

Appendix A

CLIMATE CHANGE VULNERABILITY AND RISK ASSESSMENT

APPENDIX A

Climate Change Vulnerability and Risk Assessment

According to the California Coastal Commission's (CCC) Sea Level Rise (SLR) Policy Guidance (CCC 2015), to be consistent with the Coastal Act hazard avoidance and resource protection policies, it is critical that local governments with coastal resources at risk from sea level rise certify or update Local Coastal Programs (LCPs) that provide a means to prepare for and mitigate these impacts. The CCC recommends the following six steps to address sea level rise as part of the development of an LCP.

1. Choose range of SLR projections relevant to LCP planning area
2. Identify potential SLR impacts in LCP planning area
3. Assess risks to coastal resources and development in planning area (i.e., identify problem areas)
4. Identify adaptation measures and LCP policy options
5. Draft updated or new LCP for certification with the CCC
6. Implement LCP and monitor and revise as needed

As part of the process to develop the Land Use Plan (LUP), a report was prepared addressing steps 1 through 3 above, entitled *County of San Diego Local Coastal Program Update Existing Conditions, Vulnerability and Risk, and Key Issues Report*. The climate change vulnerabilities and risk section of the report is presented below.

1.1 Sea Level Rise Projections

The following section summarizes SLR projections relevant to the County's CZ. The selected SLR scenarios were developed through a review of the CCC's SLR Policy Guidance (CCC 2015) and other local and regional SLR planning efforts conducted to date within the County. AECOM concluded that there are currently no consistently applied SLR scenarios within the County based on review of these prior studies. The majority of prior studies were performed prior to finalization of the CCC's recently adopted SLR Policy Guidance in August 2015 and therefore reflect the available guidance at the time of each study.

SLR Ranges and Scenarios

The 2015 CCC SLR Policy Guidance recommends use of the best-available SLR science for the California coast when addressing SLR in LCPs. The National Research Council's (NRC) 2012 report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, Future*, is currently considered the "best available science" by climate scientists. The years 2030, 2050, and 2100 were selected as the planning time horizons for the SLR vulnerability and risk assessment for the San Diego County LCP update for consistency

with NRC planning horizons, to allow for evaluation of assets with a range of service lives, and to facilitate identification of trigger points for SLR impacts. NRC SLR projections were adopted for evaluation as part of the SLR vulnerability and risk assessment conducted for the San Diego County LCP update. NRC's 2012 report provides three different SLR scenarios: low-range (or best-case), mid-range, and high-range. These scenarios represent a range of possible futures. Use of the lowest projections is not recommended for planning purposes, since robust planning generally requires use of more conservative futures than best-case scenarios. AECOM evaluated the mid-range and high-range SLR scenarios as part the vulnerability and risk assessment. These projections are shown in Table 7 and Exhibit 1.

Table 7. NRC (2012) Regional Sea Level Rise Projections for Southern California

	NRC (2012) SLR Projections California – South of Cape Mendocino Region	
Year	Mid-Range (inches)	High-Range (inches)
2030	6	12
2050	11*	24
2100	37	66

Note:*An SLR value of 12 inches was adopted for the 2050 mid-range projection for the vulnerability and risk assessment because the risks at 11 and 12 inches of SLR would be comparable and a 12-inch SLR amount can represent the 2030 high-range and 2050 mid-range scenarios using a single value. *Source: NRC (2012) – Table 5.3, Regional Sea-Level Rise Projections Relative to Year 2000 for the Los Angeles Tide Station*

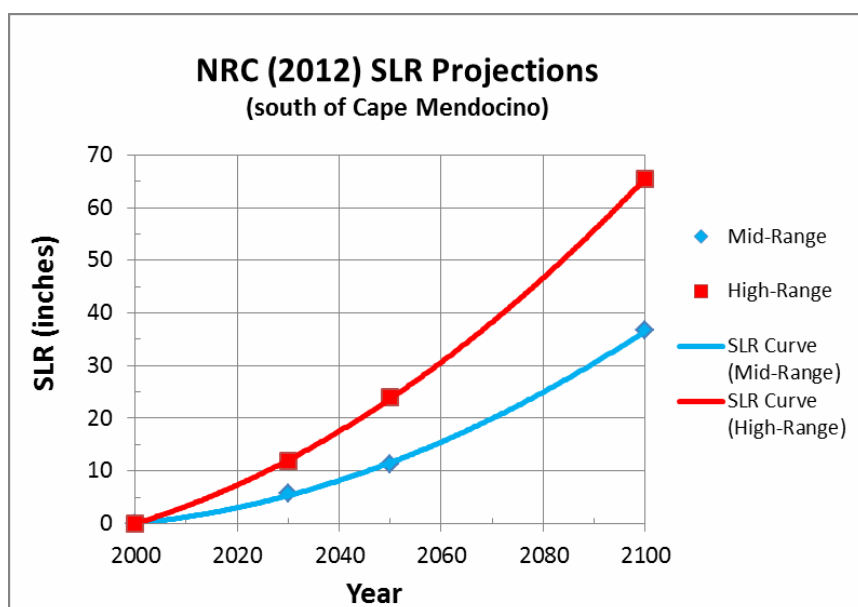


Exhibit 1. NRC (2012) Sea Level Rise Projections for Southern California

1.2 Potential Physical SLR Impacts

The following sections discuss potential SLR impacts to physical hazards, such as local water conditions, historical and future shoreline change, and water quality.

1.2.1 Existing Local Water Conditions

a. Tides

Coastal water levels fluctuate naturally throughout the day due to astronomical tides caused by the gravitational pull of the moon and sun. The San Diego coast experiences two high and two low tides each day, which vary in height over time. The largest annual tides, often referred to as King Tides, occur approximately 4 to 5 days each year. King Tides produce ocean levels that are approximately 1 foot higher than average high tides.

Tide elevations along the coast are typically measured relative to a vertical datum—a baseline position against which other elevations may be related. Tidal datums are defined by a certain phase of the tide, for example, mean higher high water (MHHW) or mean sea level. Tidal datums are calculated by the NOAA over a standard 19-year period of observation. The North American Vertical Datum of 1988 (NAVD88) is the current national standard reference datum. Tides along the San Diego open coast are characterized by NOAA's recorded water levels at the La Jolla tide station. Table 8 shows NOAA's published tidal datums and extreme tide estimates from the Federal Emergency Management Agency (FEMA) (BakerAECOM 2015). The diurnal tide range (height from MHHW to mean lower low water [MLLW]) is approximately 5.3 feet, although extreme tides can reach heights of nearly 8 feet.

Table 8. Tidal Datums and Extreme Tides at La Jolla, CA Tide Station

Water Level	Feet MLLW	Feet NAVD88
100-year Tide	7.93	7.74
50-year Tide	7.78	7.59
10-year Tide	7.46	7.27
Highest Observed Tide	7.66	7.47
Highest Astronomical Tide	7.14	6.95
Mean Higher High Water (MHHW)	5.32	5.13
Mean High Water (MHW)	4.50	4.31
Mean Tide Level (MTL)	2.75	2.56
Mean Sea Level (MSL)	2.73	2.54
Mean Low Water (MLW)	0.90	0.71
Mean Lower Low Water (MLLW)	0.00	-0.19

Source: NOAA Tides and Currents La Jolla, CA Tide Station (#9410230) and BakerAECOM (2015)

High tides propagate from the open coast through the mouth of San Elijo Lagoon, but tidal exchange and flushing are impeded by four constrictions or barriers within the lagoon: Highway 101, the railroad bridge, I-5, and the CDFW dike. These barriers divide the lagoon into three distinct basins (west, central, and east) and mute the tide range within the lagoon so that high tides are lower and low tides are higher than along the open coast. The CDFW dike extends from north to south across the marsh and is the primary constraint on tidal flows reaching the upstream reaches of the lagoon. The CDFW dike and constriction at I-5 also impound freshwater discharge from Escondido and La Orilla Creeks. The east basin is primarily freshwater influenced as a result. The reduced tide range and impoundment of freshwater discharge produce a variety of transitional marsh habitats, including riparian, freshwater, brackish, and salt marsh. The distribution of these habitats depends on ground elevation, inundation regime, and water salinity.

b. Water Level Changes from Storms, PDO, ENSO, and Basin Phenomena

Many factors influence ocean water levels, including storm surge, ocean swell, wind waves, the El Niño Southern Oscillation (ENSO), the Pacific Decadal Oscillation (PDO), and tsunamis. Each of these factors can raise water levels independently, and two or more may combine to form exceptionally high coastal

waters. Elevated coastal waters along the open Pacific coast will flow into San Elijo Lagoon and elevate water levels within the lagoon as well.

El Niño-Southern Oscillation: California's coastal water levels are strongly influenced by the large-scale changes in the ENSO cycle. Under normal conditions, global trade winds blow from east to west across the Pacific, moving warm surface water away from the Americas toward the western Equatorial Pacific. Every 2 to 7 years, these winds weaken or reverse, pushing warm, equatorial water toward the Americas, and north along the San Diego coastline. This warmer ocean water expands and coastal waters during El Niño conditions are higher than typical. In addition, El Niño conditions in the Pacific Ocean frequently produce severe winter storms that impact the San Diego coastline because Pacific Ocean storms follow a more southerly route. Because the storm tracks are shifted farther south, waves approach from a more southerly direction, exposing normally protected reaches of shoreline to high water levels and wave hazards.

Pacific Decadal Oscillation: The PDO is a long-term (multi-decadal) ocean-atmosphere cycle of climate variability that shifts the locations of cold and warm water masses in the Pacific Ocean basin and alters the path of the jet stream. It is similar to ENSO, but it occurs over a longer time scale. The "warm" phase of the PDO is characterized by warmer than normal water temperatures in the eastern North Pacific and a more southerly jet stream. The "cool" phase of the PDO is characterized by cooler than normal water temperatures in the eastern North Pacific and a more northerly jet stream.

Coastal Storms: Large storm systems can impact the San Diego coast during the winter season. These storms are typically characterized by low barometric pressure and strong winds, which produce storm surge, and are accompanied by large powerful waves. Storm characteristics such as wind speed, water level, and wave height are often described statistically using a concept referred to as the "return period" such as a "100-year wave run-up elevation." It is important to note that a 100-year storm does not occur once every 100 years, but rather has a 1% chance of occurring in any given year. Therefore, it is possible to experience two 100-year storm events in a single year, or have a period of greater than 100 years without a 100-year storm.

Table 9 presents factors that may contribute to extreme water levels along the San Diego coast.

Table 9. Processes That Temporarily Elevate Coastal Waters along the San Diego Coast

Factors Affecting Water Level	Typical Range	Duration of Impact	Frequency
King Tides	1 to 1.3 feet above MHHW	Hours	2 to 4 times each year
Storm Surge	0.5 to 2 feet	Days	Several times each year
Storm Waves	10 to 15 feet	Hours to Days	Several times each year
El Niño	0.5 to 1 feet	Months	Every 2 to 7 years
Pacific Decadal Oscillation	Unknown	20 to 30 years	Decades

c. Wave Impacts

Wave impacts from wave runup occur during coastal storm events along coastlines exposed to high tides, storm surge, and ocean storm waves. Since the County's CZ is located landward of the Pacific coastline, it is not exposed to these hazards.

d. Flooding from Extreme Events

The County's CZ is subject to flooding from extreme events from a number of sources: (1) extreme tide flooding from the Pacific Ocean, (2) riverine flooding from watershed runoff, and (3) tsunami runup and inundation from local and distant seismic events. Potential sources of existing conditions flooding due to extreme events within the County's CZ are discussed below.

Extreme Tidal Flooding: Extreme tidal flooding along the open coast is a relatively rare occurrence that results from the combination of high astronomical tides coupled with other factors such as storm surge and/or El Niño conditions (Table 9). These factors elevate high tides above normal levels and can result in temporary flooding of low-lying areas along the shoreline. Extreme tides along the San Diego open coast do not have the potential to reach inland areas of the County's CZ except within San Elijo Lagoon. Extreme tides along the San Diego open coast will propagate through the lagoon mouth, overtop the CDFW dike, and flood the upstream reaches of San Elijo Lagoon Ecological Reserve at its boundary with the County's CZ. Statistical analysis of extreme tide levels along the San Diego open coast conducted by FEMA (Table 8) estimated the 100-year tide level to be approximately 7.7 feet NAVD88. Low-lying coastal resources and assets exposed to extreme tides would experience temporary flooding by saltwater. High waters within

the lagoon drain to the ocean over subsequent low tides. Given the inland and upland location of the County's CZ, extreme tides do not impact the County's CZ under existing conditions.

Riverine Flooding: Riverine flooding within the County's CZ occurs as a result of freshwater discharge during heavy precipitation events. Portions of the County's CZ are immediately adjacent to and contained within the FEMA Special Flood Hazard Area along Escondido and La Orilla Creeks. The Escondido Creek watershed is much larger in size and therefore represents the primary source of riverine flooding within the County's CZ. Freshwater discharge from Escondido and La Orilla Creeks enters San Elijo Lagoon prior to draining to the ocean. The CDFW dike impounds freshwater discharge within the east basin of San Elijo Lagoon Ecological Reserve. Modeling conducted as part of the San Elijo Lagoon Restoration Project EIR/EIS estimated the 100-year riverine flood level in the east basin to be approximately 14 to 15 feet NAVD88 (Moffatt & Nichol 2012)—approximately 6 feet higher than the 100-year tide level. Floodwaters within the lagoon can completely fill the east basin and freshwater conditions can remain for approximately 1 week following a storm (Moffatt and Nichol 2012). Approximately 24 parcels along Escondido Creek upstream of San Elijo Lagoon and within the County's CZ are located within FEMA's 1% (100-year) or 0.2%-annual-chance (500-year) riverine floodplain (Figure 3-1).

Tsunami Inundation: Tsunamis are ocean waves with very long wavelengths that are generated from geologic events such as earthquakes, landslides, and volcanic eruptions. The California coast is exposed to tsunami hazards from local sources within the Southern California Bight and distant sources such as the Pacific Northwest, Aleutian Islands, Japan, and Kuril Islands. The State of California (2009) evaluated potential tsunami inundation hazard zones along the California coast and developed exposure maps for emergency planning purposes. Tsunami hazard zones within San Elijo Lagoon are depicted on the Encinitas Quadrangle; however, the tsunami inundation area does not extend landward of I-5 so impacts to the County's CZ would be negligible.

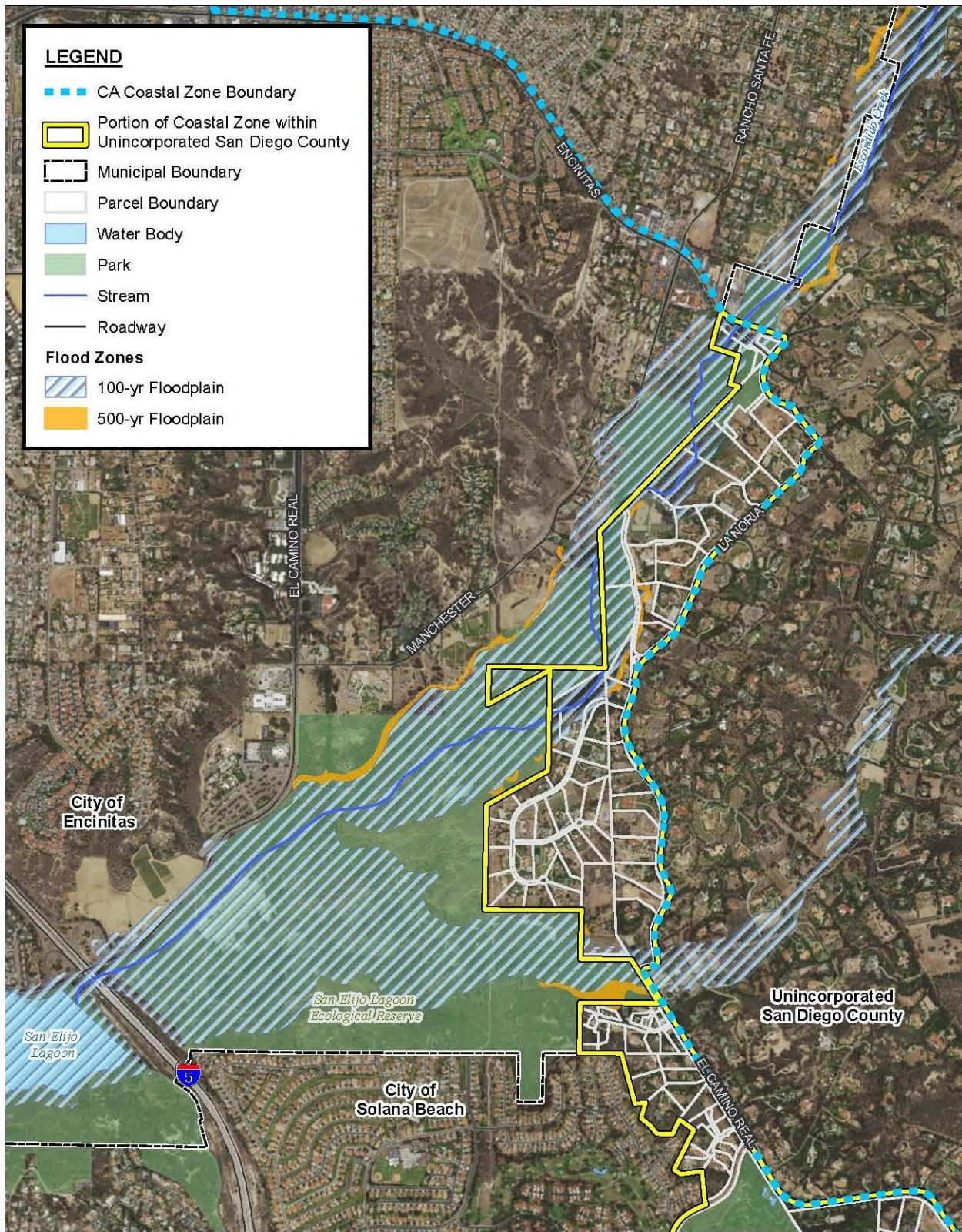


Figure 1-1
FEMA Special Flood Hazard Areas

1.2.2 Future Local Water Conditions

Future coastal and riverine flood risks may be magnified by the effect of future climate change. As sea levels rise, the frequency and magnitude of tidal flooding will increase. Higher sea levels may also exacerbate riverine flooding because higher water levels at the coast may impede drainage of freshwater discharge from lagoons and creeks. Other aspects of climate change, such as changes in storm frequency and intensity, may change the nature of coastal and watershed storm events in the future.

The following coastal and riverine flood hazards may increase as a result of climate change:

Daily tidal inundation: As sea level rises, the amount of land and infrastructure subjected to daily inundation by high tides will increase. The County's CZ is relatively high in elevation compared to typical daily high tide elevations and currently does not experience adverse impacts of tidal flooding. However, as seas rise, previously dry or rarely inundated areas may be reached with increased frequency. This will result in the conversion of transitional or upland areas to tidal wetland within the upper reaches of San Elijo Lagoon Ecological Reserve, but daily tidal inundation is not anticipated to occur within the County's CZ under the SLR scenarios and with the proposed restoration actions evaluated in this report.

Annual high tide inundation (King Tides): King Tides are abnormally high, predictable astronomical tides that occur approximately two to four times per year. As seas rise, the elevation of King Tides will rise concurrently. When King Tides occur coincident with storm waves, coastal flood and erosion impacts are more likely to occur; however, these conditions are not anticipated to occur within the County's CZ under the SLR scenarios and proposed restoration actions evaluated in this report.

Extreme tides: Extreme tides refer to any temporary ocean water level above the predicted (astronomical) daily high tide (not including wave effects). They occur as a combination of high astronomical tides, storm surge, and El Niño effects (see Table 9). As seas rise, the elevation of extreme tides will rise concurrently. The impact of future extreme tides on the County's CZ is discussed in Section 3.3 (Potential Risks for Sea Level Rise to Coastal Resources and Development) of this report.

Storms and El Niño: Climate change may affect the frequency and intensity of coastal storms, El Niño cycles, and related processes. A clear consensus has not yet fully emerged on the nature of these changes in the Pacific Ocean and this is an area of active research.

Shoreline change and coastal erosion: The San Diego County coastline has undergone natural and manmade alterations that have impacted natural shoreline change processes. The long-term cumulative effects of tides, waves, and SLR generally results in the landward migration of the shoreline; however, there is much variability depending on location and time period. A general consensus among the scientific community is that SLR will increase long-term rates of shoreline change although the exact nature of that increase is not well understood and this is an area of active research. The County's CZ is located inland from the open coast, and long-term shoreline change and coastal erosion will not directly impact coastal resources and assets in the County's CZ. However, resources and assets located along the open coast that are utilized by residents of unincorporated areas of San Diego County may be impacted.

Riverine flooding: SLR may exacerbate riverine flooding by raising flood levels along tidally influenced creeks and streams; however, a detailed assessment of the impact of SLR, changes in land use (such as

future development), and climate change¹ on riverine flood hazards along Escondido and La Orilla Creeks has not been conducted to date.

Tsunami inundation: The effect of SLR on tsunami hazards is an area of active research. SLR will increase the base tide level upon which tsunami waves propagate and therefore may increase the extent of inland inundation by tsunamis; however, local topography and wave dynamics are also important factors. A detailed assessment of the impact of SLR on tsunami hazards has not been conducted to date.

Planning is currently underway to implement a restoration project within San Elijo Lagoon Ecological Reserve (San Elijo Lagoon Conservancy 2016). The proposed project would make improvements to the mouth of the lagoon and interior channel network, and would reduce existing flow constrictions that currently restrict tidal exchange and flushing of the lagoon and degrade habitat quality. The proposed improvements would promote more efficient lagoon hydraulics and increase tidal influence in the east basin. These changes would effectively unmute tides within the upper reaches of the lagoon so that high tides would be higher and low tides would be lower. In addition, reduction of flow constrictions within the lagoon would reduce impoundment of freshwater during watershed flooding events and reduce the potential for riverine flooding along Manchester Avenue. The proposed restoration actions are relevant to the County's CZ because they will change the riverine and coastal flood levels within the east basin of San Elijo Lagoon Ecological Reserve. Increased tidal influence will likely increase coastal flood risk by allowing extreme high tides to propagate farther upstream, while reduction in flow constrictions will likely decrease riverine flood risk by reducing impoundment and ponding of freshwater discharge.

1.2.3 Shoreline Change

a. Historical Shoreline Change

Shoreline change is a complex process that can occur on a variety of time scales, ranging from individual storm events to multi-decadal climatic cycles, and can result in either retreating or advancing shorelines. Short-term shoreline change generally consists of episodic, storm-induced erosion or human alterations (e.g., beach nourishments or placement of coastal protection or sand retention structures). Long-term shoreline change is typically facilitated by natural or human-induced changes in sediment budget, longshore and cross-shore sediment transport, wave climate, SLR, surface runoff, and groundwater processes (Hapke et al. 2006; Hapke and Reid 2007). The USGS National Assessment of Shoreline Change estimated historical rates of change along sandy and cliff shorelines in Encinitas, Cardiff, and Solana Beach. Results indicated that shorelines remained fairly stable over the long term (1887–1998) but moderately erosional over the short term (1972–1998).

¹ Effects of climate change on riverine flood hazards include changes in storm characteristics such as magnitude, intensity, and duration.

b. *Future Shoreline Changes*

While historical rates of shoreline change can be estimated from careful measurements of aerial photographs and topography changes, no standard methodology exists to predict future rates of shoreline change. Coastal engineers apply a variety of methods and techniques to incorporate the effects of SLR on shoreline response. The simplest approach is to project historical rates of shoreline change into the future; however, there is broad consensus among scientists that SLR will increase the rate of shoreline retreat above historical values. Uncertainties in future management scenarios further complicate future projections of shoreline change. The U.S. Geological Survey (USGS) recently completed a study of long-term shoreline evolution in southern California for sandy beaches and bluffs using the Coastal Storm Modeling System (CoSMoS). Initial future shoreline positions corresponding to SLR scenarios of 0.5 meter (1.6 feet), 1.0 meter (3.3 feet), 1.5 meters (4.9 feet), and 2.0 meters (6.6 feet) are available for public use. Additional scenarios will be available at the end of 2016.

Shoreline change within San Elijo Lagoon Ecological Reserve will occur due to the increased extent of tidal influence as a result of SLR and the proposed restoration actions. The tidally influenced footprint of the lagoon will increase gradually over time as high tides reach higher elevations and the lagoon expands. These potential shoreline changes within the lagoon are discussed here for context and are not anticipated to impact the County's CZ.

1.2.4 *Water Quality*

a. *Saltwater Intrusion*

Saltwater intrusion into aquifers can occur when freshwater aquifers have a direct connection to the ocean or other saltwater source (such as a lagoon or estuary system). The extent of saltwater influence within freshwater aquifers depends on the balance between dense saltwater intruding from the ocean side and the characteristics of the freshwater aquifer, including subsurface geology, elevation of the water table, volume and rate of groundwater withdrawal, and rate of recharge.

The extent of saltwater intrusion into a freshwater aquifer is affected by the relative difference between water levels in the ocean and the aquifer. Typically, groundwater elevations are higher than mean sea level and groundwater flows toward the coast, effectively blocking intrusion of saltwater into the aquifer. When the relative difference between the ocean and the groundwater level decreases—due to drawdown of the aquifer by pumping, or raising of mean sea level due to SLR—the interface between saltwater and freshwater can move inland. Once saltwater intrudes into a freshwater aquifer, it can be very difficult and costly to remove.

San Elijo Lagoon is underlain by the San Elijo Valley Groundwater Basin, which has been identified as a potential source of potable water. The basin comprises a surface alluvial aquifer directly underlying the lagoon and a deeper aquifer. The basin is unconfined and exchange occurs between the aquifer and the overlying lagoon and adjacent ocean waters. Natural recharge of the alluvial aquifer is primarily through percolation from Escondido Creek. Infiltration from direct precipitation and agricultural and residential uses contributes additional recharge (DWR 2004).

Increased tidal exchange and shifts in salinity regime that would occur as a result of SLR and proposed restoration actions are not predicted to cause a substantial change in conditions that influence groundwater quality and/or recharge characteristics within the County's CZ (although seawater intrusion may impact the groundwater basin in the area west of I-5). The groundwater aquifer is at depths substantially lower than the alluvial aquifer directly underlying the lagoon and exchange between the lagoon and groundwater is believed limited to the alluvial aquifer (San Elijo Lagoon Conservancy 2016).

b. Coastal Water Pollution

Potential effects of SLR on coastal water pollution are typically the result of failure of wastewater infrastructure as a result of exposure to erosion and flood conditions. AECOM did not identify any critical wastewater infrastructure exposed to SLR impacts within the County's CZ, thereby concluding that increased risk of coastal water pollution as a result of SLR is minimal.

1.3 Potential Risks for Sea Level Rise to Coastal Resources and Development

In addition to direct exposure to coastal flooding and erosion as a result of SLR, coastal communities may also be at risk of, and indirectly affected by, impairment of critical infrastructure and services. Within the County's CZ, SLR impacts could directly damage, destroy, or temporarily interrupt critical infrastructure including roads and water, wastewater, and power supply systems. Temporary or permanent loss of such facilities would have indirect, but serious, impacts to coastal residents. This section evaluates direct and indirect impacts² to:

Existing and planned development, including residential and commercial property

Vulnerable public facilities, such as schools, post offices, libraries, or community centers

Critical infrastructure, including transit, water and wastewater, and power

Public access, including beaches, recreation areas, and coastal trails

Environmentally sensitive habitats and sensitive marine species, such as seals and sea lions and sensitive coastal bird species.

The County's CZ is generally located landward and upland of coastal oceanographic processes that are typically evaluated as part of a SLR vulnerability and risk assessment, such as waves, tides, storm surge, coastal storm erosion, and long-term shoreline change. Discussion of physical SLR impacts will therefore be limited to the upstream reaches of San Elijo Lagoon at the confluence of Escondido and La Orilla Creeks, where portions of the County's CZ have the potential for exposure to SLR impacts.

² Residents of the County's Coastal Zone (CZ) rely on critical infrastructure that is located outside of the study area (for example, power and wastewater treatment facilities). Sea level rise impacts to these assets were not evaluated as part of this assessment.

1.3.1 Exposure Analysis

AECOM evaluated potential risks of SLR to coastal resources and development within the County's CZ through the creation of inundation and flooding exposure maps. The mapping effort focused on the upstream reaches of San Elijo Lagoon Ecological Reserve and its boundary with the County's CZ. The inundation maps were developed using a 1-meter digital elevation model created from high-resolution coastal Lidar data obtained from NOAA. Each SLR scenario (Table 7) was combined with the estimated daily high tide (MHHW) and extreme tide (100-year tide) water levels to estimate future inundation and flooding extents within the County's CZ. The future conditions water level scenarios are shown in Table 10. The evaluated scenarios assume full tidal exchange between the lagoon and the Pacific Ocean because the exact nature of the lagoon response to SLR and proposed restoration actions is unknown. The inundation maps do not take into account detailed hydraulics, storm duration, and other elements that affect the extent of inundation, such as constrictions and overland flow. The inundation maps therefore represent a conservative estimate of tide levels and any potential increase of these levels due to restoration activity in the lagoon. Hydrodynamic modeling conducted as part of the San Elijo Lagoon Restoration Project EIR/EIS found that all proposed restoration alternatives would increase the high tide range within the east basin of the lagoon; however, the exact response will depend on a variety of natural and anthropogenic factors. Actual future daily high tide and extreme tide elevations may be less than shown in Table 10 depending on future management and geomorphic evolution of the lagoon.

Table 10. Future Conditions Daily High Tide and Extreme Tide Sea Level Rise Scenarios

Sea Level Rise (inches)	Daily High Tide (MHHW) (feet NAVD88)	Extreme Tide (100-yr tide) (feet NAVD88)	Sea Level Rise Scenario
Existing	5.1	7.7	-
6	5.6	8.2	2030 mid
12	6.1	8.7	2030 high, 2050 mid
24	7.1	9.7	2050 high
37	8.2	10.8	2100 mid
66	10.6	13.2	2100 high

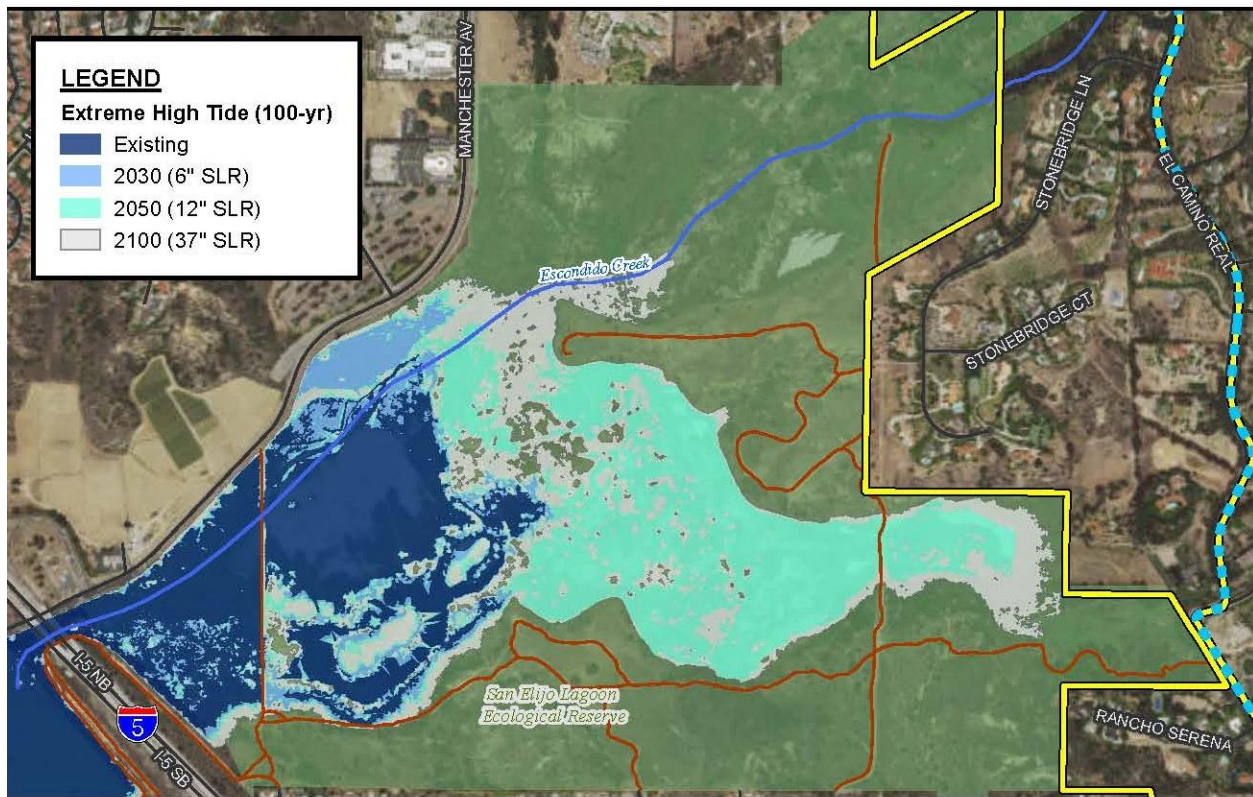
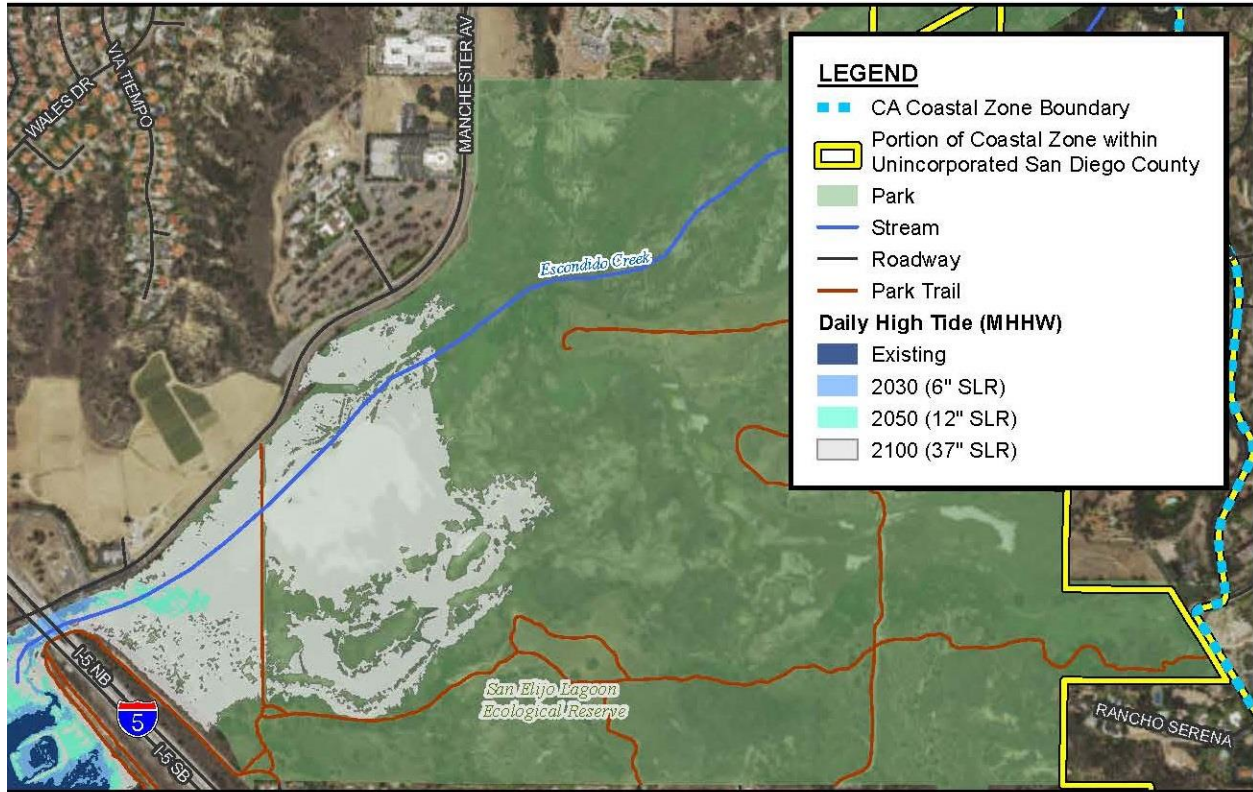
The future inundation and flooding maps for the County's CZ are shown in Figures 3-2 and 3-3, respectively, for the mid-range and high-range SLR scenarios (see NRC SLR scenarios Table 7).

AECOM also evaluated future exposure to combined coastal and riverine flooding using modeling results from the USGS CoSMoS study.³ The CoSMoS modeling results are shown in Figure 3-4⁴. The USGS modeling evaluated combined flooding from a future conditions 100-year coastal storm event with SLR and a likely coincident riverine discharge event⁵. The results suggest that the flow constriction at I-5 impounds freshwater discharge in the lagoon and that flood levels in the east basin do not increase as a result of SLR; however, the combined effects of an extreme freshwater discharge event (e.g., 100-year discharge) and SLR were not evaluated. These findings are consistent with modeling completed for the San Elijo Lagoon Restoration Project EIR/EIS (Moffatt & Nichol 2012), which showed elevated flood levels within the east basin due to impoundment of freshwater behind the CDFW dike and I-5 embankment.

³ Note that the U.S. fore do not exactly align with the adopted National Research Council SLR scenarios used to produce the inundation maps presented in Figures 3-2 and 3-3

⁴ USGS sea level rise scenarios: 50 cm (20 inches), 100 cm (39 inches), 150 cm (59 inches), and 200 cm (79 inches). The flood extents of the existing and future SLR scenarios overlap in the eastern portion of San Elijo Lagoon Ecological Reserve, indicating that SLR does not influence the extent of riverine flooding east of Interstate 5.

⁵ The USGS modeling scenarios were intended to capture future flooding associated with the 100-year coastal storm event. Freshwater discharge was included in the coastal storm modeling because the same storm systems that contribute to coastal flooding are often accompanied by watershed precipitation. The return period of the freshwater discharge event modeled with the coastal storm conditions is not known and represents a best guess of the discharge that may occur coincident with the 100-year coastal storm event.



Source: SanGIS 2016; NAIP 2014; AECOM 2016.

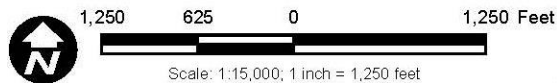
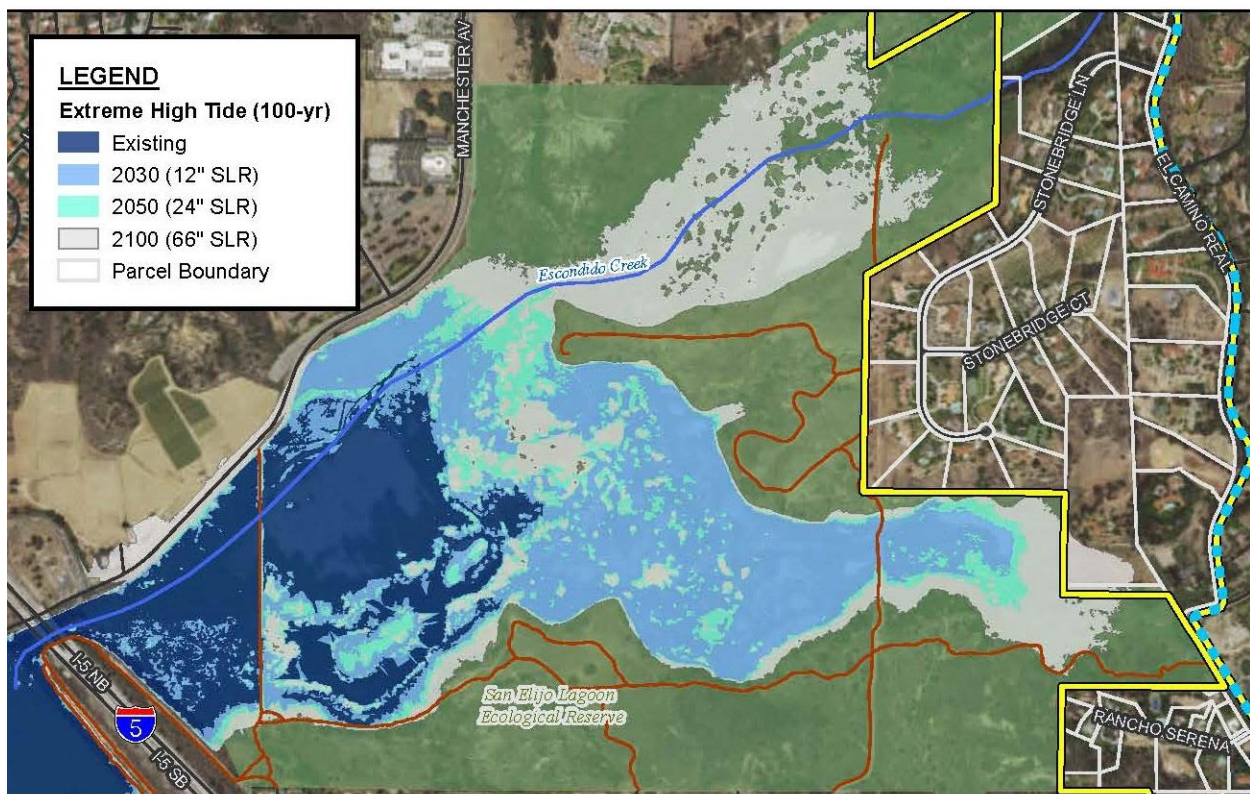
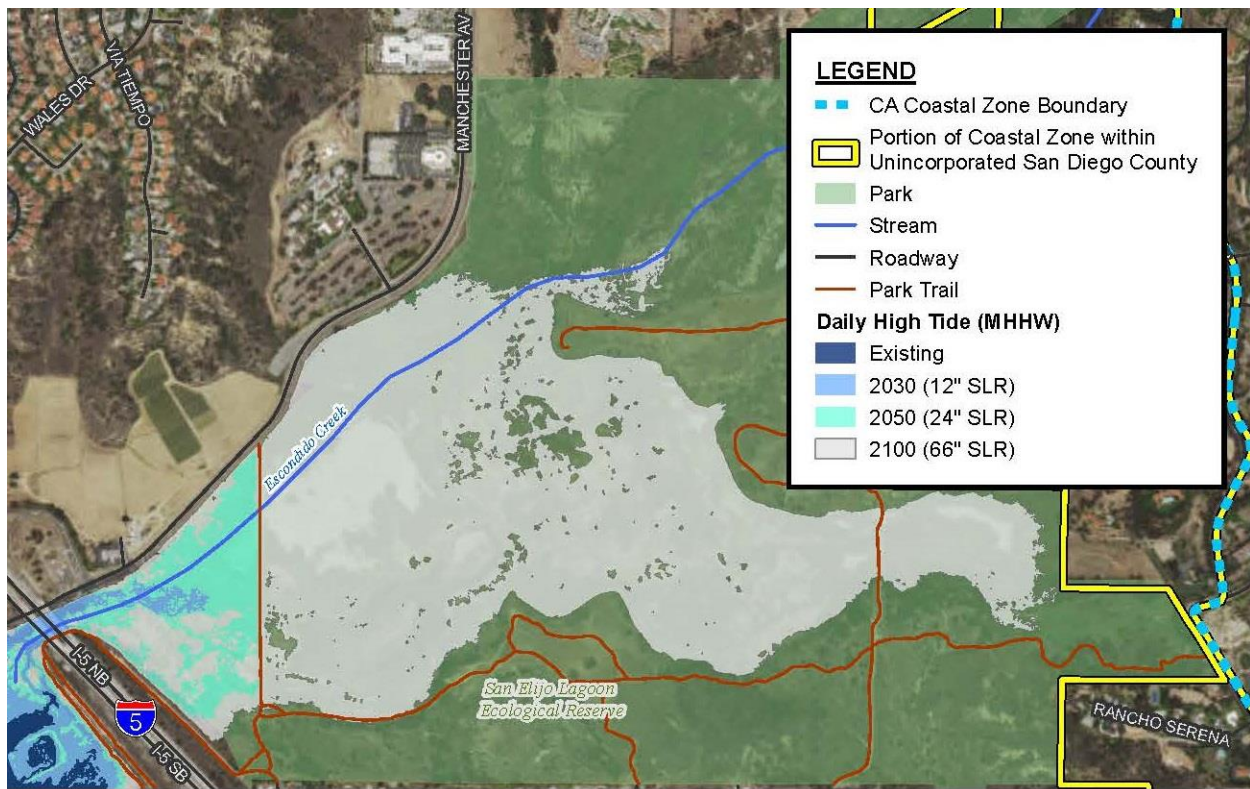


Figure 1-2
San Elijo Lagoon Ecological Reserve
Future Inundation and Flooding (Mid-range SLR)



Source: SanGIS 2016; NAIP 2014; AECOM 2016.

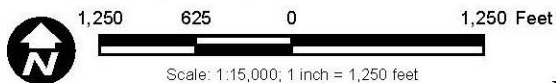
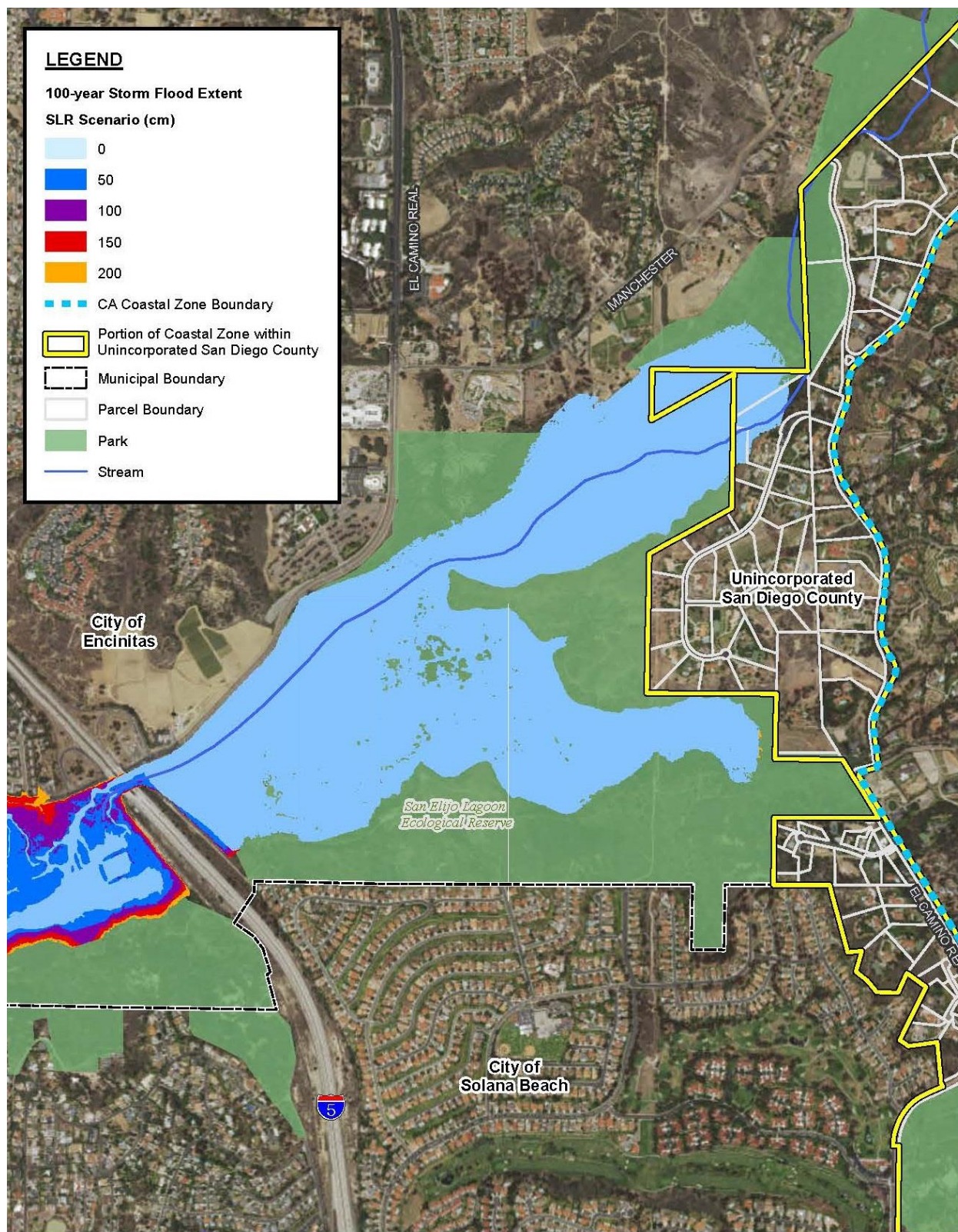


Figure 1-3
San Elijo Ecological Reserve
Future Inundation and Flooding (High-range SLR)



Source: SanGIS 2016; NAIP 2014.

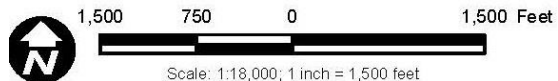


Figure 1-4
USGS CoSMoS Modeling Results within
San Elijo Lagoon Ecological Reserve

1.3.2 Resource Inventory

The full list of coastal resources and assets identified above was screened to identify those that could potentially be exposed to direct and indirect SLR impacts in the future. Potentially exposed assets were identified by overlaying the maximum flood extent for the 100-year extreme tide with 66 inches of SLR⁶ on the resource and asset inventory. Coastal resources and assets that were located within this exposure area were identified for further evaluation. The list of resources below includes those located within the County's CZ and those located immediately adjacent to the County's CZ, which may indirectly impact residents of the County's CZ (for example, transportation routes that provide access from the County's CZ to the coast):

Existing development within the Stonebridge Community along Stonebridge Lane;

Manchester Avenue, east of I-5 and north of San Elijo Lagoon;

ESHAs immediately adjacent to or within the County's CZ; and

San Elijo Lagoon Ecological Reserve trail network.

1.3.3 Vulnerability and Risk

Existing development: Existing development within the County's CZ may be exposed to coastal or riverine flood hazards under future SLR scenarios. Existing development within the County's CZ is generally located landward and upland of the extent of tidal influence, with the exception of one parcel located west of the El Camino Real-La Orilla intersection and near the limit of flooding under the 100-year tide + 66 inches of SLR scenario (Figure 3-3). In general, however, all existing development within the County's CZ is located at an elevation above the predicted future limit of riverine and coastal flooding and is not vulnerable to direct impacts of SLR.

Transportation infrastructure: No transportation infrastructure is located within the County's CZ that falls within the SLR exposure area; however, Manchester Avenue, which runs along the northern boundary of San Elijo Lagoon Ecological Reserve, provides an important transportation route from the County's CZ to I-5, Highway 101, and coastal recreation areas. The 0.4-mile-long portion of Manchester Avenue east of I-5 is at an elevation of approximately 12 feet NAVD88 and is exposed to temporary flooding under the 100-year + 66 inches SLR scenario. Flooding during such an event would inundate the roadway by approximately 1 foot of water for approximately 2 to 3 hours around high tide. Vehicular passage along this stretch of Manchester Avenue may be interrupted during this time and travelers may have to take an alternate route. Adaptation strategies such as elevating the roadway, construction of a low-profile

⁶ The flood extent of the 100-year extreme tide with 66 inches of SLR was used to develop the SLR exposure area because it encompassed the maximum extent of tidal flooding under the end-of-century high-range SLR scenario and covered the functional service life of existing assets

floodwall, or setback of the roadway from the lagoon edge could improve the resiliency of this transportation route in the future.

Environmentally Sensitive Habitat Areas: ESHAs are discussed in Section 2.4.2 (Biological Resources) of this report, with additional information provided in Appendix B. Changes in inundation and salinity regime as a result of SLR and/or proposed restoration actions (which would increase conveyance of tidal waters to upper reaches of the lagoon) could expose some of these existing habitat areas to increasingly saline conditions. Existing wetland habitat adjacent to and downstream of the County's CZ primarily consists of coastal salt marsh along Escondido and La Orilla Creeks, although a more diverse mix of riparian, brackish, and freshwater marsh exists along Escondido Creek due to larger freshwater inflows. These existing freshwater-influenced habitats (riparian, brackish, and freshwater marsh) within San Elijo Lagoon may convert to more saline habitats such as coastal salt marsh in the future as a result of regular but infrequent flooding by saltwater caused by SLR and improved drainage of freshwater ponding due to proposed restoration actions. This would allow sensitive habitats and species to migrate inland or upland as sea level rises; however, habitat conversion within the County's CZ is not expected because its higher ground elevations are above the reach of future conditions daily high tides.

San Elijo Lagoon Ecological Reserve trail network: As mentioned in Section 2.4.5 (Recreation and Public Access) of this report, a network of trails provides public access to San Elijo Lagoon Ecological Reserve. The La Orilla trailhead near the El Camino Real-La Orilla intersection provides the only public access point to the lagoon located within the County's CZ (Figure 2-8). The trailhead is located at an elevation above 20 feet NAVD88 and is not exposed to coastal flooding under the SLR scenarios evaluated for this study; however, portions of the trail network within San Elijo Lagoon Ecological Reserve accessed from this trailhead are impacted by coastal flooding:

North-south cross trail connecting La Orilla and Stonebridge Trails: This trail has low spots at an elevation of approximately 7–8 feet NAVD88 and is first impacted at the MHHW + 37 inches SLR scenario (daily inundation) and 100-year existing conditions scenario (temporary flooding).

CDFW Dike/Levee Trail: This trail has low spots at an elevation of approximately 8 feet NAVD88 and is first impacted at the MHHW + 66 inches SLR scenario (daily inundation) and 100-year + 12 inches SLR scenario (temporary flooding). The proposed restoration action within San Elijo Lagoon would remove the CDFW dike so this impact is only relevant for the without-project scenario.

Trails subject to daily inundation would likely be rendered inoperable unless they were raised or elevated on a boardwalk. Trails subject to infrequent temporary flooding during an extreme tide event may require monitoring and/or more frequent maintenance but could likely remain in service except during storm events.

Appendix B

Wildlife and Plants Tables

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
Invertebrates		
Riverside fairy shrimp <i>Streptocephalus woottoni</i>	ESA: Endangered MSCP: Covered	Deep vernal pool habitat in southern California. May occur in road ruts, vernal pools, or other temporarily ponded waters where the water remains ponded for several weeks.
San Diego fairy shrimp <i>Branchinecta sandiegonensis</i>	ESA: Endangered MSCP: Covered	Vernal pool habitat in southern California. May occur in road ruts, vernal pools, or other temporarily ponded waters.
wandering (saltmarsh) skipper <i>Panoquina errans</i>	MSCP: Covered	Restricted to estuarine and tideland habitats where adults are often associated with salt grass (<i>Distichlis spicata</i>).

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
Quino checkerspot butterfly <i>Euphydryas editha quino</i>	ESA: Endangered	Primarily scrublands, however adult butterflies will only deposit eggs on species they recognize as host plants including species of <i>Plantago</i> .
Riverside fairy shrimp <i>Streptocephalus woottoni</i>	ESA: Endangered MSCP: Covered	Vernal pool habitat in southern California. May occur in road ruts, vernal pools, or other temporarily ponded waters.
western spadefoot <i>Spea hammondi</i>	CDFW: Species of Special Concern	Temporary ponds, vernal pools, and backwaters of slow-flowing creeks for breeding and upland habitats such as grasslands and coastal sage scrub for aestivation.
western pond turtle	CDFW: Species of Special Concern	Associated with permanent

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
<i>Emys marmorata</i>	MSCP: Covered	water or nearly permanent water from sea level to 6,000 feet. Prefers habitats with basking sites such as floating mats of vegetation, partially submerged logs, rocks, or open mud banks.
coast horned lizard <i>Phrynosoma blainvillii</i>	CDFW: Species of Special Concern MSCP: Covered	A variety of habitats including sage scrub, chaparral, and coniferous and broadleaf woodlands (Stebbins 2003). Found on sandy or friable soils with open scrub. Requires open areas, bushes, and fine loose soil.
coastal whiptail <i>Aspidoscelis tigris stejnegeri</i>	CDFW: Species of Special Concern	Inhabits low-elevation coastal scrub, chamise-redshank chaparral,

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		mixed chaparral, and valley-foothill hardwood habitats.
Coronado island skink <i>Eumeces skitonianus interparietalis</i>	CDFW: Species of Special Concern	Most commonly found in open areas, sparse brush, and in oak woodlands, usually under rocks, leaf litter, logs, debris, or in the shallow burrows it digs (CDFG 1994).
orange-throated whiptail <i>Aspidoscelis hyperythra</i>	CDFW: Species of Special Concern MSCP: Covered	A variety of habitats including sage scrub, chaparral, and coniferous and broadleaf woodlands (Stebbins 2003). Found on sandy or friable soils with open scrub. Requires open areas, bushes, and fine loose soil.
silvery legless lizard	CDFW: Species of Special Concern	Loose soil in a number of vegetation

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
<i>Anniella pulchra pulchra</i>		communities including coastal dunes; chaparral; pine-oak woodland; and streamside growth of sycamores, cottonwoods, or oaks. Small shrubs such as bush lupine (<i>Lupinus</i> sp.) growing in sandy soils indicate suitable conditions. Occurs often near intermittent and permanent streams.
coast patch-nosed snake <i>Salvadora hexalepis virgulata</i>	CDFW: Species of Special Concern	A variety of habitats including coastal sage scrub, chaparral, riparian, grasslands, and agricultural fields. Prefers open habitats with friable or sandy soils, burrowing

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		rodents for food, and enough cover to escape predation.
two-striped garter snake <i>Thamnophis hammondi</i>	CDFW: Species of Special Concern	Aquatic habitats, preferably rocky streams with protected pools, cattle ponds, marshes, vernal pools, and other shallow bodies of water.
red-diamond rattlesnake <i>Crotalus ruber ruber</i>	CDFW: Species of Special Concern	Chaparral, coastal sage scrub, along creek banks, and in rock outcrops or piles of debris. Habitat preferences include dense vegetation in rocky areas.
Birds		
Bell's sage sparrow <i>Artemisiospiza belli belli</i>	CDFW: Watch List USFW: Birds of Conservation Concern	Chaparral and coastal sage scrub.
burrowing owl	CDFW: Species of Special Concern	Prefers grassland and

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
<i>Athene cunicularia</i>	USFW: Birds of Conservation Concern MSCP: Covered	open scrub. Take over the burrows of mammals, especially those of the California ground squirrel (<i>Spermophilus beecheyi</i>) as well as culverts and artificial burrows.
coastal cactus wren <i>Campylorhynchus brunneicapillus sandiegonensis</i>	CDFW: Species of Special Concern MSCP: Covered	Breeds and winters in coastal sage scrub, including prickly pear and/or cholla cacti; found only in coastal and near-coastal portions of California, generally below 3,000 feet.
coastal California gnatcatcher <i>Polioptila californica californica</i>	ESA: Threatened CDFW: Species of Special Concern MSCP: Covered	Diegan coastal sage scrub dominated by California sagebrush (<i>Artemisia californica</i>) and flat-topped buckwheat (<i>Eriogonum fasciculatum</i>)

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		below 2,500 feet elevation in Riverside County and below 1,000 feet elevation along the coastal slope. Generally avoids steep slopes above 25% and dense, tall vegetation for nesting.
California black rail <i>Laterallus jamaicensis coturniculus</i>	CESA: Threatened CDFW: Fully Protected USFW: Birds of Conservation Concern	Found in southern California coastal marshes.
California Clapper Rail <i>Rallus longirostris obsoletus</i>	ESA: Endangered CESA: Endangered MSCP: Covered	Salty and brackish water marshes with pickleweed and cordgrass.
light-footed Ridgway's rail <i>Rallus longirostris levipes</i>	ESA: Endangered CESA: Endangered	Salty and brackish water marshes with pickleweed and cordgrass.

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
	MSCP: Covered	
common Loon <i>Gavia immer</i>	CDFW: Species of Special Concern	Widespread along the coast both in the ocean and within tidal bays and estuaries.
Costa's hummingbird (nesting) <i>Calypte costae</i>	USFW: Birds of Conservation Concern	Primarily found in desert wash, edges of desert riparian and valley foothill riparian, coastal scrub, desert scrub, desert succulent shrub, lower-elevation chaparral, and palm oasis.
Cooper's hawk <i>Accipiter cooperii</i>	CDFW: Watch List (nesting) MSCP: Covered	Known to nest in a variety of woodland habitats including oak, willow, eucalyptus and other large trees that provide suitable cover. May nest in urban riparian vegetation.

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
grasshopper sparrow <i>Ammodramus savannarum</i>	CDFW: Species of Special Concern (nesting)	Arid grasslands with shrubs.
Catalina Hutton's vireo <i>Vireo huttoni</i>	CDFW: Species of Special Concern	Endemic to Catalina, but known to breed in San Diego. Habitat consists of oak woodland (primarily coast live oak), riparian woodland and chaparral habitats (Shuford and Gardali 2008).
Lawrence's goldfinch <i>Spinus lawrencei</i>	USFW: Birds of Conservation Concern	Desert riparian, palm oasis, pinyon-juniper, and lower montane habitats.
least bittern <i>Ixobrychus exilis</i>	CDFW: Species of Special Concern (nesting)	Marsh habitats or large emergent wetlands with cattails (<i>Typha</i> sp.) and tules.
California least tern	ESA: Endangered	A ground nesting bird that

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
<i>Sternula antillarum browni</i>	CESA: Endangered CDFW: Fully Protected (nesting colony) MSCP: Covered	requires undisturbed stretches of beach and coastline. Adults are highly philopatric to natal colonies, and forage in bays and estuaries near their colonies.
Clark's marsh wren <i>Cistothorus palustris clarkae</i>	CDFW: Species of Special Concern	Year-round resident of coastal freshwater and brackish marshes in coastal southern California.
northern harrier <i>Circus cyaneus</i>	CDFW: Species of Special Concern (nesting) MSCP: Covered	Breeds predominantly in wetland habitats but will also use upland habitats. Prefers grasslands and agricultural fields during migration and in winter.
osprey <i>Pandion haliaetus</i>	CDFW: Watch List	Primarily along rivers, lakes, reservoirs, and

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
	(nesting)	seacoasts, occurring widely in migration, often crossing land between bodies of water. Nests in dead snags, live trees, cliffs, utility poles, wooden platforms, channel buoys, chimneys, windmills, etc. Usually near or above water.
Reddish Egret <i>Egretta rufescens</i>	MSCP: Covered	Salt and brackish water wetlands
southern California rufous-crowned sparrow <i>Aimophila ruficeps canescens</i>	CDFW: Watch List MSCP: Covered	Grassy or rocky slopes with open scrub at elevations from sea level to 2,000 feet. Occurs mainly in coastal sage scrub.
Belding's savannah sparrow <i>Passerculus sandwichensis beldingi</i>	CESA: Endangered MSCP: Covered	Resident in salt marshes with dense pickleweed, particularly <i>Salicornia virginica</i> , within

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		which most nests are found. Found in areas with tidal flow.
large-billed savannah sparrow <i>Passerculus sandwichensis rostratus</i>	CDFW: Species of Special Concern (wintering) MSCP: Covered	Breeds in open, low salt marsh vegetation, including grasses, pickleweed, and iodine bush (does not breed in North America). Winters along rocky shorelines in Southern California.
tricolored blackbird <i>Agelaius tricolor</i>	CDFW: Species of Special Concern (nesting colony) MSCP: Covered	Breeds near freshwater, especially marshy areas. The most favored sites for colonies are heavy growths of cattails and tules. Winters near pastures, dry seasonal pools, agricultural fields, rice fields, feedlots, and dairies.

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
vermilion flycatcher <i>Pyrocephalus rubinus</i>	CDFW: Species of Special Concern (nesting)	Prefers open riparian woodland, arid lands, and mesquite bosques on desert floodplains. Nests in native trees such as willows and cottonwoods.
western snowy plover <i>Charadrius nivosus nivosus</i>	ESA: Threatened CDFW: Species of Special Concern (nesting) MSCP: Covered	Nests on beaches, dunes, and salt flats in San Diego County, with the highest concentrations in two areas: Marine Corps Base Camp Pendleton and Silver Strand. Outside the breeding season species is more widespread but not common along the county's coast.
white-tailed kite <i>Elanus leucurus</i>	CDFW: Fully Protected (nesting)	Breeds and winters in savanna, open woodlands, marshes, desert

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		grassland, partially cleared lands, and cultivated fields.
golden eagle <i>Aquila chrysaetos</i>	CDFW: Fully Protected (nesting and wintering) MSCP: Covered	Nests on cliff ledges and trees on steep slopes. Hunts for prey in nearby grasslands, sage scrub, or broken chaparral. Requires very large territories.
ferruginous hawk <i>Buteo regalis</i>	CDFW: Watch List (wintering) MSCP: Covered	Does not breed in California. Only winters in San Diego County in open country, primarily plains, prairies, badlands, sagebrush, and shrubland.
Swainson's hawk <i>Buteo swainsoni</i>	CESA: Threatened (nesting) MSCP: Covered	Open grasslands; however it has become increasingly dependent on agriculture, especially alfalfa crops, as native grassland

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		communities are converted to agricultural lands.
prairie falcon <i>Falco mexicanus</i>	CDFW: Watch List (nesting) MSCP: Covered	Forages in open grasslands, agricultural fields, and desert scrub. Prefers ledges on rocky cliffs for nesting.
American peregrine falcon <i>Falco peregrinus anatum</i>	CDFW: Fully Protected (nesting) MSCP: Covered	Nests in open areas from tundra, moorlands, steppe, and seacoasts to mountains and open forested regions, especially where there are suitable nesting cliffs.
light-footed Ridgway's rail <i>Rallus obsoletus levipes</i>	ESA: Endangered CESA: Endangered CDFW: Fully Protected	Found in southern California in coastal salt marshes, especially those dominated by cordgrass. Nearby breeding

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
	MSCP: Covered	locations include San Elijo Lagoon and to the east of the BSA.
long-billed curlew	CDFW: Watch List MSCP: Covered	Tidal mudflats, coastal strand, salt marshes, fallow agricultural fields, and grasslands along the coast. Uncommon migrant and winter visitor to San Diego County.
black skimmer <i>Rynchops niger</i>	CDFW: Species of Special Concern (nesting)	Breeds in loose groups on sand banks or bare dirt areas near water sources. May utilize the same habitat as terns.
burrowing owl <i>Athene cunicularia</i>	CDFW: Species of Special Concern (burrow sites and some winter sites) MSCP: Covered	Breeds and winters in flat, open terrain with soft soil, short grass, sparsely distributed vegetation, or exposed

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		ground. Strongly associated with California ground squirrel burrows.
least Bell's vireo <i>Vireo bellii pusillus</i>	ESA: Endangered CESA: Endangered MSCP: Covered	Riparian woodland with understory of dense young willows or mulefat and willow canopy. Nests often placed along internal or external edges of riparian thickets (Unitt 2004).
California horned lark <i>Eremophila alpestris actia</i>	CDFW: Watch List	Found year-round in coastal strand, grasslands, and sandy deserts of San Diego County. This species requires open, low-growing vegetation for nesting and prefers sandy areas with

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		occasional vegetation.
yellow-breasted chat <i>Icteria virens</i>	CDFW: Species of Special Concern (nesting)	Riparian woodland, with dense undergrowth.
grasshopper sparrow <i>Ammodramus savannarum perpallidus</i>	CDFW: Species of Special Concern (nesting)	Breeds and winters in open grasslands and prairies with patches of bare ground. This species tends to nest in open native grassland.
Bell's sparrow <i>Amphispiza belli</i>	CDFW: Watch List	Occurs mainly in coastal sage scrub and semi-open chaparral habitats several years after fire events have opened up the vegetation.
western bluebird <i>Sialia mexicana</i>	MSCP: Covered	Frequents open woodlands for foraging, but requires suitable roosting and nesting cavities usually in snags. Availability of snags may limit

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		population density.
Mammals		
big free-tailed bat <i>Nyctinomops macrotis</i>	CDFW: Species of Special Concern	Rocky and rugged terrain including desert shrub, woodlands, and evergreen forests
Dulzura pocket mouse <i>Chaetodipus californicus femoralis</i>	CDFW: Species of Special Concern	Slopes covered with chaparral and live oaks.
pallid bat <i>Antrozous pallidus</i>	CDFW: Species of Special Concern	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect them from high temperatures.
Mexican long-tongued bat <i>Choeronycteris mexicana</i>	CDFW: Species of Special Concern	In San Diego County, occurs primarily in urban areas. In Arizona and

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		Mexico, found in deep canyons and in the mountains, foraging in riparian, desert scrub, and pinyon-juniper habitats, in particular on <i>Yucca</i> sp.
pocketed free-tailed bat <i>Nyctinomops femorosaccus</i>	CDFW: Species of Special Concern	Rugged cliffs, rocky outcrops, and slopes in desert shrub and pine oak forests.
western red bat <i>Lasiurus blossevillii</i>	CDFW: Species of Special Concern	Obligate foliage-roosting species that roosts in trees and forages along wooded edges and riparian areas. Feeds over grasslands, shrublands, open woodlands, forests, and croplands.
western mastiff bat <i>Eumops perotis californicus</i>	CDFW: Species of Special Concern	Colonial roosting species that prefers steep rocky

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		cliffs, but occasionally may use buildings. Chaparral, live oaks, and arid, rocky regions. Requires downward-opening crevices.
western yellow bat <i>Lasiurus xanthinus</i>	CDFW: Species of Special Concern	Below 600 meters in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats.
northwestern San Diego pocket mouse <i>Chaetodipus fallax fallax</i>	CDFW: Species of Special Concern	Inhabits coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities.
pacific pocket mouse <i>Perognathus longimembris pacificus</i>	ESA: Endangered CDFW: Species of Special	Plant communities suitable for the Pacific pocket mouse consist of shrublands with firm, fine-grain, sandy substrates in the immediate vicinity of the

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		ocean. These communities include coastal strand, coastal dunes, river alluvium, and coastal sage scrub growing on marine terraces.
San Diego black-tailed jackrabbit <i>Lepus californicus bennettii</i>	CDFW: Species of Special Concern	Typical habitats include early stages of chaparral, open coastal sage scrub, and grasslands near the edges of brush.
San Diego desert woodrat <i>Neotoma lepida intermedia</i>	CDFW: Species of Special Concern	Common to abundant in Joshua tree, piñon-juniper, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats.
Mule deer <i>Odocoileus hemionus</i>	MSCP: Covered	This species requires large areas of chaparral or coastal sage

Special-Status Wildlife Species Potentially Occurring ¹ in the LCP		
Common Name Scientific Name	Sensitivity Status ²	Habitat Requirements
		scrub and riparian vegetation for cover and foraging.
mountain lion <i>Felis concolor</i>	MSCP: Covered	This species requires vast areas of rugged mountains, forests, riparian vegetation, deserts, and other areas with plenty of cover and a mammalian prey base.
American badger <i>Taxidea taxus</i>	CDFW: Species of Special Concern MSCP: Covered	Coastal sage scrub, mixed chaparral, grassland, oak woodland, chamise chaparral, mixed conifer, pinyon-juniper, desert scrub, desert wash, montane meadow, open areas, and sandy soils.

¹ Species listed in this table were found to have been historically recorded within the vicinity of the LCP area (San Diego County Bird Atlas [Unitt 2004], U.S. Fish and Wildlife Service [USFWS 2016], California Natural Diversity Database [CNDDDB 2016], and San Diego County [County 2016]) during a desktop analysis

of the USGS 7.5-minute Topographic Quadrangles that include and surround the LCP area (Del Mar, Encinitas, Rancho Santa Fe). The traditional nine-quadrangle search could not be implemented because the LCP area is directly adjacent to the Pacific Ocean, for which there are no designated quadrangles. Focused surveys and detailed vegetation mapping are required on a project-by-project basis to determine the presence, absence or potential for a species to occur within the LCP area.

²Sensitivity status taken from CDFW Special Animals List July 2016 and the MSCP list of covered species.

Sensitivity Status Key

ESA: Federal Endangered Species Act (ESA)

CESA: California Endangered Species Act (CESA)

CDFW: California Department of Fish and Wildlife

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Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Red-sand verbena <i>Abronia maritima</i>	CNPS: List 4.2	Perennial herb. Found in coastal dunes. Elevation 0- 100 meters.	February - November
San Diego thorn-mint <i>Acanthomintha ilicifolia</i>	CNPS: List 1B.1 ESA: Threatened CESA: Endangered MSCP: Covered	Annual herb. Found in clay (openings), chaparral, coastal scrub, valley and foothill grassland, vernal pools. Elevation 10 – 960 meters.	April – June
Nuttal’s acmispon <i>Acmispon prostratus</i>	CNPS: List 1B.1	Annual herb. Found in coastal dunes, coastal scrub. Elevation 0-10 meters.	March – July
California adolphia <i>Adolphia californica</i>	CNPS: List 2B.1	Deciduous shrub. Found in chaparral, coastal scrub, and valley and foothill grassland/clay soils. Elevation 45 – 740 meters.	December– May
Shaw’s agave <i>Agave shawii var. shawii</i>	CNPS: List 2B.1	Perennial leaf succulent. Found in maritime succulent scrub, coastal bluff scrub, and coastal scrub. Elevation 10 – 120 meters.	September – May

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
singlewhorl burrobrush <i>Ambrosia monogyra</i>	CNPS: List 2B.2	Perennial shrub. Found in chaparral and Sonoran desert scrub. Elevation 10 – 50 meters.	August – November
San Diego ambrosia <i>Ambrosia pumila</i>	CNPS: List 1B.1 ESA: Endangered MSCP: Covered	Perennial rhizomatous herb. Found in chaparral, coastal scrub, valley and foothill grassland, and vernal pools. Elevation 20 – 450 meters.	April – October
aphanisma <i>Aphanisma blitoides</i>	CNPS: List 1B.2 MSCP: Covered	Annual herb. Found in coastal bluff scrub, coastal dunes, and coastal scrub in sandy soils. Elevation 3–920 meters.	March –June
Del Mar manzanita <i>Arctostaphylos glandulosa</i> ssp. <i>Crassifolia</i>	ESA: Endangered CNPS: List 1B.1 MSCP: Covered	Evergreen shrub. Found in chaparral maritime scrub in sandy soils. Elevation 0–350 meters.	December– June
Rainbow manzanita <i>Arctostaphylos rainbowensis</i>	CNPS: List 1B.1	Perennial evergreen shrub Found in chaparral. Elevation 205-670 meters.	December – March

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
San Diego sagewort <i>Artemisia palmeri</i>	CNPS: List 4.2	Deciduous shrub. Found in chaparral, coastal scrub, riparian forest, riparian scrub, and riparian woodland. Elevation 15 – 915 meters.	May– September
Western spleenwort <i>Asplenium vespertinum</i>	ESA: Endangered CESA: Endangered CNPS: List 4.2	Perennial rhizomatous herb. Found in chaparral, cismontane woodland, coastal scrub. Elevation 180 – 1000 meters.	February – June
coastal dunes milkvetch <i>Astragalus tener</i> var. <i>titi</i>	ESA: Endangered CESA: Endangered CNPS: List 1B.1	Annual herb. Found in coastal bluff scrub, coastal dunes, and coastal prairie. Elevation 0–50 meters.	March–May
Coulter’s saltbush <i>Atriplex coulteri</i>	CNPS: List 1B.2	Perennial herb. Found in coastal bluff scrub, coastal dunes, and coastal scrub, valley and foothill grassland. Elevation 3 – 460 meters.	March– October

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
south coast saltscale <i>Atriplex pacifica</i>	CNPS: List 1B.2	Annual herb. Found in coastal bluff scrub, coastal dunes, coastal scrub, and playas. Elevation 0 – 140 meters.	March– October
Parish's brittlescale <i>Atriplex parishii</i>	CNPS: List 1B.1	Annual herb. Found in chenopod scrub, playas, and vernal pools Elevation 25 - 1900 meters.	June – October
Encinitas baccharis <i>Baccharis vanessae</i>	ESA: Threatened CESA: Endangered CNPS: List 1B.1 MSCP: Covered	Perennial deciduous shrub. Found in chaparral (maritime) and Cismontane woodland. Elevation 60 - 720 meters.	August – November
golden-spined cereus <i>Bergerocactus emoryi</i>	CNPS: List 2 B.2	Perennial stem succulent. Found in closed-cone coniferous forest, chaparral, and coastal scrub. Elevation 3 – 395 meters.	May – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
San Diego goldenstar <i>Bloomeria clevelandii</i>	CNPS: List 1B.1 MSCP: Covered	Perennial bulbiferous herb. Found in chaparral, coastal scrub, valley and foothill grassland, and vernal pools. Elevation 50 – 465 meters.	April – May
thread-leaved brodiaea <i>Brodiaea filifolia</i>	ESA: Threatened CESA: Endangered CNPS: List 1B.1 MSCP: Covered	Perennial bulbiferous herb. Found in chaparral (openings), cismontane woodland, coastal scrub, playas, valley and foothill grassland, and vernal pools. Elevation 25 – 1120 meters.	March – June
Orcutt's brodiaea <i>Brodiaea orcuttii</i>	CNPS: List 1B.1 MSCP: Covered	Perennial bulbiferous herb. Found in closed- cone coniferous forest, chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, and vernal pools. Elevation 30 – 1692 meters.	May – July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Brewer's calandrinia <i>Calandrinia breweri</i>	CNPS: List 4.2	Annual herb. Found in chaparral and coastal scrub. Elevation 10 – 1220 meters.	January – June
Dunn's mariposa lily <i>Calochortus dunnii</i>	CESA: Rare CNPS: List 1B.2 MSCP: Covered	Perennial bulbiferous herb. Found in closed- cone coniferous forest, chaparral, and valley and foothill grassland. Elevation 185 – 1830 meters.	February – June
Lewis's evening- primrose <i>Camissonia lewisii</i>	CNPS: List 3	Annual herb. Found in coastal bluff scrub, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland. Elevation 0 – 300 meters.	March–May
Lakeside ceanothus <i>Ceanothus cyaneus</i>	CNPS: List 1B.2	Perennial evergreen shrub. Found in closed- cone coniferous forest and chaparral. Elevation 235 - 455 meters.	April – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Otay Mountain ceanothus <i>Ceanothus otayensis</i>	CNPS: List 1B.2	Perennial evergreen shrub. Found in chaparral in metavolcanic or gabbroic soils. Elevation 600 - 1000 meters.	January – April
wart-stemmed ceanothus <i>Ceanothus verrucosus</i>	CNPS: List 2.2 MSCP: Covered	Evergreen shrub. Found in chaparral. Elevation 1 – 380 meters.	December– May
southern tarplant <i>Centromadia parryi</i> ssp. <i>australis</i>	CNPS: List 1B.1	Annual herb. Found in marshes and swamps, valley and foothill grassland, and vernal pools. Elevation 0 – 480 meters.	May– November
smooth tarplant <i>Centromadia pungens</i> ssp. <i>laevis</i>	CNPS: List 1B.1	Annual herb. Found in chenopod scrub, meadows and seeps, playas, riparian woodland, and valley and foothill grassland. Elevation 0 – 640 meters.	April– September
Orcutt's pincushion <i>Chaenactis glabriuscula</i> var. <i>orcuttiana</i>	CNPS: List 1B.1	Annual herb. Found in coastal bluff scrub and coastal dunes. Elevation 0 – 100 meters.	January– August

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
southern mountain misery <i>Chamaebatia australis</i>	CNPS: List 4.2	Perennial evergreen. Found in chaparral. Elevation 300 – 1020 meters.	November – May
salt marsh bird's-beak <i>Chloropyron maritimum</i> ssp. <i>maritimum</i>	ESA: Endangered CESA: Endangered CNPS: List 1B.2 MSCP: Covered	Annual herb (hemiparasitic). Found in coastal dunes, marshes and swamps (coastal salt). Elevation 0 – 30 meters.	May – October
Orcutt's spineflower <i>Chorizanthe orcuttiana</i>	ESA: Endangered CESA: Endangered CNPS: List 1B.1	Annual herb. Found in closed-cone coniferous forest, chaparral (maritime), coastal scrub. Elevation 3 - 125 meters.	March – May
long-spined spineflower <i>Chorizanthe polygonoides</i> var. <i>longispina</i>	CNPS: List 1B.2	Annual herb. Found in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Elevation 30 – 1530 meters.	April – July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
seaside cistanthe <i>Cistanthe maritima</i>	CNPS: List 4.2	Annual herb. Found in coastal bluff scrub, coastal scrub, and valley and foothill grassland. Elevation 5 - 300 meters.	February – August
delicate clarkia <i>Clarkia delicata</i>	CNPS: List 1B.2	Annual herb. Found in chaparral and cismontane woodland. Elevation 235 - 1000 meters.	April–June
summer holly <i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>	CNPS: List 1B.2	Evergreen shrub. Found in chaparral and cismontane woodland. Elevation 30 – 790 meters.	April–June
small-flowered morning-glory <i>Convolvulus simulans</i>	CNPS: List 4.2	Annual herb. Found in chaparral, coastal scrub, and valley and foothill grassland. Elevation 30 – 740 meters.	March – July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
San Diego sand aster <i>Corethrogyne filaginifolia</i> var. <i>incana</i>	CNPS: List 1B.1	Perennial herb. Found in coastal bluff scrub, chaparral, and coastal scrub. Elevation 3 – 115 meters.	June – September
Del Mar Mesa sand aster <i>Corethrogyne filaginifolia</i> var. <i>linifolia</i>	CNPS: List 1B.1	Perennial herb. Found in coastal bluff scrub, chaparral, and coastal scrub. Elevation 15 – 150 meters.	May – September
Wiggins' cryptantha <i>Cryptantha wigginsii</i>	CNPS: List 1B.2	Annual herb. Found in coastal scrub. Elevation 20 – 275 meters.	February – June
snake cholla <i>Cylindropuntia californica</i> var. <i>californica</i>	CNPS: List 1B.1 MSCP: Covered	Perennial stem succulent. Found in chaparral and coastal scrub. Elevation 30 – 150 meters.	April – May

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
paniculate tarplant <i>Deinandra paniculata</i>	CNPS: List 4.2	Annual herb. Found in coastal scrub, valley and foothill grassland, and vernal pools. Elevation 25-940 meters.	March – November
western dichondra <i>Dichondra occidentalis</i>	CNPS: List 4.2	Rhizomatous herb. Found in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Elevation 50 - 500 meters.	March–July
Blochman's dudleya <i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i>	CNPS: List 1B.1	Perennial herb. Found in chaparral, coastal scrub, and valley and foothill grassland. Elevation 5 - 450 meters.	April – June
short-leaved dudleya <i>Dudleya brevifolia</i>	CESA: Endangered CNPS: List 1B.1 MSCP: Covered	Perennial herb. Found in chaparral and coastal scrub. Elevation 30 - 250 meters.	April – May

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
variegated dudleya <i>Dudleya variegata</i>	CNPS: List 1B.2 MSCP: Covered	Perennial herb. Found in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland, and vernal pools. Elevation 3 – 580 meters.	April – June
sticky dudleya <i>Dudleya viscida</i>	CNPS: List 1B.2	Perennial herb. Found in coastal bluff scrub, chaparral, cismontane woodland, and coastal scrub. Elevation 10 – 550 meters.	May – June
Palmer's goldenbush <i>Ericameria palmeri</i> var. <i>palmeri</i>	CNPS: List 1B.1 MSCP: Covered	Perennial evergreen shrub. Found in chaparral and costal scrub. Elevation 30 – 600 meters.	July – November
San Diego button-celery <i>Eryngium aristulatum</i> var. <i>parishii</i>	ESA: Endangered CESA: Endangered CNPS: List 1B.1 MSCP: Covered	Annual / perennial herb. Found in coastal scrub, valley and foothill grassland, and vernal pools. Elevation 20 – 620 meters.	April – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Pendleton button-celery <i>Eryngium pendletonense</i>	CNPS: List 1B.1	Perennial herb. Found in coastal bluff scrub, valley and foothill grassland, and vernal pools. Elevation 15-110 meters.	April – July
cliff spurge <i>Euphorbia misera</i>	CNPS: List 2B.2	Perennial shrub. Found in coastal bluff scrub, coastal scrub, and Mojave and desert scrub. Elevation 10 – 500 meters.	December – October
San Diego barrel cactus <i>Ferocactus viridescens</i>	CNPS: List 2B.1 MSCP: Covered	Perennial stem succulent. Found in chaparral, coastal scrub, valley and foothill grassland, vernal pools. Elevation 3 – 450 meters.	May – June
Palmer's frankenian <i>Frankenia palmeri</i>	CNPS: List 2B.1	Perennial herb. Found in coastal dunes, marshes and swamps (coastal salt), and playas. Elevation 0 – 10 meters.	May - July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Campbell's liverwort <i>Geothallus tuberosus</i>	CNPS: List 1B.1	Ephemeral liverwort. Found in coastal scrub (mesic), and vernal pools. Elevation 10 – 600 meters.	N/A
Mission Canyon bluecup <i>Githopsis diffusa ssp. filicaulis</i>	CNPS: List 3.1	Annual herb. Found in chaparral. Elevation 450 - 700 meters.	April – June
San Diego gumplant <i>Grindelia hallii</i>	CNPS: List 1B.2	Perennial herb. Found in chaparral, lower montane coniferous forest, meadows and seeps, valley and foothill grassland. Elevation 185 – 1745 meters.	May – October
Palmer's grapplinghook <i>Harpagonella palmeri</i>	CNPS: List 4.2	Annual herb. Found in chaparral, coastal scrub, and valley and foothill grassland. Elevation 20 – 955 meters.	March–May
Orcutt's goldenbush <i>Hazardia orcuttii</i>	CESA: Threatened CNPS: List 1B.1	Evergreen shrub. Found in chaparral and coastal scrub. Elevation 80 – 85 meters.	August– October

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
beach goldenaster <i>Heterotheca sessiliflora</i> ssp. <i>sessiliflora</i>	CNPS: List 1B.1	Perennial herb. Found in chaparral (coastal), coastal dunes, and coastal scrub. Elevation 0 – 1225 meters.	March – December
graceful tarplant <i>Holocarpha virgata</i> ssp. <i>elongata</i>	CNPS: List 4.2	Annual herb. Found in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Elevation 60 – 1100 meters	May – November
vernal barley <i>Hordeum intercedens</i>	CNPS: List 3.2	Annual herb. Found in coastal dunes, coastal scrub, valley and foothill grassland (saline flats and depressions), and vernal pools. Elevation 5 - 1000 meters.	March – June
Ramona horkelia <i>Horkelia truncata</i>	CNPS: List 1B.3	Perennial herb. Found in chaparral, cismontane woodland. Elevation 400 - 1300 meters.	May – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
decumbent goldenbush <i>Isocoma menziesii</i> var. <i>decumbens</i>	CNPS: List 1B.2	Perennial shrub. Found in chaparral and coastal scrub. Elevation 10 – 135 meters.	April – November
San Diego marsh-elder <i>Iva hayesiana</i>	CNPS: List 2.2 MHCP	Perennial herb. Found in marshes, swamps, and playas. Elevation 10 – 500 meters.	April–October
southwestern spiny rush <i>Juncus acutus</i> ssp. <i>leopoldii</i>	CNPS: List 4.2	Perennial herb. Found in coastal dunes, meadows and seeps, and marshes and swamps. Elevation 3 – 900 meters.	May–June
Coulter's goldfields <i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	CNPS List 1B.1	Annual herb. Found in marshes and swamps, playas, and vernal pools Elevation 1 – 1220 meters.	February– June
Robinson's pepper-grass <i>Lepidium virginicum</i> var. <i>robinsonii</i>	CNPS List 4.3	Annual herb. Found in chaparral and coastal scrub. Elevation 1 – 885 meters.	January – July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
sea dahlia <i>Leptosyne maritima</i>	CNPS List 2B.2	Perennial herb. Found in coastal bluff scrub and coastal scrub. Elevation 5 – 150 meters.	March – May
California desert thorn <i>Lycium californicum</i>	CNPS: List 4.2	Perennial shrub. Found in coastal bluff scrub and coastal scrub. Elevation 5 – 150 meters.	March– August
small-flowered microseris <i>Microseris douglasii</i> ssp. <i>platycarpa</i>	CNPS: List 4.2	Annual herb. Found in cismontane woodland, coastal scrub, valley and foothill grassland, and vernal pools. Elevation 15 – 1070 meters.	March – May
low bush monkeyflower <i>Mimulus aurantiacus</i> var. <i>aridus</i>	CNPS: List 4.3	Perennial evergreen shrub. Found in chaparral (rocky), Sonoran desert scrub. Elevation 750 – 1200 meters.	April – July
Palomar monkeyflower <i>Mimulus diffusus</i>	CNPS: List 4.3	Annual herb. Found in chaparral and lower montane coniferous forest. Elevation 1220 – 1830 meters.	April – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
light gray lichen <i>Mobergia calculiformis</i>	CNPS: List 3	Crustose lichen (saxicolous). Found in coastal Scrub. Elevation 10 meters.	N/A
felt-leaved monardella <i>Monardella hypoleuca</i> ssp. <i>lanata</i>	CNPS List 1B.2 MSCP: Covered	Perennial rhizomatous herb. Found in chaparral and cismontane woodland. Elevation 300 - 1575 meters.	June – August
willow monardella <i>Monardella viminea</i>	ESA: Endangered CESA: Endangered CNPS List: 1B.1	Perennial herb. Found in coastal scrub/alluvial ephemeral washes with adjacent coastal scrub, chaparral, riparian forest, and/or riparian scrub. Elevation 50-225 meters	June-August
little mousetail <i>Myosurus minimus</i> ssp. <i>apus</i>	CNPS List 3.1	Annual herb. Found in valley and foothill grassland and vernal pools. Elevation 20 - 640 meters.	March – June
mud nama <i>Nama stenocarpa</i>	CNPS List: 2B.2	Annual herb. Found in marshes and swamps. Elevation 5-500 meters.	January- July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
spreading navarretia <i>Navarretia fossalis</i>	ESA: Threatened CNPS List: 1B.1	Annual herb. Found in vernal pools, chenopod scrub, marshes and swamps, and playas. Elevation 30-655 meters.	April-June
prostrate vernal pool navarretia <i>Navarretia prostrata</i>	CNPS List: 1B.1	Annual herb. Found in coastal scrub, valley and foothill grassland, and vernal pools. Elevation 3 - 1210 meters.	April-July
Coast woolly- heads <i>Nemacaulis denudata</i> var. <i>denudata</i>	CNPS: List 1B.1	Annual herb. Found in coastal Dunes. Elevation 0-100 meters.	April- September
slender cottonheads <i>Nemacaulis denudata</i> var. <i>gracilis</i>	CNPS: List 2B.2	Annual herb. Found in coastal dunes, desert dunes, and Sonoran desert scrub. Elevation -50 - 400 meters.	March – May
California adder's-tongue <i>Ophioglossum californicum</i>	CNPS: List 4.2	Perennial rhizomatous herb. Found in chaparral, valley and foothill grassland, and vernal pools. Elevation 60-525 meters.	December – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
California Orcutt grass <i>Orcuttia californica</i>	ESA: Endangered CESA: Endangered CNPS List: 1B.1	Annual herb. Found in vernal pools. Elevation 15-660 meters	April-August
short-lobed broomrape <i>Orobanche parishii</i> ssp. <i>brachyloba</i>	CNPS List: 4.2	Perennial herb. Found in coastal bluff scrub, coastal dunes, and coastal scrub. Elevation 3- 305 meters	April-October
golden-rayed pentachaeta <i>Pentachaeta aurea</i> ssp. <i>aurea</i>	CNPS List: 4.2	Annual herb. Found in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, riparian woodland, and valley and foothill grassland. Elevation 80-1850 meters.	March – July
south coast branching phacelia <i>Phacelia ramosissima</i> var. <i>austrolitoralis</i>	CNPS List: 3.2	Perennial herb. Found in chaparral, coastal dunes, coastal scrub, and marshes and swamps. Elevation 5-300 meters.	March – August

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Brand's star phacelia <i>Phacelia stellaris</i>	CNPS List: 1B.1	Annual herb. Found in coastal scrub and coastal dunes Elevation 1-400 meters	March-June
Torrey pine <i>Pinus torreyana</i> var. <i>torreyana</i>	CNPS: List 1B.2 MSCP: Covered	Evergreen coniferous tree. Found in closed- cone coniferous forest and chaparral in sandstone soils. Elevation 75-160 meters	N/A
chaparral rein orchid <i>Piperia cooperi</i>	CNPS List: 4.2	Perennial herb. Found in chaparral, cismontane woodland, and valley and foothill grassland. Elevation 15-1585 meters.	March – June
San Diego mesa mint <i>Pogogyne abramsii</i>	ESA: Endangered CESA: Endangered CNPS List: 1B.1	Annual herb. Found in vernal pools. Elevation 90-200 meters.	March-July

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Otay Mesa mint <i>Pogogyne nudiuscula</i>	ESA: Endangered CESA: Endangered CNPS List: 1B.1	Annual herb. Found in vernal pools. Elevation 90-250 meters.	May-July
Delta woolly-marbles <i>Psilocarphus brevissimus</i> var. <i>multiflorus</i>	CNPS List: 4.2	Annual herb. Found in vernal pools. Elevation 10-500 meters.	May – June
Nuttall's scrub oak <i>Quercus dumosa</i>	CNPS: List 1B.1	Evergreen shrub. Found in closed-cone coniferous forest, chaparral, and coastal scrub. Elevation 15-400 meters.	February-April
Engelmann oak <i>Quercus engelmannii</i>	CNPS List: 4.2	Perennial deciduous tree. Found in chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland. Elevation 50-1300 meters.	March – June

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
Munz's sage <i>Salvia munzii</i>	CNPS: List 2B.2	Perennial evergreen shrub. Found in chaparral and coastal scrub. Elevation 115-1065 meters.	February – April
ashy spike-moss <i>Selaginella cinerascens</i>	CNPS: List 4.1	Perennial rhizomatous herb. Found in chaparral and coastal scrub. Elevation 20-640 meters.	N/A
chaparral ragwort <i>Senecio aphanactis</i>	CNPS List: 2B.2	Annual herb. Found in chaparral, cismontane woodland, and coastal scrub. Elevation 15-800 meters	January-April
bottle liverwort <i>Sphaerocarpos drewei</i>	CNPS List: 1B.1	Ephemeral liverwort. Found in chaparral and coastal scrub. Elevation 90-600 meters.	N/A
purple stemodia <i>Stemodia durantifolia</i>	CNPS List: 2B.1	Perennial herb. Found in Sonoran desert scrub. Elevation 180-300 meters	January – December

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
San Diego County needle grass <i>Stipa diegoensis</i>	CNPS List: 4.2	Perennial herb. Found in chaparral and coastal scrub. Elevation 10-800 meters.	February – June
estuary seablite <i>Suaeda esteroa</i>	CNPS List: 1B.2	Perennial herb. Found in marshes and swamps. Elevation 0-5 meters.	May - January
woolly seablite <i>Suaeda taxifolia</i>	CNPS List: 4.2	Perennial evergreen shrub. Found in coastal bluff scrub, coastal dunes, and marshes and swamps. Elevation 0-50 meters.	January – December
Parry's tetracoccus <i>Tetracoccus dioicus</i>	CNPS List: 1B.2	Perennial deciduous shrub. Found in chaparral and coastal scrub. Elevation 165-1000 meters.	April – May
woven-spored lichen <i>Texosporium sancti-jacobi</i>	CNPS List: 3	Crustose lichen (terricolous). Found in chaparral. Elevation 290-660 meters.	N/A

Special-Status Plant Species Potentially Occurring within the LCP ¹			
Common Name Scientific Name	Sensitivity Status ²	General Habitat Description (CNPS 2016)	Blooming Period
San Diego County viguiera <i>Viguiera laciniata</i>	CNPS List: 4.2	Perennial shrub. Found in chaparral and coastal scrub. Elevation 60-750 meters.	February – August
rush-like bristleweed <i>Xanthisma junceum</i>	CNPS List: 4.3	Perennial herb. Found in chaparral and coastal scrub. Elevation 240 – 1000 meters.	May – January

¹**Historical Occurrence:** Species listed in this table were found to have been historically recorded within the vicinity of the LCP area (CNPS 2016;CNDDDB 2016) during a desktop analysis of the USGS 7.5-minute Topographic Quadrangles that include and surround the LCP area (Del Mar, Encinitas, Rancho Santa Fe). The traditional nine-quadrangle search could not be implemented because the LCP area is directly adjacent to the Pacific Ocean, for which there are no designated quadrangles. Focused surveys and detailed vegetation mapping are required on a project-by-project basis to determine the presence, absence or potential for a species to occur within the LCP area.

²**Sensitivity Status Key**

ESA: Federal Endangered Species Act (ESA)

CESA: California Endangered Species Act (CESA)

CNPS: California Native Plant Society California Rare Plant Rank Lists:

1B: Considered rare, threatened, or endangered in California and elsewhere

2: Plants rare, threatened, or endangered in California, but more common elsewhere

3: Plants for which we need more information – review list

4: Plants of limited distribution a watch list

Decimal notations: .1 – Seriously endangered in California, .2 – Fairly endangered in California, .3 – Not very endangered in California

Multiple Species Conservation Program (MSCP)

Literature Cited

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