5 Creek and Watershed Impairments

Impairments within the City's creeks and watersheds are a result of many factors including historical and current land uses and practices within and outside of the City's jurisdiction. Impairments can vary between creeks as they are tightly interwoven with the creek characteristics, adjacent land uses, and physical, biological, and chemical elements associated with each creek, as discussed in Section 4, Baseline Watershed Characterization. In the context of this discussion, impairments are physical, biological, and chemical changes to the environment that affect the larger watershed system.

Field reconnaissance efforts for the CWMP focused on creek segments within the City's limits. However, other efforts have documented impairments within the creeks that traverse the City outside of the City's limits which may impact the larger watershed or City creeks. Generally, the magnitude of impairments in creeks is related to the extent of human development and uses within the watershed, and may include water quality impairments and pollutants (SBCK 2006, 2014; RWQCB 2019); altered hydrology and geomorphology (e.g., fence revetments, concrete lined channels, and reduced baseflows) due to historical flood control projects, soil conservation projects, and on-going maintenance (see County of Santa Barbara 2020); fish impediments and barriers (Stoecker et al. 2002; CDFW and CalFish 2020); habitat fragmentation due to barriers and/or impediments to species movement; and generally the introduction of noise, lighting, and predation by domestic pets. Additional potential impairments to creeks may also include increased erosion and sedimentation and pollutants in creeks as a result of adjacent development or land management practices; intentional and inadvertent introduction of non-native plant and animal species which outcompete native species for resources; inadvertent removal of native vegetation; and altered hydrology and geomorphology due to land development, water diversions, and agricultural wells.

5.1 Creek Impairments Outside of the City

As shown in Table 2, Summary of Sub-Watershed Area by Jurisdiction and Region, in Section 4, the majority of the watershed is located outside of the City's limits and particularly north of the City. As a result, activities, land uses, and decision making outside of the City impact creeks within the City. For example, impediments to wildlife movement or destruction of habitat located north of the City may result in reduced or lack of occurrences for that species within the City's limits. In addition, any activities that result in chemicals or pollutants discharging into creeks north of the City may be detected and cause impairments within the City's limits. Water wells and creek diversions north of the City may impair, or eliminate, creek flows within the City. Similarly, activities, land uses, and decision making within the City's limits may have similar effects on creek reaches (and associated lagoons and estuaries) south of the City's limits.

Any recognition of impairments outside of the City will require a collaborative and multi-jurisdictional approach to resolve. Appendix H, Potential Impairments Outside the City of Goleta, provides a list of impairments outside City limits identified by EDC. These potential impairments can be used to discuss future implementation actions through collaboration with other agencies, land use regulatory authorities, and other interested parties.

Section 6, Implementation Program, includes a variety of strategies and actions to address regional issues regarding creek and watershed issues. These strategies and actions reflect the reality that the

City cannot solve impairments to creeks and their associated watersheds alone. Even many impairments identified below that are within the City may be difficult to resolve without collaboration. Collaboration and engagement with other agencies and interested parties will be crucial to improve the quality of the City's creeks as part of CWMP implementation.

5.1.1 Multi-jurisdictional Approach to Watershed Management and Agency Responsibilities

As described in Section 1.1, Section 2.0, and CE-IA-3 of the City's General Plan Conservation Element, one of the purposes of the CWMP is to "participate in multijurisdictional watershed management plans, where appropriate." The following provides the jurisdiction and existing watershed management plan(s) within the extent of the Goleta Slough and Goleta Watersheds (Table 27).

Table 27. Summary of Creek and Watershed Plans in the Goleta Slough and Goleta Watersheds

Agency / Committee / Organization	Year	Plan	Coverage	Notes
U.S. Forest Service	2011	Watershed Condition Classification Technical Guide (USDA Forest Service FS-978)	National Forests	Local focus is the Los Padres National Forest
National Marine Fishery Service (NOAA Fishery)	2012	Recovery Plan	Southern California Steelhead DPS	
Central Coast RWQCB (R3)	–	TMDL	Impaired State Waters	None are in preparation for the creeks that extend through the City of Goleta. TMDLs for Nitrates have been established for Bell Canyon, Winchester Canyon, Ellwood Canyon, Glen Annie, and Los Carneros Creeks.
CDFW	–	No plan in conception	Goleta Slough Ecological Reserve (440-acre)	Regulations for recreational use noted: 630(e)(17)
SBFCD	Annual	Annual Routine Maintenance Plan	County creeks	Includes reaches of creeks within the City's jurisdiction

Table 27. Summary of Creek and Watershed Plans in the Goleta Slough and Goleta Watersheds

Agency / Committee / Organization	Year	Plan	Coverage	Notes
SBFCD	1991	San Jose Creek Revegetation Plan	1.5-mile segment of San Jose Creek	
SBFCD	1992	San Jose Creek Restoration Project: Geomorphic Investigation and Recommendations	1.5-mile segment of San Jose Creek	
County of Santa Barbara Water Resources Agency	2003	San Jose Creek Watershed Plan	Entire watershed	Provides an overview of conditions and management of watershed.
City of Santa Barbara – Creeks Division	2000	Creek Inventory and Assessment Study	Creeks within the City of Santa Barbara	The Inventory documents and evaluates the physical, biological, hydrological, and water quality conditions of City Creeks, and the overall functioning of the creeks; identifies problem areas; and, proposes restoration approach on short- and long-term projects
U.C. Santa Barbara	2004 (revised in 2015)	Coal Oil Point Reserve Management Plan	Lower Devereux Watershed	Includes a watershed management program.
U.C. Santa Barbara	2016	North Campus Open Space Restoration Project	Devereux Creek and Lagoon	Focus on restoration and improving the habitats of Devereux Slough
Goleta Slough Management Committee	2015	Goleta Slough Area Sea Level Rise and Management Plan	Goleta Slough Ecosystem	Includes reaches of creeks and watersheds within the City's jurisdiction

Many impairments to City creeks and watersheds are a result of actions within the City, however, areas that are under the purview of federal, state, and other local jurisdictions may cumulatively contribute to these impairments. Although many have management plans in place, ongoing

coordination with creek and watershed directions, public works, and flood control districts is essential in restoring City creeks and watersheds back to highly functional systems.

5.2 Creek Impairments within the City

Below is a summary of impairments associated with the twelve creeks traversing the City and occurring within the City's limits. The impairments are discussed by the topics covered in Section 4, including hydrology and water quality, geomorphology, and biological resources. In addition, impairments are described in greater detail in this section and some impairments are characterized in detail in Appendix I, Project Description Sheets. Project Description Sheets (PDS) are concise 2-page summaries that describe sources of degradation, and what objectives would be needed to achieve rehabilitation, preservation, or management goals. The management or restoration approach is summarized, along with target conditions and/or success criteria, estimated project implementation timeframe or phasing approach, pre- and post-monitoring recommendations, cost range estimate, and graphics/photos to illustrate the specific problems at the site location, as introduced here and described in Section 6). In addition, specific recommended actions to address impairments identified in this section are discussed in Section 6.

5.2.1 Hydrology and Water Quality Impairments

5.2.1.1 Stream Flow

In-stream diversions and groundwater production utilized for agriculture within the foothills and for urban use within the Goleta Groundwater Basin have been identified as potentially reducing inputs to creeks which could reduce the rate, duration, and/or amount of flow in several of the creeks .

As noted in Section 4.3, there are only a few stream gauges currently in use that provide historical stream flow data within City creeks, either as measured within the City or upstream from the City (Maria Ygnacio, San Jose, and San Pedro Creeks). Existing data suggest that stream flow is highly correlated with rain fall quantities and duration. In addition, base flow and seasonal duration of stream flow, particularly for intermittent streams, is heavily reliant on groundwater inputs. However, other activities within the watersheds may impact stream flows, including permitted and unpermitted water diversions, municipal water wells, private wells, reductions in groundwater intrusion, and structures that pond or otherwise hold up the natural flows within a creek. Section 6 includes a variety of actions to address the potential flow impairments. Additional analysis of flow rates and their changes over time are needed to better understand changes in flow over time within each creek. Additional research into creek diversions and the rates of extraction may also enhance this understanding. At that point, further analysis could be done where abnormal flow rates, based on expected flows due to rainfall amounts and basin characteristics, occur and at points downstream from documented creek diversions.

5.2.1.2 Water Quality Objective Exceedances

A generalized matrix of water quality issues present within City creeks is provided below. This data provides a way to broadly assess which creeks exhibit high levels of water quality impairment, currently compared against the water quality thresholds that are identified in Table 28 and in the

future against the Total Maximum Daily Loads (TMDL), and to plan which watersheds may warrant specific attention.

The following section discusses the types of water quality issues, as presented in Section 4.3.6, for individual creeks and summarized below in Table 28, along with potential sources that cause the impairments. In general, a variety of human-driven pollutant discharges cause these water quality impairments, including from agricultural, residential, and non-residential land uses. Section 6 includes a variety of actions to address the variety of potential sources discussed.

In the future, additional water quality analyses may be warranted in watersheds shown as having the greatest number of impairments, especially with non-point source pollution where the root causes of the problems are not currently known, or where, for example, impairments may be in response to issues further up in the watershed, outside of the City.

Table 28. Summary of In-Creek Water Quality Objectives Impairments by Creek within the City[1]

Creek	Floating Materials	Turbidity	pH	Inorganic Chemicals	Bacteria	Specific Conductivity	Biostimulatory Substances[2]	Dissolved Oxygen	Temperature	Toxicity	BMI IBI[2]	Stream Flow[3]
Maria Ygnacio Creek	X	X	X	X	X	–	–	–	–	–	–	–
San Jose Creek	–	–	X	X	X	X	–	–	–	–	X-Poor	–
Old San Jose Creek	–	–	–	–	–	–	–	–	–	–	–	–
Las Vegas Creek	–	–	–	–	–	–	X	–	–	–	–	–
San Pedro Creek	–	–	X	X	X	–	X	X	X	–	–	–
Los Carneros Creek	–	–	X	X	X	–	–	–	–	–	–	–
Glen Annie Creek	X	–	–	X	X	–	–	–	–	X	–	–
El Encanto Creek	–	–	–	–	–	–	–	–	–	–	–	–
Devereux Creek	–	–	X	–	X	–	–	X	–	–	–	–
Winchester Canyon Creek	X	–	–	X	X	–	–	–	–	X	–	–
Ellwood Canyon Creek	X	–	–	X	X	–	–	–	–	X	–	–

Table 28. Summary of In-Creek Water Quality Objectives Impairments by Creek within the City[1]

Creek	Floating Materials	Turbidity	pH	Inorganic Chemicals	Bacteria	Specific Conductivity	Biostimulatory Substances[2]	Dissolved Oxygen	Temperature	Toxicity	BMI IBI[2]	Stream Flow[3]
Bell Canyon Creek	X	–	–	X	X	–	–	–	–	X	–	–
Tecolote Creek	X	–	–	X	–	–	–	X	–	–	X-Poor	–

Notes
1 "X" denotes streams that have exceeded thresholds or general/specific baseline water quality objectives as identified in SBCK or the State's 303(d) list.
2 Biostimulatory substances are most directly linked to increased nutrient loading (i.e., nitrogen and phosphorus).
3 BMI = Benthic Macro-Invertebrate – IBI Index of Biological Integrity
4 Stream flow not an identified Water Quality Objective Impairment for any City creeks. See Section 5.2.1.1 for more information.

Based on recent monthly water quality sampling data, yearly stream bioassessment analysis (BMI), and the impairment designation by the Central Coast RWQCB all water quality impairments continue to exist in City creeks and watersheds. Water quality impairments continue in City's creeks and watersheds, but also in areas above and below (i.e., Goleta Slough, Atascadero Creek) the City's jurisdiction, which likely contribute to water quality issues observed through two decades of water quality data collection.

Source control retrofitting, including a more thorough description of the problem, cost estimate, time implementation, and monitoring recommendations, is provided in the Project Description Sheet provided in Appendix I.

5.2.1.3 Floating Materials

Floating materials are typically associated with trash entering the creek system. Field surveys, including those conducted by SBCK and EDC, found floating materials in several City creeks. Trash is often transported by stormwater runoff and can be illegally dumped directly into a creek. Trash is increasingly the result of homeless encampments along creek corridors. Regardless of source or type, trash is a form of water pollution. EDC staff and volunteers removed 6,432 pounds of trash from six Goleta creeks in 2019 (EDC 2020). Common items found in streams include plastic cups, plastic bags and wrapping materials, fast-food wrappers, plastic bottles, and other plastic containers. Plastics can be especially hazardous to wildlife. Depending on their form they can either be ingested, causing internal organ failure, or they can cause a slow strangulation. Furthermore, toxic materials can leak or leach out of certain kinds of trash (e.g., pressure-treated lumber, used oil filters, and lead-acid batteries). Further discussion of trash impacts on the biological integrity of creeks and riparian corridors is provide below in Section 5.2.3.1, Trash/Debris.

5.2.1.4 Turbidity and Total Suspended Solids

Turbidity is a result of suspended sediment load and biomass (e.g., algae, suspended sediment, and organic matter particles [SWAMP 2020]) in a given environment. Waters with low concentrations of total suspended solids (TSS) are clearer and less turbid than those with high TSS concentrations. Turbidity can be caused by high concentrations of biota such as phytoplankton, or by loading of abiotic matter such as sediments. Turbidity is important in aquatic systems as it can alter light intensities through the water column, thus potentially affecting rates of photosynthesis. Lowered rates of photosynthesis may in turn affect the levels of DO available in a given body of water, thus affecting larger populations such as fish.

City parks and sparsely vegetated open areas can have bare areas and abrupt transitions to riparian habitat(s) and are, therefore, subject to soil erosion that can lead to impacts to turbidity and TSS. One example of a City park experiencing sparse vegetation adjacent to a riparian corridor is Evergreen Park adjacent to El Encanto Creek. Sparse vegetation can also result from illegal vegetation removal along riparian corridors on private property and homeless encampments. In addition, certain agricultural activities, especially on steep slopes, may lead to increased erosion, leading to greater turbidity and TSS.

5.2.1.5 pH

pH assumes a value between 0 and 14, defining how acidic or basic (or alkaline) a body of water is along a logarithmic scale. The alkalinity of water varies due to the presence of dissolved salts and carbonates, as well as the mineral composition of the surrounding soil. Photosynthesis, respiration, and decomposition all contribute to pH fluctuations due to their influences on carbon dioxide levels. pH changes depend on the alkalinity of the water, but there are often noticeable diurnal variations (Radke 2006). Potential sources for this impairment in City creeks include agricultural runoff (if lime used), local geology, and concrete production operations, and waste (construction runoff).

5.2.1.6 Inorganic Chemicals

Inorganic chemical contaminants can include plastics, resins, pharmaceuticals, disinfectants, deodorants, detergents, petroleum products, road runoff, and pesticides and biocides. Inorganic chemicals of note within City creeks include sodium (Maria Ygnacio, San Jose, San Pedro, Glen Annie, and Tecolote Creeks), nitrates (Los Carneros, Glen Annie, and Bell Canyon Creeks), and chloride (San Jose, Glen Annie, and Tecolote Creeks). For many of these substances, accumulation in aquatic environments can cause environmental problems.

5.2.1.7 Fecal Bacteria

There are three different indicator bacteria on the State's 303d list: Enterococcus, *Escherichia coli (E. Coli*), and Fecal Coliform. All three are indicators of fecal matter within water, although *E. Coli* and enterococcus are considered better indicators for identifying waste from humans and warm-blooded animals. Potential sources include manure, pet waste, leaking septic systems, and wildlife. Elevated bacteria levelstend to have higher conductivity because of the presence of materials that ionize when washed into the water. Ground water inflows can have the same effects depending on the bedrock they flow through (EPA 2020).

Changes in conductivity are an early indicator of change in a water system. For example, a failing sewage or septic system would raise the conductivity because of the presence of chloride, phosphate, and nitrate ions, whereas an oil spill would lower the conductivity as the oil would do not break down into ions. Most bodies of water maintain a constant conductivity that can be used as a baseline of comparison for future measurements. Significant change, whether it is due to natural flooding, evaporation, or human-caused pollution can be very detrimental to water quality by negatively affecting the creek biota. Studies of inland fresh waters indicate that streams supporting good mixed fisheries have a range between 150 and 500 µmhos/cm. Conductivity outside this range could indicate that the water is not suitable for certain species of fish or macroinvertebrates. Industrial waters can range as high as 10,000 µmhos/cm (EPA 2020). Potential sources leading to this impairment include fertilizers (agriculture, residential, commercial, livestock/equestrienne, cemetery, and golf), general urban runoff (streets, commercial, industrial, and residential), leaking septic systems (moderate to low density residential), wastewater treatment plants, and aerial deposition.

5.2.1.8 Biostimulatory Substances

Biostimulatory substances stimulate primary productivity within water bodies and is most directly linked to increased nutrient loading (i.e., nitrogen and phosphorus) which causes algal blooms and can lead to eutrophic conditions (depleted DO concentrations with increased bacteria digestion of dying organic matter and algal respiration at night). Potential sources include: fertilizers (agriculture, residential, commercial, livestock/equestrienne, cemetery, and golf), leaking septic systems, septic systems located near creeks, wastewater treatment plants, homeless encampments, and aerial deposition.

5.2.1.9 Dissolved Oxygen

Dissolved Oxygen (DO) is the amount of gaseous oxygen (O2) dissolved in the water; the amount of oxygen available to living aquatic organisms. Oxygen enters the water by direct diffusion from the atmosphere, by rapid mixing, or as a byproduct of plant photosynthesis. The concentration of DO in surface waters are affected by temperature and has both a seasonal and a daily cycle. Cold water can hold more DO than warm water. In winter and early spring, when the water temperature is low, the DO concentration is high (depending on organic loading). In summer and fall, when the water temperature is high, the DO concentration is often lower. DO in surface water is used by all forms of aquatic life. Photosynthesis is the primary process affecting the DO/temperature relation; water clarity and strength and duration of sunlight, in turn, affect the rate of photosynthesis and nutrient inputs. Depletion in DO can cause major shifts in the kinds of aquatic organisms found in water bodies. Anaerobic organisms may also become abundant in waters with low levels of DO. Low DO can be caused by decomposition of algae blooms.

5.2.1.10 Temperature

Temperature influences several other parameters and can alter the physical and chemical properties of water. Temperature affects metabolic and photosynthetic rates, influences the responses of organisms to toxins, and directly affects levels of DO, conductivity, salinity, oxidation reduction potential, pH, and water density. For example, colder waters can hold more DO, result in a lower pH, and decrease water density. Low temperature can also inhibit plant respiration and photosynthesis (Wetzel 2001). Temperature is also an important habitat parameter for fish and aquatic wildlife, with steelhead, for instance, requiring cooler water. In general, algal photosynthesis will increase with

temperature, although different species will have different peak temperatures for optimum photosynthetic activity (Wetzel 2001) and temperature tolerance ranges. Potential sources for increased temperature in City creeks include loss of riparian canopy (including along concrete lined channels) and broadened/shallow channel bottoms (including along concrete channels).

5.2.1.11 Benthic Macroinvertebrates

Benthic macroinvertebrates (BMIs) are small invertebrates living among stones, logs, sediments, and aquatic plants, which may be affected by several factors that are identified as creek impairments. The abundance and variety of BMIs within a creek is an indication of the biological condition of that creek. BMIs respond in varying ways to changes in water quality and the physical environment. For example, a polluted creek may result in the mortality of a diversity of BMIs and only provide suitable habitat for pollutant-tolerant BMIs, whereas increased sedimentation reduces available habitat for BMIs.

The County and City of Santa Barbara conduct BMI sampling on several creeks within the south coast of Santa Barbara County. However, within the City, only San Jose and Tecolote Creeks (and Bell and Tecolote Lagoons) have typically been sampled. BMI samples are analyzed in the laboratory, and six core metrics specified in the Index of Biotic Integrity (IBI) for Southern Santa Barbara County Streams (Ecology Consultants Inc. 2004) are calculated for each study reach. The IBI provides a measurement of biological integrity for study streams based on the evaluation of the six, core metrics, all of which reflect different aspects of the BMI community including diversity, composition, and trophic structure. Both San Jose and Tecolote Creeks had poor IBI values during the most recent sampling (Ecology Consultants Inc. 2016).

Bioassessment sampling for BMIs was not performed for the CWMP and should be considered for future efforts. Such information would provide further details about the biological quality of City creeks beyond existing sampling methods.

5.2.1.12 Flooding

As shown in Figure 5, Flood Hazard Zones, all City creeks exhibit some level of flood hazards. The most extreme flood hazards occur within the eastern portion of the City, with extensive flood risk in Old Town, although this has been substantially lessened by the San Jose Creek Flood Control and Fish Passage Project. With the expectation of more extreme weather events associated with climate change, including greater ocean storm surges, sea level rise, more intense rainfall events, flood hazards are likely to increase over time (see Section 5.2.5, Climate Change).

One of the key findings in the City's Coastal Hazards Vulnerability Assessment and Fiscal Impact Report is that three neighborhoods within the City face flooding impacts: the Winchester Canyon neighborhood located north of Highway 101; the Aero Camino neighborhood located just south of the 101; and the Placencia neighborhood located in the southern portion of Old Town, east of Highway 217. Additionally, the Coastal Hazards Vulnerability Assessment and Fiscal Impact Report includes a key finding that "Climate change impacts on future creek flooding extents, including changes to precipitation and sea level rise, have not been modeled and therefore remain a significant data gap in the vulnerability assessment, especially considering the extent of existing creek flood hazards mapped by FEMA."

5.2.2 Channel Geomorphology

A generalized matrix of geomorphic constraints and problems present within creek corridors of each of the watersheds within the City is provided in Table 29. This provides a way to broadly assess which channels exhibit the most extensive geomorphic degradation, and to plan which watersheds (or geomorphic impairment type) may warrant specific attention.

Additional geomorphic analyses may be warranted in watersheds shown as having the greatest number of geomorphic impairments, especially where the root causes of the problems are not currently well established, or where problems may be responses to channel or hydrologic disturbances further up in the watershed, in areas not surveyed for the CWMP.

The following section discusses the types of geomorphic problems summarized in Table 29 and shown in Figures 9a through 9c.

Table 29. Summary of Geomorphic Impairments by Creek Within the City of Goleta[1]

Creek	Concrete-lined channel[2]	Fence revetment[3]	Streambed and Bank protection structures[4]	Altered channel alignment[5]	High sedimentation[6]	Sediment transport barriers[7]	Knickpoints[8]	Relict incised bed condition[9]	Active extensive bank erosion[10]	Constrained floodplain[11]	Lack of bank-top vegetation[12]
Maria Ygnacio Creek	short portions	present	at crossings	–	yes	–	yes	yes	–	yes	–
San Jose Creek	long portions	prevalent	at crossings	lower segment	yes	–	yes	yes	present	yes	below Hollister
Old San Jose Creek	–	–	at crossings	lower segment	–	yes	–	yes	–	yes	–
Las Vegas Creek	long portions	prevalent	at crossings	portions	yes	–	yes	yes	–	yes	periodically above Covington Way
San Pedro Creek	long portions	prevalent	at crossings	–	yes	–	yes	yes	–	yes	between Calle Real and Avenida Gorrion
Los Carneros Creek	long portions	–	at crossings		–	–	yes	yes	–	yes	below Hollister
Glen Annie Creek	long portions	present	at crossings	–	–	–	yes	yes	–	yes	–
El Encanto Creek	long portions	present	at crossings	–	–	–	–	yes	–	yes	small portions

Table 29. Summary of Geomorphic Impairments by Creek Within the City of Goleta[1]

Creek	Concrete-lined channel[2]	Fence revetment[3]	Streambed and Bank protection structures[4]	Altered channel alignment[5]	High sedimentation[6]	Sediment transport barriers[7]	Knickpoints[8]	Relict incised bed condition[9]	Active extensive bank erosion[10]	Constrained floodplain[11]	Lack of bank-top vegetation[12]
Devereux Creek	–	–	at crossings	–	–	yes	–	–	–	–	portions through golf course
Winchester Canyon	–	–	at crossings	–	–	yes	some	yes	–	yes	–
Ellwood Canyon	–	–	at crossings	–	–	–	–	yes	–	yes	–
Bell Canyon	–	–	at crossings	–	–	yes	–	yes	–	–	–
Tecolote Creek	–	–	at crossings	–	–	yes	–	yes	–	–	–

Notes:

1 Note that the classifications highlight generalized conditions; some impairments may be locally present but not noted here, or in reaches that were not canvassed in some watersheds.
2 Does not include culverts under roads.
3 Constructed in the mid-1900's, presumably for bank erosion protection.
4 Streambed and bank protection structures include grouted rock, rock rip rap, gabions, and/or concrete aprons or walls that significantly impinge on in-channel geomorphology. These structures are often present upstream and downstream of road crossings or bridges as a transition between natural channel segments to protect against downcutting of the stream bed (grade control structures) and erosion of the stream banks (armoring). These structures are also often present at concrete culvert inlets and outfalls, narrowed engineered channel segments, and at utility crossings.
5 Watersheds where long sections of creek have been moved or diverted to a different location; does not include sections that have been straightened but maintain the same general alignment; aerial photographs from the 1920's were generally the earliest reference data for this assessment and indicate that in some cases, such as Los Carneros Creek and El Encanto Creek, channels in the lower segments of the watershed were indistinct prior to agricultural production and are therefore considered channelized but not necessarily realigned.
6 Where some portion of the creek appears to have depositional zones with more sediment than would be expected; potentially supplied by upstream processes.
7 Undersized culverts or other disruptions in channel continuity that may block sediment transport in natural flows.

8 Generally a localized condition, often located downstream of concrete aprons associated with road culverts.
9 Historical incision over the past 100 years or so; different than active (current) incision mechanisms as described in Note 10
10 Bank erosion, generally located on the outer edge of a bend in the channel; recorded here where extensive or occurring frequently on a reach-wide scale
11 Incised channels, levees, elevated floodplains, road crossings, or other features that prevent flood waters from flowing onto adjacent floodplains
12 Deep-rooted bank-top vegetation provides resistance to erosion in natural or earthen-banked channels; riparian corridors also provide shade, temperature modulation, and organic materials to channels, enhancing in-stream and near-stream habitat for aquatic and terrestrial species.

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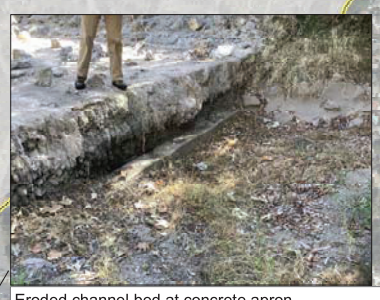
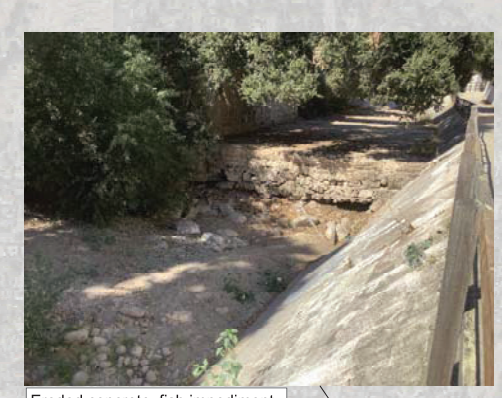
Natural bottom bridge culvert, less geomorphically functional



Eroded channel bed at concrete apron downstream of bridge culvert, fish passage impediment

Bank erosion behind revetment fence, less geomorphically functional

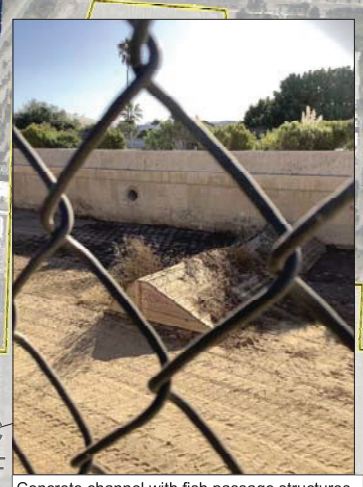


Eroded concrete, fish impediment, not geomorphically functional

Constrained channel, no trees on inside of fence revetment, less geomorphically functional

Natural corridor, geomorphically functional

Concrete energy dissapation and downstream bridge culvert, not geomorphically functional



Concrete channel with fish passage structures, not geomorphically functional

COUNTY OF SANTA BARBARA

CITY OF SANTA BARBARA

CITY OF GOLETA

San Pedro

Las Vegas

San Jose

Maria Ignacio

Cathedral Oaks Rd

Fairview Ave

Calle Real

Hollister Ave

Patterson Ave

Walnut Ln

Shoreline Dr

Fowler Rd

Goleta City Boundary

Geomorphic field sites and channel classifications

- Geomorphic reconnaissance sites
- Natural alignment, fewer geomorphic impacts
- Natural alignment, more geomorphic impacts
- Earthen engineered channels
- Concrete channels
- Underground culverts

Notes:
Qualitative classifications were made based on point observations along each channel, review of local reports, and aerial photograph interpretation.

Channels that appear to be in approximately the same alignment as original topographic maps are classified as "Natural alignment". These channels were subdivided into reaches that generally show more or less evidence of geomorphic impacts. Impacts include fish passage impediments, bank erosion, high sedimentation, and/or channel confinement (incision, fence revetment or bank protection structures).

N

0 500 1,000 Feet

CITY OF GOLETA CREEK & WATERSHED MANAGEMENT PLAN

FIGURE 9a - EAST PANEL

Geomorphic Resources

City of Goleta Creek and Watershed Management Plan

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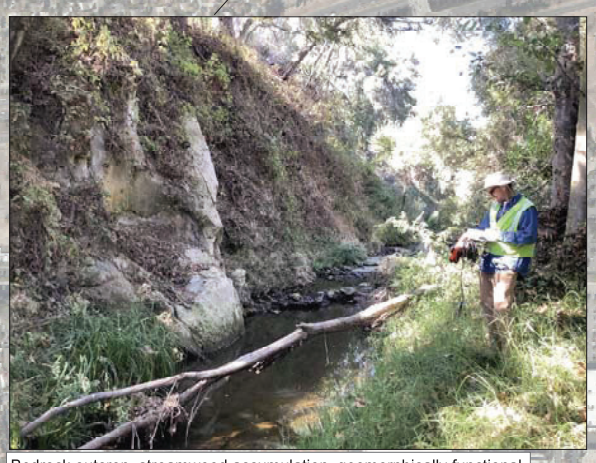
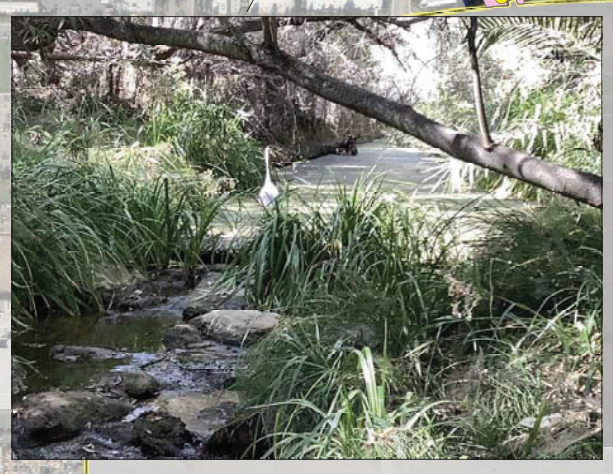
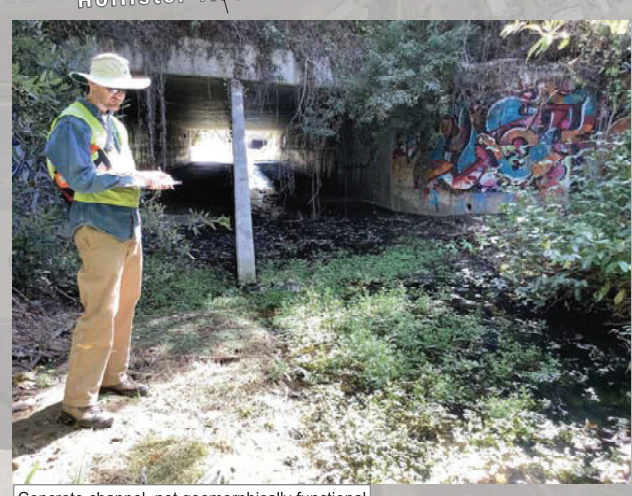
Abandoned bridge abutment, geomorphically functional

Eroded concrete apron downstream of bridge; fish impediment



Bedrock outcrop, streamwood accumulation, geomorphically functional





Concrete channel, not geomorphically functional

Cathedral Oaks Rd

Glen Annie Rd

Glen Annie

Los Carneros

Cathedral Los Carneros Rd

Calle Real

101

Hollister Ave

Phelps Rd

Storke Rd

COUNTY OF SANTA BARBARA

0 500 1,000 Feet

Goleta City Boundary

Geomorphic field sites and channel classifications

- Geomorphic reconnaissance sites
- Natural alignment, fewer geomorphic impacts
- Natural alignment, more geomorphic impacts
- Concrete channels
- Underground culverts

Notes:
Qualitative classifications were made based on point observations along each channel, review of local reports, and aerial photograph interpretation.

Channels that appear to be in approximately the same alignment as original topographic maps are classified as "Natural alignment". These channels were subdivided into reaches that generally show more or less evidence of geomorphic impacts. Impacts include fish passage impediments, bank erosion, high sedimentation, and/or channel confinement (incision, fence revetment or bank protection structures).

CITY OF GOLETA CREEK & WATERSHED MANAGEMENT PLAN

FIGURE 9b - CENTRAL PANEL

Geomorphic Resources

City of Goleta Creek and Watershed Management Plan

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Bedrock sill, streamwood, geomorphically functional

Winchester Canyon

Ellwood Canyon

Cathedral Oaks Rd

Bell Canyon

Streamwood accumulation, geomorphically functional

Tecolote

Culvert impedes passage and sediment transport, functional downstream

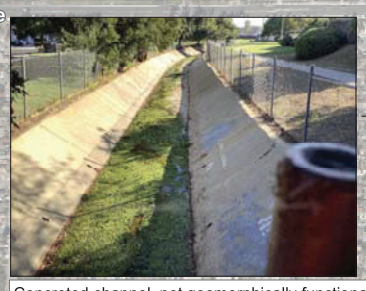
El Encanto

Bell Canyon

101

Devereux

Hollister Ave



Concreted channel, not geomorphically functional

Estuary, geomorphically functional

Low slope, geomorphically functional

COUNTY OF SANTA BARBARA

Goleta City Boundary

Geomorphic field sites and channel classifications

- Geomorphic reconnaissance sites
- Natural alignment, fewer geomorphic impacts
- Natural alignment, more geomorphic impacts
- Concrete channels
- Underground culverts

Notes:
Qualitative classifications were made based on point observations along each channel, review of local reports, and aerial photograph interpretation.

Channels that appear to be in approximately the same alignment as original topographic maps are classified as "Natural alignment". These channels were subdivided into reaches that generally show more or less evidence of geomorphic impacts. Impacts include fish passage impediments, bank erosion, high sedimentation, and/or channel confinement (incision, fence revetment or bank protection structures).

N

0 500 1,000 Feet

CITY OF GOLETA CREEK & WATERSHED MANAGEMENT PLAN

FIGURE 9c - WEST PANEL

Geomorphic Resources

City of Goleta Creek and Watershed Management Plan

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5.2.2.1 Concrete-Lined Channels

Long sections of creeks within the City have been converted to concrete-lined flood control channels. These channels essentially have no beneficial geomorphic value, having little to no complexity to slow flows or to serve as habitat or migration refugia for fish and other aquatic species, greatly reduce terrestrial wildlife movement, increase temperature, and typically provide no sediment storage/buffering capacity. Three exceptions encountered during field reconnaissance: 1) in lower San Jose Creek, refugia structures have been installed within a concrete-lined channel that provide some channel complexity (Figure 7); 2) a fish passage structure in San Pedro Creek, upstream of Calle Real, provides passage at the transition from the natural channel to the concrete channel because, and 3) Glen Annie Creek between Highway 101 and Glen Annie Road.

In addition, short concrete-lined segments are present at many of the road crossings within the City, either as culverts or as grade-stabilization structures within the channel. Many of these structures are associated with knickpoints, but at the same time are serving to locally stabilize stream grades.

Concrete-lined channel removal, including a more thorough description of the problem, cost estimate, time implementation, and monitoring recommendations, is provided in the Project Description Sheet provided in Appendix I.

5.2.2.2 Pipe and Wire Fence Revetment

Sturdy fencing has been used along extensive reaches of some channels, likely installed along with urban expansion as a way to provide for bank protection . Presumably, these fences were intended to partially slow flows near the stream banks and provide some protection from bank erosion. In some of the segments surveyed, the portion of channel within the fencing was almost entirely devoid of woody vegetation.

Fence revetment removal, including a more thorough description of the problem, cost estimate, time implementation, and monitoring recommendations, is provided in the Project Description Sheet provided in Appendix I.

5.2.2.3 Streambed and Bank Protection Structures

With the exception of localized bank protection near road and footbridge crossings (and concrete-lined segments, as discussed above), extensive bank protection structures other than fence revetments do not appear to be present within most City creeks. Some segments of grouted and ungrouted rock riprap, concrete walls, and/or gabion structures were noted during field reconnaissance (mostly within the San Jose and Maria Ygnacio watersheds), but these tend to be locally associated with protection of roads and pathways rather than evidence of extensive, reach-wide patchwork bank repair. Due to the limited extent of these impairments, no specific actions are identified to address this issue.

5.2.2.4 Altered Channel Alignment

Most of the mainstem channels within the City appear to remain along their historic alignment, though portions have been straightened locally to accommodate development. One exception is in the lower San Jose Creek watershed, where the lower section of creek (downstream of Hollister

Avenue) was diverted to a new flood control channel around 1962. The historic alignment is still an active channel (Old San Jose Creek), but simply drains the surrounding urban development area.

It is important to note that the "historic" alignment of the channels is not necessarily the "natural" alignment for the channels, especially in the lower-gradient portion of the watersheds. Agricultural ditching around the early 1900s likely locked some channels into place, and/or created well-defined channels where none were present under natural conditions. For example, the lower-most portions of Old San Jose Creek and El Encanto Creek did not have a well-defined channel in aerial photographs from 1927; Old San Jose Creek was ditched at its current location by 1944 and El Encanto Creek appeared to be ditched downstream of Highway 101 by 1948.

5.2.2.5 High Sedimentation

City creeks are within the lower portions of their watersheds where sediment has historically settled, and will continue to settle, as the steep watershed comes in contact with the coastal area where it historically could spread but is now forced to remain in channels. However, several channels within the City, most notably those within the eastern portion of the City, appear to exhibit conditions typical of disproportionate sedimentation. Some channel bottoms have extensive sand and small gravel deposits, with little distinction between morphologic units such as pool, riffle, and bar features. Sediment is fairly soft and lacked established in-channel vegetation. It is unclear whether this condition is the result of a temporary episodic input (e.g., landslide/debris flows) or a more chronic condition (geologic source material or long-term response to anthropogenic disturbance in the watershed, such as steep slope agriculture, which occurs in the middle or upper sections of each Goleta Valley watershed). In either case, the current condition in these reaches represents a relative lack of in-channel complexity, a potential geomorphic constraint regardless of whether it's a natural or anthropogenic cause. In addition, the excess sediment may be contributing to active bank erosion noted within the San Jose Creek watershed (as discussed further below).

5.2.2.6 Sediment Transport Barriers

Undergrounded portions of channels and undersized culverts, which have the potential to become blocked, are the primary sediment transport barriers in the City. Blockages can occur when organic or other materials, such as fencing, accumulate at a culvert entrance; regular maintenance is needed to keep the channel open. The smallest culvert encountered during field reconnaissance was in Devereux Creek, at the south embankment of Hollister Avenue. Just north of this location, the culvert under the UPRR tracks has been identified as exhibiting blockage due to sediment buildup.

5.2.2.7 Knickpoints

Stream profile knickpoints, which are features that erode the channel bed and move in the upstream direction, were observed at a number of locations during reconnaissance. In most cases, these features are present at the downstream end of culverted road crossings or other grade control structures, either as an intentional engineered grade drop or an arrested headcut indicative of former or active incision of the stream channel. Though field reconnaissance did not cover all portions of all creeks, there is little evidence of currently active, reach-wide downcutting in most channels within the City.

However, accentuated knickpoints at stream grade controls and high channel banks throughout some channel reaches illustrate that there has been significant reach-wide downcutting in past decades (see discussions of relict incised bed condition and constrained floodplain), especially those toward the eastern side of the City such as Maria Ygnacio Creek and San Jose Creek, which have experienced historical downcutting up to, or exceeding, approximately 10 to 20 feet in height.

Channel knickpoints and scour, including a more thorough description of the problem, cost estimate to address, time implementation, and monitoring recommendations, is provided in the Project Description Sheet provided in Appendix I.

5.2.2.8 Relict Incised Bed Condition

Channel incision (or channel downcutting) is a natural process of channel adjustment and is not solely an indication of degraded geomorphic conditions. However, rapid or extensive (reach-wide) incision is a key indicator of geomorphic impairments, often related to anthropogenic disturbances. In general, incised channel conditions were observed at many (if not most) of the sites canvassed within the City, which is indicative of broad-scale geomorphic channel adjustment throughout the City. This broad-scale incision appeared to be related to historical land use changes and/or tectonic uplift, such that there were fewer observations of active, ongoing, channel incision than evidence of incision that occurred during previous decades.

5.2.2.9 Active Bank Erosion

Stream bank erosion is a natural process of channel adjustment and migration and is not, in and of itself, an indication of degraded geomorphic conditions. However, rapid or extensive (reach-wide) bank erosion is a key indicator of geomorphic impairment, often related to anthropogenic disturbances. In general, sites canvassed within the City lacked evidence of reach-wide bank erosion. Although bank erosion was noted at several locations, most appeared to be related to local channel conditions (in-channel obstructions, deflection effects of pre-existing creek bank armoring, or localized scour at outfalls, for example) rather than indicative of broad-scale geomorphic channel adjustment. One notable exception, however, is a reach of San Jose Creek between Cathedral Oaks Road and Calle Real. Here, several segments of bank erosion are present that likely indicate broad-scale geomorphic adjustment.

Bank repair and stabilization, including a thorough description of the problem, cost estimate, time implementation, and monitoring recommendations, is provided in the Project Description Sheet provided in Appendix I.

5.2.2.10 Constrained Floodplain

Overbank areas adjacent to stream channels provide important flood and sediment attenuation capacity functions within the lower (alluvial) portions of watersheds. Urbanization adjacent to stream channels can constrain this floodplain area, restricting this function and exacerbating flooding and sediment problems in and near the downstream receiving waters. Confinement can be the result of raising the elevation of adjacent terrace surfaces (in preparing housing pads, for example), construction of berms or levees (as noted within the lower Maria Ygnacio Creek watershed), construction of floodwalls, entrenched flood-control channels, culverted creek sections, road crossings, or accelerated downcutting of the stream channel due to hydromodification effects.

Channel downcutting may be natural or induced/exacerbated by urbanization. Under natural conditions a downcut channel typically widens by initiating bank erosion to establish a new inset floodplain, but under urbanized conditions this process is typically restricted. Nearly all channels within the City exhibit at least some aspect of floodplain confinement.

5.2.2.11 Lack of Bank-Top Vegetation

Deep-rooted trees and understory vegetation that has grown along the channel bank provides resistance to erosion in natural or banked earthen-engineered channels; riparian corridors also provide shade, temperature modulation, and organic materials to channels, enhancing in-stream and near-stream habitat for aquatic and terrestrial species. Lack of mature trees and understory vegetation are most prevalent in channels that are concrete-lined. Some more natural channel reaches support narrow bands of riparian species along both banks and other reaches support more robust riparian corridors.

There are areas within City-owned open spaces, as well as private properties, that exhibit a lack of adequate riparian vegetation, including multiple locations within Evergreen Park and Bella Vista Park along tributaries of El Encanto Creek and in Stonebridge Neighborhood Open Space along San Pedro Creek. These locations lack understory vegetation and either lack, or contain unhealthy, non-native, and/or dying native trees.

5.2.3 Biological Resources

Based on the field reconnaissance surveys, a variety of biological concerns are present along the creeks within City limits. Table 30 provides a summary of these concerns along with a description of each below. Biological resources (including plants, animals, habitats, and other living organisms within the creeks) are affected by synergistic effects of the water quality, water quantity, and geomorphology concerns mentioned above. For example, the pollutants described under Hydrology and Water Quality affect the quality of habitat for biological resources within the creeks. Impaired flows, discussed under Hydrology and Water Quality, affect the health and diversity of riparian plants, and the presence of avian species, and special-status fish, reptile, and amphibian species Similarly, the concrete-lined channels described under Channel Geomorphology affect the quantity quality, size, and diversity of habitat or space available for biological resources. In addition, although this section focuses on biological resources, it should be noted that people play a critical role in the health of the ecosystems within the creeks. Healthy creek environments provide recreational and enjoyment opportunities to the community. Therefore, the health of the entire ecosystem and community are intertwined.

Table 30. Summary of Biological Impairments by Creek Within the City of Goleta[1,2]

Creek	Trash/Debris	General Potential for Pollutants	Human Presence[3]	Non-Native Invasive Plant Species	Barriers to Fish Passage	Concrete-lined Channels	Barriers to Wildlife Movement	Outdoor/Night-Time Lighting	Nighttime Noise and Vibration	Impermeable Fencing	Altered Hydrology[4]
Maria Ygnacio Creek	X	X	X	X	X	–	…	…	…	…	X
San Jose Creek	X	X	X	X	X	X	…	…	…	…	X
Old San Jose Creek	X	X	X	X	X	X	…	…	…	…	X
Las Vegas Creek	X	X	X	X	X	X	…	…	…	…	X
San Pedro Creek	X	X	X	X	X	X	–	…	…	…	X
Los Carneros Creek	South of Hwy 101	X	–	–	X	–	South of Hwy 101	…	…	…	X
Glen Annie Creek	X	X	–	X	X	X	…	…	…	…	X
El Encanto Creek	X	X	X	–	–	X	–	…	…	…	X
Devereux Creek	X	X	X	X	–	–	–	…	…	…	X
Winchester Canyon Creek	–	X	–	X	–	–	…	…	…	…	X
Ellwood Canyon Creek	–	X	–	X	–	–	…	…	…	…	X
Bell Canyon Creek	South of Hwy 101	X	–	X	–	–	…	…	…	…	X
Tecolote Creek	X	X	X	X	Under Hwy 101	–	…	…	…	…	X

Notes

1 "X" denotes the impairment is noticeable concern along the creeks within the City; lack of an "X" does not signify the impairment does not exist, but its presence was not noticeable during reconnaissance surveys performed within the City in Fall 2019 / Winter 2020.

2 "…" denotes the impairment is likely but requires additional investigation

3. Includes homeless encampments

4. Includes impaired baseflows due to upstream dams (e.g., Glen Annie Dam and Dennis Reservoir Dam on Fremont Creek) and creek diversions, increased runoff rates due to impervious surfaces, and lowered groundwater tables due to water well pumping.

5.2.3.1 Trash/Debris

During the reconnaissance surveys in Fall 2019/Winter 2020, trash was nearly absent; however, prior to site visits, six clean-up events were scheduled from August to October 2019 throughout several of Goleta's creeks, including Devereux Creek, Glen Annie Creek, San Pedro Creek, San Jose Creek, and Maria Ygnacio Creek organized by the EDC, and the City. In 2019 the Goleta Creek and Watershed Protection and Cleanup Program, led by the EDC, removed 6,432 pounds of trash from five City creeks and Atascadero Creek.[9] These critical efforts protect water quality, geomorphology (from larger sized trash), and biological resources throughout the creeks. In addition, creek clean-ups minimize the amount of debris and pollutants that would travel downstream and into the sloughs, lagoons, and ocean. It is estimated that 80% of the debris in the oceans is attributed to trash, packaging, and waste improperly disposed on land that has washed into creeks and lakes and has traveled down into the ocean (EPA 2020).

Trash not only brings potential pollutants into creek systems (see Section 5.2.1.3.) but can also pose as physical hazards to the wildlife residing within the creeks. For example, rope, twine and six-pack rings can pose physical hazards to wildlife traversing or living in the creeks. Similarly, plastic bags, deflated balloons, and other debris can be mistaken as food and swallowed by wildlife; ultimately blocking an individual's airway or causing interior damage and bleeding within the digestive system. Broken glass, sharp, rusty metal debris, and fence revetment wires pose risk of injury to fish and wildlife. In addition, the presence of smaller sized bits of trash (e.g., plastic lids, plastic bags, bottles, cigarette butts.) signals to pedestrians that such behavior is tolerated in the community. This may lead to a complacency and buildup of trash to the point where large, more unsightly trash may appear in a waterway (e.g., tires) causing additional erosion along the creek banks.

Trash can originate from several sources, including homeless encampments, pedestrians, motorists, trucks with uncovered loads, inappropriate household trash placement or receptacles, project/construction sites, stockpiles inappropriately located adjacent to creeks, and improper trash management on commercial sites. Similarly, wind processes can pick up plastic bags and other light debris and carry it to locations away from disposal sites. Trash impacts have been noted along all City creeks, notably including El Encanto Creek at Phelps Road and along Las Vegas Creek and along Glen Annie Creek on the east side of Glen Annie Road by the intersection of Highway 101.

5.2.3.2 Human Presence

During reconnaissance surveys, individuals were observed within City creeks, including groups of community members experiencing homelessness. Human presence typically results in increased trampling of vegetation, soil compaction that could affect the viability of plant communities, water quality impairments, fires, human excrement, noise, nighttime light, and exotic plants, and the decreased presence of wildlife species. In addition, human presence can introduce unwanted diseases or pollutants or invasive species in the water which affect the viability of aquatic organisms. Trampling may also affect the rate of rainfall interception and evapotranspiration, soil moisture, water penetration pathways, surface flows, and erosion. An increased human population using riparian corridors increases the risk for damage to special-status vegetation communities.

[9] The five City creeks include Devereux, Glen Annie, San Pedro, San Jose, and Maria Ygnacio Creeks.

The homeless population utilizing creeks corridors for shelter may also contribute to an increase in creek bank erosion, trash on the banks and within the creek, and a reduction in flood control capacity. The health and human hazard risks extend to those living in or adjacent to creeks as well as the health of the watershed, those working in creeks, downstream water users, and beachgoers.

Additionally, impacts can result from unpermitted activities on private property such as removal of vegetation within the riparian corridor, as seen on San Pedro Creek and from unpermitted activities within City-owned open spaces such as a BMX jump within Stonebridge Open Space adjacent to San Pedro Creek. These alterations to the landscape can increase erosion and adversely affect wildlife and riparian habitat, water quality, as well as impact aesthetic and recreational values.

5.2.3.3 General Potential for Pollutants

Chemical pollution (releases of fuel, oil, lubricants, paints, release agents, herbicides, rodenticides, and other construction materials) from adjacent land uses may affect biological resources within the creeks. Many are direct toxins or have sublethal effects on the biota. Used motor oil and paints are known pollutants in City creeks based on observations during creek cleanup events. The introduction of chemical pollutants within and along the creeks may lead to a decrease in the number of plant pollinators, increase the existence of non-native plants, and cause damage to and destruction of native plants. The introduction of chemical pollutants can arise from several situations, including when members of the public perform oil changes or tune-ups within parking lots adjacent to creeks, run-off from residential and non-residential areas, chemicals released in backyards, and from businesses which leak into riparian areas.

5.2.3.4 Non-Native Invasive Species

5.2.3.4.1 Plant Species

Non-native invasive plant species are located throughout the creeks with particular areas containing significant stands of these invasive species, becoming a focus for restoration efforts, as shown in Figures 7a through 7i, Biological Resource. Additional information on invasive species within each creek corridor is provided in Section 4.3.6, Individual Creek Characteristics.

Invasive plant species that thrive in edge habitats are a well-documented problem in Southern California. Non-native invasive species establish and quickly reproduce and spread resulting in the displacement of native species and hybridization with native species, thereby potentially altering biological communities and ecosystem processes (Cal-IPC 2020). Bossard et al. (2000) list several adverse effects of non-native on native species in natural open areas, including but not limited to competition for light, water, and nutrients. Invasive species also can create a thatch that blocks sunlight from reaching smaller native plants. Invasive plant species may alter habitats and displace native species over time, leading to extirpation of native plant species and unique vegetation communities, as well as contribute to an increase in the frequency of wildfires. For example, non-native annual grasses that have invaded a shrubland can increase fire frequency and the length of the fire season (Brooks and Lusk 2008). In addition, invasive plant species can degrade or eliminate the functionality of creeks as wildlife corridors, as discussed below.

Over time non-native invasive species can colonize and displace native riparian plant species. Specific locations with non-native trees along City creek corridors include within Evergreen Park along

El Encanto Creek, within the Highway 101 Northbound Glen Annie/Storke Road Onramp landscape area along Glen Annie Creek (Shamel Ash Trees [*Fraxinus uhdei*]), and along San Pedro Creek (Shamel Ash). In addition, arundo is located in multiple creeks in abundance. Arundo has been documented to decrease bank stability, outcompete native riparian species, and increase fire risk.

5.2.3.4.2 Animal Species

The introduction of non-native, invasive animal species can also be detrimental to native wildlife species. Non-native, invasive animal species have multiple and compounding impacts on native populations including, but not limited to, predation on native populations leading to reduced population sizes, introduction of diseases, and competition for resources. For example, non-native species introduction is one of the primary factors that have adversely affected the California red-legged frog throughout its range. In California, the decline and eventual local disappearance of California and northern red-legged frogs has been observed in systems supporting bullfrogs (Twedt 1993; Jennings and Hayes 1994), red swamp crayfish (*Procambarus clarkia*), signal crayfish (*Pacifastacus leniusculus*), and several species of warm water fish including sunfish (Lepomis spp.), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish (see USFWS 2002). These declines and disappearances have been attributed to predation, competition, and reproduction interference. Non-native species introduction is one of the primary factors that have adversely affected the California red-legged frog throughout its range.

5.2.3.5 Impediments and Barriers to Fish Passage

Steelhead are of particular concern along City creeks, with several designated as critical habitat for the endangered Southern California steelhead, which has been observed in multiple creeks across the region (see Section 4, Baseline Watershed Characterization).

Stoecker et al. (2002) provides an extensive review of steelhead migration and barriers in southern Santa Barbara County. In this report, most of the creeks traversing the City contain a barrier that would prevent steelhead from traveling upstream to spawn. Overall, a total of 22 features consisting of 8 total barriers, 11 partial barriers, and 3 features with an unknown status are located within the City's limits (Table 31) (Stoecker et al. 2002; CDFW and CalFish 2020). In general, the features within the City that pose barriers to fish passage include concrete channels, grade control structures, and box culverts, which may pose barriers to passage due to a variety of features including, but not limited to, inappropriate lengths and slopes, lack of resting areas, shallow water during low flows, and accelerated water velocities during high flow.

Table 31. Summary of Barriers and Impediments to Fish Passage Within the City of Goleta[1]

Creek	Total Number of Features	Total Barriers[2]	Partial Barriers[3]	Natural Total Barrier[4]	Natural Partial Barrier[5]	Unscreened Diversion[6]	Unknown Passage Status[7]	Summarized Notes for Barriers (north to south)[1]
Maria Ygnacio Creek	2	–	2	–	–	–	–	<u>Partial Barrier</u> • Concrete channelization and drop under UPRR and Hwy 101 bridges. Concrete channelization/box culvert under Hollister Avenue. Note: Two additional partial barriers are located on Maria Ygnacio Creek downstream of City limits and an additional two partial barriers are located along Atascadero Creek downstream of the confluence of Maria Ygnacio and Atascadero Creeks.
San Jose Creek	1	1	–	–	–	–	–	<u>Total Barrier</u> • Concrete channelization south of Hollister Avenue. In 2013, the first 4,100 feet (~0.776 miles) of channel was replaced with a wider channel and an articulated concrete revetment mimicking a natural creek bottom, and a low flow fish passage channel (30 weirs and pools) was installed on the east side of the flood control channel which is deeper and narrower than the rest of the channel. The low flow fish passage channel uses weirs to slow the release of water and allow for resting pools for fish. The weirs in San Jose Creek will ensure the water will be deep enough for the fish to swim. The channel replacement and low-flow fish passage channel stopped short of a privately owned steel bridge so that it could be utilized for access. The steel bridge is just downstream of Hollister Avenue. Phase II of the San Jose Creek Flood Control and Fish Passage Project will widen the channel and install a low-flow

Table 31. Summary of Barriers and Impediments to Fish Passage Within the City of Goleta[1]

Creek	Total Number of Features	Total Barriers[2]	Partial Barriers[3]	Natural Total Barrier[4]	Natural Partial Barrier[5]	Unscreened Diversion[6]	Unknown Passage Status[7]	Summarized Notes for Barriers (north to south)[1]
								channel. The Hollister Avenue Bridge must be replaced prior to the widening the channel and the Hollister Ave Bridge replacement is dependent on the Ekwill Street Extension project. The City of Goleta is working on a monitoring plan with NMFS. Due to the drought, there has not been much to monitor so it is unknown at this time if the remediation in the lower portion of the channel passes fish. Total length of flood control channel: ~ 4,250 feet.
Las Vegas Creek	3	–	–	–	–	–	2	<u>Unknown Status</u> • Road crossing directly northwest of Bolsa Chica Court. La Goleta Road Crossing.
San Pedro Creek	4	1	3	–	–	–	–	<u>Partial Barrier</u> • One grade control structure north of Stow Canyon Road. • Two grade control structures between Stow Canyon Road and Covington Way. <u>Total Barrier</u> • Concrete channelization for 0.29 miles north of Hwy 101.
Los Carneros Creek[8]	1	–	–	–	–	–	1	<u>Unknown Status</u> • Road crossings under Cathedral Oaks Road and under Hwy 101.
Glen Annie Creek	9	4	5	–	–	–	–	<u>Total Barrier</u> • Double box culvert and apron road crossing under Cathedral Oaks Road

Table 31. Summary of Barriers and Impediments to Fish Passage Within the City of Goleta[1]

Creek	Total Number of Features	Total Barriers[2]	Partial Barriers[3]	Natural Total Barrier[4]	Natural Partial Barrier[5]	Unscreened Diversion[6]	Unknown Passage Status[7]	Summarized Notes for Barriers (north to south)[1]
								• Concrete channelization and double box culvert between Hwy 101 and the Calle Real offramp. • Road crossing under Hwy 101. • Double box culvert road crossing directly south of UPRR. <u>Partial Barrier</u> • Concrete slab blockage east of Dos Pueblos High School. • Grade control structure between Hwy 101 and the Calle Real offramp. • Railroad crossing box culvert under UPRR. • Grade control structure between South Los Carneros Road and Cortona Drive. • Double box culvert under Hollister Avenue, bordering the City of Goleta limits.
El Encanto Creek[8]	1	–	1	–	–	–	–	<u>Partial Barrier</u> • Concrete channel and culvert under Hwy 101.
Devereux Creek[8]	–	–	–	–	–	–	–	None
Bell/Winchester/Ellwood Canyon Creek	–	–	–	–	–	–	–	None
Bell Canyon Creek[8] (south of Hwy 101)	1	1	–	–	–	–	–	<u>Total Barrier</u> • Long culvert under Hwy 101.
Tecolote Creek	1	1	–	–	–	–	–	<u>Total Barrier</u>

Table 31. Summary of Barriers and Impediments to Fish Passage Within the City of Goleta[1]

Creek	Total Number of Features	Total Barriers[2]	Partial Barriers[3]	Natural Total Barrier[4]	Natural Partial Barrier[5]	Unscreened Diversion[6]	Unknown Passage Status[7]	Summarized Notes for Barriers (north to south)[1]
								• Long culvert under Hwy 101. Likely impassible due to length, slope, apparent lack of resting areas, absence of light, shallow water during low flows, and accelerated velocities during high flow.
Total	22	8	11	–	–	–	3	

Sources: Stoecker et al. 2002; California Department of Fish and Wildlife, Passage Assessment Database, March 2020, Version v5.89.14c.

Notes

1 Barrier definitions and summarized notes from CDFW and CalFish 2020. The following are recorded in the database but not included in this table: "Not a Barrier, Remediated", "Fish Response Unconfirmed", "Screened Diversion", "Unassessed"

2 Total barrier = A barrier that is not naturally occurring, and blocks fish passage for all anadromous species at all life stages at all flows. This includes sites where site type is not 'non-structural' and barrier status is 'total'.

3 Partial Barrier = Barriers that are not naturally occurring and partially restrain or obstruct passage by either blocking passage at certain flows and/or to certain species or life stages. This includes sites where the site type is listed as 'Non-structural' and where barrier status is listed as 'partial', 'temporal', 'temporal & total' or 'temporal & partial'.

4 Natural Total Barrier = A barrier that is naturally occurring, and blocks fish passage for all anadromous species at all life stages at all flows. This includes sites where site type is 'non-structural' and barrier status is 'total'.

5 Natural Partial Barrier = Barrier that is naturally occurring, and partially restrains or obstructs passage by either blocking passage at certain flows and/or to certain species or life stages. This includes sites where the site type is listed as 'Non-structural' and where barrier status is listed as 'partial', 'temporal', 'temporal & total' or 'temporal & partial'.

6 Unscreened Diversion = Water diversion without a fish screen.

7 Unknown Passage Status = Barrier/passage status is unknown or inconclusive, the structure may no longer be in existence, or the site is a diversion and it is unknown whether it is screened. Assigned to records with barrier/passage statuses listed as 'Unknown', 'structure may no longer be in existence' and 'unknown/diversion'.

8 The following features not listed above may also pose barriers to fish passage:

(a) Los Carneros Creek: Concrete flood control channel between Hollister Avenue and Los Carneros Road; Rock dam directly west of the Calle Real and North Los Carneros intersection; and Concrete channel below 101 to the slough;

(b) El Encanto Creek: Underground culvert along Alpine Drive and Tuolumne Drive; Concrete channel between Hollister Avenue and Phelps Road;

(c) Devereux Creek: (Culverts under Hollister Avenue;

(d) Bell Canyon Creek north of Hwy 101: Grade control (grouted rock check dam) adjacent to San Miguel Open Space and concrete channel along and under Winchester Canyon Road (from geomorphic reconnaissance surveys).

5.2.3.6 Concrete-Lined Channels

Concrete-lined channels may not only pose barriers to fish passage but change the dynamic of creek systems. Concrete-lined channels reduce the quantity of natural substrates and vegetation in the creek; change the hydrology of the system; and result in fragmentation of creek systems. These channels are typically not buffered and may change the water quality or temperature in a system. Concrete-lined channels have their greatest effects on aquatic organisms. They destroy natural substrates, flow patterns, shading, and geomorphology, eliminating or reducing the habitat needed by many native species. By eliminating or reducing riparian vegetation they also reduce riparian species and disconnect migratory corridors. With enough concrete-lined channels installed. there is a potential for a type of habitat fragmentation within the creek system. In general, habitat fragmentation and isolation of plant populations may cause extinction of local populations as a result of two processes: reduction in total habitat area, which reduces effective population sizes, and insularization of local populations, which affects dispersal rates (Wilcove et al. 1986; Wilcox and Murphy 1985). Although these effects, including reduced genetic diversity in isolated populations, are more readily observable in wildlife, there are potential ecological effects, such as changes in pollinator populations, that can result in altered plant community composition and thus adversely affect special-status vegetation communities.

5.2.3.7 Barriers to Wildlife Movement

As discussed in the Wildlife Corridor Study Report (Appendix F), during the study three large mammal species (mountain lion, black bear, and mule deer), three medium-sized mammals (coyote, bobcat, and raccoon), and multiple resident species (such as striped skunk and Virginia opossum) were captured on camera traveling in creeks within the City of Goleta. Brown bears and mountain lions have also been documented at UCSB and in Goleta in recent years (e.g., Edhat 2019; Noozhawk 2016). However, coastal habitat patches within Goleta are not large enough to sustain populations of these species.

During dire conditions such as fire or drought, coastal habitat patches, and the wildlife corridors these species may use to access them, may provide an important safety valve for individuals of these species by providing additional space away from core habitats where these species can temporarily find food, water, and cover. The complex of natural lands in the Devereux/Coal Oil Point/Ellwood Mesa area may also provide a linkage to safety west of the City.

All species observed in creeks within the City of Goleta likely have the potential to utilize any of the creeks. Although the creeks currently provide movement and habitat opportunities for various species, changes in management practices may potentially improve these opportunities, and enhance the safety and habitat for a variety of wildlife species, including birds, utilizing the creeks. There may be various direct and indirect barriers to wildlife movement, which include lighting, noise, and fencing. These topics are discussed below.

5.2.3.7.1 Outdoor/Nighttime Lighting

As discussed in Section 4.3.5.5, Wildlife Movement Areas, approximately 91% of observations captured during wildlife camera studies (Appendix F) occurred during the evening or night hours. As a result, outdoor and nighttime lighting within or along City creeks may pose indirect barriers to wildlife movement or to wildlife usage of the habitats at night. Nighttime lighting may disturb wildlife

activities which results in the alteration of behavior and movement. For example, nighttime lighting may disrupt night vision; internal timing rhythms (biological clocks); and foraging behavior as well as increase the risk of predation or mortality, including mortality along roads; and disrupt behavior due to indirect habitat fragmentation from various levels of light illumination across the landscape (Rich and Longcore 2006; Schirmer et al. 2019). Sources of nighttime lighting can come from residential neighborhoods, adjacent commercial or industrial areas, including parking lots, highways and roadways, and recreational facilities.

5.2.3.7.2 Noise and Vibrations

Due to the nature of the urban environment surrounding City creeks, typical daytime noise is not expected to significantly affect wildlife utilizing the creeks. However, daytime construction-related noise and vibrations could occur from equipment used during construction activities. These daytime construction noises may have a variety of indirect effects on wildlife species, including increased stress, weakened immune systems, altered foraging behavior, displacement due to startle, degraded communication with conspecifics (e.g., masking), damaged hearing from extremely loud noises, and increased vulnerability to predators (Lovich and Ennen 2011; Brattstrom and Bondello 1983, as cited in Lovich and Ennen 2011). Noise significantly reduces, although is not entirely eliminated, at nighttime which may provide opportunities for wildlife adverse to utilizing creeks during the day to venture into the systems at night. However, noise at night (if significantly loud for nighttime levels) may lead to similar behaviors as discussed above, depending on the location, noise level, and length of noise activity occurring at night.

5.2.3.7.3 Impermeable Fencing

Impermeable fencing is fencing that is not passable by wildlife. Depending on the type of material used, fencing may not be passable by smaller and/or larger wildlife. For example, mesh fencing, chain-link, or solid fence structures, and fence revetments pose barriers to movement within and along creeks; whereas fencing with significant space between fencing material may allow movement. However, fencing designed for wildlife passage must ensure the spacing is sufficient to allow movement while preventing injury (MFWP 2012). As discussed in Section 4, in general the creek reaches within the City limits are constrained and the majority of land uses adjacent to creeks are highly developed and urbanized. These adjacent land uses utilize a variety of fencing structures to exclude unwanted passage through private and/or closed properties. Specific fence designs and placements may serve as direct barriers to wildlife movement across the Goleta landscape, including within the creeks, to adjacent open space areas. To date, fencing designs and their effects on wildlife passage have not been studied or examined in detail throughout the creeks.

5.2.3.8 Riparian Bird Habitat

Like many land bird populations, riparian birds, and particularly those obligate riparian bird species, are experiencing population declines. The loss of riparian habitats is likely the most important contributor to the decline of these populations (RHJV 2004). Additional threats to riparian bird populations, habitat, and corridors for migratory birds include pesticides and pollution, degradation of habitat, habitat modification, increased wildfires, human interference and disturbance when nesting, nest parasitism (Kus et al. 2020), and invasive mammalian predators, such as the domestic or feral cat (Doherty et al. 2016). Within the City, some significant threats to riparian bird habitat include the spread of non-native invasive plant and wildlife species, pollutants, domestic or feral cats,

removal and clearance of native vegetation, reduced creek flows, altered hydrology and, in some places, human disturbance. In addition, any creek maintenance activities such as removal of downed trees and limbs, removal of live vegetation, brushing, removal of exotic plant species and other maintenance activities have the potential to impact birds during various periods of their life cycles (e.g., nesting, fledgling, migration) and their prey resources.

5.2.3.9 Altered Hydrology

Altered hydrology is the process of altering the seasonally variable patterns of creek flow patterns and sediment and nutrients. Depending on the actions, human activities may result in an altered hydrology and cause a variety of pressures on the hydrology including, but not limited to, changes to the quantity, quality, velocity, and temperature of the water flows, changes to the channel and bed erosion and deposition process, and alteration in water availability to biological resources, such as riparian vegetation, plants, wildlife, and health of creek communities. In addition, altered hydrology can allow for the establishment of non-native plants and/or invasion by Argentine ants (*Linepithema humile*), which can compete with native ant species that could be seed dispersers or plant pollinators. Altered hydrology may results in many impairments discussed in this Section. Additional information on the affects of an altered hydrology is available in the various subsections related to specific impairments, such as, but not limited to, Stream Flow (5.2.1.1), Temperature (5.2.1.11), Benthic Macroinvertebrates (5.2.1.12), Altered Channel Alignment (5.2.2.4), Active Bank Erosion (5.2.2.9), Non-Native Invasive Species (5.2.3.4), and Riparian Bird Habitat (5.2.3.8).

5.2.3.10 Data and Information

Many important organizations within the region have dedicated countless hours to further the understanding and protection of Goleta's watersheds and the creeks that traverse the City's jurisdiction. These organizations include, but are not limited to, the organizations that are represented on the Technical Advisory Committee associated with this project (see Acknowledgements). These organizations have collected large quantities of data on the state of Goleta's creeks and the City would benefit from future collaborative efforts that utilize these datasets to inform decisions regarding the creeks, including understanding and addressing impairment of the creeks.

In addition, the City of Goleta would benefit from the compilation of long-term datasets that would help decision-making bodies to make informed decisions. These datasets can be generated in several ways, including utilizing currently available datasets and efforts by organizations to collect data from the creeks, establishing citizen science efforts, and/or collaborating with local organizations and institutions of higher learning for data collection. Beneficial long-term datasets could include information related to, but not limited to:

- Climate Modeling – In order to make informed decisions regarding the ecological impacts of sea-level rise and climate change, datasets should be compiled and studies planned to examine the effects of future development and climate change on community resources;
- Wildlife Corridor Movements – Studies to understand the usage of creeks as wildlife habitat and migration corridors, connecting open spaces; as well as the role lands north and south of the City's limits serve in sustaining wildlife populations;
- Riparian Bird and Wildlife Studies – Studies to provide a comprehensive understanding of bird and wildlife habitat use and diversity hotspots, which complement current citizen efforts;

- Hydrology – Hydrological studies of flow records and flow conditions within creeks to understand factors affecting flow patterns and how groundwater availability affects creek conditions; and
- Invertebrates – Studies related to benthic invertebrates and creek quality.

5.2.4 Flood Control Activities

As discussed in Section 3.3.7.2, SBFCD conducts annual maintenance activities within creeks Countywide and these activities typically include maintenance activities within City creeks. Although these activities address flooding and drainage issues, they can have negative environmental impacts. SBFCD completed programmatic EIRs in 1990 and 2001 to analyze these impacts. The 2001 EIR identified four Class I (significant and unavoidable) impacts associated with annual maintenance activities. Below is a summary of these impacts as they are described in the 2001 EIR:

- Potentially Reduce the Amount of Natural Biofiltering. Removal and/or thinning of vegetation from channel bottom due to brushing, herbicide application, desilting, and channel shaping cause a temporary reduction in vigor and/or cover of successional riparian habitats and emergent wetlands. This same impact could occur due to clearing pilot channels and outlet works in debris basins, as well as removing sediments from basins. It could potentially reduce the bio-filtration effects (if any) of emergent wetland present along the wetland channel and debris basin bottom. As such, maintenance activities could contribute to an overall decrease in water quality.
- Reduce Amount and Quality of Channel Bottom Habitat. Removal and/or thinning of vegetation from channel bottom due to brushing, herbicide application, desilting, and channel shaping cause a temporary reduction in vigor and/or cover of successional riparian habitats and emergent wetlands. This same impact could occur due to clearing pilot channels and outlet works in debris basins, as well as removing sediments from basins. Although the functions and values of the habitat temporarily disturbed by maintenance would be replaced through SBFCD's habitat restoration program, there is a potentially adverse cumulative effect of annual habitat disturbances throughout the County.
- Displace Wildlife due to Vegetation Removal in the Channel Bottom. Removal and/or thinning of vegetation from channel bottom due to brushing, herbicide application, desitling, and channel shaping cause a temporary reduction in vigor and/or cover of successional riparian habitats and emergent wetlands. This same impact could occur due to clearing pilot channels and outlet works in debris basins, as well as removing sediments from basins. These actions could reduce foraging and loafing habitat for certain riparian and wetland dependent bird species. It can also reduce habitat heterogeneity for reptiles and small mammals and degrade aquatic habitats by removing protective cover and increasing temperatures. While the long-term functions and values of the habitat temporarily disturbed by maintenance would be replaced through SBFCD's updated habitat restoration program, there will be a temporal impact to wildlife that cannot be fully mitigated.
- Adverse Effects of Maintenance on Aquatic Habitat. Channel shaping, bank stabilization by placing fill or grading banks, sandbar removal, excessive removal and/or thinning of in-channel vegetation, and pilot channel construction could reduce vegetation cover, pools and gravel beds, organic input from overhanging vegetation supporting aquatic productivity, and

instream cover and debris providing micro-habitat. In addition, fish and aquatic organisms could be directly displaced. These impacts are temporary and reversible.

Although the above four impacts were classified as significant and unavoidable, the EIR includes several mitigation measures to address these impacts, including compensatory habitat mitigation, minimization of vegetation removal from channel bottoms, and construction monitoring during vegetation removal.

In addition to the Class I impacts detailed above, the EIR also includes several Class II (significant, but mitigable) impacts. These included a variety of impacts to hydrology; water quality; wetlands, riparian habitat, and rare plants; fish, aquatic species, and wildlife; air quality; noise; cultural resources; recreation; and visual impacts.

With respect to herbicide application, several Class II impacts were identified and a mitigation measure (W-2: Responsible Herbicide Application), among others, was included in the EIR. Mitigation Measure W-2 includes timing limitations for herbicide application (August-November), a requirement for hand-held sprayers rather than truck mounted sprayers, dilution requirements, wind limits, and a requirement for post-application informational signage near public recreation locations.

5.2.5 Climate Change

Changes resulting from climate change are expected to exacerbate impairments within City creeks and watersheds. The Santa Barbara Area Coastal Ecosystem Vulnerability Assessment (SBA CEVA; Myers et al. 2017) report addresses five topics: climate change, watershed runoff, coastal hazards and shoreline change, estuaries, and beaches. Scientists worked in close collaboration with the Cities of Santa Barbara, Carpinteria, and Goleta, the County of Santa Barbara, and UCSB throughout the duration of the research.

Four major take-home messages were identified:

- All climate models examined were consistent in predicting increasing temperatures across the region throughout the 21st century.
- The amount of annual watershed runoff will increase for all Santa Barbara watersheds. However, a majority of models project greater year-to-year- variability of annual precipitation by the second half of the 21st century that would increase the likelihood of extended periods of drought.
- Many beaches will narrow considerably, and as many as two-thirds will be completely lost over the next century.
- Estuarine wetlands and sandy beaches of Santa Barbara County are extremely vulnerable to the effects of sea level rise.

Climate change is likely to result in increases in temperature with associated changes in precipitation, more extreme storm events, including increased rainfall intensity and droughts, as well as increases in sea level and other consequences (ESA August 2015 for the GSMC). Below is a more detailed explanation of how climate change impacts can exacerbate the impairments identified in the CWMP.

Southern California is projected to have:

- Warmer winters, earlier warming in the spring, and increased temperatures year-round.

- Some evidence for a slightly drier future climate relative to today.

Even as overall precipitation in the Southwest is projected to decrease, the number of heavy rainfall events is anticipated to increase (Walsh et al. 2014). Climate change is expected to continue to affect average annual temperature, temperature extremes, drought and fire frequency, and contribute to sea-level rise affecting the coastal portion of the City.

5.2.5.1 Fire, Flood, and Debris Flows

California faces a dramatic increase in the number and severity of wildfires, with 10 of the most destructive fires occurring since 2015 (CAL FIRE 2020). The state's major study on climate impacts, the Fourth Climate Assessment (Bedsworth et al. 2018), projects that California's wildfire burn area is likely to increase by 77% by the end of the century. There is potential for reduced wildfire risk due to the lack of vegetation resulting from drought conditions (City of Goleta 2015). However, recent local examples show a high frequency of significant wildfire events. These events, with the potential to be exacerbated by climate change, can have significant impacts on City creeks and watersheds.

Neighborhoods built on alluvial fans below debris laden slopes are at risk even without climate change. Analysis of erosion hazards in drainages above those neighborhoods may identify actions that can be taken to reduce risk of catastrophic debris flow. For example, where runoff from mountain roads can be slowed, and spread out to facilitate safe retention of runoff, debris flow risks may be lessened. This highlights the need for inter-jurisdictional watershed planning.

5.2.5.2 Sea Level Rise

As noted in Section 4, sea level rise would threaten people and infrastructure located along the California coastline and in coastal communities, including increased erosion and threats to vital infrastructure such as roads, bridges, power plants, ports and airports, gasoline pipes, and emergency facilities as well as negatively impacting coastal recreational assets such as beaches and tidal wetlands. The 2015 Goleta Slough Area Sea Level Rise and Management Plan (GSMC 2015), re-evaluates the Goleta Slough study area and assesses vulnerability and risk to environmental and human resources, and recommends policies and potential adaptation strategies but does not include a fluvial hydrological analysis.

5.2.5.3 Drought

Stream flow conditions would be highly affected by drought conditions. Drought, especially prolonged drought, would greatly affect water availability in underground aquifers as well as above ground stream conditions. In addition, during drought conditions, the GWD may extract groundwater to address local water use needs. This occurred during the recent drought conditions in the Goleta Valley (see Section 3.3.71, including information on GWD's peak groundwater extractions in 2015). In addition, alluvial and bedrock water wells the lower the water table can cause significant impacts on biological resources. As noted in the City's Environmental Thresholds Guidelines, "[l]owering of the water table can effect biological resources on the land surface by reducing access to water by deep-rooted native vegetation or by reducing discharge of groundwater (baseflow) in streambeds. Even if a basin were pumped at a hydrologic 'safe yield' rate (long-term water levels remain stable) a drop in water levels during a drought could adversely affect biologic resources." (County of Santa Barbara 2002, at 88). In addition, drought would affect habitat quality (including increased

opportunities for invasion of non-native invasive species) and availability of water for aquatic organisms, including endangered southern California steelhead and threatened California red-legged frogs. Reduced flows can also diminish pool habitat, dissolved oxygen concentrations, and water quality, which would affect fish and invertebrate growth and survival. As a result, overall plant and wildlife communities would be adversely affected.

5.2.5.4 Vegetation Type Conversion

Type conversion is the process of change from a native shrubland to a non-native dominated grassland. One potential consequence of climate change is type-conversion of chaparral. Chaparral is well adapted to fire and regenerates readily after fire through sprouting or seeds. However, when fire occurs too frequently native shrubs are not able to recover as they do after a single fire. Repeated fires at short intervals (e.g., fewer than 10 years) kill young plants before they produce seed. Non-native grasses and annual plants often colonize areas recovering from a fire and during years with long fire intervals chaparral species will grow in and close the canopy. However, frequent fires reduce shrub seed production while grass seeds survive the frequent fires, perpetuate a cycle of more frequent fires (as non-native annual plants are more ignitable than chaparral (KPCC Environment and Science 2017), and reduce shrub cover causing a negative feedback loop. Ultimately, increasing fire frequency is expected to result in vegetation type conversion and may adversely affect vegetation communities, and vegetation cover in Goleta's watersheds (California Chaparral Institute 2020). Type conversion could result in exposed soils on slopes in the watershed, increased erosion and runoff, and increased sedimentation and debris, including rocks and boulders, in City creeks. Erosion and sedimentation may result in changes to the creek conditions, including suitable habitats for a variety of common and special-status wildlife species (e.g., steelhead, California red-legged frog, and southwestern pond turtle).

5.2.6 Safety

5.2.6.1 Fire

Desiccated fuels ignite easily and burn with intensity, accelerating fire behavior. Safety of riparian fuels, like all vegetation, depends on adequacy of live fuel moisture. Maintaining live fuel moisture in a safe range depends on presence of adequate water in riparian soils. Volatile non-native fuels that have encroached into riparian space also accelerate fire behavior. Where desiccated and/or volatile resinous fuels have accumulated, fire behavior can be extreme and erratic. Risks are increased for both firefighting operations and evacuation of residents.

5.2.6.2 Flooding

As noted in Section 5.2.1.13, Flooding, all City creeks exhibit some level of flooding. Much of the landscape throughout Goleta has lost its ability to absorb rainwater. Urbanization, with proliferation of hard surfaces, roof tops, and concrete storm drains has impaired the ability of the land to absorb storm water and then slowly and safely release it into creeks. This has resulted in flooding risks that are identified in the CWMP. Future consideration of flooding impacts will be done consistent with existing City, regional, state, and federal regulations.

5.2.6.3 Channelized Creeks

During high flow conditions, concrete channels can be dangerous to individuals due to swiftness of the water and lack of hand holds. These channels are engineered to allow for fast flows and lack roughness elements such as branches or other things to grab onto such that when a person gets trapped in a concrete channel during a storm, they can be washed downstream a long distance and may drown.

5.3 Crosswalk with Section 6

In order to assist the reader in connecting impairments (discussed in Section 5) with implementation actions (discussed in Section 6), Table 32 provides a crosswalk for the impairments with implementation action.

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources												Flood Control Activities	Climate Change			Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
1. Plan Management																																								
Action 1.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 1.2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 1.2.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 1.3.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 1.3.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Funding																																								
Action 2.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 2.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 2.1.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 2.2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 2.3.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 2.3.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources												Flood Control Activities	Climate Change			Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
3. Data Management and Information Gathering																																								
Action 3.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Action 3.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Action 3.1.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Action 3.1.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Action 3.2.1																									X				X		X					X	X		
Action 3.2.2																									X				X		X					X	X		
Action 3.2.3	X																								X				X	X	X								
Action 3.3.1		X	X	X	X	X	X	X	X	X														X		X													
Action 3.3.2		X	X	X	X	X	X	X	X	X														X		X								X					
Action 3.3.3		X	X	X	X	X	X	X	X	X																								X					
Action 3.3.4											X																													
Action 3.4.1	X																																		X					

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources												Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 3.5.1																													X												
Action 3.6.1																													X												
Action 3.6.2																													X												
4. Plan Updates																																										
Action 4.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 4.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5. Interagency and Non-Profit Organization Coordination																																										
Action 5.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 5.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 5.1.3												X	X	X	X									X	X			X		X	X	X			X						X	
Action 5.1.4	X	X	X	X	X	X	X	X	X	X	X	X					X							X		X	X	X		X			X		X					X	X	
Action 5.1.5	X																															X						X					
Action 5.1.6																											X																
Action 5.1.7	X																															X				X		X					

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 5.1.8	X		X														X							X		X									X			X	X	X	
Action 5.1.9	X	X	X	X	X	X	X	X	X	X													X	X		X	X				X	X									
Action 5.1.10		X	X	X	X	X	X	X	X	X																X															
Action 5.1.11	X	X	X	X	X	X	X	X	X	X	X						X						X	X	X	X	X	X		X	X	X									
Action 5.1.12	X	X	X	X	X	X	X	X	X	X	X						X						X	X	X	X	X	X		X	X	X									
Action 5.2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 5.2.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 5.2.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 5.2.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 5.3.1	X	X	X	X	X	X	X	X	X	X		X												X		X															
Action 5.3.2		X	X	X	X	X	X	X	X	X														X		X															
Action 5.3.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment													Geomorphology												Biological Resources												Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 5.3.4																																X		X	X	X	X			
6. Planning Consistency																																										
Action 6.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 6.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 6.1.3																								X					X													
Action 6.1.4																								X					X													
Action 6.1.5																								X						X		X									
Action 6.1.6		X	X	X	X	X	X	X	X	X														X	X	X															
Action 6.1.7		X				X																		X	X		X				X				X						
Action 6.1.8			X						X	X							X						X				X				X			X							
Action 6.1.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 6.1.10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology											Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 6.1.11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7. Public Education and Engagement																																							
Action 7.1.1		X	X	X	X	X	X	X	X	X	X													X	X	X	X			X	X			X		X			
Action 7.1.2		X	X	X	X	X	X	X	X	X	X													X	X	X	X			X	X			X		X			
Action 7.1.3		X	X	X	X	X	X	X	X	X	X													X	X	X	X			X	X			X		X			
Action 7.2.1		X	X	X	X	X	X	X	X	X	X													X		X													
Action 7.2.2		X	X	X	X	X	X	X	X	X	X													X		X													
Action 7.3.1		X	X	X	X	X	X	X	X	X	X													X		X	X			X	X	X					X		
Action 7.3.2																																							
Action 7.4.1				X	X		X	X			X															X													
Action 7.4.2				X	X		X	X			X															X													
Action 7.4.3				X	X		X	X			X															X													
Action 7.5.1		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X			

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology											Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X				
Action 7.5.2		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X				
Action 7.5.3		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X				
Action 7.5.4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X				
Action 7.6.1		X	X	X	X	X	X	X	X	X														X	X															
Action 7.7.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.7.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.7.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.7.4																									X					X	X								
Action 7.7.5																									X					X	X								
Action 7.8.1		X			X																			X	X	X													
Action 7.8.2		X			X																			X	X	X													
Action 7.8.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.8.4		X			X																			X	X	X													

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources												Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 7.9.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.10.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.10.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.11.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.11.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 7.12.1		X	X			X						X						X					X	X	X		X	X		X					X				X	X	
Action 7.12.2												X				X							X		X	X	X	X	X	X	X											
8. Review and Regulation of Development																																											
Action 8.1.1		X	X	X	X	X	X	X	X	X	X	X										X	X	X	X	X	X			X	X										
Action 8.1.2		X	X	X	X	X	X	X	X	X	X	X										X	X	X	X	X	X			X	X										

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment													Geomorphology												Biological Resources											Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 8.1.3																														X	X											
Action 8.1.4																														X	X											
Action 8.1.5																														X	X											
Action 8.1.6	X	X	X	X	X	X	X	X	X	X	X	X			X		X					X	X	X	X	X	X			X	X									X		
Action 8.1.7																									X		X			X	X					X						
Action 8.2.1	X																						X				X								X		X		X			
Action 8.2.2																							X				X								X		X		X			
Action 8.2.3	X																						X				X			X	X				X		X					
Action 8.2.4	X																									X									X		X		X			
Action 8.3.1		X	X														X									X																
Action 8.3.2		X	X														X									X																
Action 8.4.1	X	X	X	X	X	X	X	X	X	X	X	X					X							X	X	X																
Action 8.4.2	X	X	X	X	X	X	X	X	X	X	X	X					X							X	X	X																

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources												Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 8.5.1												X										X		X																	X	
Action 8.5.2												X										X		X																	X	
Action 8.5.3												X										X		X																	X	
Action 8.6.1	X																									X	X			X	X											
Action 8.6.2	X																									X	X			X	X											
Action 8.7.1		X	X	X	X	X	X	X	X	X	X													X		X																
Action 8.7.2		X	X	X	X	X	X	X	X	X	X													X		X																
9. Land Purchases and Conservation Easements																																										
Action 9.1.1												X										X					X			X	X											
Action 9.1.2												X										X					X			X	X										X	
Action 9.1.3																																										
Action 9.1.4												X										X	X				X			X	X										X	
Action 9.1.5																																										

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology										Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 9.1.6												X										X	X				X		X	X								
Action 9.1.7																																		X	X	X	X			
Action 9.2.1												X										X								X	X								
Action 9.2.2												X										X								X	X								
10. Invasive Plant Removal																																								
Action 10.1.1																							X				X							X		X		X		
Action 10.1.2																							X				X							X		X				
Action 10.1.3																							X				X							X		X				
Action 10.1.4																														X	X								
Action 10.1.5																							X				X				X								

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment													Geomorphology												Biological Resources											Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 10.1.6																																		X								
Action 10.1.7																										X																
Action 10.1.8																										X																
Action 10.2.1																																	X							X		
11. Riparian Tree and Vegetation Planting and Protection																																											
Action 11.1.1			X						X	X							X						X				X				X											
Action 11.1.2			X						X	X							X						X				X				X											
Action 11.1.3			X						X	X							X						X				X				X											
Action 11.1.4			X						X	X							X						X				X				X											

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 11.2.1			X						X	X							X						X				X				X										
Action 11.2.2																																	X									
Action 11.2.3																																										
Action 11.3.1			X						X	X							X						X				X				X										
12. Creek Restoration and Enhancement Projects																																										
Action 12.1.1	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X				X	X	X		X										
Action 12.2.1												X																X														
Action 12.2.2																							X				X			X												
Action 12.2.3												X																X														

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment													Geomorphology											Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 12.2.4																		X									X														
Action 12.3.1														X																											
Action 12.3.2														X																											
Action 12.4.1													X																	X											X
Action 12.4.2																																									
Action 12.4.3													X																	X											X
Action 12.5.1																		X										X													
Action 12.5.2																		X										X													
Action 12.6.1															X						X																				

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment													Geomorphology											Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 12.6.2															X						X																				
Action 12.6.3																					X																				
Action 12.7.1													X																	X	X										
Action 12.8.1																														X											
Action 12.8.2																														X											
Action 12.8.3													X																	X											
Action 12.9.1			X			X				X														X	X	X	X			X	X	X							X		
13. Flooding and Drainage																																									
Action 13.1.1	X	X	X	X	X	X	X	X	X	X	X	X					X							X	X	X	X												X		

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology											Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 13.1.2												X										X		X	X														X	
Action 13.2.1												X																												X	
Action 13.2.2												X																												X	
Action 13.3.1												X																												X	
Action 13.3.2												X																												X	
Action 13.3.3												X																												X	
Action 13.3.4												X																												X	
Action 13.4.1												X	X	X	X								X	X	X			X		X	X	X			X	X	X	X			X	
Action 13.4.2												X	X	X	X								X	X	X			X		X	X	X			X					X	

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology											Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 13.5.1																																X		X	X	X			X	
14. Water Quality																																								
Action 14.1.1		X			X																		X																
Action 14.1.2		X			X																		X																
Action 14.2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Action 14.3.1		X			X																		X																
Action 14.3.2		X			X																		X																
Action 14.4.1	X	X	X	X	X	X	X	X	X	X	X	X					X						X		X														
Action 14.4.2	X	X	X	X	X	X	X	X	X	X	X	X					X						X		X														

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment												Geomorphology												Biological Resources										Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pipe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action 14.4.3	X	X	X	X	X	X	X	X	X	X	X	X					X							X		X															
Action 14.5.1	X	X	X	X	X	X	X	X	X	X	X	X					X						X	X		X															
Action 14.5.2	X	X	X	X	X	X	X	X	X	X	X	X					X							X		X															
Action 14.6.1		X			X	X			X	X	X												X	X	X		X														
Action 14.7.1		X	X	X	X	X	X	X	X	X	X						X							X		X															
Action 14.8.1		X	X	X	X	X	X	X	X	X	X						X							X		X															
15. Protection of Baseflows																																										
Action 15.1.1	X																															X					X		X		
Action 15.1.2	X																															X					X		X		

Table 32. Crosswalk of Impairments (Section 5) to Implementation Action (Section 6)

Program and Action	Water Quality Impairment													Geomorphology											Biological Resources												Flood Control Activities	Climate Change				Safety		
	Stream Flow (5.2.1.1)	*Floating Materials (5.2.1.3)*	*Turbidity and Total Suspended Solids (5.2.1.4)*	*pH (5.2.1.5)*	*Inorganic Chemicals (5.2.1.6)*	*Fecal Bacterial (5.2.1.7)*	*Specific Conductivity (5.2.1.8)*	*Biostimulatory Substances (5.2.1.9)*	*Dissolved Oxygen (5.2.1.10)*	*Temperature (5.2.1.11)*	*BMIs (5.2.1.12)*	*Flooding (5.2.2.13)*	*Concrete-Lined Channels (5.2.2.1)*	*Pilpe and Wire Fence Revetment (5.2.2.2)*	*Streambed and Bank Protection Structures (5.2.2.3)*	*Altered Channel Alignment (5.2.2.4)*	*High Sedimentation (5.2.2.5)*	*Sediment Transport Barriers (5.2.2.6)*	*Kinckpoints (5.2.2.7)*	*Relict Incised Bed Condition (5.2.2.8)*	*Active Bank Erosion (5.2.2.9)*	*Constrained Floodplain (5.2.2.10)*	*Lack of Bank-Top Vegetation (5.2.2.11)*	*Trash/Debris (5.2.3.1)*	*Human Presence (5.2.3.2)*	*General Potential for Pollutants (5.2.3.3)*	*Non-Native Invasive Plant Species (5.2.3.4)*	*Impediments and Barriers to Fish Passage (5.2.3.5)*	*Concrete-Lined Channel (5.2.3.6)*	*Barriers to Wildlife Movement (5.2.3.7)*	*Riparian Bird Habitat (5.2.3.8)*	*Altered Hydrology (5.2.3.9)*	*Data and Information (5.2.3.10)*		*Fire, Flood, and Debris Flows (5.2.5.1)*	*Sea-Level Rise (5.2.5.2)*	*Drought (5.2.5.3)*	*Vegetation Type Conversion (5.2.3.4)*	*Fire (5.2.6.1)*	*Flooding (5.2.6.2)*	*Channelized Creeks (5.2.6.3)*
Action	X																														X					X			X			
Action 15.2.1	X																														X					X			X			
Action 15.2.2	X																														X					X			X			
Action 15.3.1	X																														X					X			X			
Action 15.3.2	X																														X					X			X			

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6 Implementation Program

6.1 Implementation Introduction

The Implementation Program for the CWMP seeks to address impairments identified in Section 5 as well as ensure general best practices, programs, and projects to protect and improve the overall quality of the City's creeks and riparian corridors for the multiple benefits these areas provide.

It is important to note that some of the actions identified in this section reflect existing practices and regulatory requirements, whereas other actions highlight potential new activities the City could undertake. New activities identified are, at the time of CWMP adoption, unfunded and would likely require additional staffing and/or funding within the Public Works Department to be achieved. As such, the Implementation Program represents an aspirational set of actions. Over time, the actions will need to be reviewed and priorities considered to best protect and improve creeks within the City given the limited resources available.

For the purposes of this CWMP Implementation Program, the following definitions apply:

Program: A planned series of activities related to a common theme.
Goal: A broad statement of the Program's intention.
Strategy: A set of plans or actions.
Action: The process of doing something to achieve a goal.

The programs detailed in Section 6.2 provide for a variety of actions to address creek and riparian corridors through a variety of means including increased administrative attention to creeks; heightened public outreach, education, and engagement; continued focus on ensuring new development meets all standards and adheres to all city policies; and new focus on projects and programs to proactively improve habitat, water quality, and the drainage of City creeks.

6.2 Implementation Programs

A. Administrative Programs

1. Plan Management

Goal 1. To implement the CWMP, the City will provide the administrative structure to oversee the CWMP programs, scheduling, and reporting, and to interface with the community at large and other relevant agencies.

Strategy 1.1. Because many of the CWMP actions are related to capital improvement projects, habitat restoration, and stormwater regulation, the City's Public Works Department Director or the Director's designee will oversee the implementation of this CWMP. Public Works personnel overseeing implementation will have specific knowledge and experience to properly address the goals, policies and actions of the CWMP.

Action 1.1.1. The City's Public Works Department, Neighborhood Services and Public Safety Department, and Planning and Environmental Review Department will meet and coordinate at least quarterly regarding CWMP implementation.

Strategy 1.2. In order to properly implement the CWMP, periodic status reports are needed to identify and describe actions completed and underway that further the goals and policies of the CWMP.

Action 1.2.1. Every two years, prepare a CWMP Status Report summarizing the City's efforts to comply with the goals, policies, and actions included in the CWMP.

Action 1.2.2. The City's Public Works Department will present the CWMP Status Report at a public meeting for stakeholder input and City Council receipt. The meeting should serve as an opportunity for the City Council and public to weigh in on the CWMP implementation process and the focus of the next two years of implementation. The CWMP Status report should be timed to inform the 2-year budget process.

Strategy 1.3. To fully implement the CWMP, significant additional staffing resources would be needed. When considering implementation prioritization, staffing and funding levels must be considered.

Action 1.3.1. During the consideration of CWMP Status Report (Action 1.2.2), consider staffing and funding needs to achieve future desired implementation of the CWMP and add staff resources and funding as deemed appropriate.

Action 1.3.2. During consideration of the Public Works Annual Work Program, consider staffing needs to achieve the plan goals and add staff resources and funding as deemed appropriate.

2. Funding

Goal 2. To provide annual and specific project funding to implement the CWMP.

Strategy 2.1. During each budget cycle, the City will consider annual and multi-year funding to support CWMP ongoing programs.

Action 2.1.1. Consider appropriating General Funds or Special Revenue Funds, as available, during the City budgeting process to actions identified in the CWMP.

Action 2.1.2. At an appropriate later date, consider the presentation of a ballot measure to impose a new tax specifically dedicated to CWMP implementation.

Action 2.1.3. Apply for grants to fund staff time on implementation of specific projects.

Strategy 2.2. The City will seek grant funding for projects and programs identified in the CWMP and any other efforts that help achieve the goals of the CWMP.

Action 2.2.1. Where staffing resources are adequate to manage any grant fund management, or as prioritized by City Council, apply for grants to support relevant projects and actions identified in the CWMP.

Strategy 2.3. The City will monitor relevant funding sources, including federal, state, and local options to ensure that appropriate opportunities to seek funding are identified.

Action 2.3.1. Maintain a potential funding source list. An initial list of funding sources is provided as Appendix J, Potential Funding Sources.

Action 2.3.2. Annually review the state database of funding opportunities found here: https://www.grants.ca.gov/, and inquire with funding agencies, including but not limited to California Coastal Conservancy.

3. Data Management and Information Gathering

Goal 3. To maintain up-to-date information on City creek corridors and attain and/or develop new data to further support management actions identified in the CWMP.

Strategy 3.1. The City shall conduct annual creek surveys in order to identify any changes and new impairments along City creek segments, as staffing and funding allow.

Action 3.1.1. Ensure adequate staffing and/or contractor funding within the City's budget to support the annual creek surveys.

Action 3.1.2. Survey all City creek segments annually to identify and photo-document changed circumstances and new information.

Action 3.1.3. Develop a standardized monitoring report sheet to be used on all creeks each year to ensure consistent data.

Action 3.1.4. As feasible, address any new impairments identified during creek surveys and forward relevant information to other responsible agencies where appropriate.

Strategy 3.2. The City should maintain a database of aerial imagery to track changes in vegetation patterns along City creeks.

Action 3.2.1. Continue periodic purchases, where opportunities are presented and funding supports, of new aerial imagery Citywide at a 6-inch resolution or less.

Action 3.2.2. When possible, consider the purchase of hyperspectral imagery associated with Action 3.2.1. in order to better identify changes in vegetation locations and health.

Action 3.2.3. Utilize City imagery and spectral data to detect changes in development and vegetation to better understand any illegal and/or unpermitted actions along City creek corridors to ensure implementation of General Plan Conservation Element subpolicy CE 1.4 (Illegal Destruction of ESHAs) and compliance with County and state regulations, as applicable, including regulations concerning habitat, water quality, and creek flows.

Strategy 3.3. The City shall continue to monitor water quality within City creeks.

Action 3.3.1. Continue water quality monitoring consistent with the City's MS4 permit and the SWMP.

Action 3.3.2. Review the stormwater monitoring program for effectiveness and consider changes to that would better support CWMP Goals, Strategies, and Actions.. The review should include, at a minimum, consideration of the following criteria: (1) sampling locations; (2) sampling frequency; (3) analytical program and potential additional analyses/speciation, as staffing and funding allow.

Action 3.3.3. Evaluate the need for additional forensic analyses to identify the most likely sources of any impacts, as funding and staffing resources allow. Such analysis could include source and receiving water chemistry comparisons, identification of past illicit discharges in relation to impacted water bodies, water table and groundwater changes and the causes of such changes, and hydrogeologic conditions.

Action 3.3.4. Where funding supports, conduct annual collection and analyses of benthic macroinvertebrate (BMI) samples and other pertinent physiochemical and biological data at various locations along City creeks. See as an example program the Southern Coastal Santa Barbara Streams and Estuaries Bioassessment Program operated by the County and City of Santa Barbara.

Strategy 3.4. The City shall seek to better understand flow rates and changing flow rate impacts on City creeks.

Action 3.4.1. As staffing and funding support, conduct flow rate monitoring, in addition to existing USGS monitoring, on City creeks, including areas north of the City where possible in coordination with other agencies. This monitoring should include installation of new flow gauges and/or visual inspection monitoring. Conduct related studies as needed, such as hydrological analyses.

Strategy 3.5. The City shall seek to better understand the wildlife use of riparian habitat and their linkage to habitat patches and core areas.

Action 3.5.1. Where funding supports, continue wildlife monitoring in riparian habitat. Such activities could include further use of motion sensor cameras and field studies of wildlife presence or activity.

Strategy 3.6. The City shall seek to better understand the impacts of nighttime lighting, noise, and fencing on wildlife behavior within City creek corridors.

Action 3.6.1. Where funding supports, conduct nighttime lighting, noise, and fencing analyses along City creeks.

Action 3.6.2. Where impacts are identified through Action 3.6.1., seek remedial action through public lighting retrofits and/or working with property owners as feasible to address lighting design, noise impacts, and fencing concerns.

4. Plan Updates

Goal 4. To ensure that the CWMP reflects recent conditions and addresses necessary programs and actions for the City to follow, periodic updates of the CWMP should be conducted.

Strategy 4.1. The City shall review the CWMP as the need for updates arises (including but not limited to changes in physical conditions of City creek corridors, changes in the regulatory setting, and new creek corridor management knowledge or strategies).

Action 4.1.1. Conduct an internal and public review of the CWMP every 5-10 years, as directed by City Council.

Action 4.1.2. Amend baseline conditions, impairments, programs, goals, strategies, and actions in the CWMP as needed to reflect the results of the review and update process. Any updates should include public input, consideration of updated information regarding impacts from climate change, and new or updated plans and reports from other agencies and organizations, as appropriate.

5. Interagency and Non-Profit Organization Coordination

Goal 5. To maintain and develop new cooperative relationships with federal, state, county, municipal, academic institutions, and special district agencies, as well as non-profit organizations engaged with City creeks, in support of integrated management practices favorable to enhancement, maintenance, and restoration of the biological and physical integrity of creek courses and their associated wetlands and riparian habitats within the City and throughout the entire watershed overview area.

Strategy 5.1. The City shall pursue and continue cooperative relationships with other public agencies regarding goals and strategies that the partners have in common concerning City creek corridors and watersheds.

Action 5.1.1. As appropriate and productive, pursue cooperative relationships with federal agencies such as the USFWS, NOAA Fisheries, USFS, US Bureau of Reclamation, and the USACE obtain permits, identify project funding opportunities, and identify and pursue other potentially shared interests regarding USFS, County of Santa Barbara, and City creek corridors and their associated watersheds.

Action 5.1.2. As appropriate and productive, pursue cooperative relationships with state entities such as the CDFW, RWQCB, UCSB, CalTrans, the California Conservation Corps, the California Coastal Conservancy, and California Coastal Commission to obtain potential permits, identify funding opportunities, and identify and pursue other potentially shared interests regarding USFS, County of Santa Barbara, and City creek corridors and their associated watersheds.

Action 5.1.3. As appropriate and productive, pursue a cooperative relationship with SBFCD to support flood control activities, including mitigation, and provide increased protections and enhancements to City creeks and riparian habitat.

- Such activities should include City annual review and comment, as necessary, on the SBFCD Annual Maintenance Plan. Consideration should be given to supporting activities to protect biological qualities within City creeks.

- Whenever feasible, the City should leverage the environmental documents and permits attained for the Annual Maintenance Plan for future City creek and watershed restoration efforts.

Action 5.1.4. Coordinate with the County of Santa Barbara regarding potentially harmful activities within the County north of the City. Issues that could be addressed collaboratively include construction staging, water extraction, and farming activities along creeks and watersheds that eventually drain through the City. Potential issues to focus on for this coordination are included in Appendix H, Potential Impairments Outside the City of Goleta.

Action 5.1.5. Coordinate with the Goleta Water District regarding water resource management activities within the Goleta Water District's authority. Coordination efforts should include:

- Review and comment, as appropriate, on any Goleta Water District updates to their Groundwater Management Plan, SAFE Water Supplies Ordinance, or any other program, plan, or activity related to groundwater management within the City and/or the Goleta Groundwater Basin, including information regarding well water extractions.
- Better understand Goleta Water District use of City-owned properties, including the use of the Berkeley Well site.
- Encourage and support Goleta Water District efforts, as appropriate, to increase groundwater storage in the Goleta Groundwater Basin.

Action 5.1.6. Make requests, encourage, and coordinate with CDFW and provide input on any efforts to eradicate invasive species (such as green sunfish, crayfish, and bullfrogs) within City creeks.

Action 5.1.7. Request, encourage, and support CDFW enforcement, when appropriate, of Fish and Game Codes, including Section 1600 et al. regarding stream alterations, and Section 5937 regarding stream flows to keep fish in good condition, and water rights donations to protect instream flows pursuant to the Water Code Section 1707.

Action 5.1.8. Coordinate and engage with the USFS, County Fire regarding fire risk management activities and post-fire management with consideration for habitat protection, reduction of sedimentation within City creeks, and habitat type-conversion.

Action 5.1.9. Engage with the Central Coast RWQCB regarding finalization and implementation of Agricultural Order 4.0. Non-point discharges from irrigated lands regulated by this Order include discharges of waste to surface water and groundwater, such as irrigation return flows, percolation, tailwater, tile drain water, stormwater runoff flowing from irrigated lands, stormwater runoff conveyed in channels or canals resulting from the discharge from irrigated lands, and runoff resulting from frost control or operational spills. The Order also regulates agricultural activities such as the removal or degradation of riparian vegetation resulting in the loss or degradation of instream beneficial uses.

Action 5.1.10. Participate in the Central Coast RWQCB development of TMDLs and remediations for listed impaired waterbodies within the City, and updates to the Central Coast Basin Plan.

Action 5.1.11. Request, encourage, and support, where appropriate, Central Coast RWQCB, CDFW, California Coastal Commission, and other state agencies in enforcement actions related to the City's creeks and their associated watersheds.

Action 5.1.12. Monitor, through coordination with other agencies, the status of creeks located outside the City.

Strategy 5.2. The City shall pursue and continue cooperative relationships with non-profit and academic organizations that support the goals and strategies in the CWMP.

Action 5.2.. Engage and build partnerships with non-profit organizations, as appropriate, to further the goals and policies of the CWMP.

Action 5.2.2. Continue relationships with non-profit members of the CWMP Technical Advisory Committee after the adoption of the CWMP.

Action 5.2.3. Support non-profit grant applications, where possible, when the applications support the implementation of the CWMP.

Action 5.2.4. Seek out relationships with researchers and students at the University of California, Santa Barbara, and other universities as opportunities are presented, to conduct research and support restoration efforts.

Strategy 5.3. The City should, as interest and resources allow, continue and develop new regional collaborative efforts to address the interjurisdictional issues related to City creeks.

Action 5.3.1. Continue to engage in the Santa Barbara Integrated Regional Water Management (IRWM) Program. The IRWM is a regional water management group governed by a broad region-wide group that includes water and wastewater districts, community service districts, city departments, county divisions, and a non-governmental organization. The IRWM Program and projects are guided by the Santa Barbara Integrated Regional Water Management Plan (IRWMP).

Action 5.3.2. Continue to participate in the Santa Barbara County Association of MS4 Mangers (SBCAMM). SBCAMM helps the City achieve regional compliance and collaboration and provides a pool of regional experts and resources for stormwater management and compliance.

Action 5.3.3. Seek to establish a Goleta watersheds-specific working group or committee comprised of agencies with regulatory authority over City creeks and contributing watersheds as well as non-governmental organizations engaged with issues related to the CWMP. Potential members include Santa Barbara County Planning, SBFCD, GWD, City of Santa Barbara (Airport), UCSB, USFS, CDFW, and NMFS.

Action 5.3.4. Continue where opportunities arise, and seek opportunities, to engage with other jurisdictions, agencies, organizations engaged in CWMP-related activities, and researchers to better understand and plan for climate change impacts on creeks and watersheds. Such activities should include supporting grant applications for further understanding of such impacts and efforts to create regional solutions to the impacts of climate changes. Consideration should be given to the Optional Studies provided in the City's Coastal Hazards Vulnerability Assessment and Fiscal Impact Report that includes a study to model future creek flooding that incorporates climate impacts on precipitation and sea level rise. Where possible, provide funding or in-kind services to support these efforts where such activities are not managed by the City.

6. Planning Consistency

Goal 6. To implement the CWMP in a manner that is consistent with various City policies, regulations, and adopted management and master plans.

Strategy 6.1. The City shall, to the greatest extent possible, ensure that the implementation of the Goals, Strategies, and Actions of the CWMP complement and support other planning documents adopted by the City. Where conflicts exist, the City must refer to the General Plan for policy direction.

Action 6.1.1. Ensure that all CWMP implementation programs are acted upon in a manner consistent with the General Plan.

Action 6.1.2. Ensure that all CWMP implementation programs are acted upon in a manner consistent with the Goleta Municipal Code.

Action 6.1.3. Ensure that the goals, policies, actions, and projects of the City's Bicycle and Pedestrian Master Plan are considered when implementing the CWMP.

Action 6.1.4. Ensure that the recommendation goals and objectives of the City's Parks, Facilities & Playgrounds Master Plan are considered when implementing the CWMP.

Action 6.1.5. Ensure that the vision for Ellwood Mesa, including Devereux Creek, included in the Ellwood-Devereux Coast Open Space and Habitat Management Plan is honored when implementing the CWMP.

Action 6.1.6. Ensure that the implementation of the CWMP supports and complements the requirements of the City's Stormwater Management Plan

Action 6.1.7. Ensure that the implementation of the CWMP supports and compliments the Homelessness Strategic Plan.

Action 6.1.8. Ensure that the goals of the City's Urban Forest Management Plan are considered when implementing the CWMP.

Action 6.1.9. Annually review CIP project list for consistency with CWMP Goals, Strategies, and actions. Revise CIPs to ensure consistency with CWMP to the maximum extent possible.

Action 6.1.10. Develop a Local Coastal Program that includes policies, programs, and ordinances that maximize protection for the City's creeks and watersheds in the Coastal Zone, consistent with the CWMP.

Strategy 6.1.11. Update the General Plan (and Local Coastal Program once certified) as appropriate to ensure the City's policies and ordinances keep up with emerging needs, threats, and opportunities related to City creeks and watersheds. Updates should include updates, as warranted, to Open Space Element Figure 3-5 and Conservation Element Figures 4-1 to map all creek and riparian habitat as ESHA.

7. Public Education and Engagement

Goal 7. To engage with and provide education information to Goleta residents emphasizing the benefits of creek corridors and the important ecological values they provide; ensuring that residents and business owners understand rules regarding stormwater and illicit discharge regulations, understand the limits on development adjacent to City creeks; providing information on available CWMP-related programs residents can utilize; and providing information on how best to protect the valuable ecological resources for the City.

Strategy 7.1. The City shall work to educate Goleta youth on the impacts to and values of City creeks and clean water and what can be done to support healthy creeks and watersheds.

Action 7.1.1. Continue to support K-6 education outreach related to watersheds, local hydrologic conditions, storm and sewer systems, and the benefits of clean and healthy waterways and beaches through an agreement with Explore Ecology, an environmental education and arts non-profit located in Santa Barbara, or through other means.

Action 7.1.2. Consider expanding outreach to grades 7-8 to reach junior high aged students, as funding and staffing supports. Also consider expanding outreach to high school students, as funding and staffing supports.

Action 7.1.3. Consider supporting or leading educational and recreational field trips to Goleta creeks and watershed.

Strategy 7.2. The City shall continue to work with business owners to support green business practices that will support creek water quality and quantity.

Action 7.2.1. Continue the business-based educational program, by conducting site visits of City businesses to educate the businesses on appropriate BMPs for their particular industry to minimize impacts to storm water quality and stream flows.

Action 7.2.2. Continue to participate in the Green Business Program of Santa Barbara County. The Green Business Program provides resources, assistance and evaluations to businesses that want to operate more sustainably in order to conserve resources, generate savings, and gain certification and recognition.

Strategy 7.3. The City shall notify property owners adjacent to City creeks of limits on development, and other activities and uses which may harm creeks or watersheds, consistent with City policies and regulations.

Action 7.3.1. At least annually, send a mailer to property owners within approximately 125 feet of a creek riparian habitat explaining the values and benefits of healthy creeks and watersheds, and policies and regulations that apply to any potential development on their property. The notice should include limits on activities in SPAs and the procedures for requesting approval of activities potentially impacting a creek ESHA or adjacent ESHA (e.g., wetlands); explain the impacts of pollution, litter, lighting, noise, and vibrations on riparian corridors; and provide suggestions for planting native plants to help protect riparian habitats and stormwater management enhancements, such as infiltration features and ocean friendly gardens See Appendix K, Example of Public Outreach Material, for an example of flier, providing planting suggestions.

Action 7.3.2. Notify property owners if any development or restoration project will result in a change to the mapped area of the riparian habitat ESHA on their property or an adjacent property that would lead to a change in the developable area on the owner's property.

Strategy 7.4. The City shall seek to inform Goleta residents of best practices for disposal of household hazardous waste in order to prevent those materials from being discharged into City creeks through the storm drain system or through direct dumping into a creek or SPA.

Action 7.4.1. Maintain a household hazardous waste collection center which is available to all City residents and businesses.

Action 7.4.2. Provide the public with information regarding various options for hazardous waste disposal. These options include: hazardous waste collection at UCSB; collection of antifreeze, batteries, oil, paint, and other materials at the Marborg Recycling Center; free medicine collection at CVS Pharmacy; and free Sharps mailing containers for medicinal needles.

Action 7.4.3. Continue to focus outreach efforts on hotspot neighborhoods, identified through the Stormwater Management Program, that have a history of illegal dumping within City creeks.

Strategy 7.5. The City shall consider the development of a City Creek Interpretive Sign Program to inform residents of the values and regulations related to creeks and associated ESHAs and SPAs within the City.

Action 7.5.1. Identify locations for interpretive signs. Sign locations should be easily viewed by the public along creeks corridors at key viewpoints from streets (including bridges), trails, and bike paths

Action 7.5.2. Design, install, maintain, and replace as needed creek interpretive signage at identified locations as funding is available.

Action 7.5.3. Replace outdated creek identification signage as appropriate to ensure a consistent style for City creek signage that eliminates inconsistent information.

Action 7.5.4. Post signs identifying creeks by name along all public bridges over creeks within the City.

Strategy 7.6. The City shall continue to mark storm drains to notify the public that materials entering the storm drain system discharge directly into City creeks and into the ocean.

Action 7.6.1. Continue to mark all storm drains, new storm drains, and check markers every year and replace as needed.

Strategy 7.7. The City shall utilize the City website (www.cityofgoleta.org) to provide the public with creek-related information.

Action 7.7.1. Continue, when information is not otherwise consolidated, to maintain existing web pages that include information relevant to the Actions within the CWMP. These pages include "Parks and Open Space" and "Environmental Services."

Action 7.7.2. Review the contents of, and update as needed, these webpages at least quarterly.

Action 7.7.3. Consider developing a separate permanent page for the creek and watershed related information with links to the webpages referenced in Action 7.7.1.

Action 7.7.4. Include in the City's "Cumulative Projects List", which is periodically posted on the "Major Development Projects" page on the City website, any request for a SPA buffer reduction request included with a development application request.

Action 7.7.5. Identify in the City's "Cumulative Project List" all projects proposed adjacent to a creek or tributary in the City.

Strategy 7.8. The City shall continue to support creek outreach efforts and events within and near the City.

Action 7.8.1. Continue to support Creek Week cleanup events. Support will include inclusion in the City's online event calendar.

Action 7.8.2. Where funding and resources are available, support creek cleanup programs, including hauling trash to the transfer station and properly removing dangerous or hazardous materials identified during creek cleanups.

Action 7.8.3. Continue to support other outreach events, including the Lemon Festival and Earth Day, and where feasible utilize these events to inform the public of the City's efforts to protect creeks and their riparian habitats.

Action 7.8.4. Participate, in collaboration with Explore Ecology and other organizations as appropriate, in the annual California Coastal Cleanup Day.

Strategy 7.9. The City shall utilize email notification to inform interested parties of information, events, and development proposals relevant to City creeks.

Action 7.9.1. Upon adoption of the CWMP, transition the listserv for project updates to a general listserv to provide updates on creek activities, information, and

developments adjacent to creeks and associated riparian habitat, including where a SPA buffer reduction is proposed.

Strategy 7.10. The City shall utilize other digital outreach efforts where opportunities exist to engage the public on topics related to creeks and associated riparian habitats, including groundwater recharge issues and resources.

Action 7.10.1. Engage the public in creek issues through the use of social media platforms including Twitter, Facebook, and other media as appropriate.

Action 7.10.2. Continue to utilize the Monarch Press as a forum to inform the public on City programs aimed at stormwater and water protection through the monthly "Goleta's Green Room." Note that the first "Goleta's Green Room" post in the Monarch Press occurred in June 2020.

Strategy 7.11. The City shall seek to incorporate ongoing public input regarding the implementation of the CWMP.

Action 7.11.1. Hold at least semi-annual meetings with interested community members to discuss issues related to City creeks. Topics to discuss should include the variety of programs and actions outlined in the CWMP.

Action 7.11.2. Provide the City Council with options for an advisory body to support City Council's prioritization and implementation of the CWMP. Options include, but are not limited to, the creation of a new Creek and Watershed Advisory Committee, an informal advisory committee, or utilization of an existing committee or commission.

Strategy 7.12. The City shall seek to coordinate with private property owners to address impairments.

Action 7.12.1. Continue and improve coordination with the Union Pacific Railroad and CalTrans to address impairments. Coordination should include addressing the impacts of human presence adjacent to creeks, invasive plants (arundo, pampas grass and fountain grass), and ensuring that culverts along the train tracks and Highway 101 do not impede drainage and fish and wildlife movement.

Action 7.12.2. Engage with private property owners along City creek corridors, where appropriate, to support land purchases, conservation easements, and restoration projects, where interest and funding support.

B. Regulation of Development

8. Review and Regulation of Development

Goal 8. To ensure that the various qualities and services provided by City creek corridors and their associated watersheds are protected and considered during the review, permitting, and operation and use of development.

Strategy 8.1. The City shall apply existing General Plan and GMC policies and regulations regarding creek and watershed ESHA to the siting of all new development.

Action 8.1.1. Apply SPA buffer requirements identified in General Plan Conservation Element and Title 17 of the GMC.

Action 8.1.2. Limit the uses and activities allowed in SPA buffers to those allowed pursuant to the General Plan Conservation Element and Title 17 of the GMC.

Action 8.1.3. Ensure that site design and development preserve, and where feasible enhances, wildlife corridors and habitat linkages, consistent with General Plan Conservation Element and Title 17 of the GMC. In conducting this analysis on a project-specific basis, the City should consider the studies and resulting information on wildlife use of City creek corridors provided in the CWMP along with any other information available.

Action 8.1.4. Ensure design of exterior lighting is controlled and directed away from creek and riparian area ESHAs, SPAs, and wildlife corridors, consistent with the General Plan Conservation Element and Title 17 of the GMC.

Action 8.1.5. Address and seek to minimize potentially significant noise, vibration, and lighting impacts to special-status species and wildlife corridors, adjacent to and within creeks, riparian areas, and SPAs consistent with the General Plan Conservation Element and Title 17 of the GMC.

Action 8.1.6. Apply all other General Plan policies and Goleta Municipal Code requirements, as applicable, to new development.

Action 8.1.7. Consider amendments to General Plan subpolicy CE 2.2 and GMC Section 17.30.070 to provide greater clarity regarding SPA buffer requirements and to provide greater protection to SPAs. Consider biological resources and water quality in any proposed amendment to subpolicy CE 2.2 of the General Plan/Coastal Land Use Plan.

Strategy 8.2. The City shall enforce existing policies and regulations related to landscaping design for all new development to support a sustainable riparian habitat.

Action 8.2.1. Require the inclusion and installation of ecologically appropriate native vegetation, collected/propagated from native plants sources in City watersheds, where available, in SPA buffers consistent with General Plan Conservation Element and Title 17 of the GMC.

Action 8.2.2. Ensure that landscaping is sited and designed to avoid or minimize the need for fuel modification post-development, consistent with General Plan Conservation Element and Title 17 of the GMC.

Action 8.2.3. Ensure that landscaping, screening and vegetated buffers support wildlife habitat whenever feasible consistent with General Plan Conservation Element and Title 17 of the GMC. Information from the CWMP should be used in the consideration of landscaping to support wildlife habitat.

Action 8.2.4. Ensure compliance with the City's Water Efficient Landscaping Ordinance.

Strategy 8.3. The City shall ensure that new development meets the requirements of the City's Stormwater Management planning documents, permits, and regulations during construction.

Action 8.3.1. Consistent with the City's Phase II Small MS4 Permit, General Plan subpolicy CE 10.7(a), and GMC Chapter 15.09 (Grading, Erosion and Sediment Control), require a Stormwater Control plan, and Stormwater Pollution Prevention Plan (SWPPP) or Erosion and Sediment Control Plan (depending on the size of the disturbed area) for all earth moving activities.

Action 8.3.2. Provide a copy of the City's "Storm Water Pollution Prevention Plan (SWPPP) Preparation Guidance Manual" at the public planning counter for public availability and post on the City's Planning and Environmental Review and Public Works Department webpages for reference purposes.

Strategy 8.4. The City shall ensure that new development adheres to stormwater management policies and regulations regarding site design and maintenance.

Action 8.4.1. Continue to apply the City's post-construction stormwater management requirements as detailed in GMC Section 13.04.115.

Action 8.4.2. Provide a copy of the "Stormwater Technical Guide, Compliance with Stormwater Post-Construction Requirements in Santa Barbara County" at the public planning counter and post on the City's Planning and Environmental Review and Public Works Department webpages for reference purposes.

Strategy 8.5. The City shall ensure that new development adhere to, or exceeds, City floodplain management policies and regulations to minimize damage to structures and the danger to life caused by flooding.

Action 8.5.1. Ensure that the capacity of natural drainage courses and floodplains are not negatively impacted by proposed development, consistent with the General Plan Safety Element.

Action 8.5.2. Ensure the application of the City's floodplain regulations found in GMC Chapter 15.10 (Floodplain Management) for new development, consistent with General Plan subpolicy SE 6.3.

Action 8.5.3. Continue to apply a watercourse setback consistent with General Plan subpolicy SE 6.6 and as detailed in GMC Chapter 17.31. Apply this requirement in a way that complements and does not supersede any buffer requirement required to protect creek and riparian ESHA.

Strategy 8.6. The City shall ensure that new development adheres to the requirements of CEQA, where applicable.

Action 8.6.1. Continue to apply the "County of Santa Barbara Thresholds and Guidelines Manual" (last updated October 2002) until the City updates this document.

Action 8.6.2. Conduct a comprehensive update to the City's CEQA Thresholds Manual, consistent with General Plan Implementation Action CE-IA-2. CE-IA-2 calls for an update to the CEQA Thresholds Manual to incorporate environmental standards consistent with the policies and standards set forth in the City's General Plan Conservation Element. This update should consider protections to creeks and associated riparian habitats as well as groundwater resources.

Strategy 8.7. The City shall seek to prevent non-stormwater hazardous and non-hazardous discharges into the City's storm drain system and into City creeks.

Action 8.7.1. Continue to investigate potential illicit discharges, consistent with GMC Section 13.04.120.

Action 8.7.2. Identify and initiate enforcement or report illicit discharges during annual creek surveys within City creeks.

C. Habitat Enhancement and Restoration

9. Land Purchases and Conservation Easements

Goal 9. To utilize land purchases and/or conservation easements, where feasible and appropriate considering the variety of land use demands and constraints within the City, to support riparian habitat enhancement and restoration.

Strategy 9.1. The City shall, where resources support, consider land purchases and/or support land purchases by conservation organizations for habitat restoration and enhancement purposes.

Action 9.1.1. Continue with land purchases located in the Open Space Overlay on General Plan Figure 2-1 and maintain purchased properties for Monarch Butterfly, Raptor Roosting, and/or Riparian Habitat. These properties are located along and south of Mathilda Drive, adjacent to the Ellwood Mesa Open Space within the Devereux Creek watershed.

Action 9.1.2. Where interested property owners are identified, consider land purchases, or support efforts by a third party, that will serve to restore riparian habitat, preserve floodplains and SPAs, infiltrate stormwater, and/or reconnect wildlife corridors along City creeks.

Action 9.1.3. Ensure that potential land purchases to provide habitat enhancement and/or restoration do not conflict with other land use considerations. These include limitations in state law on the conversion of sites zoned for housing and for sites used in the City's Regional Housing Needs Assessment as well as limitations on conversion of agriculturally zoned land as outlined in General Plan Land Use Element Policy LU 7.5.

Action 9.1.4. When considering potential land purchases for restoration, prioritize parcels that contain or are adjacent to riparian and/or stream habitat, or where the opposite bank of the creek is also City-owned, to ensure any future restoration efforts can be done on both sides of the riparian corridor. Additional favorable consideration

should be given to parcels within the mapped floodplain and that may provide a natural buffer between creeks and urban and agricultural uses.

Action 9.1.5. When considering potential land purchases, consider input from CWMP stakeholders, and City Council's advisory body, if established, on advisable locations.

Action 9.1.6. When considering potential land purchases, consider prioritizing efforts to acquire Bishop Ranch south of Cathedral Oaks Road, to protect and enhance Glen Annie Creek and Los Carneros Creek and their associated watersheds.

Action 9.1.7. When considering potential land purchases for restoration, consider sites that will be beneficial to address watershed adaptation to future impacts due to climate change,

Strategy 9.2. The City shall support the establishment of conservation easements along creek corridors within the City.

10. Invasive Plant Removal

Goal 10. To eradicate existing and future stands of invasive non-native species and prevent or control new occurrences of invasive non-native plant species within creek corridors.

Strategy 10.1. The City shall seek to control invasive plant species within City creek corridors, as feasible, based on funding and staff resources.

Strategy 10.2. The City shall undertake annual monitoring, as feasible, to identify and eradicate or control new occurrences of arundo, Cape ivy, English ivy, and Perwinkle and any other invasive non-native species as listed on the Cal-IPC Inventory of non-native invasive plants in California.

11. Riparian Tree and Vegetation Planting and Protection

Goal 11. Improve riparian habitats through the planting of native trees and native vegetation and protection of existing native trees and vegetation within and adjacent to riparian corridors within the City.

Strategy 11.1. The City shall ensure that new trees and plants planted installed in or adjacent to creeks and riparian habitats and within SPAs are from local seed or propagule source (genotype) collected from City creek watersheds, where available.

Action 11.1.1. Establish and maintain a native tree and plant list to use for riparian corridor tree planting and limit plantings to only those trees on the list. A preliminary list of acceptable native trees is provided below:

- Coast live oak (*Quercus agrifolia*)
- Western sycamore (*Platanus racemosa*)
- Black cottonwood (*Populus trichocarpa*)
- California bay laurel (*Umbellularia californica*)
- Arroyo willow (*Salix lasiolepis*)

- Red Willow (*Salix laevigata*)
- Sandbar willow (*Salix exugia*)
- White alder (*Alnus rhombifolia*)

Action 11.1.2. Where feasible, utilize clones or direct descendants of local native trees from City creek watersheds for new plantings in and adjacent to creek and riparian habitats and within SPAs. See Action 11.1.1 above for acceptable native trees.

Action 11.1.3. Ensure that trees approved as memorial tress in and adjacent to riparian corridors in accordance with Resolution No. 10-54 are on the City's native tree list. Update Resolution No. 10-54 by 2022, or as soon as feasible, to ensure consistent application.

Action 11.1.4. Prepare and adopt a Tree Protection Ordinance, consistent with General Plan Implementation Action CE-IA-4, by 2024, or as soon as feasible. The Tree Protection Ordinance should address protections for native trees city-wide and the policies outlined in Conservation Element Policy CE 9 (Protection of Native Woodlands).

Strategy 11.2. As resources allow, the City shall plant ecologically appropriate native trees and appropriate vegetation in City-owned open spaces within creeks and SPAs (see also Action 11.1.2 above).

Action 11.2.1. Identify locations for tree plantings utilizing the information provide in the CWMP and other documents as warranted. Areas of primary concern include areas in Evergreen Park adjacent to El Encanto Creek. Additionally, consider restoration in other City open spaces, including, but not limited to, La Goleta Neighborhood Open Space along Las Vegas Creek, Stonebridge Open Space on San Pedro Creek, and the San Jose Creek Neighborhood Open Space.

Action 11.2.2. Continue to monitor locations that would benefit from native tree plantings to improve habitat values in City open spaces. Map such locations during annual creek surveys.

Action 11.2.3. Refrain from plantings in areas that may be a location for a larger restoration effort in the near future.

Strategy 11.3. As resources allow, consider the establishment of a private property tree planting program for properties adjacent to City creeks.

Action 11.3.1. Develop a Tree Planting Program for private property owners adjacent to City creeks. Under such a program, the City would provide the trees to ensure they are local genotypes collected from City creek watersheds where available and funding for tree planting, including irrigation. Focus the program on creek segments with identified lack of bank-top vegetation and areas with exotic vegetation.

12. Creek Restoration and Enhancement Projects

Goal 12. To improve the in-creek and riparian habitat through voluntary habitat restoration projects and through mitigation and/or conditioning of development.

Strategy 12.1. The City shall ensure, where the City has regulatory authority, that General Plan policies, as applicable, are adhered to during restoration and enhancement efforts.

Action 12.1.1. Ensure that restoration and enhancement projects comply with General Plan Conservation Element Policy CE 2.6 (Restoration of Degraded Creeks).

Strategy 12.2. The City shall complete existing Capital Improvement Program projects that will improve riparian habitats throughout the City.

Action 12.2.1. Complete planned CIP project #9009 - San Jose Creek Emergency Channel Repair.

Action 12.2.2. Complete planned CIP project #9007-1 - San Jose Creek Bike Path middle extent.

Action 12.2.3. Complete Action 13.3.1 (Hollister Avenue Bridge Replacement). In addition to decreased flooding, this project will improve fish passage at this location on San Jose Creek.

Action 12.2.4. Complete the Ellwood Trails project, including restoration along Devereux Creek.

Strategy 12.3. The City should, where funding and resources allow, plan, implement, and complete new capital projects to address fence revetment removal within City creeks.

Action 12.3.1. Develop a CIP project based on the Project Description Sheet (Appendix I, pages 1-2) for fence revetment removal. This CIP may be a programmatic approach for removal of all such revetments or as separate projects for each individual creek identified with this impairment (Maria Ygnacio, San Jose, Las Vegas, San Pedro, Glen Annie Creeks). As part of the CIP project development, identify relevant property owners and permitting requirements for removal. As an example, the fence revetment within Las Vegas Creek was installed as a condition of approval for adjacent development.

Action 12.3.2. Investigate the permit history for fence revetments, collaborate with landowners, and educate landowners about obsolete, or poorly functioning fence revetments, and about more natural alternatives, in order to effectuate fence revetment removal projects, to facilitate wildlife movement, and enhance creek aesthetics.

Strategy 12.4. The City should, where funding and resources allow, prioritize and complete new capital projects to address the removal of concrete channels within the City.

Action 12.4.1. Develop a CIP project or projects based on the Project Description Sheet (Appendix I, pages 3-4) for removal of concrete channels within City creeks. This CIP may be a programmatic approach for removal of all such concrete channels or as

separate projects for each individual creek identified with this impairment (Maria Ygnacio, San Jose, Las Vegas, San Pedro, Los Carneros, Glen Annie, El Encanto, and Winchester Canyon Creeks).

Action 12.4.2. Consider prioritizing locations that do not have existing or pending projects to address impairments associated with concrete channels.

Action 12.4.3. Conduct engineering feasibility analyses in support of concrete channel removal and creek restoration projects in a timely fashion.

Strategy 12.5. The City should, where funding and resources allow, complete new capital projects to address channel knickpoints and scour within City creeks.

Action 12.5.1. Develop a CIP based on the Project Description Sheet (Appendix I, pages 5-6) to redesign channel beds to address knickpoints and scour. This CIP may be a programmatic approach for redesign of all such knickpoints and scour or as separate projects for each individual creek identified with these impairments (various locations on most creeks).

Action 12.5.2. Prioritize implementation on City-owned sites.

Strategy 12.6. The City should, where funding and resources allow, complete new capital projects to address bank repair and stabilization along City creeks.

Action 12.6.1. Develop a CIP based on the Project Description Sheet (Appendix I, pages 7-8) to address streambank repair and stabilization where needed along City creeks. This CIP may constitute a programmatic approach for redesign of all such locations with increased risk of bank failure and channel widening or as separate projects for each individual creek identified with this impairment (San Jose, San Pedro, Glen Annie, Winchester Canyon creeks).

Action 12.6.2. Ensure project consistency with General Plan Safety Element subpolicy SE 5.6 (Streambed Stabilization Projects) and the Conservation Element.

Action 12.6.3. Prioritize San Jose Creek restoration due to the significance of the creek for steelhead, existing CIP projects within the same area of the creek, and the fact that active erosion is occurring along San Jose Creek on a City-owned parcel.

Strategy 12.7. The City should support Flood Control capital projects that support habitat enhancement.

Action 12.7.1. Support funding, design, and permitting, as appropriate, for SBFCD's San Pedro Creek Fish Passage project. The project will modify the existing concrete-lined trapezoidal channel from Calle Real at the downstream end to the terminus of the concrete lined channel at the upstream end (approximately 1,565 feet) in order to accommodate fish passage.

Strategy 12.8. The City shall develop and support projects to remove fish passage impediments within the City, whenever feasible.

Action 12.8.1. Where opportunities exist, coordinate with relevant local, state, and federal agencies and interested parties to develop projects to remove fish passage barriers to address impairments detailed in Table 31. Information provided in the Project Description Sheet (Appendix I, pages 5-6) to redesign channel beds to address knickpoints and scour can be used for further considerations regarding implementation.

Action 12.8.2. If full removal proves infeasible at specific locations, consider development of projects, with appropriate partners, to consider barrier modifications to support fish passage.

Action 12.8.3. Prioritize, when possible, permitting for fish passage projects.

Strategy 12.9. The City should develop and support projects to address incompatible uses within creeks and SPAs.

Action 12.9.1. Seek to remove incompatible uses and restore creek corridors to natural conditions where feasible. An example project could include addressing recreational disc golf activities within Evergreen Park within the El Encanto creek corridor.

D. Flood Control, Drainage, Water Quality, and Baseflows

13. Flooding and Drainage

Goal 13. To ensure an adequate drainage system to address stormwater and flooding within City watersheds.

Strategy 13.1. Ensure existing policies and standards are applied to all new development to address impacts to stormwater and drainage within the City.

Action 13.1.1. Apply post-construction stormwater regulations consistent with Strategy 8.4.

Action 13.1.2. Apply floodplain development regulations consistent with Strategy 8.5.

Strategy 13.2. Study and evaluate drainage issues and sources of flooding in the entire City.

Action 13.2.1. Complete the planned Capital Improvement Program project #9085 - Goleta Storm Drain Master Plan. The proposed Storm Drain Master Plan will study patterns of drainage and flooding that exist throughout the entire City, including a specific focus on Old Town Goleta. The work will include evaluating the capacity of existing storm-drain pipes and channels and providing recommendations for improvements to area drainage, storm drain, and channel capacity. Consideration should be given to identifying locations for retrofitting of existing development to support on-site groundwater infiltration.

Action 13.2.2. Implement the recommendations derived from the Storm Drain Master Plan as resources allow.

Strategy 13.3. Complete existing CIP projects that will improve drainage and/or reduce flooding impacts throughout the City while protecting ESHAs and fish and wildlife habitat.

Action 13.3.1. Complete the planned CIP project #9033 – Hollister Avenue Bridge Replacement. The new bridge will have a 100-year storm flow capacity.

Action 13.3.2. Complete the planned CIP project #9081 – Covington Drainage System Improvements. This project will address system capacity, peak flow attenuation, inlet efficiency and downstream conveyance between the inlet at Cathedral Oaks near Laguna Camino Vista, and the outlet at Covington Way and Lake Los Carneros.

Action 13.3.3. Complete the planned CIP project #9090 – La Patera Drainage System Improvements.

Action 13.3.4. Complete the planned CIP project #9105 – Ellwood Beach Drive Drainage Infrastructure Replacement.

Strategy 13.4. Support, as appropriate, SBFCD annual flood control maintenance activities within the City.

Action 13.4.1. Implement Action 5.1.3, including a review of SBFCD's planned activities within the City.

Action 13.4.2. Collaborate with SBFCD to modify maintenance and mitigation practices, where appropriate, to further the Goals of the CWMP.

Strategy 13.5. Continue to support and engage in efforts to better understand the impacts of climate change on flooding within City creeks and watersheds.

Action 13.5.1. Implement Action 5.3.4.

14. Water Quality

Goal 14. Improve the water quality within City creeks to provide higher quality habitat.

Strategy 14.1. The City shall address the discharge of trash and other waste into City creeks and riparian corridors through implementation of the City's Track 2 Trash Implementation Amendment to the City's MS4 Permit.

Action 14.1.1. Follow the complete implementation of the Track 2 Implementation Plan to address trash impacts as staffing and funding permits. Examples of potential action items include increased street sweeping and signage and trash capture systems.

Action 14.1.2. Complete new actions and changes to City operations as identified through the Track 2 Implementation Plan process as staffing and funding permits.

Strategy 14.2. The City shall conduct water quality testing to understand impairments in water quality and potentially identify specific causes of water quality degradation.

Action 14.2.1. Implement Strategy 3.3 and associated actions.

Strategy 14.3. The City shall complete existing Capital Improvement Program projects that will improve water quality within City creeks.

Action 14.3.1. Complete the planned CIP project #9106 - Phelps Ditch Flood Control Channel (El Encanto Creek) Trash Control Structure.

Action 14.3.2. Complete the planned CIP project #9107 - Old Town South Fairview Trash Capture Devices.

Strategy 14.4. The City should, where funding and resources allow, complete new projects to address uncontrolled flows that cause hydromodification impacts and water quality issues in City creeks and inhibit groundwater recharge within the City.

Action 14.4.1. Develop a proactive approach based on the Project Description Sheets (Appendix I, pages 9-10) to address source control retrofits where needed near City creeks. Retrofits for existing structures may include green parking lots/streets/alleys, directing downspouts and runoff from paved surfaces through rain gardens, bioswales, or bioretention basins, and replacement of asphalt/concrete with permeable pavement.

Action 14.4.2. Seek out pilot retrofit projects on City properties, including at City Hall and the Goleta Valley Community Center if possible. When such projects are implemented, utilize outreach tools to demonstrate the success of such efforts to the general public. As an example, the Santa Barbara Creeks Division has installed permeable pavers in City owned parking lots over the past decade.

Action 14.4.3. Encourage and engage with private property owners where potential projects may successfully address hydromodification impacts associated with development built prior to existing stormwater requirements. Consider City funding support for such efforts where funding and resources are available.

Strategy 14.5. The City should incorporate proposed projects in the Santa Barbara County-Wide Integrated Stormwater Resource Plan into the City's Capital Improvement Program.

Action 14.5.1. Add a new CIP project for the Evergreen Park Bioretention and Dry Wells Project. This potential project provides water quality benefits to El Encanto Creek as well as for native vegetation, groundwater, and flood management.

Action 14.5.2. Add a new CIP project for the Dry Wells Project Concept San Pedro Creek (Stonebridge) Open Space Project. This potential project provides water quality benefits for El Encanto Creek as well as for groundwater and flood management.

Strategy 14.6. The City shall address water quality impacts through the implementation of the Homelessness Strategic Plan.

Action 14.6.1. Implement the Homelessness Strategic Plan. Implementation of this plan is expected to result in co-benefits to creek water quality and riparian habitat over time.

Strategy 14.7. The City shall, where opportunities and interest exist, coordinate with upstream and downstream regulatory agencies to address system wide water quality impacts.

Action 14.7.1. Implement Strategies 5.3 and associated actions.

Strategy 14.8. The City shall update the City's SWMP as required by the upcoming MS4 Permit.

Action 14.8.1. Update the City's SWMP to include any new requirements from the upcoming MS4 permit, including the Trash Provisions and the City's Track 2 Implementation Plan for trash. Additional MS4 requirements are anticipated to include increased inspections for commercial and industrial sites; increased collaboration with school districts; and increased and integrated pest management strategy. The new MS4 permit issuance is anticipated in late 2020/early 2021. A revised SWMP is anticipated within one year of permit issue date.

15. Protection of Baseflows

Goal 15. Ensure that adequate baseflows are available in-creek to support healthy riparian habitats.

Strategy 15.1. The City should analyze baseflow conditions to adequately understand baseflow conditions and changes to those conditions within each creek in the City.

Action 15.1.1. Based on the monitoring results obtained through Action 3.4.1. (stream flow monitoring), regularly analyze stream flow data with rain and groundwater data and other variables to accurately determine if impairments to base flows exist within City creeks and their likely cause.

Action 15.1.2. Consider any input from local residents and interested parties regarding potential locations to specifically consider and focus on flow analysis.

Strategy 15.2. Where impairments to base flows are identified through Strategy 15.1, the City should investigate the source of the baseflow reductions and seek solutions to the impairment.

Action 15.2.1. Where a baseflow impairment is identified within a specific creek, and where staffing and funding supports, analyze water diversion rights as compiled in the State Water Resources Control Board Electronic Water Rights Information Management System (https://www.waterboards.ca.gov/waterrights/water_issues/programs/ewrims/).

Action 15.2.2. Consider methods to address any baseflow impairments identified through flow analysis. Methods could include:

- Establish baseline flow through installation of stream gauges in all City creeks and during monthly SBCK water quality sampling.
- Coordination with interested water rights holders to dedicate their rights to instream flow through the State Water Resources Control Board, consistent with California Water Code Section 1707. This section of water code enables the State Water Board to approve petitions to change existing water rights for the purposes of preserving or enhancing wetlands, protecting fish and wildlife, and recreation.

- Remediation of potential illegal diversions through the State Water Resources Control Board Complaints Program (see Appendix H, Potential Impairments Outside the City, for potential locations to investigate).
- Investigation of potential impacts from groundwater well activities.
- Support groundwater recharge efforts consistent with Strategy 14.4.

In many cases, the City would need to work collaboratively on any such efforts with other local jurisdictions and agencies and non-governmental organizations to address such impairments.

Strategy 15.3. The City should continue to regulate the development of new water wells within the City where permitting authority supports this activity.

Action 15.3.1. Continue an effective well moratorium within the City based on City Ordinance No. 15-05.

Action 15.3.2. Consider adoption of a water well ordinance if appropriate. Any such ordinance should include consideration of water well impacts to the Goleta Groundwater Basin and to instream water flows.

7 Glossary of Terms

Glossary of Terms[10]

Active Channel Width	The width of geomorphic features formed by stream flows, typically defined by a break in bank slope along the edge of permanent vegetation, or the area within which sediment is actively transported (and deposited) during small to moderate storm events.
Adverse Impact	A negative consequence for the physical, social, or economic environment resulting from an action or project.
Alluvial Fan	The build-up of alluvial sediments at or near the base of steeply sloped canyons (such as along the Santa Barbara Coastal Plain). Sediments build-up over time on floodplains, creating thick wedges of materials that slope gently downstream.
Alluvial Terrace	Remnant portions of an alluvial fan or plain (multiple fans that coalesce together), formed as a result of downcutting of the stream into the alluvial material, that are no longer (or very rarely) inundated by the stream that deposited the materials. Terraces are often present as a series of stepped surfaces that are elevated above the existing channel,
Alluvium	Sediments such as silt, sand, gravel, cobble and boulder that are transported by streamflow and deposited in the channel or on the floodplain.
Altered Channel Alignment	When the channel has been purposefully moved from its historical (pre-European settlement) flowpath, generally for purposes of flood control or urbanization.
Ambient	Surroundings on all sides; used to describe measurements of existing conditions with response to water, noise, air, and other environments.
Aquifer	An underground, water-bearing layer of earth, porous rock, sand, or gravel, through which water can seep or be held in natural storage. Aquifers generally hold sufficient water to be used as a water supply.
Bank (Left vs. Right)	Left bank The left side and/or bank of a creek or river when looking in a downstream direction. Right bank The right side and/or bank of a creek or river when looking in a downstream direction.
Bank Protection Structures	Boulder-sized rocks, concrete blocks, gabions, or other materials used as protection from bank erosion. These structures are often used at the interface of a natural channel and a culvert or concrete-lined channel, or to slow active bank erosion.
Bedforms	Features on a channel bed that form as a result of geomorphic processes associated with flowing water in a stream. Bedforms include pools, riffles,

[10] Where applicable, definitions acquired from the General Plan Glossary.

	bars and other features that provide channel complexity and habitat variability to the channel bed.
Braided Channel	A network of small channels within a larger channel, creek, or river. The network of small channels are separated by temporary land features (e.g., sand).
Buffer	An open area or barrier used to separate potentially incompatible activities and/or development features; for example, a required setback to separate an area of development from environmentally sensitive habitat, to reduce or eliminate the effects of the development on the habitat.
Channelization	The straightening and/or deepening of a watercourse for purposes of storm-runoff control or ease of navigation. Channelization often includes lining of banks with a retaining material such as concrete.
Coastal Zone (within the City)	That portion of the Coastal Zone, as established by the California Coastal Act of 1976, as amended, which lies within the City, as indicated on the City's Zoning Map.
Concrete-lined Channels	Sections of a creek with concrete channel banks and/or channel beds.
Conservation	The management of natural resources to prevent waste, destruction, or degradation.
Constrained Floodplains	Channel overbank areas that would naturally be inundated during elevated flows, but which have been removed from the natural floodplain through downcutting of the channel as a result of local or upstream land use changes, or by construction of constraining features such as levees, berms, or raised building pads, or where the channel has otherwise been disconnected from the natural floodplain area by the construction of concrete-lined flood control channels or culverting of the channel.
Core-Habitat Area	A large block of natural habitat supporting suitable living conditions for a genetically diverse population of species. Although this term typically refers to habitat supporting a species, here it applies to a large area that likely serves as habitat for a variety of species. Specifically, this refers to the large area of natural habitats in the Santa Ynez Mountains and Los Padres National Forest, north of the City.
Corridor, Riparian	A relatively narrow area along creeks that serve as an interface between terrestrial and aquatic ecosystems.
Corridor, Wildlife	Linear features that connect larger areas of habitat that more mobile species need to live and move, but that do not necessarily provide sufficient habitat for all life history requirements of a species.
Culverts	Rectangular or round fully-enclosed conduits of various sizes, generally made of concrete, that provide a route for flow to pass under a road, railroad, urbanized area or other landscape feature.

Creek	Linear natural and adjoining human-made features that direct precipitation to downstream waterbodies (e.g., river, lake, lagoon, ocean); a minor tributary of a river. Also see stream.
Development	On land, in or under water, the placement or erection of any solid material or structure, discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act, and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use, change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practices Act of 1973.
Downcutting	An erosive geomorphic process that works to remove sediment materials from channel beds, often during repeated elevated flow events (that may be concentrated and/or larger as a result of land use changes), that results in a lowering of the bed relative to the surrounding landscape and can ultimately result in disconnection of the stream from its natural floodplain. Downcutting and floodplain disconnection in Goleta creeks is widespread.
Earthen-engineered Channels	Sections of the creek that have been extensively altered either by re-alignment or by changes to cross-sectional geometry, but with bed and banks that remain predominately composed of natural material or compacted fill material.
Easement	A portion of land created by grant or agreement for specific purpose; an easement is the right, privilege, or interest which one party has in the land of another.
Easement, Conservation	A tool for acquiring open space with less than full-fee purchase, whereby a public agency buys only certain specific rights from the land owner. These may be positive rights (providing the public with the opportunity to hunt, fish, hike, or ride over the land), or they may be restrictive rights (limiting the uses to which the land owner may devote the land in the future.)
Environmentally Sensitive Habitat Areas (ESHA)	As defined in the General Plan (CE 1.1), ESHAs shall include, but are not limited to, any areas that through professional biological evaluation are determined to meet the following criteria: a. 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 that could be easily disturbed or degraded by human activities and developments. b. Any area that includes habitat for species and plant communities recognized as threatened or endangered by the state or federal

governments; plant communities recognized by the State of California (in the Terrestrial Natural Communities Inventory) as restricted in distribution and very threatened; and those habitat types of limited distribution recognized to be of particular habitat value, including wetlands, riparian vegetation, eucalyptus groves associated with monarch butterfly roosts, oak woodlands, and savannas.

c. Any area that has been previously designated as an ESHA by the California Coastal Commission, the California Department of Fish and Game, City of Goleta, or other agency with jurisdiction over the designated area. *(Amended by Reso. 09-59, 11/17/09)*

Erosion, Bank

(1) The loosening and transportation of rock and soil debris by wind, rain, or running water.

(2) The gradual wearing away of the upper layers of earth.

Bank erosion is geomorphic process that works to remove natural sediment material and vegetation from channel banks, often during elevated flow events, that results in widening of the channel relative to previous bank positions. Bank erosion in Goleta creeks is not widespread.

Fence Revetment

In Goleta creeks, bank revetment consists of extensive (reach-wide) sturdy fencing and wire mesh, with or without rock backfill, installed along channel banks in the mid-1900's most likely as a combination of protection against bank erosion and as a method of flood control.

Fire Hazard Zone

An area where, due to slope, fuel, weather, or other fire-related conditions, the potential loss of life and property from a fire necessitates special fire protection measures and planning before development occurs.

Floodplain

An area of land adjacent to a waterway, which stretches from the top-of-bank outward to include any land area susceptible to being inundated by floodwaters.

Floodway

The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Also referred to as "regulatory floodway."

General Plan

The City of Goleta General Plan/Coastal Land Use Plan.

Geomorphic Processes

Processes related to the formation and alteration of landforms on the earth's surface. These include a wide range of physical interactions, such as weathering, mass wasting (e.g., landslides), erosion of surfaces (including stream bed and banks), and the movement and deposition of sediments; these actions are present and active in all watersheds and in all stream channels.

Groundwater

Water under the earth's surface, often confined to aquifers capable of supplying wells and springs.

Groundwater Recharge	The natural process of infiltration and percolation of rainwater from land areas or streams through permeable soils into water-holding rocks that provide underground storage ("aquifers").
Habitat Linkage	An area that possesses sufficient cover, food, water, and/or other essential elements for survival and serves as a movement pathway between two or more large areas of habitat.
Habitat Patches	A defined area used by species for breeding, socializing, or obtaining resources such as food, water, or shelter.
Impervious Surface	Surface through which water cannot penetrate, such as roof, road, sidewalk, and paved parking lot. The amount of impervious surface increases with development and establishes the need for drainage facilities to carry the increased runoff.
Knickpoint	A part of a stream channel where there is an abrupt change in channel slope, typically associated with channel bed erosion, and often caused by concentrated streamflows that induce channel downcutting. Knickpoints may either be stable (a steep drop in the channel downstream of a culvert, for example) or active, with the break in slope migrating upstream as the stream bed continues to erode and downcut.
MAP (mean annual precipitation)	The long-term average amount of rainfall that falls per year at a particular location. MAP is often quantified either per calendar year (January through December) or by water year (October through the following September).
Minimize	To reduce or lessen, but not necessarily to eliminate.
Mitigate	To ameliorate, alleviate, or avoid to the extent reasonably feasible
Non-Point Source Pollutants	Pollutants generated over broad areas without a single identifiable discharge point to water, such as agricultural and urban land uses.
Open Space	Natural to semi-natural spaces used by wildlife. These areas support less natural habitat than those characterized in this report as “habitat patches,” but provide space, such as in parks, golf courses, or the sides of roads or highways, that some wildlife can use for various life-history functions.
Point Source Pollutants	Pollutants with identifiable discharge points, such as wastewater treatment facilities or industrial waste discharges.
Rare or Endangered Species	A species of animal or plant listed in: Sections 670.2 or 670.5, Title 14, California Administrative Code; or Title 50, Code of Federal Regulations, Section 17.11 or Section 17.2, pursuant to the Federal Endangered Species Act designating species as rare, threatened, or endangered.
Regulatory Floodway	The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.
Riparian Lands	Riparian lands are comprised of the vegetative and wildlife areas adjacent to perennial and intermittent streams. Riparian areas are delineated by the existence of plant species normally found near freshwater.

Runoff	That portion of rain or snow that does not percolate into the ground and is discharged into streams instead.
Runoff, Storm	Surplus surface water generated by rainfall that does not seep into the earth but flows overland to flowing or stagnant bodies of water.
Scour	Localized erosion of a stream bed or bank caused by concentrated or high velocity flows. Scour often occurs at the downstream end of a concrete-lined or culverted channel where it transitions to a natural channel, or where an in-channel obstruction or constriction directs high-velocity flow toward the channel bed or bank.
Setback	The horizontal distance between the property line and any structure.
Seral Community	A plant or vegetation community in an intermediate stage.
Stream	A flowing body of water, typically smaller than a river.
Ephemeral	A stream that flows only briefly during and following a period of rainfall.
Intermittent	A stream that normally flows for at least thirty (30) days after the last major rain of the season and is dry a large part of the year.
Perennial	A stream that has continuous flow in parts of its stream bed all year-round during years of normal rainfall.
Streamside Protection Area (SPA)	Creek channel, wetlands and/or riparian vegetation related to the creek hydrology, and an adjacent upland buffer area.
Substrate Embeddedness	The extent to which coarse substrate (e.g., gravel, cobbles, boulders) are surrounded by fine sediment (e.g., silt, sand, mud).
Topography	Configuration of a surface, including its relief and the position of natural and human-made features.
Top of Bank	The line formed by the intersection of the general plane of the sloping side of the watercourse with the general plane of the upper generally level ground along the watercourse; or, if the existing sloping side of the watercourse is steeper than the angle of repose (critical slope) of the soil or geologic structure involved, "top of the bank" shall mean the intersection of a plane beginning at the toe of the bank and sloping at the angle of repose with the generally level ground along the watercourse. The angle of repose is assumed to be 1.5 (horizontal): 1 (vertical) unless otherwise specified by a geologist or soils engineer with knowledge of the soil or geologic structure involved.
Watercourse	Natural or once natural flowing (perennially or intermittently) water including rivers, streams, and creeks. Includes natural waterways that have been channelized, but does not include manmade channels, ditches, and underground drainage and sewage systems.
Watershed	The total area above a given point on a watercourse that contributes water to its flow; the entire region drained by a waterway or watercourse that drains into an outflow point, such as a lake, reservoir, or ocean.

Wetlands Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Lands classified as wetlands generally have one or more of the three indicators: 1) a substrate that is predominately undrained hydric soils; 2) a preponderance of plants adapted to moist areas, or hydrophytic plants; or 3) a surface or subsurface water source which is present for sufficient periods of time to promote formation of hydric soils or growth of hydrophytic plant species.

Wildlife Corridors Linear features that connect large patches of natural open space and provide avenues for dispersal or migration of animals and dispersal of plants (e.g., via wildlife vectors).

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