Draft Environmental Assessment

for Issuance of an Incidental Take Permit and Implementation of the City of Santa Cruz Anadromous Salmonid Habitat Conservation Plan

AUGUST 2023

Prepared for:

NATIONAL MARINE FISHERIES SERVICE
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Prepared by:

DUDEK
725 Front Street, Suite 400
Santa Cruz, California 95060

Table of Contents

SECTION **PAGE**

FIGURES

TABLES

APPENDICES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AMBAG	Association of Monterey Bay Area Governments
AMM	avoidance and minimization measure
amsl	above mean sea level
ASHCP	Anadromous Salmonid Habitat Conservation Plan
ASR	aquifer storage and recovery
Basin Plan	Water Quality Control Plan for the Central Coastal Basin
BMP	best management practice
CCC	Central California Coast
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIP	Capital Improvement Program
City	City of Santa Cruz
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
coho	Central California Coast coho salmon (*Oncorhynchus kisutch*)
CRLF	California red-legged frog
dbh	diameter at breast height
DO	dissolved oxygen
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FMMP	Farmland Mapping and Monitoring Program
FMP	Fishery Management Plan
FR	Federal Register
HCP	habitat conservation plan
IPaC	Information for Planning and Consultation
ITP	incidental take permit
mgy	million gallons per year
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
NFCF	Non-Flow Conservation Fund
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

Acronym/Abbreviation	Definition
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NTU	nephelometric turbidity units
OMHCP	Operations and Maintenance Habitat Conservation Plan
PBFs	physical or biological features
PCBs	polychlorinated biphenyls
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SLVWD	San Lorenzo Valley Water District
SSC	California Species of Special Concern
steelhead	Central California Coast steelhead (*Oncorhynchus mykiss*)
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TMDL	total maximum daily load
U.S.C.	United States Code
UCSC	University of California, Santa Cruz
USFWS	U.S. Fish and Wildlife Service
UWMP	Urban Water Management Plan
WSAS	Water Supply Augmentation Strategy
WUA	weighted usable area
ZBWG	Zayante band-winged grasshopper

1 Purpose and Need

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) has prepared this Environmental Assessment (EA) pursuant to the National Environmental Policy Act of 1969, as amended (NEPA), using the 2022 Council on Environmental Quality (CEQ) NEPA Implementing Regulations at 40 Code of Federal Regulations (CFR) Parts 1500-1508. This chapter provides an overview of the Proposed Action, the regulatory background, and the purpose of and need for the Proposed Action.

1.1 Action Requiring Review

NMFS has received an application from the City of Santa Cruz (City) for an incidental take permit (ITP) pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (ESA; 16 United States Code [U.S.C.] § 1531 et seq.) for federally threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) (steelhead) and federally endangered CCC coho salmon (*O. kisutch*) (coho) (Covered Species). The incidental take is anticipated to occur as a result of Covered Activities within the area covered by the City of Santa Cruz Anadromous Salmonid Habitat Conservation Plan (ASHCP) (Plan Area). These Covered Activities include operation, maintenance, and rehabilitation of the City's water supply and water system facilities, including diversion of surface water; operation and maintenance of the City's municipal facilities; and management of City lands. The City has requested that the Section 10(a)(1)(B) permit be issued for a period of 30 years.

The Proposed Action being evaluated by this EA is the issuance of an ESA ITP by NMFS that would authorize take of the Covered Species incidental to the Covered Activities and implementation of the Conservation Strategy to mitigate that take, as contained in the draft ASHCP, in accordance with the statutory and regulatory requirements of the ESA. The approval of the ASHCP and proposed issuance of an ITP are considered federal actions under NEPA. NMFS is the lead federal agency on this review and is fulfilling obligations under NEPA to evaluate the effects of, and alternatives to, the Proposed Action.

1.2 Regulatory Background

The ESA prohibits the unauthorized "take" of an animal species that is listed as threatened or endangered. Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" (16 U.S.C. § 1532[19]; 50 CFR § 222.102). Under federal regulations, "take" is further defined to include habitat modification or degradation that results, or is reasonably expected to result, in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR § 222.102).

Section 10 of the ESA allows NMFS to authorize the taking of species that is incidental to an otherwise lawful activity by a non-federal entity, if the entity first prepares and agrees to implement a habitat conservation plan (HCP) that meets permit issuance criteria. Among other issuance criteria, an HCP must minimize and mitigate to the maximum extent practicable the potential impacts of such incidental take. The City has developed the ASHCP (City of Santa Cruz 2023) in close coordination with NMFS and the California Department of Fish and Wildlife (CDFW), as the City is also seeking a state ITP pursuant to Section 2081 of the California Fish and Game Code (the California Endangered Species Act of 1984).

1.3 Purpose and Need

The purpose of NMFS' Proposed Action is to fulfill our authority under ESA Section 10(a)(1)(B). As NMFS fulfills this authority, we will:

- Respond to the City's application for an ITP for the Covered Species related to Covered Activities, as described in the ASHCP, that have the potential to result in take, pursuant to ESA Section 10(a)(1)(B) and its implementing regulations and policies;
- Ensure that issuance of the ITP and implementation of the ASHCP protect, conserve, and enhance the Covered Species and their habitat to contribute to the long-term survival of the Covered Species; and
- Ensure compliance with the ESA.

The need for the Proposed Action is due to the potential that the City's implementation of Covered Activities within the Plan Area could result in incidental take of the Covered Species, which are currently listed under the ESA, and the Covered Species need protection as provided in the ESA. Normal, otherwise lawful operation of the City's facilities could result in take of the Covered Species, and the City needs a long-term, comprehensive solution that assures compliance with the ESA. The Covered Activities are necessary because they constitute established, essential public services provided by the City. The operation, maintenance, rehabilitation, and management of its water supply and water system facilities, municipal facilities, and City lands are essential to the welfare of the City's citizens and visitors.

NMFS must decide whether to issue or deny the ITP. If NMFS determines that the permit issuance criteria contained in Section 10(a)(1)(B) of the ESA are satisfied, it must issue the ITP to the City. If the ESA's permit issuance criteria are not met, NMFS will deny the permit request.

In this EA, NMFS analyzes the impacts of the Proposed Action on all potentially affected elements of the natural and human environment within the Plan Area. At the end of the review process, the determination of whether the issuance criteria have been met will be presented in (1) a findings and recommendations memorandum that document NMFS' conclusions on permit issuance under Section 10(a)(1)(B) of the ESA, and (2) an ESA Section 7 biological opinion.

2 Description of Proposed Action and Alternatives

This EA considers two possible actions: the No Action Alternative and the Proposed Action. This chapter describes the location of the alternatives (i.e., the Plan Area), alternatives analyzed in detail, which include the No Action Alternative and Proposed Action that NMFS considered in this analysis, as well as alternatives considered but not analyzed in detail. This chapter also describes components common to both alternatives.

2.1 Plan Area Location and Context

The location of the Proposed Action and alternatives (i.e., the Plan Area) is shown on Figure 1. The Plan Area includes watershed and water service/urban areas that total approximately 176 square miles in Santa Cruz County across three geographically distinct areas: (1) the 18-square-mile North Coast watersheds (Liddell, Laguna, and Majors); (2) portions of the 138-square-mile San Lorenzo River watershed; and (3) the City Urban Center, which encompasses approximately 12 square miles centered around the mouth of the San Lorenzo River, as well as the approximately 8 square miles of water service areas outside of the City limits.[1] Steelhead within the Plan Area are part of the CCC steelhead Distinct Population Segment (DPS), listed as threatened under the ESA, consisting entirely of winter-run steelhead and extending from the Russian River south to Aptos Creek in the southern end of Santa Cruz County (NMFS 2021). Streams in the Plan Area are included in the critical habitat designation for the CCC steelhead DPS (70 Federal Register [FR] 52487, September 2, 2005). Coho in the Plan Area are part of the CCC coho Evolutionarily Significant Unit (ESU), listed as endangered under the ESA, extending from Punta Gorda in Humboldt County south to and including Aptos Creek (NMFS 2022a). Critical habitat has been designated for the CCC coho ESU and includes the accessible portions of the streams in the Plan Area (64 FR 24049, May 5, 1999).

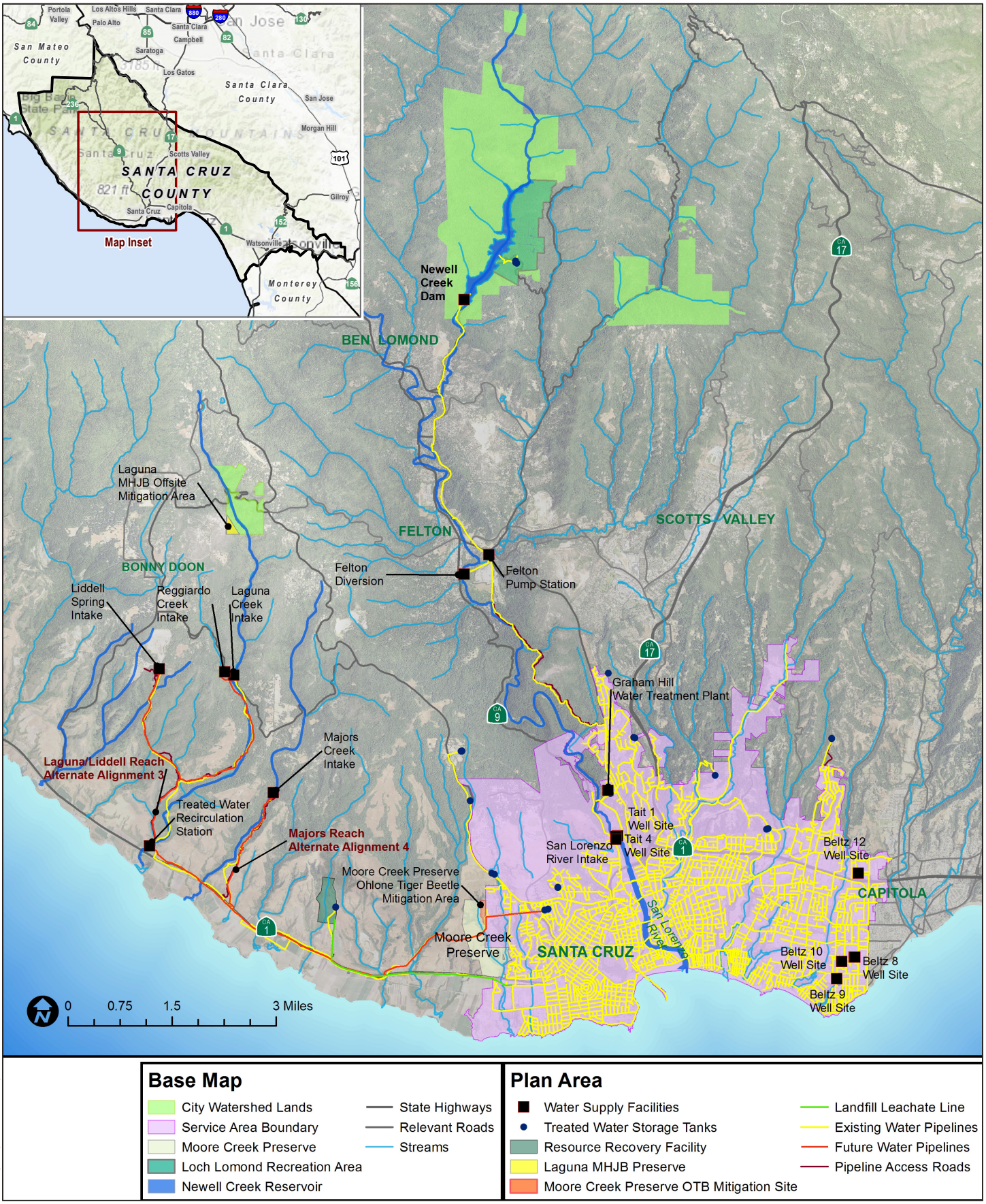
2.2 Alternatives Analyzed in Detail

Alternatives analyzed in detail in this EA consist of the No Action Alternative and the Proposed Action. These alternatives are described as follows, as well as activities common to both alternatives.

2.2.1 Components Common to Both Alternatives

Under both alternatives, the City would continue to conduct activities related to the operation, maintenance, rehabilitation, and management of its water supply and water system facilities, municipal facilities, and City lands. These activities are described in Section 2.2.1.1. Under the Proposed Action, an ITP would authorize incidental take of steelhead and coho from these activities, whereas under the No Action Alternative, the City would need to avoid take of steelhead and coho or obtain ESA take coverage on an individual basis, as further described below in Sections 2.2.2 and 2.2.3. The City would also implement minimum instream bypass flows under both alternatives, which are a component of the ASHCP's Conservation Strategy, as further explained in Section 2.2.1.2. Additionally, the City would also implement standard construction practices under both alternatives, as further explained in Section 2.2.1.3.

[1] The City owns and operates a water system that diverts and serves water both within the City limits and outside of those limits. The areas served by the City outside of the City limits include a portion of the City of Capitola, portions of unincorporated Santa Cruz County in Live Oak and Soquel, along a portion of Graham Hill Road and Branciforte Drive, and an area with limited service only along the coast north of the City, primarily along State Highway 1 up towards Bonny Doon Road.



SOURCE: City of Santa Cruz 2023
NOTES: MHJB = Mount Hermon June beetle; OTB = Ohlone tiger beetle.

FIGURE 1

Project Location and Plan Area

Anadromous Salmonid Habitat Conservation Plan

DUDEK

2.2.1.1 Covered Activities

As explained above, the City would conduct the following activities under both the No Action Alternative and the Proposed Action, which are summarized as follows, listed in Table 1, and fully described in Chapter 3 of the ASHCP:

- Operation, maintenance, and rehabilitation of the City's water supply and water system facilities, including water diversions and reservoir rehabilitation and operations, sediment management, fish ladder and screen maintenance, pipeline installation, rehabilitation, and operations, and dewatering of creeks for maintenance and repairs;
- Operation and maintenance of the City's municipal facilities, including flood control and stormwater maintenance, emergency operations and response, and general vegetation management within riparian corridors; and
- Management of City lands, including Loch Lomond Recreation Area and watershed lands, habitat management and restoration, and monitoring.

Table 1. Summary of Covered Activities[1]

General Activity	Description
Rehabilitation of diversion structures and pipeline reaches	▪ Laguna Creek,[2] Majors Creek, and Reggiardo Creek Diversions: Sediment transport and fish screening improvements ▪ Felton Diversion: Fish passage improvements and pump upgrades and replacements ▪ Tait Street Diversion:[3] Fish passage improvements and diversion capacity increase ▪ North Coast System pipeline rehabilitation: Replacement of portions of supply pipelines
Water diversion	▪ Provision of drinking water utilizing existing water rights and pending water rights modifications under consideration by the SWRCB with addition of "Conservation Flows" (also known as Agreed Flows) at Liddell Spring Diversion, Reggiardo Creek Diversion, Laguna Creek Diversion, Majors Creek Diversion, Newell Creek Dam, Felton Diversion, and Tait Street Diversion and Wells
Reservoir operations	▪ Chemical algaecide treatment of reservoir: 1-5 algaecide treatments annually ▪ Testing deluge and gate valves: 1 test annually of 5-10 cubic feet per second (cfs) for several hours. Bigger tests during winter/high flows as possible ▪ Woody debris removal on reservoir face: 10 cubic yards of less than 10-inch-diameter/8-foot-long wood removed annually
Water diversion sediment management	▪ Liddell Spring Diversion: Excavation of up to 3 yards per event, 1-3 events per year. Valve operations: valves operated as needed to maintain natural sediment transport dynamics during storm events ▪ Laguna Creek Diversion: Excavation of 5-10 cubic yards per event, 1-3 events per year. Valve operations (described above). ▪ Majors Creek Diversion: Excavation of 5-10 cubic yards per event, 1-3 events per year. Valve operations (described above).
Fish ladder and screen maintenance	▪ Felton Diversion: 1-3 maintenance events per year to remove up to 1 yard of sediment and wood material from the ladder ▪ Tait Street Diversion: 1-3 maintenance events per year to remove up to 1 yard of sediment and wood material from the intake
Pipeline operations	▪ Conveyance pipeline system inspections and repairs: Inspection and leak response on 19.23 miles of water line and 5.5 miles of leachate line

Table 1. Summary of Covered Activities[1]

General Activity	Description
	▪ Finished water pipeline system flushing and repairs: Flushing and leak response on 270 miles of water line ▪ Pumping well return to the San Lorenzo River: Ongoing pumping from clear well to remove sediment during high and moderate flows in winter and spring ▪ North Coast valve blow-off to the San Lorenzo River: 5-10 cfs blow-off to riverbank for 1-4 hours per event occurring during any part of the year once every few years
Dewatering of creeks for maintenance and repairs	▪ Dewatered stream reaches can range from approximately 20-200 feet at 1-10 sites for 1-4 weeks per year
Flood control maintenance	▪ Debris/obstruction removal: 1-3 maintenance events per year to remove up to 100 cubic yards of material in wet years ▪ Flood control sediment management/removal: Removal of approximately 2 cubic yards of sediment per drainage structure annually or biannually at up to 30 drainage structures ▪ Vegetation management: Thin riparian groves and remove willows greater than 3 inches diameter at breast height (dbh) and alders greater than 6 inches dbh. Retain a 5-10-foot-wide riparian buffer adjacent to the low flow channel, but remove vegetation greater than 6 inches dbh annually
Stormwater maintenance	▪ Inspection and cleaning: Inspect and clean as needed but as frequently as weekly. Sweep 35 miles of streets daily ▪ Structural retrofits of storm drain inlets and basins: As-needed improvements of storm drain infrastructure ▪ Sanitary landfill leachate management: Ongoing maintenance of two leachate ponds, transmission of leachate to wastewater plant and repair of leachate line
Emergency operations and response	▪ Response to flood, fire, spill, or other related incident on an as-needed basis, lasting from a few days to several weeks every couple of years
General vegetation management within riparian corridors	▪ Pruning and limited removal of riparian trees less than 5,000 square feet on an annual basis during the summer/fall months as needed adjacent to pipeline rights-of-way, water diversions, and other utility infrastructure
Land management	▪ Management of Loch Lomond Recreation Area and watershed lands: Operation and management of 180-acre recreation area and 3,880 acres of open space ▪ Trail maintenance and repair: less than 50 yards of trail in non-anadromous watersheds annually ▪ Road maintenance and decommissioning: - Maintenance: Approximately 6.9 miles of road maintained annually - Decommissioning: 0-1 miles of road including up to 3-4 culverts on non-anadromous drainages annually
Habitat management and restoration	▪ Aquatic habitat management and restoration: Fish removal and dewatering of streams, up to 100 cumulative yards for 2-6 weeks annually ▪ Monitoring: Habitat typing up to 20 miles of stream and tagging/handling up to10,000 salmonids annually. Visual census of up to 5,000 feet of stream annually. Maintenance of up to 10 stream gages, 2 pit tag antennas, 10 temperature loggers, 1 fish trap, and 2 water quality data sondes annually

1 While the term "Covered Activities" is not used for the No Action Alternative, it is expected that the City would implement similar activities under this alternative, as these are ongoing activities.
2 The Laguna Creek Diversion facility was retrofitted in 2021 in conformance with the ASHCP and is not analyzed in this EA.
3 Tait Street Diversion, also referred to as San Lorenzo River Tait Street Diversion, Tait Diversion, San Lorenzo River Tait Intake, etc., is one of two surface water diversions on the San Lorenzo River and located in Santa Cruz with the other being located in Felton.

2.2.1.2 Conservation Flows/Agreed Flows

The City has petitioned the State Water Resources Control Board (SWRCB) to revise its decades-old permitted and licensed water rights in the San Lorenzo River watershed to allow more options for where and how those water rights can be used. The City analyzed the environmental effects of implementation of the Santa Cruz Water Rights Project in the *Final Environmental Impact Report for the Santa Cruz Water Rights Project* (City of Santa Cruz 2021d), which the City Council certified in December 2021. The SWRCB is now considering the proposed water rights modifications, which include the minimum instream bypass flows (also called Conservation Flows or Agreed Flows) that are described in the ASHCP's Conservation Strategy. If the SWRCB approves the petitions to modify the City's water rights, the City will then take steps to incorporate the Agreed Flows into the pre-1914 water rights in the North Coast Streams as well. Therefore, it is reasonably foreseeable that the expected future condition under the No Action Alternative will include the City's implementation of the Agreed Flows and the City's proposed water rights modifications. Given that, both the No Action Alternative and the Proposed Action would include implementation of the Agreed Flows and the proposed water rights modifications. This document presents analyses of the Agreed Flows assuming water rights modifications that were developed and included in the Santa Cruz Water Rights Project Environmental Impact Report (EIR) (City of Santa Cruz 2021d). Note that the effects analysis presented in ASHCP Section 5.2, Effects of Water Supply Operations - Water Diversions (City of Santa Cruz 2023) uses a different baseline than is used in this EA, as described in Appendix A. Specifically, as further discussed in Appendix A, the ASHCP modeling used a baseline that did not account for any additional bypass flows for fisheries habitat at the City's surface water diversions, whereas the Santa Cruz Water Rights Project EIR modeling used a baseline that accounted for interim bypass flows in place in 2018 when the City initiated the EIR. The 2018 interim bypass flows continue to be representative of existing conditions, as the City and CDFW signed a new agreement in 2023 that has the same interim bypass flows as the 2018 agreement. Therefore, like the Santa Cruz Water Rights Project EIR, this EA uses the interim bypass flows (i.e., existing conditions) as the baseline by which to analyze effects of the Agreed Flows. The analyses in the Santa Cruz Water Rights Project EIR are incorporated by reference into this EA, where relevant, and are summarized herein.[2]

Interim bypass flows regulate existing City water supply operations under an interim agreement between the City and CDFW.[3] Agreed Flows regulate City water supply operations under the No Action Alternative and the Proposed Action. The major differences between the interim bypass flows and the Agreed Flows are as follows:

- The Agreed Flows have a bypass during adult migration in Laguna Creek, Liddell Creek, and Majors Creek in April of 0% to 60% hydrologic conditions; the interim bypass flows do not have bypass flows for adult migration during April in those locations.
- The Agreed Flows have a bypass for adult spawning in Liddell Creek and Majors Creek in December of 0% to 60% hydrologic conditions and in Laguna Creek in December of all hydrologic conditions; the interim bypass flows have no bypass for spawning during December.
- The Agreed Flows have a 1 cfs minimum release to Newell Creek with a 0.25 cfs release during low Loch Lomond Reservoir storage levels; the interim bypass flows have a 1 cfs minimum release to Newell Creek at all times.

[2] The Santa Cruz Water Rights Project EIR (State Clearinghouse number 2018102039) is available for review in digital format at the Santa Cruz Public Library, Downtown Branch, 224 Church Street, Santa Cruz, California, 95060, or online at https://www.cityofsantacruz.com/home/showpublisheddocument/86973/637731697885370000.

[3] The interim bypass flow requirements are those flow requirements agreed to by CDFW and the City as part of an agreement between CDFW and the City. The City and CDFW have had numerous such agreements since 2007 during development of the ASHCP, with the most recent agreement being signed in 2023.

- The Agreed Flows have a 40 cfs minimum flow below the Felton Diversion during migration and spawning periods; the interim bypass flows have a 20 cfs minimum during migration and spawning periods below the Felton Diversion.
- The interim bypass flows have an exception year reduced bypass for rearing downstream of the Tait Street Diversion; the Agreed Flows do not have a reduced exception year rearing flow.
- The Agreed Flows have a bypass for adult migration in April of 0% to 60% hydrologic conditions in the San Lorenzo River downstream of the Tait Street Diversion; the interim bypass flows have no bypass for adult migration in April at this location.

In the reach between the Felton Diversion and the Tait Street Diversion, the effect of Agreed Flows is to slightly increase (3% or less) the frequency of flows in the range of 20 cfs to 40 cfs and to slightly decrease (3% or less) the frequency of flows in the range of 40 cfs to 50 cfs, as compared to the interim bypass flows. In the reach of the San Lorenzo River downstream of the Tait Street Diversion, the water rights modifications would result in a small reduction in flow from September through May, relative to the interim bypass flows.

2.2.1.3 City Standard Construction Practices

The City or its contractors would implement standard construction practices during construction activities associated with the No Action Alternative and Proposed Action, where relevant (Appendix B). The City implements these standard practices across projects to reduce adverse effects on the environment during the construction phase of projects.

2.2.2 No Action Alternative

The No Action Alternative reflects future conditions without the Proposed Action and serves as the basis of comparison for determining potential effects to the human environment. Under the No Action Alternative, NMFS would not issue the Section 10(a)(1)(B) ITP to the City, and the ASHCP would not be implemented. The City would continue to conduct operation, maintenance, and rehabilitation of the City's water supply and water system facilities; operation and maintenance of the City's municipal facilities; and management of City lands (i.e., Covered Activities in the ASHCP; see Table 1 above), which would be subject to the prohibition of unauthorized taking of listed salmonid species. When carrying out the activities described in Table 1, the City would operate in a manner consistent with existing authorizations, rights, and legal requirements, including conservation measures for wildlife and plant species covered under the City's Operations and Maintenance HCP (OMHCP) (City of Santa Cruz 2021e). City activities with the potential to cause incidental take of listed fish species would either require measures to avoid incidental take or require individual incidental take authorizations on a project-by-project basis, as is currently the case.

Under this alternative, the City would need to evaluate individual operations and maintenance activities to determine whether incidental take of listed salmonid species could be avoided through seasonal restrictions and other modifications to the activity, or whether an activity-specific incidental take authorization would instead be required. When determined to be required, project-by-project incidental take authorizations would be sought through the Section 7 consultation process or through a project-specific Section 10 permit application. The issuance of individual incidental take authorizations would require a project-by-project mitigation strategy, including implementation of project-specific AMMs. AMMs for individual projects are expected to be similar to those required under the Proposed Action, and may include, but are not limited to, construction timing restrictions, erosion and water quality control measures, sediment transport and fish passage upgrades, temporal restrictions on surface water diversions, and species and habitat surveys. Given the project-by-project review, it is anticipated that

activities, if permitted, would occur at a slower pace and AMMs may be less comprehensive and more site-specific, compared to the Proposed Action. This type of mitigation can also be more expensive and time-consuming and provide less conservation benefit than a regional or watershed-level approach, as provided by the Proposed Action.

As discussed above in Section 2.2.1.2, the SWRCB is now considering Agreed Flows, which were included in the Santa Cruz Water Rights Project EIR. Therefore, similar to the Proposed Action, it is reasonably foreseeable that under the No Action Alternative the City would implement the Agreed Flows with the pending water rights modifications. However, under the No Action Alternative, the City would not implement the ASHCP Conservation Strategy.

2.2.3 Proposed Action

Under the Proposed Action, NMFS would issue the ITP to the City with a 30-year term and the City would conduct the Covered Activities that are the same as the No Action Alternative (see Table 1), and implement the ASHCP. Like the No Action Alternative, under the Proposed Action the City would operate in a manner consistent with existing authorizations, rights, and legal requirements, including conservation measures for wildlife and plant species covered under the City's OMHCP (City of Santa Cruz 2021e). The Covered Activities of the OMHCP are equivalent to the Covered Activities of the ASHCP, where relevant to the Covered Species.

2.2.3.1 Permit Term

The ASHCP is a 30-year plan, and the City has requested authorization from NMFS for a 30-year permit term. The permit term is the length of time for which the City can use the ITP issued by NMFS to cover incidental take of Covered Species resulting from implementation of the ASHCP. Prior to expiration of the ASHCP and ITP, the City may apply to renew or amend the ASHCP and ITP to include an extension of the permit term, subject to subsequent review under NEPA.

2.2.3.2 Covered Species

Covered Species are those species addressed in the ASHCP for which the City is seeking incidental take authorization and for which the Conservation Strategy would be implemented. The ASHCP proposes coverage for two anadromous salmonid species: federally threatened steelhead and federally endangered coho. The ASHCP includes a Conservation Strategy to protect both Covered Species and their habitats.

2.2.3.3 Covered Activities

Covered Activities are activities that the City would implement within the Plan Area that may result in incidental take of a Covered Species. The Proposed Action would allow take of Covered Species incidental to the Covered Activities, which are summarized above in Section 2.2.1.1 and in Table 1. Chapter 3 of the ASHCP fully describes Covered Activities.

2.2.3.4 Conservation Strategy

The Conservation Strategy is designed to avoid, minimize, and fully mitigate the effects of Covered Activities on Covered Species and their habitat in support of the long-term viability of these populations within the San Lorenzo River and North Coast Streams in the Plan Area. The Conservation Strategy recognizes that the City's efforts will support and coordinate with overarching efforts to contribute to the conservation of these species within Santa Cruz County and the larger DPS and ESU boundaries. The Conservation Strategy assumes, and is dependent upon, approval of the pending

Santa Cruz Water Rights Project with the SWRCB. The Conservation Strategy includes three primary components: Biological Goals and Objectives, AMMs, and a Non-Flow Conservation Fund (NFCF). The City would fund the Conservation Strategy through allocation of a portion of its water rate revenues in defined increments over the 30–year permit term. The Conservation Strategy is summarized as follows and is fully described in Chapter 4 of the ASHCP.

Biological Goals and Objectives

The Biological Goals and Objectives provide a statement of desired future conditions and provide the basis for determining strategies, monitoring effectiveness, and evaluating the success of actions. Biological Goals are broad, guiding principles based on the conservation needs of the resources. Biological Goals involve provision of bypass flows at each diversion source to improve habitat conditions; creation, restoration, and enhancement of physical habitat to mitigate any residual effects of the diversions; and avoiding, minimizing, and fully mitigating effects to Covered Species resulting from City operations and maintenance activities. Objectives are expressed as conservation targets or desired conditions for each Biological Goal. Some objectives are further expanded into specific sub-objectives focused on North Coast Streams and the San Lorenzo River for each of the two Covered Species, which are fully described in Section 4.3 of the ASHCP (City of Santa Cruz 2023).

- **Biological Goal #1.** Contribute to the conservation of Covered Species by providing flows sufficient to improve habitat conditions and increase the likelihood of persistence of populations within the Plan Area.
  - **Objective 1.1.** Within two (2) years of permit issuance, and for the duration of HCP implementation, increase the quantity and quality of habitat supporting adult migration in terms of average number of days with flow meeting minimum migration criteria during the adult migration period (December through April for steelhead, December and January for coho).
  - **Objective 1.2.** Within two (2) years of permit issuance, and for the duration of Plan implementation, increase the quantity and quality of habitat supporting spawning as measured by average annual weighted usable area (WUA) during potential spawning periods (after migration event in December-May for steelhead, December-March for coho).
  - **Objective 1.3.** Within two (2) years, and for the duration of Plan implementation, increase the quantity and quality of habitat supporting juvenile rearing as measured by seasonal average (winter, spring, summer) rearing WUA.
  - **Objective 1.4.** Within two (2) years of permit issuance, and for the duration of Plan implementation, increase the quantity and quality of habitat supporting smolt outmigration as measured by annual number of days with flows meeting minimum migration criteria during the smolt migration period (January through May).
  - **Objective 1.5.** Within two (2) years of permit issuance and for the duration of Plan implementation, improve rearing habitat in the San Lorenzo River Lagoon by providing minimum inflow of 8 cubic feet per second (cfs) to improve temperature and dissolved oxygen (DO) levels during periods when the lagoon is closed.
- **Biological Goal #2.** Contribute to the conservation of Covered Species by creating, restoring, or enhancing aquatic habitat in the Plan Area.[4]
  - **Objective 2.1.** Between years 1-10, fund and oversee habitat restoration or enhancement projects worth $2.7M (2018 dollars excluding administration) and potentially including removal of passage

[4] The objectives for Biological Goal #2 relate to implementation of the NFCF (discussed further below).

obstacles, placement of large wood structures, riparian conservation easements, spawning gravel augmentation, riparian restoration, and sediment control projects.

- **Objective 2.2.** Between years 11-20, fund and oversee habitat restoration or enhancement projects worth $2.7M (2018 dollars excluding administration) and potentially including removal of passage obstacles, placement of large wood structures, riparian conservation easements, spawning gravel augmentation, riparian restoration, and sediment control projects.
- **Objective 2.3.** Between years 21-30, fund and oversee habitat restoration or enhancement projects worth $2.7M (2018 dollars excluding administration) and potentially including removal of passage obstacles, placement of large wood structures, riparian conservation easements, spawning gravel augmentation, riparian restoration, and sediment control projects.

- **Biological Goal #3.** Avoid, minimize, and fully mitigate effects to Covered Species resulting from City operations and maintenance activities.
  - **Objective 3.1.** During all years of Plan implementation, operate facilities to avoid stranding Covered Species by implementing a ramping rate during flow changes at the Felton Diversion Dam, Tait Street Diversion, Laguna Creek Diversion, Liddell Spring Diversion, Majors Creek Diversion, and Newell Creek Dam to limit flow reductions such that change in stage is limited.
  - **Objective 3.2.** During all years of Plan implementation, operate facilities to reduce introduction of sediment.
  - **Objective 3.3.** Within ten (10) years of permit issuance, enhance fish passage through the Felton Diversion Dam by upgrading facilities to meet current NMFS and CDFW criteria for fish screens and passage.
  - **Objective 3.4.** Within ten (10) years of permit issuance, enhance fish passage through the Tait Street Diversion by modifying the Tait Street Diversion to prevent entrainment and impingement and provide bypass in accordance with current criteria issued by NMFS and CDFW.

Avoidance and Minimization Measures

The ASHCP incorporates numerous AMMs to eliminate or reduce effects of Covered Activities on Covered Species to the extent practicable. The AMMs define specific tools and techniques and measurable steps to meet HCP objectives and achieve desired future conditions. The AMMs may involve the removal of an activity from a particular location or the scheduling of an activity to occur during a period in which the species is unlikely to be affected. AMMs may also apply constraints or limitations on an activity that allow it to proceed while avoiding or minimizing effects to species. The AMMs are fully listed in Section 4.4 of the ASHCP (City of Santa Cruz 2023) and summarized in this EA. The AMMs consist of the following measures:

- Provision of minimum bypass flows at each City diversion under a range of hydrologic conditions. The minimum instream flow requirements are those flows needed to maintain habitat for steelhead and coho during all freshwater life stages (migration, spawning, incubation, and rearing) over a range of Hydrologic Condition Types. Bypass flows are presented by month, life stage, and hydrologic condition, and are driven by the salmonid life stage having the highest flow requirement. This also includes implementation of ramping rates during flow changes. See Section 4.4.2 of the ASHCP for specific minimum instream flow targets. (ASHCP Section 4.4.2, Measures WS-1 through WS-30, WS-34 through WS-39, WS-41 through WS-46).
- Measures to facilitate sediment transport and fish passage at diversions to avoid accumulation of sediment behind dams, remove accumulated sediment behind dams, flush sediments when the majority of sediment is being transported, allow adult steelhead and coho to migrate upstream, and rehabilitate the Laguna, Reggiardo, and Majors diversions to allow more natural sediment transport (ASHCP Section 4.4.3, Measures WO-15 through WO-17).

- Measures for fish ladder and fish screen inspections and maintenance (ASHCP Section 4.4.2, Measures WS-31 and WS-32; ASHCP Section 4.4.3, Measures WO-18 and WO-19).
- Temporal restrictions on surface water diversions at Felton Diversion (ASHCP Section 4.4.2, Measure WS-33).
- Facility upgrades to Felton and Tait Street Diversions to meet current fish screen and fish passage criteria (ASHCP Section 4.4.2, Measures WS-33 and WS-40).
- Measures to avoid or minimize effects related to treatment of the Newell Reservoir (also referred to as the Loch Lomond Reservoir) with copper-containing algaecides/aquatic pesticides (ASHCP Section 4.4.2, Measures WS-47 through WS-52).
- Measures related to release of reservoir water to maintain aeration of released water, control turbidity, and ensure appropriate temperatures of released water (ASHCP Section 4.4.2, Measures WS-53 through WS-57).
- Use of woody debris removed from the inside reservoir face for instream restoration projects downstream of the reservoir and minimization of debris removal to allow natural habitat-forming material to remain in streams (ASHCP Section 4.4.2, Measure WS-58; ASHCP Section 4.4.4, Measures MF-1 through MF-4).
- General measures for work around water bodies, including working outside the wetted channel, conducting activities during the low-flow season, erosion control measures, and measures related to management of riparian vegetation for shading, streambank stabilization, and removal of non-native vegetation (ASHCP Section 4.4.3, Measures WO-1 through WO-8).
- Measures applicable to work that must occur within the wetted channel, such as isolation of the work area from flowing water, relocation of fish from areas to be dewatered to nearby suitable habitat, minimizing hazardous materials spills/contamination, and staff training (ASHCP Section 4.4.3, Measures WO-9 through WO-14).
- Measures to avoid sediment discharge to water courses, and contain sediment and spills, including procedures for flushing pipelines to reduce impacts of potential chlorine and sediment discharges, and preventing riparian erosion and hydromodification by implementing flow dissipation, erosion control, and hydromodification-prevention measures; and minimizing sediment discharge, turbidity, and color impacts by implementing sediment, turbidity, erosion, and color control measures (ASHCP Section 4.4.3, Measures WO-20 and WO-21).
- Procedures for dewatering and relocation of Covered Species, construction timing guidelines, and restoration and regrading of stream channels following completion of work activities, minimizing the size of access routes and staging areas and siting them outside of sensitive riparian and wetland areas (ASHCP Section 4.4.3, Measures WO-22 through WO-30).
- Installation of habitat improvement features (e.g., boulders, riparian plantings) in conjunction with scheduled instream repair work whenever feasible (ASHCP Section 4.4.3, Measure WO-31).
- Surveys to identify important salmonid habitat areas, vegetation characteristics, and sediment aggradation (ASHCP Section 4.4.4, Measures MF-6 and MF-7).
- Sediment removal restrictions/guidelines (ASHCP Section 4.4.4, Measures MF-5, MF-8 through MF-10).
- Vegetation management guidelines, including timing of vegetation removal and non-native plant control (ASHCP Section 4.4.4, Measures MF-11 through MF-17, MF-36 and MF-37).
- Minimization of stormwater pollutants and runoff, and upgrades to and maintenance of stormwater facilities (ASHCP Section 4.4.4, Measures MF-18 through MF-35).
- Temporal restrictions on vehicle access, installation of drainage improvements, remediation of erosion areas, monitoring and removing unauthorized trails, and assuring appropriate use of trails (ASHCP Section 4.4.5, Measures LM-1 through LM-4).

- Road management including erosion control and procedures for decommissioning of roads that are no longer required for Covered Activities (ASHCP Section 4.4.5, Measures LM-5 through LM-14).
- Habitat restoration methods, permitting, timing, and monitoring protocols (ASHCP Section 4.4.5, Measures LM-15 through LM-21).

Non-Flow Conservation Fund

After implementation of AMMs, some residual effects of Covered Activities would remain, including diversion-related effects at most diversions, effects of sediment and vegetation management in the flood control channels, and repairs conducted instream that involve dewatering. To ensure that effects remaining after the implementation of AMMs are fully mitigated, the City would implement a compensatory mitigation program to fund enhancement and restoration of Covered Species habitat. Compensatory mitigation would focus on actions that improve salmonid habitat in the North Coast and San Lorenzo River watersheds. The mitigation program is designed to address key limiting factors in watersheds where Covered Activities take place. The mitigation program would prioritize measures that address the life stage and/or location directly affected by a specific activity. In some cases, however, direct on-site conservation actions may be impracticable or of limited benefit to the species. As such, conservation actions funded may include areas outside the Plan Area or be focused on other life stages than those directly affected by Covered Activities. The NFCF would allocate approximately $8 million[5] to fund numerous habitat enhancement projects over the 30-year permit term.

The City would work with NMFS and CDFW to form a Technical Advisory Committee (TAC) to develop a working list of potential habitat enhancement projects. The TAC would evaluate potential projects over a planning cycle of 5 years. The number of projects selected for funding through the NFCF would vary for each 5-year planning cycle based on the size and complexity of projects. It is expected that most projects funded through the NFCF would require a 1- to 3-year project timeline from initial planning to construction. The TAC would determine the actual projects selected for funding, which are not known at this time, based on restoration opportunities and priorities during Plan implementation. Table 4-9 of the ASHCP identifies possible project types, including but not limited to floodplain expansion and riparian corridor restoration; removal of bridges, dams, and other passage obstructions; and installation of large wood structures in streams.

The NFCF project types would focus on linkages with the specific residual impacts identified from the Covered Activities. While the residual impacts are generally limited to a specific life history stage and/or water year type, many of the potential projects that the City would implement through the NFCF provide benefits across life history and water year types. For example, placement of large wood structures to offset impacts to rearing in dry years would provide deeper pools and pool tail-outs to increase summer rearing opportunities, and could also provide high-flow refuge during wet winters and improve spawning opportunities through better substrate sorting.

Monitoring Program

The Proposed Action also includes a monitoring program to assess compliance with the terms of the ASHCP, verify progress toward the biological goals and objectives, provide information so that the City can adapt AMMs as needed in response to changing conditions and new knowledge, and inform management decisions including the selection of NFCF projects. The monitoring program would involve data collection on the distribution and abundance of the Covered Species, their habitats, and potential threats within the Plan Area. Monitoring activities would consist of

[5] The NFCF analysis presented in Appendix 1 of the ASHCP estimated a range of approximately $8,011,479 to $8,250,000 specifically for habitat conservation spending over the permit term. $8 million is used for simplicity's sake in this discussion and future planning purposes.

the following categories: compliance monitoring for Covered Activities, mitigation effectiveness monitoring for NFCF projects, and population and habitat monitoring for the Covered Species. The City would report monitoring results to NMFS and CDFW in an annual monitoring report which would support an adaptive management approach.

2.2.3.5 Overview of Conservation Strategy Facility Improvements

The ASHCP Conservation Strategy includes several facility improvements including upgrading the Felton, Tait Street, Laguna Creek, Reggiardo Creek, and Majors Creek Diversions where needed to improve sediment transport during high flows and/or fish passage in accordance with current fish screening criteria (NMFS 2022e; CDFW 2000). The potential approval of the ASHCP and issuance of the ITP would not directly authorize these diversion improvements; rather, proposed diversion improvements would be subject to additional permitting and subsequent environmental review under NEPA and/or the California Environmental Quality Act (CEQA) when the City develops specific design details and pursues each of these diversion improvements. Specifically, within 10 years of the signed ITP, the ASHCP calls for modifying the Laguna Creek, Reggiardo Creek, and Majors Creek Diversions on the North Coast to provide improved sediment transport during high flows (ASHCP Objective 3.2.2, Measure WO-17) and the Felton and Tait Street Diversions on the San Lorenzo River to enhance fish passage (ASHCP Objectives 3.3 and 3.4, Measures WS-33 and WS-40). The City completed the Laguna Creek Diversion retrofit in 2021 and it is therefore not analyzed in this EA. Specific design details are not available at this time for the improvements to the other diversion facilities, but the ASHCP's Conservation Strategy generally describes them as follows below.

The Reggiardo Creek[6] and Majors Creek Diversions are concrete impoundments that can collect sediment and debris during storm flows. Sediment may accumulate behind these dams during storm flows and, if the diversions are not properly operated, this sediment may be passed downstream in a concentrated plug. These sediment plugs may impair habitat for production of benthic macro-invertebrates as a food source for Covered Species, and impair habitat for spawning, egg incubation, and juvenile rearing. Thus, as part of the Conservation Strategy, the City would undertake rehabilitation of the Reggiardo Creek Diversion and Majors Creek Diversion to allow flow and sediment to move naturally down the stream channel during high flows and avoid any potential for pulsing of sediment to downstream habitat. Modifications to these structures, which are located above the anadromous reaches on the creeks, would likely include dewatering by way of the installation of a cofferdam and a temporary bypass system, earthwork, reinforced concrete demolition and construction, metal work fabrication and installation, bank armoring, and miscellaneous electrical and mechanical services, including a pneumatically operated spillway gate or a passive intake structure. This work would enable the diversion structures to facilitate bypass flows and passage of suspended sediment and bed load downstream in a more natural manner, minimizing the need for manual clearing of these materials and deposition in downstream habitat.

The Felton Diversion is a surface water diversion/intake on the San Lorenzo River that pumps raw water from the river to the City's Loch Lomond Reservoir. The Felton Diversion was constructed in 1976 and, in general, consists of an inflatable rubber dam, fish-screened intake structures, a conventional sump and high-lift pump station, a slide-gated bypass channel, a Denil-style fish ladder, an operations building, and miscellaneous site improvements. Future rehabilitation of the Felton Diversion would include pump, screen, and ladder improvements, though no pumping capacity increases are currently planned. Proposed fish passage improvements at the Felton Diversion would provide for compliance with current fish passage and screening requirements (NMFS 2022b; CDFW 2000). Planning for the facility upgrade would include a comprehensive evaluation of existing fish migration conditions at the facility and potential improvements for upstream and downstream migration of both juvenile and adult steelhead. Findings of this evaluation would be used to design state-of-the-art fish passage components that may

[6] The Reggiardo Creek impoundment has filled with sediment and is currently inoperable.

include revisions to the pumping channel, the Denil fish ladder, or both. These improvements may include fish screen replacement, installation of a mechanical traveling brush system on a 5-minute continuous cleaning cycle to keep the fish screens operating at optimum efficiency, and construction of a continuous downstream outmigration bypass route so that outmigrants entrained in the intake structure can continue their movement downstream. Ladder upgrades to improve passage would be evaluated and incorporated as appropriate as well. The Santa Cruz Water Rights Project EIR included an analysis of the Felton Diversion improvements (City of Santa Cruz 2021d); this EA incorporates those analyses by reference, which are summarized herein.

The Tait Street Diversion is located on a fairly straight, low-gradient section of the San Lorenzo River approximately 2.4 miles upstream of the mouth of the river, and is one of the City's critical water supply sources, supplying up to 12.2 cfs to its overall water supply via the adjacent Coast Pump Station facility. The Tait Street Diversion was constructed in 1961 and was modified in 1983 with a fish screen that met California Department of Fish and Game[7] and NMFS regulatory design criteria at that time. Proposed improvements at the Tait Street Diversion would provide for compliance with current fish screening requirements, as well as pumping capacity to take advantage of high winter flows and allow deferral of winter pumping at North Coast diversions. The capacity of the Tait intake and pump station would be designed to accommodate up to 28 cfs[8] of surface water flows. Improvements at the Tait Street Diversion would include a new or modified intake and screen design. Design features would include uniform flow across the screens; approach velocities not exceeding 0.33 feet per second; sweeping velocities that exceed approach velocities; provision for appropriate juvenile bypass; and provision for continuous cleaning. The Santa Cruz Water Rights Project EIR included an analysis of the Tait Street Diversion improvements (City of Santa Cruz 2021d); this EA incorporates those analyses by reference, which are summarized herein.

The ASHCP biological goals and objectives and NFCF projects include other activities that may require some level of construction activities including: habitat restoration or enhancement projects including removal of passage obstacles, placement of large wood structures, riparian conservation easements, spawning gravel augmentation, riparian restoration, and sediment control projects. The City would implement these activities throughout the permit term.

2.3 Alternatives Considered but not Analyzed in Detail

2.3.1 Reduced Covered Activities Alternative

Under a reduced covered activities alternative, the City would limit the ASHCP to implementing the Agreed Flows only, and the numerous Covered Activities associated with operations and maintenance of the water supply system would not be covered and the City would not implement the remainder of the Conservation Strategy.

As with the No Action Alternative, under this alternative the City would need to evaluate individual operations and maintenance activities to determine whether incidental take of listed species could be avoided through seasonal restrictions and other modifications to the activity, or whether an activity-specific incidental take authorization would instead be required. When determined to be required, project-by-project incidental take authorizations would be sought through the Section 7 consultation process or through a project-specific Section 10 permit application, as would occur under the No Action Alternative. In contrast to a comprehensive HCP, project-by-project incidental take authorizations would tend to result in small piecemeal mitigation that can be more expensive and time-consuming

[7] The former Department of Fish and Game was renamed the Department of Fish and Wildlife in 2013.

[8] Intake and pump station capacity of 28 cfs would provide for the proposed diversion of water at the Tait Street Diversion under both the Tait Licenses and Felton Permits.

and provide less conservation benefit than a regional or watershed level approach. Such authorizations can also result in inconsistent and changing minimization measures that complicate implementation of operations and maintenance activities.

Processing individual applications for numerous operations and maintenance activities would also require the City and NMFS to expend substantial resources over the years and would require NMFS to balance competing priorities from other entities and projects. This could interfere with timely implementation of operations and maintenance activities that are critical to providing a safe and reliable water supply.

Additionally, the Reduced Covered Activities Alternative is the same as the No Action Alternative given that the City would also implement the Agreed Flows under the No Action Alternative. Accordingly, NMFS did not select this alternative for detailed analysis.

3 Affected Environment and Environmental Consequences

This section identifies the potentially affected environment and the environmental consequences involved with the No Action Alternative and the Proposed Action, in addition to environmental trends and conditions that currently exist. The affected environment is the area and its resources (e.g., biological, physical, socioeconomic) that the No Action Alternative and Proposed Action would potentially impact. The purpose of describing the affected environment is to define the context in which the impacts would occur. To make an informed decision about which alternative to select, it is necessary to first understand which resources would be affected and to what extent. This chapter provides the basis for this understanding.

Relative to the City's proposal for an ESA Section 10 ITP, the affected environment includes those settings where any of the proposed Covered Activities would occur (also referred to as the Plan Area). Section 2.1 describes the three geographically distinct areas within the 176-square mile Plan Area. The North Coast watersheds are located northwest of the City along Highway 1 and include Majors Creek, Laguna Creek, Reggiardo Creek, Liddell Creek, and Lombardi Gulch. North Coast Streams flow off the west flank of Ben Lomond Mountain and drain directly into the Pacific Ocean. The San Lorenzo River watershed includes the San Lorenzo River and its major tributaries including Newell Creek and Zayante Creek. Streams within the City Urban Center are the lower San Lorenzo River and tributaries, and smaller urban drainages and aquatic resources including Neary Lagoon, Laurel Creek, Moore Creek, and Arana Creek. The streams listed under the City Urban Center are located either partially or wholly within the City limits, and are influenced by urban land management activities such as vegetation management, flood control, and stormwater management activities, rather than or in addition to surface water diversions. Therefore, although they are part of the San Lorenzo River watershed, this EA discusses the lower San Lorenzo River (from the City limits to the river mouth), Branciforte Creek, Carbonera Creek, and Pogonip Creek, under the City Urban Center, where relevant.

The intent of an EA analysis under NEPA is to determine if a Proposed Action would result in significant impacts on the environment. Thus, the scope of the analysis encompasses those resources that the Proposed Action could significantly affect. In defining potentially affected resources, NMFS considered the potential impacts associated with the Proposed Action of issuance of an ESA Section 10 ITP to the City for incidental take of steelhead and coho and implementation of the proposed ASHCP (see Section 2.2.3). Consistent with NEPA, NMFS also considered a No Action Alternative, where the City would continue to conduct water system management activities without broad incidental take coverage and would have to avoid incidental take or require individual take authorization on a project-by-project basis, as is currently the case (see Section 2.2.2).

This analysis includes elements of the natural and human environment with the potential for significant differences between the alternatives, or for which an analysis was required to demonstrate that the difference would not be substantial. This analysis does not specifically address elements of the natural and human environment that the Proposed Action would not affect (e.g., transportation, energy consumption, air quality, noise, scenic resources/aesthetics, land use).

NEPA defines "effects" as "changes to the human environment from the proposed action or alternatives that are reasonably foreseeable," including direct, indirect, and cumulative impacts. Direct effects are caused by the action and occur at the same time and place, and indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR § 1508.1). Cumulative effects are discussed in Chapter 4.

3.1 Agriculture

3.1.1 Affected Environment

The California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) compiles Important Farmland Maps combining current land use information with U.S. Department of Agriculture Natural Resources Conservation Service soil survey data. Agricultural land mapped by the FMMP includes Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. In addition to agricultural land mapped by the FMMP, the County's agricultural zoning districts include Commercial Agriculture, Agriculture, and Agricultural Preserve.

The North Coast watersheds contain the majority of agricultural lands in the Plan Area. Agricultural land mapped by the FMMP is concentrated on the lower marine terraces along Highway 1, with relatively small, isolated patches of farmland farther inland, including within the North Coast watersheds (DOC 2022). The majority of land area in the North Coast watersheds is mapped as Other Land, followed by Grazing Land (DOC 2022). The North Coast also contains most of the zoning for Commercial Agriculture and Agricultural Preserve in the Plan Area, as well as pockets of lands zoned Residential Agriculture.

Agricultural land mapped by the FMMP in the San Lorenzo River watershed is limited to an isolated patch along the San Lorenzo River just outside of the City limits on Ocean Street Extension. All other lands within the San Lorenzo River watershed are designated as Other Land, Urban and Built-Up Land, and Grazing Land (DOC 2022). Lands zoned Agriculture by the County are located primarily east of Highway 17. Pockets of lands zoned Residential Agriculture are also located throughout the San Lorenzo Valley.

No agricultural land exists in the City Urban Center. The City is largely developed and all lands within City limits and the City's existing Sphere of Influence are designated as Urban and Built-Up Land, Other Land, and Grazing Land in the Farmland Mapping and Monitoring Program of the California Department of Conservation (DOC 2022; City of Santa Cruz 2021d).

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

The No Action Alternative would not substantially affect agricultural land or agricultural uses located primarily in the North Coast watersheds. Implementation of Agreed Flows under the No Action Alternative could result in limitations on the availability of irrigation water for agricultural use on the North Coast during drier hydrological conditions, as less water would be available for surface water diversions. However, Agreed Flows would not have the potential to indirectly convert agricultural lands to non-agricultural uses with adverse environmental effects. Individual activities and projects pursued in the future in support of operation and management of the City's water supply facilities and other municipal facilities, as well as management of City lands and watersheds would not involve construction of new facilities on agricultural land and therefore would not have the potential to directly convert agricultural lands to non-agricultural uses, nor would they result in conflicts with existing zoning for agricultural use, as such activities would not change zoning or result in new land uses that could cause such conflicts. Therefore, the No Action Alternative would not result in significant adverse effects on agricultural resources.

3.1.2.2 Proposed Action

As with the No Action Alternative, the Proposed Action would not substantially affect agricultural land or agricultural uses located primarily in the North Coast watersheds. Like the No Action Alternative, the ASHCP Conservation Strategy of the Proposed Action would include the implementation of Agreed Flows, which could result in limitations on the availability of water for agricultural use on the North Coast during drier hydrological conditions as less water would be available for surface water diversions. However, Agreed Flows would not have the potential to indirectly convert agricultural lands to non-agricultural uses with adverse environmental effects. Implementation of the Proposed Action would not result in Covered Activities that would involve construction of new facilities on agricultural land and therefore would not have the potential to directly convert agricultural lands to non-agricultural uses, nor would it result in conflicts with existing zoning for agricultural use, as such activities would not change zoning or result in new land uses that could cause such conflicts. The City would conduct Covered Activities and implement the Conservation Strategy at existing City facilities that do not contain agricultural land. While specific NFCF projects are not known at this time, the NFCF would be focused on projects that improve salmonid habitat in the North Coast and San Lorenzo watersheds, and thus projects would be located in and adjacent to streams. As such, NFCF projects would not be located on land containing existing agricultural land and uses and would not result in conversion of or other adverse effects on agricultural land. Therefore, the Proposed Action would not result in significant adverse effects on agricultural resources.

3.2 Biological Resources

Covered Species and other co-occurring federally or state-listed species are the primary resources evaluated in this EA; non-listed special-status plant, wildlife, and fish species were considered and are either not present in the Plan Area, do not warrant detailed analysis due to low likelihood of impacts, or were brought forward for analysis (Appendix C). For the purposes of this EA, non-listed special-status species include (1) fish or wildlife designated by the CDFW as a California Species of Special Concern (SSC), (2) wildlife designated as Fully Protected species under the California Fish and Game Code, (3) plants designated as rare under the California Native Plant Protection Act (NPPA) of 1977, or (4) plants with a California Rare Plant Rank (CRPR) of 1 or 2. Listed and non-listed special-status species potentially occurring in or near the Plan Area were identified by querying USFWS' Information for Planning and Consultation (IPaC) online tool (USFWS 2022), CDFW's California Natural Diversity Database (CDFW 2022b), and the California Native Plant Society's Inventory or Rare and Endangered Plants (CNPS 2022). Location criteria for the California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) queries encompassed the Davenport, Felton, Laurel, Santa Cruz, and Soquel U.S. Geological Survey 7.5-minute quadrangles.

Several of the co-occurring special-status species are Covered Species under the City's OMHCP. Given that the Covered Activities of the OMHCP are equivalent to the Covered Activities of the ASHCP, where relevant to the Covered Species, the affected environment and environmental consequences of the No Action Alternative and the Proposed Action (the ASHCP) on these OMHCP Covered Species are summarized herein with appropriate references to the OMHCP.

3.2.1 Affected Environment

3.2.1.1 Terrestrial Vegetation and Land Cover Types

There are five dominant vegetation or land cover types in the Plan Area: woodland and forest, riparian forest, coastal scrub and coyote brush scrub, grasslands and artificial ponds, and disturbed areas (see

Section 2.6 of the OMHCP [City of Santa Cruz 2021e] for a more detailed description). Specific vegetation communities or cover types within each of these categories are identified in Table 2. Streams that provide habitat for fish and other aquatic organisms are described in Section 3.4.1.1.

Table 2. Vegetation and Land Cover Types

Vegetation or Land Cover Type	General Description
Redwood Forest	Forests dominated by coast redwood (*Sequoia sempervirens*). Occurs on lower slopes of drainages in North Coast watersheds and Upper San Lorenzo River and its tributaries.
Mixed Conifer Forest	Coniferous forests comprised of Douglas-fir (*Pseudotsuga menziesii*), knobcone pine (*Pinus attenuata*), and coast redwood. Occurs on north-facing slopes of drainages in upper Liddell and Laguna Creeks and upper tributaries of San Lorenzo River.
Mixed Evergreen Forest	Mixed forest co-dominated by coast live oak (*Quercus agrifolia*), Pacific madrone (*Arbutus menziesii*), and California bay (*Umbellularia californica*). Occurs on moist, well-drained slopes above redwood forest in North Coast watersheds.
Central Coast Live Oak Woodland	Woodland dominated by coast live oak. Occurs in uplands on hilltop edges above conifer communities.
Central Coast Arroyo Willow Riparian Forest	Dense thicket of arroyo willow (*Salix lasiolepis*), often associated with red alder (*Alnus rubra*). Occurs in smaller drainages along Highway 1, in scattered locations along streams in North Coast watersheds, and along Moore Creek and Arana Creek in City Urban Center.
Coast Live Oak Riparian Forest	Forest dominated by coast live oak mixed with California buckeye (*Aesculus californica*). Occurs along Moore Creek and its tributaries in City Urban Center.
Red Alder Riparian Forest	Forest dominated by red alder up to heights of 80 feet. Occurs in patches along drainages in North Coast watersheds.
Coyote Brush Scrub	Scrub dominated by coyote brush (*Baccharis pilularis*). Occurs along Highway 1 and on hillsides throughout Plan Area, often encroaching into historically grazed grassland.
Coastal Scrub	Diverse scrub community with poison oak (*Toxicodendron diversilobum*), blue blossom (*Ceanothus thyrsiflorus*), California coffee berry (*Frangula californica*), and coyote brush. Occurs on steep hillsides along coastal arroyos.
Annual Grassland	Grassland composed of numerous non-native annual grasses such as perennial rye grass (*Lolium perenne*), bromes (*Bromus* spp.), and wild oat (*Avena fatua*). Occurs throughout Plan Area.
Native Grassland	Grassland primarily composed of native grasses such as purple needlegrass (*Stipa pulchra*), California oatgrass (*Danthonia californica*), and California brome (*Bromus carinatus*). Stands intermingled with annual grassland in the Laguna and Majors Creek watersheds (North Coast watersheds) and on slopes just west of the City in the Moore Creek Preserve, portions of Pogonip, and within Arana Gulch Greenbelt (City Urban Center).
Freshwater Ponds	Constructed ponds supporting freshwater emergent wetland vegetation (bulrushes [*Scirpus* sp.] and cattails [*Typha* sp.]). Several occur along Highway 1.
Urban, Industrial, and Agriculture	Urban or agricultural areas without natural vegetation. Includes residential housing, ornamental trees and landscaping plants, roads, barren areas (e.g., sand mining), and agricultural row crops along Highway 1.

Source: City of Santa Cruz 2021e.

3.2.1.2 Special-Status Plant Species

Based on the results of the CNDDB (CDFW 2022b) and CNPS (2022) queries, 42 special-status plants have been recorded in the Plan Area vicinity (Appendix C). Of these, 11 could potentially occur in the Plan Area and be affected by City activities and/or are Covered Species under the City's OMHCP (Table 3). Additional habitat and occurrence information for these species is provided in Appendix C (Table C-1).

Table 3. Special-Status Plant Species Potentially Affected

Common Name	Scientific Name	Status (Federal/ State/ CRPR)	Notes
Listed Species			
Ben Lomond spineflower	*Chorizanthe pungens* var. *hartwegiana*	FE/None/ 1B.2	OMHCP Covered Species endemic to Zayante sandhills (San Lorenzo River watershed).
robust spineflower	*Chorizanthe robusta* var. *robusta*	FE/None/ 1B.1	OMHCP Covered Species known to occur in City Urban Center Unit and Laguna Creek watershed (North Coast).
Santa Cruz wallflower	*Erysimum teretifolium*	FE/SE/ 1B.1	May occur in sandhills habitat affected by activities (San Lorenzo River watershed).
Santa Cruz tarplant	*Holocarpha macradenia*	FT/SE/ 1B.1	OMHCP Covered Species known to occur on marine terraces in City Urban Center.
San Francisco popcornflower	*Plagiobothrys diffusus*	None/SE/ 1B.1	OMHCP Covered Species known to occur in City Urban Center and Laguna Creek watershed (North Coast).
Non-Listed Species			
Bonny Doon manzanita	*Arctostaphylos silvicola*	None/ None/1B.2	May occur in sandhills habitat affected by activities (San Lorenzo River watershed).
deceiving sedge	*Carex saliniformis*	None/ None/1B.2	May occur in mesic grassland areas affected by activities.
Ben Lomond buckwheat	*Eriogonum nudum* var. *decurrens*	None/ None/1B.1	May occur in sandhills habitat affected by activities (San Lorenzo River watershed).
minute pocket moss	*Fissidens pauperculus*	None/ None/1B.2	May occur in redwood forest habitat affected by activities.
Choris' popcornflower	*Plagiobothrys chorisianus* var. *chorisianus*	None/ None/1B.2	May occur in grassland habitat affected by activities (North Coast).
Santa Cruz clover	*Trifolium buckwestiorum*	None/ None/1B.1	May occur in grassland habitat affected by activities (North Coast).

Source: City of Santa Cruz 2021e, CDFW 2022b.
Notes: CRPR = California Rare Plant Rank; FE = federally endangered; FT = federally threatened; SE = state endangered; SR = state rare; 1B.1 = CRPR 1B.1 (seriously threatened); 1B.2 (moderately threatened).

3.2.1.3 Special-Status Wildlife Species

Based on the results of the CNDDB (CDFW 2022b) and USFWS IPaC (2022) queries, 46 special-status fish or wildlife species have been recorded in the Plan Area vicinity (Appendix C). Of these, 11 wildlife species could potentially occur in the Plan Area and be affected by City activities and/or are Covered Species under the City's OMHCP (Table 4). Special-status fish are discussed in Section 3.2.1.4. Additional habitat and occurrence information for these species is provided in Appendix C (Table C-2).

Table 4. Special-Status Wildlife Species Potentially Affected

Common Name	Scientific Name	Status (Federal/ State)	Notes
Mount Hermon (=barbate) June beetle	*Polyphylla barbata*	FE/None	OMHCP Covered Species endemic to Zayante sandhills.
Ohlone tiger beetle	*Cicindela ohlone*	FE/None	OMHCP Covered Species known to occur in native grassland at Moore Creek Open Space and Younger Ranch.
Zayante band-winged grasshopper	*Trimerotropis infantilis*	FE/None	Endemic to Zayante sandhills.
California red-legged frog	*Rana draytonii*	FT/SSC	OMHCP Covered Species known to occur in North Coast watersheds.
California giant salamander	*Dicamptodon ensatus*	None/SSC	Suitable habitat in North Coast watershed streams and Upper San Lorenzo River watershed and adjacent redwood, mixed conifer, and riparian forests.
Santa Cruz black salamander	*Aneides flavipunctatus niger*	None/SSC	Suitable habitat in North Coast watershed streams and Upper San Lorenzo River watershed and adjacent redwood, mixed conifer, and riparian forests.
Western pond turtle	*Emys* (=*Actinemys*) *marmorata*	None/SSC	OMHCP Covered Species, despite few Plan Area occurrences except for upper Newell Creek, Loch Lomond Reservoir, and lower San Lorenzo River.
Grasshopper sparrow (nesting)	*Ammodramus savannarum*	None/SSC	Suitable grassland habitat on slopes and ridgetops of North Coast watersheds and northwest of City Urban Center.
American badger	*Taxidea taxus*	None/SSC	Suitable habitat on slopes and ridgetops of North Coast watersheds; known to occur in areas around North Coast pipeline near Laguna Creek.
Ringtail	*Bassariscus astutus*	None/FP	Suitable habitat in all woodland and forest types.
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	None/SSC	Suitable habitat in all woodland and forest types.

Source: City of Santa Cruz 2021e, CDFW 2022b.
Notes: FE = federally endangered; FT = federally threatened; PT = proposed threatened; SE = state endangered; SSC = California Species of Special Concern; CFP = California Fully Protected Species.

3.2.1.4 Special-Status Fish Species

ASHCP Covered Species

Steelhead

As described in Section 2.1, steelhead within the Plan Area are part of the CCC steelhead DPS, listed as threatened under the ESA, consisting entirely of winter-run steelhead and extending from the Russian River south to Aptos Creek in the southern end of Santa Cruz County (NMFS 2021). NMFS published a recovery plan for CCC steelhead in 2016 (NMFS 2016b). The critical habitat designation for the CCC steelhead DPS includes streams in the Plan Area (see additional information about critical habitat in Section 3.2.1.5).

Steelhead life history is quite diverse and adaptive, providing the necessary flexibility to survive varied environmental conditions naturally occurring throughout their range and within their natal watershed. In general, steelhead grow and mature in the ocean and spawn in freshwater. In central California, adult steelhead enter coastal streams during the wet season in association with increased runoff. The majority of steelhead enter freshwater from January through March or April, and spawn relatively soon after entering freshwater. Incubation of eggs can take a few weeks. Young steelhead (or fry) typically disperse to the stream margins after emerging from the substrate. Depending upon the size attained by the fall following emergence, the juveniles aggregate in pools and begin the smolting process that prepares them for life in the ocean (known as smoltification). Juvenile steelhead can spend from 1 to 3 years in freshwater before smolting. Steelhead smolts migrate downstream to the ocean as early as the fall, but most commonly in the spring (March through May). Steelhead may spend from 1 to 2 years in the ocean before reaching maturity and returning to their natal stream to spawn.

Laguna Creek, Liddell Creek, Majors Creek, and the San Lorenzo River and its tributaries provide habitat for steelhead (City of Santa Cruz 2023; Berry, C. et al. 2019). The mouths of these streams may provide seasonal estuarine environments that are well developed (Laguna Creek and the San Lorenzo River) or more transient (Majors and Liddell creeks). The seasonal lagoons at Laguna Creek and the San Lorenzo River support rearing steelhead. ASHCP Section 2.5.1 provides additional information about the life history and abundance of steelhead in the Plan Area.

Coho

As described in Section 2.1, coho in the Plan Area are part of the CCC coho ESU, listed as endangered under the ESA, extending from Punta Gorda in Humboldt County south to and including Aptos Creek (NMFS 2022a). The critical habitat designation for the CCC coho ESU includes the accessible portions of the streams in the Plan Area (see additional information about critical habitat in Section 3.2.1.5). NMFS published a recovery plan for CCC coho in 2012 (NMFS 2012). At that time, NMFS concluded that in spite of the protections afforded by these listings, the development of a recovery plan and ongoing implementation of many actions recommended in the recovery plan, the population had not stabilized and continues to decline (NMFS 2012); the two independent populations in the Santa Cruz Mountain diversity strata (Pescadero Creek and San Lorenzo River) were considered currently extirpated or nearly so in the last NMFS 5-year status review (NMFS 2023).

Coho spawning migrations from the ocean to freshwater streams or rivers usually begin after the first heavy rains in late fall or winter. In the short coastal streams of central California, coho typically return to

freshwater during November through February. The female may dig several pits to complete spawning, laying an average of 2,500 eggs per female. Newly hatched fry (alevins) remain in gravel for approximately 3 weeks before emerging. As they grow during the spring, juvenile coho disperse to pools where they set up individual territories. After spending the ensuing summer, fall and winter in the stream, the immature yearling coho begin to migrate downstream toward the ocean in spring. During this time, juveniles undergo smoltification. Growth in freshwater varies, but typically smolts leave California streams after 1 year. Outmigration typically peaks from late April to mid-May. Coho have a fairly strict 3-year life cycle, with about half spent in freshwater and half spent in saltwater. After growing and sexually maturing in the ocean, most coho return to their natal streams as 3-year-olds to spawn and die. Some precocious males (jacks) return to freshwater at 2 years of age. There is very little variability in age of spawning for female coho; nearly all wild female coho spawn at 3 years.

Laguna Creek, Liddell Creek and Majors Creek provide habitat for coho in at least some years (City of Santa Cruz 2023; Berry, C. et al. 2019). Coho are considered extirpated from the San Lorenzo River. ASHCP Section 2.5.2 provides additional information about the life history and abundance of coho in the Plan Area.

OMHCP Covered Fish Species

Special-status fish species included in the OMHCP Covered Species are tidewater goby and Pacific lamprey.

Tidewater goby are currently listed as endangered under the federal ESA (59 FR 5494) but have been proposed for reclassification as threatened (79 FR 14340). The USFWS characterizes tidewater goby populations (i.e., localities) along the California coast as metapopulations (a group of distinct populations that are genetically interconnected through occasional exchange of animals) (USFWS 2007). Local populations of tidewater gobies occupy coastal lagoons and estuaries that in most cases are separated from each other by the open ocean. Some tidewater goby populations persist on a consistent basis (potential sources of individuals for recolonization), while other tidewater goby populations appear to experience intermittent extirpations. Local extirpations may result from one or a series of factors, such as the drying up of some small streams during prolonged droughts, water diversions, and estuarine habitat modifications (USFWS 2007). Some localities where tidewater gobies have been extirpated apparently have been recolonized when extant populations were present within a relatively short distance of the extirpated population (i.e., less than 6 miles (10 kilometers). Tidewater gobies are known to inhabit, or recently inhabited, the coastal lagoons of several streams in the Plan Area including Laguna Creek, Baldwin Creek, Lombardi Gulch, Old Dairy Gulch, Wilder Creek, Younger Lagoon, Moore Creek, the San Lorenzo River, Corcoran Lagoon, and Moran Lake (USFWS 2005). Suitable habitat for the goby has also been identified in the lagoons of Majors (Smith 2001) and Arana Creeks (City of Santa Cruz 1997; HRG 1996).

Pacific lamprey is a state species of special concern not listed under the federal ESA. Pacific Lampreys are eel-like in form and anadromous, using both fresh water and marine habitats to complete their life cycle. Adult Pacific Lampreys are parasitic and well-known for the sucker-like disc and three cuspid teeth used to cling to other animals to feed (CDFW 2022a). After about one to three years in the ocean, Pacific lampreys migrate from the ocean to upstream freshwater spawning habitat as adults and, after hatching, larvae drift downstream to low-velocity rearing areas. Larvae eventually transform to juveniles and migrate downstream to enter the ocean (CDFW 2022a). The San Lorenzo River and its tributaries support Pacific lamprey but they have not been reported from the North Coast Streams (City of Santa Cruz 2021d).

Other Special-Status Fish

Monterey roach is a sub-species of California roach and a state species of special concern not listed under the federal ESA. California roach are widely distributed in California, both geographically and in terms of habitat conditions. They are found in small, warm streams, coldwater "trout" streams, in heavily modified habitats, and main channels of rivers. Their relatively short lifespan (maturity in 2 to 3 years and maximum life span of 6 years) and fecundity (250-2000 eggs per female) can produce abundant populations in the right conditions. Monterey roach are present in the San Lorenzo River watershed but have not been reported from the North Coast Streams. Roach have been consistently reported in electrofishing surveys between 1994 and 2019 at 25% to 75% of all sampled locations upstream of the Tait Diversion (SCCWRP 2021). They have been observed most commonly in the mainstem San Lorenzo River between Felton and Boulder Creek and are less common, even infrequent in the tributaries and upper mainstem. They have been captured occasionally or rarely at sites downstream of Felton (SCCWRP 2021). Roach have not been observed in seining surveys in the San Lorenzo lagoon and may not be abundant downstream of the Tait Diversion (HES 2010 – 2019).

3.2.1.5 Special Habitats

Critical Habitat

As part of this regulatory act, the federal ESA provides for designation of critical habitat, defined in federal ESA Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features (PBFs) "essential to the conservation of the species" are found and that "may require special management considerations or protection." Critical habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species." Critical habitat designations identify, with the best available knowledge, those PBFs which provide for the life history processes essential to the conservation of the species. In the Plan Area, critical habitat has been designated for the following species: coho, steelhead, robust spineflower, Santa Cruz tarplant, California red-legged frog, and Zayante band-winged grasshopper. The critical habitat for these species is described below.

ASHCP Covered Species

Streams in the Plan Area are designated critical habitat for steelhead and coho. PBFs for CCC steelhead critical habitat in the Plan Area include (1) freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development; (2) freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development, and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks; (3) freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival; and (4) estuarine areas free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater, natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders and side channels, and juvenile and adult forage, including aquatic macroinvertebrates and fishes, supporting growth and maturation (70 FR 52488).

Coho critical habitat includes the following essential habitat types (1) juvenile summer and winter rearing areas; (2) juvenile migration corridors; (3) areas for growth and development to adulthood; (4) adult migration corridors; and (5) spawning areas. Within these areas, essential features of coho salmon critical habitat include adequate: (1) substrate; (2) water quality; (3) water quantity; (4) water temperature; (5) water velocity; (6) cover/shelter; (7) food; (8) riparian vegetation; (9) space; and (10) safe passage conditions (64 FR 24029).

The condition of coho and steelhead critical habitat, specifically the ability to provide for species conservation, has been degraded from conditions known to support viable salmonid populations. Present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat:[9] degraded water quality, over-appropriation of surface and groundwater, dams and diversions, estuary and wetland losses and impairment, timber harvest, agriculture, urbanization, stream channelization and modification, and impaired passage (NMFS 2016a). Impacts of concern include alteration of stream bank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels, loss of large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased stream bank erosion, increases in erosion and sedimentation in streams from upland areas, loss of shade (higher water temperatures) and loss of nutrient inputs (Busby et al. 1996; 70 FR 52488). Water development has drastically altered natural hydrologic cycles in many of the streams in the CCC steelhead DPS (NMFS 2011a) and CCC coho ESU (NMFS 2011b). Diversion and associated changes to freshwater stream flow results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids.

OMHCP Covered Species

The USFWS designated critical habitat for tidewater goby in 2008 (73 FR 5920). Critical habitat in the Plan Area includes the mouth of Laguna Creek, mouth of Baldwin Creek, mouth of Moore Creek, and Corcoran Lagoon. The critical habitat designation does not include the mouth of the San Lorenzo River (City of Santa Cruz 2021e).

The USFWS designated critical habitat for robust spineflower and Santa Cruz tarplant in 2002 (67 FR 36822–36845; 63968–64007). Portions of the City Urban Center occur within the Branciforte Unit of robust spineflower critical habitat: approximately 152 acres at Pogonip Park and 4 acres on private land within City limits. The 65-acre Arana Gulch Unit of Santa Cruz tarplant critical habitat occurs in the City Urban Center (City of Santa Cruz 2021e).

The USFWS designated critical habitat for California red-legged frog in 2006 and revised it on March 17, 2010 (75 FR 12816–12959). The North Coast watersheds are within Unit SCZ-1 of designated critical habitat for the species (City of Santa Cruz 2021e).

Other Special-Status Species

The USFWS designated critical habitat for Zayante band-winged grasshopper between Highways 9 and 17 in Santa Cruz County in 2001 (66 FR 9220–9233). Most of these lands occur from the southeastern portion

[9] Other factors, such as overfishing and artificial propagation have also contributed to the current population status of this species. All these human-induced factors have exacerbated the adverse effects of natural factors such as drought and poor ocean conditions.

of Henry Cowell Redwoods State Park west to the City of Scotts Valley and north to the communities of Ben Lomond, Lompico, and Zayante. Portions of the Newell and Zayante watersheds in the San Lorenzo River watershed overlap with designated critical habitat for this species (City of Santa Cruz 2021e).

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104- 267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal Fishery Management Plan (FMP). Section 305(b)(2) of the Magnuson-Stevens Act requires Federal action agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. As part of the EFH Consultation process, the guidelines require Federal action agencies to prepare a written EFH Assessment describing the effects of that action on EFH (50 CFR § 600.920[e][1]). The act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (NMFS 2022b). Although the concept of EFH is similar to critical habitat of the ESA, measures recommended by NMFS or a regional fisheries management council to protect EFH are advisory, not prescriptive. The Proposed Action is located within an area designated as EFH for three FMPs, the Pacific Coast Groundfish, Coastal Pelagic Species, and Pacific Salmon FMPs (NMFS 2022c).

Over 30 species of fish have been found in the Plan Area although many of these species are only occasional visitors. The largest diversity has been found in the San Lorenzo Lagoon (HES 2022a). Two species, topsmelt and steelhead, have made up approximately 94% of the fish species captured in the lagoon in annual surveys since 2008 (HES 2022a). Nine species which are federally managed under these plans have been found in the Plan Area (Table 5).

Table 5. FMP-Managed Species Known to Occur in the Plan Area

Common Name	Scientific Name	Comment
Coastal Pelagic Species FMP		
Pacific sardine	*Sardinops sagax*	1 specimen captured in San Lorenzo Lagoon June 2015
Northern anchovy	*Engraulis mordax*	San Lorenzo Lagoon: 6 of 14 years, numerous in 2018, 2017, 2021
Jack mackerel	*Trachurus symmetricus*	1 specimen captured in San Lorenzo Lagoon October 2011
Pacific Coast Groundfish FMP		
Grass rockfish	*Sebastes rastrelliger*	1 specimen captured in San Lorenzo Lagoon June 2009
Starry flounder	*Platichthys stellatus*	Present most years in San Lorenzo Lagoon, not abundant
Lingcod	*Ophiodon elongatus*	1 specimen captured in San Lorenzo Lagoon July 2017
Pacific Salmon FMP		
Coho salmon	*Oncorhynchus kisutch*	Found occasionally in Laguna Creek, Majors Creek and Liddell Creek since 2005
Chinook salmon	*Oncorhynchus tshawytscha*	Captured in San Lorenzo Lagoon on three occasions
Pink salmon	*Oncorhynchus gorbuscha*	2 adults captured fall 2019 in San Lorenzo Lagoon

Source: San Lorenzo River Lagoon and Laguna Creek Lagoon seining surveys 2008-2022; City of Santa Cruz snorkel surveys 2006-2022; San Lorenzo River electrofishing surveys 1994-2022.
Note: FMP = Fishery Management Plan.

Only two of the species managed under these plans, northern anchovy and starry flounder, occur in the Plan Area with any regularity (Table 5). Habitat for the coastal pelagic species, as the name implies is in nearshore and offshore ocean environments. Northern anchovy, the only pelagic species with more than incidental occurrence in the San Lorenzo River Lagoon, is primarily found in the upper layers of the ocean closest to the coastline and above the continental shelf. They favor areas of coastal upwelling. They are a mobile schooling species that does not maintain a home range. They feed on krill, copepods, and decapod larvae, and collect food via filter feeding and active predation. Spawning may occur throughout the year, but peak activity is from February to April. Northern anchovies are promiscuous, broadcast spawners with production of 20,000 to 30,000 offspring per female. Their presence in the San Lorenzo River Lagoon is incidental, likely depending on patterns of ocean upwelling, currents, and overall population abundance (HES 2022a).

Population levels of northern anchovy are unknown but thought to be abundant (NMFS 2022f). Based on research by CDFW, northern anchovy landings[10] and exploitation rates[11] since 1983 have been decreasing. While biomass estimates are unavailable for recent years, CDFW believes the stock is currently stable at a modest biomass level. Northern anchovies are classified as a species of least concern on the International Union for Conservation of Nature's Red List of Threatened Species (Davis et al. 2022). Although current populations are thought to be stable, overfishing presents a potential threat to the long-term persistence of this species (Davis et al. 2022).

Starry flounders are inshore fish, occurring in brackish and freshwater zones of estuaries, and in freshwater streams up to the first riffles, with young found as much as 120 kilometers (75 miles) inland. Larvae feed in the water column on planktonic algae and crustaceans, shifting to larger prey as they mature, and eventually orienting to the substrate and feeding on benthic invertebrates. Spawning occurs November through February in shallow water near river mouths and sloughs (Orcutt 1950). The San Lorenzo River Lagoon provides suitable habitat for starry flounder and their presence in the lagoon should be expected. Starry flounder have never been reported in river reaches upstream of the lagoon. The shallow waters of the river mouth likely provide spawning habitat.

Groundfish populations on the West Coast have rebounded from lows experienced in the 1990s. The implementation of fishing management measures (closed areas, reduced catch limits, and a shift to "catch shares" management) has advanced the recovery of some species more than a decade earlier than the timeline estimated by scientists. Today, most of the 90 plus stocks managed under the West Coast groundfish fisheries are not overfished and are not experiencing overfishing (NMFS 2022g).

Chinook salmon have been captured on three occasions: five individuals captured in October 2011 were juveniles (about 9 inches in length) with adipose fins clipped, likely escaped from a nearby net pen-rearing project; 20 adults captured in September 2012 also had adipose fins clipped; and three smolts were captured in June 2014 with adipose fins intact. Adipose fin clips indicate a fish was reared in a hatchery, but not all hatchery-reared fish are adipose clipped. Chinook hatcheries in the Central Valley release juvenile Chinook from various locations throughout the San Francisco Bay/Delta and from net pens in Monterey Bay. Because there are no documented wild runs of Chinook salmon in the San Lorenzo River or nearby watersheds, the few Chinook salmon observed in the San Lorenzo River without adipose fin clips are believed to be strays from regional hatchery operations. Two small adult pink salmon were captured in September 2019. These were stray fish from watersheds north of the Plan Area. The Pacific Salmon FMP

10 Landings are the report of the total number or weight of species captured, brought to shore, and sold.
11 Exploitation rate is the proportion of numbers or biomass removed by fishing.

only addresses pink salmon in Puget Sound (PFMC 2022). Therefore, Chinook and pink salmon are not considered further in this EA.

A self-sustaining run of wild coho has been presumed to be extirpated from the San Lorenzo River watershed since the drought of the late 1980s but coho are targeted for recovery in the ASHCP Plan Area (City of Santa Cruz 2023). The San Lorenzo River is at the extreme southern end of the range of coho, which corresponds closely with the range of redwood forests (Spencer et al. 2004). With the exception of a few juveniles observed in 2005 in Bean Creek and Zayante Creek (tributary to the San Lorenzo River), coho salmon have not been observed in the San Lorenzo watershed in snorkel, electrofishing, and seining surveys since the early 1990s. Juvenile coho have been observed during snorkel, electrofishing, and seining surveys in Laguna Creek, Majors Creek, and Liddell Creek occasionally since 2005 (City of Santa Cruz 2023).

3.2.2 Environmental Consequences

Evaluation of the effects of the No Action Alternative and Proposed Action on biological resources are supported by analyses in the ASHCP (City of Santa Cruz 2023), the OMHCP (City of Santa Cruz 2021e) and the Santa Cruz Water Rights Project Environmental Impact Report (EIR) (City of Santa Cruz 2021d). Where relevant, it is assumed that the No Action Alternative and the Proposed Action would be subject to conservation measures in the OMHCP and related ITP, which the USFWS approved in 2021. These conservation and mitigation measures are referenced, where relevant. Evaluation of effects on fish species, associated critical habitat, and EFH are supported by analyses of the Agreed Flows that were developed and included in the Santa Cruz Water Rights Project EIR (City of Santa Cruz 2021d). Note that the effects of the Agreed Flows that are presented in ASHCP Section 5.2, Effects of Water Supply Operations - Water Diversions (City of Santa Cruz 2023), are compared to a different baseline than is used in this EA, as further described in Appendix A. This EA incorporates these analyses by reference, where relevant, which are summarized herein.

3.2.2.1 No Action Alternative

Special-Status Plant Species

Effects on special-status plants under the No Action Alternative would be the same as those described for the Proposed Action (see Section 3.2.2.2). Conservation measures for the four plants covered under the OMHCP would avoid or minimize adverse effects on these species and these measures would continue to be implemented under the No Action Alternative and the Proposed Action. Any significant adverse effects on other special-status plants from individual activities or projects proposed in the future would be mitigated under NEPA and/or CEQA, as relevant on a project-by-project basis. Therefore, the No Action Alternative would not result in significant adverse effects related to special-status plants.

Special-Status Wildlife Species

Effects on special-status wildlife under the No Action Alternative would be the same as those described for the Proposed Action (see Section 3.2.2.2). Conservation measures for the four terrestrial wildlife species covered under the OMHCP would avoid or minimize adverse effects on these species and these measures would continue to be implemented under the No Action Alternative and Proposed Action. Any significant adverse effects on other special-status wildlife from individual activities or projects proposed in the future

would be mitigated under NEPA and/or CEQA on a project-by-project basis. Therefore, the No Action Alternative would not result in significant adverse effects related to special-status wildlife.

Special-Status Fish Species

ASHCP Covered Species

Since the No Action Alternative would include Agreed Flows and assumes the City's water rights modifications, conditions for steelhead and coho under the No Action Alternative would be as evaluated and presented in the ASHCP and the Santa Cruz Water Rights Project EIR (City of Santa Cruz 2023, City of Santa Cruz 2021d). Habitat modeling that characterizes the effects of the Agreed Flows indicates that, although there are isolated instances of minor effects to some life stages in some reaches relative to existing conditions, the Agreed Flows would result in a net beneficial effect on both steelhead and coho (City of Santa Cruz 2023; City of Santa Cruz 2021d).[12] The only negative effect of the No Action Alternative (relative to existing conditions) that showed more than a 2% decline in habitat indices is a 2.7% decline in the rearing habitat index[13] in wet years for coho in Laguna Creek, as compared to existing conditions (see Appendix A, Table A-2). This effect was determined not to be biologically significant or substantial and is compensated for by habitat improvements for other life stages in other areas that would occur with the Agreed Flows (City of Santa Cruz 2021d). Overall, with implementation of the Agreed Flows and the pending water rights modifications, the No Action Alternative would not have a substantial adverse effect on habitat indices for steelhead or coho in the Plan Area nor would it interfere substantially with migration of steelhead or coho.

Operation of Loch Lomond Reservoir with the Agreed Flows and the pending water rights modifications would have potential temperature effects in Newell Creek (City of Santa Cruz 2021d; City of Santa Cruz 2023). Without the implementation of other elements of the ASHCP (e.g., AMMs), the No Action Alternative may result in potential adverse water temperature effects due to an increase in Loch Lomond Reservoir spill frequency. This effect may occur at times when the reservoir is in spill in late spring or summer and the existing 1 cfs fish release is not sufficient to maintain temperature in Newell Creek below 21°C. However, while the ASHCP AMMs would not be implemented under the No Action Alternative, the Santa Cruz Water Rights Project EIR includes Standard Operational Practice #6 that is equivalent to ASHCP AMM WS-24. Per this operational practice, when the reservoir is spilling during late spring and summer, the City would release additional cooler flow through the fish release below the dam to mitigate the potential warming effects of reservoir spills below Newell Creek Dam. Therefore, this potential temperature effect in Newell Creek would also be minimized under the No Action Alternative.

For the Proposed Action, the majority of potential non-flow related effects on Covered Species from Covered Activities under the ASHCP are avoided or minimized by application of ASHCP AMMs (see EA Section 2.2.3.4 and ASHCP Section 4.4). For the No Action Alternative, the City would either avoid take or obtain ESA take exemptions on a project specific basis. The AMMs that the City will implement for each project are not presently defined and are therefore uncertain. Additionally, the City would not

[12] These Agreed Flows effects of the Proposed Action are the same as for the No Action Alternative given that this alternative includes the Agreed Flows and assumes the pending water rights modifications.

[13] The habitat index may be either the weighted usable area (WUA) value for spawning or rearing, or the number of days with suitable conditions for migration of adult or smolt life stages.

implement a monitoring program under the No Action Alternative, so take associated with the ASHCP monitoring program would not occur under the No Action Alternative.

Even with implementation of the Agreed Flows, the City's activities under the No Action Alternative may result in incidental take of steelhead and coho from habitat modification. (See ASHCP Section 5.0 for details about how incidental take was estimated for the Covered Species.) With implementation of the Agreed Flows and project specific AMMs the City would avoid and minimize effects to Covered Species to the maximum extent practicable. Therefore, the No Action Alternative would not result in significant adverse effects on the environment. However, there would be no NFCF under the No Action Alternative and the additional benefits of habitat improvement projects implemented under this fund would not be realized.

OMHCP Covered Fish Species

Tidewater Goby

Effects of the No Action Alternative and the Proposed Action are not substantially different with respect to tidewater goby since both alternatives include the City's OMHCP and the Agreed Flows. The OMHCP addresses effects of the Covered Activities on tidewater goby (City of Santa Cruz 2021e), which are summarized in the Proposed Action discussion in the following section. Effects of flow alterations under the Agreed Flows have been evaluated in the Santa Cruz Water Rights Project EIR and the ASHCP (City of Santa Cruz 2021d, City of Santa Cruz 2023) and are also summarized in the discussion of the Proposed Action below. As discussed below, implementation of the Agreed Flows with the pending water rights modifications under the No Action Alternative would not result in a substantial adverse effect on tidewater goby, would not cause goby populations to drop below self-sustaining levels, or threaten to eliminate or substantially reduce the number or restrict the range of goby. Potential effects of the Covered Activities are avoided and minimized through implementation of the AMMs as specified in the OMHCP. Changes in lagoon inflow related to the Agreed Flows are not of sufficient magnitude to alter habitat conditions for goby significantly. Therefore, the No Action Alternative would not result in significant adverse effects on tidewater goby.

Pacific Lamprey

The City's OMHCP addresses effects of the Covered Activities on Pacific lamprey (City of Santa Cruz 2021d), which are summarized under the Proposed Action. The OMHCP found no direct or indirect effects to Pacific lamprey from the Covered Activities occurring on the North Coast and limited effects due to sediment removal in the San Lorenzo and Branciforte Creek flood control channels. Potential effects of the Covered Activities are avoided and minimized through implementation of the AMMs as specified in the OMHCP.

Implementation of the Agreed Flows would have minimal effect on lamprey in the San Lorenzo River and Newell Creek where migration, spawning, and rearing can occur (see discussion under the Proposed Action). Other components of the Conservation Strategy that would not be implemented in the No Action Alternative (Biological Goals and Objectives, AMMs, and the NFCF) are targeted to benefit salmonids and are unlikely to significantly affect lamprey. Therefore, the No Action Alternative would not have a substantial adverse effect on Pacific lamprey, would not cause lamprey population to drop below self-sustaining levels, or threaten to eliminate or substantially reduce the number, or restrict the range of lamprey.

Other Special-Status Fish Species

The effects of the No Action Alternative and Proposed Action are limited to relatively small flow changes downstream of the Felton Diversion, the Tait Street Diversion and Newell Creek Dam. As described for the Proposed Action, these small flow changes would not likely have a significant adverse effect on Monterey roach.

Special Habitats

Critical Habitat

ASHCP Covered Species

Under both the No Action Alternative and the Proposed Action critical habitat for steelhead and coho would be improved through implementation of the Agreed Flows (see Special-Status Fish Species above). The City developed the Agreed Flows specifically to improve habitat conditions for steelhead and coho life-stages. However, the City would not implement the ASHCP NFCF improvements because under the No Action Alternative the ASHCP Biological Goals and Objectives would not be implemented. The City may implement similar improvements through project specific AMMs and mitigation but these AMMs and mitigation actions are not presently defined and therefore are uncertain.

OMHCP Covered Species

Effects on critical habitat for OMHCP Covered Species tidewater goby, robust spineflower, Santa Cruz tarplant, and California red-legged frog under the No Action Alternative are the same as described for the Proposed Action (see Section 3.2.2.2). Given the OMHCP AMMs, the No Action Alternative would not result in significant adverse impacts to critical habitat for OMHCP Covered Species.

Other Special-Status Species

The OMHCP did not analyze effects on critical habitat for Zayante band-winged grasshopper (ZBWG) because it is not an OMHCP Covered Species. As described for the Proposed Action, the No Action Alternative would have no adverse effects on critical habitat for this species.

Essential Fish Habitat

Both the Coastal Pelagic Species FMP and Pacific Coast Groundfish FMP address species that would be found primarily in the San Lorenzo River lagoon. Effects are limited to City activities that influence the lagoon, primarily water diversion at the Tait Street Diversion and Tait wells. The Pacific Salmon FMP is relevant for coho in the Plan Area.

During the summer and particularly in low flow years the lagoon can close for greater amounts of time resulting in conversion to fresh water, warmer temperatures, and periods of reduced oxygen in deeper water. Under existing operations there is no requirement to bypass flow at the Tait Street Diversion to the lagoon. The City's implementation of the Agreed Flows under the No Action Alternative would impose a minimum bypass of 8 cfs at the Tait Street Diversion under dry and very dry hydrologic conditions and higher bypass in wetter years. As a result, inflow to the lagoon would be greatly improved with Agreed Flows relative to existing conditions in critically dry years and some dry years (City of Santa Cruz 2023). The Agreed Flows

result in an average increase in summer inflow of 17% in normal years, 102% in dry years, and 963% in critically dry years relative to existing conditions. Increased flow into the lagoon from the San Lorenzo River can result in longer periods of open lagoon conditions and associated connection of the lagoon with ocean water with associated cooler temperatures, higher oxygen levels and higher salinity. Coastal Pelagic Species and Pacific Coast Groundfish FMP species using the lagoon may benefit from longer periods with more estuarine conditions and connectivity to the ocean.

Northern anchovy, the only Coastal Pelagic Species FMP species found with any regularity in the Plan Area, is a marine species although they do enter brackish water around river mouths. This species has broad distribution in coastal waters and only occurs incidentally in the lagoon. The lagoon does not represent important spawning habitat. Starry flounder, the only Pacific Coast Groundfish FMP species found regularly in the lagoon, has broad distribution in estuaries and coastal waters in the region and the lagoon is not used for reproduction.

Coho are a target species for conservation and enhancement under the ASHCP, including implementation of Agreed Flows (City of Santa Cruz 2023). Effects of implementation of the No Action Alternative are covered in the sections of this document addressing coho and critical habitat (see Special-Status Fish Species and Special Habitats above). Implementation of the Agreed Flows, as well as other likely project-by-project mitigation under the No Action Alternative, are consistent with the overall objectives of the Pacific Salmon FMP and likely aligned with specific recommendations for conservation and enhancement measures for EFH as listed in Appendix A of the FMP (PFMC 2022). Therefore, the No Action Alternative would not result in significant adverse effects on EFH for northern anchovy, starry flounder, or coho.

3.2.2.2 Proposed Action

Special-Status Plant Species

Implementation of Agreed Flows under the Proposed Action would not result in adverse effects to species-status plant species as these flows would not result in ground disturbance, vegetation removal, or other disturbance or degradation to vegetation. Covered Activities would have the potential to adversely affect special-status plants under the Proposed Action. Direct effects on special-status plants could result from excavation and clearing for diversion improvements or pipeline replacements, as an example. Indirect effects on special-status plants could result from increased competition from invasive species and smothering from construction-related dust.

OMHCP Covered Species

The OMHCP addresses potential effects of OMHCP Covered Activities on several special-status plants, as identified in Section 3.2.1.2 and Appendix C (Table C-1). The OMHCP provides several measures to address potential effects of OMHCP Covered Activities on OMHCP covered plant species. OMHCP measure SSM-27 would minimize direct effects by requiring that covered plant species population boundaries be clearly delineated with visible flagging or fencing prior to beginning the Covered Activity. OMHCP measure GM-3 requires that the spread or introduction of invasive exotic plant species be avoided to the extent practicable, and that when practicable, invasive exotic plants in the project areas will be removed. SSM-28 will eliminate the potential adverse effects from fugitive dust. GM-8, GM-9, and GM-10 will minimize potential effects related to erosion and siltation. The OMHCP concluded that the combination of the implementation of

AMMs along with the nature and location of operations and maintenance activities would result in only minimal direct or indirect effects to covered plant species (City of Santa Cruz 2021e). Therefore, the Proposed Action would not result in significant adverse effects on OMHCP special-status plant species.

Other Special-Status Plants

Covered Activities could result in adverse effects on other special-status plants from rehabilitation of diversion structures and pipeline reaches, vegetation management activities during pipeline operations (rights-of-way [ROWs] inspections and repairs) and flood control and stormwater maintenance, and general vegetation management within riparian corridors. These other special-status plant species are identified in Section 3.2.1.2 and Appendix C (Table C-1). Vegetation management activities are less likely to result in direct effects on other special-status plants since pipeline ROW and City facilities are already highly disturbed and these activities have been ongoing. Indirect effects on special-status plants that could result from the above activities include increased competition from invasive species and smothering from construction-related dust.

Any significant adverse effects from such activities on other special-status plants from Covered Activities would be minimized through the implementation of Mitigation Measure (MM) BIO-1 (Appendix B). Additionally, several conservation measures under the Proposed Action would avoid or minimize impacts on riparian vegetation (e.g., WO-5 and WO-6) and such actions would indirectly benefit any special-status plants potentially occurring in affected areas. Therefore, the Proposed Action would not have significant adverse effects on other special-status plants.

Special-Status Wildlife Species

Implementation of Agreed Flows under the Proposed Action would not result in adverse effects to special-status wildlife species. Aquatic habitat modeling presented in the Santa Cruz Water Rights Project EIR indicates that residual flows would not be substantially altered from 2018 baseline conditions and would therefore not have a significant impact on riparian-dependent wildlife (City of Santa Cruz 2021d). Agreed Flows would also not result in ground disturbance, vegetation removal, or other disturbance or degradation to vegetation.

Covered Activities could result in adverse effects on special-status wildlife from rehabilitation of diversion structures and pipeline reaches, vegetation management activities during pipeline operations (ROW inspections and repairs) and flood control maintenance, and dewatering of creeks for maintenance and repairs. Specific activities potentially affecting special-status wildlife species are discussed below.

OMHCP Covered Species

The OMHCP addresses potential effects of OMHCP Covered Activities on four special-status wildlife species, as identified in Section 3.2.1.3. The OMHCP provides several measures to address potential effects of OMHCP Covered Activities on OMHCP wildlife species. OMHCP measures SSM-29, SSM-30, SSM-34, and SSM-35 would minimize direct effects on Mount Hermon June beetle and Ohlone tiger beetle by requiring that access routes and work areas in areas potentially occupied by these species be sited to avoid as much ground disturbance as possible and clearly delineated prior to beginning the Covered Activity. OMHCP measures SSM-31 and SSM-36 identify procedures for avoiding take of individual Ohlone tiger beetles and Mount Hermon June beetles, respectively. SSM-32 and SSM-37 will eliminate potential adverse effects from fugitive dust. OMHCP measures SSM-12 and SSM-14 would minimize direct effects on California red-legged frog (CRLF) individuals from capture and relocation during emergency repairs and sediment removal by

requiring that only trained biologists handle frogs and full-time monitoring of such activities; OMHCP measures SSM-20 to SSM-23 would do the same for western pond turtles. Implementation of standard erosion control best management practices (BMPs) and GM-10 will minimize potential erosion and sedimentation effects to CRLF habitat. Effects on these species are therefore not expected to be significant under the Proposed Action.

Other Special-Status Wildlife

Covered Activities could result in adverse effects on other special-status wildlife from rehabilitation of diversion structures and pipeline reaches, vegetation management, sediment management, flood control and stormwater maintenance, emergency operations and response, and dewatering.

Implementation of MM BIO-2 and MM BIO-3 (Appendix B) would avoid or minimize any significant adverse effects from such activities on other special-status wildlife from Covered Activities, by providing for pre-construction special-status wildlife surveys and monitoring on construction sites to avoid direct impacts on special-status wildlife species not otherwise addressed by the OMHCP. Therefore, the Proposed Action would not have significant adverse effects on other special-status wildlife.

Special-Status Fish Species

ASHCP Covered Species

The Proposed Action would result in the City receiving an ITP to implement the ASHCP, which includes implementation of the Covered Activities, Conservation Strategy, and a Monitoring Program. Habitat conditions for steelhead and coho would be as evaluated in the ASHCP and the Santa Cruz Water Rights Project EIR (City of Santa Cruz 2023, City of Santa Cruz 2021d). ASHCP Chapter 5 provides an estimate of the effects anticipated to occur to steelhead and coho from implementation of the ASHCP Conservation Strategy and the Covered Activities associated with the Proposed Action. Effects were evaluated in the context of existing habitat conditions and conditions expected over the life of the Plan. Since the No Action Alternative would include Agreed Flows and assumes the City's water rights modifications, the effects of the Agreed Flows are described in Section 3.2.2.1 of the EA. Implementation of the Agreed Flows under the Proposed Action would not have a substantial adverse effect on habitat indices for steelhead or coho in the Plan Area nor would it interfere substantially with migration of steelhead or coho.

Under the Proposed Action, the City would implement the ASHCP Conservation Strategy and a Monitoring Program. The Conservation Strategy includes measures (AMMs) that would be adopted under the ASHCP to avoid and minimize effects on steelhead and coho from the Covered Activities. AMMs are an important part of the Conservation Strategy for steelhead and coho because they provide either complete protection for the species from the activity or provide for minimization of effects through implementing practices that reduce effects on life cycle stages or habitat (see EA Section 2.2.3.4 and ASHCP Section 4.4). The application of AMMs would eliminate the effects of many of the Covered Activities on Covered Species. Some residual effects are unavoidable, however, including diversion-related effects at most diversions, effects of sediment and vegetation management in the FCCs, and repairs conducted instream that involve dewatering. To ensure that effects remaining after the implementation of AMMs are fully mitigated, the City would implement the NFCF to fund enhancement and restoration of Covered Species habitat. The Monitoring Program involves observation or capture of juveniles and adults that may result in disturbance, temporary dislocation from

preferred habitats, interruption of normal behaviors including feeding, and low levels of incidental mortality (less than 2%). In sum, implementation of the Covered Activities, Conservation Strategy, and Monitoring Program, under the Proposed Action would not result in significant adverse effects on coho or steelhead.

OMHCP Covered Fish Species

Tidewater Goby

Effects of flow alterations under the Agreed Flows related to tidewater goby has been evaluated in the Santa Cruz Water Rights Project EIR (City of Santa Cruz 2021d) and are summarized here. The analysis concluded that the Agreed Flows with the pending water rights modifications could result in some reduction in inflows to the San Lorenzo River lagoon with the greatest effect in wet and normal years when inflows are relatively high. Changes in inflow to the San Lorenzo River lagoon related to the Agreed Flows are not of sufficient magnitude to result in a substantial adverse effect on tidewater goby in this lagoon. Additionally, inflow to Laguna Creek lagoon would increase slightly with the Proposed Action in spring of dry, normal, and wet years and would be unchanged in summer and in spring of critically dry years. The increase in lagoon inflow may result in later closure of the lagoon in spring of wetter years; however, this condition is closer to the natural streamflow pattern. Change in inflow to the Laguna Creek lagoon under the Proposed Action would not result in a substantial adverse effect on tidewater goby in this lagoon.

The City's OMHCP addresses effects of the Covered Activities on tidewater goby (City of Santa Cruz 2021e). The OMHCP found that some Covered Activities (e.g., water supply operations, pipeline construction) have the potential to impact tidewater goby. As a component of the OMHCP, the City will implement AMMs to minimize and avoid effects to tidewater goby from these activities including pre-construction surveys, project timing, limitation and demarcation of work areas, isolation of work areas, relocation of gobies present, construction monitoring, and post-construction stream channel restoration.

Implementation of Covered Activities and the Conservation Strategy, including the Agreed Flows, under the Proposed Action would not result in a significant adverse effect on tidewater goby, would not cause goby population to drop below self-sustaining levels, or threaten to eliminate or substantially reduce the number or restrict the range of goby.

Pacific Lamprey

The City's OMHCP addresses effects of the Covered Activities on Pacific lamprey (City of Santa Cruz 2021e), which are summarized herein. Covered Activities with the greatest potential for impacts to Pacific lamprey or its habitat are related to water supply operations and flood control maintenance, such as sediment removal in flood control channels. However, lamprey rearing in the flood control channels likely represents a minor component of the population in the San Lorenzo River system. Other Covered Activities are conducted in areas where lamprey do not occur or have negligible potential for effects due to limited scope or potential for downstream effects. Potential effects of the Covered Activities are avoided and minimized through implementation of the AMMs as specified in the OMHCP.

Implementation of the Agreed Flows would have minimal effect on lamprey in the San Lorenzo River and Newell Creek where migration, spawning, and rearing can occur. These flow changes are not likely to affect lamprey rearing since larval lamprey (ammocoetes) occupy benthic habitat composed of fine sediments, generally in quieter water. The effect of flow on the larval stage of this species is likely to be less than on juvenile salmonids which feed in a current (City of Santa Cruz 2021d). Adult lamprey migrate upstream in winter during the same period that steelhead migrate. Adult lamprey migration may be hindered at low flows by shallow riffle depth, similar to steelhead and coho, but lamprey can likely negotiate somewhat more shallow depths than salmonids since their body depth is not as great. Under the Agreed Flows, minimum flows for adult migration and spawning are increased from 20 cfs under existing operation to 40 cfs. Analysis in the ASHCP indicates that migration and spawning conditions for steelhead and coho will be improved in the San Lorenzo River in dry and critical years through implementation of the Agreed Flows and not changed from existing conditions in normal and wet years. Conditions for steelhead and coho migration and spawning in Newell Creek will be unchanged or improved in all year types (City of Santa Cruz 2023). Similar effects are anticipated for lamprey. Therefore, the Proposed Action would not likely have a substantial adverse effect on Pacific lamprey, would not cause lamprey population to drop below self-sustaining levels, or threaten to eliminate or substantially reduce the number or restrict the range of lamprey.

Other Special-Status Fish

The effects of the Proposed Action are limited to relatively small flow changes downstream of the Felton Diversion, the Tait Street Diversion and Newell Creek Dam. Monterey roach are tolerant of a range of environmental conditions. As for the No Action Alternative, the relatively small flow changes under the Proposed Action would not likely have a significant adverse effect on Monterey roach, would not cause roach population to drop below self-sustaining levels, or threaten to eliminate or substantially reduce the number or restrict the range of roach.

Special Habitats

Critical Habitat

ASHCP Covered Species

Under both the No Action Alternative and the Proposed Action, implementation of the Agreed Flows would improve critical habitat for steelhead and coho (see Special-Status Fish Species above). The City developed the Agreed Flows specifically to improve habitat conditions for steelhead and coho life-stages influenced by streamflow. However, further improvements to habitat provided in the ASHCP through the NFCF would only occur under the Proposed Action and the stated Biological Goals and Objectives would also be in place. This would provide enhancements to critical habitat under the Proposed Action that would not be realized under the No Action Alternative.

OMHCP Covered Species

Critical habitat for tidewater goby occurs in lagoons in the ASHCP Plan Area in Laguna Creek lagoon, Baldwin Creek lagoon, Moore Creek lagoon, and Corcoran lagoon. The City's OMHCP describes effects of the Covered Activities on tidewater goby critical habitat and provides AMMs to minimize and avoid effects (City of Santa Cruz 2021d). Similar to the No Action Alternative, change in inflows to the Laguna Creek lagoon

under the Agreed Flows would not result in a substantial adverse effect on tidewater goby critical habitat in Laguna Creek. The Agreed Flows result in inflows more typical of natural flows.

OMHCP Covered Activities will not affect critical habitat for robust spineflower and have a very minor impact on critical habitat for Santa Cruz tarplant. Critical habitat for robust spineflower occurs in the Plan Area but is absent from City facilities; therefore, it will not be affected. Covered Activities have the potential to impact up to 2,902 acres, less than 1% of the total, of critical habitat for Santa Cruz tarplant. This small amount would not appreciably reduce the value of the critical habitat to the species' recovery (City of Santa Cruz 2021e).

OMHCP Covered Activities will result in the permanent loss of 0.5 acres and temporary disturbance to 8.4 acres of critical habitat for CRLF. However, maintaining minimum stream flows year-round and reducing the amount of water diverted over time is expected to offset these impacts (City of Santa Cruz 2021e).

Other Special-Status Species

The OMHCP did not analyze effects on critical habitat for Zayante band-winged grasshopper (ZBWG) because it is not an OMHCP Covered Species. City pipelines along Newell Creek Road, Glen Arbor Road, Brackney, and Graham Hill Road occur within critical habitat for this species but the PBFs of ZBWG critical habitat (i.e., Zayante soils and associated plants and microhabitat conditions) only occur in unpaved areas of loose, sandy soils outside the paved areas where activities will occur. Therefore, no adverse effects on critical habitat for this species are expected under the Proposed Action.

Essential Fish Habitat

Under the Proposed Action, like the No Action Alternative, the City would continue to conduct all Covered Activities listed in the ASHCP and implementation of the Agreed Flows. Unlike the No Action Alternative, all elements of the Conservation Strategy including the Biological Goals and Objectives, AMMs, and NFCF would be implemented with the Proposed Action. This may result in earlier implementation of AMMs and projects developed under the NFCF may be implemented over a larger area and involve more significant restoration potential than mitigation projects for individual ITPs under the No Action Alternative. For these reasons there may be a more beneficial effect for coho EFH with the Proposed Action compared to the No Action Alternative. Effects of the Proposed Action on species in the Coastal Pelagic Species FMP and Pacific Coast Groundfish FMP (i.e., northern anchovy and starry flounder), since they are largely related to lagoon inflow, are the same as the No Action Alternative.

Coho are a target species for conservation and enhancement under the ASHCP, including implementation of Agreed Flows and Conservation Strategy (City of Santa Cruz 2023). Effects of implementation of the ASHCP are covered in the sections of this document addressing coho and critical habitat (see Special-Status Fish Species and Special Habitats above). Implementation of the Agreed Flows and Conservation Strategy, as well as other goals and policies of the City, are consistent with the overall objectives of the PFMC Pacific Salmon FMP and aligned with specific recommendations for conservation and enhancement measures for EFH as listed in Appendix A of the FMP (PFMC 2022). Therefore, the Proposed Action would not result in significant adverse effects on EFH for northern anchovy, starry flounder, or coho.

3.3 Cultural Resources

"Cultural resources" is a broad term that includes districts, sites, buildings, structures, objects, and landscapes considered significant in the context of prehistory, history, archaeology, culture, architecture, and engineering.[14] The National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 300101 et seq.) is the primary federal legislation that mandates the federal government's responsibility to consider the effects of its undertakings on historic properties. It defines the steps necessary to identify historic properties, including consultation with federally recognized Native American tribes to identify resources with important cultural values, to determine whether they may be adversely affected by a proposed undertaking, and the process for eliminating, reducing, or mitigating adverse effects. The historic preservation review process required by 54 U.S.C. 306108, commonly known as Section 106 of the NHPA, is outlined in 36 CFR Part 800. Historic properties are defined as those cultural resources listed, or eligible for listing, on the National Register of Historic Places (NRHP). The NRHP is a national list of cultural properties that exhibit qualities of historical significance in the context of our national heritage. The criteria for NRHP eligibility are described at 36 CFR § 60.4. Generally, a property must be at least 50 years old to qualify for the NRHP, though there are exceptions.

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. § 3001 et seq.) and associated regulations at 43 CFR Part 10 regulate the treatment of Native American human remains and associated and associated funerary objects, sacred objects, and objects of cultural patrimony, including documentation of Native American human remains and cultural items, an opportunity for repatriation of these materials, and plans for dealing with potential future discoveries of these items.

3.3.1 Affected Environment

3.3.1.1 Prehistoric and Historic Context

Prior to European contact, Native Americans residing along California's central coast practiced a hunter-gatherer lifeway. The Plan Area lies within the territory that was occupied by the Ohlone or Costanoan people. Post-Spanish contact development in the County began with the establishment of Mission Santa Cruz on August 28, 1791. The Spanish missions drastically altered the lifeways of the Native Americans, who were conscripted by Spanish missionaries to move to missions where they were indoctrinated as Catholic neophytes. In 1834, the Mexican government secularized the mission lands, releasing the Native Americans from control of the mission system. Extensive land grants were established covering over 150,000 acres in the County (Koch 1973; Lehmann 2000). The Mexican American War ended with the Treaty of Guadalupe Hidalgo in 1848. Santa Cruz was designated as one of the 27 original counties of California on February 18, 1850. The lumber, lime, cement, fishing, tanning, and leisure industries formed the economic foundation of the County during the second half of the nineteenth century. In the central and southern areas of the County, early settlers established large farms and dairies (Lehmann 2000). Urban expansion continued into the early twentieth century across the County. Agriculture and tourism continued

[14] Cultural resources include existing and/or potential prehistoric and historic archaeological sites, existing and/or potential Native American traditional cultural properties and sites, buildings and structures, groups of buildings, districts, street furniture, signs, and landscapes.

as the region's most prominent economic drivers. The expansion of urban areas included the widespread growth of commercial corridors and municipally funded improvements.

3.3.1.2 Historic (Archaeological) Properties

Based on the City's and County's archaeological sensitivity maps (City of Santa Cruz 2011; County of Santa Cruz 2022), the Plan Area includes defined areas that are sensitive for archaeological resources, some of which may contain unrecorded or undiscovered resources. These areas have a high potential for historic (archaeological) properties to occur, as determined by the locations of known archaeological sites, and by geographic attributes based on the topography and geological conditions of the area. Greater sensitivity generally occurs on level to gently rolling hills near the coast or along water courses. These areas of heightened sensitivity occur throughout the Plan Area.

Previous California Historical Resources Information System (CHRIS) records search results from the Northwest Information Center (NWIC) and field surveys conducted for the Santa Cruz Water Rights Project, Laguna Creek Diversion Retrofit Project, and Newell Creek Dam Inlet/Outlet Replacement Project included the Felton and Tait Street Diversions, Laguna Creek Diversion, and Newell Creek Dam and Loch Lomond Recreation Area, respectively. No historic (archaeological) properties were identified within or near these sites and the sites were determined to have a low potential for encountering unknown archaeological resources (City of Santa Cruz 2019, 2021c, 2021d).

3.3.1.3 Native American Coordination

On September 19, 2022, Dudek requested a Native American Heritage Commission (NAHC) search of the Sacred Lands File (SLF) for the Plan Area. On October 13, 2022, the NAHC responded indicating sacred sites were identified in the vicinity of the Plan Area and recommended contacting the Costanoan Ohlone Rumsen-Mutsen Tribe for additional information. Additionally, the NAHC provided a list of Native American tribes culturally affiliated with the Plan Area who may have knowledge of cultural resources in the Plan Area. Pursuant to 36 CFR § 800.4(a)(4), on December 1, 2022, NMFS sent letters offering consultation to the Amah Mutsun Tribal Band, Amah Mutsun Tribal Band of San Juan Bautista, Costanoan Ohlone Rumsen-Mutsen Tribe, Indian Canyon Mutsun Band of Costanoan, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, and Wuksache Indian Tribe/Eshom Valley Band and requested their assistance to identify sites of religious or cultural significance in the Plan Area that may be affected by the proposed undertaking. Communication from one State of California recognized Tribe has been received to date, occurring on August 3, 2023. Patrick Orozco, Chairman of the Costanoan Ohlone Rumsen-Mutsen Tribe, indicated that there are several recorded Indian sites within or near the Plan Area. NMFS will coordinate with the Costanoan Ohlone Rumsen-Mutsen Tribe as the Draft EA is released for public comment and seek comments. This outreach is also intended to ensure compliance with the American Indian Religious Freedom Act (1978) and Consultation and Coordination with Indian Tribal Governments (Executive Order 13175 [2000]).

3.3.1.4 Historic Properties

There are 48 buildings, structures, sites, and districts in Santa Cruz County listed on the NRHP, 27 of which are generally located within the Plan Area in Ben Lomond, Boulder Creek, Felton, and Santa Cruz, though these NRHP-listed resources are not located at City facilities that are the subject of the Covered Activities in the ASHCP.

Previous evaluations for potential historical significance have been conducted for some of the City's water diversion facilities that are 45 years old or older, including the Newell Creek Dam, Laguna Creek Diversion, and Tait Street Diversion (City of Santa Cruz 2018, 2020, 2021b). The Santa Cruz Water Rights Project EIR included an evaluation of the Tait Street Diversion and the site was not recommended as eligible for listing in the NRHP due to a lack of historical associations, architectural merit, and compromised integrity (City of Santa Cruz 2021b). The Newell Creek Dam and Laguna Creek Dam appear eligible for listing in the NRHP for their associations with the development history of water infrastructure in the City's water service area; therefore, they are considered historic properties under Section 106 of the NHPA (City of Santa Cruz 2018, 2020). The Majors Creek, Reggiardo Creek, and Felton Diversion facilities are over 45 years of age and have not been evaluated for potential historical significance; given their ages, these facilities may be considered historic properties under Section 106 of the NHPA if they are determined to be eligible for listing in the NRHP.

3.3.2 Environmental Consequences

Implementation of Agreed Flows under both the No Action Alternative and the Proposed Action would not result in adverse effects to historic (archaeological or built) properties or traditional cultural properties as these flows would not result in ground disturbance or damage, demolition, or destruction of such properties. Therefore, Agreed Flows are not further discussed in this section.

3.3.2.1 No Action Alternative

Individual activities and projects pursued in the future in support of operation and management of the City's water supply and municipal facilities, as well as management of City lands and watersheds have the potential to result in adverse effects on historic (archaeological and built) properties and traditional cultural properties. As described for the Proposed Action, any ground-disturbing activities in native soils in any portion of the study area where development would occur could potentially affect historic (archaeological) properties or traditional cultural properties. Additionally, activities that include alterations to historic (built) properties 45 years old or older, would have the potential to have significant adverse effects on such properties.

If any individual activities or projects are proposed in the future that would result in potential impacts on historic properties, such projects would be assessed under NEPA and/or CEQA, as relevant, on a project-by-project basis and would be required to mitigate any potentially significant adverse effects to the extent feasible. Therefore, the No Action Alternative would not result in significant adverse effects on historic properties.

3.3.2.2 Proposed Action

The potential for the Proposed Action to adversely affect historic properties or traditional cultural properties is contingent on the site-specific conditions of each Covered Activity or component of the Conservation Strategy, including the cultural resource sensitivity of the site, and anticipated encroachment into native soils or within the boundaries of known or potentially eligible historic properties.

Historic (Built) Properties

The Proposed Action includes Covered Activities that could be located within or adjacent to eligible or potentially eligible historical built properties and therefore may have the potential to adversely affect such resources directly or indirectly. Activities that include alterations to built environment resources 45 years

old or older, including improvements to the Majors Creek, Reggiardo Creek, and Felton Diversions; North Coast pipeline rehabilitation; pipeline inspections and repairs; retrofits of storm drain inlets and basins; and decommissioning of roads would have the potential to have significant adverse effects on historic properties if such facilities are determined to be potentially eligible for listing on the NRHP. In consideration of the historic context for the existing water management systems in the region, there is a low likelihood that water management structures that postdate the late 1800s or early 1900s (pioneering water system era) would be found historically significant. Implementation of MM CUL-1 (Appendix B) would minimize potential adverse effects on historical properties by ensuring that potential historical properties are identified and evaluated, and any proposed modifications to identified historical properties are in conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68) such that the historical properties would continue to convey their historical significance.

Additionally, the California Department of Transportation (Caltrans) compiled a synthesis of research on the effects of vibration with thresholds ranging from 0.08 in/sec PPV to 4.0 in/sec PPV for "fragile historic buildings" and "structures of substantial construction," respectively. Based on the synthesis of research, Caltrans developed recommendations for guideline threshold criteria of 0.3 in/sec PPV for older residential structures and 0.25 in/sec PPV for historic buildings and some old buildings exposed to continuous/frequent intermittent sources. For extremely fragile historic buildings, ruins, and ancient monuments, Caltrans recommends a threshold of 0.08 in/sec PPV (Caltrans 2020). If historic properties are located within a project site (for instance, if the Felton, Reggiardo, or Majors Creek dams are determined to be eligible for listing on the NRHP at the time they are evaluated), the structure may be susceptible to damage from vibration during construction activities if vibration levels exceed the Caltrans threshold for fragile historic structures of 0.08 in/sec PPV (Caltrans 2020). MM NOI-1 (see Appendix B) requires that an appropriate threshold be developed by qualified engineering personnel that would prevent vibration impacts to any historical properties. Development and implementation of a construction vibration monitoring plan would be required and vibration-generating construction activities would be monitored to ensure compliance with the developed threshold. With implementation of MM NOI-1, the potential for adverse effects to historic properties resulting from construction-related vibration would be minimized.

Therefore, the Proposed Action would not result in significant adverse effects to historic (built) properties.

Historic (Archaeological) and Traditional Cultural Properties

Adverse effects on archaeological sites usually occur by physical destruction or damage that can be caused by grading and excavation, trenching, weather-induced erosion, etc. Impacts to archaeological resources and human remains most often occur as the result of excavation or grading within the vertical or horizontal boundaries of a historic (archaeological) properties, such as could occur during construction activities associated with Covered Activities. Archaeological resources may also suffer impacts as the result of Covered Activities that increase erosion, or increase the accessibility of a surface resource, and thus increase the potential for vandalism or illicit collection. Because archaeological resources often are buried or cannot be fully defined or assessed on the basis of surface manifestations, substantial ground-disturbing work in native soils may have the potential to uncover previously unidentified resources, including archaeological deposits and human remains. As precise excavation and fill depths may not be known in all cases, it must be assumed that any ground-disturbing activities in native soils in any portion of the study area where development will occur could potentially affect historic (archaeological) properties or traditional cultural properties. Therefore, Covered Activities and components of the Conservation Strategy that include ground disturbance in native

soils would have the potential to have significant adverse effects on historic (archaeological) properties or traditional cultural properties if such resources are present. These include improvements to the Majors Creek and Reggiardo Creek diversion facilities, North Coast pipeline rehabilitation, pipeline inspections and repairs, retrofits of storm drain inlets and basins, trail maintenance and repair, road maintenance and decommissioning, and vegetation management involving ground disturbance in native soils. Management provisions for identification and evaluation of archaeological resources in advance of implementation of Covered Activities, and inadvertent discoveries of buried resources during ground-disturbing activities are provided in MM CUL-2 and in standard construction practices #15 and #16 (Appendix B) and would minimize potential adverse effects. Therefore, the Proposed Action would not result in significant adverse effects on historic (archaeological) properties or traditional cultural properties.

3.4 Hydrology and Water Quality and Quantity

3.4.1 Affected Environment

3.4.1.1 Hydrology

The Plan Area encompasses several watersheds. A watershed identifies an area of land that contains a common set of streams and rivers that all drain into a single larger body of water, such as a creek, river, lake, or ocean. Watersheds with the potential to be affected by Covered Activities and/or the Conservation Strategy are discussed as follows.

Liddell Watershed

Liddell Creek is a second-order stream that drains in a southwest direction off the western flank of Ben Lomond Mountain and flows into the Pacific Ocean at Bonny Doon Beach, along the North Coast of Santa Cruz County, directly south of Davenport. The Liddell watershed comprises approximately 4 surface square miles, with an additional drainage area of over 3 square miles provided by sub-surface karst. The elevation of the watershed ranges from 0 feet at the creek mouth to approximately 1,300 feet at its headwaters near Smith Grade. Liddell Creek consists of three distinct forks, including the Middle, East, and West branches. The approximate stream channel length from the mouth of Liddell Creek to the mainstem headwaters is 3.2 miles. The Liddell Spring feeds the watershed and is the location of the City's intake in this watershed. The intake is located on a tributary to the East Branch of Liddell Creek, near its headwaters, approximately 2.5 miles upstream from the creek mouth. The channel gradient from the diversion to the creek mouth is approximately 3% along the East Branch of the creek. Former CEMEX quarry operations in the upper portion of the Liddell watershed have locally affected the hydrology and water quality in the upper watershed. In addition, the CEMEX quarry operated a stream diversion on a tributary to East Liddell Creek to support quarry operations and the current landowner continues to operate the diversion (City of Santa Cruz 2021d). Land use in the watershed is predominantly zoned for agriculture with the remainder comprised of mountainous residential areas (County of Santa Cruz 2014).

Laguna Watershed

Laguna Creek is a second-order stream that drains in a southwest direction off Ben Lomond Mountain and flows into the Pacific Ocean along the North Coast of Santa Cruz County. The Laguna watershed drains an

area of approximately 8 square miles and is comprised of Laguna Creek, Reggiardo Creek, and several unnamed streams. The elevation of the watershed ranges from 0 feet at the creek mouth to approximately 2,420 feet at the headwaters near Empire Grade. The Laguna watershed is underlain by karst topography which has a significant influence on streamflow and summer baseflow by producing multiple springs within the watershed (City of Santa Cruz 2005). The approximate stream length from the mouth of Laguna Creek to its headwaters is 8.5 miles. The City diversion on Laguna Creek is directly upstream (0.1 mile) of the Reggiardo Creek confluence, which is approximately 4.2 miles upstream from the mouth of Laguna Creek. The channel gradient from the diversion to the creek mouth is about 3%, and the channel gradient upstream of the diversion to the headwaters is approximately 6% (City of Santa Cruz 2021d). Predominant land uses in the watershed are agriculture, residential, and resource conservation uses (County of Santa Cruz 2014).

Majors Watershed

Majors Creek is a second-order stream that drains off Ben Lomond Mountain and flows into the Pacific Ocean along the North Coast area of Santa Cruz County. The Majors watershed, located between the Laguna and Baldwin/Wilder watersheds, drains an area of approximately 5 square miles and is comprised of Majors Creek and three unnamed tributaries. The elevation of the watershed ranges from 0 feet at the creek mouth to approximately 1,800 feet at its headwaters near Felton Peak. The approximate stream channel length from the creek mouth to the creek headwaters is 5.9 miles. The City diversion on Majors Creek is located approximately 2.2 miles upstream from the mouth of Majors Creek. The channel gradient from the diversion to the creek mouth is about 3%, and the channel gradient upstream of the diversion to the headwaters is approximately 6% (City of Santa Cruz 2021d). Land use is predominantly parkland, with the remainder comprised of rural residential and a small area of agricultural production (County of Santa Cruz 2014).

San Lorenzo Watershed

The San Lorenzo River, located within a 138-square mile watershed in northern Santa Cruz County, is the City's largest source of water supply. Originating in the Santa Cruz Mountains, the watershed consists of a 25-mile-long main stem and nine principal tributaries that include primary creeks Branciforte, Carbonera, Zayante, Bean, Fall, Newell, Bear, Boulder, Lompico, and Kings Creeks. The watershed includes the cities and communities of Santa Cruz, Scotts Valley, Felton, Ben Lomond, and Boulder Creek. Much of the watershed is forested except for these pockets of urban areas. City diversions on the San Lorenzo River include the Felton Diversion in Felton and the Tait Street Diversion in Santa Cruz. The watershed is comprised predominantly of open space lands (41%) in the northern portion and residential neighborhoods (26%) and paved roads (13%) as the river flows south through the City. Land uses in the remaining 20% of the watershed include commercial businesses and a portion of the University of California, Santa Cruz (UCSC) campus (City of Santa Cruz 2011; County of Santa Cruz 2014).

Surface water flows within tributary creeks in the watershed are characterized as flashy with periodic high flow events that coincide with winter storms and low summer baseflows. This results in high-energy systems that have the potential to move a significant quantity of sediment. Stream base flow levels, sustained by groundwater flow, rise in the winter and decline steadily through the spring and early summer months. The lowest flows occur in the late summer and fall months before winter rains. Zayante Creek is the largest tributary to the San Lorenzo River (City of Santa Cruz Water Department 2013).

Since approximately 1960, the San Lorenzo River has been impacted by increasing development within the watershed and the channelization of the lower 2.5 miles into a levee flood control structure, following a damaging flood in Santa Cruz in 1955. This flood control project, developed in cooperation with the U.S. Army Corps of Engineers (USACE), included rip-rap levee banks, removal of all vegetation from the banks, and dredging of the river channel bottom. During construction of the levee project, Jessie Street Marsh was filled, and the lower Branciforte Creek was channelized in a cement flood control channel. The USACE completed another levee improvement project in 2000 that improved and raised the levees (City of Santa Cruz 2011).

Newell Watershed

Newell Creek and the Loch Lomond Reservoir, which is impounded by Newell Creek Dam, are located within the San Lorenzo River watershed. Loch Lomond Reservoir is located near the town of Ben Lomond in the Santa Cruz Mountains. Construction of the reservoir was completed in 1961 and has a maximum capacity of approximately 2,858 million gallons (Whealdon-Haught et al. 2021). The Newell watershed (a subwatershed of the San Lorenzo River watershed) upstream of the reservoir is about 9 square miles (City of Santa Cruz 2016). The City-owned tract, which is predominantly upstream of the Newell Creek Dam, comprises approximately 46% of the total watershed. Newell Creek is the largest drainage within this tract, entering the reservoir at the north end. Three other tributaries, including McFarland Creek and two unnamed tributaries (northern tributary and southern tributary), enter the reservoir from the west. Terrain within the watershed consists of rugged, ridge-and-valley terrain, including narrow-crested, steep-sided ridges and deeply incised, v-shaped valleys (City of Santa Cruz 2013). The Newell Creek Dam impounds water to support the City's water supply production and it does not act as flood control.

3.4.1.2 Water Quality

The Regional Water Quality Control Board (RWQCB) establishes beneficial uses and characterizes the water quality of surface water bodies based on watershed boundaries. Stormwater pollutants present in City watersheds include metals, solvents, paint, concrete, masonry products, detergents, vehicle fuels and fluids, oil and grease, pesticides and herbicides (organic compounds and nutrients), debris and litter, bacteria, pathogens and oxygen demanding compounds, and sediment and silt.

The June 2019 Water Quality Control Plan for the Central Coastal Basin (Basin Plan) is the Central Coast RWQCB's current master water quality control planning document (Central Coast RWQCB 2019). The Basin Plan establishes beneficial uses and water quality objectives for each of the water bodies in the Central Coast Region. The Clean Water Act requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the Clean Water Act. Clean Water Act Section 303(d) requires states to identify and prepare a list of water bodies that do not meet water quality objectives, and to establish total maximum daily loads (TMDLs) for each water body to ensure attainment of water quality objectives. These TMDLs are updated every two years in the SWRCB Integrated Report, also known as the Section 305(b) report, which assigns an Integrated Report Condition Category to all assessed water body segments. Water body segments that exceed protective water quality standards are placed on the 303(d) list of impaired waters. Water quality impairments for the water bodies potentially affected by the Proposed Action include benthic community effects, chlordane, chloride, chlorpyrifos, enterococcus, nitrate, polychlorinated biphenyls (PCBs), sedimentation/siltation, sodium, water temperature, and toxicity for the San Lorenzo River and pH and sedimentation/siltation for Newell Creek (SWRCB 2022). These impaired bodies are listed as Category 5 in the SWRCB Integrated Report, which

includes waters where at least one beneficial use is not supported, and a TMDL is required. Loch Lomond Reservoir, Liddell Creek, Laguna Creek, and Majors Creek do not have any water quality impairments.

3.4.2 Environmental Consequences

Direct effects associated with the implementation of Agreed Flows include those related to changes in hydrology of the San Lorenzo River and North Coast Streams. Implementation of Agreed Flows would modify the hydrology of the San Lorenzo River and the North Coast Streams by both increasing and reducing stream flows at different times, in different seasons and in different water-year types. Residual flows are the stream flows downstream of the City's diversions. The residual flow is either the Agreed Flow for that time period, the Agreed Flow plus whatever amount is not needed for City supply, or the natural streamflow if the available flow is zero and diversion is precluded. Hydrologic and water supply modeling conducted for the Santa Cruz Water Rights Project EIR assessed potential effects of Agreed Flows on residual flows based on an average of all years and an average of critically dry years in the historical record (1936 to 2015) for the San Lorenzo River at the Felton Diversion and Tait Street Diversion, Newell Creek at the Newell Creek Dam, and the North Coast Stream diversions at Laguna Creek, Liddell Spring, and Majors Creek. If stream diversions resulted in a substantial decrease in residual flows, water quality impacts could occur, including increased temperature (i.e., due to shallower water) and altered salinity, dissolved oxygen, and pH concentrations. Changes in Loch Lomond Reservoir levels and spill characteristics were also modeled to assess potential water quality impacts that could occur. The results of the modeling are included in the discussions below and incorporated by reference from the Santa Cruz Water Rights Project EIR (City of Santa Cruz 2021d).

3.4.2.1 No Action Alternative

Effects on water quality and quantity from the No Action Alternative could occur through alterations to stream flows and changes in Loch Lomond Reservoir levels and spill characteristics due to implementation of Agreed Flows with pending water rights modifications. As described under the Proposed Action, Agreed Flows would not substantially alter the existing drainage patterns of the City's surface water sources such that potentially adverse water quality impacts would result. Additionally, the Agreed Flows with pending water rights modifications would increase Loch Lomond Reservoir levels, which indicates that the reservoir would spill more frequently. As Newell Creek Dam does not function as a flood control impoundment, an increase in Loch Lomond Reservoir levels and spill frequency would not cause downstream flooding. However, without the implementation of other elements of the ASHCP (e.g., AMMs), the No Action Alternative may result in potential adverse water temperature effects due to an increase in Loch Lomond Reservoir spill frequency. The Santa Cruz Water Rights Project EIR includes standard operational practice #6 that is equivalent to ASHCP AMM WS-24. Therefore, this potential temperature effect in Newell Creek would also be minimized under the No Action Alternative.

The No Action Alternative would not result in the implementation of habitat restoration projects under the NFCF and therefore would not result in short-term water quality effects from such projects involving temporary disturbance of sediment that could increase surface water turbidity and accidental release of oil, gas, and other fluids from construction equipment. However, the No Action Alternative would also not result in the long-term effect of implementing the habitat restoration projects and related improvements in water quality conditions in the North Coast Streams and San Lorenzo River.

If any individual City activities or projects are proposed in the future that would result in potential impacts related to violation of any water quality standards or waste discharge requirements or degradation of water quality, such projects would be assessed under NEPA and/or CEQA, as relevant, on a project-by-project basis and would be required to mitigate any potentially significant adverse effects, to the extent feasible. Therefore, the No Action Alternative would not result in significant adverse effects related to hydrology and water quality.

3.4.2.2 Proposed Action

Agreed Flows

Effects on water quality and quantity from the Proposed Action could occur through alterations to stream flows and changes in Loch Lomond Reservoir levels and spill characteristics due to implementation of Agreed Flows with pending water rights modifications. Based on an average of all years in the historical record (1936 to 2015), the difference in residual flows with the Proposed Action would be minimal relative to 2018 existing conditions, with the exception of residual flows in Newell Creek during critically dry years. In that case, the Proposed Action would result in an increase in residual flows of approximately 1 cfs relative to the existing conditions. Additionally, on a month-by-month basis, residual flows would result in some incremental differences (both higher and lower) than under 2018 existing conditions, including during critically dry years.

The Proposed Action would increase Loch Lomond Reservoir levels, which indicates that the reservoir would spill more frequently. Operation of Loch Lomond Reservoir (reservoir spill and the existing required 1 cfs fish release) is the only City activity associated with the Proposed Action that has the potential to influence water temperatures. The majority of spill occurs during or after precipitation events in the winter when Loch Lomond Reservoir's temperature is cool. However, reservoir spill can result in increased temperature downstream of the dam in Newell Creek during periods when the reservoir surface temperature is high during spring and early summer (May through July) when the lake surface is warming and there is still a potential for spill, at least in wetter years when storage is high. Under AMM WS-24, when the reservoir is spilling during late spring and summer, the City would release additional cooler flow through the fish release below the dam when needed to offset the potential warming effects of reservoir spills below Newell Creek Dam at that time of the year. Therefore, Agreed Flows would not substantially alter the existing drainage patterns of the City's surface water sources such that potentially adverse water quality impacts would result. Additionally, as Newell Creek Dam does not function as a flood control impoundment, an increase in Loch Lomond Reservoir levels and spill frequency would not cause downstream flooding.

Diversion Facility Improvements and Other Covered Activities

Effects on water quality through exceedance of water quality standards, non-conformance with waste discharge requirements, or by other means could potentially result from the short-term effects of construction activities associated with Covered Activities (e.g., erosion and sedimentation due to land disturbances, uncontained material and equipment storage areas, improper handling of hazardous materials) and the long-term effects of operations of upgraded facilities (e.g., use/handling of hazardous materials). Construction activity on projects that disturb 1 or more acres of soil must obtain coverage under the State's Construction General Permit. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must list BMPs that the discharger will use to protect stormwater runoff and the placement of those BMPs. A Notice of Intent

(NOI) and SWPPP must be prepared prior to commencement of construction. Proposed grading and development on the project sites of Covered Activities would likely disturb more than 1 acre in some instances, and, thus, such projects would be subject to the Construction General Permit and preparation of a SWPPP. The City's regulatory requirements and BMPs, as detailed in the "Stormwater Best Management Practices Manual" published by the City's Public Works Department, must be implemented.

Rehabilitation of City diversion facilities on the North Coast Streams and San Lorenzo River may require dewatering during construction activities. Dewatering would be subject to Central Coast RWQCB permitting approval. Excavations and construction associated with the diversion facility improvements or other Covered Activities immediately adjacent to Reggiardo Creek, Majors Creek, and the San Lorenzo River could potentially result in erosion and sedimentation of these water bodies if not properly controlled. In addition to sediment, other pollutants associated with construction activity could include heavy metals, oil/grease, fuels, debris/trash from construction-related materials, and concrete-curing compounds. Sediment can also be a carrier for these pollutants if they are released to soils. These potential effects would be addressed through implementation of SWPPPs, where relevant, and by a number of AMMs in the ASHCP, all of which would serve to control pollutants affecting water quality, including:

- Protocols related to release of reservoir water to maintain aeration of released water, control turbidity, and ensure appropriate temperatures of released water (Measures WS-53 through WS-57);
- Installation of erosion control measures, devices, and fencing and remediation of erosion areas (Measures WO-3, WO-4, LM-3, LM-11, LM-13, and LM-14);
- Minimization of disturbance to banks and riparian vegetation that stabilizes banks (Measures WO-5 through WO-7);
- Practices related to minimizing hazardous materials spills/contamination and protecting water quality during work within the wetted channel (Measures WO-9 through WO-14);
- Measures to avoid sediment discharge to water courses, and contain sediment and spills (Measures WO-20 and WO-21); and
- Minimization of stormwater pollutants and runoff, and upgrades to and maintenance of stormwater facilities (Measures MF-18 through MF-35).

No water quality impacts are anticipated with diversion facility operations, as no new potential pollutants (other than currently used minor quantities of oil, grease, degreasers, etc.) would be used to operate the diversion structures. Additionally, Covered Activities are not expected to result in a substantial increase in impervious surface area given that facility sites are already developed and paved, and pipeline corridors would be subsurface. Therefore, construction and operations at the diversions and other facility sites and construction or land disturbance associated with other Covered Activities would not substantially alter drainage patterns, increase the rate or amount of surface runoff, violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of North Coast Streams, the San Lorenzo River, and Newell Creek.

The Proposed Action would result in the implementation of habitat restoration projects under the NFCF and therefore would result in similar short-term water quality effects from such projects as those described above for other construction activities. The AMMs identified above would address these short-term water quality effects. Because implementation of the Conservation Strategy, including NFCF restoration projects, is intended to improve habitat for Covered Species, it is anticipated that the long-term effect of

implementing the Proposed Action would be to improve water quality conditions in the North Coast Streams and San Lorenzo River, as well as other streams that provided habitat for Covered Species, if restoration projects are implemented outside of the Plan Area.

There are no designated flood hazard zones at the diversion facilities on the North Coast Streams. The Felton and Tait Street Diversion improvements would be completed within the 100-year flood zone of the San Lorenzo River. However, all proposed diversion improvements and other Covered Activities would involve similar use of hazardous materials as under existing conditions and would not result in an increase in the storage of hazardous materials. Materials such as oil, grease, or degreasers would be used, stored, and disposed in accordance with all applicable state and local regulations. As a result, diversion improvements would not risk release of pollutants due to inundation.

Given the foregoing, the Proposed Action would not result in significant adverse effects on hydrology and water quality and quantity.

3.5 Recreation

3.5.1 Affected Environment

The Plan Area includes Loch Lomond Recreation Area, as well as known informal access and related recreation along Newell Creek, at or near Loch Lomond Reservoir; along the San Lorenzo River, at various park locations; and at North Coast Streams, where the streams flow through North Coast beaches. The City owns and operates Loch Lomond Recreation Area, located at the Loch Lomond Reservoir in the Santa Cruz Mountains. Loch Lomond Recreation Area is approximately 355 acres, stretches 3 miles long, and is located at 100 Loch Lomond Way near Ben Lomond, California, in unincorporated Santa Cruz County. Loch Lomond Recreation Area is open from March to September for limited recreational use. Recreational use of the reservoir is prohibited during the winter (City of Santa Cruz 2013).

Amenities at Loch Lomond Recreation Area include a boat dock and launch ramp area, boat rentals, picnic areas with developed restrooms and portable toilets, a park store, fishing, hiking, and natural resource interpretive programs. Due to concerns about contamination of the City's water supply in the reservoir, swimming and wading are prohibited and private boat launching is restricted to only allow boats that are stored at Loch Lomond Recreation Area. Space is limited to approximately 100 boats (City of Santa Cruz 2020b); however, most of the boats at the recreation area are paddle and row boats available for rent.

The reservoir supports a warm water fishery primarily composed of introduced non-native game species including largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), channel catfish (*Ictalurus punctatus*), and bluegill (*Lepomis macrochirus*) (City of Santa Cruz 2013). In addition, one other non-native species, golden shiner (*Notemigonus crysoleucas*) and three native species, Sacramento sucker (*Catostomus occidentalis),* prickly sculpin (*Cottus asper*) and rainbow trout (*O. mykiss*)[15] are known to occur in the reservoir, though golden shiner and Sacramento sucker have not been observed since 1992. CDFW has planted hatchery-raised rainbow trout in Loch Lomond Reservoir as part of an annual stocking program,

[15] Rainbow trout are the same species as steelhead, but they have different life histories. Rainbow trout spend their lives mostly or entirely in freshwater, while steelhead are anadromous, meaning they spend part of their lives in the sea before going to rivers to breed.

with stocking occurring as recently as March and April 2021 (CDFW 2021). Therefore, all rainbow trout currently within the reservoir are assumed to be hatchery-raised fish.

When full, Loch Lomond Reservoir provides 180 surface acres of water that are accessible by rental paddle boats and row boats, and private boats that are stored at Loch Lomond Recreation Area (City of Santa Cruz 2013). Loch Lomond Reservoir is kept as full as possible as it serves as the City's primary water supply during drought conditions (City of Santa Cruz 2013). However, the water surface elevation in the reservoir is highly variable and is influenced by natural inflow from Newell Creek, pumping to the Graham Hill Water Treatment Plant, pumping from the Felton Diversion, evapotranspiration, and instream flow releases for fisheries downstream of the dam (City of Santa Cruz 2013). While the reservoir is typically open to the public from March 1 to mid-October, boats and related infrastructure can only operate safely throughout the full recreational season when the lake level is approximately 564 feet above mean sea level (amsl) or higher at the beginning of the season, which allows for current marina infrastructure to function safely (City of Santa Cruz 2014). When the lake level is below approximately 564 feet amsl at the beginning of the season (March 1) the City either, depending on actual lake levels, does not allow for boating at all that season or discontinues boating mid-season when boat launching is no longer possible. Based on an average of all years in the historic hydrologic record (1936 to 2015), there are approximately 12% of days under existing conditions where a full recreational season of boating would not occur because lake levels fall below approximately 564 feet amsl in March, at the beginning of the season (City of Santa Cruz 2021d).

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

Like the Proposed Action, the No Action Alternative would enhance recreational opportunities at Loch Lomond Recreation Area and fishing opportunities downstream in the San Lorenzo River—beneficial effects. Given this beneficial effect, the No Action Alternative would not conflict with existing recreational uses at Loch Lomond Reservoir. As described for the Proposed Action, the changes in residual flows with the No Action Alternative, as a result of the Agreed Flows with pending water rights modifications, would have no effect on informal access and recreational uses along Newell Creek, San Lorenzo River, and the North Coast Streams. Given the foregoing, the No Action Alternative would not result in significant adverse effects on recreation overall and would result in beneficial effects on recreation at Loch Lomond Recreation Area.

3.5.2.2 Proposed Action

With implementation of Agreed Flows, other elements of the Proposed Action, and the pending water rights modifications, the City would rehabilitate the Tait Street and Felton Diversions on the San Lorenzo River, which would involve improvements to pumping capacity at the Tait Street Diversion. These improvements would allow for deferral of winter pumping at North Coast diversions and pursuit of improvements in groundwater storage that could serve water system demand during low-flow periods. The ability to take more water at the Tait Street Diversion and store it in the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin, as the pending water rights modifications would allow, would offset water that the City would otherwise withdraw from Loch Lomond Reservoir. Decreased reliance on stored water in Loch Lomond Reservoir for water supply would result in an associated increase in lake levels, based on hydrological and water supply modeling conducted for the Santa Cruz Water Rights Project (City of Santa

Cruz 2021d). Under the Proposed Action, on average, there would be approximately 4.5% of days where a full season of boating and related operations would not occur because lake levels fall below approximately 564 feet amsl in March, an improvement over 12% of days under existing conditions (City of Santa Cruz 2021d). Therefore, the Proposed Action would enhance recreational opportunities compared to existing conditions at Loch Lomond Recreation Area—a beneficial effect. Given that lake levels would increase, the Proposed Action would also not degrade the recreational experience of boaters and other recreationalists at the Loch Lomond Recreation Area, such as might occur with aesthetic impacts at the reservoir. Additionally, higher lake levels and flows would result in enhanced fishing downstream in the San Lorenzo River where there is a legal steelhead fishery. Therefore, the Proposed Action would have a beneficial effect on boating in Loch Lomond Reservoir and fishing in the San Lorenzo River.

As discussed in Section 3.4.2.2, based on an average of all years in the historical record (1936 to 2015), the difference in residual flows below the City's points of diversion would be minimal relative to existing conditions, with the exception of critical-year residual flows in Newell Creek. In that case, the Proposed Action would result in an increase in residual flows of approximately 1 cfs relative to existing conditions. Therefore, the changes in residual flows with the Proposed Action would have no effect on informal access and recreational uses along Newell Creek, San Lorenzo River, and the North Coast Streams.

Given the foregoing, the Proposed Action would not result in significant adverse effects on recreation overall and would result in beneficial effects on recreation at Loch Lomond Recreation Area.

3.6 Socioeconomics and Environmental Justice

3.6.1 Affected Environment

3.6.1.1 Methodology

This section presents demographic and economic characteristics of the Plan Area, including information pertaining to population, housing, employment, minority and low-income populations, and water rates. Data from the U.S. Census Bureau were used to identify socioeconomic and environmental justice characteristics of the Plan Area relative to Santa Cruz County, the State of California, and the United States. Potentially affected geographies were determined by identifying Census Tracts wholly or partially within the Plan Area. For the purposes of this analysis, the Plan Area includes the following 34 Census Tracts (asterisks indicate Census Tracts that are within the Plan Area but not the City's water service area): 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008.01, 1008.02, 1009, 1010.01, 1010.02, 1011, 1012, 1202, 1203.01*, 1203.02*, 1205*, 1206*, 1207, 1208, 1211, 1212, 1213, 1214.01, 1214.02, 1214.03, 1215.01, 1215.02, 1216.01, 1216.02, 1217.01, 1217.02, and 1220.05.

3.6.1.2 Population and Housing

The Plan Area is within Santa Cruz County, which is the 25th most populous county in the State of California. The population within the Plan Area is approximately 142,940, which is approximately 53% of the County's total population of 270,861 (U.S. Census Bureau 2020a). The Association of Monterey Bay Area Governments (AMBAG) projects that the population of Santa Cruz County will grow to 294,967 by 2045, which would represent an average annual growth rate of 0.4% (U.S. Census Bureau 2020a; AMBAG 2022). The current

population residing in the Santa Cruz water service area is estimated to be 96,186 people. Approximately two thirds of the total population, over 64,000, lives inside the City limits (City of Santa Cruz 2021a).

Approximately 56% of the housing units in Santa Cruz County are within the Plan Area. The vacancy rate of the Plan Area is 9.5%, which is similar to that for Santa Cruz County (9.5%) and the United States (9.7%), and higher than that for the State of California (6.4%) (U.S. Census Bureau 2020b). Approximately 37,701 housing units are within the City's water service area. A large proportion of the local housing stock (over 50%) is rented. Like other coastal communities, housing supply in the service area remains limited and housing affordability is a major economic, political, and social issue (City of Santa Cruz 2021a).

3.6.1.3 Employment and Economy

The number of employable residents (i.e., its available labor force), the number of job opportunities, and the unemployment rate are key indicators of the economic health of an area. The unemployment rate in the Plan Area is 5.4%, which is slightly lower than that for the County (6.1%) and State (6.2%), and similar to that for the United States (5.4%).

AMBAG estimated the total number of jobs in Santa Cruz County in 2020 to be 140,002. AMBAG projects that the number of jobs will increase to 153,261 by 2045, which represents an increase of 9.5% (AMBAG 2022). Overall, the University of California, Santa Cruz is the area's largest single employer and is a key component of the region's economic fabric in terms of employment, spending, research, and business creation. Other top employers include the County of Santa Cruz, City of Santa Cruz, and the Santa Cruz Beach Boardwalk. Tourism and lodging are additional major economic drivers in the community (City of Santa Cruz 2021a). Santa Cruz County's economy relies primarily on its agriculture, tourism, high technology, educational, and health care industries. The industries with the largest number of jobs in the Plan Area include educational services, and health care and social assistance; professional, scientific, and management, and administrative and waste management services; arts, entertainment, and recreation, and accommodation and food services; retail trade; manufacturing; and construction. While important to the County's economy, employment in the agricultural industry is relatively lower within the Plan Area (U.S. Census Bureau 2020d).

3.6.1.4 Environmental Justice Communities

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations." The U.S. Environmental Protection Agency (EPA) defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, sex, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

Race and income are socioeconomic characteristics critical to the consideration of a project's effects on minority and/or low-income populations. For the purposes of implementing Executive Order 12898, the Council on Environmental Quality (CEQ) guidance (CEQ 1997) defines a minority as any individual who is a member of any of the following Census-defined races or ethnicities: Black, Asian, American Indian and

Alaskan Native, Native Hawaiian or Other Pacific Islander, or Hispanic. The CEQ guidance states that minority populations should be identified where the minority population of the affected area either exceeds 50% of the area's population or is meaningfully greater than the minority percentage in the general population or geographic unit of analysis. Similarly, a low-income population exists if a community has 50% or more of its residents living at or below the U.S. Census Bureau's annual statistical poverty thresholds or its population of poverty level residents is meaningfully greater than the proportion of low-income individuals within the general population or geographic unit of analysis.

This analysis uses a combination of the *Fifty Percent* analysis and the *Meaningfully Greater* analysis using the Census Tract as the geographic unit of analysis. As documented below, the Plan Area does contain Census Tracts with minority population percentages greater than 50%, but none of the Census Tracts have low-income populations greater than 50%. Therefore, for the purposes of this analysis, a Census Tract that contains 50% or more minority population, or more than 14% of people living below the poverty threshold (i.e., a greater percentage than the Plan Area as a whole) constitutes an environmental justice community.

Table 6 shows the total population, minority population percentage, median household income, and percentage of all people with income below the Federal poverty threshold for the Census Tracts that are partially or wholly within the Plan Area, as compared to the Plan Area as a whole, Santa Cruz County, the State of California, and the United States.

Table 6. Minority and Low-Income Populations

Geographic Unit	Total Population	Minority Population Percentage[1,2]	Median Household Income	Percentage of People with Income Below Poverty Threshold[2]
Plan Area Total	142,940	35%	$92,389	14%
Census Tract 1001	2,294	28%	$124,196	**16%**
Census Tract 1004	8,452	**74%**	$29,943	**29%**
Census Tract 1005	5,490	39%	$93,348	**39%**
Census Tract 1007	2,275	39%	$39,065	**17%**
Census Tract 1008.01	3,956	**53%**	$65,313	**19%**
Census Tract 1009	4,274	30%	$87,103	**15%**
Census Tract 1010.01	4,030	45%	$40,461	**33%**
Census Tract 1010.02	4,771	**54%**	$41,556	**33%**
Census Tract 1012	3,461	32%	$85,938	**29%**
Census Tract 1215.02	2,085	42%	$58,224	**23%**
Santa Cruz County	270,861	46%	$89,986	12%
California	39,538,223	65%	$78,672	13%
United States	331,449,281	42%	$64,994	13%

Source: U.S. Census Bureau 2020a, 2020c.
Notes:
1 Includes all individuals other than non-Hispanic white. Calculated by subtracting the "Not Hispanic or Latino – White alone" population from the total population for each geography.
2 Values that exceed the thresholds considered for minority or low-income populations of concern are shown in bold.

Minority Populations

As shown in Table 6, approximately 35% of Plan Area residents are members of minority populations, as compared to approximately 46% for Santa Cruz County as a whole, 65% for the State of California, and 42% for the United States. Three Census Tracts within the Plan Area are considered minority communities of concern as they have minority populations of greater than 50% (1004, 1008.01, and 1010.02).

Low-Income Populations

Median household income in the Plan Area is $92,389, which is higher than the County, State, and United States. The U.S. Census Bureau uses a set of dollar-value annual income thresholds that vary by family size and composition to determine who is in poverty. For instance, the 2020 poverty threshold for a household with one person under the age of 65 was $13,465, and for a two-person household with two children under age 18 was $26,246 (Shrider et al. 2021). As shown in Table 6 above, approximately 14% of Plan Area residents have incomes below the Federal poverty threshold, as compared to approximately 12% for Santa Cruz County, and 13% for the State of California and United States. Ten Census Tracts within the Plan Area are considered low-income communities of concern as they have a greater percentage of people with income below the poverty threshold than the Plan Area as a whole of 14% (1001, 1004, 1005, 1007, 1008.01, 1009, 1010.01, 1010.02, 1012, and 1215.02).

3.6.1.5 Water Rates

The City Water Department is funded entirely by revenues from fees and charges paid by customers receiving its services. Approximately every five years, the City Water Department reviews its long-range projections for operating and capital costs, as well as financial policies and metrics. These annual revenue requirements, policies, and metrics are then used to develop recommended water rates for a five-year period. The City Council approved the current water rate structure and water rates for fiscal years (FY) 2023 - 2027 in Fall 2021. The current and recommended rate structure collects approximately 90% of total revenue through charges based on water consumption and the remaining 10% through fixed charges based on meter size. Fixed charges are set to recover the cost of meter reading and meter maintenance, producing and delivering bills, and providing customer service. Consumption charges are split into two types, charges that recover the cost of water utility operations, and an Infrastructure Reinvestment Fee (IRF) that recovers pay-as-you-go capital investments and the cost of debt service on funds borrowed to support capital investment and reinvestment (City of Santa Cruz 2021b).

Percent median household income (%MHI) is commonly used by state and Federal regulatory agencies and by water industry stakeholders for assessing community-wide water charges affordability for decades. %MHI is utilized by the SWRCB (at 1.5% threshold) and the EPA (at 2.5% threshold) for assessing affordability (SWRCB 2021). A water service affordability analysis was conducted in 2020 to support the City's water rate setting process (M.Cubed 2020) and found that the water service affordability ratio for the City's water service area is 1.3% of the area's adjusted median household income, which is below SWRCB and EPA thresholds for water service affordability. Therefore, water service is affordable for the majority of the City's customers. Approximately 6% of households within the City's water service area are located in Census block groups with affordability ratios for water service greater than 2.5%; for those households, meeting basic living expenses including water service costs may constitute a financial burden.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Individual activities and projects in support of operation and management of the City's water supply and other municipal facilities, and land management activities would not result in displacement of people or housing, as such City facilities are existing and do not contain residential uses. Like the Proposed Action, implementation of Agreed Flows under the No Action Alternative may require the addition of approximately one new permanent employee, which would be negligible within the context of the existing employment and labor force in the Plan Area. Therefore, the No Action Alternative would not foster population growth as a result of creation of new jobs. Like the Proposed Action, the No Action Alternative would not result in changes to the City's existing water service area, or the extension of infrastructure or introduction of service into areas that are not currently served and thus, would not include activities that could indirectly induce population growth. While the Agreed Flows with pending water rights modifications are designed to increase available water supplies within the areas served by the City, such supplies are intended to meet projected supply[16] deficits during times of identified water supply shortfalls (City of Santa Cruz 2021a and 2021d). As such, the No Action Alternative would not generate substantial population growth or new employment, directly or indirectly, and thus, would not result in changes to the demographics or population of the Plan Area.

Individual activities and projects that the City pursues in the future could cause temporary, short-term construction effects at existing City facilities that may cause nuisances from construction emissions and noise at the land uses adjacent to the facilities. However, such nuisances would be temporary and would be eliminated upon construction completion. Furthermore, no significant unmitigable adverse impacts related to other resource areas have been identified in this EA for the No Action Alternative; thus, there is no potential for disproportionate adverse effects on minority or low-income populations. Therefore, the No Action Alternative would not result in significant adverse effects related to socioeconomics and environmental justice.

3.6.2.2 Proposed Action

Population and Housing

Like the No Action Alternative, the Proposed Action would include operation and management of the City's water supply and other municipal facilities, and land management activities, which do not contain residential uses and would therefore not displace people or housing. No new residential or commercial uses are proposed.

Construction activities under the Proposed Action would consist of modifications to existing infrastructure and associated improvements at existing facilities and would require temporary employment of construction workers. Although the Proposed Action would generate a limited number of short-term construction jobs, these jobs could be accommodated within the existing local labor force in the Plan Area and would not require substantial relocation of workers to the Plan Area. Approximately one additional

[16] Demand projections are associated with growth already anticipated in areas served by the City as set forth in the 2020 UWMP, which is consistent with and lower than current AMBAG regional population forecasts and is also consistent with local general plans.

permanent employee may be required for implementation of Agreed Flows, which would be negligible within the context of the existing employment and labor force in the Plan Area. Given the maintenance nature of this new job, it is expected that the new employee would be drawn from the local labor force and likely would not require recruitment from outside of the Plan Area.

The Proposed Action would not result in changes to the City's existing water service area, or the extension of infrastructure or introduction of service into areas that are not currently served and thus, would not include activities that could indirectly induce population growth. As explained above for the No Action Alternative, while the Agreed Flows with pending water rights modifications are designed to increase available water supplies within the areas served by the City, such supplies are intended to meet projected supply deficits during times of identified water supply shortfalls (City of Santa Cruz 2021a and 2021d). As such, the Proposed Action would not generate substantial population growth or new employment, directly or indirectly, and thus, would not result in changes to the demographics or population of the Plan Area.

Given the foregoing, the Proposed Action would not result in significant adverse effects related to population and housing.

Employment and Economy

The Proposed Action would generate a limited number of new short- and long-term employment opportunities. Employment and associated income impacts would stem from the hiring of construction workers as well as long-term employees in the Plan Area. Construction activities would generate a limited number of temporary construction jobs and implementation of Agreed Flows would generate approximately one permanent job, which could result in a minor increase in per capita income. Construction activity could result in direct economic effects related to increased spending on construction materials, equipment, and services. The magnitude of the economic benefits of construction spending to the Plan Area's economy would depend on the proportion of employment, goods, and services procured from local residents and businesses and would likely have a relatively minor benefit on the Plan Area's economy.

The Proposed Action would not have adverse effects on the Plan Area's principal industries, including tourism, research/education, high technology, and health care. Construction activities could result in minor, short-term traffic increases on Plan Area roadways. This would not be expected to deter tourists from visiting the area, or preclude access to businesses or recreational opportunities.

As discussed above, the existing unemployed labor force in the Plan Area could meet workforce requirements for the Proposed Action. The extent to which temporary and permanent jobs could be filled by local residents would be driven in part by the local labor market characteristics, the availability of unemployed or underemployed skilled construction workers, and prevailing wages. Given the size of the labor force in the Plan Area relative to the number of jobs that the Proposed Action would generate, the effect on labor availability would not be adverse. Therefore, the Proposed Action would have a minor beneficial effect on local employment.

Given the foregoing, the Proposed Action would not result in significant adverse effects related to employment and the economy.

Environmental Justice Communities

Covered Activities of the Proposed Action would result in temporary, short-term construction effects at existing City facilities that may cause nuisances from construction emissions and noise at the land uses adjacent to the facilities, which include residences, businesses, and schools. However, such nuisances would be temporary and would be eliminated upon construction completion. Since the Proposed Action would not have any significant adverse effects, as documented in this EA, there would be no potential for disproportionate adverse effects on environmental justice populations. Furthermore, construction activities at City diversion facilities would not be located within or near Census Tracts identified as environmental justice communities of concern.

In addition, the Proposed Action would also have beneficial effects that would be distributed within the Plan Area as identified in this EA on biological resources through protection of Covered Species and their habitat, recreation through increased lake levels at Loch Lomond Recreation Area, and employment and economic benefits through generation of jobs and construction-related spending. Therefore, the Proposed Action would not disproportionately burden minority and low-income communities with adverse human health or environmental effects.

Given the foregoing, the Proposed Action would not result in significant adverse effects on environmental justice communities.

Water Rates

The Proposed Action would result in an increase in the cost of water to consumers within the City's water service area, due to an increase in the City's water rates to consumers to fund activities identified in the ASHCP. As described in Section 7.3 of the ASHCP, funding would occur in scheduled increments over the 30-year permit term to manage the impact on water ratepayers. Water service is deemed affordable if the typical household bill is less than 2.5% of service area median household income. Future proposed water rate restructuring would be analyzed to assess how affordability may change.

Annual funding increments include allocations for costs related to administration, adaptive management, research monitoring, effectiveness monitoring, compliance monitoring, and habitat conservation. The City's analysis determined that shifting funds forward or backward in time from the defined annual increments would have unacceptable effects on water rates. For this reason, shifts in the allocation of project costs can occur only within, not between, the allocated time periods (i.e., the expenses for ASHCP implementation must be spread out relatively evenly over the 30-year permit term). Therefore, the Proposed Action would not result in significant adverse effects on the cost of water to consumers.

3.7 Water Supply

3.7.1 Affected Environment

The Santa Cruz Water Department is a municipal utility that the City owns and operates. The City provides water service to an area approximately 20 square miles in size, including the entire City of Santa Cruz, adjoining unincorporated areas of Santa Cruz County, a small part of the City of Capitola, and coastal agricultural lands north of the City (City of Santa Cruz 2021a).

The City water system obtains all its water supply from local sources; the system relies entirely on rainfall, surface runoff, and groundwater infiltration occurring within watersheds located in the County. Surface water sources comprise approximately 95% of the City's total annual water production, which include the North Coast Streams (Liddell Spring and Laguna, Majors, and Reggiardo Creeks), the San Lorenzo River (Felton Diversion, Tait Street Diversion, and Tait Wells), and Newell Creek and Loch Lomond Reservoir. The remainder of the City's supply is derived from groundwater extracted from wells in the Purisima Formation in the Santa Cruz Mid-County Groundwater Basin. In general, the water supply system is managed to use available flowing sources to meet daily demands as much as possible. Groundwater and stored water from Loch Lomond Reservoir are used primarily in the summer and fall when flows in the North Coast Streams and San Lorenzo River decline (City of Santa Cruz 2021a).

The City's dependence on local surface water flows and limited storage within the supply system make the system vulnerable to multi-year droughts. Since 2015, the City has been pursuing the Water Supply Augmentation Strategy (WSAS) developed by the Water Supply Advisory Committee, a citizen committee formed in 2014 by the Santa Cruz City Council. The WSAS that the City is pursing includes demand management (i.e., water conservation), transfers and exchanges with other local water districts, aquifer storage and recovery (ASR), and recycled water or desalination (the City would pursue desalination if other alternatives are unable to meet required demands). The Santa Cruz Water Rights Project supports the implementation of the WSAS and involves the modification of the City's existing water rights to increase the flexibility of the water system by improving the City's ability to utilize surface water within existing allocations, including incorporation of the Agreed Flows into the City's water rights, and allowing for water supply augmentation in the form of ASR and transfers and exchanges (City of Santa Cruz 2021a).

Until the early 2000s, the general trend in system demand was one in which water use rose roughly in parallel with account and population growth over time, except during two major drought periods in the late 1970s and the early 1990s. Around 2000, this pattern changed and system demand began a long period of decline, accelerated by pricing changes, drought, economic downturn, and other factors including the influences of active conservation programs and updated plumbing codes. In 2015, after two years of water rationing due to severe drought conditions, annual water use fell to a level of about 2.5 billion gallons, similar to the level experienced during the 1970s drought. In 2020, demand was still at a similar level as 2015, about 2.6 billion gallons, despite several years above long-term average rainfall from 2016 and 2020. While demand did rebound following droughts in the 1970s and 1980s, demand has not rebounded to predrought conditions following 2014, contrary to previous projections. The City's adopted 2020 Urban Water Management Plan (UWMP) estimates that water demand will increase at a slow rate from about 2.6 billion gallons per year in 2020 to about 2.7 billion gallons per year with total water use projected to be about 2.8 billion gallons per year in 2045 (City of Santa Cruz 2021a).

The City's UWMP projects having sufficient water supply available in normal years and single dry years to serve anticipated demand throughout the 2025 – 2045 analysis period. Consistent with the City's WSAS, implementation of pending water rights modifications including Agreed Flows (i.e., the Santa Cruz Water Rights Project) is assumed in the UWMP's projections after 2025. Improved reliability is projected after 2030 due to implementation of ASR and planned infrastructure projects.

Under multi-year drought conditions in the near term (2025), with proposed water rights modifications but before implementation of the ASR and planned infrastructure projects, available supplies would meet projected demand in years one through four of the multi-year drought scenario, but would fall short of

demand by 27% in year five. Under multi-year drought conditions after 2030, with implementation of the ASR and planned infrastructure projects, available supplies would meet projected demand in years one through four of the multi-year drought scenario, and the year-five shortage is anticipated to be substantially reduced with projected shortages no larger than a negligible 2% (City of Santa Cruz 2021a).

The UWMP also projected water supplies and demand under climate change hydrology. The City projects having sufficient water supply available in normal years under the climate change hydrology. In single dry year conditions in the near term (2025), with proposed water rights modifications but before implementation of the ASR and planned infrastructure projects, supply would fall short of projected demand by 7%. Under multi-year drought conditions in the near term, available supplies would meet projected demand in years one and two of the multi-year drought scenario, but would fall short of system demands by 2% in year three and by 23% in years four and five. However, under multi-year drought conditions after 2030, with implementation of the ASR and planned infrastructure projects, available supplies would meet projected demand in years one through four of the scenario, and the year-five shortage is anticipated to be substantially reduced with projected shortages no larger than 5% (City of Santa Cruz 2021a).

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Provision of the Agreed Flows with the pending water rights modifications would generally require reduced diversions from the North Coast Streams and from the San Lorenzo River at the Tait Street Diversion at certain times and corresponding increased use of stored water from Loch Lomond Reservoir and use of groundwater. This would result in reduced storage in Loch Lomond Reservoir available for use during dry and drought periods. Absent the changes proposed in the Santa Cruz Water Rights Project, the implementation of the Agreed Flows would further reduce the City's dry-year water supply reliability, as it would further limit the amount of water that the City can divert. However, like the Proposed Action, the No Action Alternative would be expected to include implementation of the Santa Cruz Water Rights Project. As discussed below in Section 3.7.2.2, the Santa Cruz Water Rights Project supports the City's WSAS and would result in a beneficial impact on water supply. Additionally, future City activities and projects that repair, replace, or enhance the capacity of water supply facilities would also have a beneficial effect on water supply. Therefore, the No Action Alternative would not result in significant adverse effects on water supply.

3.7.2.2 Proposed Action

Incorporating the Agreed Flows into all City water rights would further constrain the City's surface water supply that currently is limited in multiple dry-year periods. Consequently, as discussed in Section 5.2 of the ASHCP, implementation of the ASHCP assumes completion of the Santa Cruz Water Rights Project to enhance the City's operational flexibility and ensure sufficient water supply, including water rights modifications to the existing rights, permits, and licenses to expand the authorized Place of Use; to better utilize existing diversions by, among other things, incorporating groundwater storage; and to extend the City's time to put water within the scope of the City's Felton water-right permits to full beneficial use.

These changes would enable better use of high winter flows in the San Lorenzo River (primarily diverted from the Tait Street Diversion) to assist recharge of regional aquifers and enable supply reliability. This would provide additional water storage for the City for drought periods and generally support

implementation of groundwater sustainability plans in their efforts to protect impacted groundwater basins such as the Santa Margarita and Mid-County Groundwater Basins. The Agreed Flows would be added as minimum flow requirements that must be met before diversions occur in the applicable North Coast Streams and San Lorenzo River. In addition, requirements for fish passage and screening improvements at City diversion facilities would be added to the City's water-rights permits and licenses that authorize diversions at the respective facilities. Minimum flow requirements would be added to the City's pre-1914 water rights in the North Coast Streams through the Santa Cruz City Council's adoption of a resolution amending those rights. Minimum San Lorenzo River flow requirements would be added to the City's Felton water-right permits and its Tait Street Diversion water-right licenses through the City's water-right petitions to the SWRCB and the SWRCB's approval of those petitions.

The City's approach to water supply, and the required approvals of the pending water rights modifications by the SWRCB, are foundational to regional water supply reliability and the City's ability to effectively implement the ASHCP. The above water rights modifications, including Agreed Flows, support the City's WSAS, which would have a beneficial effect on water supply (City of Santa Cruz 2021d). Additionally, Covered Activities that repair, replace, or enhance the capacity of water supply facilities would also have a beneficial effect on water supply. Therefore, the Proposed Action would not have significant adverse effects on water supply.

4 Cumulative Effects

Cumulative effects are defined under NEPA as "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions" (40 CFR § 1508.1). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. This section presents the methods used to evaluate cumulative effects, lists projects and management activities that may have cumulative effects when combined with the effects from the No Action Alternative and Proposed Action discussed in this EA, and describes the potential cumulative effects of both alternatives. The cumulative effects of the various activities within the scope of this EA vary little between the No Action Alternative and the Proposed Action due to the inclusion of Agreed Flows with pending water rights modifications and the same ongoing operations and maintenance activities and projects under both alternatives. Therefore, the cumulative effects of the No Action Alternative and Proposed Action would be similar. The difference between the two alternatives is related to the amount of habitat enhancement and protection measures that would occur, as the No Action Alternative would not include the comprehensive Conservation Strategy of the Proposed Action. In other words, adverse effects would be the same, while beneficial effects would differ between the two alternatives, with the No Action Alternative having fewer beneficial effects related to habitat enhancement and protection.

4.1 Cumulative Effects Assessment Methods

Past, present, and reasonably foreseeable future actions that are relevant to the cumulative effects analysis include projects that could contribute incremental environmental effects on the same resources as those discussed in this EA, be located within the defined geographic scope for the cumulative effect, or contribute effects that coincide with effects of the Proposed Action during construction (short-term) or operation (long-term) of the Covered Activities and Conservation Strategy. This chapter addresses the incremental cumulative effects on each of the resources discussed in Chapter 3; however, the focus of the analysis is on the Covered Species given that the federal action is approval of the ASHCP and related ITP for the Covered Species. Actions considered for this analysis include the following projects (referred to collectively as "cumulative projects"). See Section 4.0 of the Santa Cruz Water Rights Project EIR for a comprehensive list and descriptions of projects in the Plan Area that are discussed below.

NMFS selected these past,[17] present, and reasonably foreseeable future actions because they are likely to have similar types of effects within the study area, affect similar resources, or are large enough to have far-reaching effects on a resource. For the purposes of this analysis, NMFS assumed any future actions would be approved and implemented within the next 5 to 10 years. NMFS considered cumulative effects to be significant if they exceed the capacity of a resource (agricultural, biological, cultural, hydrological, recreation, socioeconomic, and water supply) to sustain itself and remain productive. The geographic and temporal scope for the cumulative effects analysis is the same as for the Plan Area and permit term.

The Santa Cruz Water Rights Project consists of proposed modifications to the City's existing water rights to improve flexibility in operation of the City's water system to better use limited water resources and implement Agreed Flows, as well as water supply augmentation components (i.e., ASR and water transfers/exchanges with neighboring districts) and surface water diversion improvements that could be

[17] Past projects are considered part of the existing conditions.

implemented after approval of the water rights modifications. In addition to the Santa Cruz Water Rights Project, the City Water Department Capital Investment Program includes plans and funding for numerous projects including rehabilitation or replacement projects, upgrades and improvement projects, water supply augmentation components, and water main replacements (City of Santa Cruz 2020a, 2020c), in support of implementing the WSAS recommended by the Water Supply Advisory Committee. Some of these projects fall under the ASHCP Covered Activities of the Proposed Action, which are also activities that the City would undertake under the No Action Alternative. Additionally, the San Lorenzo Valley Water District (SLVWD) has proposed the Conjunctive Use Plan for the San Lorenzo River Watershed.

The City's OMHCP and associated USFWS ITP issued in January 2021 (City of Santa Cruz 2021d) covers six wildlife and four plant species, as described in Section 3.2. Covered Activities in the OMHCP are equivalent to the Covered Activities in the ASHCP, where relevant to the ASHCP Covered Species. Common measures are included in the Conservation Strategies of both the OMHCP and the ASHCP to provide for consistency, where applicable.

4.2 Cumulative Effects Analysis

As described in Chapter 3, implementing the Proposed Action would have both beneficial and some adverse impacts on the resource areas described in Chapter 3, including biological resources, cultural resources, hydrology, recreation, and water supply. Overall, NMFS found that none of these beneficial or adverse impacts would rise to the level of significant with the implementation of the ASHCP Biological Goals and Objectives, AMMs, other elements of the Conservation Strategy; ongoing implementation of the OMHCP; implementation of the City's standard construction practices; and implementation of several project-specific mitigation measures for cultural resources and for several special-status species not covered by either the ASHCP or the OMHCP. The incremental effects of the No Action Alternative and Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions are described below.

As indicated throughout this EA, the City's pending water rights modifications in the Santa Cruz Water Rights Project are reasonably foreseeable and therefore considered in the analysis in Chapter 3. Most of the City Water Department Capital Investment Program projects are Covered Activities under the ASHCP and OMHCP or would not be likely to adversely affect the Covered Species. Therefore, such Covered Activities are already considered in the analysis in Chapter 3. The only other known cumulative project that could affect conditions in the San Lorenzo River is the SLVWD's Conjunctive Use Plan for the San Lorenzo River Watershed. The Conjunctive Use Plan to increase stream baseflow for fish and increase reliability of surface and ground water supplies for the SLVWD would include water rights changes, use of existing interties to move water between service areas, and use of SLVWD's Loch Lomond Reservoir contractual rights for specified quantities of reservoir water. As both the No Action Alternative and Proposed Action are intended to improve long-term conditions in the San Lorenzo River for fish by improving or controlling river water levels or baseflows (Agreed Flows), neither alternative would have adverse cumulative effects on Covered Species or other special-status species.

Overall, the incremental impact of the Proposed Action, in combination with past, present, and reasonably foreseeable future projects described in Section 4.2, would be negligible for all resources areas because of the ASHCP Biological Goals and Objectives, AMMs, other elements of the Conservation Strategy; ongoing implementation of the OMHCP; implementation of the City's standard construction practices; and implementation of several project-specific mitigation measures for cultural resources and for several

special-status species not covered by either the ASHCP or the OMHCP. The No Action Alternative would also have a negligible incremental cumulative impact, as it would still include the Agreed Flows that are protective of anadromous salmonids in addition to ongoing implementation of the City's OMHCP and standard construction practices. Therefore, neither the No Action Alternative nor the Proposed Action would result in significant adverse cumulative effects on any resource areas.

INTENTIONALLY LEFT BLANK

5 References

Busby, P. J., Wainwright T. C., Bryant, G. J., Lierheimer, L. J., Waples, R. S., Waknitz, F. W., and Lagomarsino, I. V. 1996. Status Review of west coast steelhead from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA. NMFS-NWFSC-27.

Caltrans (California Department of Transportation). 2020. *Transportation and Construction Vibration Guidance Manual*. Prepared by J. Andrews, D. Buehler, H. Gill, and W.L. Bender. Sacramento: Caltrans. April 2020. Accessed February 27, 2022 at https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf.

CDFW (California Department of Fish and Wildlife). 2000. *Fish Screen Criteria, Department of Fish and Game.* June 19, 2000.

CDFW. 2022a. "Pacific Lamprey, *Entosphenus tridentatus, Species Description.*" Accessed October 10, 2022 at https://wildlife.ca.gov/Conservation/Fishes/Pacific-Lamprey.

CDFW. 2022b. RareFind, Version 5.2.14 (commercial subscription). California Natural Diversity Database (CNDDB). Sacramento, California: CDFW, Biogeographic Data Branch. Accessed October 10, 2022 at https://apps.wildlife.ca.gov/rarefind/view/RareFind.aspx.

Central Coast RWQCB (Regional Water Quality Control Board). 2019. *Water Quality Control Plan for the Central Coastal Basin.* June 2019. Accessed December 9, 2022 at https://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/docs/2019_basin_plan_r3_complete_webaccess.pdf.

CEQ (Council on Environmental Quality). 1997. *Environmental Justice Guidance Under the National Environmental Policy Act.* December 10, 1997. Accessed September 22, 2022 at https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf.

City of Santa Cruz. 1997. *Arana Gulch Interim Management Plan*. Parks and Recreation Department. July 1997.

City of Santa Cruz. 2005. *Draft Environmental Impact Report, North Coast System Repair and Replacement Project*. Prepared by Entrix Environmental Consultants for the City of Santa Cruz Water Department. April 2005. Accessed December 9, 2022 at https://www.cityofsantacruz.com/Home/Components/BusinessDirectory/BusinessDirectory/124/2089?alpha=N.

City of Santa Cruz. 2011. *Draft Environmental Impact Report, City of Santa Cruz General Plan 2030*. September 2011. Accessed October 5, 2022 at https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/long-range-policy-planning/general-plan/draft-eir-for-the-draft-general-plan-2030.

City of Santa Cruz. 2013. *Draft Watershed Lands Management Plan. Final Implementation Report. Newell, Zayante, and Laguna Creek Tracts*. Prepared by the City of Santa Cruz Water Department. April 2013.

City of Santa Cruz. 2016. *2015 Urban Water Management Plan*. August 2016. Prepared by City of Santa Cruz Water Department. Accessed October 5, 2022 at https://www.cityofsantacruz.com/home/showpublisheddocument?id=55168.

City of Santa Cruz. 2019. *Final Environmental Impact Report, Newell Creek Dam Inlet/Outlet Replacement Project.* April 2019. Accessed November 11, 2022 at https://www.cityofsantacruz.com/Home/Components/BusinessDirectory/BusinessDirectory/127/2089.

City of Santa Cruz. 2020a. "Capital Improvement Program." Water Department. Accessed August 19, 2020 at https://www.cityofsantacruz.com/government/city-departments/water/engineering/santa-cruz-water-program.

City of Santa Cruz. 2020b. "Loch Lomond Recreation Area." Accessed December 7, 2020 at https://www.cityofsantacruz.com/government/city-departments/parks-recreation/parks-beaches-open-spaces/parks/loch-lomond-recreation.

City of Santa Cruz. 2020c. *Water Department CIP.* Fiscal Years 2020-2024. Water Department.

City of Santa Cruz. 2021a. *2020 Urban Water Management Plan.* Accessed October 11, 2022 at https://www.cityofsantacruz.com/home/showpublisheddocument/87122/637739611535800000.

City of Santa Cruz. 2021b. *City of Santa Cruz Water Department Long-Range Financial Plan.* September 2021. Accessed October 21, 2022 at https://www.cityofsantacruz.com/home/showpublisheddocument/86451/637686070453300000.

City of Santa Cruz. 2021c. *Final Environmental Impact Report, Laguna Creek Diversion Retrofit Project.* February 2021. Accessed November 11, 2022 at https://www.cityofsantacruz.com/home/showpublisheddocument/83030/637479507787870000.

City of Santa Cruz. 2021d. *Final Environmental Impact Report, Santa Cruz Water Rights Project.* November 2021. Accessed October 21, 2022 at https://www.cityofsantacruz.com/home/showpublisheddocument/86973/637731697885370000.

City of Santa Cruz. 2021e. Operations and Maintenance Habitat Conservation Plan for the Issuance of an Incidental Take Permit under Section 10(a)(1)(B) of the Endangered Species Act.

City of Santa Cruz. 2023. *Draft City of Santa Cruz Anadromous Salmonid Habitat Conservation Plan for the Issuance of an Incidental Take Permit under Section 10(a)(1)(B) of the Endangered Species Act.* June 2023. Accessed July 24, 2023 at https://www.cityofsantacruz.com/home/showpublisheddocument/94505.

CNPS (California Native Plant Society). 2022. Inventory of Rare and Endangered Plants. Online ed. Version 9-01 1.5. Sacramento, California: CNPS. Accessed August 30, 2022 at https://www.rareplants.cnps.org.

County of Santa Cruz. 2014. *Santa Cruz Integrated Regional Water Management Plan*. July 2014. Prepared by County of Santa Cruz, Health Services Agency, Environmental Health Division, Water Resources Program. Accessed October 5, 2022 at https://www.santacruzirwmp.org/plan.

County of Santa Cruz. 2022. "Archeologic Resources." Updated March 29, 2022. Accessed October 25, 2022 at https://opendata-sccgis.opendata.arcgis.com/maps/42370e2416de4f3aa65ccb9431a121f9.

Davis, T., E. DelaTorre, and A. Raub. 2022. Animal Diversity Web: Northern Anchovy. Accessed February 24, 2022 at https://animaldiversity.org/accounts/Engraulis_mordax/.

DOC (California Department of Conservation). 2022. "California Important Farmland Finder." Accessed December 5, 2022 at https://maps.conservation.ca.gov/DLRP/CIFF/.

Hagar, J., E. Bean, and C. Berry. 2017a. *North Coast Streams Limit of Anadromy*. Prepared for the City of Santa Cruz Water Department. August 23, 2017.

Hagar, J. E. Bean, and C. Berry, 2017b. *Newell Creek Limit of Anadromy*. Prepared for City of Santa Cruz Water Department. August 23, 2017.

HES (Hagar Environmental Science). 2010. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling. Technical Memorandum, January 15, 2010.

HES. 2011. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2010. Technical Memorandum, September 30, 2011.

HES. 2012. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2011. Technical Memorandum, December 11, 2012.

HES. 2013. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2012. Technical Memorandum, November 15, 2013.

HES. 2014. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2013. Technical Memorandum, June 24, 2014.

HES. 2015. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2014. Technical Memorandum, June 25, 2015.

HES. 2016. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2015. Technical Memorandum, June 28, 2016.

HES. 2017. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2016. Technical Memorandum, June 30, 2017.

HES. 2018. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2017. Technical Memorandum, June 29, 2018.

HES. 2019. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2018. Technical Memorandum, June 27, 2019.

HES. 2022a. City of Santa Cruz Habitat Conservation Plan, Lagoon Fish Population Sampling 2021. Technical Memorandum. June 17, 2022.

HES. 2022b. Revised Biological Assessment for the San Lorenzo River Lagoon Interim Management Program. March 2022.

HRG (Habitat Restoration Group). 1996. Arana Gulch Biotic Assessment-Final Report. Santa Cruz, California. January 10, 1996.

Koch, M. 1973. Santa Cruz County: Parade of the Past. Fresno, California: Valley Publishers.

Lehmann, S. 2000. "Fully Developed Context Statement for the City of Santa Cruz."

M.Cubed. 2020. Water/Sewer Service Affordability Analysis Technical Memorandum. October 26, 2020. Accessed September 27, 2022 at https://www.cityofsantacruz.com/home/showpublisheddocument/84828/637594482625900000.

NMFS. 2006. Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Final Rule. 71 Fed. Reg. 834 (Jan. 5, 2006). Accessed October 10, 2022 at https://www.federalregister.gov/documents/2006/01/05/06-47/endangered-and-threatened-species-final-listing-determinations-for-10-distinct-population-segments.

NMFS. 2011a. *North-Central California Coast Recovery Domain, 5-Year Review: Summary and Evaluation of Central California Coastal Steelhead DPS and Northern California Steelhead DPS.* Southwest Region. Accessed October 10, 2022 at https://repository.library.noaa.gov/view/noaa/21162.

NMFS. 2011b. *North-Central California Coast Recovery Domain, 5-Year Review: Summary and Evaluation of California Coastal Chinook Salmon ESU and Central California Coast Coho Salmon ESU.* Southwest Region.

NMFS. 2012. Final Recovery Plan for Central California Coast coho salmon Evolutionarily Significant Unit. National Marine Fisheries Service, Southwest Region, Santa Rosa, California. Accessed November 15, 2022 at https://repository.library.noaa.gov/view/noaa/15987.

NMFS. 2016a. *2016 5-Year Review: Summary and Evaluation of Central California Coast Coho Salmon*. National Marine Fisheries Service, West Coast Region. April 2016. Accessed July 6, 2023 at https://repository.library.noaa.gov/view/noaa/17797.

NMFS. 2016b. *Final Coastal Multispecies Recovery Plan, California Coastal Chinook Salmon, Northern California Steelhead, Central California Coast Steelhead.* Volume IV: Central California Coast Steelhead. October 2016. Accessed November 15, 2022 at https://media.fisheries.noaa.gov/dam-migration/2016-multispecies-recovery_plan-vol4.pdf.

NMFS. 2021. "Central California Coast Steelhead." Last updated December 6, 2021. Accessed August 2, 2022 at https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/central-california-coast-steelhead.

NMFS. 2022a. "Central California Coast Coho Salmon." Last updated April 26, 2022. Accessed August 2, 2022 at https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/central-california-coast-coho-salmon.

NMFS. 2022b. Essential Fish Habitat. Accessed October 6, 2022 at https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat.

NMFS. 2022c. Essential Fish Habitat Mapper. Accessed October 6, 2022 at https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper.

NMFS. 2022d. Landings. Accessed November 15, 2022 at https://www.fisheries.noaa.gov/foss/f?p=215:200:5989325785572::::::.

NMFS. 2022e. *NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual.* National Marine Fisheries Service, West Coast Region, Environmental Service Branches. June 2022.

NMFS. 2022f. "Northern Anchovy." Accessed February 24, 2022 at https://www.fisheries.noaa.gov/species/northern-anchovy.

NMFS. 2022g. "West Coast Groundfish." Accessed February 28, 2022 at https://www.fisheries.noaa.gov/species/west-coast-groundfish.

NMFS. 2023. *2023 5-Year Review: Summary & Evaluation of Central California Coast Coho Salmon.* National Marine Fisheries Service, West Coast Region. Accessed July 6, 2023 at https://media.fisheries.noaa.gov/2023-05/5-year-status-review-ccc-coho.pdf.

Orcutt, H.G. 1950. *The Life History of the Starry Flounder* Platichthys stellatus *(Pallas)*. State of California Department of Natural Resources, Division of Fish and Game, Bureau of Marine Fisheries, Fish Bulletin No. 78. Accessed October 10, 2022 at https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/COSJ%20et%20al/part2sur_rebuttal/SJC_497.pdf.

PFMC (Pacific Fishery Management Council). 2022. *Pacific Coast Salmon Fishery Management Plan for Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California as Revised through Amendment 22.* Accessed October 10, 2022 at https://www.pcouncil.org/documents/2016/03/salmon-fmp-through-amendment-20.pdf/.

SCCWRP (Southern California Coastal Water Research Project). 2021. Juvenile Steelhead and Stream Habitat (JSSH) web. Southern California Coastal Water Research Project.

Shrider, Emily A., Melissa Kollar, Frances Chen, and Jessica Semega, U.S. Census Bureau, Current Population Reports, P60-273, Income and Poverty in the United States: 2020, U.S. Government Publishing Office, Washington, DC, September 2021.

Smith, J. 2001. Tidewater Goby Study Progress Report for 2000 (Permit: PRT-793640).

Spencer, W., S. Gregory, G. Hayes, P. Kareiva, A. Launer, P. Moyle, T. Roelofs, D. Smith, and B. Goldstein. 2004. Science Advisory Report for City of Santa Cruz Habitat Conservation Plan. Prepared for the City of Santa Cruz. Produced by the Conservation Biology Institute. December 2004.

SWRCB (State Water Resources Control Board). 2021. *2021 Drinking Water Affordability Assessment.* April 2021. Accessed September 27, 2022 at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/results_and_methodology_affordability_assessment.pdf.

SWRCB. 2022. *2020-2022 Integrated Report for Clean Water Act Sections 303(d) and 305(b).* Final Staff Report. Appendix C5: Category 5 Water Quality Impairments. February 16, 2022. Accessed December 9, 2022 at https://www.waterboards.ca.gov/water_issues/programs/tmdl/2020_2022state_ir_reports_revised_final/apx-c-catreports/category5_report.shtml.

U.S. Census Bureau. 2020a. Hispanic or Latino, and Not Hispanic or Latino by Race. Decennial Census Redistricting Data (Public Law 94-171). Table ID: P2. Topic: Race and Ethnicity. Accessed September 20, 2022 at https://data.census.gov/cedsci/table?t=Race%20and%20Ethnicity&g=0100000US_0400000US06_0500000US06087,06087%241400000&tid=DECENNIALPL2020.P2.

U.S. Census Bureau. 2020b. Occupancy Status. Decennial Census Redistricting Data (Public Law 94-171). Table ID: H1. Topic: Housing. Accessed September 22, 2022 at https://data.census.gov/cedsci/table?t=Housing&g=0100000US_0400000US06_0500000US06087,06087%241400000&tid=DECENNIALPL2020.H1.

U.S. Census Bureau. 2020c. Poverty Status in the Past 12 Months. 2016-2020 American Community Survey 5-Year Estimates Subject Tables. Table ID: S1701. Topic: Income and Poverty. Accessed September 20, 2022 at https://data.census.gov/cedsci/table?t=Income%20and%20Poverty&g=0100000US_0400000US06_0500000US06087,06087%241400000&tid=ACSST5Y2020.S1701.

U.S. Census Bureau. 2020d. Selected Economic Characteristics. 2016-2020 American Community Survey 5-Year Estimates Subject Tables. Table ID: DP03. Topic: Employment and Labor Force Statistics. Accessed September 20, 2022 at https://data.census.gov/cedsci/table?t=Employment%20and%20Labor%20Force%20Status&g=0100000US_0400000US06_0500000US06087,06087%241400000&tid=ACSDP5Y2020.DP03.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for the Tidewater Goby* (Eucyclogobius newberryi). Pacific Region. Portland, Oregon. Accessed November 15, 2022 at https://ecos.fws.gov/docs/recovery_plan/051207.pdf.

USFWS. 2007. *Tidewater Goby (*Eucyclogobius newberryi*) 5-Year Review: Summary and Evaluation.* Accessed October 7, 2022 at http://ecos.fws.gov/docs/five_year_review/doc1144.pdf.

USFWS. 2022. IPaC (Information for Planning and Consultation) Resource List. Accessed August 30, 2022 at https://ecos.fws.gov/ipac/.

Whealdon-Haught, D.R., Wright, S.A., and Marineau, M.D. 2021. *Storage Capacity and Sedimentation Characteristics of Loch Lomond Reservoir, California, 2019*. U.S. Geological Survey Scientific Investigations Report 2021–5081. Accessed December 9, 2022 at https://doi.org/10.3133/sir20215081.

6 Persons and Agencies Consulted

NMFS

SHPO

USFWS

Amah Mutsun Tribal Band

Amah Mutsun Tribal Band of Mission San Juan Bautista

Costanoan Ohlone Rumsen-Mutsen Tribe

Indian Canyon Mutsun Band of Costanoan

Muwekma Ohlone Indian Tribe of the San Francisco Bay Area

Wuksache Indian Tribe/Eshom Valley Band

INTENTIONALLY LEFT BLANK