

CITY OF MORRO BAY

ENVIRONMENTALLY SENSITIVE HABITAT AREA (ESHA) REVIEW AND CURRENT CONDITIONS MAPPING



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EXECUTIVE SUMMARY

Rincon Consultants, Inc. (Rincon), in cooperation with Michael Baker International (Michael Baker), is assisting the City of Morro Bay (City) to conduct data review and analysis of the current extent and locations of Environmentally Sensitive Habitat Area (ESHA) resources within the City's coastal zone. The goal of the review and data analysis is to assist the City in updating its Local Coastal Program (LCP), obtain mapping approval by the California Coastal Commission (Commission) as part of the City's LCP update, and provide updated maps of potential ESHA under current conditions to better aid planning staff reviewing projects that have the potential to impact ESHA.

Rincon evaluated and overlaid existing the biological resource information and previous ESHA mapping on recent aerial imagery to refine outdated mapping polygons, identify undeveloped areas or areas with no recently mapped ESHA information that have a moderate to high potential to contain ESHA habitats, and review existing data documenting presence and distribution of special status wildlife, plants, and sensitive habitats. These data sources are outlined in more detail below. Field reconnaissance surveys were also conducted for field verification.

Seventeen special status wildlife, sixteen special status plant species, and three special status vegetation communities are documented in California Natural Diversity Database (CNDDB) as occurring within the City's coastal zone. Federally designated critical habitat for south-central California coast steelhead (*Oncorhynchus mykiss*), California red-legged frog (*Rana draytonii*), Morro shoulderband snail (*Helminthoglypta walkeriana*), tidewater goby (*Eucyclogobius newberryi*), Pacific leatherback sea turtle (*Dermochelys coriacea*), and western snowy plover (*Charadrius alexandrinus nivosus*) also occur within the City's coastal zone. Based on the existing biological resource information and previous ESHA mapping, 16 ESHA types have been determined. These areas fall into three broad categories: aquatic resources and wetland habitats; other sensitive natural communities; and breeding and overwintering sites (roosts, certain nests, and rookeries). These types are described in more detail in Section 4.2 below.

Please note that the graphic information provided portrays the various biological resource boundaries as accurately as possible, but should not be interpreted to constitute site-specific mapping throughout the Morro Bay coastal zone, as site access was limited. This data is only a cartographic representation of the existing environment, evaluated in the context of existing published datasets, and should not be used on its own without field determination procedures to establish precise boundary locations. Conditions on the ground control permit and appeal jurisdictional boundary locations, based on Coastal Act definitions, regardless of how accurate the mapped boundary may be.

1. INTRODUCTION

1.1 PURPOSE

Rincon Consultants, Inc. (Rincon), in cooperation with Michael Baker International (MBI), is assisting the City of Morro Bay (City) to conduct data review and analysis of current extent and locations of Environmentally Sensitive Habitat Area (ESHA) resources within the City's coastal zone. The goal of the review and data analysis is to assist the City in updating its Local Coastal Program (LCP), obtain mapping approval by the California Coastal Commission (Commission) as part of the City's LCP update, and provide updated maps of potential ESHA under current conditions to better aid planning staff reviewing projects that have the potential to impact ESHA.

This report summarizes the methodology used to conduct the review and data analysis, a brief description of the habitats that occur within the Morro Bay coastal zone, and a summary of the updated mapped ESHA based on current conditions within the Morro Bay coastal zone. An analysis of potential effects to ESHA resulting from climate change and associated sea level rise, and a projection of its future effects on ESHA, will be provided under separate cover.

Under the California Coastal Act of 1976 (Coastal Act), activities such as land development, public infrastructure projects, and maintenance within the coastal zone are typically subject to regulatory oversight. The authority for regulating such activities varies throughout the coastal zone. In tide lands and certain non-tidal areas of the coastal zone, the Commission has retained permit authority. In areas of the coastal zone within San Luis Obispo County, permit authority resides with the local governing agency, including San Luis Obispo County for the unincorporated areas, and the coastal municipalities of Pismo Beach, Grover Beach, and Morro Bay. Each of these local jurisdictions has an adopted LCP that provides guidance on land uses and permit requirements consistent with the applicable LCP, as well as the Coastal Act, to protect and enhance resources within the coastal zone.

1.2 REGULATORY DEFINITIONS OF ESHA, WETLANDS AND MARINE RESOURCES

Relevant Coastal Act policies concerning ESHA, wetlands, and marine resources are found in Coastal Act Sections 30107.5, 30121, 30230, 30231, and 30240 and Section 13577(b) of the California Code of Regulations (CCR).

Coastal Act Section 30107.5 Environmentally Sensitive Area

"Environmentally sensitive area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

To ensure consistency with the Coastal Act, it is important to include the definitions of wetlands found in Coastal Act Section 30121 and CCR Section 13577(b). In addition, the Commission will also consider identification of a species or habitat as rare when there is other compelling evidence of rarity such as consideration for listing as rare, threatened or endangered under the California or Federal Endangered Species Acts and/or evidence of rarity in published academic studies.

The Coastal Act criteria for determining whether a vegetation community qualifies as an ESHA are based upon the habitat's ecological importance, including the rarity or function of the habitat. The California Department of Fish and Wildlife (CDFW) (2010) List of California Terrestrial Natural Communities provides an inventory of California's natural communities and identifies those that are considered rare because of their highly limited distribution. These rare communities may or may not contain individual species that are rare, threatened, or endangered, but would still be considered ESHA by the Commission.

Coastal Act Section 30121 Wetland

"Wetland" means lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.

CCR Section 13577(b) (in part)

Wetland shall be defined as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent and drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salts or other substances in the substrate.

Based on the Coastal Act definition, areas can be classified as "wetlands" within the coastal zone by exhibiting any one of the three wetland parameters used by the U.S. Army Corps to define

wetland areas (U.S. Army Corps of Engineers uses a three-parameter definition). The Coastal Act definition of wetland does not distinguish between wetlands according to their quality. Thus, under the Coastal Act, poorly functioning or degraded areas that meet the definition of wetlands are subject to wetland protection policies.

Section 30230 Marine Resources; Maintenance

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30231 Biological Productivity; Water Quality

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Section 30240 Environmentally Sensitive Habitat Areas; Adjacent Developments

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas. (Amended by Ch. 285, Stats. 1991.)

2. METHODOLOGY

2.1 OVERVIEW

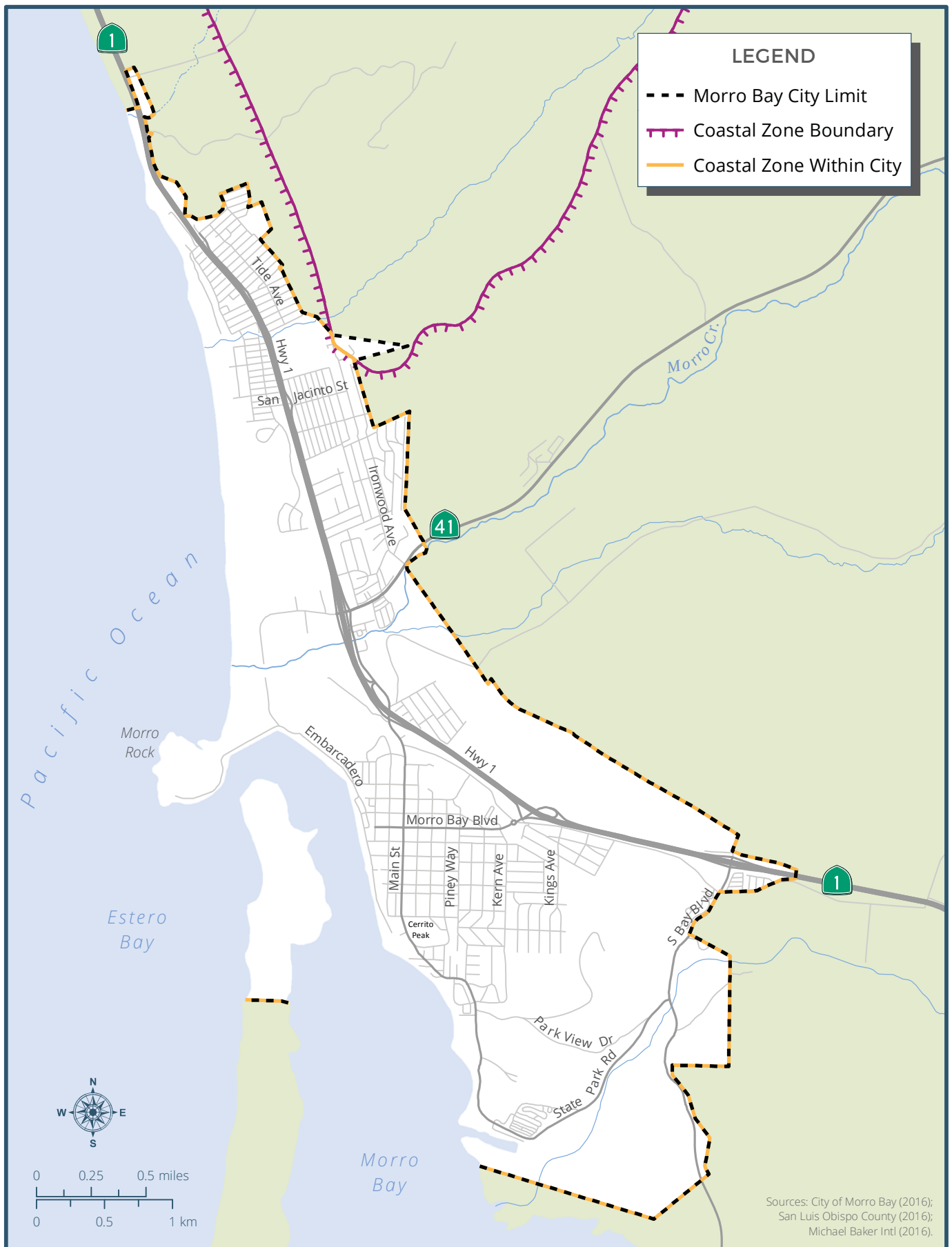
Rincon compiled and reviewed available biological resource mapping data within the City's coastal zone. Specifically, the area included in data analysis is limited to the portions of the City that are contained within the designated coastal zone between Toro Creek Road to the north and pickleweed marsh near the outlets of Chorro and Los Osos Creeks into the Morro Bay Estuary to the south (Figure 1). Rincon also reviewed ESHA mapping for adjacent jurisdictions within the County of San Luis Obispo where they adjoin the City.

Rincon evaluated and overlaid the existing biological resources information and previous ESHA mapping on recent aerial imagery to refine outdated mapping polygons, identify undeveloped areas or areas with no recently mapped ESHA information that have a moderate to high potential to contain ESHA habitats, and review existing data documenting presence and distribution of special status wildlife, plants, and sensitive habitats. These data sources are outlined in more detail below.

Rincon then performed preliminary mapping of ESHA boundaries based on desktop analysis of high-resolution, current aerial photographs and other published datasets. Rincon then conducted a field reconnaissance survey from publicly accessible roads and public lands to evaluate if existing conditions were consistent with the general mapped boundaries, and annotated draft maps. ESHA features were then revised and mapped using Geographic Information Systems (GIS) software, and attribute information for ESHA within the Morro Bay coastal zone was compiled using a combination of field observations regarding existing conditions in the study area, and supporting evidence from a variety of publicly available datasets. The existing published datasets vary in regards to scale, methodology and purpose, and were used as a baseline to support more specifically and consistently mapped ESHA boundaries.

Accessible areas with potential ESHA and sites adjacent to ESHA, as well as rare habitats with high level of sensitivity, were selected for field verification. Field reconnaissance surveys were conducted on May 22, 23, and 24, 2017. The field reconnaissance surveys did not constitute a definitive study to confirm the presence or absence of federal or state listed rare, endangered, threatened or fully protected species (i.e. special status species), nor did the surveys include formal delineation of wetlands and other waters. Protocol surveys to determine the presence or absence of special status species were not performed as part of this analysis.

Based on the above methodology, potential ESHA polygons and stream centerlines were generated using Arc Map 10.3. (These are provided as a separate enclosure with this report.)



Mapping criteria was generally conducted based on a minimum mapping unit of 0.10 acre and further reduced based on existing site conditions (i.e. breaks in features at existing roads, changes in vegetation structure, the City's coastal zone boundary, and distinction on recent aerial photographs) and publicly available GIS data. Stream features lacking visible riparian canopy or wetland vegetation are depicted as centerlines due to lack of access for more specific mapping that would be necessary for ordinary high water mark (OWHM) and top of bank mapping. Approximately 3,767 acres comprise the Morro Bay coastal zone and therefore, were included in this review. Once the preliminary ESHA polygons were generated, existing information previously reviewed to aid in generating the polygons, including data from the California Natural Diversity Database (CNDDB; CDFW 2017), U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) designated final critical habitat polygons (2017a; 2017), USFWS National Wetlands Inventory (NWI; 2017b), **United States Geological Survey (USGS) National Hydrography Dataset (NHD; 2017)**, and other datasets were overlaid to integrate supporting documentation for ESHA designation into the shapefile attributes. Published maps in reports, including map products in annual eelgrass survey reports by the Morro Bay National Estuary Program (MBNEP), were also referenced.

Based on the above methodology, potential ESHA polygons and stream centerlines were generated using Arc Map 10.3. (These are provided as a separate enclosure with this report.) Mapping criteria was generally conducted based on a minimum mapping unit of 0.10 acre and further reduced based on existing site conditions (i.e. breaks in features at existing roads, changes in vegetation structure, the City's coastal zone boundary, and distinction on recent aerial photographs) and publicly available GIS data. Stream features lacking visible riparian canopy or wetland vegetation are depicted as centerlines due to lack of access for more specific mapping that would be necessary for ordinary high water mark (OWHM) and top of bank mapping. Approximately 3,767 acres comprise the Morro Bay coastal zone and therefore, were included in this review. Once the preliminary ESHA polygons were generated, existing information previously reviewed to aid in generating the polygons, including data from the California Natural Diversity Database (CNDDB; CDFW 2017), U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) designated final critical habitat polygons (2017a; 2017), USFWS National Wetlands Inventory (NWI; 2017b), **United States Geological Survey (USGS) National Hydrography Dataset (NHD; 2017)**, and other datasets were overlaid to integrate supporting documentation for ESHA designation into the shapefile attributes. Published maps in reports, including map products in annual eelgrass survey reports by the Morro Bay National Estuary Program (MBNEP), were also referenced.

The biological productivity of the near-shore portion of the ocean is dependent on upstream activities that effect habitat and water quality. In accordance with the Commission's guidance, Marine Resources as defined in Section 30230 can be considered ESHA. Offshore resources are not included in this dataset of mapped potential ESHA; however, they are awarded the same protection by the Commission, and the condition of the contributing watershed is directly and indirectly linked to water quality and habitat conditions in receiving offshore waters. Thus, offshore marine resources were considered in reviewing potential ESHA.

2.2 SOURCE INFORMATION

The desktop review included existing environmental literature and other pertinent information, including but not limited to:

- A Manual of California Vegetation, Second Edition (Sawyer et al. 2009)
- Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986)
- CNDDDB (CDFW 2017a)
- Online Biological Spatial Data Server (BIOS; CDFW 2017b)
- Calflora “What Grows Here” Online Botanical Database (2017)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (2017)
- USFWS NWI Wetlands Mapper (2017a)
- USFWS Critical Habitat Portal (and relevant published shapefiles) (2017b)
- NMFS Critical Habitat on the West Coast (and relevant published shapefiles) (2017a)
- NMFS Essential Fish Habitat Mapper (2017b)
- CDFW BIOS Habitat Connectivity Mapper (and associated shapefiles) (2017b)
- City of Morro Bay General Plan/LCP (1988; 1982, as amended)
- Atlas of Sensitive Species of Morro Bay Area (Sims 2010)
- Morro Bay Eelgrass Reports (MBNEP 2013)

Detailed information on methodology used to derive the source information is available in the source information reports, plans or at the websites listed in Section 6, References of this report. Below is a brief summary of the methodology used to generate shapefiles and other map datasets supporting the sources reviewed to support this mapping effort. Refer to Section 3 for results of database and literature reviews, as well as maps depicting the locations of resources presented by these source data sets. As noted in the following detailed discussion, map scales and methodology among these data sources varied and level of accuracy is not consistent across all datasets.

2.2.1 USFWS National Wetlands Inventory

The USFWS objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. This dataset represents the extent, approximate location and type of wetlands and deepwater habitats in the United States and its Territories. These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The maps are prepared on a national scale, from the analysis of high altitude imagery, and contain a level of error on a local scale. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis. The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground-truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

This dataset should be used in conjunction with the Wetlands Project Metadata layer, which contains project-specific wetlands mapping procedures and information on dates, scales and emulsion of imagery used to map the wetlands within specific project boundaries. The present goal of the USFWS is to provide the citizens of the United States and its Territories with current geospatially referenced information on the status, extent, characteristics and functions of wetlands, riparian, deepwater and related aquatic habitats in priority areas to promote the understanding and conservation of these resources.

This dataset was used as a reference to support more refined mapping based on aerial photo interpretation and features observable from public rights of way and publicly accessible sites.

Exclusions - Certain wetland habitats are excluded from the NWI mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

By policy, the USFWS also excludes certain types of "farmed wetlands" as may be defined by the Food Security Act or that do not coincide with the Cowardin et al. (1979) definition. Contact the USFWS Regional Wetland Coordinator for additional information on what types of farmed wetlands are included on wetland maps.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

2.2.2 National Hydrography Dataset

The National Hydrography Dataset (NHD), a component of the USGS National Map, is a digital geospatial dataset that defines the general location of surface waters in the United States. The NHD provides mapping of the nation's drainage networks, including rivers, streams, drainages, lakes, ponds, coastlines, dams, and canals, with a resolution of 1:24,000 scale or better. These datasets are updated quarterly and used in general mapping of surface water systems (USGS 2017).

2.2.3 Critical Habitats

Critical habitat is a term used in the federal Endangered Species Act (ESA) and defined as a specific geographic area (or areas) that contain features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. These areas provide notice to the public and land managers of the importance of these areas to the conservation of a listed species. Special protections and/or restrictions are possible in these areas when Federal funding, permits, licenses, authorizations, or actions occur or are required.

When a species is proposed for listing as endangered or threatened under the ESA, the USFWS or NMFS, depending on the species, must consider whether there are areas of habitat believed to be essential to the species' conservation. An area is designated as "critical habitat" after the USFWS or NMFS publishes a proposed rule in the Federal Register and receives and considers public comments on the proposal. The final boundaries of the critical habitat are also published in the Federal Register. Critical habitat is mapped on varying scales and may include areas that are not currently occupied by the species but that will be needed for its recovery. The final boundaries of the critical habitat area, once identified, are published in the Federal Register and accessible to the public. Due to varying scales of mapping efforts and lack of on the ground access, a margin of error is inherent; thus, detailed on-the-ground inspection of any particular site may provide more information regarding a specific site's suitability to support a particular listed species.

The USFWS is responsible for designation of critical habitat for terrestrial species, freshwater aquatic species, and certain fur-bearing ocean mammals, including sea otters. The NMFS of the National Oceanic and Atmospheric Association (NOAA) is responsible for establishing critical habitat for protection of sensitive marine species such as whales, sea turtles, corals, and anadromous species including steelhead and salmon. They aim to provide vital services, including the conservation of protected resources and healthy ecosystems.

2.2.4 Marine Mammal Protection Act and Magnuson-Stevens Fishery Conservation and Management Act

The NMFS also administers the Marine Mammal protection Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Under the Marine Mammal Protection Act and the ESA, the NMFS works to recover and protect sensitive marine (and anadromous) wildlife. Under the Magnuson-Stevens Act, the NMFS requires regional fishery management councils to identify the Essential Fish Habitat (EFH) which is identified in a fisheries management plan. EFH is broadly defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. The open ocean including and north of Morro Rock as well as Morro Bay is considered EFH pursuant to the EFH Mapper (NMFS, 2017). EFH in these areas includes but is not limited to groundfish, such as sole, flounder and sanddab, which is currently or has historically been occupied by such species (Pacific Fishery Management Council, 2016).

2.2.5 Habitat Connectivity Maps

Wildlife movement corridors, or habitat linkages, are generally defined as connections between habitat patches that allow for physical and genetic exchange between otherwise isolated animal populations. Such linkages may serve a local purpose, such as providing a linkage between foraging and denning areas, or they may be regional in nature. Some habitat linkages may serve as migration corridors, wherein animals periodically move away from an area and then subsequently return. Others may be important as dispersal corridors for young animals. A group of habitat linkages in an area can form a wildlife corridor network.

The California Essential Habitat Connectivity Project: A Strategy for Conserving Connected California (Spencer et al. 2010) and Penrod et al. (2010) have evaluated critical wildlife movement corridors throughout California that have been identified as priority areas for conservation. Essential Connectivity Areas (ECAs) represent the most critical wildlife movement areas for long-term conservation of California's sensitive wildlife species; however, it should be noted that ECAs do not represent an exhaustive list of movement corridors in the state and they are presented on a City or County scale. ECAs are large, continuous areas, and individual ECAs may overlap one another without clearly defined boundaries.

2.2.6 CDFW California Natural Diversity Database

The CNDDDB aims to provide the most current information and to track the location and condition of all reported occurrences of California's special status species, which include those species that are listed as rare, threatened, or endangered by the CDFW or the USFWS, or are candidates for state and/or federal listing by the CDFW and/or USFWS, or have been designated as "fully protected" or "species of special concern" by the CDFW. The CNDDDB also includes information on other species that are tracked by CDFW, that do not fall into any of the categories cited above. The CNDDDB also includes a database and spatial dataset of the status and locations of known occurrences of California's rare species and natural community types.

The CNDDDB is a dynamic system with information continually being added and upgraded. The CNDDDB contains over 84,000 locational records for over 2,500 elements (plant taxa, animal taxa, and natural communities). A location record is referred to as Element Occurrence, and is a site that contains an individual, population, nest site, den, or stand of a special status element. Populations, individuals, or colonies located within 1/4 mile of each other generally constitute a single occurrence, sometimes with multiple parts.

The documentation of these occurrences serves as a guideline and background for designating suitable habitat for special status species. The CNDDDB provides the date and meter accuracy of each occurrence to allow further analysis and application of the documented information. Quality of occurrence mapping varies from occurrence to occurrence, based upon the source data submitted.

2.2.7 Morro Bay General Plan/LCP

The California Coastal Act of 1976 requires each coastal jurisdiction in California to prepare and update a LCP to govern future development along the coast. The LCP includes concerns such as land use, archaeology, agriculture, and visual resources, among others. The Morro Bay LCP Land Use Plan was certified in 1982. Subsequent amendments were submitted to update the LCP following the initial certification. A comprehensive plan update was initiated in 2000 but was never certified by the Commission. The Morro Bay General Plan was adopted in 1988 and outlined physical development of the City. Land use, circulation, housing, conservation, open space, noise, and safety were all outlined in the plan.

Chapter Twelve (XII) of the Morro Bay LCP addresses ESHAs within the coastal zone of the City. The ESHAs specified in this document are discussed further in Section 3.1. Mapping produced as part of the planning efforts completed in the 1980s are also discussed in Section 3.1. An updated, complete GIS-based map of ESHAs in Morro Bay was not produced.

Additionally, a baseline report describing habitats in Morro Bay was prepared as part of the current General Plan/LCP Update. See Chapter 9 of the Baseline Assessment Chapters submitted for the Morro Bay General Plan Update for details.

2.2.8 Atlas of Sensitive Species of Morro Bay Area

The MBNEP hosts a number of publications on their website related to biological resources in the Morro Bay area. These include a 2010 Atlas of Sensitive Species of Morro Bay Area (Sims 2010), the purpose of which was to compile all available information on natural resources found in the Morro Bay area and assist in prioritizing conservation of sensitive species. This document consisted of research and analysis of references including CNDDB, peer-reviewed technical flora and fauna guides and texts, available herbaria, online databases, CDFW records and other public information. Field work was also done to confirm the presence or absence of many special status species in the area. The project included areas around the Morro Bay Estuary and Morro Bay watershed, including the City of Morro Bay, and the town of Los Osos and Baywood Park.

2.2.9 Morro Bay Eelgrass Report

The MBNEP monitors eelgrass (*Zostera marina*) and other intertidal vegetation on an annual or biennial frequency via multispectral aerial imagery and digital classification (MBNEP 2013). The MBNEP publishes periodic reports on the status of eelgrass, including comparisons of mapping and transect studies done dating back to 2007. The most recent report published is from 2013.

2.3 MAPPING

Polygons, centerlines, and attribute information for ESHAs within the Morro Bay coastal zone were compiled using the above summarized publicly available datasets in addition to an independent reconnaissance-level field survey and intensive desktop analysis by Rincon (May 2017) based on previously listed criteria outlined in Section 1, with reference to previously listed published datasets.

3. RESULTS

A geographic area can be designated ESHA due to the presence of individual species of plants or animals, or the presence of a particular habitat. Second, for an area to be designated as ESHA, the species or habitat must be either rare, or especially valuable, or determined to be easily disturbed or degraded by human activities. In this section, we first present results of the database queries, literature reviews, and field surveys that support ESHA determination, and then synthesize the information into updated ESHA categories and mapping. Updated current ESHA extent is presented on updated maps as well as updated spatial datasets in shapefile format. Attribute information within the spatial dataset includes vegetation communities and other habitats, occurrences of special status species supported by these habitats, critical habitat locations, and known or potential wetlands and waters. ESHA as depicted within the GIS submittal can serve as an illustrative tool to help identify potential biological resources.

ESHA information provided in this submittal is not intended to be an exhaustive compilation of the habitat areas that meet the ESHA definition; therefore, requirements for conducting site-specific biological evaluations and field observations to identify ESHA and other sensitive biological resources are required prior to project development approval. Following completion of the mapping of ESHAs, ESHAs will be buffered by an agreed upon buffer, typically a minimum of 50-100 feet. While exact policy is still being developed, typically, LCPs require that sites with mapped ESHA areas or areas that fall within the specified buffer of potential ESHA require site-specific biological evaluations and field observations to identify ESHA and other sensitive biological resources prior to project development approval.

Below is a summary of database and literature review findings, followed by a description of the updated ESHA determinations.

3.1 QUERY AND LITERATURE REVIEW RESULTS

As noted previously, Rincon evaluated and overlaid mapped wetland and vegetation information on the recent aerial imagery available from a variety of sources, including the County of San Luis Obispo. Maps depicting the locations of resources presented by these source data sets are included as Figures 2 through 6.

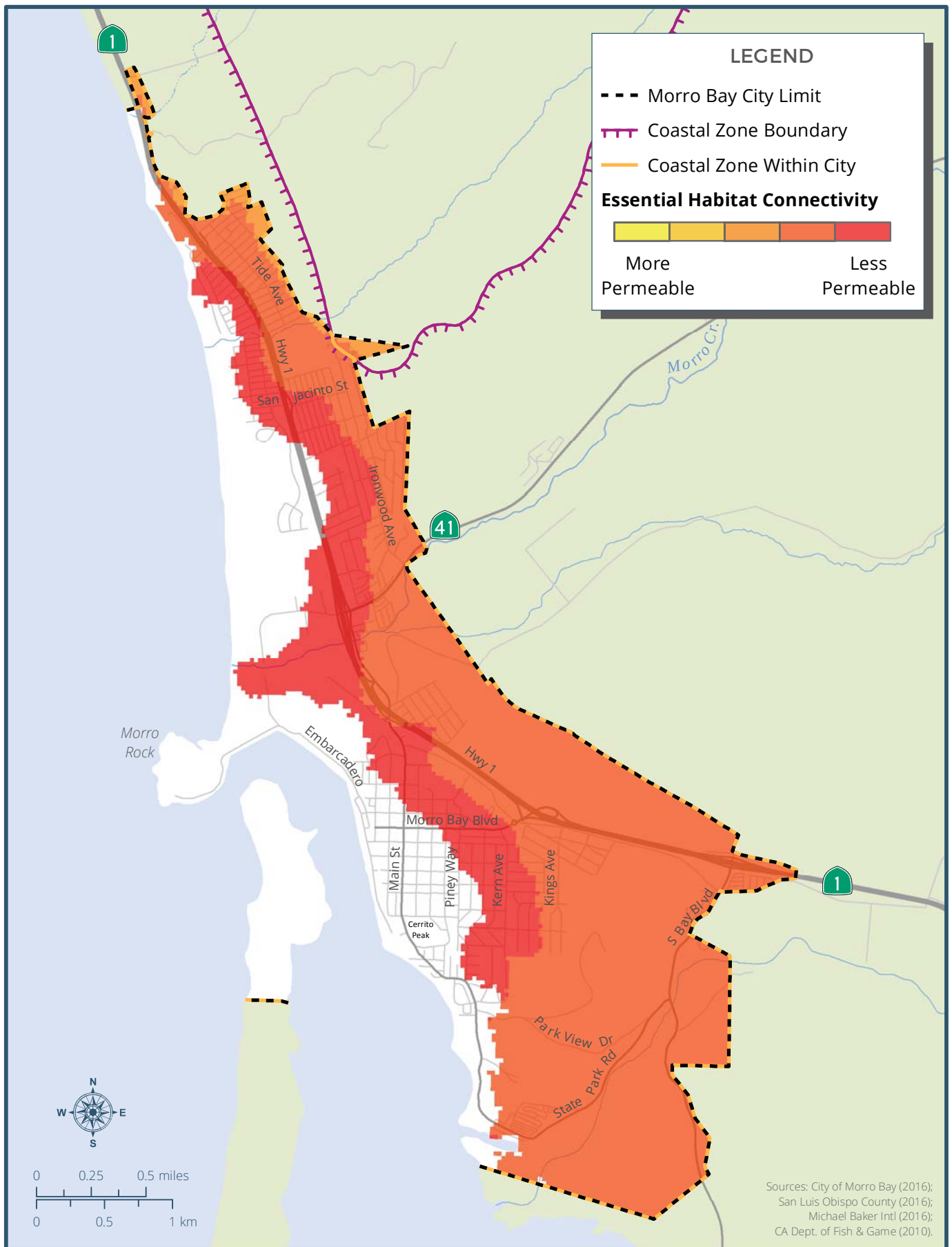


FIGURE 2

Essential Habitat Connectivity

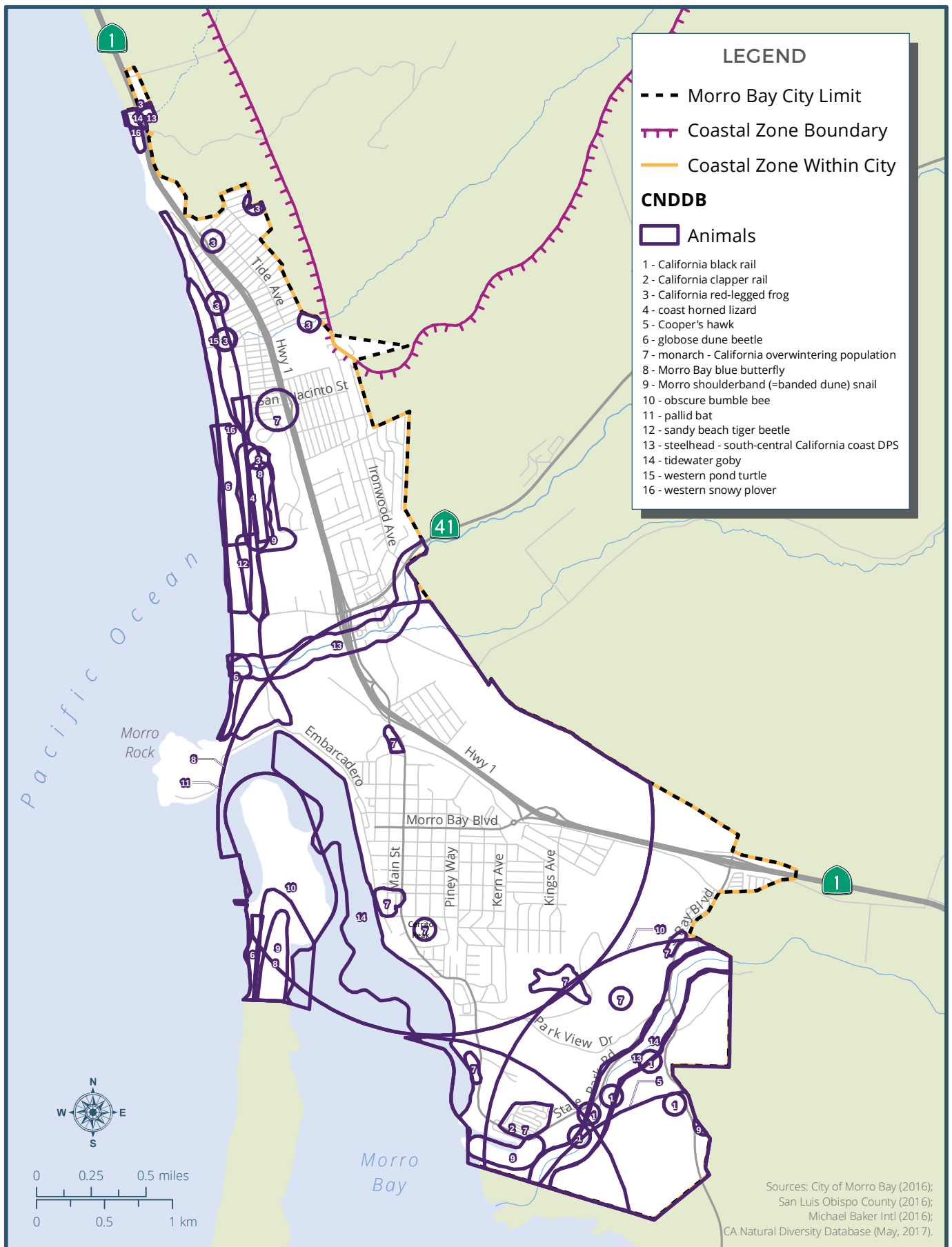


FIGURE 3A

Special Status Species and Sensitive Natural
Communities, as Reported by CNDDDB

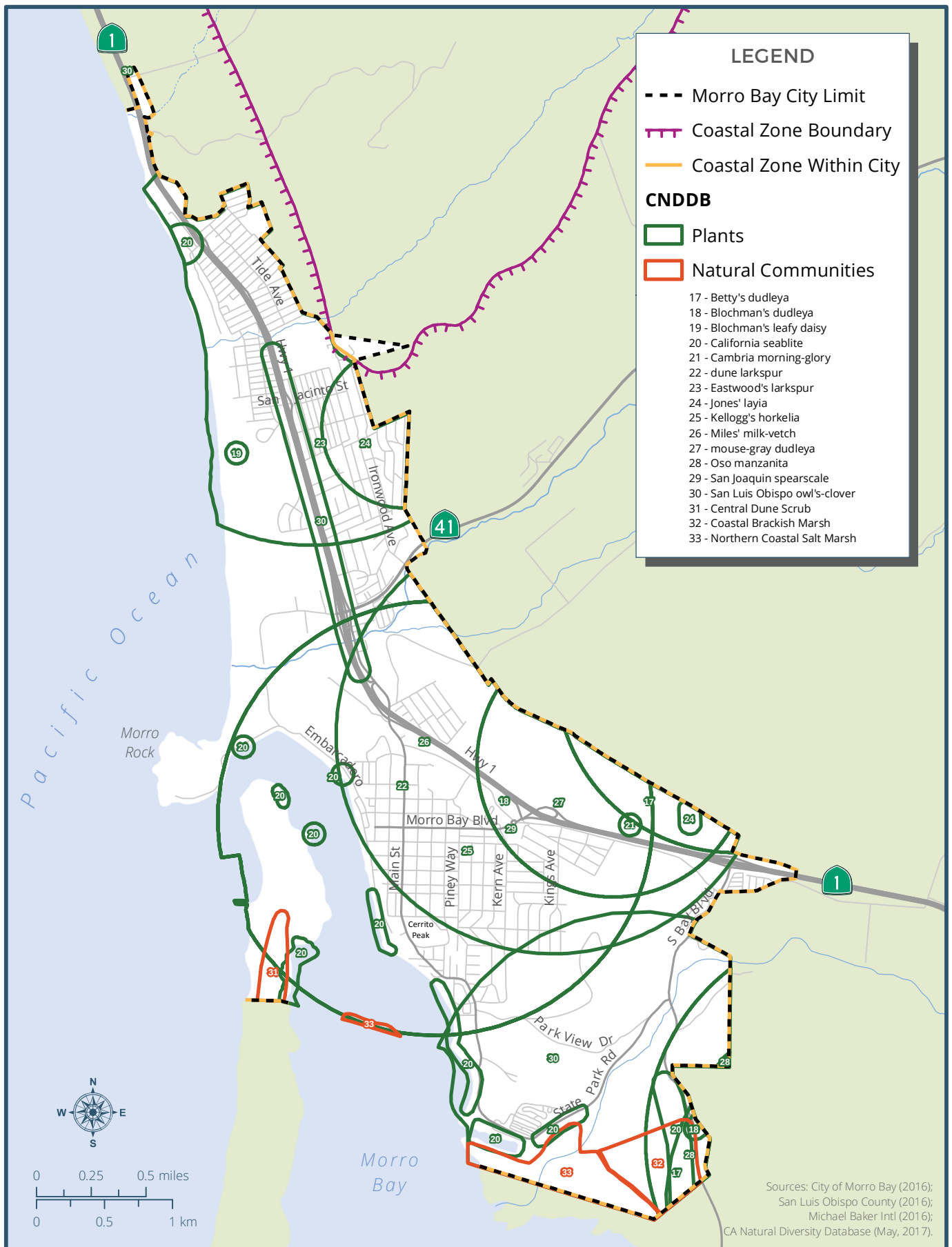
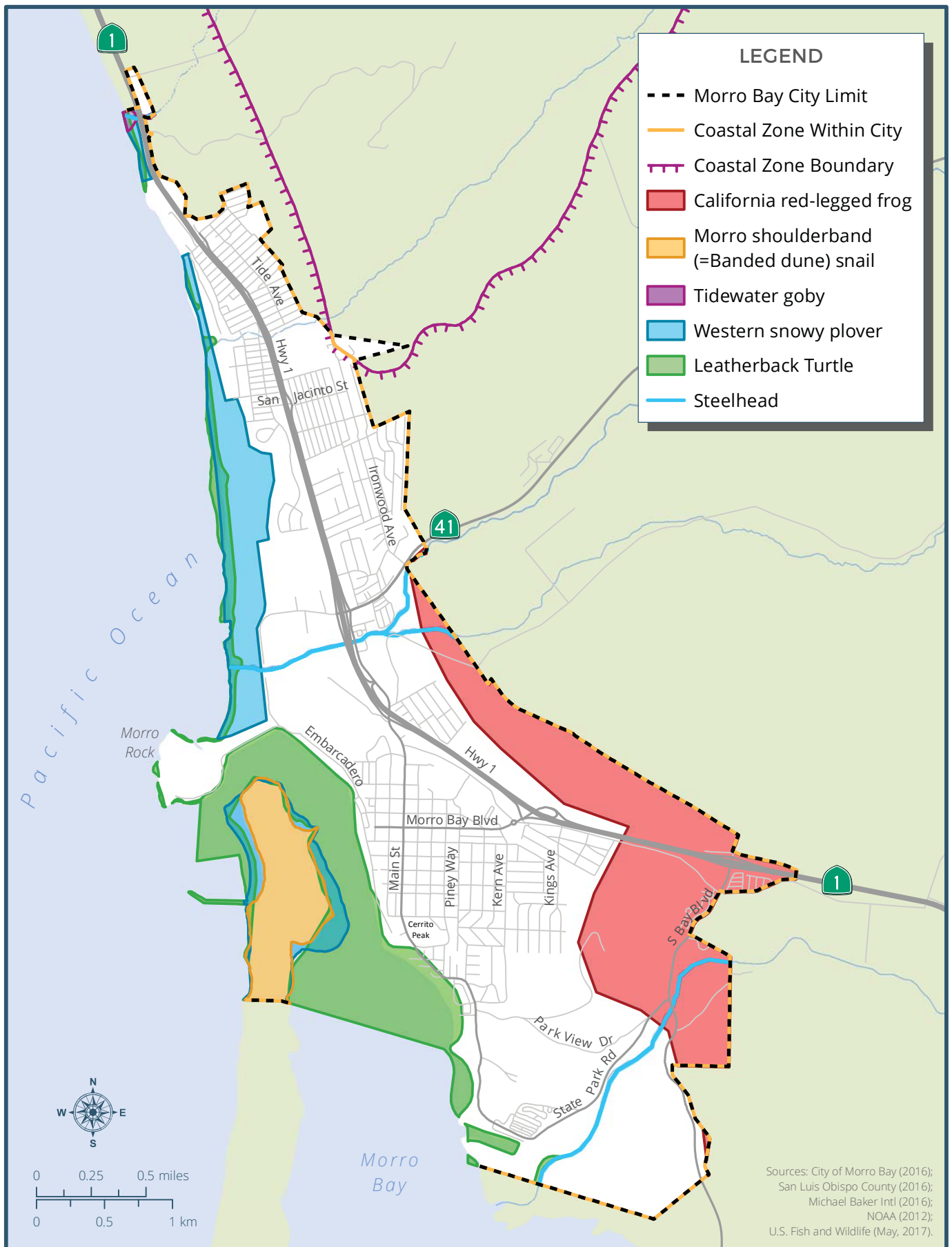
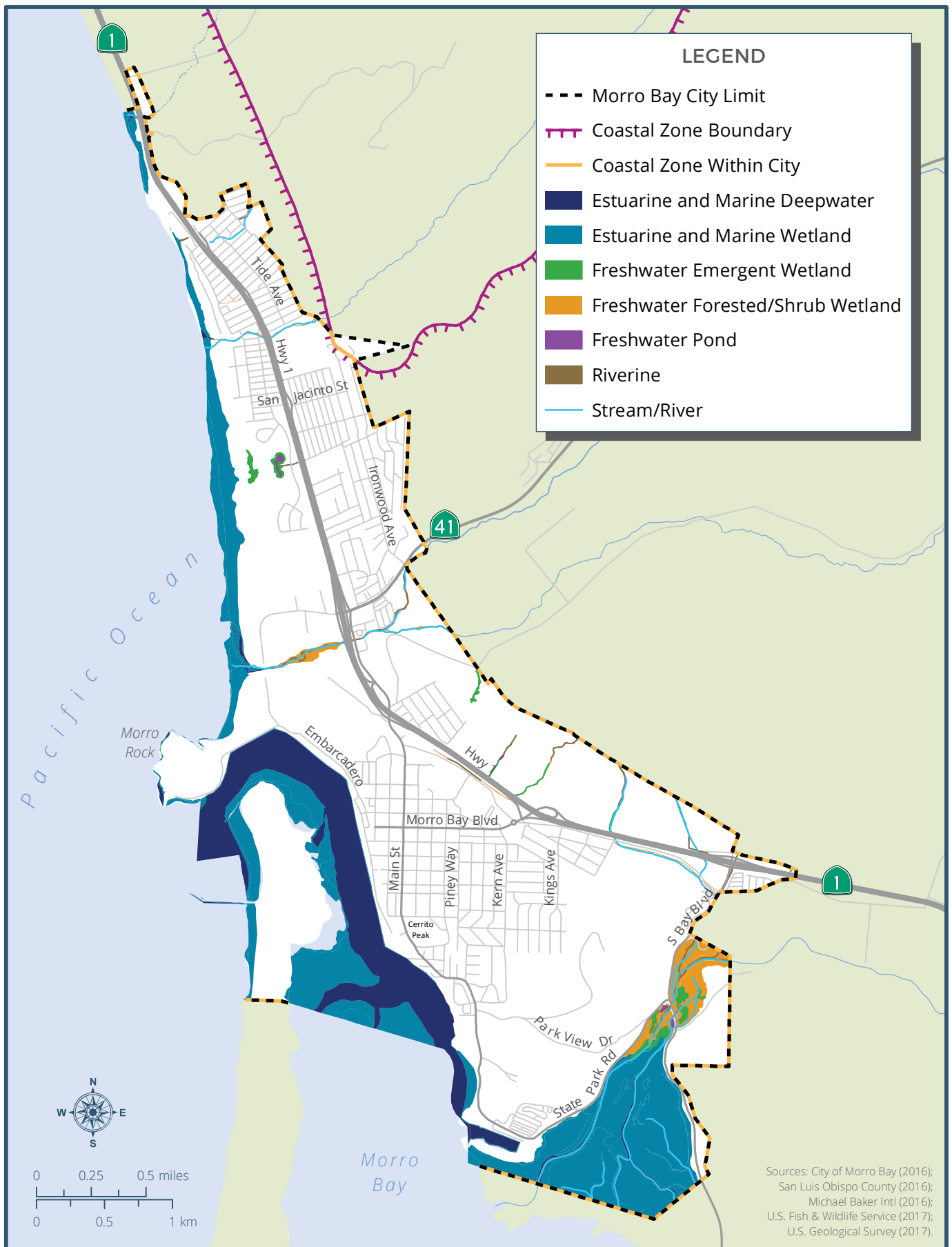
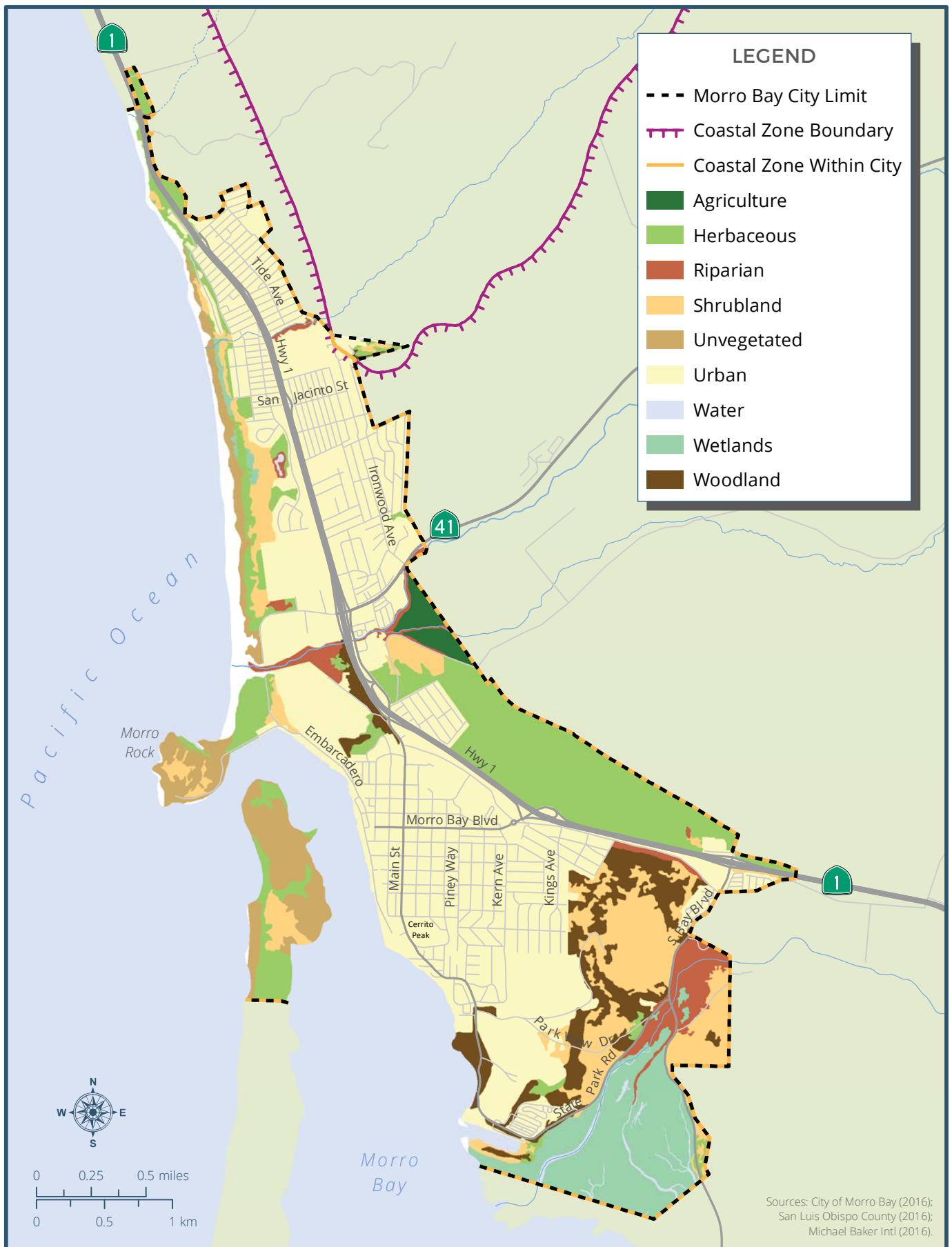


FIGURE 3B

Special Status Species and Sensitive Natural
 Communities, as Reported by CNDDDB







3.1.1 NWI and NHD

NWI documents four wetland community types within the City's coastal zone: freshwater emergent wetland, freshwater forested/shrub wetland, estuarine and marine wetland, and estuarine and marine deepwater wetland. Additionally, riverine types are identified. The NHD identifies coastal streams, including both perennial and seasonal features, as well as the bay and estuary, and the Pacific Ocean (Figure 5).

3.1.2 Designated Critical Habitats

Final designated critical habitat for the following species occurs within the City's coastal zone: steelhead (*Oncorhynchus mykiss*), California red-legged frog (*Rana draytonii*), Morro shoulderband snail (*Helminthoglypta walkeriana*), tidewater goby (*Eucyclogobius newberryi*), Pacific leatherback sea turtle (*Dermochelys coriacea*), and western snowy plover (*Charadrius alexandrinus nivosus*) (Figure 4). Records for steelhead, California red-legged frog, Morro shoulderband snail, tidewater goby, and western snowy plover are reported from the Morro Bay coastal zone. Suitable habitat for federally listed species within federally designated critical habitat is expected to be ESHA, even if the species has not been previously documented as occurring in particular locations.

It should be noted that critical habitat for Pacific leatherback sea turtle along the Pacific coast, including the vicinity of Morro Bay, was designated on the basis of prey base. Pacific leatherback are specialists that consume jellyfish, including brown sea nettle (*Chrysaora fuscescens*) and other scyphomedusae of the order Semaestomeae, such as moon jellies (*Aurelia labiata*) (NFMS 2012a, 2012b). Two populations of Pacific leatherback are recognized: the Western population breeds on tropical islands in the western Pacific islands, including Indonesia, Papua New Guinea, and the Solomon Islands, and migrates extreme distances between breeding and foraging grounds, which include coastal waters along the west coast of North America; the Eastern population breeds on tropical beaches in Mexico and Central America, and forages primarily in tropical waters of the eastern Pacific Ocean (NMFS 2012b). Pacific leatherbacks are not known or expected to breed on beaches in Morro Bay. Additionally Pacific leatherbacks do not typically pursue prey farther than the mean lower low water and thus are not expected from shallow water habitats of the immediate shore of the Morro Bay coastal zone (including the intertidal zone). Pacific leatherback could occur in the marine environment offshore, in deeper waters adjacent to areas evaluated for ESHA, as they have been reported foraging in the deeper coastal waters of Estero Bay marine environment, based on telemetry data, fishery interaction data, and aerial surveys (NFMS 2012b).

3.1.3 Habitat Connectivity

Wildlife movement corridors can be both large and small scale. Regionally, the Morro Bay coastal zone is located at the edge of an identified ECA, as mapped in the report, California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California (2010). This ECA that connects Natural Landscape Blocks such the Los Padres National Forest

and other relatively intact natural areas. This essential habitat connectivity is mapped as somewhat permeable along the eastern edges of the Morro Bay coastal zone, and less permeable in developed areas (Figure 2). The immediate coast and coastal strand were not mapped as part of this ECA in the available larger scale habitat connectivity models. ECAs are mapped based on coarse ecological condition indicators, rather than the needs of particular species and thus serve the majority of species in each region.

Small scale habitat corridors are also present in the Morro Bay coastal zone, and include drainages and other topographic features that facilitate movement, and contiguous areas of natural vegetation, including the coastal dunes and Black Hill Natural Area. Perennial streams, wetlands, shallow bays and estuaries, including Morro Creek and Morro Bay Estuary, provide potential fish and other aquatic wildlife movement habitat. At the local scale, areas of natural vegetation, including drainages, provide important movement opportunities for wildlife, particularly where these features connect blocks of natural vegetation interspersed with developed areas, and therefore, have been utilized for guidance regarding ESHA, although habitat connectivity alone does not constitute an ESHA determination.

3.1.4 Special Status Species

It has been established that the Commission will consider presence of a rare plant and/or wildlife species (when there is other compelling evidence of rarity such as consideration for listing as rare, threatened or endangered under the California or federal Endangered Species Acts and/or evidence of rarity in published academic studies) to signify an area as ESHA. For the purposes of this analysis, “Special Status Species” includes the following:

- Species listed as threatened or endangered under the federal ESA;
- Species listed as rare, threatened, or endangered under the California ESA;
- Species considered “Fully Protected” or “Species of Special Concern” by the CDFW that were documented as occurring in the Morro Bay General Plan/LCP (1982); and
- Plants ranked California Rare Plant Rank (CRPR) 1 or 2 in the CNDDDB and/or CNPS Online Inventory of Rare and Endangered Plants. Some CRPR 3 and 4 species are also considered when they are part of an unusual plant community, on an unusual substrate, at type localities, and when locally designated as species of concern.

Seventeen special status wildlife species, sixteen special status plant species, and three special status vegetation communities are documented in the CNDDDB as occurring within the City’s coastal zone as shown on Figure 3. See Appendix B for a complete list of Sensitive Species, Natural Communities, and Designated Critical Habitats reported to occur in the vicinity, as reported by the CNDDDB.

Of these, listed species documented within the City's coastal zone include salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*), California seablite (*Suaeda californica*), Morro shoulderband snail, tidewater goby, and western snowy plover. Morro Creek and Chorro Creek are designated critical habitat for south-central California coast steelhead.

Open space areas within the City's coastal zone with documented occurrences of listed or rare species or special status habitats are considered potential ESHA. While individual occurrences of the above mentioned species may not indicate the presence of ESHA, their presence could indicate the overall high quality and value of the habitat in which the species is observed.

3.1.5 Previously Described ESHA

The City of Morro Bay first adopted an approved LCP in 1982. Habitat areas as described in the 1982 City of Morro Bay LCP (MBLCP) were grouped into four broad categories: coastal wetlands, coastal streams/riparian habitats, rare or endangered wildlife habitats, and rare or endangered plant communities. The following criteria were used to establish ESHA:

1. unique, rare or fragile communities which should be preserved to ensure their survival in the future;
2. rare and endangered species habitats that are also protected by state and federal laws;
3. specialized wildlife habitats which are vital to species survival;
4. outstanding representative natural communities which have an unusual variety or diversity of plant and animal species; and
5. areas with outstanding educational values that should be protected for scientific research and educational uses now and in the future.

These ESHAs were referenced in the text and shown at a large scale within the document. No pre-existing spatial data were available for these maps, so the map was georectified and the data were hand-digitized into ArcGIS in shapefile format. Each of the previously identified ESHA types is summarized in the following sections.

Coastal Wetlands

The original MBLCP included three habitat types generally consisting of coastal wetlands: wetland, estuary, and open coastal water. These habitat types were defined in the MBLCP as follows:

- a. Wetland: lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes; swamps, mudflats and fens.

- b. Estuary: coastal water body usually semi-enclosed by land, but which has open, partially obstructed or intermittent exchange with the ocean and in which ocean water is at least occasionally diluted by fresh water runoff from the land. The salinity may be periodically increased above the open ocean by evaporation. In general, the boundary between "wetland" and "estuary" is the line of extreme low water.
- c. "Open coastal water" or "coastal water" refers to the open ocean.

Morro Bay and the Morro Bay Estuary comprise the primary wetland areas within the City. The bay is primarily a shallow lagoon with two freshwater creeks (Chorro and Los Osos) draining into it. Tidal waters also fill the bay, flowing through the bay entrance and southward to fill the bay. The intertidal area is saltmarsh and mudflat. Morro Bay is separated from Estero Bay, by an approximately 4-mile long sandbar which extends north/northeastward from the Irish Hills to the mouth of the bay near Morro Rock. Morro Bay is the interior, enclosed bay to the east (inland) side of the sandbar, and Estero Bay is the outer bay that forms the coast of the Pacific Ocean along the west edge of the Morro Bay coastal zone. Morro Bay is tidal and directly connected to the Pacific Ocean through a channel that is maintained through periodic dredging south of Morro Rock. A portion of Morro Bay is maintained for harbor uses. The remainder includes coastal wetlands, tidal marshes, mudflats, freshwater marshes and related bodies of water. Morro Bay and Morro Bay Estuary serve as an important link between oceanic and terrestrial ecosystems. A sensitive and delicate balance exists between the tidal flushing of the bay and the nutrient-rich freshwater runoff which retains the productivity of these systems.

Coastal Streams/Riparian Habitats

The MBLCP included two habitat types within coastal streams/riparian habitats: stream or river, and riparian habitat, and defines these habitat types as follows:

- a. Stream or River: natural watercourse as designated by a solid line or dash and three dots symbol shown on the USGS map most recently published, or any well-defined channel with distinguishable bed and bank that shows evidence of having contained flowing water as indicated by scour or deposit of rock, sand, gravel, or other debris.
- b. Riparian Habitat: an area of riparian vegetation consists of an association of plant species which grows adjacent to freshwater watercourses, including perennial and intermittent streams, lakes, and other bodies of fresh water.

Toro Creek, Alva Paul Creek, Morro Creek, Little Morro Creek, Chorro Creek, and other unnamed creeks are present in the MBLCP area. Freshwater streams serve as an important coastal resource. The Chorro and Los Osos creeks drain into Morro Bay Estuary from the upland areas of large watersheds. The combined estuary at the mouth of these two perennial creeks is a significant habitat in the bay. Unlike the Chorro and Los Osos creeks, Morro Creek is intermittent, and several other creeks within the City are ephemeral (they do not run year round).

Many of the creeks that do not drain into the estuary drain directly into Estero Bay (the Pacific Ocean).

Rare or Endangered Habitats

The original MBLCP considers both rare and endangered wildlife habitats and rare or unusual plant communities within this category and includes three distinct areas within Morro Bay within this habitat type: Morro Rock, Black Hill Natural Area, and Fairbanks Point.

Morro Rock

Morro Rock is located at the mouth of the bay and is the northern-most visible volcanic plug in a chain of plugs that extend from Islay Hill in the City of San Luis Obispo to Morro Rock. The Rock is connected to the mainland via a strand composed of fill materials, much of it dredged from the bay during past operations. The Rock is a known peregrine falcon nest site.

Black Hill Natural Area

This upland area of Morro Bay State Park is located southeast of the City. The clubhouse and golf course are located to the southwest of Black Hill. The dominant community is coastal sage scrub. Rare plants, including Jones' layia (*Layia jonesii*), are known to occur in this natural area reserve.

Fairbanks Point

Located at the southern end of the City limits and adjacent to Morro Bay State Park is Fairbanks Point. The grove of eucalyptus trees located at Fairbanks Point served as a major nesting site for herons when the previous ESHA mapping was designated. With decline of the eucalyptus grove due to salt buildup from guano, the species composition using the rookery site has shifted to cormorants. In 1971, 74 active nests of the great blue heron were counted. A count conducted in 1972 indicated 100 nests of the black-crowned night heron were located here. In 2017, this rookery was occupied by active cormorant nests.

Integration of Previously Described ESHA

Previously designated ESHA was reviewed for inclusion in the updated map set. As noted above, the previous map set did not exist in GIS-compatible format, and the level of resolution of some mapped areas was low. Updated ESHA maps considered previous documentation of resources that constitute ESHA, while updating maps to have better resolution and integration into GIS-based systems.

Note that despite updated mapping efforts, unmapped ESHA may still be present, and onsite review of potential ESHA and delineation of actual ESHA boundaries may be necessary to evaluate site-specific conditions.

3.1.6 Other Sensitive Natural Communities

In addition to tracking special status species, the CNDDDB also includes some data on sensitive natural communities, although this portion of the database is not currently updated. CDFW has shifted to an updated vegetation classification system, and maintains a List of California Terrestrial Natural Communities (2010). Sensitive natural communities include

- Sensitive natural communities as documented by the CNDDDB;
- Rare vegetation alliances and associations ranked State Rarity ranks S1 through S3, as listed in the CDFW List of California Terrestrial Natural Communities (2010); and
- Other unique, sensitive, or fragile habitats, including shallow bay and eelgrass beds, rookeries, monarch aggregation sites, and special status raptor nest sites.

Central Dune Scrub, Coastal Brackish Marsh, and Northern Coastal Salt Marsh are sensitive natural communities reported by the CNDDDB in the area. Under the updated classification used in the 2010 CDFW List of California Terrestrial Natural Communities, additional rare vegetation alliances present or likely to be present include dune mats, silver dune lupine - mock heather dune scrub, pickleweed mats, bulrush marshes and salt marsh bulrush marshes, sand dune sedge swaths, iris-leaved rush seeps, and salt rush swales.

The MBNEP eelgrass monitoring program has documented the decline of the local eelgrass populations between 2007 and 2013, and maps where the populations previously/currently occur were referenced. These maps were used as a baseline to establish ESHA within the bay itself. Eelgrass habitat was mapped in combination with shallow bay and mudflat areas.

As previously noted, Morro Rock is a known nest site for peregrine falcons. The nest site is used year after year by the now recovered peregrine falcon.

Finally, although eucalyptus trees are not native to California and in fact are often invasive, stands of eucalyptus along the coast can provide unique habitats for wildlife in some situations. Rookery sites that are used year after year as communal nest sites are known in Morro Bay, as previously noted. Additionally, some groves provide monarch overwintering habitats used each year during late fall and winter months. Where eucalyptus stands provide this unique habitat for these wildlife species, they may be considered ESHA.

3.1.7 Vegetation Maps and Site Survey Results

Morro Bay has a wide diversity of tree (hardwood and coniferous forests, oak woodlands), shrub (chaparrals, coastal scrubs), and herbaceous (grasslands and herbaceous communities) terrestrial habitat types, as well as aquatic habitat types. The vegetation communities and wildlife habitats described as occurring in the City are based on the CDFW's California Wildlife Habitat Relationship (CWHR) classification system (CDFW 2008).

The County of San Luis Obispo also produced a general vegetation map classifying general vegetation types such as woodland, shrubland, grassland, and aquatic habitats (Figure 6). These data were reviewed as part of the ESHA update.

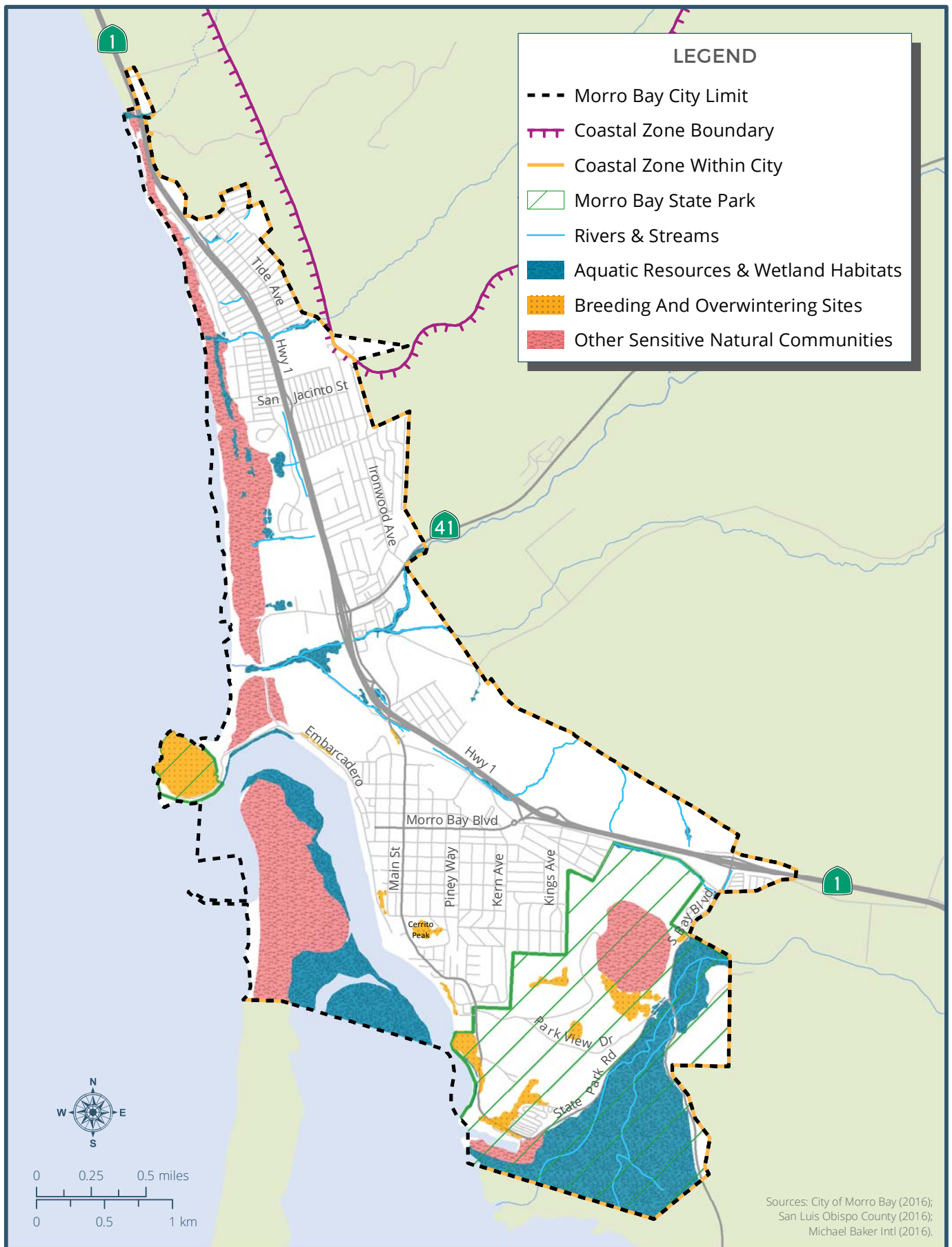
Additionally, during field surveys, vegetation communities and other habitats such as rock outcrops were evaluated to the extent feasible from public vantage points with reference to current mapping standards. In addition to urban and developed land cover types, a number of native plant communities were documented, including:

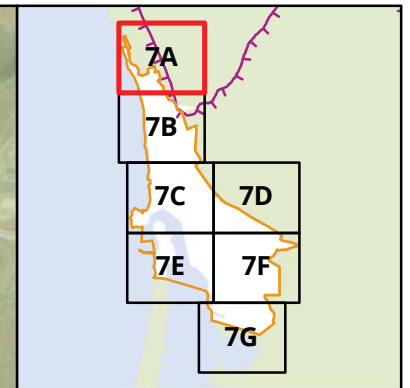
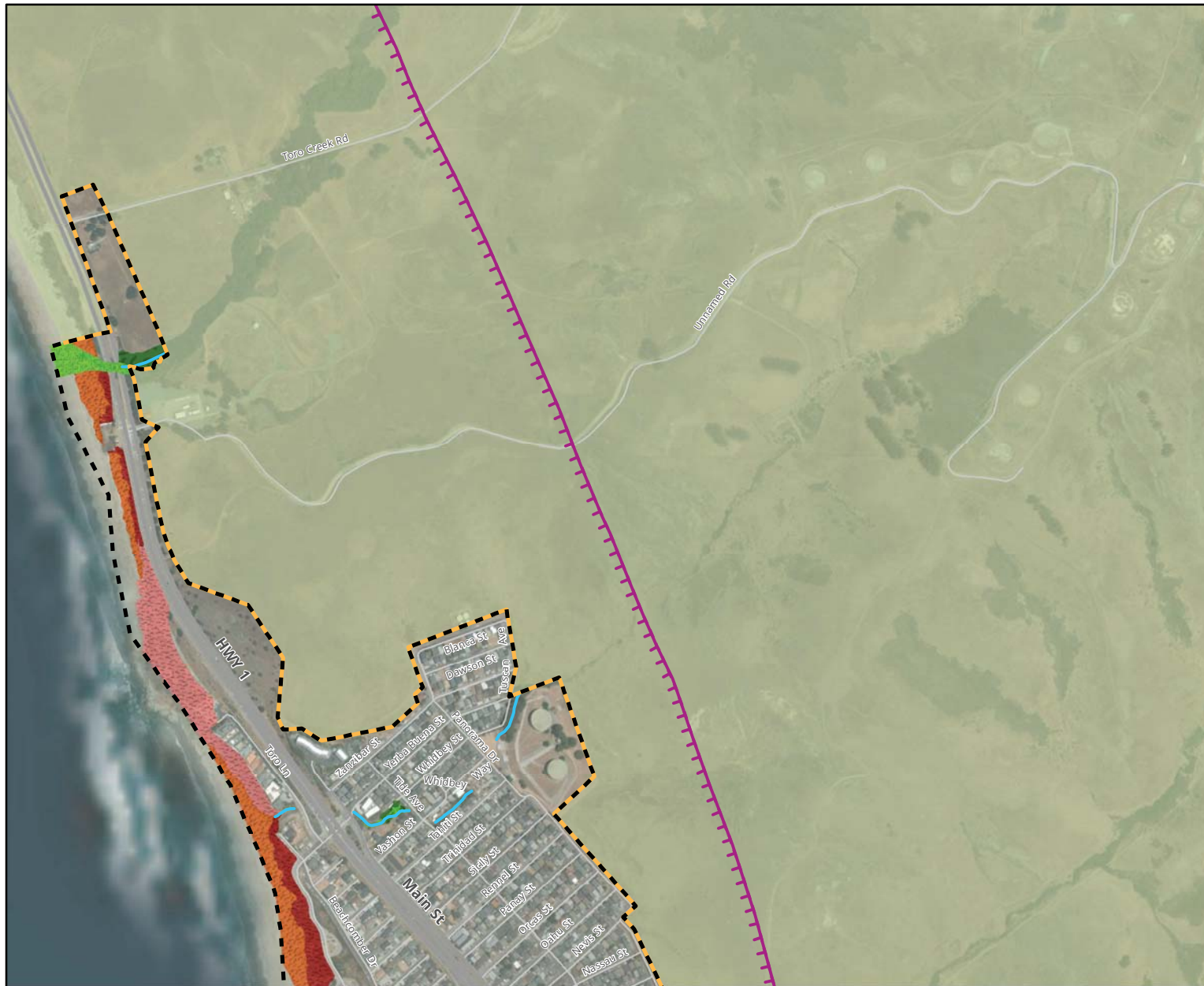
- Arroyo willow (*Salix lasiolepis*) thickets
- Dune mats
- Silver dune lupine – mock heather scrub
- Other coastal scrubs, including bluff scrub
- Pickleweed (*Salicornia* spp.) mats
- Other brackish wetlands
- Freshwater wetlands, including bulrush and rush wetlands
- Dune wetlands
- Sedge swaths

Representative photos taken during the surveys are included as Appendix A.

3.2 UPDATED ESHA DETERMINATION

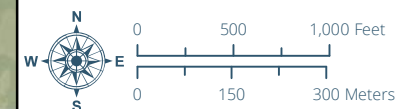
Within the City's coastal zone, approximately 1,006 acres of mapped potential ESHA were identified (please see GIS submittal package and figures), exclusive of drainages where only centerlines were mapped. To provide continuity with the 1982 plan, while including all best available data, ESHAs were grouped into three general habitat communities/categories: aquatic resources and wetland habitat; other sensitive natural communities; and breeding and overwintering sites. The mapped ESHAs are depicted in Figure 7, which includes a mapbook of finer scale maps in addition to an overview sheet. Within these broad habitat categories, more detailed community data (such as dune scrub, river/stream and monarch overwintering roosts, etc.) are included and described below, as well as provided with the attribute information. Several of the vegetation communities that occur in the City's coastal zone are designated as high priorities for conservation by CDFW, and are easily disturbed or degraded by human activity, and therefore are presumed to meet the definition of ESHA under the Coastal Act.





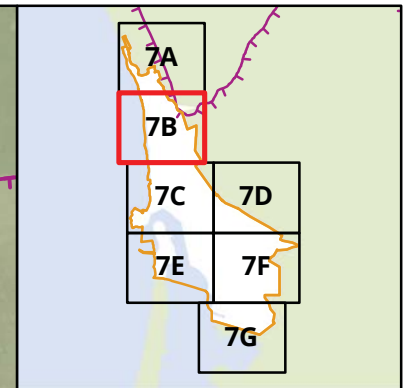
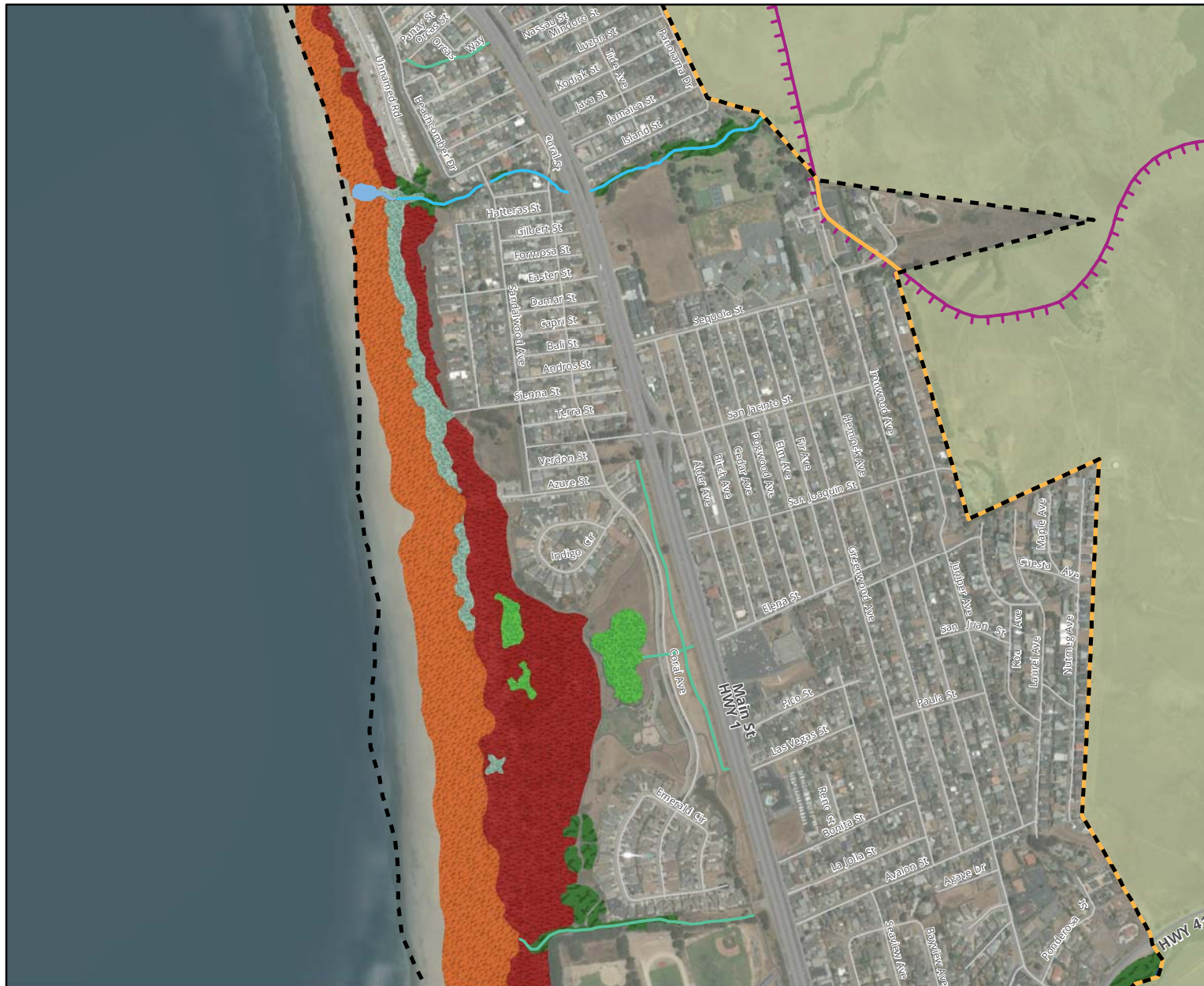
LEGEND

- Morro Bay City Limit
- Coastal Zone Boundary
- Coastal Zone Within City
- Morro Bay State Park
- Aquatic Resources & Wetland Habitats**
 - Rivers & Streams - Seasonal
 - Freshwater Emergent Wetland
 - Willow Woodland and Scrub
- Other Sensitive Natural Communities**
 - Foredune
 - Backdune / Dune Scrub
 - Coastal Bluff



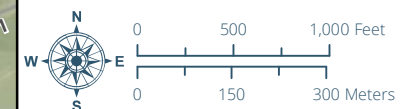
Sources: City of Morro Bay (2016); San Luis Obispo County (2016); Michael Baker Intl (2016); CA Dept of Parks & Recreation (2016); ESRI (2017).

FIGURE 7A



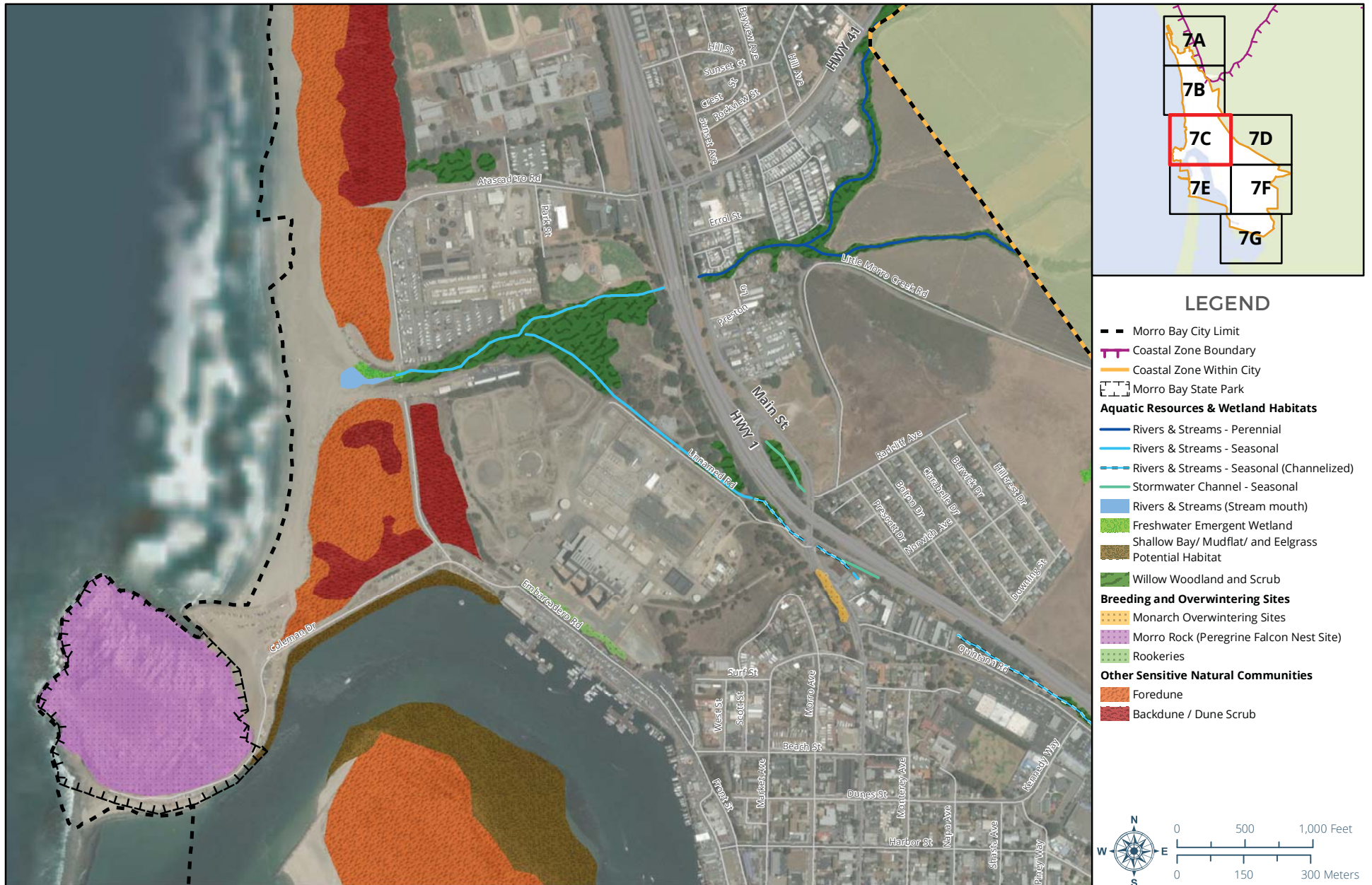
LEGEND

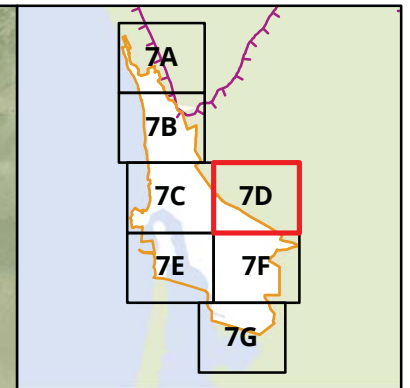
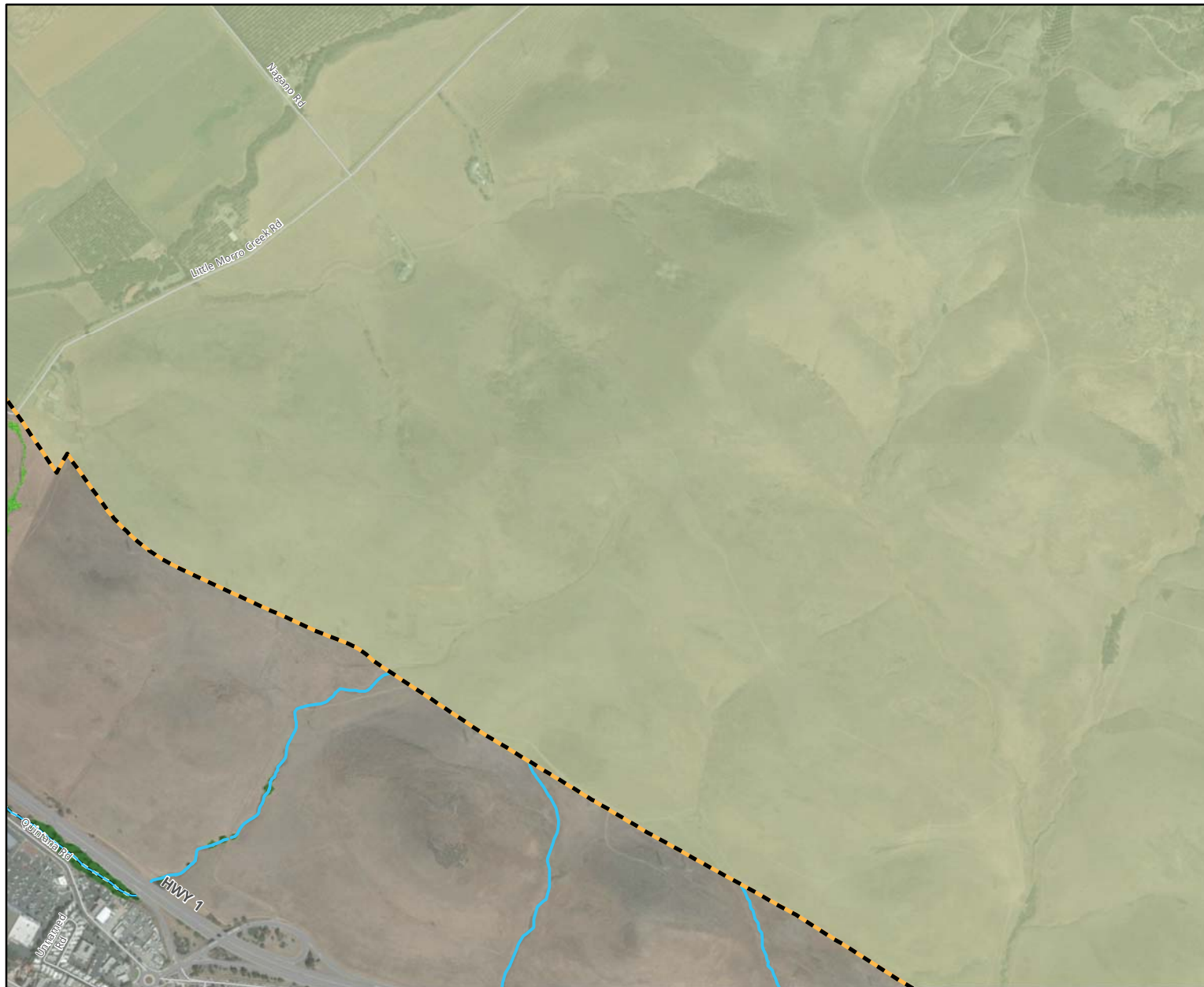
- Morro Bay City Limit
- Coastal Zone Boundary
- Coastal Zone Within City
- Morro Bay State Park
- Aquatic Resources & Wetland Habitats**
 - Rivers & Streams - Perennial
 - Rivers & Streams - Seasonal
 - Stormwater Channel - Seasonal
 - Rivers & Streams (Stream mouth)
 - Dune Wetlands
 - Freshwater Emergent Wetland
 - Willow Woodland and Scrub
- Breeding and Overwintering Sites**
 - Monarch Overwintering Sites
- Other Sensitive Natural Communities**
 - Foredune
 - Backdune / Dune Scrub



Sources: City of Morro Bay (2016); San Luis Obispo County (2016); Michael Baker Intl (2016); CA Dept of Parks & Recreation (2016); ESRI (2017).

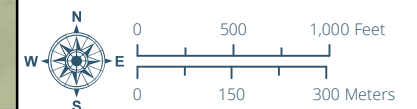
FIGURE 7B



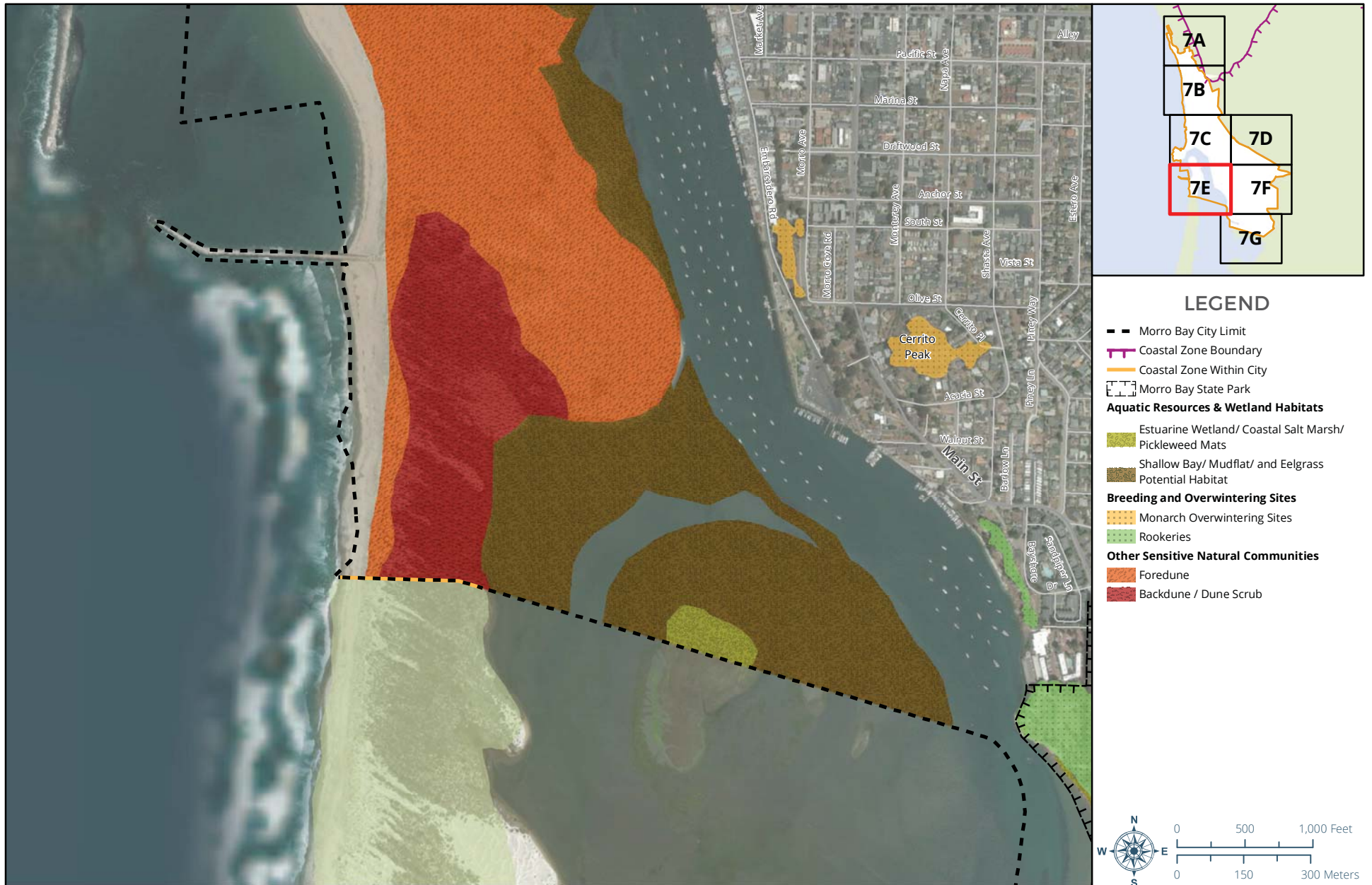


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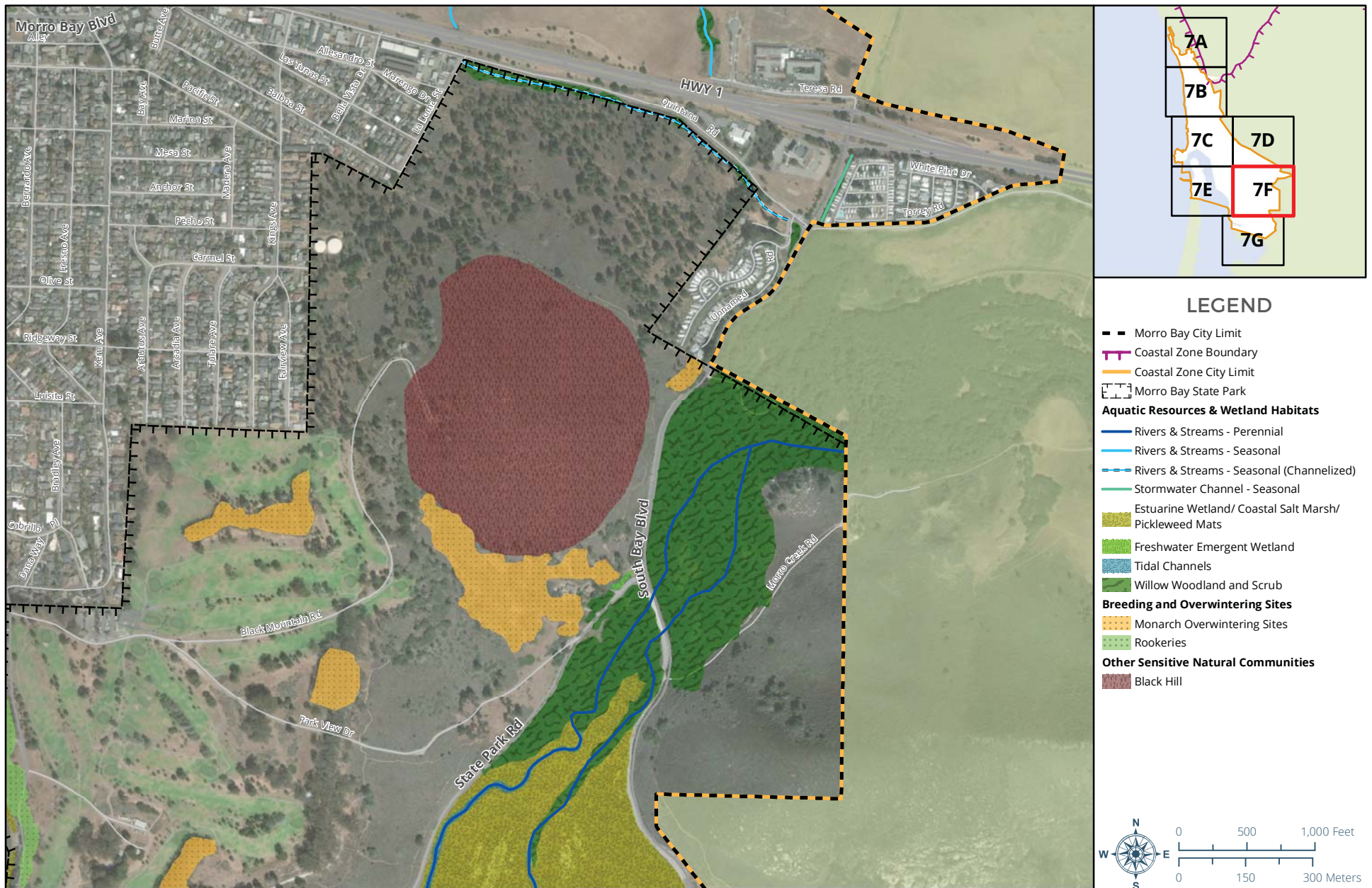
- Morro Bay City Limit
- Coastal Zone Boundary
- Coastal Zone Within City
- Morro Bay State Park
- Aquatic Resources & Wetland Habitats**
 - Rivers & Streams - Seasonal
 - Rivers & Streams - Seasonal (Channelized)
 - Freshwater Emergent Wetland
 - Willow Woodland and Scrub



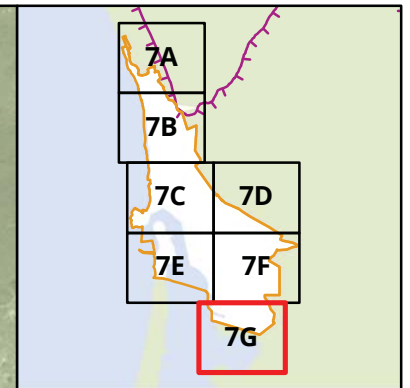
Sources: City of Morro Bay (2016); San Luis Obispo County (2016); Michael Baker Intl (2016); CA Dept of Parks & Recreation (2016); ESRI (2017).



Sources: City of Morro Bay (2016); San Luis Obispo County (2016); Michael Baker Intl (2016); CA Dept of Parks & Recreation (2016); ESRI (2017).

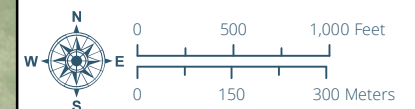


Sources: City of Morro Bay (2016); San Luis Obispo County (2016); Michael Baker Intl (2016); CA Dept of Parks & Recreation (2016); ESRI (2017).



LEGEND

- Morro Bay City Limit
- Coastal Zone Boundary
- Coastal Zone Within City
- Morro Bay State Park
- Aquatic Resources & Wetland Habitats**
 - Rivers & Streams - Perennial
 - Estuarine Wetland/ Coastal Salt Marsh/ Pickleweed Mats
 - Tidal Channels
- Breeding and Overwintering Sites**
 - Monarch Overwintering Sites
 - Rookeries
- Other Sensitive Natural Communities**
 - Backdune / Dune Scrub



Sources: City of Morro Bay (2016); San Luis Obispo County (2016); Michael Baker Intl (2016); CA Dept of Parks & Recreation (2016); ESRI (2017).

Based on the sources and queries described above, the below described ESHA determinations have been established.

3.2.1 Aquatic Resources and Wetland Habitats

Several aquatic habitats are present within the City's coastal zone, including freshwater streams, riparian areas, and wetlands, as well as dune wetlands, coastal salt marshes and pickleweed mats, shallow bay and mudflats.

Rivers and Streams

Several creeks and their tributaries flow through the City and terminate into the Morro Bay estuary or directly into the Pacific Ocean within the City's coastal zone. These waterways include Chorro Creek, Morro Creek, Alva Paul Creek, and Toro Creek as well as several unnamed creeks with a bed and bank.

Willow riparian woodland and willow scrub often occurs along both perennial and intermittent streams. Some of these areas overlap portions of California red-legged frog, steelhead, and tidewater goby critical habitat. The multi-layered riparian vegetation, available water supply, and vegetative cover make these areas essential habitat for several special status species. Smaller streams may lack riparian canopy, but provide groundwater recharge, seasonally wet habitat, and also convey water, nutrients, and potential pollutants to the bay and the ocean, thus influencing quality of downstream receiving waters.

Creeks and Tributaries

Chorro Creek, Morro Creek, Alva Paul Creek, and Toro Creek are all located within the City's coastal zone. Morro Creek, the largest creek in the City's coastal zone terminates into the ocean. Morro Creek and Toro Creek form seasonal sand bars at the mouth of the streams that block direct flow to the sea during summer months, creating a lagoon between the river mouth and the Pacific Ocean. A large number of waterfowl and shorebirds use the temporary lagoon as a migratory stop-over and breeding ground. The lagoon also provides a habitat for a number of fish species, including the federally endangered and state threatened tidewater goby. This and other creeks and waterways provide suitable habitat for fish, bird and plant species. These areas should be considered ESHA in the updated LCP.

Note that some segments of these stream features were realigned and/or channelized in the past adjacent to Highway 1. These streams are noted using different symbology on the attached figures, because highly constrained stream features along roadways and channelized reaches typically require periodic maintenance for public safety and floodway protection, limiting their peak habitat quality. These stream segments are identified as "channelized" to differentiate these features from the natural watercourses that constitute ESHA.

Additionally, a number of stormwater channels that are visible on aerial photographs are also identified on the attached maps. These features convey runoff from roads and developed areas during storms. These features are not natural watercourses but some features do convey water into natural wetlands and waterways. These channels are identified as stormwater channels to differentiate these features from the natural watercourses that constitute ESHA.

Willow Woodland and Willow Scrub

Willow woodland and scrub habitats are areas in which riparian vegetation dominates and forms dense thickets commonly associated with floodplains and banks. These habitats are dominated by arroyo willow (*Salix lasiolepis*) and are common around the freshwater wetlands and waterways within the City's coastal zone. Other common species found in this habitat include coyote brush (*Baccharis pilularis*), poison oak (*Toxicodendron diversilobum*), and dock (*Rumex* sp.). Note that willow stands are also found as components of back dune wetland complexes where they are not directly associated with streams. These sites are typically consistent with the Commission definition of wetlands due to the dominance of hydrophytic (i.e., water-loving) plant life.

Estuary and Shallow Bay

Shallow Bay, Mudflat and Eelgrass Habitat

The shallows of Morro Bay and the associated estuary consist of a varying degree of brackish water. These waters are a mixture of tidal waters of the Pacific Ocean and freshwaters from surrounding watersheds. These waters provide nesting and foraging habitat for many bird species in the area, as well as abundant fish habitat. These areas also provide suitable habitat for marine mammals such as otters and seals. Brackish waters also contain areas of steelhead designated critical habitats near mouths of certain creeks.

The shallow waters of Morro Bay support threatened populations of eelgrass, and provide abundant foraging habitat for coastal bird species. The eelgrass beds are essential nurseries and foraging habitat for fish and crustaceans.

Tidal Channels

At the mouth of the major streams, larger tidal channels are evident and interspersed with coastal salt marsh (identified below). The majority of these channels have non-vegetated beds and are largely exposed at low tide, allowing foraging habitat for coastal bird species and other wildlife.

Wetlands

Estuarine Wetlands, Coastal Salt Marsh, and Pickleweed Mat

The delta at the mouths of Chorro and Los Osos creeks is primarily vegetated with a pickleweed (*Salicornia pacifica*; also called *Sarcocornia pacifica* in some references) mat wetland. These wetlands are tidally influenced, and soils are saline due to the tidal waters. Pickleweed marsh is the dominant natural community where Chorro Creek terminates into Morro Bay estuary. This community most closely resembles the *Sarcocornia* [= *Salicornia*] *pacifica* (*Salicornia depressa*) Herbaceous Alliance, as defined by Sawyer et al. (2009). This alliance is ranked S3 under State Rarity rankings and thus is considered a special status vegetation community by CDFW. The marsh is influenced by seasonal variations of fresh, brackish, and saline water and the level of the water table that occurs close to or at the surface for at least part of the growing season. Common species in this community include pickleweed (*Salicornia virginica*), California saltbrush (*Atriplex californica*), spearscale (*A. triangularis*), slough sedge (*Carex obnupta*), saltgrass (*Distichlis spicata*), giant rush (*Juncus acutus*), creeping rush (*J. lesueurii*), sea lavender (*Limonium californicum*), coastal silverleaf (*Potentilla anserine*), American three-square (*Scirpus americanus*), common three-square (*S. pungens*), and arrowgrass (*Triglochin concinna*).

Other brackish and salt marsh habitats are present, including areas that provide suitable habitat for the endangered California seablite, a vascular plant that colonizes the upper portion of the intertidal zone. There is some overlap between suitable habitats for this species and eelgrass, so where both are present, the features were mapped with eelgrass. Additionally, coastal brackish marsh includes areas at mouths of streams where salt marsh bulrush and other salt-tolerant emergent hydrophytes are dominant, as well as potentially suitable habitat for another listed plant, salt marsh bird's beak.

In addition to including an S3-ranked sensitive natural community, these marshes provide essential habitat for many species known to utilize the marsh. This ESHA provides important nesting and breeding habitat for avian and aquatic species, as well as suitable habitat for special status plant species, as mentioned above, that include the federally and state endangered salt marsh bird's-beak and federally endangered California seablite.

Dune Wetlands

Dune wetlands occur under two general scenarios – they often occur where fresh water from rivers or streams accumulates behind a sandbar at the mouth of a coastal stream, and they can also occur where perched groundwater accumulates in low lying backdune areas, often due to lenses within the dune that restrict water movement, not directly tied to the mouth of a river or stream. The soils in these areas have slow drainage and form mesic environments with nutrient rich soils and high potential to support wetland vegetation. These communities are can be found where Alva Paul Creek enters the coastal natural communities within the City's coastal zone, and in low lying areas in the backdune of the dune complex along the coast. Dune wetlands are

dominated by sand dune sedge (*Carex pansa*), spiny rush (*Juncus acutus*), and brownheaded rush (*Juncus phaeocephalus*), with inclusion of arroyo willow and understory of dock, and coastal silverweed. These dune wetlands contain suitable habitat for special status plant species and provide nesting, foraging, and refuge for wildlife species.

Freshwater Emergent Wetlands

Multiple freshwater emergent wetlands are located within the Morro Bay coastal zone. These areas are dominated by wetland vegetation such as dock, brownheaded rush, and tule (*Schoenoplectus acutus*). Freshwater emergent wetlands are found both at springs and seasonal drainages and provide habitat for avian and special status plant species. Some of these wetlands also include areas of California red-legged frog critical habitat. A constructed wetland with open water patches interspersed with cattail (*Typha* sp.), California bulrush (*Schoenoplectus californicus*), and willows is also included in this type.

3.2.2 Other Sensitive Natural Communities

A variety of non-wetland sensitive natural communities are present within the City's coastal zone, providing essential habitat for many sensitive species in the area. These communities overlap in part with critical habitats for western snowy plover and Morro shoulderband snail (USFWS/NMFS 2017) and provide suitable habitat for many special status plants known to occur in the vicinity. Four types are described: foredune, backdune/ dune scrub, coastal bluff, and the Black Hill Natural Area. Each of these areas is discussed in detail below.

Foredune

The foredune natural community occurs where sand begins to accumulate and stabilize, with increased plant cover and diversity. This community occurs between the coastal strand and the backdune and stabilized dune scrub community. The predominant vegetation is dune mat, a sensitive natural community dominated by sand verbena (*Abronia maritima*), beach sand verbena (*Abronia umbellata*) and beach bur (*Ambrosia chamissonis*). Other common species include yarrow (*Achillea millefolium*), coastal sage (artemisia pycnocephala), spearscale (*Atriplex* spp.), sea rocket (*Cakile maritima*), beach primrose (*Camissonia cheiranthifolia*), seaside daisy (*Erigeron glaucus*), and seaside golden yarrow (*Eriophyllum staechadifolium*). Foredune communities in Morro Bay are most closely associated with the *Ambrosia chamissonis*-*Abronia maritima*-*Cakile maritima* Association of the *Abronia latifolia* - *Ambrosia chamissonis* Herbaceous Alliance, an S3 ranked Sensitive Natural Community, as defined by Sawyer et al. (2009).

In addition to being a S3-ranked sensitive natural community, most of this ESHA overlaps with the western snowy plover critical habitat and provides essential habitat for other special status species, such as globose dune beetle (*Coelus globosus*), sandy beach tiger beetle (*Cicindela hirticollis gravida*), and legless lizard (*Anniella pulchra*). The foredune also contains suitable

habitat for many special status plant species such as Eastwood's larkspur (*Delphinium parryi* ssp. *eastwoodiae*) and coast woolly-heads (*Nemacaulis denudata* var. *denudata*). This community also provides abundant foraging habitat for many special status wildlife species in the coastal zone.

Backdune and Stabilized Dune with Dune Scrub

The stabilized dune and backdune natural community contains an increased abundance of herbaceous and woody vegetation. Some species previously mentioned in the foredune community are present. Dune scrub communities occur in stabilized coastal dune areas with higher water retention, more organic matter, and less salt (Sims 2010). Dune Scrub is the most abundant and diverse of the coastal natural communities and is dominated by shrubs of varying composition across the Morro Bay coastal zone. Dominant plant species in this community include: California sagebrush (*Artemisia californica*), coyote brush, heather (*Ericameria ericoides*), seaside golden yarrow, and beach lupine (*Lupinus chamissonis*). This community most closely resembles the *Lupinus chamissonis* - *Ericameria ericoides* Shrubland Alliance (S3), as defined by Sawyer et al. (2009). Site-specific studies have previously been used in the Morro Bay coastal zone to identify extent of backdune, stabilized dune and dunescrub.

In addition to being a S3 -ranked sensitive natural community, the dune scrub ESHA contains regions of the western snowy plover and Morro shoulderband snail critical habitats, and provides abundant nesting and foraging habitat for other avian and special status wildlife species. This community also provides suitable habitat for many special status plant species including Eastwood's larkspur, California seablite, and Blochman's leafy daisy (*Erigeron blochmaniae*).

Within the area analyzed in this LCP, invasive plant species, such as iceplant and European beach grass, often occur in the dune scrub community. This degrades the quality of this ESHA type; however, presence of invasive plant species does not eliminate the potential for special status species to occur in this community.

Coastal Bluff Scrub

In limited locations within the Morro Bay coastal zone, coastal bluffs are present at the transition between the beach, certain dune communities, and upland terraces. Although some of the bluff area is developed, some areas retain native vegetation consisting of bluff scrub, with sagebrush and coastal goldenbush (*Isocoma menziesii*) as well as spearscale. Vegetation in this community is adapted to strong winds, salt spray and thin soils. Coastal bluff provides an important transition between the beach, dune communities, when present, and upland inland habitats. Some areas are degraded with presence and dominance of invasive plant species.

Black Hill Natural Area

Black Hill supports a mixture of coastal sage scrub, chaparral, and annual and native grassland communities with scenic views over the estuary and south bay. The dominant community is coastal sage scrub. The site provides habitat for a variety of native birds and other wildlife. Rare plants, including Jones' layia, are known to occur in this natural area reserve. This location was previously identified as an important natural reserve area, and should be retained as ESHA in this update on the basis of continued presence of natural vegetation and habitat for special status plants and wildlife.

3.2.3 Breeding and Overwintering Sites

Morro Bay contains areas of known roosts, nests, and rookeries that are not associated with sensitive native vegetation. Morro Rock is a known peregrine falcon nest site. These areas are essential for the survival and reproduction of the above species and are reused year after year. These breeding and overwintering sites should therefore be considered ESHA in the updated LCP.

As previously noted, documented monarch overwintering roosts are identified in groves scattered throughout the coastal zone of Morro Bay, including a eucalyptus grove at Cerrito Peak and groves on State Park land. Not all eucalyptus groves support monarch overwintering habitats, and monarchs are known to use other tree species including Monterey pine (*Pinus radiata*) and Monterey cypress (*Cupressus macrocarpa*) as well as other large natives (Pelton et al. 2016), though no such sites are documented in Morro Bay at this time. Suitable groves for monarch overwintering provide a specific microclimate with high humidity, dappled light, access to water, and shelter from high winds and freezing temperatures (Pelton et al. 2016). These groves typically have dense trees and often occur on south- to west-facing slopes, which provide the most solar radiation (Leong et al. 2004 as cited in Pelton et al. 2016). The conditions within groves change over time as trees die and fall and new trees reach maturity. These changes in turn affect the microclimate of the stands. As stand health and suitability changes, monarchs may select new, more suitable overwintering locations not identified within this analysis, and abandon old sites. Thus, site-specific, appropriately timed surveys for overwintering monarch ESHA must be completed for project sites with potentially suitable groves. Site-specific studies have previously been used in the Morro Bay coastal zone to evaluate sites with potential and with old and vague records to determine if monarch overwintering roost habitats are present (e.g. Frey and Stevens 2007). Surveys for overwintering monarchs should be scheduled between mid-November through late-January for best detection.

A known heron, egret and cormorant rookery, now occupied primarily by cormorants, is located at Fairbanks Point. In 2017, heron and egret rookeries were located at Bayshore Park in eucalyptus and Monterey cypress trees, and in cypress and eucalyptus trees along the Embarcadero in front of the former power plant.

Heron rookeries may be occupied for many years, and increase in size as more birds build nests and occupy the site (Vermont Fish and Wildlife Department 2002). Rookeries are generally located near suitable feeding and foraging habitat for the birds that occupy and nest within the rookery. One study in Minnesota found that the median flight distance between a rookery and feeding sites was 2.7 kilometers for great blue herons, and 13.5 kilometers for great egrets (Custer and Galli 2002). Double-crested cormorants must also nest within close distance of a reliable source of food (Palmer 1962 as cited in Zeiner et al. 1990). Herons and cormorants generally prefer rookery sites with tall trees (Zeiner et al. 1990). Human disturbance around rookery sites can have varying effects on birds nesting within the rookery, and these effects can vary based on the size of the rookery, the degree of habituation to human activity, and the stage of the nesting cycle (Vermont Fish and Wildlife Department 2002). A study of heron rookeries in urban and rural landscapes in coastal British Columbia found that heron nesting productivity was negatively affected as human activities near the colonies increased (Vennesland and Butler 2004).

Although the current location of documented roosts and rookeries are provided in this analysis, the locations of these ESHAs are subject to change. Within active rookeries, the salt buildup from guano gradually causes the health decline and eventual loss of the eucalyptus stand. Without new recruitment of young trees under the dead and dying trees, eventually the stand will no longer support standing tall trees, live or dead, and suitability for nesting may decline. Similarly, as trees die and fall within known monarch overwintering roosts, the microclimate of the stands changes. As stand health and suitability declines, the known roosts and rookeries will likely migrate to new, more suitable locations not identified within this analysis. Implementation of seasonally timed surveys will aid in the identification of new roosts and rookeries, and determination of rookeries that are no longer in use.

4. OTHER ATTRIBUTE INFORMATION

Please note that the graphic information provided portrays the various biological resource boundaries as accurately as possible. This data is only a cartographic representation of the existing environment and should not be used on its own without field determination procedures to establish a precise boundary location. Conditions on the ground control permit and appeal jurisdictional boundary locations, based on Coastal Act definitions, regardless of how accurate the mapped boundary may be. It is important to emphasize that all adopted maps come with the following disclaimer:

Potential ESHA maps are not an exhaustive compilation of the habitat areas that meet the ESHA definition and are for planning assessments only. Site-specific biological evaluations and field observations to identify ESHA and other sensitive resources and potential impacts, including cumulative impacts, should be conducted at the time of proposed development or plan amendment application. Conditions on the ground control permit and appeal jurisdictional boundary locations, regardless of the accuracy of mapped boundaries.

5. CONCLUSION

The proposed map changes to the City's ESHA mapping focused on improving ESHA identification within the Morro Bay coastal zone and expanding mapped habitat areas by including areas previously excluded due to lack of resource information (e.g., new records of special status species occurrences are now available). Figure 8 depicts a comparison of previous ESHA mapping, digitized from the MBLCP, with current ESHA mapping. The majority of revisions are the result of present-day availability of more published datasets, including higher resolution aerial photograph base maps. These data allowed for more precise mapping of stream centerlines, better distinction among existing plant community boundaries, and additional data that was not available when original ESHA maps were drawn, including extent of habitat suitable for eelgrass, California seablite, and other sensitive resources.

The ESHA information provided in this submittal is not intended to be an exhaustive compilation of the habitat areas that meet the ESHA definition. To ensure that all ESHAs within the City's coastal zone were considered, designated ESHAs may be buffered by a minimum of 50-100 feet, depending upon the habitats present and the proposed development. Buffers will be finalized in the LCP. The ESHAs and areas that fall within this buffer from potential ESHAs will require site-specific biological evaluations and field observations to identify ESHA and other sensitive biological resources prior to project development approval.

Updated ESHA information will improve ESHA identification, utilizing the best available information early in the development review stage. The data included within this submittal was produced in order to achieve consistency with the Coastal Act and are based on the latest available scientific information and precedential decisions. However, the Commission may require mandatory site reviews for projects that have the potential to impact ESHA, and provisions that require avoidance of resource impacts to be pursued for development before mitigation measures are implemented as an additional means of achieving compliance with the Coastal Act. These assurances along with the updated mapped ESHA are required for the LCP Update to be found consistent with Coastal Act Sections 30230, 30231, and 30240.



6. REFERENCES

- American Ornithologists' Union (AOU) and Cooper Ornithological Society. 2017. Check-list of North American Birds. Retrieved from <http://www.aou.org/checklist/north> (May 15, 2017).
- Baldwin B. G., Goldman, D. H., Keil D. J., Patterson R., Rosatti T. J. (editors). 2012. *The Jepson Manual: Vascular Plants of California*, Second Edition, Thoroughly Revised and Expanded. University of California Press. Berkeley, California.
- Calflora. 2017. Information on Wild California Plants for Conservation, Education, and Appreciation. Berkeley, CA. Updated online and accessed via: <http://www.calflora.org/>.
- California Department of Fish and Game. *The Natural Resources of Morro Bay* (Coastal Wetland Series, 8), by Gerdes, Gene L. and Primbs, Edward R.J. and Browning, Bruce M. and Edon, Clyde S. and Aplin, John A. and Lidberg, James L. and Speth, John W. 1974. Sacramento, California http://aquaticcommons.org/549/1/natural_resources_of_morro_bay.pdf (accessed June 05, 2017)
- California Department of Fish and Wildlife. 2017a. California Natural Diversity Database, RareFind 5 (V 5.2.7, Biogeographic Data Branch. Retrieved from <https://map.dfg.ca.gov/> (accessed May 02, 2017).
- . 2017b. Biogeographic Information and Observation System (BIOS) (V 5.49.25). Retrieved from <http://bios.dfg.ca.gov> (May 2017).
- . 2017c. Special Vascular Plants, Bryophytes, and Lichens List. Biogeographic Data Branch, California Natural Diversity Database. Updated January 2017.
- California Native Plant Society (CNPS), Rare Plant Program. 2017. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website <http://www.rareplants.cnps.org> [accessed 02 May 2017].
- California, State of. 2017. California Fish and Game Code. Available at: http://www.leginfo.ca.gov/.html/fgc_table_of_contents.html
- City of Morro Bay. 1982. "General Plan/Coastal Land Use Plan." Environmentally Sensitive Habitat Areas. <http://www.morro-bay.ca.us/574/General-Plan-Local-Coastal-Plan> (accessed May 01, 2017).
- County of San Luis Obispo. 2007. "Local Coastal Program Policy Document; A Portion of the San Luis Obispo County Land Use Element of the General Plan." Coastal Plan Policies. <http://www.slocounty.ca.gov/Assets/PL/Elements/Coastal+Plan+Policies.pdf> (accessed April 26, 2017).

Custer, C.M. and J. Galli. 2002. Feeding Habitat Selection by Great Blue Herons and Great Egrets Nesting in East Central Minnesota. *Waterbirds*. 25(1):115-124.

———. 2009. “Land Use Element and Local Coastal Plan of the San Luis Obispo County General Plan.” Estero Area Plan.
<http://www.slocounty.ca.gov/Assets/PL/Area+Plans/Estero+Area+Plan.pdf> (accessed April 26, 2017).

———. 2017. “Natural Resources Maps.” Vegetation Resources.
http://www.slocounty.ca.gov/planning/zoning/Map_Image_Download_Center/Natural_Resource_s_Maps.htm (May 2017).

Frey, Dennis and Shawna Stevens. 2007. Preconstruction Monarch Butterfly Habitat Survey, San Jacinto Subdivision – Tentative Tract 2859, City of Morro Bay. May 15.

Google Earth. 2017. Available at: <http://earth.google.com/>

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

Holland, Robert F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Wildlife, Nongame Heritage Program. 156 pgs.

Morro Bay National Estuary Program. 2012. “Comprehensive Conservation and Management Plan.” <http://www.mbnep.org/comprehensive-conservation-management-plan/> (accessed May 02, 2017.)

Morro Bay National Estuary Program. 2013. “Morro Bay Eelgrass Report.”
http://www.mbnep.org/wp-content/uploads/2014/12/2013_Eelgrass_Monitoring_Report.pdf
(accessed May 02, 2017.)

National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2017. Essential Fish Habitat Mapper. Available at:
<http://www.habitat.noaa.gov/protection/efh/efhmapper/>

———. 2005. Final Rule. “Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California.” *Federal Register* 70, no. 170 (September 2, 2005): 52488. <https://www.gpo.gov/fdsys/pkg/FR-2005-09-02/pdf/05-16389.pdf>

———. 2012a. Final Rule. “Endangered and Threatened Species: Final Rule to Revise the Critical Habitat Designation for the Endangered Leatherback Sea Turtle.” *Federal Register* 77, no. 17 (January 26, 2012): 4170. <http://www.nmfs.noaa.gov/pr/pdfs/fr/fr77-4170.pdf>

———. 2012b. Final Biological Report: Final Rule to Revise the Critical Habitat Designation for Leatherback Sea Turtles. January 2012. Prepared by: NOAA's National Marine Fisheries Service; Primary Authors: NMFS Southwest Fisheries Science Center

Pacific Fishery Management Council. 2016. Pacific Coast Groundfish Fishery Management Plan. Available at: <http://www.pcouncil.org/groundfish/fishery-management-plan/>

Parham, James F., Theodore J. Papenfuss. Pers Comm with California Herpetology Website Curator (<http://www.californiaherps.com/lizards/pages/a.pulchra.html#taxonomy>) May 2010.

Pelton, E., Jepsen, S., Schultz, C., Fallon, C., Black, Scott H. 2016. State of the Monarch Butterfly Overwintering Sites in California. Prepared for USFWS by The Xerces Society for Invertebrate Conservation. Portland, Oregon.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

Stebbins, Robert C. 2003. Western Reptiles and Amphibians, Third Edition. Peterson Field Guides. Houghton Mifflin Company, 514 pages.

United States Fish and Wildlife Service. 1973. The Endangered Species Act of 1973, as amended (16 U.S.C 1531 et seq.).

———. 2017a. Critical Habitat Portal. Retrieved from <http://criticalhabitat.fws.gov> (May 02, 2017).

———. 2017b. National Wetlands Inventory. Retrieved from <http://wetlands.fws.gov> (May 02, 2017).

———. 2010 Final Rule. "Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the California Red-Legged Frog." *Federal Register* 75, no. 51 (March 17, 2010): 12816. <https://www.gpo.gov/fdsys/pkg/FR-2010-03-17/pdf/2010-4656.pdf>

———. 2013. Final Rule. "Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Tidewater Goby." *Federal Register* 78, no. 25 (February 6, 2013): 8746. <https://www.gpo.gov/fdsys/pkg/FR-2013-02-06/pdf/2013-02057.pdf>

———. 2012. Final Rule. "Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover."

Federal Register 77, no. 118 (June 19, 2012): 36728. <https://www.gpo.gov/fdsys/pkg/FR-2012-06-19/pdf/2012-13886.pdf>

Vermont Fish and Wildlife Department. 2002. Guidelines for Protection and Mitigation of impacts to Great Blue Heron Rookeries in Vermont.

Vennesland, R.G. and R. G. Butler. 2004. Factors Influencing Great Blue Heron Nesting Productivity on the Pacific Coast of Canada from 1998 to 1999. *Waterbirds*. 27(3):289-296.

Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California.

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APPENDIX A. PHOTOGRAPHS – MAY 2017 CONDITIONS



Photograph 1. View of dune wetland. Photo facing south.



Photograph 2. View of foredune natural community. Photo facing southwest.



Photograph 3. View of the foredune (left) natural community, adjoining the coastal strand. Photo facing south.



Photograph 4. View of backdune dune scrub natural community in the foreground. Photo facing north.



Photograph 5. View of Morro Creek, at coastal outlet. Photo facing east.



Photograph 6. View of Morro Creek, at coastal outlet. Freshwater emergent wetland seen at right. Photo facing west.



Photograph 7. Example of seasonal drainage and willow scrub within LCP area. Photo facing southeast.



Photograph 8. View of rookery at Fairbanks Point. Photo facing northwest.



Photograph 9. View of pickleweed marsh in Morro Bay Estuary. Photo facing southeast.



Photograph 10. View of pickleweed marsh in Morro Bay Estuary. Photo facing west.

APPENDIX B. SPECIAL STATUS SPECIES KNOWN TO OCCUR ON OR IN THE VICINITY OF THE LCP AREA

Table B-1. Special Status Species Known to Occur on or in the Vicinity of the LCP Area

Scientific Name Common Name	Status ¹ Fed / ² State ESA ³ CRPR / ² CDFW ⁴ G-Rank / S-Rank	Habitat Preference / Requirements	Potential for Occurrence / Basis for Determination
Plants			
<i>Arctostaphylos morroensis</i> Morro manzanita	Threatened/-- G1 / S1 1B.1	Bloom period: December-March. Requires fine sands within maritime chaparral, cismontane woodland, pre-Flandrian dunes, and coastal scrub. Elevations: 5-205 meters.	Moderate Potential: Suitable habitat exists within coastal scrub of LCP. CNDDDB documents three occurrences of this species in within 1 mile of the LCP. Specifically in Baywood Park (CNDDDB 2014) and along the northern fork of the Crespi Loop trail in Morro Bay State Park (CNDDDB 2015).
<i>Arctostaphylos osoensis</i> Oso manzanita	--/-- G1 / S1 1B.2	Bloom period: February-March. Grows in chaparral and in cismontane woodland on dacite porphyry buttes. Narrowly endemic to the mountains North of Los Osos Valley, San Luis Obispo County. Elevations: 300-500 meters.	Moderate Potential. CNDDDB documents one occurrence of this species along the outer boundary of the 1 mile buffer zone. Specifically, at the intersection of the Crespi Trail and Chumash Trail, east of South Bay Boulevard (CNDDDB 2015). The LCP contains limited habitat within the required elevational range of this species.
<i>Astragalus didymocarpus</i> var. <i>milesianus</i> Miles' milk-vetch	--/-- G5T2 / S2 1B.2	Bloom period: March-June. Clay substrates within coastal scrub. Elevations range: 20-90 meters.	Moderate Potential. Suitable habitat present within scrub habitats of LCP. Limited suitable soils present. CNDDDB document one occurrence of this species within the LCP and one occurrence within the 1 mile buffer. Although these occurrences are dated prior to 1970, suitable habitat for this species occurs within the clay soils of the scrub habitat of the LCP.

Scientific Name Common Name	Status ¹ Fed / ² State ESA ³ CRPR / ² CDFW ⁴ G-Rank / S-Rank	Habitat Preference / Requirements	Potential for Occurrence / Basis for Determination
<i>Bryoria spiralifera</i> twisted horsehair lichen	--/-- G3 / S1S2 1B.1	Endemic to the west coast of North America, ranging from San Luis Obispo County northward to Coos County, Oregon in communities ranging from maritime coniferous forest to maritime chaparral and dune communities (CALS 2008).	Moderate Potential. CNDDDB documents one occurrence of this species within the 1 mile buffer of the LCP. This occurrence is located in the Elfin Forest of Los Osos (CNDDDB 1991). Suitable habitat for this species occurs within the forested and chaparral habitats of the LCP, specifically on the pines in Black Hill Natural Area.
<i>Calystegia subacaulis</i> ssp. <i>episcopalis</i> Cambria morning- glory	--/-- G3T2 / S2 4.2	Bloom period: April-May. Rhizomatous, perennial herb that occurs in chaparral, cismontane woodland, and sparse to dense grassland covering sloped or flat areas in clay-rich soils; restricted to outer South Coast ranges in SLO and Santa Barbara Counties. Elevations: 60-500 meters.	Moderate Potential. Suitable habitat for this species occurs within the chaparral, woodland, and grassland habitats within the LCP. This species is documented within the chaparral, woodland, and grassland habitats 0.6 miles north of Black Hill summit (CNDDDB 1995).
<i>Castilleja densiflora</i> var. <i>obispoensis</i> San Luis Obispo owl's-clover	--/-- G5T2 / S2 1B.2	Bloom period: April. Grows in valley and foothill grasslands. Occurs in Arroyo Grande, Pismo Beach, Port San Luis, San Luis Obispo, Lopez Mountain, Morro Bay, Cayucos, San Simeon, Pico Creek, Cambria, Piedras Blancas, and Burro Mountain. Elevations: 10-400 meters.	High Potential. CNDDDB documents two occurrences of this species within the LCP. Suitable habitat for this species occurs within the grasslands, meadows, and seeps. Elements of suitable habitat present within LCP.
<i>Chloropyron maritimum</i> ssp. <i>maritimum</i> salt marsh bird's- beak	Endangered/Endangered G4?T1 / S1 1B.2	Bloom period: May-October. Requires coastal salt marshes that line bays and estuaries. Elevations: 0-10 meters.	High Potential. This species was documented in close proximity to the LCP, in Montana de Oro State Park, by CNDDDB in 2008. Suitable habitat for this species occurs within the marsh, and coastal dune habitats within the LCP.
<i>Delphinium parryi</i> ssp. <i>blochmaniae</i> dune larkspur	--/-- G4T2 / S2 1B.2	Chaparral, coastal dunes (maritime). On rocky areas and dunes. 15-375 m.	High Potential. Elements of suitable habitat present within LCP. CNDDDB documents one occurrence of this species within the LCP (CNDDDB 1899). The chaparral and coastal dune habitats within the LCP provide suitable habitats for this species.

Scientific Name Common Name	Status ¹Fed / ²State ESA ³CRPR / ²CDFW ⁴G-Rank / S-Rank	Habitat Preference / Requirements	Potential for Occurrence / Basis for Determination
<i>Delphinium parryi</i> ssp. <i>eastwoodiae</i> Eastwood's larkspur	--/-- G4T2 / S2 1B.2	Chaparral, valley and foothill grassland. Serpentine. Openings. 60-640 m.	High Potential. CNDDDB documents one occurrence of this species within the LCP (CNDDDB 1960). The serpentine influenced chaparral and grassland habitats within the LCP provide suitable habitats for this species.
<i>Dithyrea maritima</i> beach spectaclepod	--/Threatened G1 / S1 1B.1	Coastal dunes, coastal scrub. Sea shores, on sand dunes, and sandy places near the shore. 3- 65 m.	Moderate Potential. This species was documented in close proximity to the LCP, in Montana de Oro State Park, by CNDDDB in 2008. Suitable habitat for this species occurs within the sandy coastal dune habitats within the LCP.
<i>Dudleya abramsii</i> ssp. <i>bettinae</i> Betty's dudleya	--/-- G4T2 / S2 1B.2	Coastal scrub, valley and foothill grassland, chaparral. On rocky, barren exposures of serpentine within scrub vegetation. 20-250 m.	Moderate Potential. CNDDDB documents two occurrences of this species within the LCP. Suitable habitat for this species occurs with the serpentine influenced scrub, grassland, and chaparral habitats within the LCP.
<i>Dudleya abramsii</i> ssp. <i>murina</i> mouse-gray dudleya	--/-- G4T2 / S2 1B.3	Chaparral, cismontane woodland, valley and foothill grassland. Serpentine outcrops. 25-535 m.	Moderate Potential. CNDDDB documents one occurrence of this species within the rolling hills on the north side of the LCP (1988). Suitable habitat for this species occurs with the serpentine influenced woodland, grassland, and chaparral habitats within the LCP.
<i>Dudleya</i> <i>blochmaniae</i> ssp. <i>blochmaniae</i> Blochman's dudleya	--/-- G3T2 / S2 1B.1	Coastal scrub, coastal bluff scrub, chaparral, valley and foothill grassland. Open, rocky slopes; often in shallow clays over serpentine or in rocky areas with little soil. 5-450 m.	High Potential. CNDDDB documents one occurrences of this species within the LCP, and six occurrences within 1 mile of the LCP boundary. Suitable habitat for this species occurs with the serpentine influenced scrub, grassland, and chaparral habitats within the LCP.
<i>Erigeron</i> <i>blochmaniae</i> Blochman's leafy daisy	--/-- G2 / S2 1B.2	Coastal dunes, coastal scrub. Sand dunes and hills. 3-45 m.	High Potential. Species known to occur in Montana De Oro State Park (Sims 2010). Suitable habitat within the sand dunes and hills of coastal dune and scrub habitat within the City's Coastal Zone.

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Scientific Name Common Name	Status ¹ Fed / ² State ESA ³ CRPR / ² CDFW ⁴ G-Rank / S-Rank	Habitat Preference / Requirements	Potential for Occurrence / Basis for Determination
<i>Extriplex joaquinana</i> San Joaquin spearscale	--/-- G2 / S2 1B.2	Chenopod scrub, alkali meadow, playas, valley and foothill grassland. In seasonal alkali wetlands or alkali sink scrub with <i>Distichlis spicata</i> , <i>Frankenia</i> , etc. 1-835 m.	Moderate Potential. Suitable habitat present within Dune wetlands of LCP.
<i>Horkelia cuneata</i> var. <i>sericea</i> Kellogg's horkelia	--/-- G4T1? / S1? 1B.1	Closed-cone coniferous forest, coastal scrub, coastal dunes, chaparral. Old dunes, coastal sandhills; openings. 5-215 m.	Moderate Potential. Elements of suitable habitat present within coastal scrub and chaparral of LCP.
<i>Layia jonesii</i> Jones' layia	--/-- G2 / S2 1B.2	Chaparral, valley and foothill grassland. Clay soils and serpentine outcrops. 5-400 m.	Present. Suitable habitat present in chaparral and grassland habitats with clay and serpentine influence within LCP. This species is known to occur on Black Hill within the LCP (LCP 1982).
<i>Monardella sinuata</i> ssp. <i>sinuata</i> southern curly-leaved monardella	--/-- G3T2 / S2 1B.2	Coastal dunes, coastal scrub, chaparral, cismontane woodlands. Sandy soils. 0-300 m.	Moderate Potential. Suitable habitat present within dune, scrub and chaparral habitats within LCP.
<i>Nemacaulis denudata</i> var. <i>denudata</i> coast woolly-heads	--/-- G3G4T2 / S2 1B.2	Coastal dunes. 0-100 m.	Moderate Potential. Suitable habitat present within coastal dune and scrub habitat within LCP
<i>Suaeda californica</i> California seablite	Endangered/-- G1 / S1 1B.1	Marshes and swamps. Margins of coastal salt marshes. 0-5 m.	Present. Known to occur along margins of Morro Bay estuary within the City's Coastal Zone (Sims 2010; CNDDDB). Suitable habitat present in estuary and associated marsh.
<i>Sulcaria isidiifera</i> splitting yarn lichen	--/-- G1 / S1 1B.1	Coastal scrub. On branches of oaks and shrubs in old growth coastal scrub. 20-55 m.	Moderate Potential. Suitable habitat present in coastal scrub habitat within LCP.
Vegetation Communities			
Central dune scrub	--/--/-- tracked by CDFW as sensitive natural community	A dense coastal scrub community of scattered shrubs, subshrubs, and herbs generally less than 1m tall.	Present.

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Coastal brackish marsh	--/--/-- tracked by CDFW as sensitive natural community	Dominated by perennial, emergent, herbaceous monocots to 2m tall. Cover is often complete and dense. Similar to Coastal Salt Marshes, but brackish from freshwater input. Usually at the interior edges of coastal bays and estuaries or in coastal lagoons.	Present.
Northern coastal salt marsh	--/--/-- tracked by CDFW as sensitive natural community	Highly productive, herbaceous and suffrutescent, salt-tolerant hydrophytes forming moderate to dense cover and up to 1m tall. Usually found along sheltered inland margins of bays, lagoons, and estuaries. These hydric soils are subject to regular tidal inundation by salt water for at least part of each year.	Present.
Invertebrates			
<i>Bombus caliginosus</i> obscure bumble bee	--/-- G4? / S1S2	Coastal areas from Santa Barbara county to north to Washington state. Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	High Potential. Majority of preferred food plants present within LCP.
<i>Cicindela hirticollis gravida</i> sandy beach tiger beetle	--/-- G5T2 / S2	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	High Potential. Suitable habitat present in the Dune communities of the LCP.
<i>Coelus globosus</i> globose dune beetle	--/-- G1G2 / S1S2	Inhabitant of coastal sand dune habitat; erratically distributed from Ten Mile Creek in Mendocino County south to Ensenada, Mexico. Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation.	High Potential. Suitable habitat present within LCP along foredune natural community. Species known to occur on sandspit at the south of the LCP.
<i>Danaus plexippus</i> pop. 1 monarch - California overwintering population	--/-- G4T2T3 / S2S3	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	Present. This species is known to occur within the LCP. CNDDB documents 9 occurrences of monarch overwintering populations.

ESHA REVIEW AND CURRENT CONDITIONS MAPPING

Scientific Name Common Name	Status ¹ Fed / ² State ESA ³ CRPR / ² CDFW ⁴ G-Rank / S-Rank	Habitat Preference / Requirements	Potential for Occurrence / Basis for Determination
<i>Plebejus icarioides moroensis</i> Morro Bay blue butterfly	--/-- G5T2 / S2	Inhabits stabilized dunes & adjacent areas of coastal San Luis Obispo & NW Santa Barbara counties. Larval food plant thought to be <i>Lupinus chamissonis</i> .	High Potential. CNDDDB documents three occurrences of this species within the LCP. The required host plant species is present in the coastal scrub habitat.
Fish			
<i>Eucyclogobius newberryi</i> tidewater goby	FE / -- SSC G3 / S3	Occurs in brackish and freshwater shallow lagoons and slow-moving lower stream reaches. Requires fairly calm and still waters, but not stagnant. Avoids open areas with strong currents or wave action.	Present. USFWS reports that the mouth and lower reach of Toro Creek, which is designated critical habitat, was occupied at the time designated critical habitat was updated in 2013 (78 FR 8745 8819). This species is known to occur within the project area.
<i>Oncorhynchus mykiss irideus</i> steelhead – Southern California DPS	FE / -- SSC G5T1Q / S1	Occurs in riparian, emergent, and palustrine habitats. Spawning and rearing occurs in cool, clear fast-flowing streams with abundant gravel or cobble and riffles. Feeds and forages in open waters within estuarine subtidal and riverine habitats. Connectivity to the Pacific Ocean is required to complete its life cycle.	Present. This species is known to occur within Chorro Creek, and the outlet into the Morro Bay estuary.
Amphibians			
<i>Rana draytonii</i> California red-legged frog	FT / -- SSC G2G3 / S2S3	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	High Potential. Suitable habitat present within LCP. In addition to the 7 CNDDDB occurrences documented within LCP, the LCP also contains designated critical habitat for this species.
Reptiles			
<i>Anniella pulchra nigra</i> black legless lizard	--/-- G3G4T2T3Q / S2 SSC	Sand dunes and sandy soils in the Monterey Bay and Morro Bay regions. Inhabit sandy soil/dune areas with bush lupine and mock heather as dominant plants. Moist soil is essential.	Low Potential. Melanistic legless lizards do occur in the LCP; however, subspecies <i>nigra</i> is now believed to occur only in the Monterey Bay region, while melanistic individuals of legless lizards in Morro Bay are now believed to be most closely related to silvery legless lizard (Parham and Pappenfuss 2008; 2010).

ESHA REVIEW AND CURRENT CONDITIONS MAPPING

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<i>Anniella pulchra</i> silvery legless lizard	--/-- G3G4T3T4Q / S3 SSC	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. Prefer soils with high moisture content.	High Potential. Suitable habitat present within LCP and reported from the dunes in the vicinity.
<i>Emys marmorata</i> western pond turtle	--/-- G3G4 / S3 SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for e	High Potential. Suitable habitat present within creeks and wetlands of LCP. The LCP contains the year-round freshwater water and substantial aquatic vegetation.
<i>Phrynosoma blainvillii</i> coast horned lizard	--/-- G3G4 / S3S4 SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, & abundant supply of ants & other insects.	High Potential. Elements of suitable habitat present within LCP include dunes and dune scrub.
Birds			
<i>Accipiter cooperii</i> Cooper's hawk	--/-- G5 / S4 WL	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Moderate Potential. CNDDDB documents one occurrence of this species within the LCP. Suitable nesting habitat for this species occurs throughout the LCP.
<i>Charadrius alexandrinus nivosus</i> western snowy plover	Threatened/-- G3T3 / S2S3 SSC	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	Present. This species is known to occur within the coastal dune and sand spit habitat of the City's Coastal Zone.
<i>Laterallus jamaicensis coturniculus</i> California black rail	--/Threatened G3G4T1 / S1 FP	Inhabits freshwater marshes, wet meadows & shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year & dense vegetation for nesting habitat.	High Potential. CNDDDB documents one occurrence of this species within the LCP. This occurrence was documented in 2001 in the marsh/estuary region of the study area.

ESHA REVIEW AND CURRENT CONDITIONS MAPPING

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<i>Rallus longirostris</i> <i>obsoletus</i> California clapper rail	Endangered/Endangered G5T1 / S1 FP	Salt-water & brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud- bottomed sloughs.	Low Potential. CNDDDB document one occurrence of this species within the LCP, dated 1939. Suitable habitat occurs for this species in the pickleweed dominated marsh and estuary habitats of the LCP.
Mammals			
<i>Antrozous pallidus</i> pallid bat	--/-- G5 / S3 SSC	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low Potential. Elements of suitable habitat present within project site; however, project site lacks preferred cliff faces and tall buildings for roosting. No occurrence records exist on or adjacent to project site.
<i>Dipodomys</i> <i>heermanni</i> <i>morroensis</i> Morro Bay kangaroo rat	Endangered/Endangered G3G4TH / SH FP	Coastal sage scrub on the south side of Morro Bay. Needs sandy soil, but not active dunes, prefers early seral stages.	Low Potential. Elements of suitable habitat present within project site; however, the species has not been seen in the wild since 1986.

Regional Vicinity refers to within a 5 mile radius of site.

FT = Federally Threatened

FC = Federal Candidate Species

FE = Federally Endangered

SE = State Endangered

ST = State Threatened

SR = State Rare

SSC = CDFW Species of Special Concern

FP = CDFW Fully Protected

WL = CDFW Watch List

CRPR (CNPS California Rare Plant Rank):

1A=Presumed Extinct in California

1B=Rare, Threatened, or Endangered in California and elsewhere

2=Rare, Threatened, or Endangered in California, but more common elsewhere

CRPR Threat Code Extension:

.1=Seriously endangered in California (> 80% of occurrences threatened / high degree and immediacy of threat)

.2=Fairly endangered in California (20-80% occurrences threatened)

.3=Not very endangered in California (<20% of occurrences threatened)

G-Rank/S-Rank = Global Rank and State Rank as per NatureServe and CDFW's CNDDDB RareFind 5.