiber optic cables from the western landing site in Brisbane to the eastern landing site in San Leandro.

The primary western cable landing site would be at the southern corner of Lagoon Road and Sierra Point Parkway in Brisbane, in an unoccupied area with Assessor’s parcel number (APN) 005-162-430, at approximate coordinates of 37°41’22.09” N and 122°23’30.59” W. Due to the complexities of local utilities, road infrastructure, and geologic conditions at the western landing site, there are currently three alternative landing sites (four in total, Figure 1-2):

- West Landing Alternative 1 is at approximate coordinates of 37°41’19.42” N and 122°23’30.15” W, located 270 feet due south of the southern corner of Lagoon Road and Sierra Point Parkway in Brisbane. This alternative is also on an unoccupied area within APN 005-162-430.
- West Landing Alternative 2 is at approximate coordinates of 37°41’19.55” N and 122°23’27.62” W, located on a narrow parcel of land, within the Highway 101 right-of-way, between the Bayshore Freeway and Sierra Point Parkway in Brisbane.
- West Landing Alternative 3 is at coordinates 37°41'15.11" N and 122°23'26.23" W, located on a narrow parcel of land in between Highway 101 and Sierra Point Parkway in Brisbane.

The eastern cable landing site, located on the eastern side of SF Bay in San Leandro, is along the Bay Trail at approximate coordinates of 37°41’14.48” N and 122°10’50.82” W, west of the Tony Lema Golf Course, and south of the Marina Dog Park within an unoccupied area within APN 080G-0910-001-06. An approximately 0.1-acre (400-square-meter) area would be used (Figure 1-3).

From the landing sites, the steel conduits would be installed via HDD boreholes to the HDD exit points in SF Bay. On the western side, a single 12-inch (30-centimeter) diameter steel conduit, with two sub-ducts, would be installed from an entry pit for both cables to be pulled through. The western steel conduit would be between 1,300 and 2,600 feet (396 and 792 meters) long, depending on the installation method and final pipeline crossing agreement, with the terrestrial portion of pipe (from landing site to OHWM) between approximately 375 to 400 feet (114 to 122 meters). The western steel conduit would be installed seaward of the landing vault at a minimum depth between 6.5 and 66 feet (2 and 20 meters) under the cable landing site, Bayshore Freeway (U.S. Highway 101), shoreline, and a portion of the bay, and would exit in

approximately 5 feet (1.5 meters) water depth. On the eastern side, a single 12-inch (30-centimeter) diameter steel conduit, with two sub-ducts, would be installed from the entry pit for both cables to be pulled through. The eastern steel conduit would be installed seaward of the landing vault at a minimum depth of 6.5 feet (2 meters) under the cable landing site, shoreline, and portion of the bay. The terrestrial portion of the steel conduit would extend approximately 175 feet (53 meters) before entering the bay, which can have a water depth of 0 foot (0 meter) at mean lower low water at the HDD exit point. The steel conduits on both sides of SF Bay would remain buried during installation and operation and would only be exposed to pull the cables into the steel conduits.

A marine geophysical survey of the cable route was conducted in summer 2022 (A2Sea 2022). The survey used hull-mounted multibeam echosounder and LiDAR to collect bathymetry (bay floor topography), a magnetometer, a sub-bottom profiler, grab samples, and core samples. These tools determined the bay floor make-up, which consisted of clay, clay with shells, clay with sand, sandy clay with shells, and clayey sand with shells. This information assists with the final proposed cable alignment of each of the cables to offer the best burial success. The cables would be installed in soft bottom substrates. No hard substrate was identified in the route survey (A2Sea 2022).

## 1.4 Action Area

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.” For the purposes of this BA, the action area was defined by analyzing the potential extent of effects of the proposed Project in the context of existing infrastructure, habitat suitability, and species sensitivity to human-caused disturbance (e.g., noise levels).

The action areas for the purpose of this BA include upland portions of the Project footprint, beginning at the approximately 0.1-acre landing site, which would include the bore entry pit and LVs, to the OHWM of San Francisco Bay along the cable route. In addition to the Project footprint, the action area includes buffers off the Project alignment to account for indirect effects on special-status species (Figures 1-4 and 1-5). The buffers included in the action area are 500 feet (153 meters) from the centerline of the cable landing sites and terrestrial cable route, up to the OHWM. Indirect effects on species using habitats above the OHWM could include noise, light, dust, and a general increase in human-related disturbance during construction.


**Figure 1-2. Western Cable Landing Site**


**Figure 1-3. Eastern Cable Landing Site**

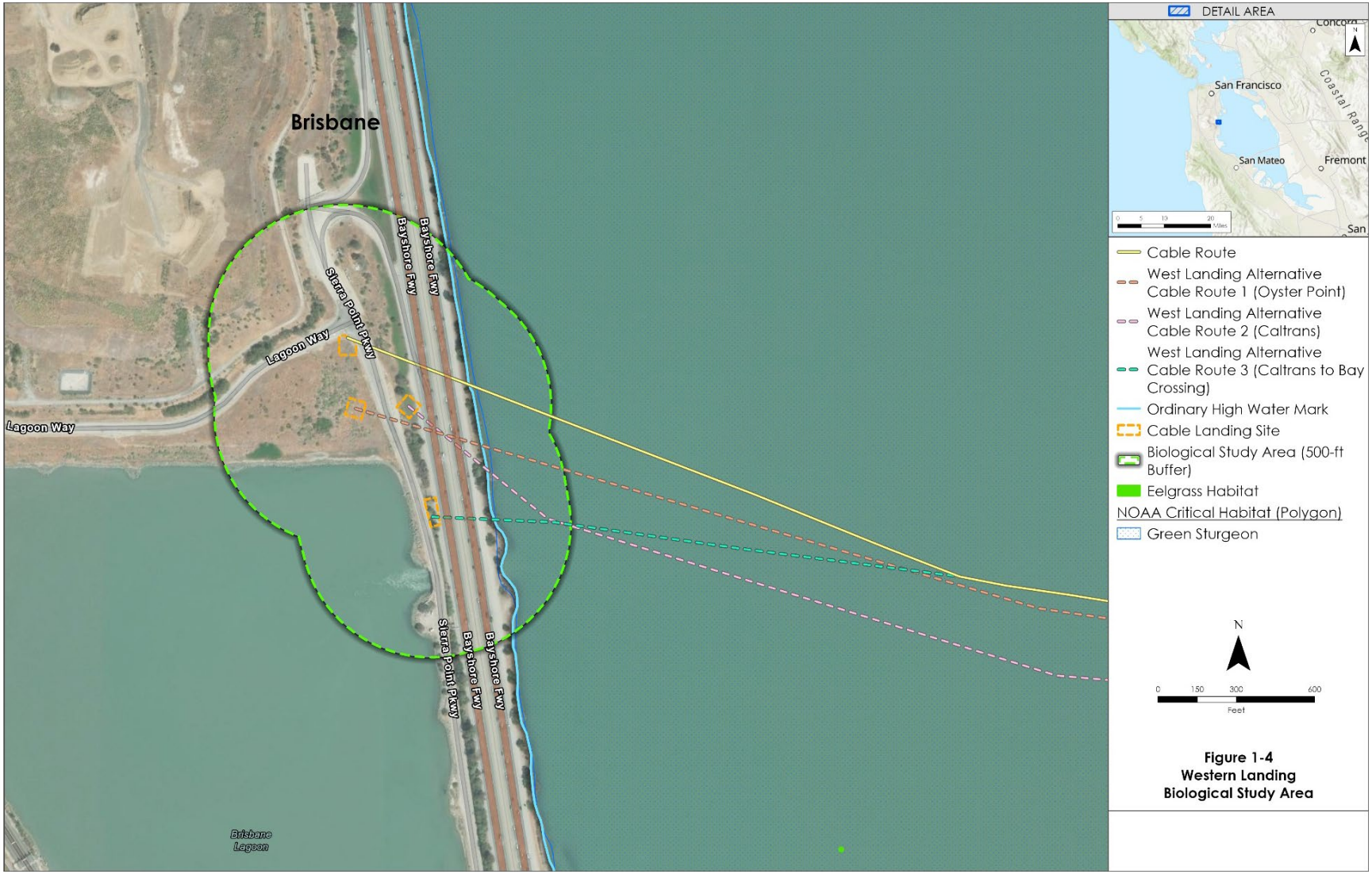


**Figure 1-4. Terrestrial Biological Study Area at the Western Cable Landing Site**


**Figure 1-5. Terrestrial Biological Study Area at the Eastern Cable Landing Site**

## 1.5 Project Description

### 1.5.1 Horizontal Directional Drilling

The HDD would involve four steps: landing site set-up, entry pit excavation, HDD and steel conduit installation, and LV installation. It is estimated that these steps would take approximately 6 weeks for the western cable landing site and 3 weeks for the eastern cable landing site. These steps are described in more detail below.

#### 1.5.1.1 Landing Site Set-up

The cable landing sites would be occupied from approximately 2 weeks before starting construction or installation work until approximately 2 weeks after construction or installation work ends. Equipment and materials such as backhoes, steel conduit, and HDD drilling equipment needed to install the terrestrial portions of the Project would be brought to the cable landing sites, operated from there, and stored there (Figure 1-6).

#### 1.5.1.2 Entry Pit Excavation

At each landing site, an entry pit for the bore hole and steel conduits would be excavated, with the soil placed at another location in the landing site and covered. Each entry pit would measure approximately 15 feet long, 10 feet wide, and 10 feet deep (4.6 meters long, 3 meters wide, and 3 meters deep), and would be excavated in line with the HDD rig to initiate the pilot hole. The purpose of the entry pit is to capture and contain the returning drilling fluid. A slurry sump pump would be set in place next to the entry pit to pump out the returning fluid to the recycling unit for further treatment, adjustment, and reuse.

A containment pit would be used to capture the material that would be removed from the hole being drilled. This containment pit (not in the water table) would be about 4 feet (1.2 meters) deep and contain only inert materials. As the pit fills with material, the material would be loaded into a dump truck, removed from the site, and disposed of offsite per industry standards.

#### 1.5.1.3 Horizontal Directional Drilling and Steel Conduits Installation

Prior to drilling activities, temporary tracking wire would be installed between the entry point on shore and the HDD exit points, as possible, to help guide the HDD installation. The wire would not be installed across roadways, including Highway 101. The marine portion of the tracking wire would be anchored by 18 to 22 concrete eco-blocks. The installation of the eco-blocks and tracking wire would take place simultaneously as the potholing and drilling equipment are being rigged up in the cable landing sites. The dimensions of each eco-block are 2 feet by 2 feet by 2 feet (0.6 by 0.6 by 0.6 meter). Two anchor support vessels would place the eco-blocks on the bay floor along the tracking wire's alignment. The eco-blocks would be attached to a galvanized cable and buoy ball and would be spaced approximately 300 feet (91.4 meters) apart, avoiding the Kinder Morgan pipeline identified along the cable route. The tracking wire would be strung using a dive boat and dive crew. The cable would be strung from the entry point on shore, through the eco-blocks, around and back to the shore, approximately 10,000 feet (3,048 meters).

Following excavation of the entry pit, the steel conduits would be installed via HDD from the landing sites to the HDD exit points in SF Bay. The steel conduit would be advanced in 30-foot sections through the bore hole as it is created. The HDD machine would occupy the bore entry site, drilling steel casing into the ground at an angle. Once the steel conduit reaches the desired depth, the direction would level out as the drilling continues to push the steel conduit horizontally through the ground. Water would be used to drill the last 100 to 130 feet (30 to 40 meters) of each conduit. Volumes would be calculated so that water will have displaced all of the drilling fluid when the drilling assembly exits the bay floor.

Once the drilling assembly exits the bay floor, the support dive crew would be deployed to verify the steel conduit exit point. Divers would then remove excess sediment from around the end of the pipe using a jetting assembly, which would allow the pipe to terminate at the proper elevation. The drill head would remain at the steel conduit's exit point offshore (in approximately 5 feet [1.5 meters] of water depth on the western side and within the intertidal zone on the eastern side) until divers or the shore-end team would take the drill head off and install a flapper valve. The flapper valve would prevent bay water from entering the steel conduit. This process also provides a drill string, which would be used to pull the cables through the pipe. The eco-blocks and tracking wire would be removed once the HDD installations have been completed.

The western installation of the cables need to cross two Kinder Morgan pipelines, bundled in the same trench. The two alternative HDD exit points are dependent on Kinder Morgan approval and are considered in this proposed Project because approval has not yet been received. One alternative is to set the HDD exit point in SF Bay closer to shore (i.e., install a shorter steel conduit), before crossing the Kinder Morgan pipelines. The cables, when installed, would then cross above the Kinder Morgan pipelines. The second alternative is to set the HDD exit point in SF Bay farther from shore (i.e., install a longer steel conduit), passing under the Kinder Morgan pipelines. The cables, when installed, would then enter the steel conduit prior to crossing the Kinder Morgan pipelines and would pass under the pipelines within the steel conduit.

#### *1.5.1.4 Drilling Fluid Management*

HDD drilling fluid, a non-toxic, inert material, typically a solution of bentonite clay and water, would be circulated into each bore hole to prevent them from caving in; the fluid would coat the wall of the bore holes to minimize fluid losses to permeable rock and soil types. Drilling fluid also serves as a lubricant for the drill head and carries the cuttings (i.e., pieces of drilled rock) back to the entry pit, where the cuttings (rock, sand, and other materials) are removed so the drilling fluid can be recirculated back into the bore hole. Drilling fluid would be used for drilling the entire bore hole except for the final approximately 100 to 130 feet (30 to 40 meters), where the drilling fluid would be changed to water; this would minimize the release of drilling fluid into the bay floor when the drill bit exits the sediment in SF Bay. Spent drilling fluid, except for that lost to the surrounding subsurface material, and cuttings would be temporarily collected at the cable landing sites and disposed of at a permitted landfill.

Given the variety of geologic conditions that may be encountered, it is possible that some of the drilling fluid may be absorbed into fractures in the surrounding subsurface material. In cases where the fracture is lateral and subterranean, lost fluid would not rise to the surface. In other cases, drilling fluid may reach the surface (e.g., if the fracture comes close enough to the surface that the pressure causes a release of drilling fluid above the sediment). This is known as an inadvertent drilling fluid release. The Project will implement a series of monitoring and management measures during HDD operations to detect and respond to a potential drilling fluid release. While drilling is taking place, the fluid system operator will monitor the volumes from the pumps and return flows from the steel conduit and alert personnel if there is a decrease in the return volume. This is the most effective and efficient way to detect a drilling fluid release.

#### *1.5.1.5 Landing Vault Installation*

Once the steel conduit has been installed, a single LV (12 feet long, 9 feet wide, and 10 feet deep [3.7 meters long, 2.7 meters wide, and 3 meters deep]) would be installed at each landing site into the HDD borehole entry pit following completion of drilling activities. Following installation, the area around the LVs would be backfilled with native soil. Once installation is complete, the only component of the LV that would be exposed is a 336-inch (91 centimeters) diameter, cast-iron LV cover at grade level or twin cover access (2 feet by 2 feet [0.6 meter by 0.6 meter]).


**Figure 1-6**
**Project Work Areas**

**Figure 1-6. Project Work Areas**

### 1.5.2 Cable Installation

Installation of the fiber optic cables across San Francisco Bay would involve a marine barge without engines and with four to six anchors as the primary cable-lay vessel, two anchor-lay vessels to support anchor movement, two guard vessels to help other marine users avoid the Project, a crew transfer vessel, and a dive support boat. The installation of the cables involves four steps: pre-lay grapnel run, tie-in of the cables to the landing sites, installation of the offshore cables, and post-lay inspection and burial. The following sections describe these steps in more detail.

#### 1.5.2.1 Pre-Lay Grapnel Run

Prior to installation of the cables or tie-in with the steel conduits and LVs, a pre-lay grapnel run would be performed along the proposed cable route. The purpose of an engineered pre-lay grapnel run is to clear debris on the bottom of the bay floor (e.g., discarded fishing gear) along the route where the cables would be buried. A grapnel, typically of the flatfish type, would be dragged along the cable route before cable installation to clear out the path for burying cables (Figure 1-7).

The grapnel would be attached to a length of chain to ensure that it touches the bottom of the bay floor. The anchor-lay support vessel or the dive support boat would tow the grapnel at approximately 1.2 miles per hour (approximately 1 knot per hour). The arms of the grapnel are designed to hook debris lying on the bay floor or shallowly buried to approximately 1.3 feet (0.4 meter). If debris is hooked and towing tension increases, towing would stop, and the grapnel would be retrieved by a winch. Any debris recovered during the operation would be stowed on the vessel for subsequent disposal in port. After debris removal, the grapnel would be redeployed with a suitable overlap and operations would continue.

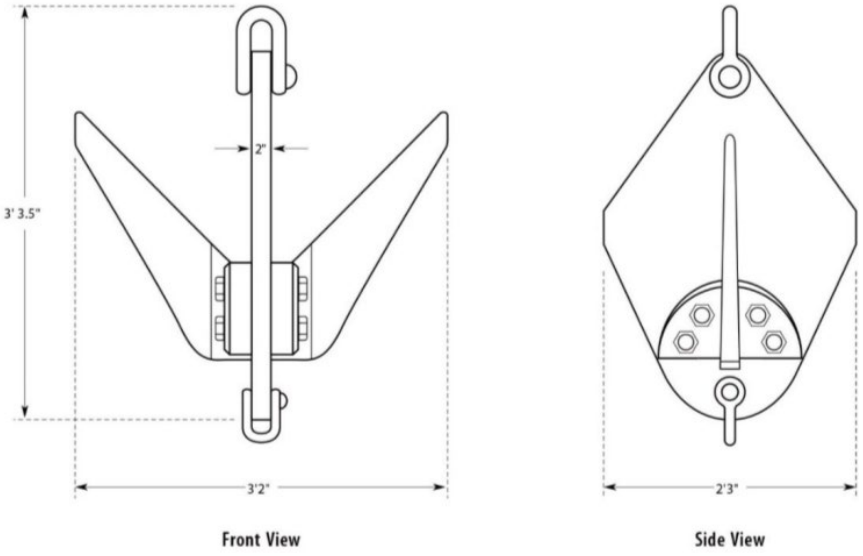


**Figure 1-7. Flat Fish Type Grapnel**

### 1.5.3 Cable Landing Tie-In

The initial plan is to work first on the west landing and tie-in with the installation barge and then lay cables along the cable route toward the eastern landing for the eastern tie-in. This direction may be reversed during the detailed planning phase.

Prior to the days of the landings, divers would locate and expose the steel conduit. For the eastern steel conduits, this would require jetting sediment around the pipe ends to expose them. On the days that cable

installations begin, the cable barge would be anchored in place as close as possible to the HDD exit point. Divers would attach the pull rope or wire from the steel conduit, through the flapper valve, to the cables on the barge. Each cable would then be pulled through the steel conduit using a 10-ton hydraulic winch and each cable would be anchored in place behind the LV using an onshore winch. Once the cables are landed and secured, a diver would swim to the cables to check on the condition of the cables on the bay floor. Adjustments would be made as needed to achieve proper cable slack and placement on the bay floor and to reduce and/or eliminate chafing points. Divers would then be using hand-jetting techniques to bury the cables in the vicinity of the HDD exit point, up to the point where the jetting sled can be deployed to commence burial.

### 1.5.4 Offshore Cable Installation

A specialized water-jetting sled cable burial tool would be used for cable installation and burial across SF Bay, which would simultaneously lay and bury the cables. The jetting sled burial tool would be deployed and moved by the cable-lay vessel. The sled, supported by two skids that are approximately 1.5 feet (45 centimeters) wide, would only impact the bay floor directly under the sled and where the skids touch (depressing the bay floor by approximately 1 to 2 inches, dependent on sediment types). The jetting nozzle assembly (“legs” or “Jet Share”) is located between the two skids and fluidizes the sediment within a 12-inch-wide (30-centimeter) swath. Once the jetting sled is deployed to the bottom, divers would assist with loading the cables into the sled’s guidance set-up. The sled is towed behind the barge. The jets would fluidize the sediment around the cables, allowing the cables to settle into the bottom of the furrow, which would naturally close under the weight of the sediments and the sled runners, and with the disturbed sediment settling back over the cables. Depending on bottom conditions, the cables would be buried to a depth of approximately 3 to 6 feet (1 to 2 meters).

Once the cables have been connected to the western landing vault, the cable-lay vessel would begin to move along the proposed route toward the eastern cable landing site, rolling out the cables as it goes. Travel speed would not be set since the barge would not move under its own propulsion. Instead, the barge would set anchors along the route, then be pulled to each set of anchors with support from the anchor-lay vessels. As the barge is pulled to a new set of anchors, the support vessels would move the anchors behind the barge to new locations ahead of it and set them. The jetting sled would be towed behind the barge as the barge moves along the anchor system.

On the eastern cable landing site, close to the HDD exit point, the water may be too shallow to use the jetting sled up to the HDD exit point. In that case, the cables would be buried by divers with hand-jets. Any portion of the cables not buried by the jetting sled offshore of the OHWM would be buried using divers and a hand-jetting system.

### 1.5.5 Post-Lay Inspection and Burial

Any areas that may not have achieved the target cable burial depth would be inspected in post-lay using divers or a small remotely operated vehicle. Any areas where remedial burial is required would use divers and a hand-jetting system.

The jetting system would loosen the bay floor sediments beneath the cables, allowing it to settle to the desired depth of 3 to 6 feet (1 to 2 meters). The disturbed sediments would settle back over the area to their original grade, leaving the cables buried. The post-lay burial of cables by divers, if needed, would disturb about 15 feet (4.6 meters) of the bay floor (not the water column).

### 1.5.6 Upland Site Restoration

Upland site restoration would involve returning the impacted areas to pre-construction contours and elevations once backfilling and compaction around the installed LVs is completed.

# 2. LISTED SPECIES AND CRITICAL HABITAT

Federally listed threatened and endangered species that occur or have the potential to occur within the Project vicinity were identified from the USFWS (2022b) Information for Planning and Conservation database, USFWS Critical Habitat Portal (2022c), the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CNDDB 2022a), and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2022).

A search of the USFWS Information for Planning and Conservation database was performed for the Project alignment to identify species under USFWS jurisdiction within 1.8 miles (3 kilometers) of the Project that may be affected by Project activities. In addition, the USFWS Critical Habitat Portal was queried to identify designated critical habitat in or adjacent to the Project. The CNDDB query provided a list of processed and unprocessed occurrences of federally listed species identified within the San Francisco, California, U.S. Geologic Survey 7.5-minute quadrangle and all adjacent quadrangles: Hayward, Hunter's Point, Las Trampa's Ridge, Montara Mountain, Newark, Oakland, Point Bonita, Redwood Point, and San Mateo. The CNPS database was also queried to identify federally listed plant species with the potential to occur in the aforementioned U.S. Geologic Survey quadrangles.

Species listed in one of the above-listed queries were examined for potential habitat within the action area and are listed in Table 2-1. Species for which marginal or suitable habitat was determined to be present, are included in the analysis for potential effects on the species or their habitats (Table 2-2).

## Table 2-1. Federally Listed Species and Critical Habitat Potentially Occurring or Known to Occur in the Action Area

| Common Name | Scientific Name | Federal Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| | | | **Plants** | | |
| California seablite | *Suaeda californica* | FE | General habitat consists of marshes and swamps (coastal salt). Elevation ranges from 0 to 49 feet (0 to 15 meters) (CNPS 2022). | Y | This species' mapped range occurs in salt marsh and dune scrub transition zones, which overlaps with both eastern and western action areas. |
| Contra Costa goldfields | *Lasthenia conjugens* | FE | Microhabitats subsist of mesic (relatively moist) environments; cismontane woodland; playas (alkaline); valley and foothill grassland; vernal pools. Elevation ranges from 0 to 1542 feet (0 to 470 meters) (CNPS 2022). | N | Suitable habitat is not likely present. |
| Fountain thistle | *Cirsium fontinale* var. *fontinale* | FE | Microhabitats consist of seeps and serpentine environments. General habitat consists of chaparral (openings), cismontane woodland, meadows and seeps, and valley and foothill grassland. Elevation ranges from 148 to 574 feet (45 to 175 meters) (CNPS 2022). | N | Suitable habitat is not likely present. |
| Franciscan manzanita | *Arctostaphylos franciscana* | FE | General habitat consists of coastal scrub (serpentinite). Elevation ranges from 197 to 984 feet (60 to 300 meters) (CNPS 2022). | N | Suitable habitat is not likely present in the action area. |
| Presidio manzanita | *Arctostaphylos montana* ssp. *ravenii* | FE | Microhabitats consist of serpentinite environments. General habitats include chaparral, coastal prairie, and coastal scrub. Elevation ranges from 148 to 705 feet (45 to 215 meters) (CNPS 2022). | N | Suitable habitat is not likely present in the action area. Additionally, only one wild individual is known, which does not occur within the action area. |
| Robust spineflower | *Chorizanthe robusta* var. *robusta* | FE | Microhabitats may include gravelly or sandy environments. General habitats consisted of chaparral (maritime), cismontane woodland (openings), coastal dunes, coastal scrub. Elevation ranges from 10 to 984 feet (3 to 300 meters) (CNPS 2022). | N | Marginal habitat may be present; however, the species is extirpated from San Mateo County. |
| San Francisco lessingia | *Lessingia germanorum* | FE | General habitat consists of coastal scrub (remnant dunes). Elevation ranges from 82 to 361 feet (25 to 110 meters) (CNPS 2022). | N | Suitable habitat is not likely present; the species is only found in Presidio and Daly City. |

| Common Name | Scientific Name | Federal Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| Showy Indian clover | *Trifolium amoenum* | FE | General habitats consist of coastal bluff scrub and valley and foothill grassland (sometimes serpentinite). Elevation ranges from 16 to 1362 feet (5 to 415 meters) (CNPS 2022). | N | Suitable habitat is not likely present. |
| Sonoma sunshine | *Blennosperma bakeri* | FE | General habitats consist of valley and foothill grassland (mesic) and vernal pools. Elevation ranges from 33 to 361 feet (10 to 110 meters) (CNPS 2022). | N | Suitable habitat is not likely present. |
| White-rayed pentachaeta | *Pentachaeta bellidiflora* | FE | General habitats comprise of cismontane woodlands and valley and foothill grassland (serpentinite). Elevation ranges from 115 to 2034 feet (35 to 620 meters) (CNPS 2022). | N | Suitable habitat is not likely present. |
| | | | **Invertebrates** | | |
| Bay checkerspot butterfly, including critical habitat | *Euphydryas editha bayensis* | FT | Habitat for this subspecies' distribution is limited to serpentine outcrops with thin soils (NatureServe 2022). | N | Critical habitat is present within 1.8 miles (3 kilometers) of the action areas; however, suitable habitat is not likely present. No critical habitat overlaps the action area. Closest critical habitat is approximately 1 mile (1.6 kilometer) south of the western action area. |
| Callippe silverspot butterfly | *Speyeria callippe callippe* | FE | General habitat consists of open pine and oak woodlands, sagelands, chaparral, grassland hills, and canyons (NatureServe 2022). | N | Suitable habitat is not likely present. |
| Mission blue butterfly | *Plebejus icarioides missionensis* | FE | Habitat encompasses grasslands containing one or more of its three host plants: silver lupine, summer lupine, or varied lupine (NPS 2020). | N | Suitable habitat is not likely present. |
| Monarch - California overwintering population | *Danaus plexippus pop. 1* | FC | Habitat for overwintering encompasses coastal California conifer or eucalyptus groves (NatureServe 2022). | N | Suitable habitat is not likely present.<br>The nearest suitable eucalyptus stand habitat is in the San Bruno Mountain State and County Park, outside the 1.8-mile (3-kilometer) buffer from the western action area. |

| Common Name | Scientific Name | Federal Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| San Bruno elfin butterfly | *Callophrys mossii bayensis* | FE | Habitat comprises steep and rocky hillsides that are undeveloped. The presence of broadleaf stonecrop, the caterpillars' host plant, is another indication of habitat potential (NPS 2021a). | N | Suitable habitat is not likely present; the closest suitable habitat is in the San Bruno Mountain State and County Park, outside the 1.8-mile (3-kilometer) buffer from the western action area. |
| Vernal pool fairy shrimp | *Branchinecta lynchi* | FT | Habitat consists of vernal pools (NatureServe 2022). | N | Suitable habitat is not likely present. |
| **Fish** | | | | | |
| Delta smelt | *Hypomesus transpacificus* | FT | Habitat consists of inshore waters with a salinity below 12 parts per thousand (ppt). They typically inhabit tidal rivers, channels, and sloughs (NatureServe 2022). | N | Suitable habitat is present; however, this species' range does not extend into southern San Francisco Bay. |
| Longfin smelt (San Francisco Bay-Delta DPS) | *Spirinchus thaleichthys* | FC; CA CI; CESA T | Open water away from substrate and shores and can be found in a wide range of salinities. Juveniles mature in brackish and saline waters, then migrate up freshwater rivers to spawn over sandy/gravel substrate (The Bay Institute 2007; USFWS 2012; CDFW 2018; CNDDB 2022a,b). | Y | Suitable habitat is present near the western and eastern action areas. |
| Tidewater goby | *Eucyclogobius newberryi* | FE | Shallow coastal lagoons and the uppermost brackish zone of larger estuaries. Rarely found in marine or freshwater environments. Typically associated with still water, less than 3.3 feet (1 meter) deep, with salinities of less than 12 ppt (USFWS 2005). | N | Suitable habitat is present near the western and eastern action areas, present in both the Brisbane Lagoon and in the NWI mapped estuarine wetlands in SF Bay. However, tidewater goby has been extirpated from the San Francisco Bay (USFWS 2014; USFWS 2005). |
| **Amphibians** | | | | | |
| California red-legged frog | *Rana draytonii* | FT | Ponds/streams in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover in lowlands or foothills. Breeding habitat includes permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. | N | Potential suitable habitat is present near the western and eastern action areas; however, presence is unlikely due to fragmented habitat present, |

| Common Name | Scientific Name | Federal Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| | | | Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5,000 feet (1,525 meters) (USFWS 2002). | | human activities, and urban development. |
| California tiger salamander | *Ambystoma californiense* | FT | Grasslands and oak savannah. Estivates in small mammal burrows during summer and fall. Breeds in grassland or oak savannah habitat containing vernal pools or seasonal ponds (EPA 2010a). | N | Marginally suitable habitat is present in the ruderal annual grasses at the action areas; however, this species' coastal range typically begins in southern San Mateo County. |
| **Reptiles** | | | | | |
| Alameda whipsnake (Striped racer) | *Masticophis lateralis euryxanthus* | FT | Chaparral or coastal scrub with rocky outcrops. Uses roads and trails as basking habitat (USFWS 2020a; EPA 2010b). | N | Potentially suitable habitat is present at the eastern action area; however, the species is not known to be present along the shoreline. |
| San Francisco garter snake | *Thamnophis sirtalis tetrataenia* | FE | Shallow, vegetated freshwater habitat with adjacent upland hillsides or meadows with small mammal burrows or dense vegetation. Preferred aquatic habitat contains shallow water edges without steep banks (USFWS 2020b; EPA 2010c). | N | Suitable habitat is not likely present. Aquatic habitats within action area are brackish. |
| **Birds** | | | | | |
| California brown pelican | *Pelecanus occidentalis californicus* | FD;[a] CDFW FP | Year-round coastal resident of California. Breeds only in the Channel Islands. Forages within 20 miles of land (AFWO 2011). | Y | Suitable foraging and wintering habitat is potentially present within action areas. |
| California Ridgway's (Clapper) rail | *Rallus obsoletus (longirostris) obsoletus* | FE; SE | Nests and forages in salt marshes and tidal sloughs around San Francisco Bay. Prefers marshes dominated by pickleweed and cordgrass (EPA 2010d). | Y | Suitable habitat is potentially present within action areas. |
| California least tern | *Sterna antillarum browni* | FE; CDFW FP | Nest in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action. Nest is a scrape in the sand (USFWS 2006).<br>This species feeds in shallow estuarine waters near the coast. Adults roost on barren to sparsely vegetated ground near water. | Y | Suitable habitat is potentially present within action areas. |

| Common Name | Scientific Name | Federal Status | General Habitat Characteristics | Potential Impacts Analyzed | Rationale |
|---|---|---|---|---|---|
| Marbled murrelet | *Brachyramphus marmoratus* | FT | Nests in coastal old growth forests within 50 miles of the coast. Foraging and wintering habitat includes marine waters and shoreline (Washington DNR 2018). | N | Suitable wintering and foraging habitat is present within action areas; however, presence is unlikely due to heavy ship traffic in SF Bay. |
| Western snowy plover | *Charadrius nivosus nivosus* | FT | This species nests on sandy marine and estuarine shores. Nests are well camouflaged and are typically shallow scrapes on flat, open areas. This species feeds in the intertidal zone, at the edges of lagoons and marshes, and in sandy areas above high tide (NPS 2021b). | Y | Suitable habitat may be present within action areas. |
| Yellow-billed cuckoo | *Coccyzus americanus* | FT | Nests within contiguous forested riparian habitat. Migrating and wintering habitat includes coastal scrub, woodlands, smaller riparian patches, and hedgerows (NPS 2014). | N | Suitable habitat is not likely present. |
| **Mammals** | | | | | |
| Salt marsh harvest mouse | *Reithrodontomys raviventris* | FE | Current habitat is restricted to saline or subsaline marsh around the SF Bay Estuary. Prefers marshes dominated by pickleweed (EPA 2010e). | N | Suitable habitat is not likely present. Both the western and eastern action areas are low-quality habitat dominated by non-native annual grasses. |

*CA CI = California Critically Imperiled; CDFW FP = CDFW Fully Protected; CESA T= California Endangered Species Act Threatened; DPS = distinct population segment; FC = Federal Candidate; FD = Federal Delisted; FE = Federal Endangered; FT = Federal Threatened; ppt = parts per trillion; NWI = National Wetlands Inventory; SE = California State Endangered*

*[a] Although this species is not currently federally listed, it is included in this analysis due to known presence in SF Bay and potential agency concern for this species.*

The likelihood of each analyzed species to occur in the action area (defined in Section 1.4, Action Area) was determined based on species range, habitat, migration routes, reproductive behavior, and foraging needs using the following general categories:

- *Present:* Species are potentially present in the action area at all times of the year based on database records and species life history.
- *Seasonally present:* Species are potentially present in the action area based on database records, but are only present at certain periods of the year due to species life history.
- *Likely to occur:* The species is likely to occur in the action area. The likelihood is dependent on time of year and reproductive criteria, migration routes, food availability, and habitat suitability.
- *Potential to occur:* The species is potentially found in the action area. This is also dependent on time of year and reproductive criteria, migration routes, food availability, and habitat suitability.
- *Unlikely to occur:* The species is unlikely to be observed in the action area, due to predation, unsuitable habitat, time of year, reproductive criteria, and absence of foraging habitat.
- *Absent:* The species is not present in the action area.

Based on a review of the distribution and habitat requirements of these species and the habitat conditions within the Project area, ERM-West, Inc., determined that four federally listed species, one federal candidate species, and one federally delisted species have either been recorded in the Project vicinity or could potentially occur based on the presence of potentially suitable habitat. The habitat requirements and potential to occur in the action area are summarized in Tables 2-1 and 2-2.

## Table 2-2. Federally Listed Species Under USFWS Jurisdiction with Potential to Occur in the Action Area

| Common Name, Scientific Name | Scientific Name | Status | Distribution in California | Habitat Association | Likelihood to Occur in Action Area |
|---|---|---|---|---|---|
| **Plants** | | | | | |
| California seablite | *Suaeda californica* | FE | Found along sandy coastal dunes in southern California and around SF Bay. | This species is found in coastal habitats which include sandy substrates near salt marshes and wet sandy dune. | Present: Year-round with a bloom period from May–October. |
| **Fish** | | | | | |
| Longfin smelt (San Francisco Bay-Delta DPS) | *Spirinchus thaleichthys* | FC; CA CI; CESA T | This DPS is restricted to the San Francisco Bay, Gulf of the Farallones, and Sacramento/San Joaquin Delta. Spawns in the Sacramento and San Joaquin rivers. | This species prefers open water away from substrate and shores and can be found in a wide range of salinities. Juveniles mature in brackish and saline waters, then migrate up freshwater rivers to spawn over sandy/gravel substrate. | Present: Year-round resident except for mature adults during the breeding season (November–June). |
| **Birds** | | | | | |
| California brown pelican | *Pelecanus occidentalis californicus* | FD;[a] CDFW FP | Found year-round along California coast. Breeding is limited to the Channel Islands. | This species feeds on small fishes within 20 miles (32 kilometers) of land via plunge diving or scavenging on the water surface. | Present: Year-round resident; however, this species does not breed within the action area. |
| California least tern | *Sterna antillarum browni* | FE, SE, CDFW FP | Breeding colonies are located along coastal areas in southern California and the shorelines along SF Bay. | This species feeds in shallow estuarine waters near the coast. Adults roost on barren to sparsely vegetated ground near water. | Seasonally Present: Adults arrive in breeding territory in late April and migrate out in mid-October. |
| California Ridgway's (Clapper) rail | *Rallus obsoletus (longirostris) obsoletus* | FE, SE | Distributed throughout the SF Bay tidal marshes and possibly nearby coastal tidal marshes. | The species is found in densely vegetated tidal marshes and can use tidal channels and nearshore mudflats for foraging habitat. | Present: Year-round resident with breeding season from February to August. |

| Common Name, Scientific Name | Scientific Name | Status | Distribution in California | Habitat Association | Likelihood to Occur in Action Area |
|---|---|---|---|---|---|
| Western snowy plover | *Charadrius nivosus nivosus* | FT, SSC | This species is commonly found near marine or estuarine shores as well as inland alkali lakes throughout the state. | This species forages along coastal upper beach habitat and salt ponds. Cover and nesting habitat consist of sandy substrate with small pebbles or gravel. | Seasonally Present: During the fall and winter, individuals are commonly found on sand marine and estuarine shores. Breeding season occurs from March to September. |

*CA CI = California Critically Imperiled; CDFW FP = CDFW Fully Protected; CESA T = California Endangered Species Act Threatened; FC = Federal Candidate; FD = Federal Delisted; FE = Federal Endangered; FT = Federal Threatened; SCC = CDFW Species of Special Concern; SE = California State Endangered*

[a] *Although this species is not currently federally listed, it is included in this analysis due to known presence in SF Bay and potential agency concern.*

## 2.1 Previous Meetings Regarding Permitting

On 9 September 2021, a pre-application virtual meeting was held to discuss pending applications and potential species of concern, with the following attendees:

- BIG: Andrew Munn
- ERM-West, Inc.: Nikki Payne, Alex Grant
- USACE: Brain Matsumoto, Sarah Firestone, Kendra Spicher, Jason Chambers, Michael Orellana
- San Francisco Bay Regional Water Quality Control Board: Brain Wines, Tahsa Sturgis
- California State Lands Commission: Afifa Awan, Ken Foster, Kelly Connor, Eric Gillies
- California Department of Fish and Wildlife: Arn Aarreberg
- U.S. Environmental Protection Agency Region 9: Jennifer Siu
- California Public Utilities Commission: Connie Chen
- National Oceanic and Atmospheric Administration, National Marine Fisheries Service: Brian Meux
- U.S. Fish and Wildlife Service: Kim Squires

Mitigation measures from the above documents and suggestions provided from the interagency meeting have been proposed in this BA with adjustments as appropriate.

# 3. SPECIES' STATUS AND CRITICAL HABITAT

## 3.1 Environmental Baseline and Habitat

The following descriptions of the existing physical conditions and vegetative communities are described in relation to the action areas at the Brisbane and San Leandro cable landing sites.

The immediate shoreline area where the action areas are located are characterized by non-engineered bulkheads separating the tidal waters of SF Bay from upland areas heavily influenced by anthropogenic uses. Prior to disturbance, these areas may have supported salt marsh or sand dune habitat, but have been extensively altered on both sides of SF Bay through urban development, marine shipping, and industry. Mitigation and restoration projects, supported by the San Francisco Bay Restoration Authority, occur throughout SF Bay in a mosaic of small wetlands, marshes, and dunes, some of which are near the action area, but not within the action areas. Figure 3-1 shows mitigation and restoration projects in the vicinity of the action areas (San Francisco Estuary Institute 2022).

### *3.1.1 Western Action Area (Brisbane)*

The action area's westernmost terminus is located on the west shoreline of SF Bay in Brisbane. This area borders SF Bay with a shoreline of riprap and is overall characterized by Highway 101, with ruderal non-native annual grasses, interspersed with intermittent upland trees and coyote brush in some areas. To the northwest is a retired landfill, with non-native annual grass cover; to the southwest is Brisbane Lagoon, which is open water with ruderal edge vegetation. East of this portion of the action area is SF Bay. The closest restoration Project is the Brisbane Baylands wetland restoration project, located approximately 1,500 feet (457 meters) north of the landing sites (Figure 3-1; San Francisco Estuary Institute 2022).

Topography within the action area is generally flat with minimal relief. Elevation ranges from approximately 0 feet above mean sea level (AMSL) near the bay front to 10 feet (3 meters) AMSL near the western border. In general, the action area slopes downward from west to east.

### *3.1.2 Eastern Action Area (San Leandro)*

The action area's easternmost terminus is on the east shoreline of the SF Bay in San Leandro. This portion of the action area boarders the SF Bay with a shoreline of riprap and is overall characterized by the paved recreational trail and adjacent Tony Lema Golf Course, with ruderal non-native grasses and scattered shrubs in meridian strips between recreation features. Adjacent to the golf course is a developed housing area to the northeast and salt ponds to the east and southeast. To the west is SF Bay. Restoration projects have occurred nearby, including the completed North Basin Wetlands, South Basin Wetlands, and San Leandro Marshlands Enhancement Project, all located within 1,800 feet (549 meters), but outside of the landing site (Figure 3-1; San Francisco Estuary Institute 2022).

Topography within the action area is generally flat with minimal relief. Elevation ranges from approximately 0 feet AMSL near the bay front to 10 feet (3 meters) AMSL near the western border. In general, the action area slopes downward from east to west.

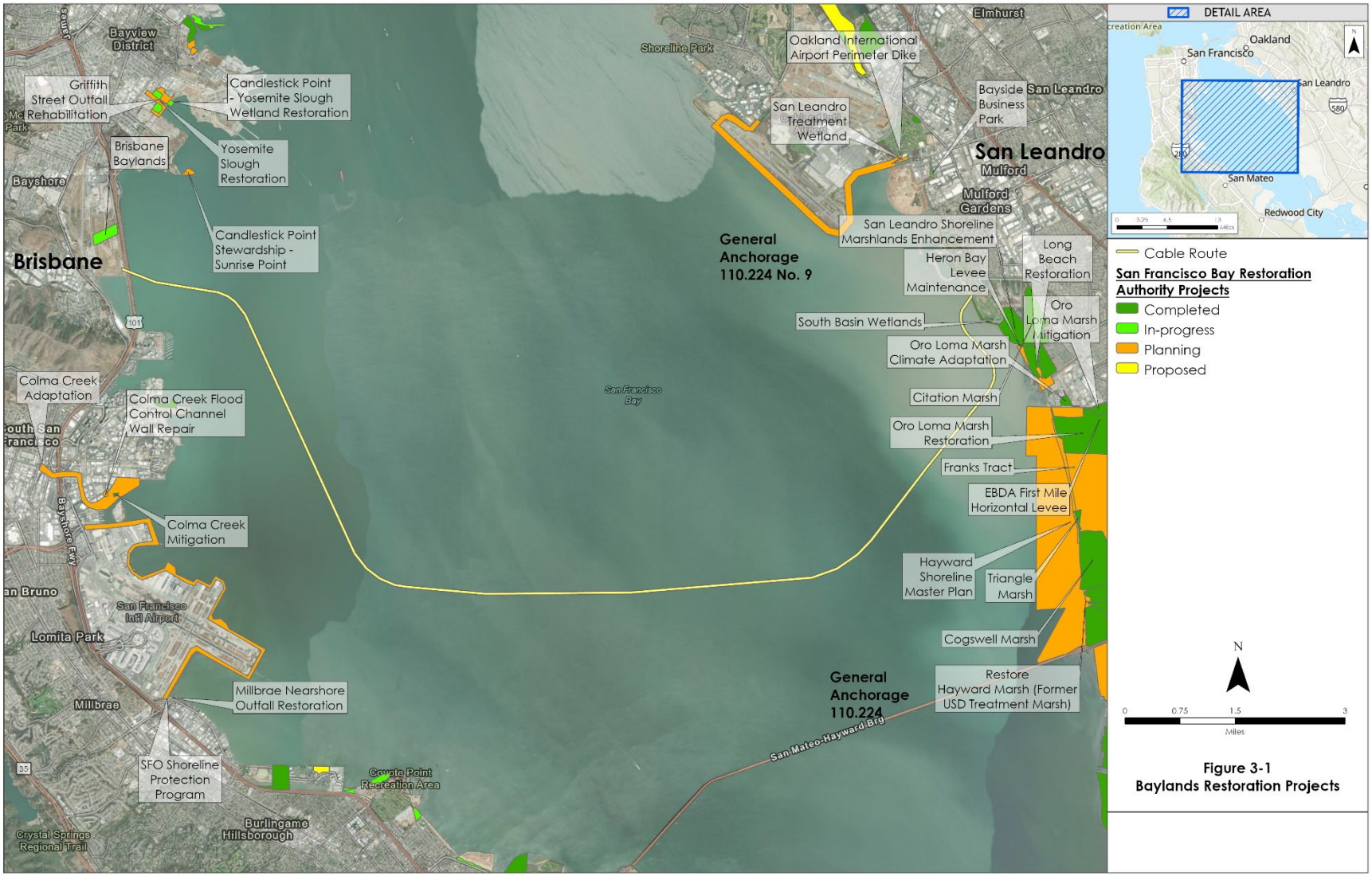


**Figure 3-1**
**Baylands Restoration Projects**

Source: San Francisco Estuary Institute 2022

**Figure 3-1. Southern San Francisco Baylands Restoration Projects**

## 3.2 Species Discussion

Species discussed are those identified as having potential habitat present in the action area and with some likelihood to occur. Although habitat in this area is generally low-quality to marginal, all species with some potential to occur are included.

### *3.2.1 California Seablite*

#### *3.2.1.1 Federal Status*

The California seablite was federally listed as endangered on 15 December 1994. No critical habitat has been designated for this species.

#### *3.2.1.2 Life History*

California seablite is a perennial shrub endemic to the California coast with succulent leaves, and the flowers may be either perfect or carpellate. This halophytic species, which is wind-pollinated, blooms primarily in late summer, but can bloom anytime between May and October (USFWS 2010). California seablite is threatened by anything that alters the hydrology of the area, such as changes in sedimentation, including dredging, erosion, and recreation.

California seablite occurs in intertidal areas, usually in saltmarsh wetlands, but may occasionally be found in non-wetland areas along the California coast. Habitat for this species includes salt marsh, sandy soils, and dune scrub within coastal salt marsh communities. Soil requirements include a porous substrate high in nitrogen, which may come from decaying plant matter and bird droppings. Invasive plant species such as introduced ice plant threaten remaining occurrences and reintroductions.

#### *3.2.1.3 Potential for Occurrence*

This species is endemic to San Luis Obispo County, California, where it is known from a few occurrences in the marshes around Morro Bay. California seablite was extirpated from the SF Bay, but has since been reintroduced in tidal marshes on the eastern side of the bay, north of the action area (USFWS 2010). There is potential for occurrence of this species in the eastern landing action area; however, occurrence is unlikely due to the poor quality coastal scrub habitat, proximity to the Tony Lema Golf Course and the Bay Trail recreational activities, and presence of non-native species.

### *3.2.2 Longfin Smelt - San Francisco Bay-Delta Distinct Population Segment*

#### *3.2.2.1 Federal Status*

The longfin smelt is comprised of approximately 20 populations found in estuaries, rivers, and lakes from Alaska to California, with the San Francisco Bay-Delta DPS being the most southerly population. In 2009, the longfin smelt was listed as threatened under the California ESA and on 2 April 2012, the USFWS concluded that the San Francisco Bay-Delta DPS of the longfin smelt warranted listing under the ESA, but was unable to federally protect the species due to prioritization of other species (USFWS 2017).

#### *3.2.2.2 Life History*

Adult longfin smelt are pelagic, preferring open water away from the substrate and shores and can be found in a wide range of salinities, from fresh to salt water, although adults prefer brackish and saline waters (USFWS 2012). Smelt location is mostly determined by water temperature, with adults moving away from estuaries and into deeper marine waters of SF Bay in summer as the water temperature

increases. Longfin smelt typically live for 2 years, with spawning occurring at the end of the second year before dying. However, some individuals may spawn after their first or third years (USFWS 2012; CDFW 2018).

During the spawning season, which is November through May or June with a peak from January or February through April, adult longfin smelt congregate in freshwater in the lower reaches of the Sacramento and San Joaquin rivers (USFWS 2012; CDFW 2018). This species then makes short runs up the river to spawn over sandy or gravel substrate and the eggs incubate for approximately 40 days, depending on water temperature. Hatchling longfin smelt occupy the top third of the water column due to their buoyancy and migrate downstream to the lowest reaches of the river immediately after hatching. After 3 months, juvenile smelt are able to withstand a full range of salinities and disperse away from the freshwater river throughout SF Bay (USFWS 2012; CDFW 2018).

#### *3.2.2.3 Potential for Occurrence*

The open waters within and adjacent to the Project area are suitable habitat for longfin smelt throughout the year, with individuals moving to deeper or shallower portions of the water column depending on water temperature. During the winter breeding season, mature adults are expected to not be present, but immature individuals may still be in the Project area during this period.

### *3.2.3 California Least Tern*

#### *3.2.3.1 Federal Status*

The California least tern was federally listed as endangered on 2 June 1970 (*Federal Register*, Title 35, pages 8491–8498 [35 FR 8491–8498]). Currently, no critical habitat is designated for this species.

#### *3.2.3.2 Life History*

California least terns are typically found along coastal waters of California from SF Bay to Baja California. Breeding colonies are found on open beaches free of vegetation and higher than normal tidal inundation. Colony sizes typically contain up to 25 pairs (USFWS 2022d). This species requires undisturbed stretches of sparsely vegetated ground near water resources such as lagoons, estuary or bay, and coastal waters. Nests consist of shallow depressions on the ground camouflaged using pebbles, shells, or debris.

California least tern generally breed from April until October along the coastline in the SF Bay area (CDFW 2017). Nests, containing on average 1 to 3 eggs, are situated on open sandy areas. Egg coloration ranges from buff to pale green with blotched black, brown, and gray spotting. Incubation is generally between 20 and 25 days. Both sexes take turns incubating the eggs. Young chicks may leave their nests a few days after hatching, but rely on both parents for food. Flight is typically achieved from 19 to 20 days, but young may stay with parents for an additional 2 to 3 months. Populations depart the Bay Area by mid-September for southern wintering grounds. Typically, only one brood per year is produced.

This species' diet changes according to seasonal availability, but mostly consists of small fish, crustaceans, insects, and mollusks. Foraging occurs by hovering over the water surface and plunging to catch prey.

#### *3.2.3.3 Potential for Occurrence*

This species may be present seasonally in the eastern action area, foraging near open water. The action area contains little to no open sandy area and is not likely to support breeding colonies. The nearest habitat for nesting is the Brisbane Lagoon on the western shore of SF Bay and the San Leandro Shoreline Marshlands Enhancement area on the eastern shore.

### 3.2.4 California Ridgway's Rail

#### 3.2.4.1 Federal Status

The California Ridgway's rail (formerly California clapper rail) was federally listed as endangered effective 13 October 1970 (35 FR 16047–16048). No critical habitat has been designated for this species.

#### 3.2.4.2 Life History

Most extant populations of California Ridgway's rail are associated with densely vegetated salt marshes. Cordgrass- and pickleweed-dominated marshes provide refuge from predation, especially during high tide events. Foraging habitat consists of tidal channels and open mudflats near vegetation. Nesting habitat involves a compromise between higher elevation marsh vegetation, which provides less cover, and low-lying tall cordgrass, which may flood during high tide events. Often nests are made in clumps of vegetation and are well camouflaged for concealment. Nests may be 7 to 12 inches in diameter (Cornell Lab 2022a).

California Ridgway's rail generally breed from January until early September along vegetated salt marshes in the SF Bay area (National Audubon Society 2022a). Nests, which contain on average 7 to 11 eggs, are hidden within dense vegetation. Egg coloration ranges from pale yellow to olive with brown and gray spots. Incubation is generally between 23 and 29 days. Both sexes take turns incubating the eggs and have active displays to draw predators away from nests. Young chicks may leave their nests shortly after hatching, but rely on both parents for food. Flight is typically achieved at 9 to 10 weeks.

California Ridgway's rails are opportunistic feeders, with diets changing according to season and availability of food resources. Typical diets include crustaceans, snails, fish, vegetation, and seeds.

#### 3.2.4.3 Potential for Occurrence

This species may be present in the action area, foraging in tidal mudflats during lower tides. The action area does not support salt marshes and therefore is not likely to support breeding. The nearest habitat for nesting is the Brisbane Lagoon on the western shore of SF Bay and San Leandro Shoreline Marshlands Enhancement area on the eastern shore.

### 3.2.5 Western Snowy Plover

#### 3.2.5.1 Federal Status

The western snowy plover was federally listed as endangered effective 5 April 1993 (58 FR 12864-12874). Critical habitat for this species was designated on 29 September 2005 (70 FR 56970–57119). No designated critical habitat is located within SF Bay.

#### 3.2.5.2 Life History

Most extant populations of western snowy plover are associated with unvegetated bare ground near wet or marine foraging habitats. Adults tend to be most abundant close to potential breeding sites and in areas with low disturbance potential. Nesting habitat consists of open, sandy areas adjacent to open water including coastal beaches or the shorelines of saline lakes. Anthropogenic resources such as salt ponds, levees, and dredge spoils are also used by this species (Cornell Lab 2022b). Nests are usually built in small depressions on the ground with little to no cover (National Audubon Society 2022b). Camouflage with surrounding rocks and shells are the best defense until chicks fledge.

Western snowy plover generally breed from March until September along the coastal waters of the SF Bay region (National Audubon Society 2022b). Nests, which typically contain three eggs, are highly

susceptible to predation. In addition, newly born chicks are not able to fly for up to 4 weeks. If not predated upon, a typical life span of this plover species is 3 years (Center for Biological Diversity 2022).

Open mudflats, nearby sandy spits, and infrequently used nearby levees may provide seasonal foraging habitat. Snowy plovers eat invertebrates including crabs, fly larvae, insects, and others. Plovers are active foragers employing quick movements interspersed with abrupt pauses to scan for predators.

#### 3.2.5.3 Potential for Occurrence

This species may be present seasonally (March to September) in the action area, foraging in tidal mudflats during lower tides or along the riprap bulkheads. The action area does not support open sandy areas and is not likely to support breeding colonies. The nearest potential habitat for nesting is in the Brisbane Lagoon on the western shore of SF Bay and San Leandro Shoreline Marshlands Enhancement area on the eastern shore. Due to human disturbance near both locations, breeding in these areas is unlikely.

### 3.2.6 California Brown Pelican

#### 3.2.6.1 Federal Status

The California brown pelican was federally listed as endangered on 13 October 1970; the endangered status was removed on 17 December 1999 (74 FR 59443). This species was also listed as a California endangered species 27 June 1971; subsequently being delisted on 3 June 2009. California brown pelicans remain fully protected under CDFW. Although this species is not currently federally listed, it is included in this analysis due to known presence in the SF Bay and potential agency concern for this species.

#### 3.2.6.2 Life History

California brown pelicans are typically found along coastal waters of California. Non-breeding pairs can be found up to British Columbia, Canada. Habitat includes breakwaters, jetties, sand spits, estuaries, and sand bars. This species is a plunge-diver that feeds on schooling fish including northern anchovy, Pacific sardine, and Pacific mackerel (NPS 2016).

Migration of this species occurs from June to October. Breeding is limited to the Channel Islands off southern California, where nests are free from predators and human disturbance. This species roosts communally in areas near adequate food supplies rarely away from saline waters and no more than 20 miles (32 kilometers) from land (AFWO 2011). The nesting season generally starts in January and extends until October (NPS 2016).

#### 3.2.6.3 Potential for Occurrence

This species has the potential to be found in open water and nearshore sand spits, jetties, and undisturbed habitats in SF Bay. Brown pelicans do not breed in the SF Bay area. Non-breeding pelicans may be present within the action area along the riprap shoreline.

# 4. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

This section will identify potential adverse effects of the proposed Project on federally listed or candidate species and critical habitat under USFWS jurisdiction. Potential effects on species are based on the current Project description and engineered construction drawings; likelihood of each species to occur within the action area; and each species' biological growth, reproduction, feeding, resting, and cover requirements as appropriate. Each species is discussed, including designated critical habitat for the species within the action area (if applicable); expected or potential Project-related effects on the species; as well as avoidance and minimization measures proposed to avoid or reduce Project-related impacts on the species.

Project-related effects on plant and wildlife species can be direct, indirect, permanent, and/or temporary. Direct impacts are those caused by the Project and occur at the time of construction or implementation. Indirect effects are those that are caused by the Project and are reasonably certain to occur, but at a later time.

No suitable habitat that could support the California seablite would be directly or permanently impacted by the Project. No suitable habitat that could support longfin smelt would be permanently impacted, though there would be temporary impacts to habitat. No habitat that could support breeding California Ridgway's rail, western snowy plover, California least tern, or California brown pelican would be directly or permanently impacted by the Project. All infrastructure would be subsurface in the upland portions of the action area, with finished landing vault access covers only present at surface grade. The HDD of the marine steel conduits would avoid any direct impacts to estuarine and tidally influenced habitats. As a result, no compensatory mitigation is proposed.

## 4.1 Federally Listed and Candidate Species

### *4.1.1 Assessment of Impacts*

Based on the results of the database queries and studies conducted to date, the following four federally listed species and one candidate species are determined to potentially occur within the action areas and are analyzed for impacts in this BA: California seablite, longfin smelt, California Ridgway's rail, western snowy plover, and California least tern. Individual discussions of potential Project impacts on California seablite, California Ridgway's rail, western snowy plover, and California least tern are presented below. According to the results of the database searches, habitat assessment, and historical records, no other federally listed species or candidate species have potential to occur in the action area.

Several other federally listed species may occur in the action area; however, they are under the jurisdiction of the National Marine Fisheries Service and are discussed in a separate BA.

#### *4.1.1.1 California Seablite*

Potential Project impacts to California seablite would be damage or take from ground disturbance, construction equipment, and general activity within the area. However, presence of this species within the action areas is unlikely. All impacted Project areas are in upland habitat not suitable for this species. Nearby potential habitat is of poor quality for California seablite due to frequent human activity, invasive species, and proximity to urban areas. This species was extirpated from the SF Bay area until revegetation efforts began in 1999 (USFWS 2010). Revegetation efforts have reintroduced California seablite to the eastern side of SF Bay. The closest known occurrence is located approximately 1.5 miles (2.4 kilometers) north of the eastern landing site. Project impacts on this species or its habitat are unlikely. The measures identified under Section 5.1 are recommended to avoid and minimize impacts on California seablite during construction.

#### 4.1.1.2 Longfin Smelt

Suitable habitat for longfin smelt occurs within both the eastern and western action areas, as well as along the cable route, but does not support suitable spawning habitat, which occurs in freshwater. Potential threats to this species include decreased water clarity due to sediment disturbance, noise, and accidental fluid release from HDD and cable-lay activities. Potential impacts on non-breeding longfin smelt are limited to temporary displacement from foraging and rearing grounds during HDD and cable-lay activities, with no long-term or permanent impacts anticipated. The habitat from which longfin smelt may be displaced during Project activities is similar to habitat found throughout southern SF Bay and therefore the displacement is not anticipated to result in permanent population-level impacts. The measures identified under Section 5.1 are recommended to avoid and minimize impacts on longfin smelt during construction.

#### 4.1.1.3 California Ridgway's Rail

The western and eastern action areas may provide potential foraging habitat for California Ridgway's rail along the shoreline and during periods of lower tide within the action area. The action area does not support suitable nesting habitat for this species. The nearest habitat for nesting is in the Brisbane Lagoon on the western shore (approximately 350 feet [107 meters] from the action area) of SF Bay and San Leandro Shoreline Marshlands Enhancement area on the eastern shore (approximately 1700 feet [518 meters] from the action area), which would not be impacted by the Project. No impacts on nesting birds or nest habitat would occur. Potential impacts on non-breeding California Ridgway's rail include noise, light, dust, and human disturbance from terrestrial construction activities. Impacts on this species are limited to temporary displacement to other foraging grounds. However, due to the heavily disturbed nature of both action areas and the high levels of recreational human traffic on the eastern action area, the potential for Project impacts on this species are low. The measures identified under Section 5.1 are recommended to avoid and minimize impacts on California Ridgway's rail during construction.

#### 4.1.1.4 Western Snowy Plover

The western and eastern action areas may provide potential foraging habitat for the western snowy plover along the riprap shoreline and during periods of lower tide within the action area. The action area does not support suitable nesting habitat for this species, which are open sandy areas. No impacts to nesting birds or nest habitat would occur. Potential impacts to non-breeding birds include noise, light, dust, and human disturbance, both from onshore activities at the cable landing sites and at the eastern HDD exit point due to the eastern HDD exit point being within the intertidal zone. Impacts to this species are limited to temporary displacement to other foraging grounds. However, due to the heavily disturbed nature of both landing sites and the high levels of recreational human traffic on the eastern landing site, the potential for species occurrence and Project impacts are low. The measures identified under Section 5.1 are recommended to avoid and minimize impacts to western snowy plover during construction.

#### 4.1.1.5 California Least Tern

The western and eastern cable landing sites may provide potential habitat for the California least tern along the shoreline. This species is a plunge-diver and may be transient throughout the area. Direct, temporary impacts on foraging habitat may occur due to the presence of vessels and human activity at the HDD exit points and along the cable route. No impacts on nesting birds or nest habitat would occur. Suitable beaches for nesting are not supported in the action areas. Potential impacts on non-breeding birds include noise, light, dust, human disturbance, and accidental fluid release from vessels. Impacts on this species are limited to temporary displacement to other areas. However, due to the heavily disturbed nature of both landing sites and the high levels of recreational human traffic on the eastern cable landing

site, the potential for Project impacts is low. Additionally, the foraging habitat from which the California least tern may be displaced during Project activities is similar to habitat found throughout southern SF Bay and therefore the displacement is not anticipated to result in permanent population-level impacts. The measures identified under Section 5.1 are recommended to avoid and minimize impacts on California Least Tern during construction.

#### *4.1.1.6 Summary of Impacts*

The Project **may temporarily affect** non-breeding longfin smelt, California Ridgway's rail, California least tern, and western snowy plover. The Project is **not likely** to affect California seablite. Potential impacts on these species include temporary displacement to other foraging grounds due to increases in noise and human activity in the action area. The Project would not result in permanent direct impacts on suitable habitat or critical habitat for these species. Due to the temporary nature of the noise and increase in human activity, the proposed Project is **not likely to adversely affect** longfin smelt, California Ridgway's rail, California least tern, and western snowy plover.

## 4.2 Special Consideration of Federally Delisted Species

### *4.2.1 California Brown Pelican*

The western and eastern cable landing sites may provide potential non-breeding habitat for the California brown pelican along the shoreline. This species is a plunge-diver. Direct, temporary impacts on foraging habitat may occur due to the presence of vessels and human activity at the HDD exit points and along the cable route. The California brown pelican does not breed in the SF Bay area, therefore impacts to nesting birds or nest habitat would not occur. Potential impacts on non-breeding birds include noise, light, dust, human disturbance, and accidental fluid release from vessels. Impacts on this species are limited to temporary displacement to other areas. However, due to the heavily disturbed nature of both landing sites and the high levels of recreational human traffic on the eastern cable landing site, the potential for Project impacts is low. Additionally, the foraging habitat from which California brown pelican may be displaced during Project activities is similar to habitat found throughout southern SF Bay and therefore the displacement is not anticipated to result in permanent population-level impacts. The measures identified under Section 5.1 are recommended to avoid and minimize impacts on the California brown pelican during construction.

The Project **may temporarily affect** non-breeding California brown pelican. Potential impacts on this species include temporary displacement to other foraging grounds due to increases in noise and human activity in the action area. The Project would not result in permanent direct impacts on suitable habitat or critical habitat for these species. Due to the temporary nature of the noise and increase in human activity, the proposed Project is **not likely to adversely affect** California brown pelican.

## 4.3 Critical Habitat

No critical habitat has been designated within the action area and no critical habitat would be directly or indirectly impacted. Critical habitat for the Bay checkerspot butterfly is the closest critical habitat to the Project and is located approximately 1 mile (1.6 kilometers) southwest of the western action area and Brisbane Lagoon.

## 4.4 Cumulative Impacts

Implementation of the avoidance and minimization measures outlined in Section 5 would avoid or minimize impacts on federally protected wildlife and plants to the greatest extent feasible. Therefore, the Project would not substantially contribute to cumulative impacts on wildlife and plants in the action area.

# 5. MITIGATION AND CONSERVATION MEASURES

## 5.1 Avoidance and Minimization Measures

Given the potential for occurrence of four federally listed species, one federal candidate species, and one federally delisted species within the Project action areas (Section 1.4, Action Area), BIG will implement the following best management practices and measures to avoid and minimize the effects of the proposed Project on listed species and their habitats.

At a minimum, BIG and its contractors will provide:

- **Worker Training.** A qualified biologist will be retained to conduct mandatory contractor/worker awareness training for Project personnel. The awareness training will be provided to all personnel to brief them on the identified location of sensitive biological resources, including how to identify species (visual and auditory) most likely to be present, the need to avoid impacts on biological resources, and to brief them on the penalties for not complying with biological mitigation requirements. If new personnel are added to the Project, they will receive the mandatory training before starting work.
- **Nesting Bird Surveys.** If staging and/or construction activities in the action area will occur during the nesting season (February 1 to August 31), preconstruction surveys to identify active bird nests must be conducted by a qualified biologist within 14 days of construction initiation. Focused surveys must be performed by a qualified biologist for the purposes of determining the presence/absence of active nest sites within the proposed impact area and a 500-foot (152-meter) buffer, where feasible.

  If active nest sites are identified within 500 feet (152 meters) of Project activities, a no disturbance buffer zone will be imposed for all active nest sites prior to commencement of any construction activities to avoid construction or access-related disturbances to bird nesting activities. A no disturbance buffer constitutes an area where Project-related activities (i.e., vegetation removal, earth moving, and construction) will not occur until the nest is deemed inactive. Activities permitted within, and the size of the no disturbance buffer, will be established by a qualified biologist based on the bird's behavior, nest location, surrounding landscape features, and proposed site activities in the vicinity.
- **HDD Inadvertent Return Plan.** When using HDD equipment to install steel conduits, an inadvertent return plan will be developed which includes the following:
  - Measures to stop work, maintain appropriate control materials on the site, contain and remove drilling mud before demobilization, prevent further migration of drilling mud into the stream or waterbody, and notify all applicable authorities.
  - Control measures of constructing a dugout or settling basin at the HDD exit point to contain drilling mud to prevent sediment and other deleterious substances from entering waterbodies.
  - Requirements for onshore and offshore biological monitors to monitor onshore and offshore to identify signs of an inadvertent release of drilling fluids.
  - Any abandonment contingency plans in case the HDD operations are forced to be suspended and a partially completed bore hole abandoned.
  - Complete list of the agencies (with telephone number) to be notified.
- **Spill Contingency and Hazardous Materials Management Plans.** A Spill Contingency and Hazardous Materials Management Plan will be developed for both the terrestrial and marine Project areas:

- *Terrestrial*: Measures for terrestrial operations must include, but not be limited to, identifying appropriate fueling and maintenance areas for equipment, a daily equipment inspection schedule, and spill response procedures including maintaining spill response supplies onsite. The terrestrial plan will identify, at a minimum, the following best management practices related to using hazardous substances:
    - Follow manufacturer's recommendations on use, storage, and disposal of chemical products used in construction.
    - Avoid overtopping construction equipment fuel gas tanks.
    - During routine maintenance of construction equipment, properly contain and remove grease and oils.
    - Conduct all equipment fueling at least 100 feet from wetlands and other waterbodies.
    - Properly dispose of discarded containers of fuels and other chemicals.
    - Maintain a complete list of agencies (with their telephone numbers) to be notified of potential hazardous material spills.
- *Marine*: For marine activities involving work vessels, the primary work vessel (cable-lay vessel) will be required to carry onboard a minimum 400 feet of sorbent boom, five bales of sorbent pads at least 18 inches by 18 inches square, and a small powered vessel for rapid deployment to contain and clean up any small hazardous material spill or sheen on the water surface. The marine plan must provide for the immediate call out of additional spill containment and clean-up resources in the event of an incident that exceeds the rapid clean-up capability of the onsite work force.

- **Trash Disposal.** All food-related trash items such as food wrappers, cans, bottles, and food scraps must be disposed of in secured closed containers and removed regularly from the Project site.
- **Fueling Buffer.** Fueling of vehicles and equipment is prohibited within 100 feet (30 meters) of open water areas.
- **Artificial Lighting.** Artificial lighting of work areas during nighttime hours will be minimized to the maximum extent practicable. When nighttime lighting is necessary, appropriate light and glare screening measures must be implemented, including the use of downward cast lighting.
- **Dust Suppression.** Standard best management practices for dust suppression will be implemented as outlined in the Stormwater Pollution Prevention Plan.

## 5.2 Site Restoration

The majority of Project impacts are temporary; therefore, no site restoration is proposed. The only permanent features in the action area included within this application would be the LVs, SF Bay cables, and articulated pipe installed offshore to onshore. These features would all be subsurface, with the exception of the LV covers, which would be at surface grade.

Upland site surface restoration would involve returning the impacted areas to preconstruction contours and elevations, as required by local ordinances.

# 6. CONCLUSION

This BA forms the basis for the conclusions on the effects of the proposed Project on the following federally listed, USFWS jurisdictional species: California Ridgway's rail, California least tern, western snowy plover, California seablite, the federal candidate longfin smelt, and the federally delisted California brown pelican. The proposed installation of parallel subsea cables crossing the San Francisco Bay from Brisbane to San Leandro **may temporarily affect** non-breeding longfin smelt, California Ridgway's rail, California least tern, western snowy plover, and brown pelican. The Project is **not likely** to affect California seablite. Potential impacts on these species include temporary displacement to other foraging grounds due to increases in noise and human activity in the action area. The Project would not result in permanent direct impacts to suitable habitat or critical habitat for these species. Due to the temporary nature of the noise and increase in human activity, the proposed Project is **not likely to adversely affect** longfin smelt, California Ridgway's rail, California least tern, western snowy plover, and brown pelican. Implementation of the mitigation measures is expected to decrease any potential impacts on federally listed species.

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