ADVANCE MITIGATION PROGRAM

Mad-Redwood, Lower Eel, and South Fork Eel Sub-basins Regional Advance Mitigation Needs Assessment

Version 1.0

Establishing Caltrans' Need for Advance Mitigation, forecast fiscal years 2017/2018 to 2026/2027

California Department of Transportation – District 1

July 2021

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LIST OF ACRONYMS

Acronym	Definition
ACE	Areas of Conservation Emphasis
ADC	Area of Deferred Certification
AMA	Advance Mitigation Account
AMP	Advance Mitigation Program
AMP Guidelines	Advance Mitigation Program Final Formal Guidelines
ASBS	areas of special biological significance
Basin Plan	Water Quality Control Plan
BEI	Bank Enabling Instrument
BLM	Bureau of Land Management
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CCA	Critical Coastal Areas Program
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CEHC	California Essential Habitat Connectivity Project
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNRA	California Natural Resources Agency
CO_2	carbon dioxide
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships
DPS	distinct population segment
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESHA	environmentally sensitive habitat area
ESU	evolutionarily significant unit
FishPAC	Fish Passage Advisory Committee
FGC	California Fish and Game Code
FHWA	Federal Highway Administration
FWS	U.S. Fish and Wildlife Service
GAI	geographic area of interest
GAP	Gap Analysis Program
GIS	geographic information system
HCP	habitat conservation plan

HU	hydrologic unit
HUC	hydrologic unit code
LCP	Local Coastal Program
MCA	mitigation credit agreement
MPO	metropolitan planning organization
NCCP	natural community conservation plan
NEPA	National Environmental Policy Act
NHD	National Hydrology Dataset
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
OPC	Ocean Protection Council
RAMNA	Regional Advance Mitigation Needs Assessment
RCIS	Regional Conservation Investment Strategy
RTPA	regional transportation planning agency
RWQCB	Regional Water Quality Control Board
SAMNA	Statewide Advance Mitigation Needs Assessment
SAMNA Reporting Tool	Statewide Advance Mitigation Needs Assessment Reporting Tool
SERCAL	Society for Ecological Restoration – California
SHC	Streets and Highways Code
SHS	State Highway System
SHOPP	State Highway Operation and Protection Program
SHOPP Ten-Year Book	State Highway Operation and Protection Program Ten-Year Project Book Fiscal Years 2017/18–2026/27
SONCC	Southern Oregon/Northern California Coast
State Water Board	State Water Resources Control Board
STIP	State Transportation Improvement Program
SWAP	State Wildlife Action Plan
TMDL	total maximum daily load
UC	University of California
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
Water Boards	State Water Resources Control Board and Regional Water Quality Control Boards
WOTUS	waters of the U.S.

EXECUTIVE SUMMARY

California's State Highway System relies on long-range planning documents to guide its operation and maintenance. In this *Mad-Redwood, Lower Eel, and South Fork Eel Sub-basins Regional Advance Mitigation Needs Assessment* ("RAMNA"), the California Department of Transportation ("Caltrans") District 1 evaluates its forecast of natural resource compensatory mitigation needs[1] for the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins for a 10-year planning horizon. The RAMNA was developed with the goal of realizing the benefits of advance mitigation, which anticipates that unavoidable impacts will be identified in the future and consists of having mitigation available that has already been vetted and agreed upon by natural resource regulatory agencies as representing mitigation actions before transportation projects are completely designed and funded. Credits are the usual currency of advance mitigation actions. When mitigation actions are independent of transportation project delivery timelines, there is an opportunity to (1) improve the schedule and cost predictability of complying with natural resource regulatory agency compensatory mitigation conditions on transportation projects and (2) consolidate the anticipated compensatory mitigation from multiple transportation projects into fewer and larger mitigation actions, establishing mitigation credits that provide ecological value greater than implementing multiple small project-by-project actions.

ES.1 Overview

In 2017, the California Streets and Highways Code ("SHC") § 800 et seq. was amended to create the Advance Mitigation Program ("AMP") within Caltrans and to provide the seed capital for an Advance Mitigation Account ("AMA"), to be operated by Caltrans as a revolving account. The stated intent of the legislation is for Caltrans, through the AMP, to realize the potential of advance mitigation to "accelerate transportation project delivery" and to "protect natural resources through transportation project [compensatory] mitigation" [SHC § 800(a)]. To this end, SHC § 800.6(a) identifies specific activities as authorized allowable expenditures under the AMA and provides for the AMA to be replenished under specific conditions. The allowable expenditures consist of purchasing or establishing compensatory mitigation credits developed through an appropriate regulatory mechanism, which are then available for use by transportation projects to compensate for adverse impacts on natural resources.

Approved at the end of 2019, the *Advance Mitigation Program Final Formal Guidelines* ("AMP Guidelines") describe how—through advance mitigation planning and advance

[1] Compensatory mitigation is a mitigation strategy that is preferentially applied only after it has been determined that there will be unavoidable adverse impacts on natural resources and other efforts to minimize, rectify, and reduce the impact have been incorporated into a transportation project's design. Traditionally, this determination occurs late in a transportation project's development process, at which time, the compensatory mitigation action is both funded and implemented concurrently with the transportation project.

mitigation project delivery—the Caltrans AMP will fulfill its intended purpose (Caltrans 2019a). The AMP Guidelines present a 10-step process, the first 5 of which are the advance mitigation planning phase (Figure ES-1) and the next 5 are the advance mitigation project delivery phase. Implementation of each step of the planning phase improves the probability that advance mitigation projects undertaken by Caltrans in the project delivery phase will yield credits (or similar) that will be usable and comply with an appropriate established regulatory framework. The AMP Guidelines also describe how transportation projects will reimburse the AMA for advance mitigation project investments, thereby making the funds available to undertake the next advance mitigation project.

Figure ES-1. Advance Mitigation Planning Phase

Source: Caltrans 2019a

Caltrans' 5-step advance mitigation planning phase starts with modeled estimates of potential impacts on more than 600 wildlife and aquatic resources and, through successive steps, focuses and refines Caltrans' need for advance mitigation to inform advance mitigation project scopes to be approved by the Caltrans Director. At this time, Steps 1 and 2 of the AMP's 5-step advance mitigation planning phase are complete. The RAMNA is intended to satisfy Step 3 and provides the results of a regional assessment of Caltrans advance mitigation needs in the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins.

A planning-level document, this RAMNA:

- Is a desktop analysis of relevant available information;
- Covers fiscal years 2018 to 2027, a specific planning period, concurrent with the time period addressed by the *State Highway Operation and Protection Program Ten-Year Project Book Fiscal Years 2017/18–2026/27* ("SHOPP Ten-Year Book") (Caltrans 2018a);
- Applies to potential compensatory mitigation conditions that may be placed on future transportation projects by the seven natural resource regulatory agency

signatories[2] to the *Master Process Agreement for Planning and Developing Advance Mitigation throughout California for the California Department of Transportation Advance Mitigation Program* (Caltrans et al. 2020);

- Focuses on a geographic area of interest ("GAI"), an area with wildlife habitats and aquatic resources[3] that has a high probability of requiring transportation project mitigation between 2018 and 2027—the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins within Caltrans District 1;
- Documents Caltrans' forecast of its potential wildlife and aquatic resource compensatory mitigation needs for GAI and planning period, as reported by the *Statewide Advance Mitigation Needs Assessment Report*, *State Highway Operation and Protection Program, Ten-Year Project Book, Second Quarter 2017/2018 Fiscal Year* (Caltrans 2019b);
- Identifies information that will be important to Caltrans when scoping any of the AMP's authorized activities in the GAI in accordance with SHC § 800.6(a), including documenting the existing mitigation supply;
- Incorporates information and feedback received from outreach to natural resource regulatory agencies, the Federal Highway Administration, metropolitan planning organizations, regional transportation planning agencies, other public agencies that implement transportation improvements, Native American tribes, interested parties, and the public; and
- Analyzes Caltrans' options to meet its mitigation needs in the GAI through the AMP's authorized activities in accordance with SHC § 800.6(a).

A brief description of each section is provided below.

ES.2 Geographic Area of Interest and Resource Focus

GAIs are established at a watershed or ecoregion scale to define appropriate planning areas for mitigation implementation and anticipated use areas that align with natural resource regulatory agency practices (Caltrans 2019a). Caltrans District 1, in communication with other transportation agencies, selected the Mad-Redwood, Lower Eel, and South Fork Eel hydrologic unit code ("HUC") sub-basins as the GAI (Figure ES-2) because SAMNA results indicate that investing AMP funds to implement landscape-scale mitigation in these sub-basins is likely to maximize State Highway Operation and Protection Program ("SHOPP") and State Transportation Improvement

[2] Natural resource regulatory agency signatories are California Coastal Commission ("CCC"); California Department of Fish and Wildlife ("CDFW"); California State Water Resources Control Board ("State Water Board"); U.S. Army Corps of Engineers ("Corps") Los Angeles District, Sacramento District, and San Francisco District; U.S. Environmental Protection Agency ("EPA"), U.S. Fish and Wildlife Service ("FWS"); and National Marine Fisheries Service ("NMFS").

[3] For the purposes of this document, aquatic resources include all wetlands and non-wetland waters regulated by CCC, CDFW, the State Water Resources Control Board and the Regional Water Quality Control Boards ("Water Boards"), Corps, and EPA.

Program ("STIP") funded transportation project acceleration while maximizing environmental benefits.

Caltrans District 1 also elected to focus the assessment on anticipated aquatic resources' mitigation needs. Transportation projects planned within the 10-year planning period are forecast to affect aquatic resources. and compensatory mitigation for aquatic resources has been historically difficult for Caltrans District 1 to procure. Further, because the SAMNA forecasts impacts on hundreds of species' habitats, to further focus the planning effort, the District selected the following aquatic species as species of mitigation need[4]: the Southern Oregon-Northern California Coast Evolutionarily Significant Unit ("ESU") coho salmon (*Oncorhynchus kisutch*) and the Northern California Coast Distinct Population Segment ("DPS") steelhead (*Oncorhynchus mykiss*). Other state and federal terrestrial special-status species occur in the GAI, and Caltrans intends for conservation benefits and values to be realized for other special-status species through the implementation of advance mitigation centered on the aquatic resources identified in the GAI. Hence, to help address wildlife conservation goals and objectives, special-status wildlife species that utilize aquatic habitats as a part of their life cycle are discussed.

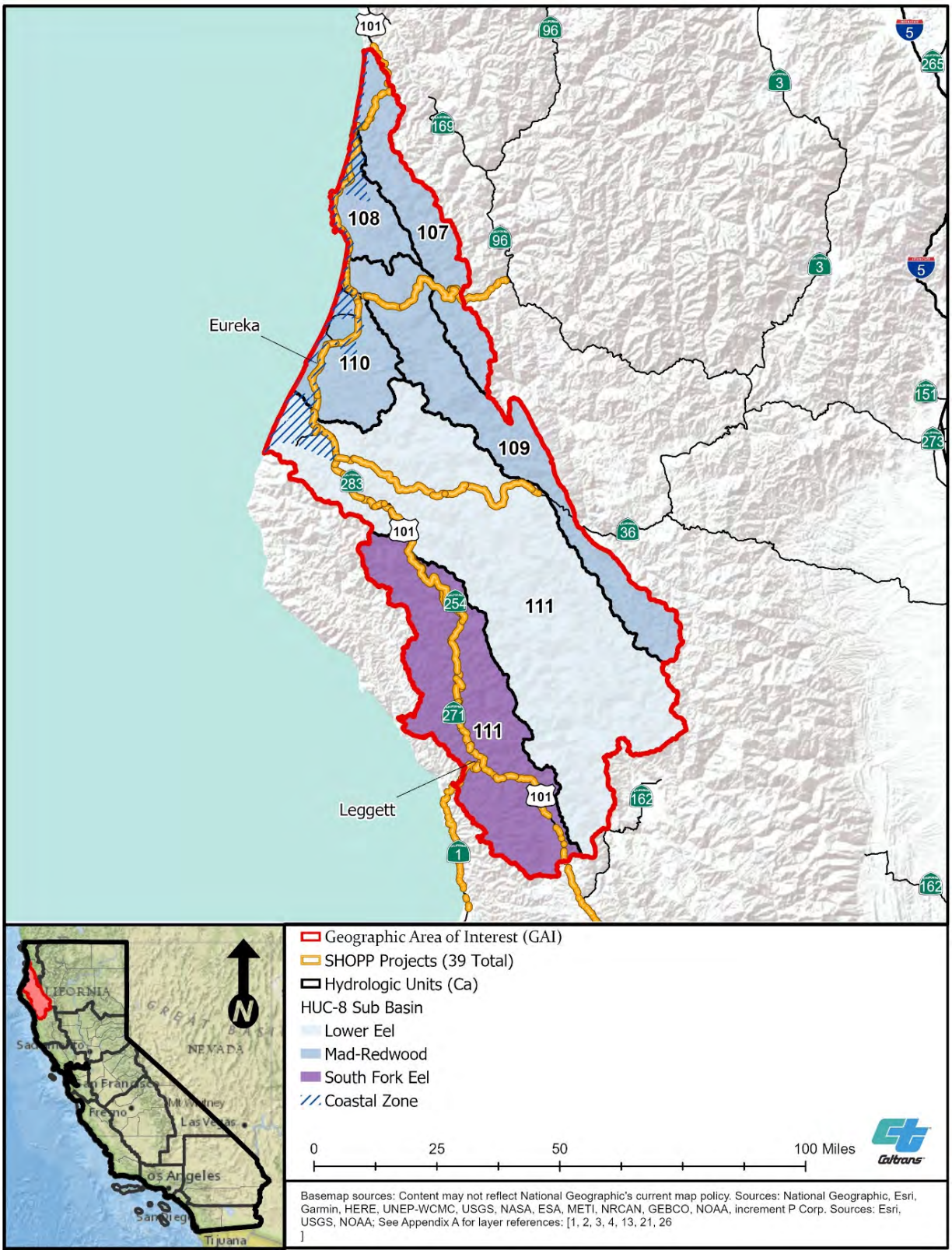
Focusing this analysis improves the probability that advance mitigation projects undertaken by Caltrans will yield mitigation credits (or similar) that will be usable and comply with an appropriate established regulatory framework. Caltrans intends for any mitigation-related measures to support these environmental resources in the GAI to benefit other environmental resources as well.

ES.3 Environmental Setting

The GAI consists of approximately 3.6 million acres in northern coastal California. The Mad-Redwood, Lower Eel, and South Fork Eel HUC-8 sub-basins define its boundaries, which are overlapped by portions of the Northern California Coast and Northern California Coast Ranges Ecoregion Sections. Geospatial data from the SAMNA Reporting Tool, CDFW's BIOS, and other readily available information are summarized and presented in this RAMNA. Climate change resiliency, wildlife connectivity, biodiversity, and conserved lands are among the information presented. Additional information on the environmental setting of the GAI is provided in Chapter 2.

[4] Species of mitigation need are selected to focus the assessment.

Figure ES-2. Mad-Redwood, Lower Eel, and South Fork Eel Sub-basins within Caltrans District 1



ES.4 Relevant Plans, Policies, and Regulations

Compensatory mitigation is informed by regulatory requirements, regulatory pathways for credit establishment, and conservation. Laws, regulations, comprehensive plans, conservation plans, and land management plans that are applicable and relevant to the GAI will be consulted by Caltrans to inform both regional understanding and advance mitigation project scoping. Caltrans identified 114 relevant documents for the RAMNA: 29 laws, guidelines, and regulations; 23 statewide and regional resource management plans; 14 plans and permits focused on species of mitigation need; 20 resource agency and Native American tribal land management plans; 4 water resources plans and documents; 15 county, city, and local government general plans; and 9 nongovernmental organization conservation and management documents. A summary and links to these documents can be found in Chapter 3.

ES.5 Existing Mitigation Opportunities

SHC § 800.6(a) authorizes Caltrans to use AMA funds for purchasing compensatory mitigation that has been previously approved by the natural resource regulatory agencies through a conservation bank, mitigation bank, habitat conservation plan ("HCP"), natural community conservation plan ("NCCP"), in-lieu fee program, or mitigation credit agreement ("MCA") developed in accordance with a CDFW-approved regional conservation investment strategy ("RCIS"). In the GAI, Caltrans identified no HCPs or NCCPs that Caltrans is eligible to participate in, one mitigation bank currently being established by Caltrans, no in-lieu fee programs, no RCISs, and no MCAs. Existing mitigation opportunities can also inform both regional understanding and advance mitigation project scoping because they may be expressions of resource agency conservation goals and objectives[5] and may be suitable for concurrent transportation project mitigation. Chapter 4 provides a more in-depth discussion of existing mitigation opportunities in the GAI.

ES.6 Estimated Impacts

Caltrans undertakes SHOPP transportation projects to address maintenance, safety, operation, and rehabilitation of the state highway system; such projects do not add new capacity to the system.[6] Metropolitan planning organizations, regional transportation planning agencies, and other public agencies also undertake transportation projects to address non-SHOPP STIP-funded transportation improvements. Since the SHOPP Ten-Year Book is an early planning document, Caltrans must rely on modeling future impacts through the SAMNA, as well as qualitative assessments of STIP-eligible needs, to define

[5] For the purposes of this RAMNA, conservation goals and objectives are a broad set of regional natural resource sustainability goals and objectives that are consistent with both regulatory requirements and conservation science.

[6] https://catc.ca.gov/programs/state-highway-operation-and-protection-program

the range of advance mitigation needs prior to developing a focused advance mitigation project scope to address anticipated needs.

As pointed out in Section ES.2, this assessment was focused toward aquatic mitigation likely to be needed in the three watersheds that make up the GAI. For aquatic resources, potential impacts from 39 SHOPP transportation projects in their planning and conceptual phases were quantitatively estimated; no STIP-eligible projects are expected to occur in the GAI during the 10-year planning period. For fiscal years 2018 to 2027, the following aquatic resource impacts were identified:

- For wetland resources, quantitative impacts from 28 of the 39 SHOPP transportation projects are forecast by the SAMNA to potentially affect 8.9 acres of wetlands (Table ES-1), including 5 acres of wetlands in the coastal zone affected by five transportation projects.
- For non-wetland water resources, quantitative impacts from all 39 of the SHOPP transportation projects are forecast by the SAMNA to potentially affect 10.6 acres of non-wetland waters (Table ES-1), including 2.8 acres of non-wetland waters in the coastal zone affected by four transportation projects.
- For fish resources, quantitative impacts from 22 of the 39 SHOPP transportation projects are forecast by the SAMNA to potentially affect 21.7[7] acres of fish habitat (Table ES-2).
- For the threatened and endangered fish species identified as species of mitigation need:
  - Quantitative impacts from 9 of the 39 SHOPP transportation projects are forecast by the SAMNA to potentially affect 0.2 acre of coho salmon habitat in the Mad Redwood Sub-basin (Table ES-2).
  - Quantitative impacts from 22 of the 39 SHOPP transportation projects are forecast by the SAMNA to potentially affect 5.7 acres of steelhead habitat (Table ES-2).

It should be noted that “non-wetland waters” is a general term that can apply to waters of the United States (“WOTUS”), waters of the state, or both.

[7] Compensatory mitigation is a mitigation strategy that is preferentially applied only after it has been determined that there will be unavoidable impacts and other efforts to minimize, rectify, and reduce the impact have been incorporated into a transportation project’s design. Traditionally, this determination occurs late in a transportation project’s development process, at which time, the compensatory mitigation action is both funded and implemented concurrently with the transportation project.

Table ES-1. Summary of Estimated SHOPP Aquatic Resource Impacts

GAI Sub-basin (HUC-8)	Number of Transportation Projects, Wetlands (HUC-8)[a]	Total Estimated Wetland Impacts (acres)	Number of Transportation Projects, Non-wetland Waters (HUC-8)[a]	Total Estimated Non-wetland Waters Impacts (acres)
Mad-Redwood	12	5.6	19	4.2
Lower Eel	9	2.3	12	3.6
South Fork Eel	9	1.0	12	2.9
Aquatic resources, total counts	**28**	**8.9**	**39**	**10.6**

[a] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect wetlands.

Table ES-2. Summary of Estimated SHOPP Impacts on Fish in the GAI (results in acres)[a]

Sub-basin (HUC-8)	Number of Trans-portation Projects (HUC-8)	Chinook Salmon – California Coastal ESU – FT	Coho Salmon – Southern Oregon/ Northern California Coast ESU – FT, ST[b]	Green Sturgeon Southern DPS – FT	Long-fin Smelt – ST	Steelhead – Northern California DPS – FT	Tide-water Goby – FE	Estimated Fish Impact[c]
Mad-Redwood	**9**	3.2	0.20	3.4	3.5	3.4	1.2	14.9
Lower Eel	**6**	1.2	0	0	1.8	1.5	0	4.4
South Fork Eel	**7**	1.6	0	0	0	0.8	0	2.4
Total	**22[d]**	**5.9**	**0.2**	**3.3**	**5.3**	**5.7**	**1.2**	**21.7[e]**

[a] Stream/river habitat impacts are provided. Stream/river habitat impacts are assumed to be representative of fish habitat impacts.
[b] SAMNA refers to this ESU as Punta Gorda to the northern border of California.
[c] For sub-basins with more than one species, co-occurrence of impacts is assumed. Acreage for the largest impact is provided.
[d] Totals reflect numbers presented in rows above. None of the SHOPP transportation projects forecast to affect fish cross more than one sub-basin.
[e] This number may be an overestimate because several fish species occupy similar habitat.

Impacts were also forecast for state and federal terrestrial special-status species that occur in the ecoregions that overlap the GAI:

- For special-status terrestrial plant and wildlife species, quantitative impacts from all 39 SHOPP transportation projects are forecast by the SAMNA to potentially affect 59 of the 144 special-status species evaluated, potentially affecting 489.5 acres of habitat in total (Table ES-3).

Given their reliance on similar habitats, Caltrans intends for conservation benefits and values to also be realized for special-status terrestrial species through the implementation of advance mitigation projects centered on the aquatic resources identified as likely to be needed in the GAI.

Table ES-3. Summary of Estimated SHOPP Wildlife Resource Impacts

GAI Wildlife Resource	Number of Caltrans SHOPP Projects	Number of Special-status Species Habitats	Number of Special-status Species	Estimated Impact (acres)
Special-status species, total count (all habitats, all species)	39	23	59	489.5

These data are summarized in Tables ES-1 through ES-3 in tabular format for ease of reference. Refer to Chapter 5 for additional information regarding aquatic and terrestrial resources impact forecasts analyzed in this RAMNA.

ES.7 Benefiting Transportation Project Considerations

One intent of the AMP's founding legislation is for Caltrans to realize the potential of advance mitigation to accelerate transportation project delivery. At this time (July of fiscal year 2020/2021), Caltrans is 3 years into the SHOPP Ten-Year Book planning period. Hence, for the time period under consideration, 2017/2018 to 2026/2027, Caltrans District 1 intends to prioritize purchasing or developing mitigation credits or values that are planned for the middle and end of the 10-year assessment period. At this time, several transportation projects have been delayed or eliminated. The following results may change between now and transportation project delivery. Caltrans will consider the updated transportation schedule when scoping advance mitigation projects.

Given the expected timing of mitigation need, at this time (July of fiscal year 2020/2021) credits or values that can be purchased or established by 2023/2024 (within the next 2 years) could currently address a subset of the impacts described above, approximately:

- 2.6 acres of threatened and endangered fish habitat mitigation need, potentially contributing to the acceleration of four transportation projects
- 2.2 acres of wetland mitigation need, potentially contributing to the acceleration of 11 transportation projects

- 4.1 acres of non-wetland waters mitigation need, potentially contributing to the acceleration of 9 transportation projects

All or some of these needs could form the basis for Caltrans District 1 to develop an advance mitigation project scope.

ES.8 Wildlife Resources Conservation Goals and Objectives

To increase the probability that advance mitigation project scopes promoted within and/or undertaken by Caltrans will successfully meet natural resource regulatory agency goals and objectives, this RAMNA was reviewed by the natural resource regulatory agencies and their comments and suggestions were incorporated into the document, as appropriate.

When establishing wildlife resources compensatory mitigation credits in accordance with SHC § 800.6(a), Caltrans will seek to align advance mitigation project scopes with the conservation goals and objectives of the multiple natural resource regulatory agencies that have the authority to approve wildlife resource-related credit establishment, and have the authority to approve their application to offset transportation project-related impacts. At a broad scale, Caltrans' understanding of the wildlife resources goals and objectives presented in this RAMNA encompass protecting, preserving, and enhancing large-scale ecological processes, environmental gradients, biological diversity, and regional linkages. Informed by relevant plans, policies, and regulations, the goals and objectives presented here summarize how state and federal natural resource regulatory agencies, and other land-managing interested parties, have prioritized regional conservation that preserves intact habitat and provides habitat linkages and connectivity. In recognition of transportation project acceleration needs, wildlife goals and objectives place an emphasis on species co-occurring with aquatic habitats in the GAI; however, advance mitigation for the benefit of the aforementioned species is anticipated to have broader benefits for multiple special-status species that rely on the same habitats. Caltrans' understanding of natural resource regulatory agency wildlife goals gathered for this RAMNA include:

- Conserving and expanding habitat for sensitive wildlife species
- Preserving, enhancing, and increasing connectivity between blocks of habitat
- Supporting resiliency of the landscape to climate change
- Decreasing mortality of sensitive species
- Providing multi-species benefits

Objectives and sub-objectives are provided under each of the above goals in Chapter 7 to guide Caltrans advance mitigation project scoping toward those actions that would create the greatest functional lift for wildlife resources in the GAI. Sub-objectives capture more specific measures from conservation and land management plans that address threats to the aforementioned resources.

ES.9 Aquatic Resources Goals and Objectives

To increase the probability that advance mitigation project scopes promoted within and/or undertaken by Caltrans will successfully meet natural resource regulatory agency goals and objectives, this RAMNA was reviewed by these agencies and their comments and suggestions were incorporated.

When establishing aquatic resources compensatory mitigation credits in accordance with SHC § 800.6(a), Caltrans will seek to align advance mitigation project scopes with the conservation goals and objectives of the multiple natural resource regulatory agencies that have the authority to approve aquatic resource-related credit establishment and have the authority to approve their application to satisfy conditions on transportation projects. At a broad scale, Caltrans' understanding of aquatic resources goals and objectives presented in the RAMNA encompasses restoring, maintaining, and enhancing large-scale ecological processes, environmental gradients, biological diversity, and regional linkages. Aquatic resources goals developed for this RAMNA prioritize:

- Providing for no net loss of aquatic resources area, functions, and values
- Restoring and maintaining the chemical, physical, and biological integrity of waters
- Restoring or enhancing and expanding habitat for coho salmon and steelhead
- Supporting resiliency of aquatic resources to climate change
- Providing multi-resource benefits

Sub-objectives are included for each goal to guide Caltrans project scoping toward those actions that would create the greatest functional lift for aquatic resources in the GAI. Sub-objectives also capture more specific measures from conservation and land management plans that address threats to the aforementioned resources.

ES.10 Authorized Activity Summary

Broadly speaking, SHC § 800.6(a) authorized activities can be divided into two groups: (1) purchasing compensatory mitigation that has been previously established and approved by the natural resource regulatory agencies through a conservation/mitigation bank, HCP/NCCP, in-lieu fee program, or MCA; or (2) establishing and receiving approval of compensatory mitigation credits, such as establishing a mitigation bank in accordance with existing laws, policies, procedures, templates, and guidance. The time it takes to perform each authorized activity varies; however, purchasing or paying fees for compensatory mitigation credits would likely take less time than establishing compensatory mitigation credits.

Caltrans District 1 will consider all feasible options when developing advance mitigation project scopes that could meet its mitigation needs. The feasibility of each authorized activity to meet the forecast mitigation need in time to accelerate transportation projects will depend on the availably of a regulatory and administrative pathway and other conditions. When establishing mitigation credits, Caltrans intends to scope projects that align with conservation goals and objectives, address multi-resource benefits, and address overlapping jurisdictions.

Caltrans District 1 will use the advance mitigation options identified in the RAMNA to inform advance mitigation project scoping, which will consider needs; conservation data and plans; input received from natural resource regulatory agencies, the Federal Highway Administration, metropolitan planning organizations, regional transportation planning agencies, other public agencies that implement transportation improvements, Native American tribes, interested parties, and the public; feasibility in consideration of mitigation need and timing; and other information presented here and that is publicly available to develop a high-level advance mitigation project scope to be included in an advance mitigation project's nomination materials. Once a nominated advance mitigation project is approved by the Caltrans Director, Caltrans District 1 will begin advance mitigation project delivery, which includes stakeholder engagement, project alternative analysis, coordination with natural resource regulatory agencies with the authority to approve compensatory mitigation, contracting with third parties and/ or credit sponsors, and developing an agency-approved instrument and/ or one or more advance mitigation project-specific interagency agreement.

As with all compensatory mitigation established through any advance mitigation process, the mitigation's suitability to address a specific transportation project's impact is determined in the future, on a case-by-case basis, when transportation project mitigation requirements are known.

1. INTRODUCTION

California's State Highway System ("SHS") relies on long-range planning documents to guide its operation and maintenance. In this *Mad-Redwood, Lower Eel, and South Fork Eel Sub-basins Regional Advance Mitigation Needs Assessment* ("RAMNA"), the California Department of Transportation ("Caltrans") District 1 presents its forecast of natural resource compensatory mitigation[1] needs for the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins for a 10-year planning horizon. The RAMNA was developed with the goal of realizing the benefits of advance mitigation, which:

- anticipates that unavoidable impacts will be identified in the future, and
- consists of having mitigation available that has already been vetted and agreed upon by natural resource regulatory agencies as representing mitigation actions—before transportation projects are completely designed and funded.

When compensatory mitigation actions are independent of transportation project delivery timelines, there is an opportunity to (1) improve the schedule and cost predictability of complying with natural resource regulatory agency compensatory mitigation conditions on transportation projects and (2) consolidate the anticipated compensatory mitigation from multiple transportation projects into fewer and larger mitigation actions, establishing mitigation credits that provide a greater ecological value than implementing multiple small project-by-project actions. Credits are the usual currency of advance mitigation actions.

This document is intended to be both an internal communication tool between Caltrans' Functional Units[2] and an external communication tool for Caltrans to communicate with the Federal Highway Administration ("FHWA"), natural resource regulatory agencies, other transportation agencies (that is, metropolitan planning organizations ["MPOs"], regional transportation planning agencies ["RTPAs"], and other public agencies that implement transportation improvements), Native American tribes, interested parties, and the public. It will be posted on the Advance Mitigation Program ("AMP") website: http://www.dot.ca.gov/env/advancemitigation/.

1.1 AMP Overview

In 2017, the California Streets and Highways Code ("SHC") § 800 et seq. was amended to create the AMP within Caltrans and to provide the seed capital for an Advance

[1] Compensatory mitigation is a mitigation strategy that is preferentially applied only after it has been determined that there will be unavoidable impacts and other efforts to minimize, rectify, and reduce the impact have been incorporated into a transportation project's design. Traditionally, this determination occurs late in a transportation project's development process, at which time, the compensatory mitigation action is both funded and implemented concurrently with the transportation project.

[2] "Functional Unit" is a general term used by Caltrans to describe its organizational structure. Caltrans functional units include, but are not limited to, transportation planning, environmental, surveys, right-of-way, real property asset management, materials, traffic, structure design, hydraulics, construction, maintenance, landscape architecture, utilities, and engineering.

Mitigation Account ("AMA"), to be operated by Caltrans as a revolving account. The stated intent of the legislation is for Caltrans, through the AMP, to realize the potential of advance mitigation to both "accelerate transportation project delivery" and "protect natural resources through transportation project [compensatory] mitigation" [SHC § 800(a)]. To this end, the legislation identifies specific activities as authorized allowable expenditures under the AMA and provides for the AMA to be replenished under specific conditions. Generally speaking, the 11 activities authorized in SHC § 800.6(a) consist of purchasing or establishing compensatory mitigation credits developed through an appropriate regulatory mechanism, which are then available for use by transportation projects to offset adverse impacts on natural resources (Table 1-1). Natural resource regulatory agencies and Caltrans will determine the appropriateness of a credit's use on a case-by-case basis, when Caltrans proposes use of the credit to satisfy a specific condition placed on a transportation project.

Table 1-1. Advance Mitigation Project Types[a]

Advance Mitigation Project Type	Authorization
Caltrans pays mitigation fees or other costs or payments associated with coverage of transportation projects under an approved natural community conservation plan ("NCCP")[b] and/or an approved habitat conservation plan ("HCP").	SHC § 800.6(a)(2)
Caltrans purchases credits from an existing conservation bank.	SHC § 800.6(a)(1)
Caltrans purchases credits from an existing mitigation bank.	SHC § 800.6(a)(1)
Caltrans purchases credits from an existing in-lieu fee program.	SHC § 800.6(a)(1)
Caltrans purchases credits developed through an MCA, established under a California Department of Fish and Wildlife ("CDFW")-approved Regional Conservation Investment Strategy ("RCIS").[c]	SHC § 800.6(a)(3)(A)
Caltrans funds the establishment of a Caltrans or third-party sponsored and operated conservation bank, in accordance with applicable state and federal standards.	SHC § 800.6(a)(1)
Caltrans funds the establishment of a Caltrans or third-party sponsored and operated mitigation bank in accordance with applicable state and federal standards.	SHC § 800.6(a)(1)
Caltrans funds the establishment of a Caltrans or third-party sponsored and operated in-lieu fee program in accordance with applicable state and federal standards.	SHC § 800.6(a)(1)
Caltrans funds the implementation of conservation actions and habitat enhancement actions[c,d] to generate mitigation credits pursuant to an MCA[b] established under a CDFW-approved RCIS.[c] The scope may include Caltrans first entering into or funding the preparation of an MCA.[c] The scope may also include Caltrans first entering into or funding the preparation of an RCIS.[c]	SHC § 800.6(a)(3) SHC § 800.6(a)(3)(A)

Advance Mitigation Project Type	Authorization
Caltrans acquires, restores, manages, monitors, enhances, and preserves lands, waterways, aquatic resources, or fisheries, or funds the acquisition, restoration, management, monitoring, enhancement, and preservation of lands, waterways, aquatic resources, or fisheries, that would measurably advance a conservation objective specified in an RCIS if the department concludes that the action or actions could conserve or create environmental values that are appropriate to mitigate the anticipated potential impacts of planned transportation improvements.	SHC § 800.6(a)(3)(B)
When the other mitigation options (above) are not practicable, Caltrans may perform mitigation in accordance with a programmatic mitigation plan[e] pursuant to SHC § 800.9. The programmatic mitigation plan shall include, to the maximum extent practicable, the information required for an RCIS.[c]	SHC § 800.6(a)(4) SHC § 800.9

[a] Caltrans intends to contract or subcontract implementation tasks when appropriate and as required.
[b] When Caltrans is a permittee under the NCCP, or if Caltrans qualifies as a Participating Special Entity and the project is a covered activity in the NCCP
[c] See: https://www.wildlife.ca.gov/Conservation/Planning/Regional-Conservation
[d] Under specific conditions, fish passage and wildlife crossing structures may qualify as enhancement actions under an RCIS in accordance with California Fish and Game Code ("FGC") § 1850–1861.
[e] Programmatic mitigation plans are defined in 23 U.S. Code ("USC") § 169(a) (SHC § 800.9). No more than 25 percent of the funds in the AMA may be allocated for this purpose over a 4-year period [SHC § 800.6(a)(4)].

1.1.1. AMP Guidelines

Approved at the end of 2019, the *Advance Mitigation Program Final Formal Guidelines* ("AMP Guidelines") describe how—through advance mitigation planning and advance mitigation project delivery—the Caltrans AMP will fulfill its intended purpose (Caltrans 2019a). As shown in Figures 1-1 and 1-2, the AMP Guidelines present a 10-step process, the first 5 of which are the advance mitigation planning phase and the next 5 are the advance mitigation project delivery phase. Implementation of each step of the planning process improves the probability that advance mitigation projects undertaken by Caltrans in the project delivery phase will yield credits (or similar) that will be usable and comply with an appropriate established regulatory framework. The AMP Guidelines also describe how transportation projects will reimburse the AMA for advance mitigation project investments, thereby making the funds available to undertake the next advance mitigation project.

Figure 1-1. Advance Mitigation Planning Phase

Source: Caltrans (2019a)

Figure 1-2. Advance Mitigation Project Delivery Phase

Source: Caltrans (2019a)

1.1.2. Advance Mitigation Planning Phase

Caltrans advance mitigation planning starts with modeled estimates of potential impacts on more than 600 wildlife and aquatic resources and, through successive steps, focuses and refines Caltrans' need for advance mitigation, in order to inform advance mitigation project scopes that will be approved by the Caltrans Director. As elaborated below, at this time, Steps 1 and 2 of the AMP's 5-step advance mitigation planning phase are complete. The RAMNA provided here satisfies Step 3 (Figure 1-1; Caltrans 2019a) and provides the results of a regional assessment of Caltrans' advance mitigation needs in the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins.

Caltrans District 1 will first use the information and analysis presented in this RAMNA to inform Step 4 of the advance mitigation planning phase. Step 4 is the point in the advance mitigation planning process when Caltrans justifies, proposes, and scopes an advance mitigation project based on its needs (Caltrans 2019a). Advance mitigation project scopes informed by this RAMNA will provide enough information, at the appropriate level of detail, for an advance mitigation project to be nominated to the Caltrans Director for funding approval. The advance mitigation planning phase will conclude when the Caltrans Director approves a specific nominated District 1 advance mitigation project for funding

(Step 5; Caltrans 2019a). Thereafter, Caltrans District 1 will use the RAMNA as a reference (Caltrans 2019a).

1.1.3. Advance Mitigation Project Delivery Phase

Steps 6 through 10 consist of the AMP's advance mitigation project delivery phase. Advance mitigation project delivery is undertaken after an advance mitigation project has been approved by the Caltrans Director and is meant to benefit from advance mitigation planning (Caltrans 2019a; see Figure 1-2). The phase consists of implementing the authorized activities under SHC § 800.6(a), which are primarily existing advance mitigation mechanisms or procedures under development.

1.1.4. Program Constraints

Implicit to the AMP, the AMP Guidelines, advance mitigation planning, and advance mitigation project delivery are a number of established laws, policies, and processes including, but not limited to, the following:

- Gas tax-derived funds may be used only to develop mitigation credits or values anticipated to be needed to fulfill the mitigation requirements of transportation improvements [California Constitution, Article XIX § 2(a)].
- AMA funds are likely not sufficient to address all of Caltrans' anticipated compensatory mitigation needs.
- Long-term transportation planning is dynamic, and compensatory mitigation needs may change over a 10-year planning horizon as funding sources and transportation project lists are refined and updated.
- Advance mitigation planning does not imply an endorsement of a transportation project alternative.
- Establishing compensatory mitigation in advance of transportation project impacts does not create any presumption or guarantee that a future transportation project impact will be authorized by a natural resource regulatory agency. Avoidance and minimization considerations continue to be required.
- Establishing compensatory mitigation in advance of transportation project impacts does not create any presumption or guarantee or that the advance compensatory mitigation will be considered adequate and/or suitable by a resource agency for a specific transportation project's impact. Appropriateness of use of advance mitigation credits developed will be assessed on a case-by-case basis.
- Advance mitigation projects should optimize their conservation benefit in such a way that the number and types of mitigation credits (or similar) are maximized.
- Advance mitigation projects, like transportation projects and conservation projects, have financial, technical, and strategic risks.
- Advance mitigation projects, like transportation projects and conservation projects, have a scope, schedule, and budget.

- Transportation projects must include mitigation costs in the scoping and programming of their budgets because they are required by law to reimburse the AMA for use of mitigation produced by the AMP [SHC § 800.6(b)].

The above list is not presented in any order or priority.

1.2 District 1 Transportation Infrastructure[3]

Headquartered in Eureka, Caltrans District 1 encompasses Del Norte, Humboldt, Lake, and Mendocino Counties. District 1 has 16 maintenance stations that take care of 10 state routes and 622 centerline miles to provide maximum benefits to the traveling public. These roadways range from scenic two-lane highways to controlled-access freeways. State Route 1 and US Highway 101, two major north and south routes connecting northern and southern California, traverse District 1. Other important SHS roadways include State Route 299 within the Redwood Creek watershed and State Route 20 from Willits north and east around Clear Lake.

A portion of Caltrans District 2 occurs within the geographic area of interest ("GAI"), consisting of the southwest corner of Trinity County. The only state route within District 2 that occurs in the GAI is State Route 36 (Figure 1-3).

Other transportation agencies that implement transportation improvements eligible for State transportation Improvement Program ("STIP") funding (MPOs, RTPAs, and other public agencies) within Caltrans District 1's boundaries are the Del Norte Local Transportation Commission, Humboldt County Association of Governments, Mendocino Council of Governments, and Trinity County Transportation Commission.

[3] Adapted from https://dot.ca.gov/caltrans-near-me/district-1.

Figure 1-3. Caltrans District 1 Road Infrastructure

1.3 Regulatory Framework Summary

Unavoidable adverse natural resource impacts that could result from transportation projects are defined under environmental policies, laws, and regulations including, but not limited to:

- California Environmental Quality Act ("CEQA") (Public Resources Code § 21000 et seq.)
- National Environmental Policy Act ("NEPA") (42 U.S. Code ["USC"] § 4321 et seq.)
- Federal Endangered Species Act of 1973 ("ESA") (16 USC § 1531–1543), as amended
- California Endangered Species Act ("CESA") (California Fish and Game Code ["FGC"] § 2050 et seq.)
- Federal Clean Water Act ("CWA"), Sections 401 and 404 (33 USC § 1251–1376)
- Porter-Cologne Water Quality Control Act (California Water Code § 13000 et seq.)
- Lake and Streambed Alteration Program (FGC § 1600 et seq.)
- California Coastal Act (California Public Resources Code § 30000 et seq.).

Natural resource regulatory agencies that may need to be engaged for transportation projects that impact natural resources in the GAI are listed in Table 1-2.

Table 1-2. Natural Resource Regulatory Agencies with Authority Over Natural Resources in the GAI

Partner	Web Address
California Coastal Commission ("CCC")	https://www.coastal.ca.gov/
CDFW, Northern Region	https://wildlife.ca.gov/regions/1
California Regional Water Quality Control Board ("RWQCB") North Coast	https://www.waterboards.ca.gov/northcoast/
State Water Resources Control Board ("State Water Board")	https://www.waterboards.ca.gov/
U.S. Army Corps of Engineers ("Corps"), South Pacific Division, San Francisco	http://www.spl.usace.army.mil/
U.S. Environmental Protection Agency ("EPA"), Region 9	http://www.epa.gov/region9/
U.S. Fish and Wildlife Service ("FWS"), Sacramento Field Office	https://www.fws.gov/sacramento/
FWS, Arcata Office	https://www.fws.gov/arcata/
National Marine Fisheries Service ("NMFS") West Coast, California Coastal Office	https://www.westcoast.fisheries.noaa.gov/

Each of the natural resource regulatory agencies listed in Table 1-2 may include compensatory mitigation as a transportation project condition after it has been determined that there will be unavoidable permanent, adverse impacts and that other efforts to

minimize, rectify, and reduce the impact have been incorporated in the transportation project's design and delivery. These natural resource regulatory agencies may also recognize the use or application of a compensatory mitigation credit that was established through an instrument or other formal interagency agreement as satisfying a transportation project's compensatory mitigation condition(s). As a lead agency under CEQA and NEPA, Caltrans may also determine compensatory mitigation is required.

Some natural resource regulatory agencies also have procedures for establishing compensatory mitigation. These are defined under environmental laws, regulations, policies, and guidelines including, but not limited to:

- *Conservation Bank and Mitigation Bank Applications and Fees* (FGC § 1797 et seq.)
- *Advance Mitigation and Regional Conservation Investment Strategies,* mitigation credit agreements (FGC § 1856)
- *Compensatory Mitigation for Losses of Aquatic Resources, Final Rule* (33 Code of Federal Regulations ["CFR"] Parts 230, 325, and 332 and 40 CFR Part 230)
- *Final Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division* (Corps 2015)
- *Memorandum of Understanding Concerning Mitigation and Conservation Banking and In-Lieu Fee Programs in California* (California Natural Resources Agency ["CNRA"] et al. 2011).

As discussed previously, credits are the usual currency of mitigation established through an advance mitigation project; however, other values may also be established. Establishing conservation banks, mitigation banks,[4] and in-lieu fee programs requires an instrument. Existing policies and regulations prescribe what an instrument must contain and address, as well as the terms of use for the credits generated by the mitigation bank, conservation bank, or in-lieu fee program. Similarly, establishing habitat conservation plans ("HCPs") and natural community conservation plans ("NCCPs") requires an agreement.

1.4 SAMNA

Predicting likely future transportation project effects on natural resources takes place at the intersection of transportation planning and conservation planning. In 2018, consistent with Step 1 of the advance mitigation planning process (Figure 1-1), the AMP forecast Caltrans' statewide compensatory mitigation needs for the transportation improvements conceptualized in the *State Highway Operation and Protection Program Ten-Year Project Book Fiscal Years 2017/18–2026/27* ("SHOPP Ten-Year Book") for fiscal years 2018 to 2027 (Caltrans 2018a, 2019b). The forecast was performed using the Caltrans

[4] The goal of conservation banks is, typically, to offset adverse impacts on a species, while the goal of mitigation banking is to replace the exact function and values of specific wetland habitats that will be adversely affected.

Statewide Advance Mitigation Needs Assessment Reporting Tool ("SAMNA Reporting Tool"), a geographic information system ("GIS") overlay model developed by Caltrans to support advance mitigation planning (Caltrans 2019b). Potential impacts for all 12 Caltrans Districts were estimated. Statewide, over 900 transportation projects and over 600 wildlife and aquatic resources were evaluated through the SAMNA Reporting Tool, yielding thousands of results (Caltrans 2019b). Caltrans District 1 results are provided on pages 21 to 46 of Caltrans 2019b.

For consistency and as appropriate, tables, figures, and information presented throughout this document, including Chapter 2, *Environmental Setting*, are consistent with the geospatial data within the SAMNA Reporting Tool. SAMNA Reporting Tool geospatial data and model assumptions are described more fully in Caltrans 2019b. Results are presented in four different reports: terrestrial and aquatic species and sub-species, threatened and endangered fish, non-wetland waters, and wetlands. The unit of measure for impacts is acres.

SAMNA Caveats: The Statewide Advance Mitigation Needs Assessment ("SAMNA") is strictly and specifically intended to be used by Caltrans to justify, propose, and scope advance mitigation projects (Caltrans 2019b). The SAMNA results:

- Are not to be used to substitute for or preempt any requirements to conduct detailed transportation project-level environmental scoping and analysis to inform the programming of individual transportation projects;
- Do not relieve Caltrans project planners from first avoiding and then minimizing impacts;
- Do not preclude the requirements under CEQA and NEPA for environmental analysis of and permitting for individual transportation projects; and
- Do not constitute a commitment on the part of an individual transportation project to implement the estimated compensatory mitigation. A transportation project's actual impacts and compensatory mitigation commitments will be determined during its environmental and permitting processes.

Use of these methods shall not support the endorsement of or any other conclusion concerning any transportation project or transportation project alternative. Use or misuse of these methods and results for any purpose other than that which is intended shall be the sole responsibility of the individuals or entities conducting or supporting that use or misuse, who shall be fully liable, therefore.

1.5 GAI and Resource Focus

Given the quantity of resources evaluated through the SAMNA, limited AMA funding, and the need for the AMP to revolve the account, Caltrans focused this analysis on a geographic area with wildlife habitats and aquatic resources where planned transportation project schedules would likely benefit from having (1) compensatory mitigation credit purchase transactions complete and/or (2) compensatory mitigation credit supplies increased.

Focusing this analysis improves the probability that advance mitigation projects undertaken by Caltrans will yield credits (or similar) that will be usable and comply with an appropriate established regulatory framework. Caltrans intends for any mitigation-related measures to support these environmental resources in the GAI to benefit other environmental resources as well.

1.5.1. GAI

To identify an area to focus on, consistent with Step 2 of the advance mitigation planning process (Figure 1-1), in 2019, Caltrans District 1 subject matter specialists:

- Reviewed the entirety of District 1's SAMNA results and their associated future transportation project locations and activities anticipated for the State Highway Operation and Protection Program ("SHOPP") (Caltrans 2019b);
- Reviewed non-SHOPP STIP-eligible transportation improvement plans for the next 10 years; and
- Identified the Mad-Redwood (hydrologic unit code ["HUC"] 18010102), Lower Eel (HUC 18010105), and South Fork Eel (HUC 18010106) sub-basins as a location where Caltrans and other public agencies that implement transportation improvements could benefit from advance mitigation—hereafter called the GAI (Figure ES-1; Figure 1-3).

As pointed out in Section 1.4, the RAMNA is consistent with SAMNA Reporting Tool geospatial data and model assumptions. In consultation with the natural resource regulatory agencies, it was determined that presenting SAMNA results by sub-basin and ecoregion, and not political boundaries, would steer advance mitigation planning toward better ecological outcomes: the 2008 Mitigation Rule specifies the sub-basin as the basis of service areas for mitigation banks, and CDFW's State Wildlife Action Plan ("SWAP") is organized by ecoregion. Because the sub-basins form an ecological boundary and not a political boundary, some of the GAI overlaps Caltrans District 2.

1.5.2. Species of Mitigation Need

Compensatory mitigation for aquatic species in the GAI was identified as both a historical transportation project compensatory mitigation need and an anticipated future transportation project compensatory mitigation need within Caltrans District 1. SHOPP transportation projects have historically been conditioned by natural resource regulatory agencies for some species more routinely than others and have benefited from mitigation credits, when available. Hence, to further focus the planning effort, Caltrans District 1 identified the Southern Oregon/Northern California Coast ("SONCC") evolutionarily significant unit ("ESU") coho salmon (*Oncorhynchus kisutch*), and the Northern California Coast Distinct Population Segment ("DPS") steelhead (*Oncorhynchus mykiss*) as "species of mitigation need." SONCC coho salmon is federal and state listed as threatened and Northern California Coast steelhead is a federal listed threatened species. No terrestrial wildlife species were chosen as species of mitigation need for this RAMNA. However, to further focus the planning effort and to align with regional and local goals for special-status wildlife species, special-status wildlife species that utilize aquatic habitats

during a portion of their life cycle inform the discussion in Chapter 7 (*Wildlife Resources Conservation Goals and Objectives*).

1.6 RAMNA

This RAMNA is a planning-level document that:

- Provides a desktop analysis of relevant available information pertaining to Mad-Redwood, Lower Eel, and South Fork Eel sub-basins, referred to as the GAI;
- Applies to fiscal years 2018 to 2027 (planning period), which is concurrent with the time period addressed by the SHOPP Ten-Year Book (Caltrans 2018a);
- Discusses potential compensatory mitigation conditions that may be placed on future transportation projects by the seven natural resource regulatory agency signatories[5] to the *Master Process Agreement for Planning and Developing Advance Mitigation throughout California for the California Department of Transportation Advance Mitigation Program* (Caltrans et al. 2020);
- Focuses on wildlife habitats and aquatic resources that have a high probability of requiring transportation project-related compensatory mitigation in the GAI and planning period;
- Documents Caltrans' forecast of potential wildlife and aquatic resource[6] compensatory mitigation needs for the GAI and planning period, as reported by the SAMNA (Caltrans 2019b);
- Identifies information that will be important to Caltrans when scoping any of the AMP's authorized activities in the GAI, in accordance with SHC § 800.6(a), including documenting the existing compensatory mitigation supply;
- Incorporates information and feedback received from outreach to the natural resource regulatory agencies, FHWA, MPOs, RTPAs, other public agencies that implement transportation projects, Native American tribes, interested parties, and the public; and
- Analyzes Caltrans' options to meet its compensatory mitigation needs in the GAI through the AMP's authorized activities.

Because early technical assistance and communication may increase the probability that advance mitigation projects promoted within and/or undertaken by Caltrans will successfully meet the AMP's purpose, in accordance with the AMP Guidelines, Caltrans has requested that this RAMNA be reviewed by FHWA, natural resource regulatory agencies, other transportation agencies (MPOs, RTPAs, and other public agencies that implement transportation improvements), Native American tribes, interested parties, and the public. Their reviews and any information they provide will also be consulted by

[5] Natural resource regulatory agency signatories are CDFW; State Water Board, Corps Los Angeles, Sacramento, and San Francisco Districts; EPA; FWS; NMFS; and CCC.

[6] For the purposes of this document, aquatic resources include all wetlands and waters regulated by CCC, CDFW, RWQCBs, Corps, and EPA.

Caltrans when it promotes and approves specific advance mitigation projects for development and funding (Caltrans 2019a).

1.7 Coordination History

With respect to external communications, the AMP's Guidelines describe three communication milestones within the advance mitigation project planning process (Caltrans 2019a). Each is summarized in the following sections.

1.7.1. MPOs, RTPAs, and Other Transportation Agencies that Implement Transportation Improvements

The AMP guidelines state that Caltrans will contact MPOs, RTPAs, and other public agencies that implement transportation projects to request specific information about their potential STIP transportation projects, to help inform the potential demand for compensatory mitigation in that area (Section 7.2 of Caltrans 2019a). Caltrans District 1 Transportation Planning conducted outreach and contacted the partners listed in Table 1-3. No non-SHOPP STIP-eligible transportation projects were identified that will be seeking compensatory mitigation within the same 10-year horizon as the current SHOPP.

Table 1-3. Regional Transportation Interaction and Outreach Summary

Date	Description
April 16, 2019	Caltrans Coastal Stewardship Branch Chief presented an overall picture of how the RAMNA is intended to work and assist District 1 mitigation needs. Representatives from all four District 1 MPOs were present or on the phone: Lake County Public Works, Del Norte Local Transportation Commission,[a] Humboldt County Association of Governments, and Mendocino Council of Governments. It was understood that the RAMNA process, within this District 1 SHOPP cycle, was not programming local assistance projects that would utilize the RAMNA through STIP funding. However, the option was open to partner with Councils of Government in mitigation projects that may arise in the future.

[a] Included for completeness. This RAMNA does not overlap Del Norte County.

1.7.2. RAMNA Review

The AMP Guidelines (Caltrans 2019a) state:

> *Before the RAMNA will be used to support advance mitigation project planning, Caltrans will, per 23 USC 169(a): consult with each natural resource regulatory agency with jurisdiction over the environmental resources considered in the RAMNA; make a draft of the RAMNA available for review and comment by applicable natural resource regulatory agencies, FHWA, Native American Tribes, local transportation agencies, local advance mitigation programs, local interested parties, and the public; request that, along with their review, natural resource regulatory agencies, Native American Tribes, FHWA, local transportation agencies, local advance mitigation programs, interested parties, and the public provide Caltrans any additional information relevant to and*

appropriate for the RAMNA; consider any comments and information received from natural resource regulatory agencies, FHWA, Native American Tribes, local transportation agencies, local advance mitigation programs, local interested parties, and the public on the draft RAMNA; and incorporate information and address such comments in the final RAMNA as appropriate.

On February 22, 2021, Caltrans distributed this RAMNA for review by FHWA, natural resource regulatory agencies, other transportation agencies (MPOs, RTPAs, and other public agencies that implement transportation improvements), Native American tribes, interested parties, and the public. Table 1-4 lists the commenters and the date of their communication. All comments received were considered, addressed, and incorporated into the document, as appropriate.

Table 1-4. Comments Received by Caltrans on the RAMNA

Commenter	Date of Comment Letter
CDFW[a]	April 30, 2021
CCC	April 29, 2021
EPA	April 30, 2021
FWS	April 21, 2021
Corps, San Francisco District	March 26, 2021
State Water Board	April 30, 2021
NMFS	July 16, 2021

[a] SHC § 800 et seq. specifically directs Caltrans to consult with CDFW on all activities pursuant to the AMP.

1.7.3. Interagency Meeting and Coordination

The Master Process Agreement states that prior to finalizing the RAMNA, "Caltrans will arrange and facilitate at least one … meeting [with natural resource regulatory agencies] to discuss the RAMNA, conservation goals and objectives, overlapping agency statutory and regulatory requirements, and other relevant topics" (Section IV, Subsection A, Provision 6). In accordance with the Master Process Agreement, a meeting between Caltrans and the natural resource regulatory agencies was held within 60 days of distribution of the RAMNA. The meeting participants and meeting dates are presented in Table 1-5. The discussion has informed this document.

Table 1-5. Interagency Meetings

Meeting Participants	Meeting Date
CCC, CDFW, FWS, State Water Board	April 20, 2021
CCC	May 14, 2021
CDFW	June 1, 2021
Corps, San Francisco District	June 4, 2021
EPA	June 3, 2021
FWS	June 9, 2021
NMFS	June 3, 2021
State Water Board	May 18, 2021

1.8 Document Organization

This document is organized as shown in Table 1-6.

Table 1-6. Document Organization

Chapter	Title	Content
Chapter 1	Introduction	This chapter introduces the RAMNA, placing it in context of the AMP Guidelines, transportation network, and regulatory framework.
Chapter 2	Environmental Setting	This chapter describes the GAI analyzed in the RAMNA. It relies on geospatial data from the SAMNA Reporting Tool and other readily available information.
Chapter 3	Relevant Plans, Policies, and Regulations	This chapter briefly describes laws, regulations, comprehensive plans, conservation plans, and land management plans that are applicable and relevant to the GAI that can inform both regional understanding and advance mitigation scoping.
Chapter 4	Existing Mitigation Opportunities	This chapter summarizes the mitigation credits (or similar) currently available to Caltrans and/or pending that are applicable to the environmental resources discussed in the RAMNA and located within or in the vicinity of the GAI.
Chapter 5	Modeled Estimated Impacts	This chapter summarizes the SAMNA forecast and regional estimates of compensatory mitigation need for the GAI.
Chapter 6	Benefiting Transportation Project Considerations	This chapter summarizes relevant information about potentially benefiting transportation projects, including scheduling considerations and constraints. A time frame for the need for forecast mitigation is provided and analyzed. The potentially benefiting transportation projects' acceleration priorities are documented in this chapter.

Chapter	Title	Content
Chapter 7	Wildlife Resources Conservation Goals and Objectives	This chapter presents Caltrans' understanding of the GAI's wildlife conservation goals and objectives, with which Caltrans seeks to align its advance mitigation projects.
Chapter 8	Aquatic Resources Conservation Goals and Objectives	This chapter presents Caltrans' understanding of the GAI's aquatic, wetland, and water resources conservation goals and objectives, with which Caltrans seeks to align its advance mitigation projects.
Chapter 9	Assessment of Authorized Activities	This chapter describes options and analyzes the feasibility of purchasing and/or establishing mitigation credits (or similar) in the GAI that have a high probability of successfully accelerating transportation project delivery and protect natural resources through transportation project mitigation.
Chapter 10	References	This chapter lists references cited in the RAMNA.
Appendices	Various	Appendices supporting this document: Appendix A – GIS Sources Appendix B – Ecoregion Subsection Descriptions Appendix C – Land Cover Types Appendix D – Local Coastal Programs Appendix E – Complete SAMNA Species Results Appendix F – Aquatic Resource Locations

2. ENVIRONMENTAL SETTING

The GAI consists of approximately 3.6 million acres in northern coastal California. The Mad-Redwood, Lower Eel, and South Fork Eel sub-basins define its boundaries, which are overlapped by portions of the Northern California Coast and Northern California Coast Ranges Ecoregion Sections. Ecoregion sections are defined as the largest ecological unit of the U.S. Department of Agriculture ("USDA") Forest Service ("USFS") National Hierarchical Framework of Ecological Units, which are nested within larger provinces (Cleland et al. 1997). The Northern California Coast Section is within the larger California Coastal Steppe – Mixed Forest – Redwood Forest Province, and the Northern California Coast Ranges Section is within the larger Sierran Steppe – Mixed Forest – Coniferous Forest – Alpine Meadow Province (McNab et al. 2007).

In this chapter, Caltrans describes the GAI in terms of land ownership, topography, coastal zone, climate, land cover, invasive species, special-status species, connectivity, and aquatic resources. Aquatic resources consist of fish, wetlands, and non-wetland water resources. Intended to inform advance mitigation project scoping, this assessment relied on readily available literature and GIS sources, including the vegetation and other geospatial data layers developed for the SAMNA Reporting Tool (Caltrans 2017a). Sources used for this assessment are cited throughout the chapter, and links to GIS sources are provided in Appendix A.

On each figure, Caltrans has provided the general location of planned SHOPP transportation projects that, during the 10-year planning period addressed by this document, natural resource regulatory agencies may condition with compensatory mitigation. The GAI's road infrastructure is described in Chapter 1, and additional information about planned SHOPP transportation projects is provided in Chapter 5.

2.1 Northern California Coast and Northern California Coast Ranges Ecoregion Subsections in the GAI

The GAI overlaps six ecoregion subsections within portions of the Northern California Coast and Northern California Coast Ranges ecoregion sections (Table 2-1, Figure 2-1). Ecoregion sections and subsections in the GAI were extracted from the SAMNA Reporting Tool (Caltrans 2019b). Brief ecoregion subsection descriptions are provided in Appendix B. Land cover is described by ecoregion subsection in Section 2.6 and is depicted on maps provided in Appendix C.

Table 2-1. Subsections of the Northern California Coast and Northern California Coast Ranges Ecoregion Sections in the GAI

Section	Subsection Name	Code[a]	Acreage[b]	Subsection as Percentage of GAI[b]
Northern California Coast	Northern Franciscan Redwood Forest	263Ab	72,957	2
Northern California Coast	Humboldt Bay Flats and Terraces	263Ae	253,864	7
Northern California Coast	Central Franciscan	263Af	829,451	23
Northern California Coast	Coastal Franciscan	263Ag	958,537	26
Northern California Coast Ranges	Eastern Franciscan	M261Ba	187,667	5
Northern California Coast Ranges	Central Franciscan	M261Bb	1,345,783	37
		Total	**3,648,259**	**100%**

Source: Caltrans 2017a
[a] USFS ecological unit subsection codes
[b] Numbers were rounded to the nearest whole number.

Figure 2-1. Northern California Coast and Northern California Coast Ranges Ecoregion Subsections in the GAI

2.2 Land Ownership in the GAI

The GAI spans parts of Humboldt, Trinity, Mendocino, and Del Norte Counties (Figure 2-2). A small portion overlaps Del Norte County; however, it does not include planned transportation project improvements anticipated for the planning period. As such, resources occurring in the Del Norte County portion of the GAI are not expected to be affected and will not be discussed further in this RAMNA. Approximately 59.9 percent of land in the GAI consists of agricultural/rural (private) land (Table 2-2, Figure 2-2). Approximately 19.0 percent is federally administered and managed by the USDA USFS; the U.S Department of Interior's Bureau of Land Management ("BLM"), FWS, and National Park Service ("NPS"); and the U.S. Department of Defense's military bases. National park land includes Redwood National Park. USFS land includes parts of the Six Rivers National Forest and Mendocino National Forest. Approximately 4.11 percent of land in the GAI consists of state-owned and -managed lands. Other lands in the GAI are owned or managed by Native American tribes, counties, cities, joint power authorities, private entities, nonprofit conservancies, and land trusts (Table 2-2, Figure 2-2).

Table 2-2. Land Ownership in the GAI

Land Owner or Land Use	Number of Parcels	Total Acreage per Agency/ Owner[a]	Ownership as Percentage of GAI
Private (agricultural/rural)	25,186	2,214,825	59.9
Private (unassigned)	57,538	386,297	10.5
USFS	1,539	431,470	11.7
BLM	1,363	142,179	3.9
Nonprofit conservancy and land trust	1,219	134,529	3.6
California Department of Parks and Recreation	1,091	131,387	3.6
NPS	492	122,816	3.3
Public lands (unassigned)	3,914	37,823	1.0
Native American tribe[b]	346	33,226	0.9
CDFW	345	20,496	0.6
Other public lands (California State Lands Commission, California Department of Forestry and Fire Protection, University of California, California State University, Caltrans)	395	20,084	0.5
City, county, and special district	1,128	14,731	0.4

Land Owner or Land Use	Number of Parcels	Total Acreage per Agency/ Owner[a]	Ownership as Percentage of GAI
U.S. military bases	8	677	<0.1
FWS	172	5,754	0.2
Total	**94,736**	**3,696,294**	**100%**

Sources: Bureau of Indian Affairs; California Protected Lands Database; California Conservation Easement Database; Caltrans 2017a; U.S. Census Bureau; USDA; and California Department of Technology for land parcels
[a] Numbers were rounded to the nearest whole number.
[b] A link to the U.S. Bureau of Indian Affairs data layer used for this planning-level document is provided in Appendix A. The layer does not distinguish between trust land (held in trust by the U.S. Bureau of Indian Affairs for a tribe), allotted trust land (held in trust by the U.S. Bureau of Indian Affairs for an individual tribal member or family), or fee land (held by an owner, Indian or non-Indian).

2.2.1. Protected Lands

The California Protected Areas Database, developed by GreenInfo Network, provides an inventory of lands that are owned in fee or protected for open space purposes, throughout California, by over 1,000 public and nonprofit organizations. These protected lands are managed for the preservation of biological diversity and other natural, recreational, and cultural uses. It is important to note, however, that these data are based on best available public information at the time of development and, as such, may not represent all protected lands in California.

In the California Protected Areas Database, lands are assigned U.S. Geological Survey ("USGS") Gap Analysis Program ("GAP") status ranks that define the degree of protection for biodiversity conservation using a 1 to 4 coding system. Areas with a GAP status of 1 are managed for biodiversity; areas with a GAP status of 2 are managed for biodiversity with disturbance events suppressed; areas with a GAP status of 3 are managed for multiple uses, potentially including mining or off-road vehicle use; and areas with a GAP status of 4 have no known mandate for biodiversity protection. The method of applying these California Protected Areas Database ranks is done in collaboration with the USGS' Protected Areas Database of the U.S.

Not all California Protected Areas Database lands have GAP status ranks, and some may be out of date. Nevertheless, available protected lands and their associated GAP status ranks are indicated on Figure 2-3. As Figure 2-3 shows, no GAP status 1 lands are identified in the database for the GAI, and most of the planned SHOPP transportation projects are in areas with no assigned GAP status or a GAP status of 3 or 4. Lands with conservation easements are also identified in the California Protected Areas Database; some of the planned SHOPP transportation projects are proximate to conservation easements (Figure 2-3).

Figure 2-2. Land Ownership

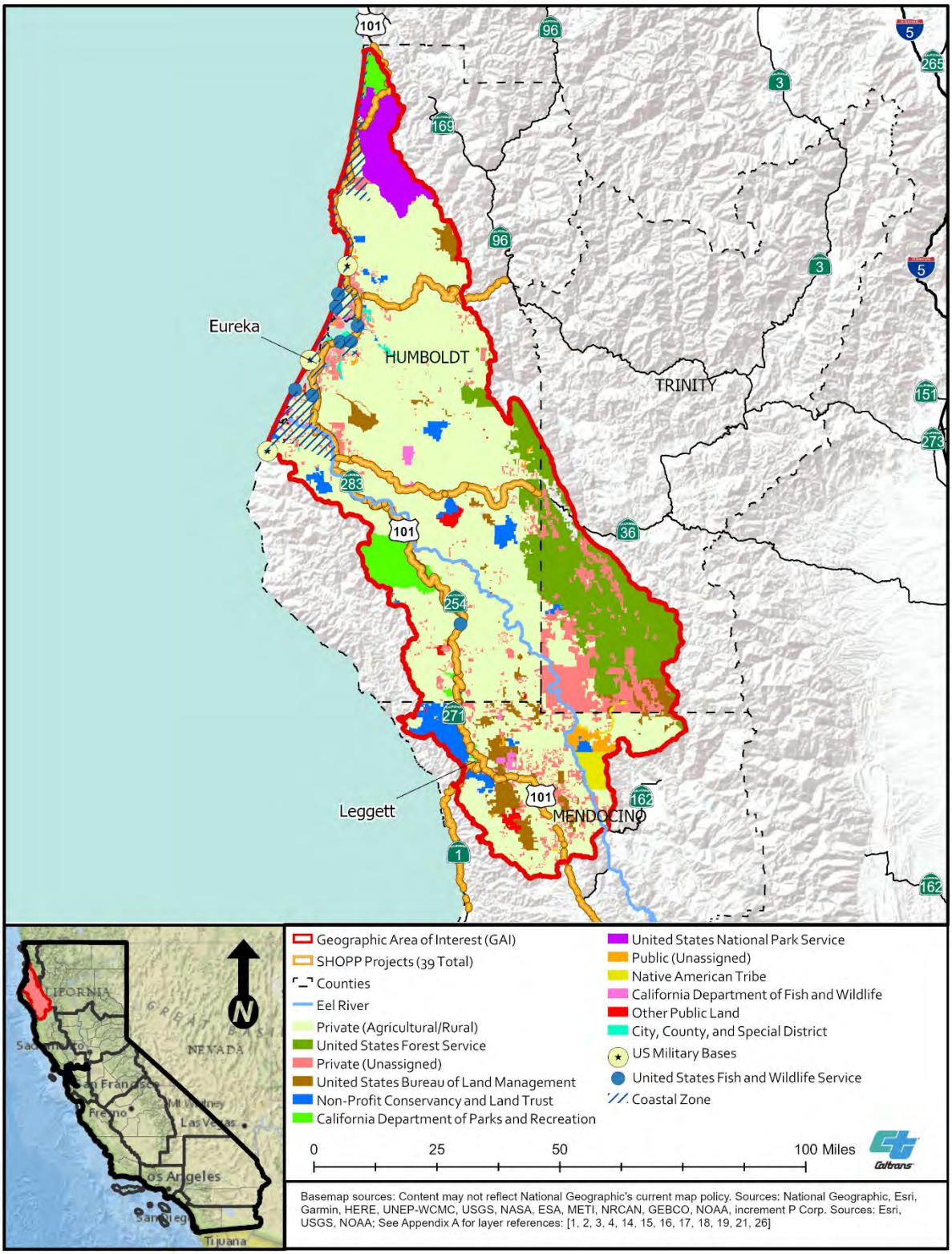


Figure 2-3. Protected Lands

2.3 Topography

The three sub-basins that make up the GAI are bounded on the west by the Pacific Ocean and extend east and upward into the Northern Coast Ranges (Figures 2-4, 2-5, and 2-6). Generally sloping westward, the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins are characterized by low mountains with areas of narrow coastal hills, coastal plains, and gently sloping marine terraces, as well as forested, steep mountainous terrain; steep coastal bluffs; and coastal lagoons (North Coast RWQCB 2018; USFS 1994). Divided by creeks and rivers, their broad valleys extend from sea level inland to the mountains. The Mad-Redwood Sub-basin's highest elevation is 6,022 feet above mean sea level (Figure 2-4). The Lower Eel Sub-basin's highest elevation is 6,140 feet above mean sea level (Figure 2-5). The South Fork Eel Sub-basin's highest elevation is 4,390 feet above mean sea level (Figure 2-6). Of the three, it is notable that the South Fork Eel supports the third-largest coastal wetland in California (Society for Ecological Restoration – California ["SERCAL"] 2015).

2.4 Coastal Zone

Public Resources Code Section 30103(a) of the California Coastal Act defines California's coastal zone as the land and water area of the State of California from the Oregon border to the border of the Republic of Mexico, as depicted on maps identified and set forth in the Coastal Act of 1976, and represents the jurisdiction of the CCC. The coastal zone extends seaward to the state's outer limit of jurisdiction, including all offshore islands, and extends inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas, the coastal zone extends inland to the first major ridgeline paralleling the sea or 5 miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards. As indicated on Figure 2-7, the coastal zone does not overlap the entire GAI; even so, planned SHOPP transportation projects are expected to occur in the coastal zone.

2.4.1. Local Coastal Programs

The Coastal Act requires mitigation for impacts on coastal habitats and other types of coastal resource impacts (for example, visual impacts) that are outside the scope of this document. The CCC regulates potentially impactful projects in the Coastal Zone primarily through the issuance of Coastal Development Permits. Local Coastal Programs ("LCPs") are planning tools used to guide development in the coastal zone through preparation of land use plans and implementation of zoning ordinances. In coastal local jurisdictions where the CCC has reviewed an LCP for consistency with Coastal Act requirements and certified the LCP, the local government assumes Coastal Development Permit authority within its jurisdiction, with certain exceptions (the CCC retains jurisdiction on tidelands—including former tidelands—submerged land, and land subject to the public trust).

Figure 2-4. Mad-Redwood Topography

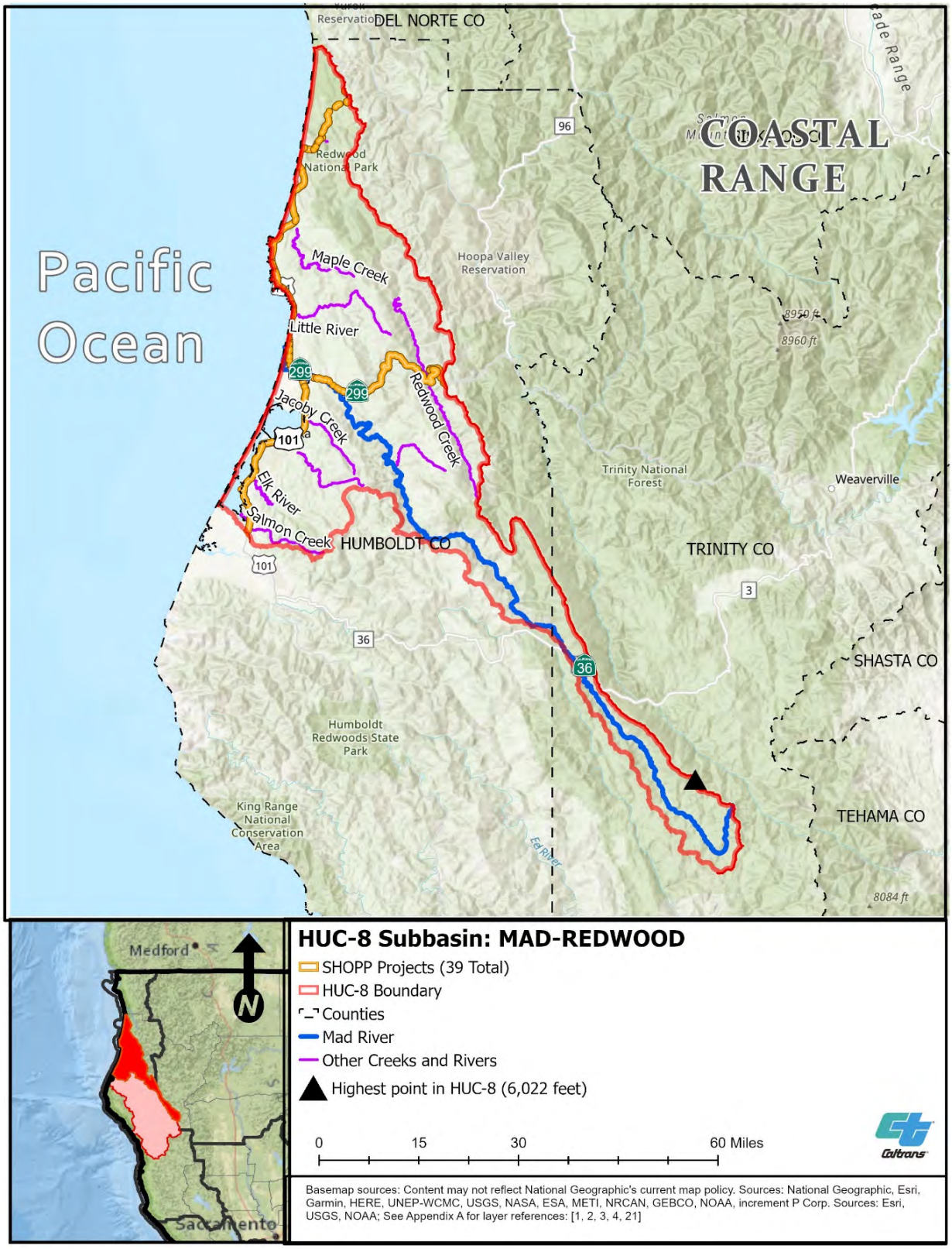


Figure 2-5. Lower Eel Topography

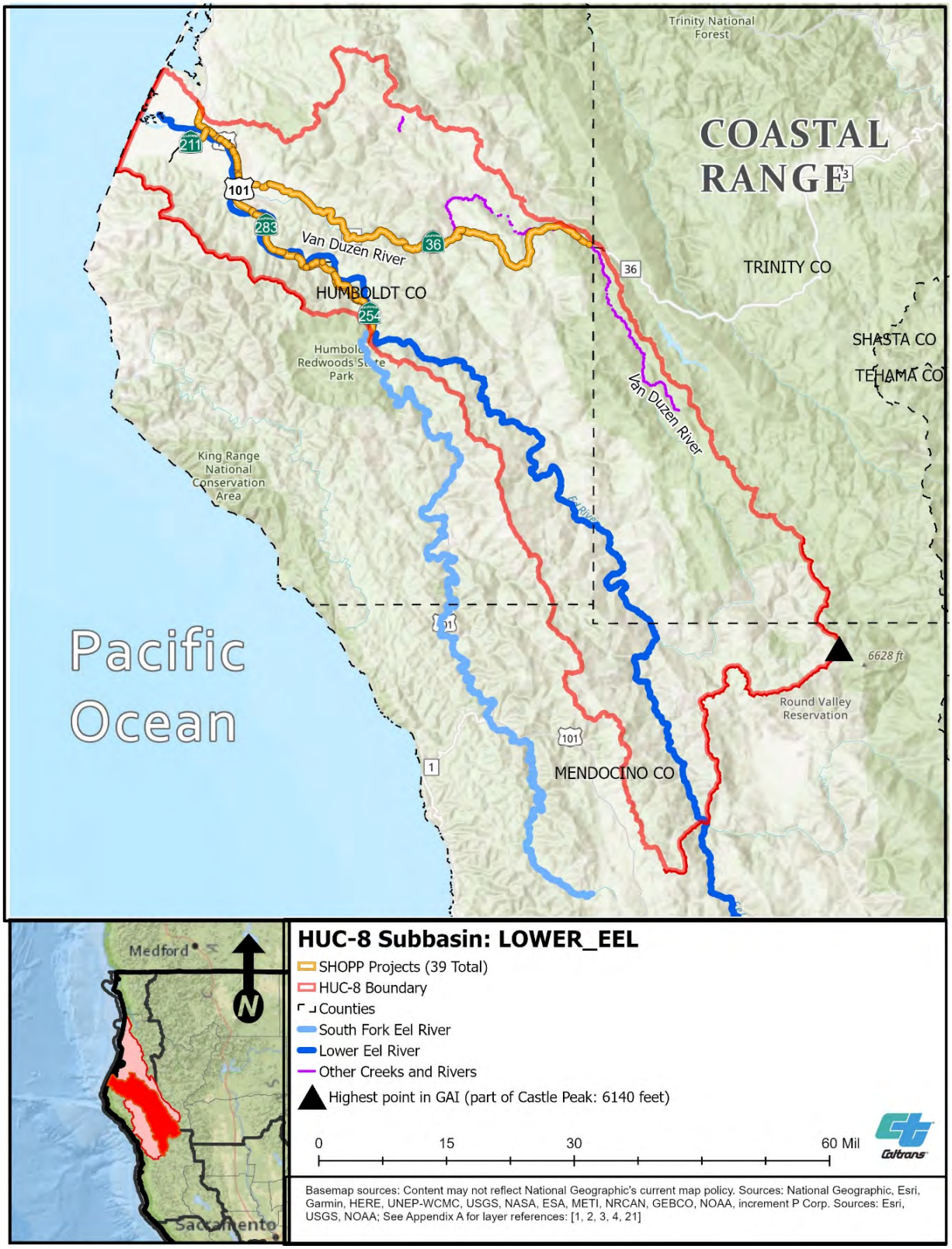


Figure 2-6. South Fork Eel Topography

Figure 2-7. Coastal Zone

Mapped in Appendix D, there are eight CCC-certified LCPs used by local governments to guide development in the Coastal Zone in coordination with the CCC. The City of Fortuna LCP has not been certified by the CCC. In addition, there are four Areas of Deferred Certification ("ADCs"). An uncertified area may be an area that was created through annexation, an area that was subsequently identified but may not have been included in an LCP segment, or an area that has applied for certification but has not yet been accepted by the CCC. The CCC retains permit authority until an LCP is effectively certified for these areas. A type of uncertified area, ADCs are geographic areas that have not been officially segmented for purposes of LCP preparation and were not certified during review of the LCP. The CCC retains permit authority until an LCP is effectively certified for these areas.

2.4.2. Environmentally Sensitive Habitat Areas

The California Coastal Act defines an environmentally sensitive habitat area ("ESHA") as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments" (Section 30107.5). Under Coastal Act § 30240, an ESHA shall be protected against any significant disruption of habitat values, and only uses dependent on those resources (for example, nature study) are allowed in those areas. Furthermore, development in areas adjacent to an ESHA must be sited and designed to prevent significant degradation of the ESHA. Whether a habitat or location is considered an ESHA is determined by evaluating the on-ground-resources and the surrounding ecological context.

Although maps or descriptions of ESHAs are included in some of the LCPs covering the GAI, there may be ESHAs that have been added since the LCPs were certified because of new listings of special-status species or the identification of new sensitive natural communities or other areas that meet the definition of ESHAs under Coastal Act § 30107.5. Specific ESHA definitions and policies vary among the eight CCC-certified LCPs in the GAI (Appendix D). LCPs may list specific species habitats as ESHAs or may designate geographic areas as ESHAs because of the presence of rare or valuable plants, animal species, or habitat. Designation of ESHAs is not limited to habitat for federally or state listed species or designated critical habitat. State Water Board-designated ocean areas of special biological significance ("ASBS"; see Section 2.18); coastal wetlands and lagoons; marine, wildlife, and education and research reserves; nearshore reefs; tidepools; sea caves; islets and offshore rocks; kelp beds; indigenous dune plant habitats; riparian corridors; and wilderness and primitive areas may also be considered ESHAs (Humboldt County 2017). ESHAs are also typically threatened by habitat fragmentation, disturbance, degradation, or other anthropogenic factors. Areas identified as ESHAs in the LCPs in the GAI include, but are not limited to, habitat for all rare or endangered species on state or federal lists; rivers, creeks, gulches, and associated riparian habitats; estuaries, sloughs, lagoons, and wetlands; rookeries for herons and egrets; seabird roosting areas; harbor seal pupping areas; rocky intertidal

areas; vegetated dune habitats; and azalea habitats (City of Arcata 2008; City of Eureka 2008; City of Trinidad 2018; Humboldt County 2007a, 2007b, 2014a, 2014b).

2.4.3. Critical Coastal Areas

California's Critical Coastal Areas ("CCA") Program fosters collaboration among local stakeholders and government agencies to coordinate efforts to protect high resource value coastal waters from polluted runoff. This nonregulatory program, which is part of California's Nonpoint Source Pollution Program, is coordinated by CCC staff through a multiagency statewide committee. The committee includes, but is not limited to, the CCC, Caltrans (stormwater), CDFW, the State Water Boards, and EPA.

The criteria for identifying CCAs reflect the CCA Program's dual goals of improving degraded coastal water quality and providing extra protection from polluted runoff to coastal waters with a recognized high resource value. To be a CCA, an area must meet one or more of the following criteria:

- Coastal watershed areas where an impaired waterway on the 1994 303(d) list is, or flows into, a bay or estuary.
- Coastal watershed areas where an impaired waterway on the 1998 303(d) list flows into a state or federal Marine Managed Area.
- Shoreline areas within San Francisco Bay where an impaired waterway on the 1998 303(d) list flows into wildlife refuges, waterfront parks, and beaches, as specified in the San Francisco Bay Plan.
- Coastal watershed areas that flow into an ASBS.
- Coastal watershed areas where an impaired waterway on the 2010 303(d) list is, or flows into, a Principal Bay or Estuary, as identified in CDFW (2001).
- Coastal watershed areas where an impaired waterway on the 2010 303(d) list is adjacent to a state Marine Protected Area, as defined in 14 CCR § 632(a)(1)(A–C).

For more information about water quality and the 303(d) list, see Section 2.15. ASBSs are discussed in Section 2.18.

Statewide, 119 CCAs have been identified, 6 of which occur in the GAI. These are listed below by sub-basin:

- Mad-Redwood Sub-basin
  - Klamath River CCA
  - Redwood National and State Parks CCA
  - Redwood Creek CCA
  - Kelp Beds at Trinity Head CCA
  - Mad River CCA
- Lower Eel Sub-basin
  - Eel River CCA

There are no CCAs in the South Fork Eel Sub-basin. The inland boundary of a CCA is the Coastal Zone boundary, as defined in the California Coastal Act. The shoreline boundary is determined on a case-by case basis.

2.5 Climate

The GAI is characterized by a cool-summer subtype of the Mediterranean dry-summer subtropical climate with typically cool, dry summers and mild winters. Annual temperatures average from 35 to 59 degrees Fahrenheit (North Coast RWQCB 2018). Mean annual precipitation ranges from 10 to 15 inches at the base of the west-facing slopes to 40 to 100 inches at higher elevations, with up to 80 percent of the annual precipitation occurring during the winter (North Coast RWQCB 2018; USFS 1994). East-facing slopes are much drier than west-facing slopes (Bailey 1995). Heavy, dense fogs are common along the coast during the summer, while winters are wet and cool, with snowfall common over 3,000 feet (Caltrans 2019c; USFS 1994).

In the next 30 years, the climate is expected to change. Sea-level rise predictions used in California for planning purposes are summarized in Section 2.5.1. Results of Caltrans' climate vulnerability assessment are summarized in Section 2.5.2. The predicted resilience of the GAI to effects resulting from climate change is summarized in Section 2.5.3.

2.5.1. State of California Sea-level Rise Guidance

The CNRA and Ocean Protection Council ("OPC") *State of California Sea-Level Rise Guidance: 2018 Update* provides guidance to California state agencies for incorporating sea-level rise projections into planning, permitting, investment, and other decisions (CNRA and OPC 2018).

The stepwise approach provides guidance on how to select sea-level rise projections by evaluating risk and vulnerability. The following recommendations provide guidance on preferred sea-level rise planning and adaptation approaches, with an understanding that the diversity of communities, uses, and natural resources along California's coastline, as well as planning for new development versus existing structures, may merit different approaches to building resilience. Adaptation planning and strategies should:

1. Prioritize social equity, environmental justice, and the needs of vulnerable communities.
2. Prioritize protection of coastal habitats and public access.
3. Consider the unique characteristics, constraints, and values of existing water-dependent infrastructure, ports, and Public Trust uses.
4. Consider episodic increases in sea-level rise caused by storms and other weather-related events.
5. Coordinate and collaborate with local, state, and federal agencies when selecting sea-level rise projections; where feasible, use consistent sea-level rise projections across multi-agency planning and regulatory decisions.
6. Consider local conditions to inform decision making.

7. Include adaptive capacity in design and planning.
8. Assess risk and conduct adaptation planning at community and regional levels, when possible.

The guidance includes sea-level rise projections centered on the year 2030, which overlaps the RAMNA's planning period (CNRA and OPC 2018). The guidance is based on the *Rising Seas in California: An Update on Sea-Level Rise Science* report (OPC 2017), which reflects the most current understanding of sea-level rise science and modeling of global sea-level rise. Based on the CNRA and OPC (2018) guidance report, the North Spit tide gauge is located along the northern California coast in the GAI (Figure 2-8). Sea-level rise projections for 2030 are based on the representative concentration pathway 8.5 (high emissions scenario) because that represents expected conditions over the next 10 years. The *Humboldt Bay Area Plan Sea Level Rise Vulnerability Assessment* (Trinity Associates 2018) also provides sea-level rise projections for the North Spit tide gauge. The 2030 sea-level rise projections for the North Spit tide gauge range from 0.7 to 1.0 foot (CNRA and OPC 2018; Trinity Associates 2018).

2.5.2. Climate Vulnerability Assessment

In 2019, Caltrans performed a statewide climate change vulnerability assessment for the SHS (Caltrans 2019c). The analysis provided in the *Caltrans Climate Change Vulnerability Assessments: District 1 Technical Report* (Caltrans 2019c) is based on global climate change data compiled by the Intergovernmental Panel on Climate Change. Caltrans applies three future emissions scenarios for greenhouse gas emission concentrations in the technical report—representative concentration pathway 2.6, which assumes global annual greenhouse gas emissions will peak in the next few years and then begin to decline substantially; representative concentration pathway 4.5, which assumes emissions will peak around 2040 and then begin to decline; and representative concentration pathway 8.5, which assumes that high emission trends continue to the end of the century—for three future 30-year periods centered on the years 2025 (2010 to 2039), 2055 (2040 to 2069), and 2085 (2070 to 2099).

The effects of climate change in the GAI pose risks for transportation infrastructure reliability and capacity. Transportation systems were designed for historical climate conditions; changing climatic conditions, including an increased frequency of extreme weather events, are expected to cause disruptions and damage to the SHS. Predicted climate change effects consist of projected extended periods of higher temperatures in the summer; large fluctuations in precipitation, with dry years becoming drier and wet years becoming wetter; and an increased risk of wildfire and flooding over the three time periods analyzed in the technical report (Caltrans 2019c). Climate change effects along the coast during the three future 30-year periods are expected to exacerbate coastal hazards, including storm surges that increase coastal bluff and dune erosion, shoreline retreat, 1-percent flood events, and inundation of low-lying coastal areas; increase landslide and mudslide frequency; and worsen the severity of wildfires. At higher elevations, extreme temperatures are expected to rise, which may result in tree mortality and changing snowmelt patterns (Caltrans 2019c).

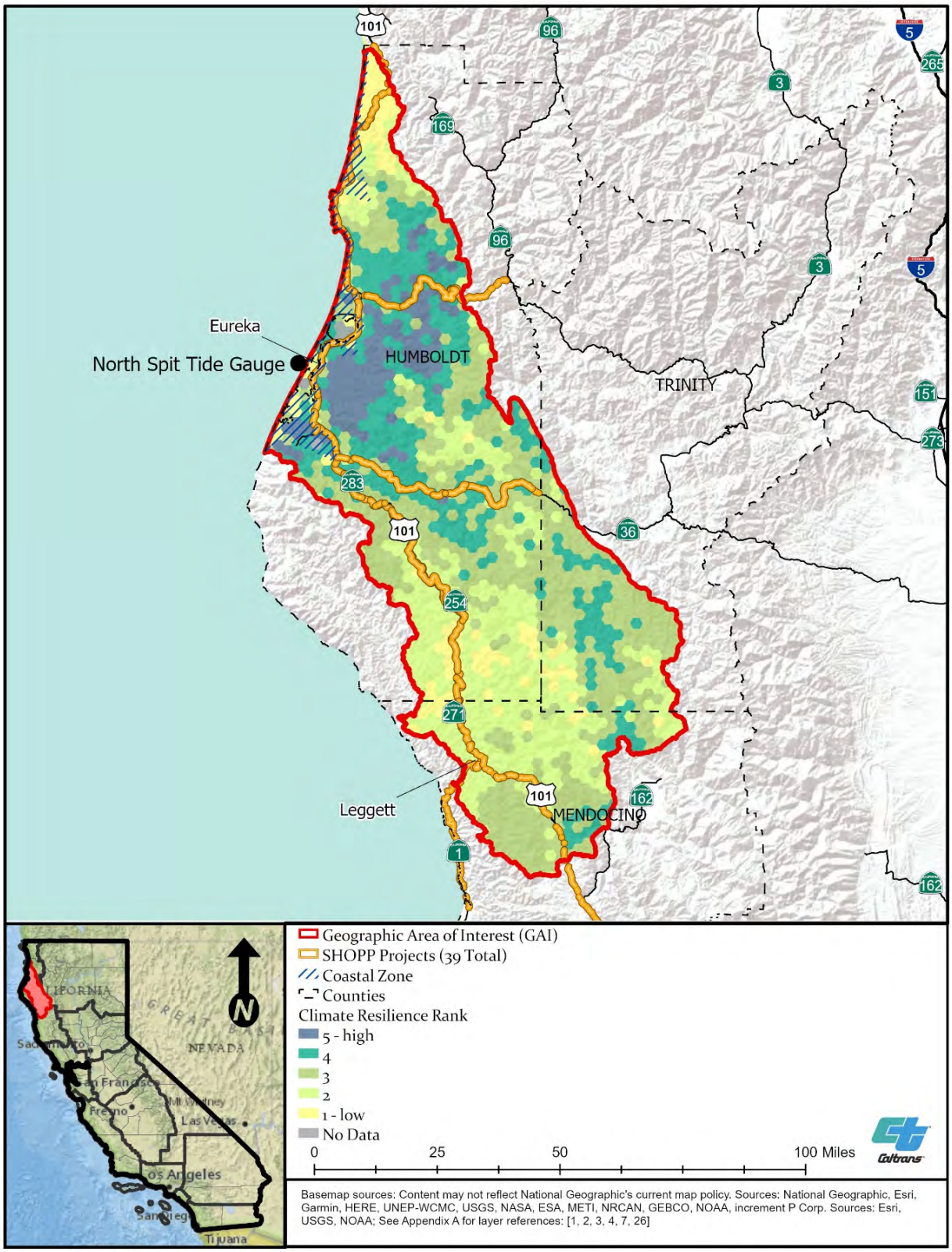
Local relative sea-level trends based on tide gauge measurements from 1977 to 2019 indicate that sea levels along the coast of the GAI have risen at a rate equivalent to 1.65 feet in 100 years (National Oceanic and Atmospheric Administration ["NOAA"] n.d.). Based on the NOAA model for estimated sea-level rise presented in the *Caltrans Climate Change Vulnerability Assessments: District 1 Technical Report*, the area where State Route 255 and US Highway 101 surround Humboldt Bay is one of the most vulnerable sections for the SHS in terms of exposure to inundation and flooding caused by storm surge events (Caltrans 2019c).

2.5.3. Climate Resiliency

A climate change-resilient natural community area is a terrestrial location expected to remain stable in the face of climate change (CDFW 2018a). The predicted resilience of the GAI to effects resulting from climate change was acquired from CDFW's Areas of Conservation Emphasis ("ACE," version 3) terrestrial climate change resilience dataset. This dataset consists of the modeled probability that a given terrestrial location may function as a plant or wildlife refugium from climate change, meaning that it would be relatively buffered from the effects of climate change, conditions would likely remain suitable for plants and wildlife currently residing in the area, and ecological functions would be more likely to remain intact. The ACE dataset combines climate refugia model results from eight future climate scenarios based on different combinations of global climate models, emissions scenarios, and time horizons. The eight scenarios assessed included two potential future climates—both a hotter and drier future and a warmer and wetter future; two future carbon dioxide ("CO_2") scenarios—one with no reductions in CO_2 emissions and one with a peak in 2040 followed by a significant decline in CO_2 emissions; and two 29-year time intervals—2040 to 2069 and 2070 to 2099. Terrestrial locations were assigned climate resilience ranks ranging from 1 (low resilience or low probability that the terrestrial location will contain climate refugia) to 5 (high resilience or high probability that the terrestrial location will contain climate refugia) (CDFW 2018a).

Resiliency is an important consideration when establishing compensatory mitigation. The terrestrial climate change resilience rank from the ACE dataset (CDFW 2018a) is presented on Figure 2-8. There is a clear pattern of low resilience in the extreme northern coastal and interior southern portions of the GAI, to areas with moderate to high resilience in the central portion of the northern half of the GAI.

Figure 2-8. Terrestrial Climate Resilience Rankings



2.6 Land Cover Types

General land cover types and the subecoregions in which they occur are depicted on the maps provided in Appendix C. Land cover types in the GAI were extracted from the SAMNA, which developed its vegetation data layer by merging CDFW's California Wildlife Habitat Relationships ("CWHR") Vegetation Classification and Mapping Program GIS database, the USFS Classification and Assessment with LandSat of Visible Ecological Groupings, and the California Department of Forestry and Fire Protection vegetation layer (Caltrans 2017b). Based on these data, tree-dominated habitats account for the largest habitat type, encompassing 80.8 percent of the GAI, with Douglas-fir, redwood, montane hardwood-conifer, and montane hardwood the most common (Table 2-3, Appendix C).

Herbaceous-dominated habitats account for 13.1 percent of the GAI, with annual grassland the most common. Shrub-dominated habitats account for 3.4 percent of the GAI, with coastal scrub the most common. Developed habitats and non-vegetated habitat types (barren areas) combined account for 2.0 percent of the GAI, with cropland the most common. Aquatic habitats account for 0.7 percent of the GAI, with riverine the most common. Land cover is generally shown on Figure 2-9.

Table 2-3. Land Cover Types in the GAI

CWHR Habitat Type	Acres[a]	Cover as Percentage of GAI[b]
Tree-dominated Habitats	**1,708,821**	**80.82**
Blue Oak Woodland	15	<0.01
Blue Oak-Foothill Pine	8,392	0.40
Closed-Cone Pine-Cypress	1,180	0.06
Coastal Oak Woodland	5,658	0.27
Douglas-Fir	455,758	21.56
Eucalyptus	77	<0.01
Jeffrey Pine	1,945	0.09
Klamath Mixed Conifer	5,781	0.27
Montane Hardwood	333,383	15.77
Montane Hardwood-Conifer	395,610	18.71
Montane Riparian	23,114	1.09
Ponderosa Pine	4,692	0.22
Red Fir	766	0.04
Redwood	398,447	18.84
Sierran Mixed Conifer	55,265	2.61
Valley Foothill Riparian	123	<0.01

CWHR Habitat Type	Acres[a]	Cover as Percentage of GAI[b]
Valley Oak Woodland	307	0.01
White Fir	18,308	0.87
Shrub-dominated Habitats	**71,317**	**3.37**
Alpine Dwarf-Shrub	11	<0.01
Chamise-Redshank Chaparral	1979	0.09
Coastal Scrub	39,935	1.89
Mixed Chaparral	17,176	0.81
Montane Chaparral	12,216	0.58
Herbaceous-dominated Habitats	**276,888**	**13.10**
Annual Grassland	237,042	11.21
Fresh Emergent Wetland	6	<0.01
Pasture	36,091	1.71
Perennial Grassland	2,729	0.13
Saline Emergent Wetland	963	0.05
Wet Meadow	57	<0.01
Aquatic Habitats	**15,335**	**0.72**
Lacustrine	3,203	0.15
Marine	38	<0.01
Riverine	12,094	0.57
Developed Habitats	**21,184**	**1.01**
Cropland	14,278	0.68
Urban	6,900	0.33
Vineyard	6	<0.01
Non-vegetated Habitats	**20,821**	**0.98**
Barren	20,821	0.98
Total	**2,114,366**	**100%**

Source: Caltrans 2017b
[a] Numbers were rounded to the nearest whole number.
[b] Numbers were rounded to the hundredths.

Figure 2-9. Major Land Cover[a]

[a] For greater detail, see Appendix C.

2.7 Invasive Species

Both invasive plant and animal species are known to occur in the GAI. Invasive species include plants and animals that are not native to an area, typically have high growth and reproductive rates, and are able to outcompete native plants and animals, often because of a lack of natural predators or controls (FWS 2012; National Wildlife Federation 2019). Invasive species may affect native species, including special-status species, by directly competing for resources, preying on native species, introducing or spreading diseases, reducing the complexity and biodiversity of ecosystems, altering soil chemistry and water availability, and increasing wildfire potential (FWS 2012).

Three entities maintain invasive species databases for California. The Invasive Species Council of California maintains a list of invasive plant and animal species throughout the state of California (California Invasive Species Advisory Committee 2010). The California Department of Food and Agriculture also maintains a list of noxious weeds for California (USDA Natural Resources Conservation Service 2003). The California Invasive Plant Council ("Cal-IPC") maintains a California invasive plant inventory that categorizes nonnative plant species based on the severity of their potential ecological impacts (Cal-IPC 2020).

Nonnative invasive plant pathogens occur in the GAI. The pathogen that causes sudden oak death (*Phytophthora ramorum*), a water mold, is particularly problematic in north coast redwood forests and has killed millions of oaks and tanoaks (*Lithocarpus densiflorus*) along the California coast (California Oak Mortality Task Force 2019; CDFW 2015). This pathogen infests a range of shrub and tree host species, causing branch and shoot dieback and leaf spots. It spreads aerially by wind and can survive in infested plant material, litter, soil, and water (Goheen et al. 2006).

In the GAI, invasive plant species have been specifically identified as threats or stressors to terrestrial and aquatic biological resources. They can also increase fire hazards in a community that is not dependent on or adapted to large or frequent fires (CDFW 2018b). Nonnative, invasive plant species with a high ranking by Cal-IPC are those that have the most severe ecological effects and are the most widely distributed geographically, although species with a moderate or limited ranking can also have negative local ecological effects. Invasive plant species that are identified as problematic for the Northern California Coast and Northern California Coast Ranges Sections in the SWAP include but are not limited to barb goatgrass (*Aegilops triuncialis*), yellow starthistle (*Centaurea solstitialis*), spotted knapweed (*Centaurea stoebe* ssp. *micranthos*), jubatagrass (*Cortaderia jubata*), pampasgrass (*Cortaderia selloana*), Scotch broom (*Cytisus scoparius*), medusahead (*Elymus caput-medusae*), and perennial pepperweed (*Lepidium latifolium*) (CDFW 2015). Additional invasive plant species that occur in the GAI include tree-of-heaven (*Ailanthus altissima*), European beachgrass (*Ammophila arenaria*), giant reed (*Arundo donax*), Sahara mustard (*Brassica tournefortii*), red brome (*Bromus madritensis* ssp. *rubens*), cheatgrass (*Bromus tectorum*), highway iceplant (*Carpobrotus edulis*), Cape-ivy (*Delairea odorata*), Brazilian waterweed (*Egeria densa*), purple veldtgrass (*Ehrharta calycina*), water hyacinth (*Eichhornia crassipes*), English ivy

(*Hedera helix*), water primrose (*Ludwigia hexapetala* and *L. peploides*), water-milfoil (*Myriophyllum aquaticum* and *M. spicatum*), Himalayan blackberry (*Rubus armeniacus*), dense-flowered cordgrass (*Spartina densiflora*), Spanish broom (*Spartium junceum*), and tamarisk or saltcedar (*Tamarix* spp.) (Cal-IPC 2020; CDFW 2015).

Nonnative animals that are/may be present in the GAI and that can negatively affect aquatic species include New Zealand mudsnails (*Potamopyrgus antipodarum*), quagga mussels (*Dreissena bugensis*), zebra mussels (*Dreissena polymorpha*), Asian clams (*Corbicula fluminea*), Chinese mystery snails (*Cipangoludina chinensis malleata*), nutria (*Myocastor coypus*), smallmouth bass (*Micropterus dolomieu*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), American bullfrog (*Rana catesbiana*), and red swamp crayfish (*Procambarus clarkia*) (CDFW 2015; NPS 2017). Introduced nonnative animals such as bullfrogs, crayfish, and fish can negatively affect foothill yellow-legged frogs (*Rana boylii*) and other aquatic species through competition for food resources, acting as disease vectors, and predation (Hayes et al. 2016). Nonnative animals that are/may be present in the GAI and that can negatively affect terrestrial wildlife through competition, predation, or parasitism include barred owls (*Strix varia*), feral pigs (*Sus scrofa*), European starlings (*Sturnus vulgaris*), wild turkeys (*Meleagris gallopavo*), and brownheaded cowbirds (*Molothrus ater*) (CDFW 2015). Invasive animal species that are/may be associated with urban areas include common ravens (*Corvus corax*), domestic dogs (*Canis lupus familiaris*), domestic cats (*Felis catus*), Argentine ants (*Linepithema humile*), and fire ants (*Solenopsis* sp.) (CDFW 2015; NPS 2017). Common raven is native to California, but is considered a subsidized predator, benefiting from urbanization and human-altered habitats to increase its range.

2.8 Special-status Species

Special-status species known to occur or with the potential to occur in the GAI were extracted from the SAMNA Reporting Tool's species-attributed vegetation data layer, which was developed using the CWHR (CDFW 2019a), the Jepson Herbarium's floristic province layer, CDFW's RareFind 5 database (CDFW 2019b), and other information (Caltrans 2019b). Special-status species include those that are considered federally and/or state threatened or endangered species, state candidate threatened or endangered species, state fully protected species, state species of concern, state rare species, and federal sensitive species (which includes species that are USFS sensitive and/or BLM sensitive). The species-attributed list developed for the SAMNA Reporting Tool depends on a species having a defined geographic range or having occurrences documented in the California Natural Diversity Database (Caltrans 2019b); although it is the best information currently available, the SAMNA Reporting Tool's species list highlights the uncertainties in this foundational information.

Threatened and endangered fish species with the potential to occur in the GAI are discussed in Section 2.17.4, and special-status terrestrial species are summarized below. Based on a search of the SAMNA Reporting Tool's species-attributed vegetation layer,

50 non-fish special-status species are known to occur or have the potential to occur in the portion of the GAI that lies within the Northern California Coast ecoregion and 45 non-fish special-status species are known to occur or have the potential to occur in the portion of the GAI that lies within the Northern California Coast Ranges ecoregion. The numbers of these special-status species by habitat type are shown in Tables 2-4 and 2-5 for the Northern California Coast and Northern California Coast Ranges ecoregions, respectively. Based on a review of the known ranges and occurrence data for special-status species identified from the SAMNA Reporting Tool's species-attributed vegetation layer, none of the special-status invertebrate or reptile species in Appendix E have the potential to occur in the Northern California Coast or Northern California Coast Ranges Ecoregion Sections. Because a species may use more than one habitat, the numbers are not additive.

The complete SAMNA results for terrestrial species by habitat type are provided in Appendix E. As described in Appendix E, for subspecies that do not have documented home ranges, the SAMNA results are provided at the species level. Also footnotes are included for those special-status subspecies that do not have the potential to occur in the GAI. Note that although SAMNA results are suitable for advance mitigation project scoping, establishing compensatory mitigation credits approved by one or more natural resource regulatory agency requires site-specific studies.

Table 2-4. Number of Potentially Occurring Special-status Species, by Land Cover Type – Northern California Coast Ecoregion Section in the GAI

Land Cover Type	Cover as Percentage of GAI	Plants	Invertebrates	Amphibians	Reptiles	Birds	Mammals
Tree-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Coastal Oak Woodland	0.27	0	0	2	0	10	7
Douglas-Fir	21.56	0	0	4	0	10	11
Eucalyptus	<0.01	0	0	2	0	12	7
Montane Hardwood	15.77	3	0	2	0	11	7
Montane Hardwood-Conifer	18.71	2	0	4	0	12	10
Montane Riparian	1.09	0	0	4	0	13	9
Ponderosa Pine	0.22	0	0	2	0	11	8
Redwood	18.84	0	0	4	0	12	11
Sierran Mixed Conifer	2.61	0	0	2	0	10	8
Shrub-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Coastal Scrub	1.89	3	0	3	0	10	7
Herbaceous-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Annual Grassland	11.21	3	0	2	0	12	6
Perennial Grassland	0.13	0	0	1	0	10	7
Saline Emergent Wetland	0.05	0	0	0	0	8	0
Aquatic Habitats	See below	See below	See below	See below	See below	See below	See below
Lacustrine	0.15	0	0	1	0	8	3
Riverine	0.57	0	0	4	0	7	5

Land Cover Type	Cover as Percentage of GAI	Plants	Invertebrates	Amphibians	Reptiles	Birds	Mammals
Developed Habitats	See below	See below	See below	See below	See below	See below	See below
Pasture	1.71	0	0	0	0	4	7
Urban	0.33	0	0	0	0	10	4
Non-vegetated Habitats	See below	See below	See below	See below	See below	See below	See below
Barren	0.98	0	0	0	0	8	7

Source: Caltrans 2019b

Table 2-5. Number of Potentially Occurring Special-status Species, by Land Cover Type – Northern California Coast Ranges Ecoregion Section in the GAI

Land Cover Type	Cover as Percentage of GAI	Plants	Invertebrates	Amphibians	Reptiles	Birds	Mammals
Tree-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Coastal Oak Woodland	0.27	0	0	3	0	11	7
Douglas-Fir	21.56	0	0	4	0	10	11
Montane Hardwood	15.77	1	0	2	0	10	8
Montane Hardwood-Conifer	18.71	3	0	4	0	10	10
Ponderosa Pine	0.22	0	0	3	0	11	9
Sierran Mixed Conifer	2.61	0	0	2	0	10	9
Valley Oak Woodland	0.01	0	0	2	0	9	8
Shrub-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Chamise-Redshank Chaparral	0.09	0	0	1	0	9	8
Mixed Chaparral	0.81	0	0	2	0	10	7

Land Cover Type	Cover as Percentage of GAI	Plants	Invertebrates	Amphibians	Reptiles	Birds	Mammals
Montane Chaparral	0.58	0	0	1	0	8	7
Herbaceous-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Annual Grassland	11.21	1	0	2	0	9	7
Aquatic Habitats	See below	See below	See below	See below	See below	See below	See below
Riverine	0.57	0	0	3	0	4	5
Developed Habitats	See below	See below	See below	See below	See below	See below	See below
Cropland	0.68	0	0	0	0	0	0
Urban	0.33	0	0	0	0	8	4
Non-vegetated Habitats	See below	See below	See below	See below	See below	See below	See below
Barren	0.98	0	0	0	0	6	6

Source: Caltrans 2019b

2.9 Critical Habitat

FWS and NMFS regulate impacts on critical habitat under the ESA. The ESA (16 USC § 1531–1544) defines critical habitat for a threatened or endangered species as (i) "specific areas within the geographical area occupied by the species at the time it is listed … on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection;" and (ii) "specific areas outside the geographical area occupied by the species at the time it is listed … upon a determination by the Secretary that such areas are essential for the conservation of the species." Further, the ESA clarifies that critical habitat "shall not include the entire geographical area which can be occupied by the threatened or endangered species." Critical habitat designations reflect a rigorous process. Before publishing the rule finalizing the critical habitat designation, FWS publishes proposals to designate critical habitat in the *Federal Register* and considers information received during the public comment period (FWS 2017a).

The GAI includes federally designated final critical habitat for 10 species (FWS 2019; NMFS 2019a):

- California Coastal ESU Chinook salmon (*Oncorhynchus tshawytscha*)
- eulachon (*Thaleichthys pacificu*s)
- Kneeland Prairie penny-cress (*Noccaea fendlerI* ssp. *californica*)
- marbled murrelet (*Brachyramphus marmoratus*)
- Northern California Coast DPS steelhead
- northern spotted owl (*Strix occidentalis caurina*)
- Southern DPS green sturgeon (*Acipenser medirostris*)
- SONCC ESU coho salmon[1]
- tidewater goby (*Eucyclogobius newberryi*)
- western snowy plover (*Charadrius alexandrinus nivosus*)

Critical habitat is an important consideration when establishing compensatory mitigation. Designated critical habitat for these species is indicated on Figure 2-10. Note that designated critical habitat represented by points on Figure 2-10 are units too small to depict at the regional level assessed in this RAMNA.

[1] NMFS has not released maps of the designated critical habitat for SONCC ESU coho salmon. Therefore, designated critical habitat for this species is not shown on Figure 2-10.

Figure 2-10. Designated Critical Habitat

2.10 Essential Fish Habitat

NMFS is responsible for ensuring impacts on essential fish habitat ("EFH") are addressed (NMFS 2019b). EFH was defined by Congress in 1996 in an amendment to the Magnuson-Stevens Fishery Conservation and Management Act. EFH covers federally managed fish and invertebrate species that are not found strictly in freshwater and includes all aquatic habitat types where fish spawn, breed, feed, or grow to maturity (NMFS 2017). Habitat types include coral reefs, kelp forests, bays, wetlands, rivers that connect to the ocean, and deep ocean habitat. EFH is protected by imposing fishing limitations and requiring consultation with NMFS prior to any federal work with the potential to affect fish habitat. NMFS designates EFH for sharks, tuna, and other migratory species that cross regional boundaries. Habitat for other managed fish species is determined by regional fishery management councils (NMFS 2017). The GAI includes EFH for Chinook and coho salmon (Figure 2-11).

2.11 Connectivity

Roads can be barriers to special-status wildlife species movement and block migration and access to and from suitable upstream habitat for special-status fish species. Improving habitat connectivity and permeability of the SHS may provide a mechanism for maintaining biodiversity in the face of California's human population growth and climate change (CDFW 2020).

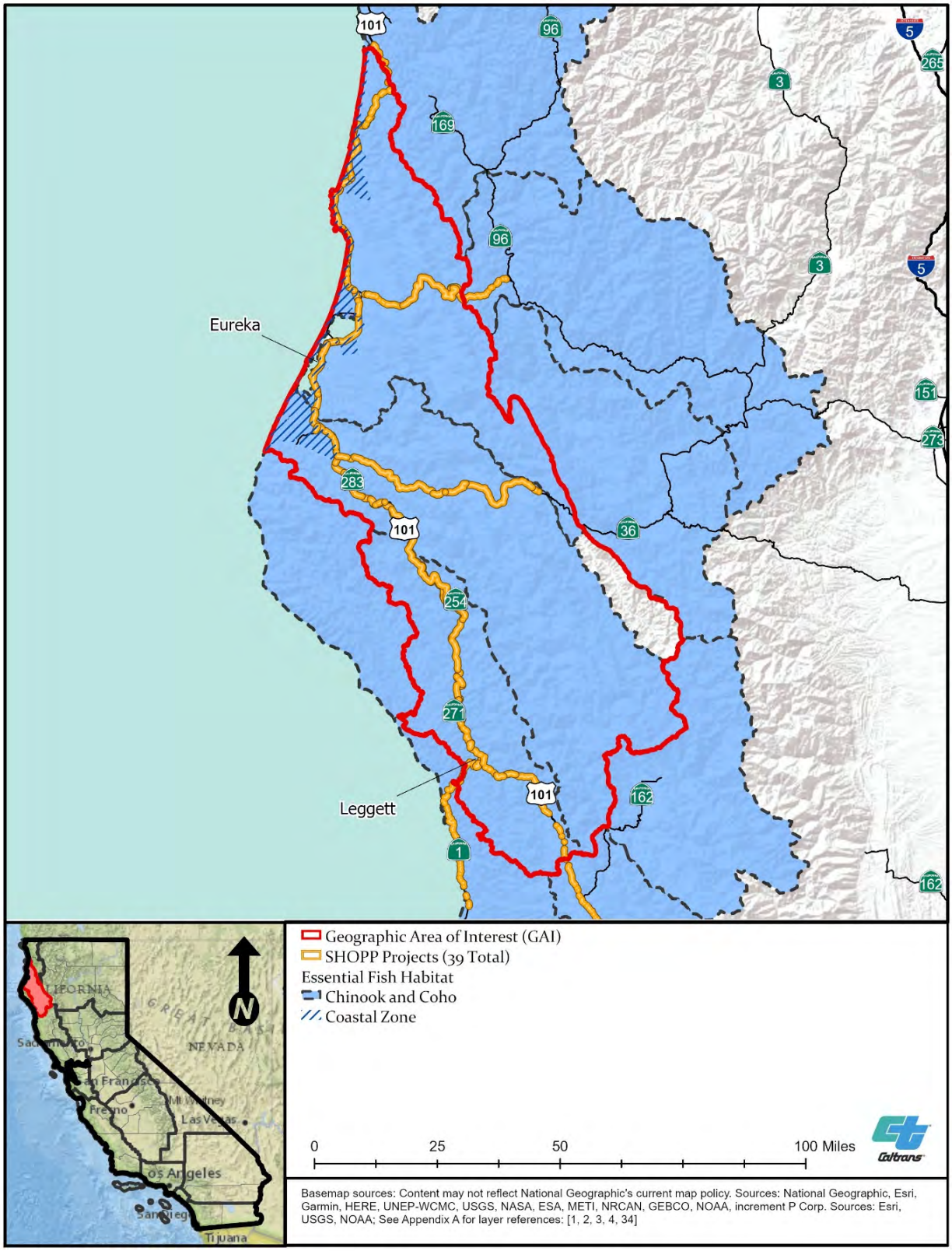
2.11.1. Wildlife Movement

Caltrans identified three connectivity assessments applicable and relevant to the GAI: California Essential Habitat Connectivity ("CEHC") Project, ACE, and CDFW's Wildlife Barriers Report. Each is briefly summarized below.

California Essential Habitat Connectivity

The CEHC Project, a statewide assessment commissioned by CDFW and Caltrans, identified large remaining blocks of intact habitat or natural landscape that support native biodiversity and modeled linkages or essential connectivity areas between them that need to be maintained, particularly as corridors for wildlife (CDFW 2018c; Spencer et al. 2010). These connectivity areas were broadly defined, focusing on ecological integrity rather than species-specific habitat needs, and also included potential riparian connections between landscape blocks. For instance, connectivity areas were selected to connect existing reserves across land that has been highly altered and fragmented by agriculture, urbanization, and roads, which typically constrain wildlife movement (Spencer et al. 2010).

Figure 2-11. Essential Fish Habitat



CDFW's Areas of Conservation Emphasis

CDFW's ACE version 3 terrestrial connectivity dataset builds on the CEHC Project and includes mapped corridors or linkages and where they occur in relation to large, contiguous natural areas (Figure 2-12). It also incorporates species-specific, fine-scale linkage information developed at a regional scale, where available, and includes areas that were not evaluated by the CEHC Project. Connectivity ranks in the terrestrial connectivity dataset were assigned as follows:

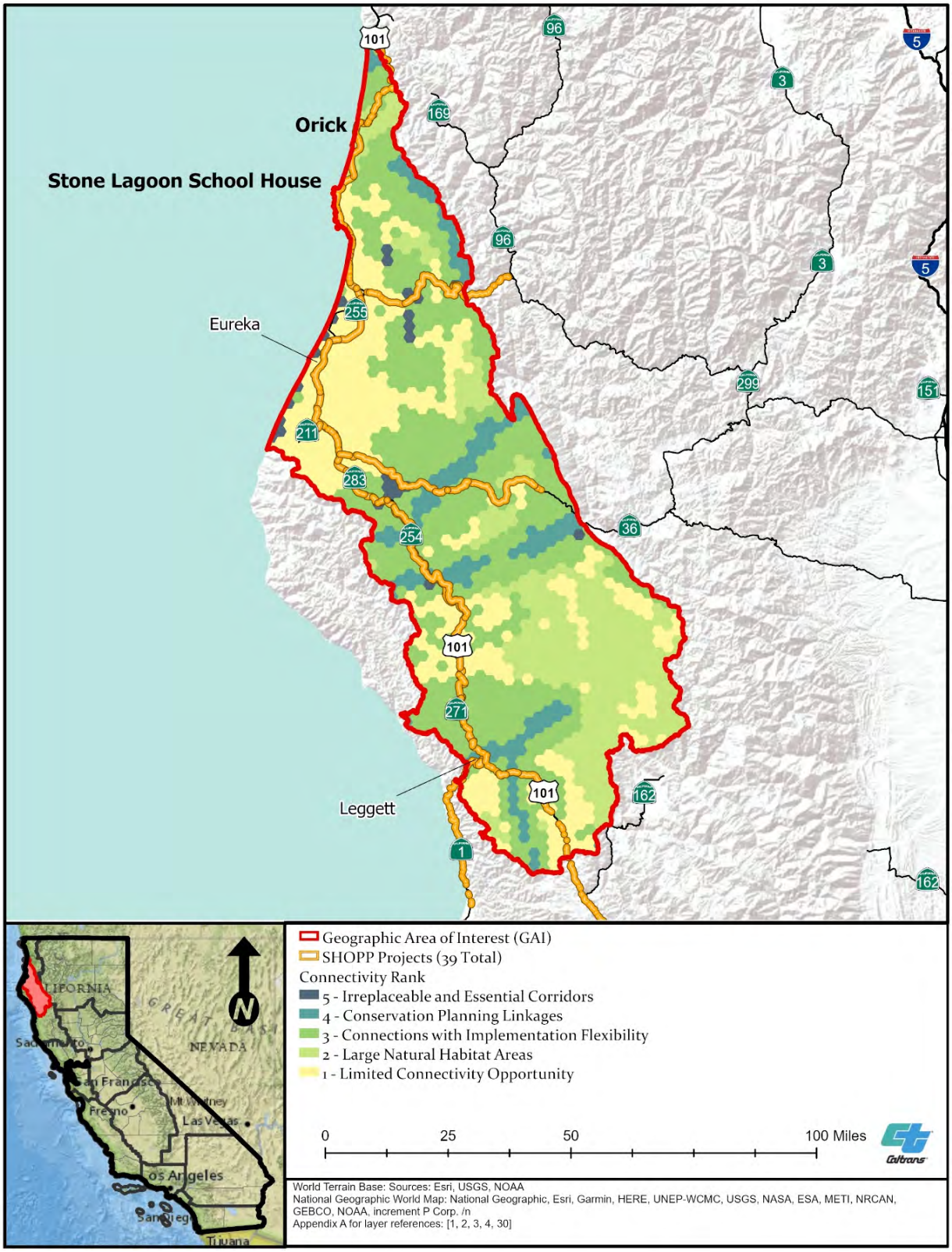
- Rank 5 (irreplaceable and essential corridors) – includes channelized areas and priority species movement corridors
- Rank 4 (conservation planning linkages) – habitat connectivity linkages mapped in the CEHC and fine-scale regional connectivity studies that are based on species-specific models and represent the best connections between core natural areas
- Rank 3 (connections with implementation flexibility) – areas with connectivity importance, including core habitat areas and areas on the periphery of mapped habitat linkages
- Rank 2 (large natural habitat areas) – large blocks of natural habitat (greater than 2,000 acres) with relatively intact connectivity
- Rank 1 (limited connectivity opportunity) – areas where land use limits connectivity, including some lakes

The GAI includes areas with rank 2, primarily in interior ranges. Areas with ranks 4 or 5 provide east-to-west movement in the central part of the GAI and north-to-south movement in the northern and southern parts of the GAI. Most of the planned SHOPP transportation projects occur in areas with a connectivity rank of 3 or 1, with fewer projects occurring in areas with a connectivity rank of 4 or 5 (Figure 2-12).

CDFW's 2020 Wildlife Barriers Report

CDFW's 2020 wildlife barriers report identified priority wildlife movement barriers created by linear infrastructure across the state to help focus financial resources to improve wildlife movement (CDFW 2020). In addition to impeding wildlife movement, these barriers act as sources of mortality and affect population demographics, gene flow, resilience, and persistence of California's wildlife. Barriers were identified using existing connectivity and road crossing studies, collared-animal movement data, roadkill observations, and professional expertise. The only priority wildlife movement barrier identified in the GAI is State Route 101 between the Stone Lagoon School ("Little Red School House") and the town of Orick. The target species for movement for this barrier are elk, mule deer, and mesocarnivores (CDFW 2020).

Figure 2-12. Terrestrial Connectivity



2.11.2. Fish Passage

Article 3.5 of Chapter 1 of Division 1 of the SHC, also known as Senate Bill 857 (Kuehl, Chapter 589 and Statute of 2005), prohibits the new construction or continued maintenance repair of SHS facilities that prevent or impede the passage of salmon and steelhead. The majority of salmon and steelhead in California are listed as either threatened or endangered, and barriers on the SHS further block fish from gaining access to upstream habitat.

SHC § 156.1 requires Caltrans to:

1. Provide an annual list of fish passage priorities for the SHS to the legislature. Fish Passage Annual Reports are available on the Caltrans Legislative Affairs website, and the most recent report is available from: https://dot.ca.gov/-/media/dot-media/programs/legislative-affairs/documents/fish-passage-report-final-ada-a11y.pdf.
2. Complete assessments of potential barriers to anadromous fish prior to commencing any transportation project using state or federal transportation funds.
3. Submit assessments to the California Fish Passage Assessment Database.
4. Construct all new transportation projects in a way that does not pose or create a barrier to fish passage.

The CESA and the ESA list 10 ESUs/DPSs of salmon and steelhead as threatened or endangered. Barriers created by the SHS are known to block access to habitat for each of these species units. CDFW, in coordination with CalTrout, estimates that without increased intervention, to include habitat remediation and restoration, the following species will become extinct in California in the next 40 years:

- Three identified species' units currently listed as state and/or federally endangered: Central California Coast ESU coho salmon, Sacramento River winter-run ESU chinook salmon, and southern California Distinct Population Segment (DPS) steelhead.
- Seven identified species currently listed as state and/or federally threatened: SONCC ESU coho salmon; Central Valley spring-run ESU and California Coastal ESU chinook salmon; and Central Valley DPS, Northern California DPS, Central California Coast DPS, and South-Central California Coast DPS steelhead.

Figure 2-13 depicts the six California Fish Passage Advisory Committee ("FishPAC") locations throughout the state. The FishPAC is a partnership between Caltrans, CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, and other local fish passage advocates. The purpose of FishPACs is to cooperatively share science and data related to known fish barriers and to prioritize SHS locations based on high-value habitat recovery.

FishPACs support the implementation of meaningful, long-term fish passage solutions for SHS projects within each FishPAC geographic area. FishPACs recommend technical solutions, explore options for accelerated delivery of transportation projects, and identify

potential funding mechanisms for both new barrier removal projects and the long-term maintenance of existing fish passage facilities for the SHS. Stream simulation designs and full-span solutions to fish passage also consider and incorporate benefits for both terrestrial and wildlife species and can also help to address sediment transport, water temperature, dissolved oxygen, and stream erosion issues.

The FishPACs help advance the desired outcomes of legislative guidance included in the SHC and promote collaborative interjurisdictional solutions. Long-term, full-span fish passage solutions are key to enhancing connectivity for both aquatic and terrestrial species in California's watersheds. Providing access to upstream habitats will help ensure fish populations can respond and adapt to climate change stressors, such as drought, wildfire, sea-level rise, changes in stream flow, and water temperature. The FishPAC network of over 200 fish passage experts, advocates, and partners throughout the range of salmon and steelhead is working collaboratively to address legacy transportation barriers with long-term solutions that facilitate both fish passage and climate resilience.

The FishPAC helps Caltrans advance the desired outcomes of SHC § 156 (J. Walth, Caltrans, personal communication, 2020). In the 14 years since 2006, in collaboration with FishPAC, statewide, Caltrans has partially or fully remediated 51 barriers on the SHS and identified approximately 556 additional barriers to salmon and steelhead. Results of Caltrans' and FishPAC's efforts to locate, assess, prioritize, and remediate fish passage barriers on the SHS are documented in Fish Passage Annual Reports prepared by Caltrans and submitted to the legislature as required by SHC § 156.1. As specified above, the FishPAC also provides SHS-related information to the Fish Passage Assessment Database, to be incorporated into its periodic updates.[2] Information regarding verified SHS fish passage barriers is available through the appropriate FishPAC.

[2] More information about the Fish Passage Assessment Database can be found in CalFish 2018.

Figure 2-13. California Fish Passage Advisory Committee Locations

2.12 Sub-basins

The Watershed Boundary Dataset maps the areal extent of surface water drainage in the U.S. It consists of a hierarchical system of nesting hydrologic units of various scales, each with an assigned HUC that is georeferenced to USGS topographic maps (USGS 2014). Each HUC classification consists of two to eight digits. For example, eight-digit HUCs, or HUC-8s, map to the sub-basin level and six-digit HUCs, or HUC-6s, map to the watershed level.

The SAMNA Reporting Tool expresses the landscape in terms of USGS HUC-8 sub-basins (Caltrans 2017a; USGS 2014). However, the California Department of Water Resources and both the State Water Board and RWQCBs do not exclusively use HUC-8 codes (California Department of Water Resources 2016). The State Water Boards also use hydrologic units ("HUs") for state-level water-related purposes, such as identifying beneficial uses.

Table 2-6 provides a crosswalk between the HUC-8 and HU classification systems for each HUC-8 in the GAI. The GAI consists of the Mad-Redwood, Lower Eel, and South Fork Eel sub-basins, which loosely correspond to the Redwood Creek, Trinidad, Mad River, Eureka Plain, and Eel River HUs (Table 2-6). Figure 2-14 shows the overlap between sub-basins and state-level HUs in the GAI.

Table 2-6. Crosswalk Table of HUC-8 Sub-basins with HUs

HUC-8 #	HUC-8 Name	HUC-8 Acreage[a]	HU #	HU Name	HU Acreage[a]
18010102	Mad-Redwood	1,284,413	107	Redwood Creek	330,877
18010102	Mad-Redwood	1,284,413	108	Trinidad	147,606
18010102	Mad-Redwood	1,284,413	109	Mad River	559,663
18010102	Mad-Redwood	1,284,413	110	Eureka Plain	246,267
18010105	Lower Eel	1,684,039	111	Eel River	2,671,171
18010106	South Fork Eel	752,329	111	Eel River	2,671,171

Source: Caltrans 2017a
[a] Numbers were rounded to the nearest whole number.

2.13 Hydrology

The Mad-Redwood, Lower Eel, and South Fork Eel sub-basins of the GAI drain an area of approximately 3,720,782 acres (5,814 square miles) (Table 2-7). These sub-basins in the GAI include 58,128 rivers and streams that traverse 16,454 miles in the North Coast RWQCB boundary (Table 2-7, Figure 2-14).

Table 2-7. Sub-basins in the North Coast RWQCB Boundary within the GAI

Sub-basin Name	Sub-basin Code (HUC-8)	Drainage Area (acres)[a]	Rivers and Streams (count)	Total Reach Length (miles)[a]
Mad-Redwood	18010102	1,284,413	17,896	4,986
Lower Eel	18010105	1,684,039	34,951	8,701
South Fork Eel	18010106	752,329	5,281	2,767
	Total	**3,720,781**	**58,128**	**16,454**

Source: California Department of Water Resources
[a] Numbers were rounded to the nearest whole number.

2.13.1. Mad-Redwood Sub-basin

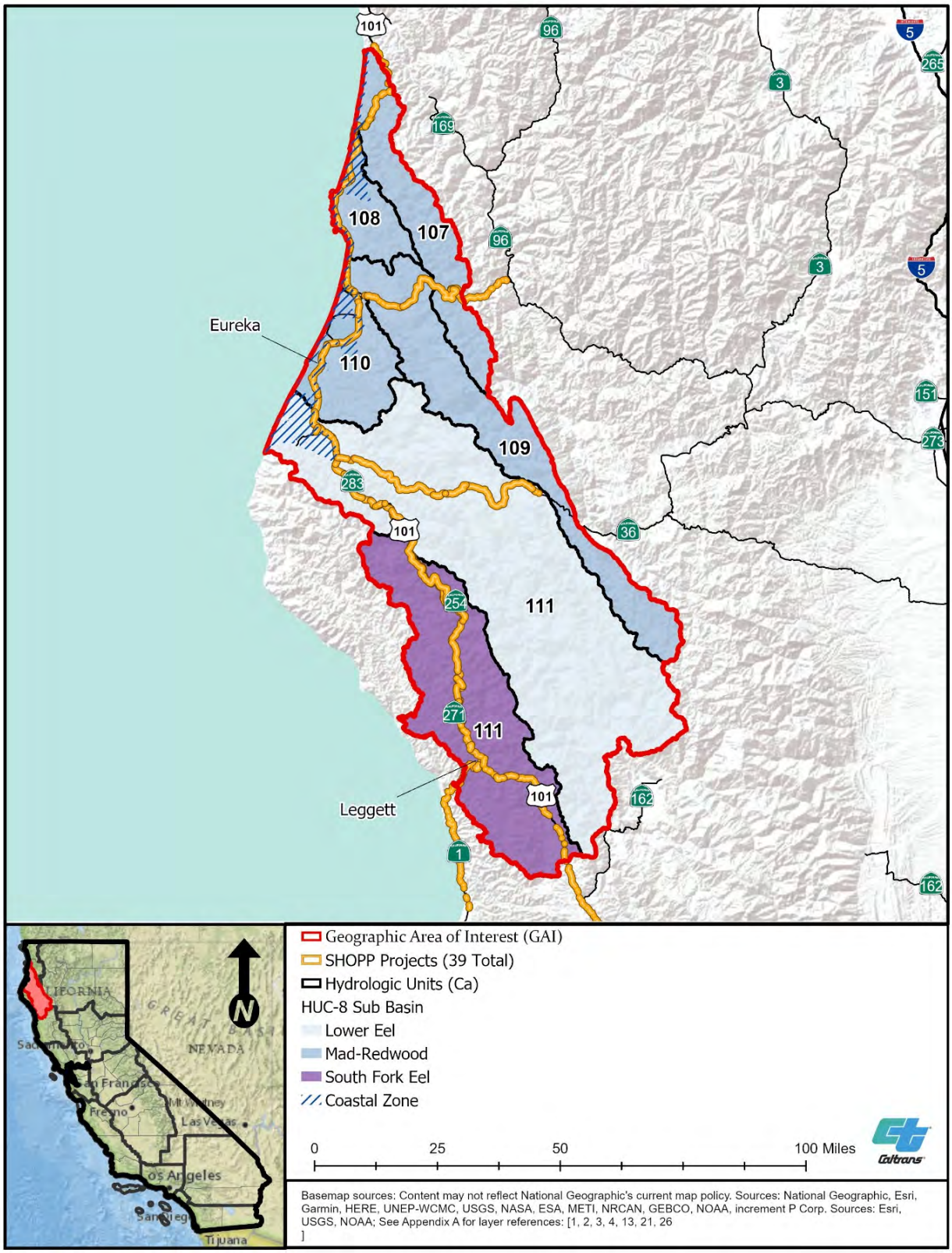
The Mad-Redwood Sub-basin drains an area of approximately 1,284,413 acres (2,007 square miles) and includes 17,896 rivers and streams that traverse 4,986 miles (Table 2-7). The Mad-Redwood Sub-basin includes the Redwood Creek, Trinidad, Mad River, and Eureka Plain HUs (Table 2-6). The average annual runoff for the Mad-Redwood Sub-basin is estimated to be 1,000,000 acre-feet (Humboldt County 2002). Redwood Creek flows for 65 river miles from an elevation of 5,200 feet at its headwaters in a northwesterly direction to the Pacific Ocean at Orick, located approximately 35 miles north of the city of Eureka (North Coast RWQCB 2019). The mainstem of Redwood Creek drops out of the headwaters to become a low-gradient stream with short tributaries coming off the steep hillsides (North Coast RWQCB 2019).

Streamflow averages 255 cubic feet per second ("cfs") near Blue Lake and 1,290 cfs near its outlet to the Pacific Ocean, with streamflow highly variable from year to year and seasonally (Humboldt County 2002).

Trinidad HU. The Trinidad HU includes several small coastal watersheds extending from just south of Redwood Creek to the Mad River. The two largest watersheds in the Trinidad HU, which begin at the foot of the Coast Ranges, are Maple Creek, which extends 18.3 river miles and outlets to the Big Lagoon estuary, and Little River, which extends 19.6 river miles and outlets to the Pacific Ocean 3 miles south of Trinidad (Humboldt County 2002; North Coast RWQCB 2017a). This HU includes two other coastal lagoons—Freshwater Lagoon, which is effectively cut off from the Pacific Ocean by State Route 101, and Stone Lagoon (North Coast RWQCB 2017a).

Mad River HU. Within the Mad River HU, the Mad River flows from the headwaters at an elevation of approximately 6,070 feet for 100 river miles in a northwesterly direction and empties into the Pacific Ocean north of Humboldt Bay, which is the largest estuary along the California coast north of San Francisco (Humboldt County 2002; North Coast RWQCB 2017b). Average flows in the Mad River range from less than 300 cfs to up to 81,000 cfs during flood events (Humboldt County 2002). Discharge ranges from 45 cfs in late summer to 3,646 cfs in midwinter, with a mean discharge of 1,381 cfs (Humboldt County 2002).

Figure 2-14. HUC-8 Sub-basins and HUs



Eureka Plain HU. The Eureka Plain HU includes the Jacoby, Freshwater, and Salmon Creeks and Elk River watersheds that begin in the coastal foothills to the east and drain in a northwesterly direction through the coastal plain and into Arcata Bay (Jacoby and Freshwater Creeks) and Humboldt Bay (Salmon Creek and Elk River) (Humboldt County 2002; North Coast RWQCB 2017c). Average maximum flow at the Jacoby Creek inlet is 737 cfs, with a range of peaks from 380 cfs and 2,510 cfs (Humboldt County 2002).

2.13.2. Lower Eel Sub-basin

The Lower Eel Sub-basin drains an area of approximately 1,684,039 acres (2,631 square miles) and includes 34,951 rivers and streams that traverse 8,701 miles (Table 2-7). The Lower Eel Sub-basin includes seven major branches of the Eel River in the Eel River HU: the Upper Mainstem Eel River, Middle Mainstem Eel River, Lower Mainstem Eel River, North Fork Eel River, Middle Fork Eel River, South Fork Eel River, and Van Duzen River. Surface water from these branches of the Eel River, with headwaters at elevations ranging from 6,000 to 8,000 feet, cuts through mountainous terrain, flows in a northwesterly direction through alluvial valleys and the coastal plain, and outlets to the Pacific Ocean at Ferndale, south of Humboldt Bay (EPA 1999, 2007). The mean annual discharge for the Eel River is approximately 6 million acre-feet (Humboldt County 2002). Discharges typically range from 145 cfs in September to 19,560 cfs in February (Humboldt County 2002).

2.13.3. South Fork Eel Sub-basin

The South Fork Eel Sub-basin drains an area of approximately 752,329 acres (1,176 square miles) and includes 5,281 rivers and streams that traverse 2,767 miles (Table 2-7). The South Fork Eel Sub-basin includes the South Fork Eel River in the Eel River HU. Surface water from the South Fork Eel River flows northward nearly 100 river miles through mountainous terrain, joining the Eel River near Weott (Humboldt County 2002; EPA 1999, 2007).

2.14 Flood Hazard Areas

As designated by the Federal Emergency Management Agency, a Special Flood Hazard Area is defined as the area of land that is covered by the floodwaters of a 100-year base flood (Federal Emergency Management Agency 2019). In accordance with Executive Order 11988, all federally approved projects that encroach into a 100-year base floodplain must try to:

- Avoid support of incompatible floodplain development,
- Minimize the impact of highway actions that adversely affect the base floodplain,
- Restore and preserve natural and beneficial floodplain values, and
- Be consistent with the standards/criteria of the National Flood Insurance Program of the Federal Emergency Management Agency (Caltrans 2015).

Flood hazard areas in the GAI are shown on Figure 2-15. Waterbodies associated with most of the flood hazard risk in the GAI include Arcata Bay, Redwood Creek, Eel River, and Mad River. This information is important for scoping advance mitigation projects and

transportation projects undertaken within the GAI, which will need to comply with Executive Order 11988.

2.15 Water Quality

Water quality objectives for surface waters and groundwater in the GAI are provided in the *Water Quality Control Plan for the North Coast Region* ("Basin Plan"; North Coast RWQCB 2018). Water quality objectives identified in the Basin Plan can be numerical or narrative. For example, the "chemical constituents" water quality objective for the protection of aquatic life and human health consists of federal water quality criteria for toxic "priority pollutants" under the California Toxics Rule (40 CFR § 131.38) and National Toxics Rule (40 CFR § 131.36). In contrast, the water quality objective for taste and odor is narrative. Undesirable tastes and odors in water are an aesthetic nuisance and can indicate the presence of other pollutants.

Surface water and groundwater beneficial uses are also identified in the Basin Plan (North Coast RWQCB 2018). If it cannot be avoided, a waterbody's beneficial uses may be affected by the construction, operation, and maintenance of highways and bridges. Impacts on wildlife and aquatic resources can be adverse or beneficial. An example of an adverse impact would be the introduction of a variety of pollutants, including sediments, heavy metals, hydrocarbons, and toxic substances (EPA 2005). An example of a beneficial impact would be repairs or retrofits that improve permeability or flows. Hence, this RAMNA considers beneficial uses identified for waterbodies located in the GAI relevant to the RAMNA when they support the preservation and enhancement of wildlife habitat and aquatic resources and are consistent with the AMP's objective to protect natural resources through transportation project mitigation (Table 2-8).

Figure 2-15. Flood Hazard Areas

Table 2-8. Beneficial Uses in the GAI

Beneficial Use	North Coast Basin Plan	Relevant to RAMNA?[a]
Agricultural Supply	Applicable	No
Aquaculture	Applicable	No
Cold Freshwater Habitat	Applicable	Yes
Commercial and Sport Fishing	Applicable	No
Estuarine Habitat	Applicable	Yes
Flood Peak Attenuation/Flood Water Storage	Applicable	Yes
Freshwater Replenishment	Applicable	Yes
Groundwater Recharge	Applicable	Yes
Hydropower Generation	Applicable	No
Industrial Process Supply	Applicable	No
Industrial Service Supply	Applicable	No
Inland Saline Water Habitat	Applicable	Yes
Marine Habitat	Applicable	Yes
Migration of Aquatic Organisms	Applicable	Yes
Municipal and Domestic Supply	Applicable	No
Native American Culture	Applicable	No
Navigation	Applicable	No
Non-Contact Water Recreation	Applicable	No
Preservation of Areas of Special Biological Significance	Applicable	Yes
Rare, Threatened, or Endangered Species	Applicable	Yes
Shellfish Harvesting	Applicable	No
Spawning, Reproduction, and/or Early Development	Applicable	Yes
Subsistence Fishing	Applicable	No
Warm Freshwater Habitat	Applicable	Yes
Water Contact Recreation	Applicable	No
Water Quality Enhancement	Applicable	Yes
Wetland Habitat	Applicable	Yes
Wildlife Habitat	Applicable	Yes

Source: North Coast RWQCB 2018
[a] Beneficial uses are relevant to the RAMNA when they support the preservation and enhancement of wildlife habitat and aquatic resources and are consistent with the AMP's objective to protect natural resources through transportation project mitigation.

Through habitat and other improvements, advance mitigation projects have the potential to contribute to compliance with the State Water Board CWA Section 303(d) List of Total Maximum Daily Load ("TMDL") Priority Schedule. For example, fish passage projects in impaired watersheds that increase road/stream crossing capacity, improve the alignment of the crossing, or implement weirs, baffles, or other grade/velocity control devices at undersized road/stream crossings will improve sediment transport and reduce scour, thereby improving water quality. Similarly, culvert replacement projects that increase flow and capacity would also reduce scour and improve sediment transport, resulting in improved channel function and flow and improved water quality.

The CWA Section 303(d) list of impaired waters includes 25 waterbodies in the GAI (State Water Board 2018). This RAMNA considers a waterbody's CWA Section 303(d) impairment designation as relevant to the RAMNA when it is indicative of a waterbody's loss of a relevant aquatic resource-related beneficial use (Table 2-8). These waterbodies, their impairments, and whether TMDLs have been established are provided in Table 2-9. A RWQCB may need to consult with CDFW or other natural resource regulatory agencies to determine whether a beneficial use may be affected by a water quality-related decision.

Table 2-9. Impaired Waters in the GAI

Sub-basin	Impaired Water	Impairment(s)	TMDL Status	Relevant to RAMNA?[a]
Mad-Redwood	Clam Beach (near Strawberry Creek)	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Clam Beach (near Mad River mouth)	Fecal indicator bacteria	Required, not established yet	No
Lower Eel	Eel River, main stem	Aluminum	Required, not established yet	Yes
Lower Eel	Eel River, main stem	Sedimentation/siltation, water temperature	Being addressed with EPA-approved TMDL	Yes
Mad-Redwood	Freshwater Creek	Sedimentation/siltation	Required, not established yet	Yes
Mad-Redwood	Gannon Slough (Campbell Creek)	Fecal indicator bacteria	Required, not established yet	
Mad-Redwood	Humboldt Bay	Dioxin toxic equivalents, polychlorinated biphenyls	Required, not established yet	Yes
Mad-Redwood	Jacoby Creek watershed	Sediment	Required, not established yet	Yes
Mad-Redwood	Jolly Giant Creek	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Little River	Fecal indicator bacteria	Required, not established yet	No

Sub-basin	Impaired Water	Impairment(s)	TMDL Status	Relevant to RAMNA?[a]
Lower Eel	Lower Eel	Aluminum, dissolved oxygen	Required, not established yet	Yes
Lower Eel	Lower Eel	Sedimentation/siltation, water temperature	Being addressed with EPA-approved TMDL	Yes
Mad-Redwood	Lower Elk River and Martin Slough	Fecal indicator bacteria, sediment	Required, not established yet	Yes
Lower Eel	Lower North Fork Eel River	Sedimentation/siltation, water temperature	Being addressed with EPA-approved TMDL	Yes
Mad-Redwood	Luffenholtz Beach	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Mad River	Sedimentation/siltation, turbidity	Being addressed with EPA-approved TMDL	Yes
Mad-Redwood	Mad River	Aluminum, water temperature	Required, not established yet	Yes
Mad-Redwood	Moonstone County Park	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Norton Creek	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Old Home Beach	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Redwood Creek	Sedimentation/siltation	Being addressed with EPA-approved TMDL	Yes
Mad-Redwood	Redwood Creek	Water temperature	Required, not established yet	Yes
Mad-Redwood	Ruth Lake	Mercury	Required, not established yet	Yes
South Fork Eel	South Fork Eel River	Aluminum	Required, not established yet	Yes
South Fork Eel	South Fork Eel River	Sedimentation/siltation, water temperature	Being addressed with EPA-approved TMDL	Yes
Mad-Redwood	Trinidad State Beach	Fecal indicator bacteria	Required, not established yet	No
Mad-Redwood	Upper Elk River	Sedimentation/siltation	Being addressed with EPA-approved TMDL	Yes

Sub-basin	Impaired Water	Impairment(s)	TMDL Status	Relevant to RAMNA?[a]
Mad-Redwood	Upper Little South Fork Elk River	Sedimentation/siltation	Required, not established yet	Yes
Mad-Redwood	Upper North Fork Eel River	Water temperature	Being addressed with EPA-approved TMDL	Yes
Lower Eel	Van Duzen River	Sedimentation/siltation	Being addressed with EPA-approved TMDL	Yes

Sources: North Coast RWQCB 2018; State Water Board 2018
[a] TMDLs relevant to the RAMNA reflect impaired aquatic resource-related beneficial uses.

2.16 Wild and Scenic Rivers

The purpose of the Wild and Scenic Rivers Act of 1968 (16 USC Chapter 28) is to protect and enhance the wild, scenic, and recreational values of designated rivers (National Wild and Scenic Rivers System 2019). Rivers designated under the Wild and Scenic Rivers Act are classified as wild, scenic, or recreational. Wild river areas include rivers or sections of rivers that are free of impoundments, inaccessible except by trail, and have unpolluted waters. Scenic river areas include rivers or sections of rivers that are free of impoundments, have relatively undeveloped shorelines, and are accessible in some places by roads. Recreational river areas include rivers or sections of rivers that are readily accessible by road or railroad, have some development along shorelines, and may have impoundments or diversions.

The Eel River is the only designated wild and scenic river in the GAI (National Wild and Scenic Rivers System 2019; Omnibus Public Land Management Act of 2009). The Eel River is also designated by CNRA as a wild and scenic river (National Wild and Scenic Rivers System 2019). The location of the Eel River is provided on Figures 2-2, 2-5, 2-6, and 2-16. On January 19, 1981, Congress designated 97 miles of the Eel River as wild, 28 miles as scenic, and 273 miles as recreational. The designation includes portions of the Middle Fork, South Fork, and North Fork of the Eel River, as well as the Van Duzen River, in the Lower Eel Sub-basin (Figure 2-16). Wild and scenic reaches of the Eel River are managed by BLM, CNRA, Round Valley Indian Reservation, and USFS (National Wild and Scenic Rivers System 2019).

Figure 2-16. Wild and Scenic Rivers in the GAI

2.17 Aquatic Resources

A high-level view of major aquatic resources in the GAI is provided on Figure 2-17, and detailed maps of aquatic resources are provided in Appendix F. Generally speaking, aquatic resources in the GAI include wetlands, non-wetland waters, and riparian habitats that may be subject to CCC, Corps, EPA, RWQCB, and/or CDFW regulations, as well as special-status fish managed by CDFW, FWS, or NMFS. The CCC regulates impacts on coastal wetlands and marine and aquatic resources, and these resources receive special protections under Coastal Act § 30230 et seq. Corps and EPA jurisdiction includes any activity that may cause a discharge of dredged or fill material into waters of the U.S. ("WOTUS"), including wetlands. Corps jurisdiction also includes any work or structure affecting navigable waters of the U.S., pursuant to Section 10 of the Rivers and Harbors Act and 33 CFR § 329, respectively. RWQCB jurisdiction includes any activity that may cause a discharge of waste to waters of the state, including wetlands. CDFW regulates any activity that may divert or obstruct the natural flow of a river, stream, or lake; change the bed, channel, or bank of any river, stream, or lake; use material from any river, stream, or lake; and deposit or dispose of material into any river, stream, or lake. Rivers, streams, and lakes include ephemeral, intermittent, and perennial watercourses. Effects on aquatic resources that extend to the outer limits of the riparian dripline, the outer limits of the floodplain of the aquatic resource, the top-of-bank on streams/rivers, or normal pool elevation on lakes may be regulated by CDFW.

2.17.1. Historical Context

The Mad-Redwood Sub-basin is shown on Figure 2-4. Historically, the Mad River was a single thread, meandering channel with deep pools, shallow riffles, point bars, cut banks, and an extensive riparian zone bordering the river (Redwood Community Action Agency 2010). Throughout the nineteenth and early- to mid-twentieth centuries, grazing and logging activities of Euro-American settlers resulted in impacts on the Mad River and Redwood Creek watersheds, increasing impermeable surfaces and sediment discharge. These changes promoted the incision of the mainstem of the Mad River, subsequently disconnecting the mainstem channel from its floodplain. In the mid-twentieth century, levee construction, channel straightening, and removal of riparian vegetation and large in-stream woody debris exacerbated changes in channel process and morphology (Mad River Alliance 2010).

The Lower Eel and South Eel Sub-basins are shown on Figures 2-5 and 2-6. Historically, the Eel River included an extensive tidal estuary with a diversity of oxbows, sloughs, and both perennial and seasonal wetlands. By the late 1800s, approximately 5,500 acres of these natural wetlands had been converted to agricultural lands as a result of settlement of the area by humans, timber harvesting, and gravel mining; this land conversion resulted in increased sedimentation in local waterways, converting relatively stable, deep river channels to unstable, shallow channels (North Coast RWQCB 2018; SERCAL 2015). Located at the mouth of the Eel River, the estuarine watershed surrounding Humboldt Bay historically consisted primarily of salt marsh; diking around 1900 converted many of these areas to seasonal freshwater marsh (FWS 2013a).

Figure 2-17. Aquatic Resource Features and Major Stream Systems[a]

[a] For greater detail, see Appendix F.

2.17.2. Wetlands

Wetland resources information for the GAI was extracted from the SAMNA Reporting Tool, which relies on the FWS National Wetlands Inventory maps (FWS 2017b), and data from the San Francisco Estuary Institute (2018) California Aquatic Resource Inventory (Table 2-10, Appendix F; Caltrans 2017c). These data were used to estimate the extent of wetlands in the GAI; however, the data layers are largely based on aerial imagery, have not been ground-truthed, provide no information on plant species associated with mapped areas, and, hence, are relatively coarse. Although suitable for advance mitigation project scoping, site-specific wetland studies that result in more detailed mapping and classification of wetlands would be required for advance mitigation projects to establish compensatory mitigation credits.

Aquatic resource types outlined here follow the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The SAMNA Reporting Tool wetlands data layer is separate from the land cover types discussed previously in Section 2.6; therefore, total acreages of wetland land cover types presented in Table 2-3 may not align with those presented in Table 2-10 (Caltrans 2017c).

Vernal Pools

Based on CDFW's Vernal Pools – ACE [ds2732] and Vernal Pools by Watershed – ACE [ds2761] datasets, and the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (FWS 2005), there are no vernal pools in the GAI.

Coastal Wetlands

Caltrans did not find any spatial data for the GAI that display "coastal wetlands" as defined by the CCC, in accordance with Public Resources Code § 30121 [14 California Code of Regulations § 13577(b)]. Evidence of a CCC coastal wetland mapping effort in the GAI was not found. The SAMNA Reporting Tool's wetland layer does not report on coastal wetlands that meet the CCC's definition. It is likely that, if located in the coastal zone, all the wetland types identified in Table 2-10 would be classified as coastal wetlands. An unknown additional number may also meet the definition of coastal wetland using the CCC's criteria; identification would have to take place in the field.

2.17.3. Non-wetland Waters

Other non-wetland water resources information for the GAI was extracted from the SAMNA Reporting Tool, which relies on the USGS National Hydrography Dataset (Table 2-11, Appendix F; Caltrans 2017c). Although suitable for advance mitigation project scoping, site-specific studies that result in more detailed mapping and classification of other, non-wetland water resources would be required for advance mitigation projects to establish compensatory mitigation credits. Similar to the wetlands data, the waters data layer is separate from the land cover types discussed previously in Section 2.6; therefore, total acreages of water land cover types presented in Table 2-3 may not align with those presented in Table 2-11 (Caltrans 2017d).

Table 2-10. Wetland Types in the GAI, by Sub-basin

Type	Mad-Redwood (acres) 18010102	Lower Fork Eel (acres) 18010105	South Fork Eel (acres) 18010106	Total (acres)
Depressional Perennial Natural Emergent	13.3	1.2	Not present	**14.5**
Depressional Perennial Natural Non-vegetated	3.4	4.3	Not present	**7.6**
Depressional Perennial Natural Shrub-Scrub	0.6	Not present	Not present	**0.6**
Depressional Perennial Natural Vegetated	1.5	0.3	Not present	**1.8**
Depressional Perennial Unnatural Emergent	6.1	1.6	Not present	**7.7**
Depressional Perennial Unnatural Non-vegetated	6.8	72.2	8.5	**87.5**
Depressional Perennial Unnatural Vegetated	2.2	Not present	Not present	**2.2**
Depressional Seasonal Natural Emergent	165.8	120.2	Not present	**286.0**
Depressional Seasonal Natural Forested	80.9	48.2	Not present	**129.1**
Depressional Seasonal Natural Non-vegetated	20.7	Not present	Not present	**20.7**
Depressional Seasonal Natural Shrub-Scrub	72.9	35.8	Not present	**108.7**
Depressional Seasonal Unnatural Emergent	349.4	85.7	Not present	**435.1**
Depressional Seasonal Unnatural Non-vegetated	0.7	Not present	Not present	**0.7**
Depressional Seasonal Unnatural Shrub-Scrub	0.2	Not present	Not present	**0.2**
Estuarine and Marine Deepwater	7,048.5	861.7	Not present	**7,910.1**
Estuarine and Marine Wetland	14,983.3	2,225.2	Not present	**17,208.6**
Estuarine Saline Natural Intertidal Emergent	24.3	4.2	Not present	**28.5**
Estuarine Saline Natural Intertidal Non-vegetated	52.1	11.0	Not present	**63.1**

Type	Mad-Redwood (acres) 18010102	Lower Fork Eel (acres) 18010105	South Fork Eel (acres) 18010106	Total (acres)
Estuarine Saline Natural Subtidal Non-vegetated	93.2	41.1	Not present	**134.3**
Estuarine Saline Natural Subtidal Vegetated	37.6	Not present	Not present	**37.6**
Estuarine Saline Unnatural Intertidal Vegetated	4.2	Not present	Not present	**4.2**
Freshwater Emergent Wetland	12,335.9	16,077.0	190.1	**28,603.1**
Freshwater Forested/Shrub Wetland	3,699.8	4,345.2	273.0	**8,318.0**
Depressional Perennial Natural Emergent	13.3	1.2	Not present	**14.5**
Depressional Perennial Natural Non-vegetated	3.4	4.3	Not present	**7.6**
Depressional Perennial Natural Shrub-Scrub	0.6	Not present	Not present	**0.6**
Depressional Perennial Natural Vegetated	1.5	0.3	Not present	**1.8**
Depressional Perennial Unnatural Emergent	6.1	1.6	Not present	**7.7**
Depressional Perennial Unnatural Non-vegetated	6.8	72.2	8.5	**87.5**
Depressional Perennial Unnatural Vegetated	2.2	Not present	Not present	**2.2**
Depressional Seasonal Natural Emergent	165.8	120.2	Not present	**286.0**
Depressional Seasonal Natural Forested	80.9	48.2	Not present	**129.1**
Depressional Seasonal Natural Non-vegetated	20.7	Not present	Not present	**20.7**
Total[a]	**39,090**	**23,872**	**472**	**63,434**

Source: Caltrans 2017c
[a] Rounded to the nearest whole number.

Table 2-11. Non-wetland Water Types in the GAI, by Sub-basin

Type	Mad-Redwood (acres) 18010102	Lower Fork Eel (acres) 18010105	South Fork Eel (acres) 18010106	Total (acres)
Freshwater Pond	454.0	317.1	139.8	**911.0**
Lacustrine Natural Non-vegetated	12.8	Not present	Not present	**12.8**
Lacustrine Natural Vegetated	1.4	Not present	Not present	**1.4**
Lacustrine Unnatural Vegetated	0.5	Not present	Not present	**0.5**
Lake	1,495.3	156.5	Not present	**1,651.8**
Marine Natural Intertidal Non-vegetated	170.3	Not present	Not present	**170.4**
Riverine	7,876.0	13,101.7	4,786.38	**25,764.1**
Total[a]	**10,011**	**13,575**	**4,926**	**28,512**

Source: Caltrans 2017d
[a] Rounded to the nearest whole number.

2.17.4. Threatened and Endangered Fish Species

Threatened and endangered fish species known to occur or with the potential to occur in the GAI were extracted from the SAMNA Reporting Tool's fish habitat layer, which was developed using the USGS National Hydrography Dataset and other information (Caltrans 2017e, 2018b). Based on a search of the fish habitat layer, six federal or state listed threatened or endangered fish species are known to occur or have the potential to occur in the GAI:

- federally and state threatened SONCC ESU coho salmon (Punta Gorda to the northern border of California);
- federally endangered tidewater goby;
- federally threatened California Coastal ESU Chinook salmon;
- federally listed Northern California Coast DPS steelhead;
- federally threatened southern DPS green sturgeon; and
- state threatened longfin smelt (*Spirinchus thaleichthys*).

As described previously in Sections 2.9 and 2.10, the GAI includes FWS- and NMFS-designated final critical habitat for the federally listed species and NMFS-designated EFH for Chinook and coho salmon.

Within the Mad-Redwood Sub-basin, Redwood Creek is an important salmonid stream in the area, supporting Chinook salmon, coho salmon, and steelhead (Humboldt County 2002; North Coast RWQCB 2019). Stone and Big Lagoons and their tributaries, the Little River, Mad River, Jacoby, Freshwater, and Salmon Creeks and Elk River, also

support anadromous salmonid populations (Humboldt County 2002; North Coast RWQCB 2017a, 2017b). Within the Lower Eel and South Fork Eel sub-basins, the Eel River is known to support runs of Chinook salmon, coho salmon, steelhead, rainbow trout, coastal cutthroat trout (*Oncorhynchus clarki clarki*), green sturgeon, and Pacific lamprey (*Entosphenus tridentatus*) (SERCAL 2015). Tidewater goby occurs within the Lower Eel estuary and small tributaries such as Salt Creek.

2.18 Areas of Special Biological Significance

The California Ocean Plan, originally adopted by the State Water Board in 1972 and updated most recently in 2019, establishes water quality objectives for ocean waters and provides the basis for the regulation of wastes discharged into coastal waters from both point and non-point sources (State Water Board 2019a). It defines ASBS as "those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities…" and requires that waste be discharged a sufficient distance from an ASBS to ensure "maintenance of natural water quality" (State Water Board 2019a). According to Resolution Nos. 74-28, 74-32, and 75-61, the State Water Board designated 34 ocean areas along the coast of California as ASBS (State Water Board 2019a). These areas typically support a variety of aquatic life and often host unique individual species (State Water Board 2017). Figure 2-18 shows ASBS located in proximity to the GAI. The GAI's northernmost coastline is adjacent to the Trinidad Head ASBS, which occupies approximately 2 miles along the coast near Trinidad Bay in the city of Trinidad (State Water Board 2017).

Figure 2-18. Areas of Special Biological Significance in Relation to the GAI

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3. RELEVANT PLANS, POLICIES, AND REGULATIONS

This chapter summarizes the references applicable to the GAI that, when relevant, Caltrans will consult when conceptualizing advance mitigation projects. The table is organized by subject: laws and regulations, statewide and regional resource management plans, plans and permits focused on the species of mitigation need, resource agency land management plans (separated by agency), water resources plans and documents, county and city general plans, and other organization conservation and management documents. HCPs, NCCPs, and RCIS documents are discussed separately in Chapter 4 because they represent or support current compensatory mitigation credit purchase opportunities for Caltrans. Table 3-1 provides the following information for each reference identified:

- Reference document title
- Status:
  - Final: The reference is completed.
  - Draft: The reference is not complete, and changes may occur when it is finalized.
  - In progress: A formal draft version has not been completed, and the document is being written.
  - In litigation: The reference is subject to at least one lawsuit and is not being revised.
  - Updated periodically: The reference is updated with new information on a somewhat frequent basis.
  - Not publicly available: The reference is known to exist but does not appear to be publicly available.
- Spatial data – whether a map is provided with the document
- Reference purpose – a summary of information relevant to advance mitigation planning and/or a summary of reference intent
- Link – where the reference can be found
- Date – when the reference was published or last updated

The list in Table 3-1 is not exhaustive. Additional relevant resources may be consulted by Caltrans as advance mitigation planning progresses and advance mitigation project scopes are conceptualized. For example, LCPs are updated frequently. When conducting advance mitigation project scoping, Caltrans will check to determine whether it has the most up-to-date version of a particular reference.

3.1 Relationship to Goals and Objectives

As pointed out in Chapter 1, the GAI for this RAMNA was selected by Caltrans District 1 based on the SAMNA results and other information. District 1 specifically identified compensatory mitigation for the SONCC ESU coho salmon, Northern California Coast DPS steelhead, and aquatic resources as a historical and anticipated mitigation need.

Hence, Table 3-1 emphasizes documents related to the specified wildlife and aquatic resources, which, in turn, form the basis for the goals and objectives presented in Chapters 7 and 8. As much as practicable, however, Caltrans intends for any compensatory mitigation established in the GAI to support these specific wildlife and aquatic resources to benefit other wildlife and aquatic resources as well.

Table 3-1. Comprehensive Plans, Agreements, Resource Management Plans, Policies, and Regulations Relevant to the GAI

Title	Status	Spatial Data	Reference Purpose	Link	Date
State Laws, Guidelines, and Regulations	See below	See below	See below	See below	See below
Barriers to Fish Passage SHC § 156	Final	No	Article 3.5 of Chapter 1 of Division 1 of the SHC, also known as Senate Bill 857 (Kuehl, Chapter 589 and Statute of 2005), prohibits new construction or continued maintenance upgrades of SHS facilities that prevent or impede the passage of salmon and steelhead, the majority of which are listed as either threatened or endangered in California, and requires Caltrans to do the following: ▪ Provide an annual list of fish passage priorities for the SHS to the legislature. ▪ Complete assessments of potential barriers to anadromous fish prior to commencing any transportation project using state or federal transportation funds. ▪ Submit assessments to the Fish Passage Assessment Database. ▪ Construct all new transportation projects in a way that does not pose or create a barrier to fish passage. Caltrans collaborates with the FishPAC to identify passage priority locations for the SHS. The FishPAC is a partnership between CDFW, NMFS, USFWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, other local fish passage advocates, and Caltrans.	https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=156.&lawCode=SHC	1/1/2006 (effective date)
California Coastal Act of 1976	Updated periodically (by California legislature)	No	The California Coastal Act is the primary law that governs decisions of the CCC. It outlines, among other things, standards for development within the coastal zone. The Act requires mitigation for impacts on coastal habitats and other types of coastal resource impacts—for example, visual impacts—that are outside the scope of this document. The CCC regulates potentially impactful projects within the coastal zone, primarily through the issuance of CDPs. In coastal local jurisdictions where the CCC has certified a LCP, the local government assumes CDP authority within its jurisdiction (with certain exceptions, such as some coastal wetlands, where the CCC retains original jurisdiction). LCPs are used by local governments to guide development in the coastal zone in coordination with the CCC. LCPs that overlap the GAI are listed in Appendix D.	https://www.coastal.ca.gov/coastact.pdf	10/9/2019 (last amended)
California Water Boards 2010 Update to Strategic Plan 2008–2012	Final	No	Update to strategic plan from the State Water Board and RWQCBs. Goals include implementing strategies to fully support beneficial uses for all water bodies listed in the 2006 report, improve and protect groundwater quality, increase sustainable local water supplies available for meeting beneficial uses by 1,725,000 acre-feet per year, comprehensively address water quality protection and restoration, improve transparency and accountability within the Water Boards, enhance consistency across the Water Boards, and ensure that the Water Boards have access to information and expertise.	https://www.waterboards.ca.gov/water_issues/hot_topics/strategic_plan/docs/2010/final_strategic_plan_update_report_062310.pdf	6/1/2010
Caltrans Fish Passage Annual Legislative Report	Final	No	Report identifies priority fish passage barriers on the SHS. Priorities are determined through FishPAC collaboration and are based on the following: ▪ Species diversity – listed threatened and endangered salmon and steelhead species currently or historically present in the watershed; ▪ Habitat – suitable habitat quality and quantity above each crossing, relative to recovery of threatened and endangered species; and ▪ Best professional knowledge – professional, discretionary value for science-based information known to fisheries and engineering subject matter experts. Subject matter experts include CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, other local fish passage advocates, and Caltrans.	https://dot.ca.gov/programs/legislative-affairs/reports	10/1/2019 (most recent)
CCC Sea Level Rise Policy Guidance	Updated periodically	No	CCC's policy guidance document for integrating development projects in the coastal zone with sea-level rise projections for LCPs and CDPs.	https://www.coastal.ca.gov/climate/slrguidance.html	11/7/2018 (last updated)

Title	Status	Spatial Data	Reference Purpose	Link	Date
CESA	Updated periodically (by California legislature)	No	Authorizes CDFW to protect State of California listed threatened and endangered species.	https://www.wildlife.ca.gov/Conservation/CESA	9/10/2018 (last amended)
Definition and Delineation of Wetlands in the Coastal Zone	Final	No	Implemented by the CCC. Creates a wetland definition that is set as a one parameter approach by which any of the three Corps' indicators constitutes a wetland. This document also includes wetland delineation procedures.	https://documents.coastal.ca.gov/reports/2011/10/W4-10-2011.pdf	10/5/2014
Executive Order W-59-93	Final	No	Governor of California's directive for a no net loss policy on the quantity, quality, and permanence of wetland acreages and values.	https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/wrapp2008/executive_order_w59_93.pdf	8/23/1993
FGC § 1602	Updated periodically (by California legislature)	No	Implemented by CDFW. Regulates activities that may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Effects on aquatic resources that occur below the outer limits of riparian vegetation, the top-of-bank on streams/rivers, or normal pool elevation of lakes, whichever is greater, require a 1602 permit from CDFW.	https://www.wildlife.ca.gov/conservation/lsa	6/27/2017 (last amended)
Porter-Cologne Water Quality Control Act	Updated periodically (by California legislature)	No	Law that governs water quality in California, establishing the nine RWQCBs and their jurisdiction to protect California's surface water and groundwater through water quality objectives and the beneficial uses of water as outlined in a project's waste discharge requirements.	https://www.waterboards.ca.gov/laws_regulations/docs/portercologne.pdf	1/1/2019 (last amended)
Procedural Guidance for Evaluating Wetland Mitigation Projects in California's Coastal Zone	Final	No	Implemented by the CCC. Creates a set of procedures for defining wetland mitigation in the coastal zone and evaluations for the performance of restoration or enhancement projects.	https://coastal.ca.gov/weteval/wetitle.html	9/1/1995
Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone	Final	No	Implemented by the CCC. Creates a set of procedures for evaluating projects that affect wetlands in the coastal zone, application procedures for permitting development in the coastal zone, and requirements for any mitigation plan in the coastal zone.	https://www.coastal.ca.gov/wetrev/wettitle.html	6/15/1994
Rising Seas in California: An Update on Sea-Level Rise Science	Final	No	Drafted by the working group of the OPC Science Advisory Team. Provides a summary of the state of science on sea-level rise and provides the foundation for the *State of California Sea-Level Rise Guidance: 2018 Update*.	https://cawaterlibrary.net/document/rising-seas-in-california-an-update-on-sea-level-rise-science/	4/1/2017
State of California Sea-Level Rise Guidance: 2018 Update	Final	No	Drafted by CNRA and OPC. Provides guidance to state agencies for incorporating sea-level rise projections into planning, permitting, investment, and other decisions.	https://www.opc.ca.gov/updating-californias-sea-level-rise-guidance/	3/14/2018
State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State	Final	No	Implemented by the State Water Board. Creates a State of California wetland definition, a framework for determining jurisdiction of state wetlands, wetland delineation procedures, and application procedures for discharges of dredge and fill material to waters of the state.	https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html	5/28/2020 (effective date)
Water Quality Control Plan for the North Coast Region	Final	Yes	Implemented by the North Coast RWQCB. Establishes general and site-specific water quality standards and objectives in the North Coast Region.	https://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/basin_plan_documents/	6/1/2018
Federal Laws, Guidelines, and Regulations	See below	See below	See below	See below	See below
2008 Final Compensatory Mitigation Rule	Final	No	Corps' ruling to establish standards and criteria for the use of all types of compensatory mitigation, including on- and off-site permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation to offset unavoidable impacts on WOTUS.	https://www.govinfo.gov/content/pkg/CFR-2012-title33-vol3/xml/CFR-2012-title33-vol3-part332.xml	7/9/2008

Title	Status	Spatial Data	Reference Purpose	Link	Date
303(d) List of Impaired Water Bodies	Final	No	EPA and the State Water Board's listing of regulated impaired water bodies.	https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml	4/11/2018 (last updated)
40 CFR § 131.12 California Antidegradation Policy	Final	No	Implemented by the State Water Board. Required by federal law, the Antidegradation Policy applies to the disposal of waste to high-quality surface water and groundwater.	https://www.waterboards.ca.gov/plans_policies/antidegradation.html	8/21/2015 (last amended)
CWA	Updated periodically (by Congress)	No	Authorized by EPA and delegated to the Corps and the State Water Board, the CWA establishes the basic structure for regulating discharges of pollutants into WOTUS and regulating quality standards for surface waters.	https://www.law.cornell.edu/uscode/text/33/1344	2/4/1987 (last amended)
CWA § 401	Updated periodically (by Congress)	No	Implemented by EPA and the State Water Board. Regulates discharge of pollutants into WOTUS.	https://www.law.cornell.edu/uscode/text/33/1341	12/27/1977 (last amended)
CWA § 404	Updated periodically (by Congress)	No	Implemented by EPA and the Corps. Regulates discharge of dredge or fill material into WOTUS.	https://www.epa.gov/cwa-404/section-404-permit-program	11/6/1986 (last amended)
ESA	Updated periodically (by Congress)	No	Authorizes FWS and NMFS to protect federally listed threatened and endangered species.	https://www.fws.gov/endangered/laws-policies/	11/24/2003 (last amended)
Executive Order 11990, Protection of Wetlands	Final	No	Aims to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands.	https://www.epa.gov/cwa-404/protection-wetlands-executive-order-11990	3/24/1977
Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division	Final	No	Corps' guidelines for mitigation and monitoring in the South Pacific Division, including California.	https://www.spd.usace.army.mil/portals/13/docs/regulatory/mitigation/mitmon.pdf	12/19/2014 (last amended)
Migratory Bird Treaty Act	Updated periodically (by Congress)	No	The Migratory Bird Treaty Act of 1918 implements four international conservation treaties that the U.S. entered into with Canada, Mexico, Japan, and Russia. It is intended to ensure the sustainability of populations of all protected migratory bird species. The Migratory Bird Treaty Act prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by FWS.	https://fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php	12/5/1995 (last amended)
National Wetlands Mitigation Action Plan	Final	No	EPA and Corps comprehensive, interagency document to further the goal of no net loss of wetlands and to set forth the no net loss policy.	https://www.epa.gov/cwa-404/national-wetlands-mitigation-action-plan	12/26/2002
State Board Resolution No. 68-16	Final	No	Policy for maintaining high water quality.	https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/1968/rs68_016.pdf	10/28/1968
Wild and Scenic Rivers Act	Final	Yes	Reserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. All federal agencies must seek to avoid or mitigate actions that would adversely affect National River Inventory river segments.	https://www.law.cornell.edu/uscode/text/16/chapter-28	12/19/2014 (last amended)
Statewide and Regional Resource Management Plans	See below	See below	See below	See below	See below
2018 Master Plan for Fisheries: A Guide for Implementation of the Marine Life Management Act	Final	No	CDFW's plan to implement the Marine Life Management Act. Includes goals to manage priority species, achieve sustainability for commercial fish stocks, conserve ecosystems, integrate marine protected areas into fisheries management, and provide adaptive management for climate change. Provides a framework for specific management plan creation.	https://wildlife.ca.gov/Conservation/Marine/Master-Plan	6/1/2018
A Climate Change Vulnerability Assessment of California's Terrestrial Vegetation	Final	Yes	CDFW's document to assess the climate vulnerability of terrestrial vegetation.	https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=116208&inline	1/1/2016

Title	Status	Spatial Data	Reference Purpose	Link	Date
A Strategy for California @ 50 Million – Supporting California's Climate Change Goals	Final	Yes	Planning report from the California Governor's Office that focuses on sustainability efforts across California in response to climate change.	http://opr.ca.gov/docs/EGPR_Nov_2015.pdf	11/1/2015
ACE Connectivity Project Version 3.0	Updated periodically	Yes	A CDFW effort to analyze large amounts of map-based data to inform decisions around goals such as biodiversity conservation, habitat connectivity, and climate change resiliency.	https://wildlife.ca.gov/Data/Analysis/ACE	7/10/2019 (last updated)
California Biodiversity Initiative	Final	No	A CNRA, California Department of Food and Agriculture, and Governor's Office of Planning and Research high-level planning document. Provides a roadmap to secure California's biodiversity future.	https://californiabiodiversityinitiative.org/pdf/california-biodiversity-action-plan.pdf	Sep-18
California Essential Habitat Connectivity Project	Final	Yes	CDFW and Caltrans assessment to identify large remaining blocks of intact habitat or natural landscape and model linkages between them that need to be maintained, particularly as corridors for wildlife.	https://www.wildlife.ca.gov/conservation/planning/connectivity/CEHC	2/1/2010
California Marine Life Protection Act Master Plan for Marine Protected Areas	Final	No	CDFW's management plan for marine protected areas.	https://www.wildlife.ca.gov/Conservation/Marine/MPAs/Master-Plan	8/24/2016
California Water Action Plan 2016 Update	Final	No	Calls for action to restore key mountain meadow habitat, manage headwaters, restore coastal watersheds, and enhance water flows in streams statewide.	http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf	2016
California Watershed Assessment Manual Volume I	Final	No	Provides guidance for conducting a watershed assessment in California.	http://www.cwam.ucdavis.edu/Manual_chapters.htm	5/1/2005
California Wildlife Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region	Final	Yes	CDFW's priority wildlife movement barriers across the state. This document is focused on large wild mammal game species; however, some priorities would benefit special-status species such as bighorn sheep.	http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178511	3/1/2020
Caltrans Adaptation Strategies Report: District 1	Final	No	Caltrans initiated a major agency-wide effort to adapt its infrastructure so that it can withstand future conditions. The effort began by determining which assets are most likely to be adversely impacted by climate change in each Caltrans district.	https://dot.ca.gov/programs/transportation-planning/2020-adapation-priorities-reports	2/1/2021
Caltrans Climate Change Vulnerability Assessment, District 1 Technical Report	Final	No	Caltrans assessment of climate change vulnerabilities for the District.	https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments	10/1/2019
CCC Strategic Plan 2020–2025	Final	No	CCC draft to guide agency actions from 2020 to 2025. The plan currently contains 9 goals, 49 objectives, and 189 specific actions. Of these, Caltrans is identified in 16 specific actions, including coordination on biodiversity resources and advanced mitigation (3.1.3, 3.2.3, 3.2.4), climate change planning (4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.3.1, 4.4.2), LCP engagement (6.1.3, 6.1.5, 6.2.1), environmental justice (5.2.1, 5.2.3), and information/GIS collaboration (8.1.1, 8.1.7, 9.6.2, 9.6.4).	https://www.coastal.ca.gov/strategicplan/spindex.html	11/6/2020
Development, Land Use, and Climate Change Impacts on Wetland and Riparian Habitats – A Summary of Scientifically Supported Conservation Strategies, Mitigation Measures, and Best Management Practices	Final	No	A technical memo from CDFW, Region 1, describing analysis and summary of recent research on fish and wildlife relationships to land use and development impacts, and conservation strategies to minimize impacts. The memo recommends that an appropriate starting place for buffering impacts on sensitive habitats is 50 meters.	https://wildlife.ca.gov/Regions/1	5/21/2014

Title	Status	Spatial Data	Reference Purpose	Link	Date
Large Mammal-Vehicle Collision Hot Spot Analyses, California, USA	Final	Yes	Western Transportation Institute's report documenting the methods and results of hot-spot analyses of large wild mammal-vehicle collisions in California, with an emphasis on mule deer. These analyses identified the road sections that had the highest concentration of deer-vehicle crashes and mule deer carcasses. Special-status species were not addressed.	https://westerntransportationinstitute.org/wp-content/uploads/2019/09/4W6693_Huijser-and-Begley-FINAL-Report-Caltrans-Statewide-20190913-reduced-image-size.pdf	9/13/2019
Our Coast Our Future: Coastal Storm Modeling System	Updated periodically	Yes	A USGS mapping program tracking projected sea-level rise for the California coast. Some pieces of the program, including the piece for the GAI, are not yet completed.	https://data.pointblue.org/apps/ocof/cms/	2016 (last piece added)
Pacific Coast Fishery Ecosystem Plan for the U.S. Portion of the California Current Large Marine Ecosystem	Final	Yes	Pacific Fishery Management Council's overarching plan for management of the marine ecosystem and fish population for the California coast.	https://www.pcouncil.org/managed_fishery/ecosystem-based-management/	7/1/2013
Safeguarding California Plan: 2018 Update	Final	No	A conservation plan by CNRA. Includes goals to strengthen the climate adaptation component of conservation planning efforts, enhance habitat connectivity, protect climate refugia through strategic acquisition and protection activities, increase restoration and enhancement activities to increase climate resiliency of natural and working lands, increase biodiversity monitoring efforts, continue incorporating climate considerations into state investment decision processes, and provide educational opportunities to the public and state agency staff regarding climate impacts and adaptation options.	http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf	1/1/2018
Strategic Plan to Protect California's Coast and Ocean 2020–2025	Draft	Yes	OPC's plan for coastal and ocean protection. Includes goals and objectives centered on safeguarding coastal and marine ecosystems, advancing equity across ocean and coastal policies and actions, enhancing coastal and marine biodiversity, and improving ocean health with economic factors.	http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20191113/Draft-Revised-Strategic-Plan-for-CA-Coast-and-Ocean_11.1.19_draft-FINAL.pdf	11/1/2019
SWAP	Updated periodically (5-year intervals)	Yes	CDFW's plan for protection of species of greatest conservation need, in addition to habitats and other wildlife in California.	https://www.wildlife.ca.gov/SWAP/Final	9/1/2015
SWAP Marine Resources Companion Plan	Final	Yes	CDFW's companion document to SWAP to assess the vulnerability and conservation strategies for the California coast and coastal waters.	https://wildlife.ca.gov/SWAP/Final/Companion-Plans	12/1/2016
SWAP Transportation Planning Companion Plan	Final	Yes	CDFW's companion document to SWAP for protection of species specific to transportation project planning.	https://wildlife.ca.gov/SWAP/Final/Companion-Plans	12/1/2016
SWAP Water Management Companion Plan	Final	Yes	CDFW's companion document to SWAP to recommend water management practices throughout the state of California.	https://wildlife.ca.gov/SWAP/Final/Companion-Plans	12/1/2016
Special-status Taxa[a] Documents	See below	See below	See below	See below	See below
Final Coastal Multispecies Recovery Plan for California Coastal Chinook Salmon, Northern California Steelhead, and Central California Coast Steelhead	Final	Yes	NMFS' recovery plan for California coastal chinook salmon, Northern California Coast steelhead, and Central California coast steelhead. The recovery plan objectives are functionally designed to reduce habitat loss, predation, disease, and overharvesting of the species.	https://archive.fisheries.noaa.gov/wcr/publications/recovery_planning/salmon_steelhead/domains/north_central_california_coast/Final%20Materials/vol._i_chapter_1-8_coastal_multispecies_recovery_plan.pdf	10/1/2016
Steelhead Restoration and Management Plan for California	Final	Yes	CDFW's restoration and management plan for steelhead throughout the state. There are separate management objectives for three designated management areas: North Coast, Central Valley, and South Coast. The GAI falls within the North Coast management area. The focus of the North Coast management area is on maintaining and increasing population abundance, with principal emphasis on summer steelhead and other naturally reproducing stocks. The management plan has recommendations for specific streams including the Redwood Creek and the Eel River.	https://www.google.com/url?client=internal-element-cse&cx=003744124407919529812:v2-t3gqht48&q=https://nrm.dfg.ca.gov/FileHandler.ashx%3FDocumentID%3D3490&sa=U&ved=2ahUKEwj1156Uz_fmAhXSHc0KHcG_CfY4ChAWMAB6BAgGEAE&usg=AOvVaw1GUboKPeGb7OoSOIkc7IH7	2/1/1996

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Critical Habitat Designation for Steelhead	Final	Yes	Designation of critical habitat for the steelhead.	https://www.fisheries.noaa.gov/resource/map/steelhead-trout-critical-habitat-map	8/13/2018
2016 5-Year Review: Summary & Evaluation of California Coastal Chinook Salmon and Northern California Steelhead	Final	Yes	NMFS' most recent formal review of the species condition.	https://www.fisheries.noaa.gov/resource/document/2016-5-year-review-summary-evaluation-california-coastal-chinook-salmon-and	4/13/2016
Steelhead Biological Opinion	Final	No	Thirty-one biological opinions have been issued for steelhead since 2010. Six of these have been issued for projects in the GAI.	https://repository.library.noaa.gov/	1/13/2020
California Endangered Species Act Status Review for Northern California Summer Steelhead (*Oncorhynchus mykiss*)	Final	Yes	CDFW's review of the summer-run of steelhead for consideration as being listed under CESA.	https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=191914&inline	3/11/2021
Final Recovery Plan for the Southern Oregon/Northern California Coast ESU of Coho Salmon (*Oncorhynchus kisutch*)	Final	Yes	NMFS' recovery plan for the SONCC ESU of coho salmon. The two overarching recovery goals for this ESU are: ▪ Populations must reach desired levels of biological viability and the recovery effort must sufficiently reduce the impact of the stresses and threats to warrant removal of this ESU from the threatened and endangered species list. ▪ The states of California and Oregon seek to rebuild wild populations to reach "broad sense recovery" to provide for sustainable fisheries and other ecological, cultural, and social benefits. The ESU is split into numerous core, non-core, and dependent populations, each with their own biological recovery criteria that must be met to lower risks of extinction and to achieve a viable ESU. Each of these populations must achieve the adequate abundance, productivity, spatial structure, and diversity metrics outlined in this recovery plan to best achieve a viable ESU most quickly.	https://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/sonccfinal_ch1to6_mainchapters__1_.pdf	1/1/2014
2016 5-Year Review: Summary & Evaluation of Southern Oregon/Northern California Coast Coho Salmon	Final	Yes	NMFS' most recent formal review of the species condition.	https://www.westcoast.fisheries.noaa.gov/publications/status_reviews/salmon_steelhead/2016/2016_soncc_coho.pdf	5/26/2016
Recovery Strategy for California Coho Salmon	Final	Yes	CDFW's recovery plan for coho. Goals center on increasing the amount of habitat for coho and the total population size. Recovery criteria for this species include maintaining and improving key populations, increasing the number of spawning adults, maintaining and increasing the distribution of coho salmon, maintaining EFH, and enhancing and restoring habitat in the current known range. An additional goal of getting the population to a point where tribal and commercial fishing can commence is also included in the plan.	https://wildlife.ca.gov/Conservation/Fishes/Coho-Salmon	2/1/2004
Incidental Take Permits for California Coho Salmon	Final	No	CDFW's list of incidental take permits issued for California coho salmon. Since 2014, 2 permits have been issued, along with 1 amendment.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	11/20/2018 (latest document)
Designated Critical Habitat; Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon	Final	No	*Federal Register* posting of critical habitat designation for the coho salmon; however, critical habitat for this species has not been designated in California.	https://www.govinfo.gov/content/pkg/FR-1999-05-05/pdf/99-11187.pdf#page=1	5/5/1999
Pacific Coast Salmon Fishery Management Plan	Periodically updated	Yes	NMFS' fisheries management plan for salmonids on the West Coast. Includes commercial fishing allowances for salmonids in the region and conservation target population sizes for various regions. The conservation goal for coho salmon in the GAI is no more than 13 percent adult equivalent exploitation rate in ocean fisheries from the Klamath River hatchery. This river, although not in the GAI, empties into the ocean directly adjacent to the GAI.	https://www.pcouncil.org/managed_fishery/salmon/	3/1/2016 (last amended)

Title	Status	Spatial Data	Reference Purpose	Link	Date
Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California	Final	Yes	FWS recovery plan for tidal marsh species in northern and central California, which includes 3 plants, 1 bird, and 1 mammal, for a total of 5 species. Salt marsh bird's beak (*Chloropyron maritimum* ssp. *maritimum*) is listed as a non-focal species because, although it would benefit from the activities covered in this plan, it has its own recovery plan. In general, recovery criteria center on habitat protection and adaptive habitat management, which include developing management plans, conducting status surveys, finding populations to be at least maintaining their population if not increasing, conducting research, and having additional public outreach and participation. No identified recovery units occur in the GAI. The plan includes a regional strategy for the Humboldt Bay and North Coast area. This strategy includes consideration of steelhead and tidewater goby as recovery targets for the area, as well as two other wildlife species, and eight plant species that would benefit from the measures in the plan.	https://www.fws.gov/sfbaydelta/documents/tidal_marsh_recovery_plan_v1.pdf	8/27/2013
Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon	Final	Yes	FWS recovery plan for vernal pool species in California and Oregon, which includes 25 plants, 7 invertebrates, and 1 amphibian, for a total of 33 species. In general, recovery criteria center on habitat protection and adaptive habitat management, which includes developing management plans, conducting status surveys, finding populations to be at least maintaining their population if not increasing, conducting research, and having additional public outreach and participation. Some species-specific criteria exist, such as seed banking for plants and preferential transition from intensive agriculture to grazing near western spadefoot toad conservation areas. Sixteen regions are identified in this plan, along with 41 core areas.	https://www.fws.gov/sacramento/es/Recovery-Planning/Vernal-Pool/	12/15/2005
State Land Management Plans	See below	See below	See below	See below	See below
Non-Natal Habitat Enhancement Planning for Endangered Species Act-Listed Salmonids in the Humboldt Bay Watershed	Final	No	Funded by CDFW and conducted by the Pacific Coast Fish, Wildlife, and Wetlands Restoration Association. The document identifies and prioritizes potential restoration sites in the Eureka Plain Hydrologic Unit for the benefit of salmonid species.	In Caltrans' archives	8/15/2020
General Planning Handbook for California State Parks	Final	No	California State Parks' guidelines for general plan development, which requires an inventory of known natural resources and general guidelines to comply with federal and state laws. Twenty-four state park entities occur in the GAI. Those with specific management goals pertinent to Chapters 7 and 8 of this RAMNA are listed below.	http://www.parks.ca.gov/pages/21299/files/planning_handbook_april_2010.pdf	4/1/2010
Humboldt Lagoons State Park General Plan (also includes Harry A. Merlo SRA General Plan)	Final	Yes	California State Parks' plan for the Humboldt Lagoons State Park. Dictates that no wetland area in Dry Lagoon State Park and Harry A. Merlo State Recreation Area shall be filled in, developed, modified, or encroached upon by any activity that will have a significant detrimental effect on wildlife.	https://www.parks.ca.gov/?page_id=21299	6/1/1983
Patricks Point State Park General Plan	Final	Yes	California State Parks' plan for the Patricks Point State Park. Mitigation measure for any future work include placing facilities to reduce vegetation loss and reduce erosion.	https://www.parks.ca.gov/?page_id=21299	6/1/1983
Richardson Grove State Park General Plan	Final	Yes	California State Parks' plan for the Richardson Grove State Park. The general plan contains one land use map.	https://www.parks.ca.gov/?page_id=21299	10/1/1956
Sinkyone Wilderness State Park Final General Plan & EIR	Final	Yes	California State Parks' plan for the Sinkyone Wilderness State Park. The plan lists 19 guidelines to fulfill the goal of rehabilitating and protecting wildlife in the park.	https://www.parks.ca.gov/?page_id=21299	11/1/2006
FWS Land Management Plans	See below	See below	See below	See below	See below
Evaluation of Population Monitoring and Suppression Strategies for Invasive Sacramento Pikeminnow in the South Fork Eel River	Final	No	Technical memorandum for FWS. Includes recommendations for monitoring, suppressing, and coordinating management of Sacramento pikeminnow in the South Fork Eel River.	In Caltrans' archives	9/1/2020

Title	Status	Spatial Data	Reference Purpose	Link	Date
Humboldt Bay National Wildlife Refuge Complex Comprehensive Conservation Plan and Final Environmental Assessment	Final	Yes	FWS' management plan for the Humboldt Bay National Wildlife Refuge. Includes goals to conserve, manage, restore, and enhance wetland, rare dune, and dune forest habitats; support the recovery of special-status species; and control invasive plants and animals.	https://www.fws.gov/uploadedFiles/Region_8/NWRS/Zone_1/Humboldt_Bay_Complex/Humbolt_Bay/Sections/Documents/Final%20CCP.pdf	9/24/2009
U.S. Military Land Management Plans	See below	See below	See below	See below	See below
None	None	None	No U.S. military installations occur in the GAI.	None	None
Native American Tribal Land Management Plans	See below	See below	See below	See below	See below
Blue Lake Rancheria Wetland Program Plan	Final	Yes	Wetland program plan for the Blue Lake Rancheria located in the northern one-third of the GAI. The goal is protecting and restoring wetland resources. Projects include monitoring wetland resources, writing wetland protection ordinances, and developing geographically defined management, protection, and restoration plans.	https://www.epa.gov/sites/production/files/2016-06/documents/blr_wpp_final.pdf	3/2/2015
Tribal Wetland Program Plan for the Cahto Tribe of the Laytonville Rancheria	Final	No	Wetland program plan for the Cahto Tribe located at the far southern portion of the GAI. Includes monitoring wetlands, evaluating their quality, and restoration projects.	https://www.epa.gov/sites/production/files/2015-10/documents/cahto_tribe_wpp.pdf	2/16/2011
Wiyot Tribe's Wetland Program Plan	Final	No	Wetland program plan for the Wiyot Tribe, located in Loleta, California. Includes restoration priorities for the tribe such as restoring habitat in the Table Bluff Reservation wetland buffer and removing dense-flowered cordgrass from tribal lands.	https://www.epa.gov/sites/production/files/2017-02/documents/wiyot_tribe_wpp.pdf	1/1/2017
USFS Land Management Plans	See below	See below	See below	See below	See below
Mendocino National Forest Land Management Plan	Final	Yes	Management plan to guide all resource management activities in the national forest.	https://www.fs.usda.gov/detailfull/mendocino/landmanagement/planning/?cid=fsbdev3_004518&width=full	2/1/1995
Six Rivers Aquatic Restoration Project Final Environmental Assessment	Final	Yes	USFS assessment of a large-scale aquatic habitat restoration project for Six Rivers National Forest.	https://www.fs.usda.gov/project/?project=42051	12/1/2018
Six Rivers National Forest – Land and Resource Management Plan	Final	Yes	Management plan to guide all resource management activities in the national forest. Contains specific standards and guidelines for fisheries management, wild and scenic river segments, and wildlife management.	https://www.fs.usda.gov/detailfull/srnf/landmanagement/planning/?cid=stelprdb5084033&width=full	1/1/1995
Yolla Bolly-Middle Eel Wilderness Management Direction	Final	Yes	USFS management plan for the Yolla Bolly-Middle Eel Wilderness Area. Management direction includes coordinating with CDFW to reduce or eliminate adverse impacts on anadromous fish and reevaluating the practice of fish stocking in the management area.	https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_004426.pdf	2/1/1995
BLM Land Management Plans	See below	See below	See below	See below	See below
California Coastal National Monument Resource Management Plan	Final	Yes	BLM management plan for California Coastal National Monument.	http://www.npshistory.com/publications/blm/california-coastal/rmp-2005.pdf	9/1/2005

Title	Status	Spatial Data	Reference Purpose	Link	Date
Headwaters Forest Reserve Proposed Resource Management Plan and Final Environmental Impact Statement/Environmental Impact Report – Volume 1	Draft	Yes	BLM management plan for the Headwaters Forest Reserve. Special-status species management goals include protecting all extant populations of old-growth-dependent fish, wildlife, and plant species from activities that could threaten their population survivability. Specifically, the plan calls for expanding high-quality spawning, rearing, and migration habitat for coho, steelhead, and other anadromous salmonids, as well as restoring aquatic and terrestrial habitat suitable for species. Watershed restoration goals include maintaining aquatic refugia within undisturbed old-growth forest habitats, restoring affected watersheds that have the highest potential for restoration and maximum benefits for species, and continuing maintenance along the South Fork Elk River to reduce sediment inputs to the river.	https://eplanning.blm.gov/epl-front-office/projects/lup/72697/96934/117090/Proposed_RMP_Volume1.pdf	9/1/2003
Headwaters Forest Restoration Resource Management Plan Amendment and Environmental Assessment/Mitigated Negative Declaration	Final	Yes	Amendment to the BLM management plan for the Headwaters Forest Reserve.	https://eplanning.blm.gov/epl-front-office/projects/lup/71600/110179/134998/Headwaters_RMP_Amendment.pdf	6/15/2017
NPS Land Management Plans	See below	See below	See below	See below	See below
Nationwide Rivers Inventory	Final	No	Listing of Nationwide River Inventory river segments that are potential candidates for inclusion in the National Wild and Scenic River System. Redwood Creek, north fork of the Eel River, and Van Duzen River are listed under this inventory.	https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm	12/21/2017
Redwood State and National Parks General Plan/General Management Plan	Final	Yes	NPS and California State Parks management plan for Redwood State and National Parks.	https://www.parks.ca.gov/pages/21299/files/GMP.pdf	4/6/2000
Water Resources Plans and Documents	See below	See below	See below	See below	See below
The Eureka Area Watersheds Storm Water Resource Plan	Final	No	Humboldt County, City of Eureka, and Humboldt Community Services District's management plan for stormwater for the Eureka Plain Hydrologic Unit, located in the Mad-Redwood HUC-8. Includes goals to improve water quality and reduce flood risk.	http://northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/	8/1/2018
Redwood Creek Integrated Watershed Strategy	Final	Yes	Redwood Creek Watershed Group's plan for the Redwood Creek watershed. The group is a combination of agencies, landowners, and organizations. Natural resource regulatory members involved with the development of this document include the CDFW, Corps, NMFS, and FWS. Additionally, FWS is a signatory to the Agreement of Intent for this document. Goals include water quality improvement, particularly in the Orick Valley area around the census-designated place of Orick, restoration of habitat for salmonid species, and reducing flood risk.	https://www.nps.gov/redw/learn/management/upload/RWC%20IWS%20Final.pdf	6/22/2006
TMDL Action Plans	Updated periodically	No	State Water Board and North Coast RWQCB's list of TMDL action plans for the North Coast Region. In the GAI, TMDL action plans exist for the Elk River.	https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/	4/4/2018 (most recent approval date)
Trinidad-Westhaven Integrated Coastal Watershed Management Plan	Final	Yes	Local management plan by the State Water Board to improve surface water quality in Trinidad Bay and the watersheds draining into it. Steelhead and coho recovery is a long-term goal for the management plan.	http://trinidad.ca.gov/document-library/coastal-watershed-management	5/1/2008
Local Government Land Management Plans	See below	See below	See below	See below	See below
Humboldt Bay Eelgrass Comprehensive Management Plan	Final	No	Management plan by the Humboldt Bay Harbor Recreation and Conservation District for the preservation, monitoring, and restoration of eelgrass ecosystems in Humboldt Bay along with streamlining regulatory mechanisms for permitting eelgrass impacts.	https://humboldtbay.org/sites/humboldtbay2.org/files/documents/Humboldt%20Bay%20Eelgrass%20Management%20Plan_10-10-17.pdf	2018

Title	Status	Spatial Data	Reference Purpose	Link	Date
Humboldt Bay Management Plan	Final	No	Management plan by the Humboldt Bay Harbor Recreation and Conservation District. Includes recommendations to improve water quality in the bay and adjacent tributaries as well as including a 100-foot buffer in between development and streams, wetlands, estuaries, and open coastal water.	http://humboldtbay.org/documents	5/1/2007
Natural Shoreline Infrastructure in Humboldt Bay for Intertidal Coastal Marsh Restoration and Transportation Corridor Protection	In progress	No	A project being proposed by Humboldt County for conducting site characterization and design studies, using tidal benches and other natural infrastructure techniques, to protect transportation infrastructure at Humboldt Bay. This project is currently in the proposal phase awaiting grant funding through the National Fish and Wildlife Foundation.	https://humboldtgov.org/2487/Sea-Level-Rise	7/1/2019 (date of grant application for project)
County General Plans	See below	See below	See below	See below	See below
Humboldt County General Plan	Final	Yes	General plan for Humboldt County. The plan designates Streamside Management Areas, which have 200-foot buffers from development. The plan also requires 100 feet of buffer from non-designated perennial streams and 50 feet of buffer for non-designated intermittent streams. Wetlands that are seasonal have 50-foot buffers and perennial wetlands have 150-foot buffers. Development in these buffers carries additional mitigation requirements.	https://humboldtgov.org/DocumentCenter/View/61984/Humboldt-County-General-Plan-complete-document-PDF	10/23/2017
Humboldt County General Plan	Final	Yes	Zoning map for Humboldt County. Land use designations include forestry recreation, flood plain, and natural resources.	http://webgis.co.humboldt.ca.us/HCEGIS2.0m/	10/23/2017
Mendocino County General Plan	Final	Yes	General Plan for Mendocino County. The plan requires a 2:1 mitigation ratio for oak woodlands and for sensitive habitats, which are defined as serpentine soils and rock outcrops, pygmy forests, old growth forests, and Section 404 wetlands and waters of the United States. This plan has a land use designation of open space, but it is defined in such a way that agriculture and forestry are not precluded activities.	https://www.mendocinocounty.org/government/planning-building-services/plans/mendocino-county-general-plan	8/1/2009
Trinity County General Plan	Final	Yes	General Plan for Trinity County. The plan includes land use designations of open space and critical environmental areas.	http://docs.trinitycounty.org/Departments/Planning/General_Plan%5CTrinityGenPlan.html	5/1/2002
City General Plans	See below	See below	See below	See below	See below
Arcata General Plan: 2020	Updated periodically	Yes	General plan for Arcata. Defines environmental buffer areas of at least 25 feet from the top of bank of streams in areas of existing development, 100 feet from the top of bank of streams outside of existing development, and the extent of riparian vegetation to a maximum of 250 feet. Similar buffers exist for wetlands between 50 and 100 feet from the wetland boundary. Development in these buffers is restricted. The plan has a land use designation of natural resource, but it is defined in such a way that it does not preclude development.	https://www.cityofarcata.org/160/General-Plan	10/1/2008 (last amended)
Blue Lake Municipal Code	Updated periodically	No	Zoning map for Blue Lake. Includes a land use designation for open space/recreation.	http://qcode.us/codes/bluelake/?view=desktop	10/1/2019
City of Eureka 2040 General Plan	Final	Yes	General plan for Eureka. The plan includes a land use designation of natural resource.	https://www.ci.eureka.ca.gov/civicax/filebank/blobdload.aspx?BlobID=15394	10/15/2018
City of Ferndale General Plan	Updated periodically	Yes	General plan for Ferndale. Identifies the Francis Creek, Salt River, Reas Creek, and Williams Creek watersheds as an area of concern, with provisions to maintain water quality and prevent sedimentation, and the Eel River floodplain as an area of concern, with provisions for flood protection. No specific conservation land use designations appear to exist under this general plan.	https://ci.ferndale.ca.us/documents/general-plan/	10/16/2010 (last updated)
Fortuna General Plan 2030 – Final Programmatic Environmental Impact Report	Final	Yes	General plan for the City of Fortuna. Requires streamside management areas to have buffers from development of 25 feet from the top of bank of ephemeral streams and 50 feet from the top of bank of perennial streams and the outer edge of jurisdictional wetlands. The plan does not include a land use designation for natural resource protection.	http://friendlyfortuna.com/index.aspx?NID=99	10/1/2010

Title	Status	Spatial Data	Reference Purpose	Link	Date
City of Rio Dell General Plan	Final	Yes	General plan for the City of Rio Dell. The plan includes a land use designation of natural resource.	http://cityofriodell.ca.gov/community-development-department	8/1/2013
City of Trinidad General Plan	Final	Yes	General plan for the City of Trinidad. Recommends a 100-foot setback for riparian vegetation along major coastal streams. Establishes riparian protection zone of 100 feet from streams in developed areas. The plan includes land use designations of open space and special environment.	http://trinidad.ca.gov/document-library/general-plan-current	1/1/1978
Trinidad-Westhaven Watershed Plan	Final	Yes	Land use plan for the Trinidad Bay and waters that drain into it.	http://trinidad.ca.gov/document-library/coastal-watershed-management	5/1/2008
Other Organization Conservation and Management Documents	See below	See below	See below	See below	See below
California Coastkeeper Alliance – Ocean Climate Resiliency Action Plan	Final	No	California coastkeeper's plan addressing climate change and rising sea levels. Plan includes preventing ocean wastewater discharges from causing ocean acidification and hypoxia hotspots, preventing agricultural nutrient inputs from causing harmful algal blooms and exacerbating ocean acidification and hypoxia hot spots, improving water quality in Marine Protected Areas, sequestering greenhouse gas emissions, and preventing coastal development in zones at risk from sea-level rise.	https://cacoastkeeper.org/wp-content/uploads/2019/11/CCKA_Ocean-Climate-Resiliency-Campaign_FINAL.pdf	11/19/2019
California EcoAtlas	Updated periodically (nearly daily)	Yes	Statewide database tracking the extent and condition of wetlands in California, managed by the San Francisco Estuary Institute. The Klamath/North Coast Region is in the GAI.	https://www.ecoatlas.org/	10/9/2020
Coastal Conservancy Strategic Plan 2018–2022	Final	No	Implemented by the Coastal Conservancy. Includes a discussion of issues and conservancy-funded efforts in the GAI, including wetland and riparian habitat restoration.	https://scc.ca.gov/about/plan/	11/30/2017
Conserving California's Coastal Habitats – A Legacy and A Future with Sea Level Rise	Final	Yes	Statewide coastal conservation plan by the Coastal Conservancy and The Nature Conservancy. Contains plans to maintain and manage coastal lands to be resilient to sea-level rise. Plans include maintaining existing resilient conservation lands, conserving resilient landscapes, managing in place for resilience, conserving potential future habitat areas, and increasing adaptive capacity.	https://www.conservationgateway.org/ConservationPractices/Marine/crr/library/Documents/TNC_SCC_CoastalAssessment_lo%20sngl.pdf	2018
Demonstrating the California Wetland Status and Trends Program: A Probabilistic Approach for Estimating Statewide Aquatic Resource Extent, Distribution and Change over Time	Final	No	A report from the Southern California Coastal Water Research Project describing a pilot study in tracking wetland conditions statewide.	https://www.sccwrp.org/publications/	4/1/2015
Humboldt Bay Watershed Salmon and Steelhead Conservation Plan	Final	Yes	Humboldt Bay Watershed Advisory Committee and Redwood Community Action Agency's conservation plan for salmonids and steelhead in the Humboldt Bay HUC-10. Identifies numerous goals for fish species centered on habitat improvement, water quality improvement, and water quantity sufficiency.	http://www.nrsrcaa.org/nrs/projcurr/bayenhance.htm	3/21/2005
Linking Land and Sea: A Northern California Coastal Conservation Needs Assessment for Mendocino, Humboldt and Del Norte Counties	Final	Yes	The Redwood Community Action Agency's assessment of conservation needs in the region.	http://www.nrsrcaa.org/linkinglandsea/index.htm	7/31/2006

Title	Status	Spatial Data	Reference Purpose	Link	Date
The Humboldt Bay Ecosystem Program	Final	Yes	A local community-based plan addressing environmental issues in the Humboldt Bay ecosystem by increasing the scientific understanding of the ecosystem and creating a framework for resource management and collaboration. The goal of the program is to protect and improve the health and well-being of the community and natural resources of Humboldt Bay.	http://www.coastalecosystemsinstitute.org/humboldt/wp-content/uploads/2014/07/HumboldtBayEcosystem-Final-Report-Apr-2008.pdf	12/1/2008
U.S. Pacific Coastal Wetland Resilience and Vulnerability to Sea-Level Rise	Final	No	An original research article describing and comparing climate models and scenarios with respect to coastal wetland resilience and sea-level rise.	https://advances.sciencemag.org/content/4/2/eaao3270	2/21/2018

[a] Consistent with the Caltrans SAMNA and Chapter 4, for the purposes of this document, special-status species are defined as federally and State of California threatened, endangered, or sensitive species; State fully protected or rare species; State species of special concern; or California Rare Plant Rank 1 and 2 species.

4. EXISTING MITIGATION OPPORTUNITIES

SHC § 800.6(a)-authorized advance mitigation project types include purchasing credits and paying fees associated with existing mitigation sources. This chapter summarizes the mitigation credits and values currently available to Caltrans and/or pending through existing HCPs, NCCPs, mitigation and conservation banks, in-lieu fee programs, and MCAs. RCISs, which are a prerequisite to MCAs, are also discussed. Caltrans begins the chapter by describing the advance mitigation credits already held by Caltrans District 1.

4.1 SHOPP Advance Mitigation Credits

The California Transportation Commission has approved the establishment of a mitigation bank with the working title of Mendocino Coast Mitigation Bank in Caltrans District 1, to be delivered through the Request for Proposal and contracting process.

Because this bank is still pending, at this time (July of fiscal year 2020/2021), the contract has been awarded to the bank sponsor, but the extent of its service area and other key information are not available. The Mendocino Coast Mitigation Bank is intended to supply credits for use for transportation-related projects to be delivered under Caltrans' SHOPP. Contracted credits are expected to be available starting in 2023 (first release) and complete within 4 to 6 years thereafter. Any credits created in excess of those required by Caltrans will be the property of the bank sponsor and could be purchased by Caltrans under normal transportation project credit purchase conditions. Available information on the Mendocino Coast Mitigation Bank is provided in Table 4-1.

Table 4-1. SHOPP Advance Mitigation Credits

Name	Year Approved	Signatories[a]	Area (acres)	Service Area	Credit Types
Mendocino Coast Mitigation Bank (working title)	In progress	**Corps** and others, to be determined[b]	To be determined	Within Mendocino County. Service area to be determined.	26.2 acres of three-parameter wetland credits and 12.2 acres of other WOTUS (non-wetland and non-riparian within the ordinary high-water mark). Additional credits if possible.

[a] Signatories in **bold** are signatories to the *Master Process Agreement for Planning and Developing Advance Mitigation throughout California for the California Department of Transportation* (Caltrans et al. 2020).
[b] The bank sponsor may also seek and receive approval from CCC, CDFW, the State Water Boards, FWS, NMFS, and EPA.

4.2 HCPs and NCCPs

HCPs and NCCPs define covered activities that consist of specific projects and actions that may have adverse effects on covered species and natural communities. The adverse effects associated with the covered activities are estimated, and incidental take permits are issued by FWS and/or CDFW. Once the HCP/NCCP is adopted and the incidental

take permit(s) are issued, signatories and participating special entities, where applicable, can request take authorization for project-related effects on covered species. Participation in an adopted HCP/NCCP streamlines permit processes by eliminating the need to obtain project-specific incidental take permits from FWS and/or CDFW and provides early documentation of compliance with the state and federal endangered species acts.

When Caltrans is not an NCCP permittee, under specific conditions and with signatory agency approval, Caltrans may be able to qualify as a Participating Special Entity under the plan, gaining some of the NCCP permittee's privileges; however, not all NCCPs have a Participating Special Entity clause.

Caltrans identified no active or pending HCPs or NCCPs in the GAI to which Caltrans and/or RTPAs are currently signatories or Participating Special Entities. Although multiple project-specific HCPs exist in the GAI, they apply to non-transportation agency single users.

4.3 Conservation and Mitigation Banks

A conservation or mitigation bank is privately or publicly owned land managed for its natural resource values. In exchange for permanently protecting, managing, and monitoring the land, the bank sponsor is allowed to sell or transfer habitat and/or aquatic resource credits to permittees who—after all appropriate and practicable avoidance and minimization has been performed—need to satisfy legal requirements and compensate for their project's unavoidable natural resource impacts. Conservation banks generally protect threatened and endangered species habitat, while mitigation banks generally protect, restore, create, and/or enhance aquatic resources. The legal document for the establishment, operation, and use of a conservation bank or mitigation bank is a Bank Enabling Instrument ("BEI").

Though one mitigation bank is being established through Caltrans SHOPP (Section 4.1), there are currently no conservation banks or mitigation banks established in the GAI.

4.4 In-lieu Fee Programs

Compensatory mitigation can also be accomplished through participation in an in-lieu fee program, which is an agreement between a natural resource regulatory agency, or agencies, and a single in-lieu fee sponsor. In-lieu fee mitigation occurs when a permittee provides funds to an in-lieu fee sponsor instead of either completing permitee-responsible mitigation or purchasing credits from a conservation or mitigation bank. An in-lieu fee sponsor can include entities such as public agencies or nonprofit organizations, and the fees are used to plan, build, and maintain a mitigation site. This method is similar to purchasing mitigation credits, in that the mitigation is usually conducted "off-site." Often, the mitigation occurs after the permitted impacts.

No in-lieu fee programs are currently established in the GAI.

4.5 RCISs and MCAs

Assembly Bill 2087 established CDFW's RCIS Program in 2016 (FGC Chapter 9, § 1850, et seq.), which created a voluntary framework for governments and other entities to strategically plan for conservation investments in their areas, including investments performed for compensatory mitigation. To promote the conservation quality of compensatory mitigation investments, the RCIS Program provides an advance mitigation tool that can be applied to resources subject to regulations implemented by CDFW. MCAs are developed when and where an RCIS is approved by CDFW and, with respect to the SHS, create credits that may be used as compensatory mitigation to offset impacts identified under CESA and the Lake and Streambed Alteration Program. It is important to note that MCAs are not permits like HCPs and NCCPs (Section 4.2). MCA advance mitigation credits are analogous to conservation and mitigation bank credits (Section 4.3). In other words, unlike an HCP and NCCP, RCISs and MCAs do not result in the issuance of incidental take permits for covered activities.

Some conservation or enhancement actions, because of their size, type, or location, would not be suitable for establishing mitigation credits through CDFW's mitigation and conservation banking program. Implementing actions on public land, such as installing wildlife crossings or removing fish passage barriers, are examples of potential enhancement actions that may establish CDFW-approved credits under an MCA and not a BEI (CDFW 2019c).

Caltrans did not identify any active or pending RCISs with service areas that overlap the GAI. Because MCAs are issued once a RCIS has been approved, there are also currently no MCAs within this GAI.

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5. MODELED ESTIMATED IMPACTS

Caltrans undertakes transportation projects and advance mitigation projects[1] to address its needs. In this chapter, Caltrans documents its potential mitigation need in the GAI for fiscal years 2017/18 to 2026/27 within Caltrans District 1, including a portion of Caltrans District 2. Needs were based on estimated potential compensatory mitigation requirements of Caltrans' anticipated SHOPP projects and regional and local STIP-eligible projects. Outreach to regional and local transportation agencies did not identify STIP-eligible projects that could benefit from the AMP planning process (Section 1.7.1). Because the assessment is intended to inform advance mitigation scoping, the impact estimates do not distinguish between permanent or temporary impacts. Actual transportation project impacts will be determined in the future through each transportation project's environmental studies and permits.

In the sections below, Caltrans:

- Describes its approach to, and major assumptions when, estimating transportation-related compensatory mitigation needs in the GAI;
- Provides its estimate of potential aquatic resource impacts for the next 10 years from the transportation projects; and
- Provides its estimate of potential impacts on wildlife resources for the next 10 years coincident with aquatic resources.

As described in Section 1.5, to focus the assessment, Caltrans District 1 identified specific sub-basins where aquatic resources impacts are anticipated, as well as aquatic species of mitigation need. Species of mitigation need are species for which a high probability of compensatory mitigation need is anticipated. As discussed further in Chapter 9, during advance mitigation project scoping, consideration will also be given to additional special-status species that the SAMNA identified as co-occurring in the same habitats with anticipated impacts that affect aquatic resources.

5.1 Approach

Transportation projects eligible to use advance mitigation offsets funded by the AMA may only be SHOPP or STIP transportation projects (SHC § 800.7; Caltrans 2019a). Hence, the advance mitigation needs for wildlife and aquatic resources in the GAI are based on Caltrans' anticipated SHOPP transportation project impacts; Caltrans, regional, and local STIP-eligible transportation project impacts; and their estimated potential compensatory mitigation needs. At this time:

- SHOPP transportation project needs are forecast quantitatively through the SAMNA model developed for the AMP.

[1] Advance mitigation projects types are provided in Table 1-1.

- STIP-eligible needs are assessed qualitatively, through Caltrans District, MPO, RTPA, and other transportation agency coordination.

All estimates assume permanent losses, although it is likely that in many cases, some of the effects of a transportation project may be avoided, may be temporary, or may not result in a full loss.

5.1.1. SHOPP Needs Assessment

SHOPP impacts were forecast through the SAMNA. The SAMNA consists of an intersection of assumed transportation project footprints with natural resource layers developed for the SAMNA. Briefly described in Section 1.4, more detailed SAMNA information is provided in the *Advanced Mitigation Needs Assessment GIS Tool Report for California Department of Transportation* (Caltrans 2018b).

To identify the list of SHOPP transportation projects planned for the GAI, Caltrans consulted the SHOPP Ten-Year Book for fiscal years 2017/2018 to 2026/2027 (Caltrans 2019b). The intent of the SHOPP Ten-Year Book is to raise awareness of planned future transportation projects, and detailed transportation project information is not provided. The SHOPP Ten-Year Book includes 39 SHOPP transportation projects in the GAI that are currently in the planning and conceptual phases (Table 5-1). The general locations of all 39 planned SHOPP transportation projects are shown on most of the maps in this document.

Each transportation project's potential impact was defined using a buffer from the edge of pavement. Different buffer widths were used depending on the transportation project's activity. Table 5-2 provides the range of buffers relevant to the transportation projects listed in the SHOPP Ten-Year Book for this GAI, which are extracted from Table 1 of Caltrans 2019b. Many transportation projects include multiple activities. In those cases, the largest buffer was assigned to the transportation project for the potential impact analysis (Table 5-1).

Table 5-1. SHOPP Transportation Projects Potentially Affecting Aquatic Resources and/or Special-status Species in the GAI

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	Caltrans District	County	Route	Begin Mile	End Mile	Ecoregion Section	Activity
Lower Eel	2018/19	9246	1	Humboldt	36	11.4	34.5	Northern California Coast	Bridge replacement/ new construction
Mad-Redwood	2019/20	9269	2	Trinity	299	Not applicable	Not applicable	Northern California Coast Ranges	Bridge rail
Lower Eel	2018/19	15896	1	Humboldt	101	R39.2[a]	R48.3	Northern California Coast	Drainage improvements
Lower Eel	2019/20	13533	1	Humboldt	36	0.1	1.6	Northern California Coast	Replace/install culverts
Lower Eel	2019/20	16442	1	Humboldt	36	10.5	10.8	Northern California Coast	Improved highway geometry
Lower Eel	2021/22	18135	1	Humboldt	101	57.1	67.8	Northern California Coast	Energy dissipation and other element
Lower Eel	2022/23	18757	1	Humboldt	101	M53.9[b]	Not applicable	Northern California Coast	Bridge rail
Lower Eel	2025/26	20286	1	Humboldt	36	2	44.8	Northern California Coast	Replace/install culverts
Lower Eel	2026/27	18709	1	Humboldt	36	5	10.1	Northern California Coast	Replace/install culverts
Lower Eel/ South Fork Eel	2018/19	13148	1	Humboldt	254	6.8	42.1	Northern California Coast	Replace/install culverts

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	Caltrans District	County	Route	Begin Mile	End Mile	Ecoregion Section	Activity
Lower Eel/ South Fork Eel	2023/24	18710	1	Humboldt	254	0.4	45.1	Northern California Coast	Replace/install culverts
Lower Eel/ South Fork Eel	2023/24	19295	1	Humboldt	101	0.5	54.3	Northern California Coast	Replace/install culvert
Lower Eel/ Mad-Redwood	2023/24	19296	1	Humboldt	101	56.6	137.1	Northern California Coast	Replace/install culverts
Mad-Redwood	2019/20	13303	1	Humboldt	96	Not applicable	Not applicable	Northern California Coast/ Northern California Coast Ranges	Bridge rail
Mad-Redwood	2017/18	13152	1	Humboldt	101	102.9	105.2	Northern California Coast	Safety roadside rest area utilities
Mad-Redwood	2017/18	13206	1	Humboldt	101	77	77.5	Northern California Coast	Drainage improvements
Mad-Redwood	2018/19	13032	1	Humboldt	101	79.8	84.7	Northern California Coast	Bridge replacement/ new construction
Mad-Redwood	2018/19	15649	1	Humboldt	101	78.1	79.6	Northern California Coast	Improved highway geometry
Mad-Redwood	2018/19	17391	1	Humboldt	101	124.5	Not applicable	Northern California Coast	Bridge replacement/ new construction
Mad-Redwood	2019/20	13439	1	Humboldt	299	R16.1	R16.4	Northern California Coast	Replace/install culverts

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	Caltrans District	County	Route	Begin Mile	End Mile	Ecoregion Section	Activity
Mad-Redwood	2019/20	13472	1	Humboldt	101	75.3	77.6	Northern California Coast	Replace/ install culverts
Mad-Redwood	2019/20	16450	1	Humboldt	101	88.2	88.3	Northern California Coast	Improved highway geometry
Mad-Redwood	2019/20	16610	1	Humboldt	299	R1.5	R2.0	Northern California Coast	Replace/install culverts
Mad-Redwood	2019/20	17235	1	Humboldt	299	R14.7	R15.7	Northern California Coast	Widen shoulders
Mad-Redwood	2019/20	18636	1	Humboldt	101	77.9	79.5	Northern California Coast	Improved highway geometry
Mad-Redwood	2021/22	14178	1	Humboldt	101	87.5	89.5	Northern California Coast	Replace/install culverts
Mad-Redwood	2021/22	16428	1	Humboldt	101	88.3	88.6	Northern California Coast	Replace/install culverts
Mad-Redwood	2023/24	18823	1	Humboldt	101	70.61	70.61	Northern California Coast	Bridge rail
Mad-Redwood	2021/22	17073	1	Humboldt	299	R1.9	37.8	Northern California Coast/ Northern California Coast Ranges	Replace/install culverts
Mad-Redwood	2019/20	17209	1	Humboldt	299	20.5	30.2	Northern California Coast/ Northern California Coast Ranges	Widen shoulders

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	Caltrans District	County	Route	Begin Mile	End Mile	Ecoregion Section	Activity
South Fork Eel	2017/18	11243	1	Mendocino	271	17.7	18	Northern California Coast	Bridge replacement/new construction
South Fork Eel	2020/21	15993	1	Humboldt	101	R11.8	26.7	Northern California Coast	Rock slope protection
South Fork Eel	2021/22	13636	1	Mendocino	101	R106.4	R106.8	Northern California Coast	Bridge rail
South Fork Eel	2021/22	18761	1	Humboldt	254	4.2	Not applicable	Northern California Coast	Bridge replacement/ new construction
South Fork Eel	2023/24	20847	1	Mendocino	271	18	21	Northern California Coast	Widen shoulders
South Fork Eel	2025/26	19426	1	Mendocino	271	22.57	22.57	Northern California Coast	Bridge rail
South Fork Eel/ Upper Eel	2019/20	11314	1	Mendocino	101	58.9	82.5	Northern California Coast Ranges	Safety roadside rest area utilities
South Fork Eel	2025/26	20285	1	Mendocino	101	1	106	Northern California Coast Ranges	Replace/install culverts
South Fork Eel	2026/27	20270	1	Mendocino	1	0	105	Northern California Coast	Replace/install culverts

Source: Caltrans 2018a
[a] R = right
[b] M = median

Table 5-2. Assumed Buffer Widths, by SHOPP Transportation Project Activity

Activity	Buffer Distance (feet)
Bridge rail	20
Bridge replacement/new construction	40
Drainage improvements	20
Energy dissipation and other element	20
Headwall/endwall	20
Improved highway geometry	40
Replace/install culverts	20
Rock slope protection	30
Safety roadside rest area utilities	10
Widen shoulders	15

Source: Caltrans 2019b, Table 1

SAMNA Model Results. The AMP developed the SAMNA strictly and specifically for Caltrans' use in advance mitigation planning—that is, when Caltrans is justifying, proposing, and scoping advance mitigation projects (Caltrans 2019a, 2019b). The SAMNA model, its foundation, and assumptions, are described in the *Statewide Advance Mitigation Needs Assessment Report* (Caltrans 2019b).

The SAMNA's impact estimates from Caltrans District 1's planned transportation projects anticipated between fiscal years 2017/18 and 2026/27 are provided in the *Statewide Advance Mitigation Needs Assessment Report* (Caltrans 2019b). All results are provided in acres. Specific to this assessment, SAMNA results estimating impacts on aquatic resources in the GAI can be found in Section 5.2. The SAMNA results estimating impacts on special-status wildlife species are summarized in Section 5.3 and provided for all habitats and species in Appendix E.

5.1.2. Non-SHOPP STIP-eligible Needs Assessment

At this time, STIP-eligible needs are assessed qualitatively, through coordination between the District, MPOs, RTPAs, and other public agencies that implement transportation improvements. Obtaining a reliable list of STIP transportation projects within the 10-year planning horizon is problematic because it is never known which transportation projects will be funded through the STIP until the funds are voted on by the California Transportation Commission, at which point the transportation projects are well past their planning and conceptualization phases and entering their delivery phases.

Because of this timing, funded STIP projects will likely need compensatory mitigation before the AMP can deliver the needed mitigation. AMP planning, therefore, must glean a list of transportation projects from the broader set of non-SHOPP transportation projects

that may or may not receive STIP funding, such as STIP-eligible transportation projects. Additionally, the STIP is currently receiving very little funding in favor of the "fix-it-first" philosophy of the Road Repair and Accountability Act of 2017, although there is a backlog of transportation projects that potentially needs these funds.

To address the dynamic nature of the non-SHOPP STIP-eligible list, it was necessary to identify transportation projects that will be (1) reasonably certain to occur in the same 10-year time frame as the SHOPP projects used in the SAMNA and (2) highly likely to receive STIP funding. To that end, the AMP consulted the Caltrans Division of Transportation Planning's Multimodal Operations, Non-SHOPP, Transportation Equity Report database, using the criteria that a transportation project would have to be in a fiscally constrained[2] regional transportation plan, with a Ready to List[3] year identified as occurring in the 10-year planning horizon. The list would be further refined through consultation with the Caltrans Districts and their regional and local transportation partners (see Table 1-2 of this document for the consultation summary). However, no planned STIP-eligible transportation projects were identified within the GAI for fiscal years 2017/18 to 2026/27.

Non-SHOPP STIP-eligible Potential Impacts. Because no planned STIP-eligible transportation projects were identified within the GAI for fiscal years 2017/18 to 2026/27, no STIP-eligible related impacts or mitigation needs are anticipated.

5.2 Estimated Aquatic Resources Impacts

The quantitative results provided in this document are pursuant to the SAMNA model. Specific aquatic resource impacts will be assessed as part of each transportation project's environmental studies. Below, estimated aquatic resource impacts are presented for the three HUC-8 sub-basins that are within the GAI boundary and that may potentially experience impacts on aquatic resources. Aquatic resources impacts are categorized as potential impacts on threatened and endangered fish, wetlands, and non-wetland waters. Coastal wetlands and coastal non-wetland waters are also discussed. Non-fish aquatic resources are mapped in Appendix F.

5.2.1. Estimated Impacts on Threatened and Endangered Fish Species

Using the methods described in Section 5.1.1, impacts on fish habitat were estimated for the 39 transportation projects listed in Table 5-1. Results for the three sub-basins in the GAI are summarized in Table 5-3. Assuming stream/river habitat impacts are representative of fish habitat impacts, of the 39 SHOPP transportation projects evaluated, 22 would result in impacts on approximately 21.7 acres of threatened and endangered fish habitat (Table 5-3; Caltrans 2019b). Table 5-3 also summarizes the estimated impacts in relation to the number of planned SHOPP transportation projects in each sub-

[2] Transportation project funding is reasonably assured.
[3] Transportation project schedule is reasonably assured. Ready to List is a named milestone within the Caltrans project delivery process. It is the point when a complete package is ready for contractors to bid on.

basin. For example, nine transportation projects are forecast to have a total of 14.9 acres of impacts in the Mad-Redwood Sub-basin, of which 3.2 acres are impacts on Chinook salmon, 0.2 acres are impacts on SONCC coho, 3.3 acres are impacts on green sturgeon, 3.5 acres are impacts on longfin smelt, 3.4 are impacts on Northern California Coast steelhead, and 1.2 acres are impacts on tidewater goby.

5.2.2. Estimated Impacts on Wetlands

Using the methods described in Section 5.1.1, impacts on wetlands were estimated for the 39 transportation projects listed in Table 5-1. Results for the three sub-basins in the GAI are summarized in Table 5-4. Of the 39 SHOPP transportation projects evaluated, 28 would result in impacts on 8.9 acres of wetland habitat in the GAI (Caltrans 2019b). Table 5-4 also summarizes the estimated impacts in relation to the number of planned SHOPP transportation projects in each sub-basin. For example, nine transportation projects are forecast to have a total of 2.3 acres of impacts on wetlands in the Lower Eel Sub-basin, of which <0.1 acres are impacts on freshwater emergent wetland, 1.1 acres are impacts on freshwater forested/shrub wetland, and 1.2 acres are impacts on riverine habitat.

Note the SAMNA's wetland layers provide output that appears similar to its terrestrial output, in that the results are provided in terms of wetland habitat. Wetland forecasts based on the SAMNA's wetland layer, however, are considered more certain than wetland habitat forecasts based on the SAMNA's terrestrial habitat layers; hence, the wetland estimates below are based solely on the SAMNA's wetland data layer (Caltrans 2019b).

Estimated Impacts on Vernal Pools

As pointed out in Section 2.17.2, no vernal pool resources were identified in the GAI.

Estimated Impacts on Coastal Wetlands

As pointed out in Section 2.17.2, Caltrans did not find any coastal wetland spatial data for the GAI. Nevertheless, for the purposes of this RAMNA, it is assumed that wetland impacts forecast within the coastal zone would be evaluated under the CCC's coastal wetland impact standards (Table 5-5). Hence, within the coastal zone, estimated impacts on coastal wetlands include 5.0 acres of impacts on eight wetland types from a total of five projects. These five projects within the coastal zone are estimated to include impacts on 0.1 acre of estuarine saline natural intertidal emergent habitat, 0.6 acre of estuarine saline natural intertidal non-vegetated habitat, 0.1 acre of estuarine saline natural subtidal non-vegetated habitat, 1.3 acres of estuarine and marine wetland habitat, <0.1 acre of depressional seasonal natural shrub scrub habitat, 0.8 acres of freshwater emergent wetland habitat and freshwater forested/ shrub wetland habitat in the Mad-Redwood Sub-basin, <0.1 acre of freshwater emergent wetland habitat, and 0.2 acre of freshwater forested/shrub wetland habitat in the Lower Eel Sub-basin.

As pointed out in Section 2.17.2, CCC would likely identify as present more coastal wetlands than included in the SAMNA's wetland layer, which is based on the National

Wetland Inventory. Consequently, it is possible that forecasts presented in Table 5-5 are underestimated.

5.2.3. Estimated Impacts on Non-wetland Waters

Using the methods described in Section 5.1.1, impacts on non-wetland waters were estimated for the 39 transportation projects listed in Table 5-1. Results for the three sub-basins that make up the GAI are summarized in Table 5-6. Of the 39 SHOPP transportation projects evaluated, all 39 would result in impacts on 10.6 acres of non-wetland waters in the GAI (Caltrans 2019b). Table 5-6 also summarizes the estimated impacts in relation to the number of planned SHOPP transportation projects in each sub-basin. For example, 19 transportation projects are forecast to have a total of 4.2 acres of impact in the Mad-Redwood Sub-basin, of which <0.1 acres are impacts on sea/ocean habitat, 0.1 acres are impacts on lake/pond habitat, 3.0 acres are impacts on stream/river habitat, <0.1 acres are impacts on coastline habitat, and 1.0 acres are impacts on foreshore habitat.

Estimated Impacts on Coastal Non-wetland Waters

Estimated impacts on non-wetland waters from planned SHOPP transportation projects within the GAI, which are located in the coastal zone and under the jurisdiction of the CCC, are shown in Table 5-7. A total of 2.8 acres of impacts on three types of coastal non-wetland waters is anticipated from four projects. These four projects within the coastal zone are estimated to include impacts on <0.1 acre of sea/ocean habitat, 0.1 acre of lake/pond habitat, and 2.3 acres of stream/river habitat in the Mad-Redwood Sub-basin and 0.4 acre of stream/river habitat in the Lower Eel Sub-basin.

Table 5-3. Summary of Estimated SHOPP Impacts on Threatened and Endangered Fish in the GAI (results in acres)[a, b]

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Chinook salmon – California Coastal ESU – FT	Coho salmon – SONCC ESU – FT, ST[c]	Green Sturgeon – Southern DPS – FT	Longfin Smelt – ST	Steelhead – Northern California Coast DPS – FT	Tidewater Goby – FE	Estimated Fish Impact (Stream/ River)[d]
Mad-Redwood	18010102	9	3.2	0.2	3.3	3.5	3.4	1.2	14.9
Lower Eel	18010105	6	1.2	0.0	0.0	1.8	1.5	0.0	4.4
South Fork Eel	18010106	7	1.6	0.0	0.0	0.0	0.8	0.0	2.4
	Total	**22[e]**	**5.9**	**0.2**	**3.3**	**5.3**	**5.7**	**1.2**	**21.7[f]**

Notes: FE = federally endangered, FT = federally threatened, ST = state threatened
[a] Stream/river habitat impacts are provided. Stream/river habitat impacts are assumed to be representative of fish habitat impacts.
[b] SAMNA results are based on CNDDB records within each watershed. Some species such as coastal cutthroat trout, Pacific lamprey, and eulachon are not represented in the results.
[c] SAMNA refers to this ESU as Punta Gorda to the northern border of California.
[d] For sub-basins with more than one species, co-occurrence of impacts is assumed. Acreage for the largest impact is provided.
[e] Totals reflect numbers presented in rows above. None of the SHOPP transportation projects forecast to impact fish cross more than one sub-basin.
[f] This number may be an overestimate because several fish species occupy similar habitat.

Table 5-4. Summary of Estimated SHOPP Impacts on Wetlands in the GAI (results in acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Estuarine Saline Natural Intertidal Emergent	Estuarine Saline Natural Intertidal Non-vegetated	Estuarine Saline Natural Subtidal Non-vegetated	Estuarine and Marine Deepwater	Estuarine and Marine Wetland	Depressional Seasonal Natural Shrub-Scrub	Depressional Seasonal Natural Emergent	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Riverine	Estimated Wetland Impact[a]
Mad-Redwood	18010102	12	0.1	0.6	0.1	1.3	1.6	<0.1	0.2	0.8	0.3	0.5	**5.6**
Lower Eel	18010105	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	1.1	1.2	**2.3**
South Fork Eel	18010106	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**1.0**
	Total	**28[b]**	**0.1**	**0.6**	**0.1**	**1.3**	**1.6**	**<0.1**	**0.2**	**0.9**	**1.5**	**2.7**	**8.9**

[a] Estimated wetland impact totals may not be exact because of rounding.
[b] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects forecast to impact wetlands cross more than one sub-basin.

Table 5-5. Summary of Estimated SHOPP Impacts on Wetlands in the GAI's Coastal Zone (results in acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Estuarine Saline Natural Intertidal Emergent	Estuarine Saline Natural Intertidal Non-vegetated	Estuarine Saline Natural Subtidal Non-vegetated	Estuarine and Marine Deepwater	Estuarine and Marine Wetland	Depressional Seasonal Natural Shrub Scrub	Freshwater Emergent Wetland	Freshwater Forested/Shrub Wetland	Estimated Wetland Impact[a]
Mad-Redwood	18010102	4	0.1	0.6	0.1	1.3	1.6	<0.1	0.8	0.3	4.8
Lower Eel	18010105	1	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	0.2	0.2
South Fork Eel	18010106	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**5**	**0.1**	**0.6**	**0.1**	**1.3**	**1.6**	**<0.1**	**0.8**	**0.5**	**5.0**

[a] Estimated wetland impact totals may not be exact because of rounding.

Table 5-6. Summary of Estimated SHOPP Impacts on Non-wetland Waters in the GAI (results in acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects (HUC-8)	Sea/ Ocean Habitat	Lake/ Pond Habitat	Stream/ River Habitat	Wash Habitat	Coastline Habitat	Foreshore Habitat	Estimated Non-wetland Waters Impact
Mad-Redwood	18010102	19	<0.1	0.1	3.0	0.0	<0.1	1.0	4.2
Lower Eel	18010105	12	0.0	0.0	3.6	<0.1	0.0	0.0	3.6
South Fork Eel	18010106	12	0.0	0.0	2.9	0.0	0.0	0.0	2.9
	Total	**39[a]**	**<0.1**	**0.1**	**9.4**	**<0.1**	**<0.1**	**1.0**	**10.6**

[a] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin.

Table 5-7. Summary of Estimated SHOPP Impacts on Non-wetland Waters in the GAI's Coastal Zone (results in acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects (HUC-8)	Sea/ Ocean Habitat	Lake/ Pond Habitat	Stream/ River Habitat	Estimated Non-wetland Waters Impact
Mad-Redwood	18010102	3	<0.1	0.1	2.3	**2.4**
Lower Eel	18010105	2	0.0	0.0	0.4	**0.4**
South Fork Eel	18010106	0	0.0	0.0	0.0	**2.8**
	Total	**4[a]**	**<0.1**	**0.1**	**2.7**	**2.8**

[a] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin.

5.3 Estimated Terrestrial Plant and Wildlife Impacts

The quantitative results given in this document are pursuant to the SAMNA Model. Specific plant and wildlife resource impacts will be assessed as part of each transportation project's environmental studies. The complete terrestrial species results of the SAMNA, inclusive of the 39 transportation projects listed in Table 5-1, are provided in Appendix E.

The special-status terrestrial plant and wildlife species evaluated through the SAMNA consisted of federal and state threatened, endangered, or sensitive species; state fully protected or rare species; or state species of special concern. Based on a search of the species-attributed vegetation layer, 50 special-status terrestrial species are known to occur or have the potential to occur in the portion of the GAI that lies within the Northern California Coast Ecoregion Section and 45 special-status species are known to occur or have the potential to occur in the portion of the GAI that lies within the Northern California Coast Ranges Ecoregion Section (Section 2.8; Appendix E; Caltrans 2019b). Using the methods described in Section 5.1.1, the SAMNA analysis determined that 39 SHOPP transportation projects could potentially affect a total of 59 special-status species, potentially affecting 489.5 acres of special-status species habitat in total (Table 5-8).

Table 5-8. Summary of Estimated SHOPP Wildlife Resource Impacts in the GAI

Ecoregion	Number of Caltrans SHOPP Projects	Number of Special-status Species Habitats	Number of Special-status Species[a]	Estimated Impact – All Habitats, All Special-status Species (acres)
Northern California Coast Ecoregion Section	36	19	50	316.6
Northern California Coast Ranges Ecoregion Section	6	21	45	172.9
Total	**39[b]**	**23[c]**	**59[d]**	**489.5**

[a] Special-status terrestrial plant and wildlife species evaluated through the SAMNA consisted of federal and state threatened, endangered, or sensitive species; state fully protected or rare species; or state species of special concern.
[b] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one ecoregion.
[c] Totals do not reflect numbers presented in rows above. The same habitat can be found in more than one ecoregion.
[d] Totals do not reflect numbers presented in rows above. The same species can be found in more than one ecoregion.

5.3.1. Estimated Impacts on Co-occurring Terrestrial Species

A number of special-status species utilize aquatic resources during one or more of their life stages and impacts on special status species could potentially co-occur with the aquatic resource impacts presented in Section 5.2. To get an idea of the number and species, Caltrans identified (1) aquatic habitats in the SAMNA model's species-attributed vegetation layer and (2) the species that use those habitats. The resultant list of special status species with the potential co-occur with aquatic resources is provided in Table 5-9.

Table 5-9. Terrestrial Special Status Species that Potentially Co-occur with Aquatic Resources in the GAI

Species Habitat That Co-occurs with Aquatic Resources[a]	Estimated Special-status Species Habitat Impact (acres)[b]	Potential Co-occurring Special-status Species[b, c]	Status
Saline Emergent Wetland Ocean/Coastal	3.0	bald eagle brant Bryant's savannah sparrow great blue heron great egret northern harrier osprey peregrine falcon short-eared owl white-tailed kite	FS, SE, SFP, SFS SSC SSC SFS SFS SSC SFS FS, SFP SSC FS, SFP
Lacustrine Lakes/ponds/open wetlands	0.7	bald eagle fringed myotis great blue heron great egret long-eared myotis northern harrier northern red-legged frog osprey peregrine falcon purple martin tricolored blackbird Vaux's swift western red bat western snowy plover western pond turtle Yuma myotis	FS, SE, SFP, SFS FS SFS SFS SFS SSC FS, SSC SFS FS, SFP SSC FS, ST, SSC SSC SSC FT, SSC FS, SSC FS

Species Habitat That Co-occurs with Aquatic Resources[a]	Estimated Special-status Species Habitat Impact (acres)[b]	Potential Co-occurring Special-status Species[b, c]	Status
Riverine Perennial/Seasonal Ephemeral	1.9	bald eagle	FS, SE, SFP, SFS
		bank swallow	FS, ST
		coastal tailed frog	SSC
		fisher	FPT, FS, ST
		foothill yellow-legged frog	FS, SSC
		fringed myotis	FS
		great blue heron	SFS
		great egret	SFS
		Humboldt marten	FT, SE, FS, SSC
		Little willow flycatcher	SE
		long-eared myotis	FS
		marbled murrelet	FT, SE, SFS
		northern harrier	SSC
		northern red-legged frog	FS, SSC
		northern spotted owl	FT, ST, SFS
		osprey	SFS
		pallid bat	FS, SSC
		peregrine falcon	FS, SFP
		purple martin	SSC
		Sonoma tree vole	SSC
		snowy plover	FT, SSC
		southern torrent salamander	FS, SSC
		Townsend's big-eared bat	FS, SSC
		Vaux's swift	SSC
		western red bat	SSC
		yellow-billed cuckoo	FT, SE, FS
		yellow breasted chat	SSC
		yellow warbler	SSC
		Yuma myotis	FS

Notes: FE = federally endangered, FPT = federal proposed threatened, FS = federal sensitive (USFS and/or BLM sensitive), FT = federally threatened, MMC = marine mammal of concern (Marine Mammal Protection Act), SCE = state candidate endangered, SE = state endangered, SFP = state fully protected, SFS = state fire sensitive, SR = state rare, SSC = species of special concern (CDFW), ST = state threatened

[a] From the SAMNA Reporting Tool's species-attributed vegetation data layer

[b] See Appendix E for all SAMNA special-status species impact estimates forecast for the 10-year interval assessed.

[c] Expert local knowledge added additional species not shown in SAMNA.

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6. BENEFITING TRANSPORTATION PROJECT CONSIDERATIONS

Benefiting transportation projects have delivery schedules that would likely benefit from advance mitigation credits. Potentially benefiting transportation projects were identified in Chapter 5 for advance mitigation planning to guide advance mitigation project scoping. Actual benefiting transportation projects will be determined in the future. Caltrans and relevant natural resource regulatory agencies shall evaluate the appropriateness of using advance mitigation credits on a case-by-case basis as part of each future transportation project's permitting and technical assistance processes.

In this chapter, Caltrans summarizes the scheduling considerations and constraints of potential benefiting transportation projects in order to inform advance mitigation project schedules. A time frame for the forecast advance mitigation is provided and analyzed. The potentially benefiting transportation projects' acceleration priorities are documented in this chapter.

6.1 Why Timing is Important

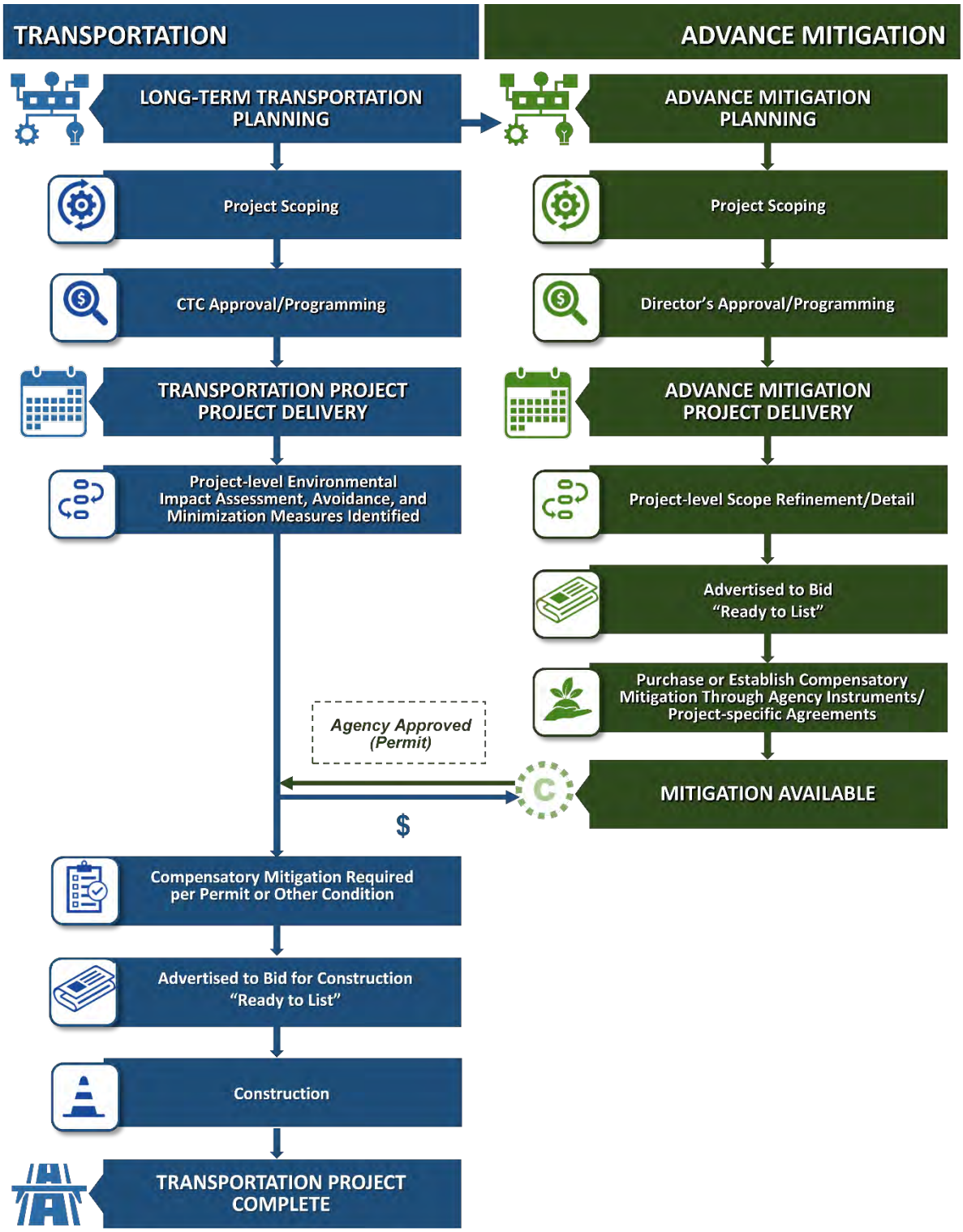
Broadly speaking, an advance mitigation project is an SHC § 800.6(a) authorized activity that consists of (1) purchasing compensatory mitigation that has been previously approved by the natural resource regulatory agencies through a conservation bank, mitigation bank, HCP/NCCP, or in-lieu fee program; or (2) establishing and receiving approval of compensatory mitigation credits, such as establishing a mitigation bank in accordance with existing laws, policies, procedures, templates, and guidance (see Table 1-1). Elaborated upon in Chapter 9, the time it takes to deliver each authorized activity varies; however, purchasing compensatory mitigation credits would likely take less time than establishing compensatory mitigation credits.

Caltrans transportation projects must have permits and compensatory mitigation lined up before advertising and selecting a contractor to bid upon and perform a transportation project (Figure 6-1). Hence, for advance mitigation project scoping, the Caltrans District's nomination of a specific advance mitigation project type will be contingent, in part, on the anticipated timing of the potentially benefiting transportation project impacts. This is because, to benefit transportation projects as intended, the compensatory mitigation purchased or established through an advance mitigation project will need to be available to meet actual transportation project permit conditions established through an environmental study and document process undertaken prior to the transportation project incurring impacts (Figure 6-1). The date when a Caltrans potential transportation project is expected to be Ready to List[1] is an appropriate estimate for identifying when a Caltrans

[1] Ready to List is a named milestone within the Caltrans project delivery process. It is the point when a complete package is ready for contractors to bid on and a transportation project has been approved to be advertised to bid for construction.

advance mitigation project will need to deliver compensatory mitigation to a potential benefiting transportation project.

Figure 6-1. Timing Advance Mitigation with Transportation Project Delivery



6.2 Patterns of Estimated Potential Impacts

Given that the planning horizon for this assessment covers the 2017/18 through 2026/27 fiscal years, and that some of the transportation projects may have already gone to bid, it is necessary to consider which of the transportation projects:

- Would need to acquire compensatory mitigation before the AMP can deliver and, hence, the AMP could not feasibly supply compensatory mitigation credits on the required schedule;
- Would need compensatory mitigation delivered in a nearer time frame, which may favor seeking already existing credit as an AMP advance mitigation project scope; or
- Would need compensatory mitigation farther out in time, and, if so, whether there is time to establish new compensatory mitigation.

Below, estimated impacts on aquatic resources are presented for each of the three HUC-8s in the GAI, followed by a discussion of potential co-impacted terrestrial special-status species impacts. Initial estimated impact patterns are based on the planned transportation project information provided in Table 5-1.

6.2.1. Mad-Redwood Sub-basin

As shown in Table 6-1 and in Figure 6-2, when the SHOPP transportation projects identified for the Mad-Redwood Sub-basin have their forecast impacts on threatened and endangered fish species examined relative to their expected advertising date, the compensatory mitigation needs for all fish species are almost entirely within the 2019/20 and 2021/22 fiscal years. However, some anticipated needs for SONCC coho salmon and longfin smelt occur in 2021/22, and needs for green sturgeon and longfin smelt occur within the 2023/24 fiscal year.

As shown in Table 6-2 and in Figure 6-3, when the SHOPP transportation projects identified for the Mad-Redwood Sub-basin have their wetland and non-wetland water resource impacts examined relative to their expected advertising date, the compensatory mitigation needs are clustered at the beginning of the 10-year planning horizon for both wetlands and non-wetland waters, with smaller needs during the 2021/22 and 2023/24 fiscal years.

Table 6-1. Estimated Impacts on Threatened and Endangered Fish Species in the Mad-Redwood Sub-basin, by Transportation Project Delivery Year

Expected Advertise-ment Year	Number of Transportation Projects	Coho Salmon Estimated Potential Impacts (acres)	Steelhead Estimated Potential Impacts (acres)	Chinook Salmon Estimated Potential Impacts (acres)	Green Sturgeon Estimated Potential Impacts (acres)	Longfin Smelt Estimated Potential Impacts (acres)	Tidewater Goby Estimated Potential Impacts (acres)	Forecast Percent-age	Forecast Cumulative Percentage
2017/18	1	0	0	0	0	0.1	0	0.3	0.3
2018/19	2	0	3.1	3.1	3.3	3.3	1.2	94.2	94.6
2019/20	2	0.1	0.3	0.1	0	0	0	3.0	97.5
2020/21	0	0	0	0	0	0	0	0	97.5
2021/22	2	0.1	0	0	0	0.1	0	1.3	98.8
2022/23	0	0	0	0	0	0	0	0	98.8
2023/24	1	0	0	0	0.1	0.1	0	1.2	100
2024/25	0	0	0	0	0	0	0	0	100
2025/26	0	0	0	0	0	0	0	0	100
2026/27	0	0	0	0	0	0	0	0	100
Total	**8**	**0.2**	**3.4**	**3.2**	**3.3**	**3.5**	**1.2**	**100%**	**100%**

Figure 6-2. Estimated Impacts on Threatened and Endangered Fish Species in the Mad-Redwood Sub-basin, by Transportation Project Delivery Year

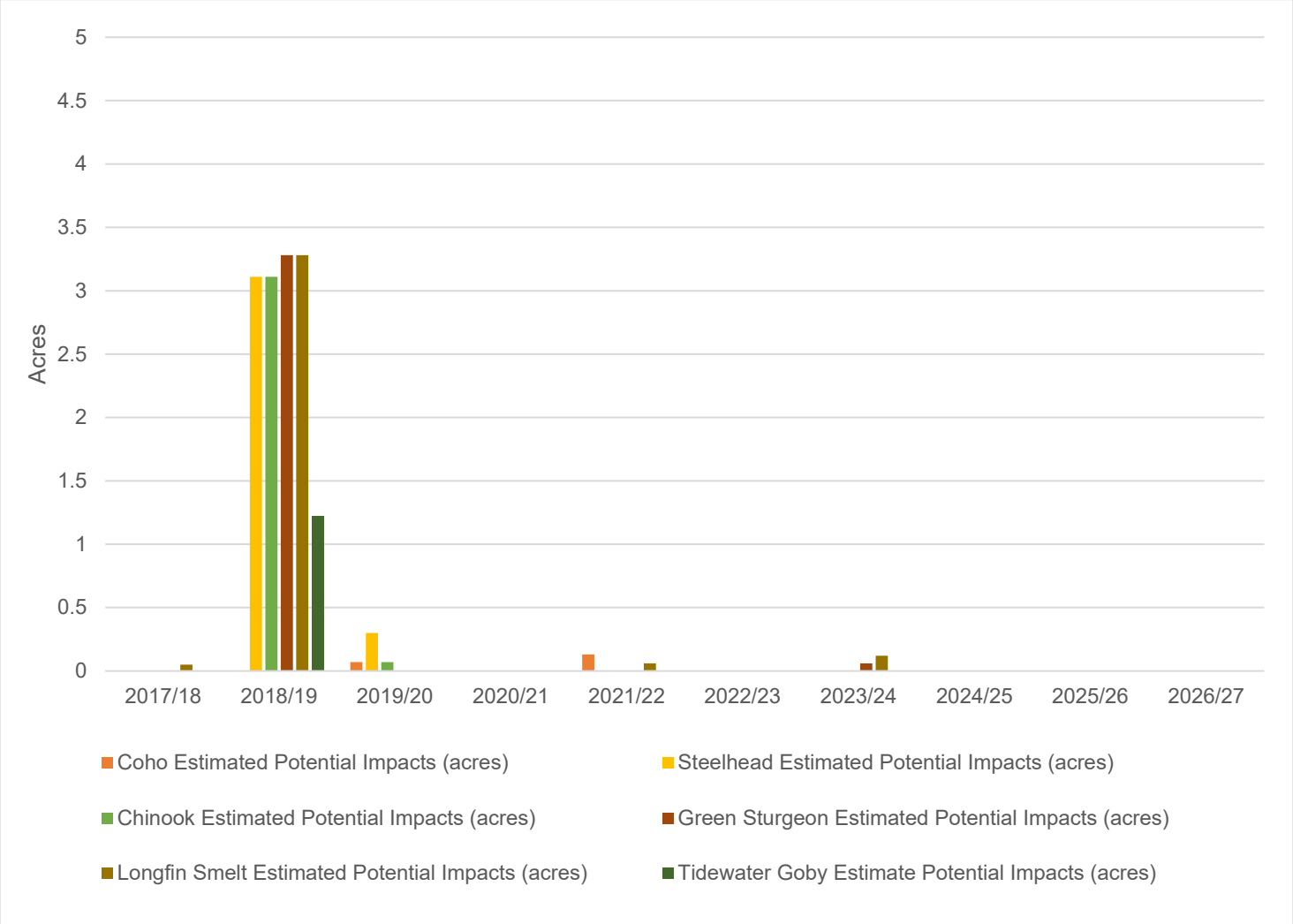
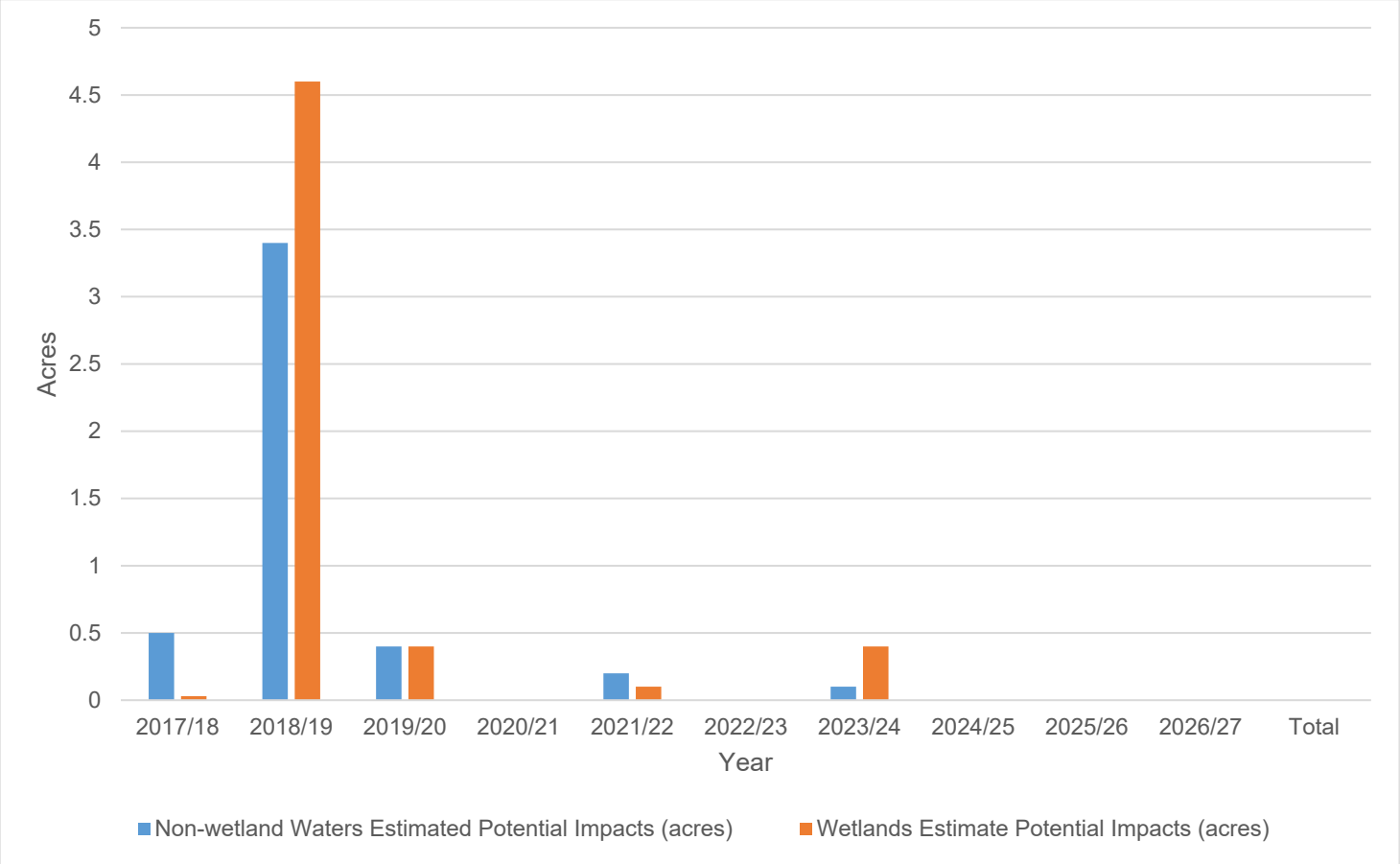


Table 6-2. Estimated Impacts on Wetland and Non-wetland Water Resources in the Mad-Redwood Sub-basin, by Transportation Project Delivery Year

Expected Advertisement Year	Non-wetland Waters Number of Transportation Projects	Non-wetland Waters Estimated Potential Impacts (acres)	Wetlands Number of Transportation Projects	Wetlands Estimated Potential Impacts (acres)	Forecast Percentage	Forecast Cumulative Percentage
2017/18	1	0.5	2	<0.1	0.8	0.8
2018/19	2	3.4	2	4.6	82.0	82.8
2019/20	3	0.4	5	0.4	8.7	91.5
2020/21	0	0	0	0	0	91.5
2021/22	2	0.2	2	0.1	3.4	94.9
2022/23	0	0	0	0	0	94.9
2023/24	1	0.1	1	0.4	5.2	100
2024/25	0	0	0	0	0	100
2025/26	0	0	0	0	0	100
2026/27	0	0	0	0	0	100
Total	**9**	**4.2**	**12**	**5.6**	**100%**	**100%**

Figure 6-3. Estimated Impacts on Wetland and Non-wetland Water Resources in the Mad-Redwood Sub-basin, by Transportation Project Delivery Year



6.2.2. Lower Eel Sub-basin

As shown in Table 6-3 and in Figure 6-4, when the SHOPP transportation projects identified for the Lower Eel Sub-basin have their forecast impacts on threatened and endangered fish species examined relative to their expected advertising date, the compensatory mitigation needs for all fish species are spread throughout the 10-year planning horizon, with the majority of impacts on steelhead and Chinook anticipated to occur during the 2022/23 fiscal year.

As shown in Table 6-4 and in Figure 6-5, when the SHOPP transportation projects identified for the Lower Eel Sub-basin have their wetland and non-wetland water resource impacts examined relative to their expected advertising date, the compensatory mitigation needs are spread throughout the 10-year planning horizon for both wetlands and non-wetland waters, with larger needs during the 2025/26 fiscal year.

Table 6-3. Estimated Impacts on Threatened and Endangered Fish Species in the Lower Eel Sub-basin, by Transportation Project Delivery Year

Expected Advertisement Year	Number of Transportation Projects	Coho Estimated Potential Impacts (acres)	Steelhead Estimated Potential Impacts (acres)	Chinook Estimated Potential Impacts (acres)	Longfin Smelt Estimated Potential Impacts (acres)	Forecast Percentage	Forecast Cumulative Percentage
2017/18	0	0	0	0	0	0	0
2018/19	1	0	0.4	0.1	0.4	19.4	19.4
2019/20	1	0	0	0	<0.1	0.9	20.3
2020/21	0	0	0	0	0	0	20.3
2021/22	1	0	0	0	0.4	8.4	28.7
2022/23	1	0	1.0	1.0	0	47.0	75.6
2023/24	1	0	<0.1	<0.1	0	0.9	76.5
2024/25	0	0	0	0	0	0	76.5
2025/26	1	0	0.1	<0.1	1.0	23.5	100
2026/27	0	0	0	0	0	0	100
Total	**6**	**0**	**1.5**	**1.2**	**1.8**	**100%**	**100%**

Figure 6-4. Estimated Impacts on Threatened and Endangered Fish Species in the Lower Eel Sub-basin, by Transportation Project Delivery Year

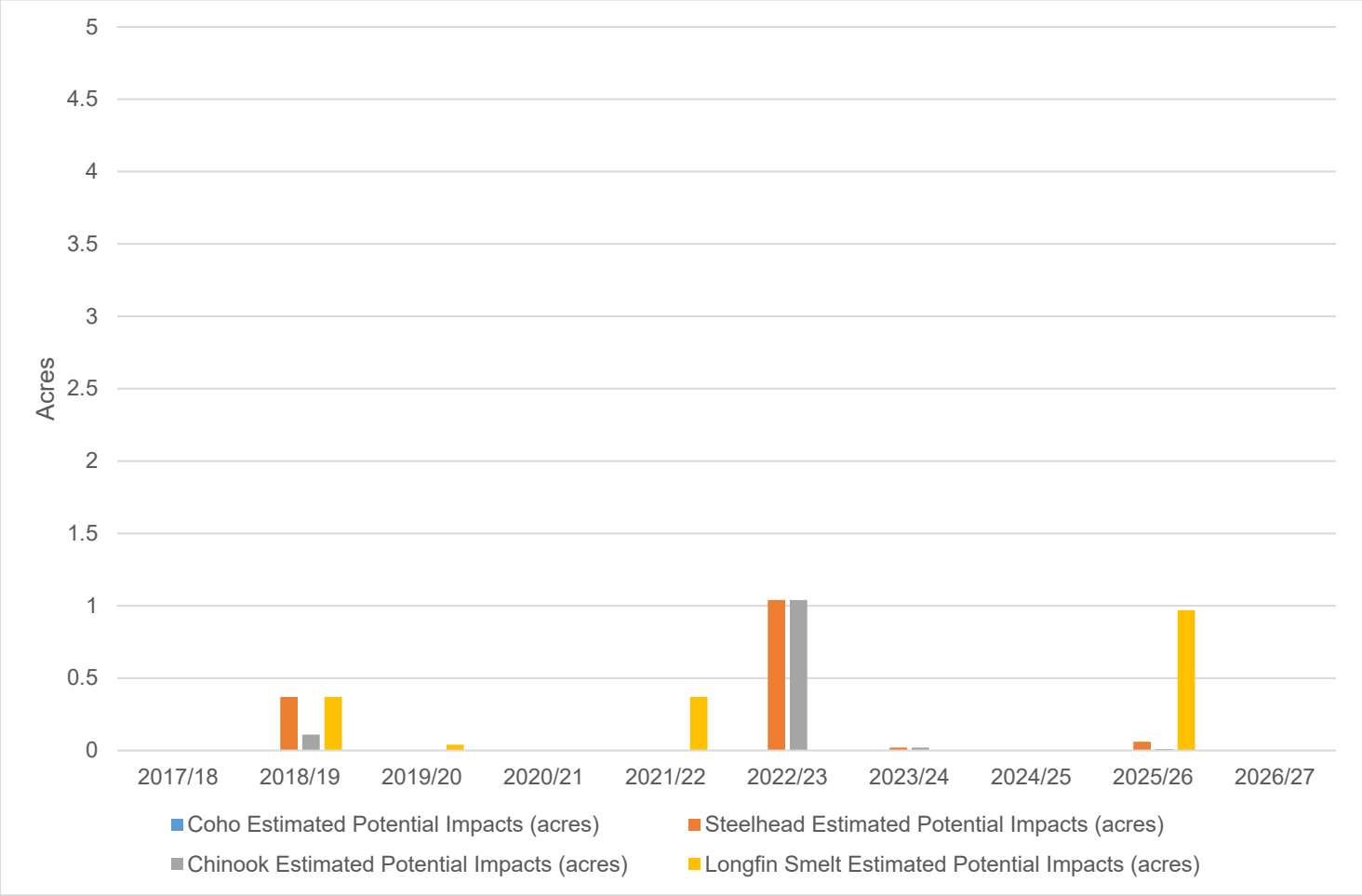
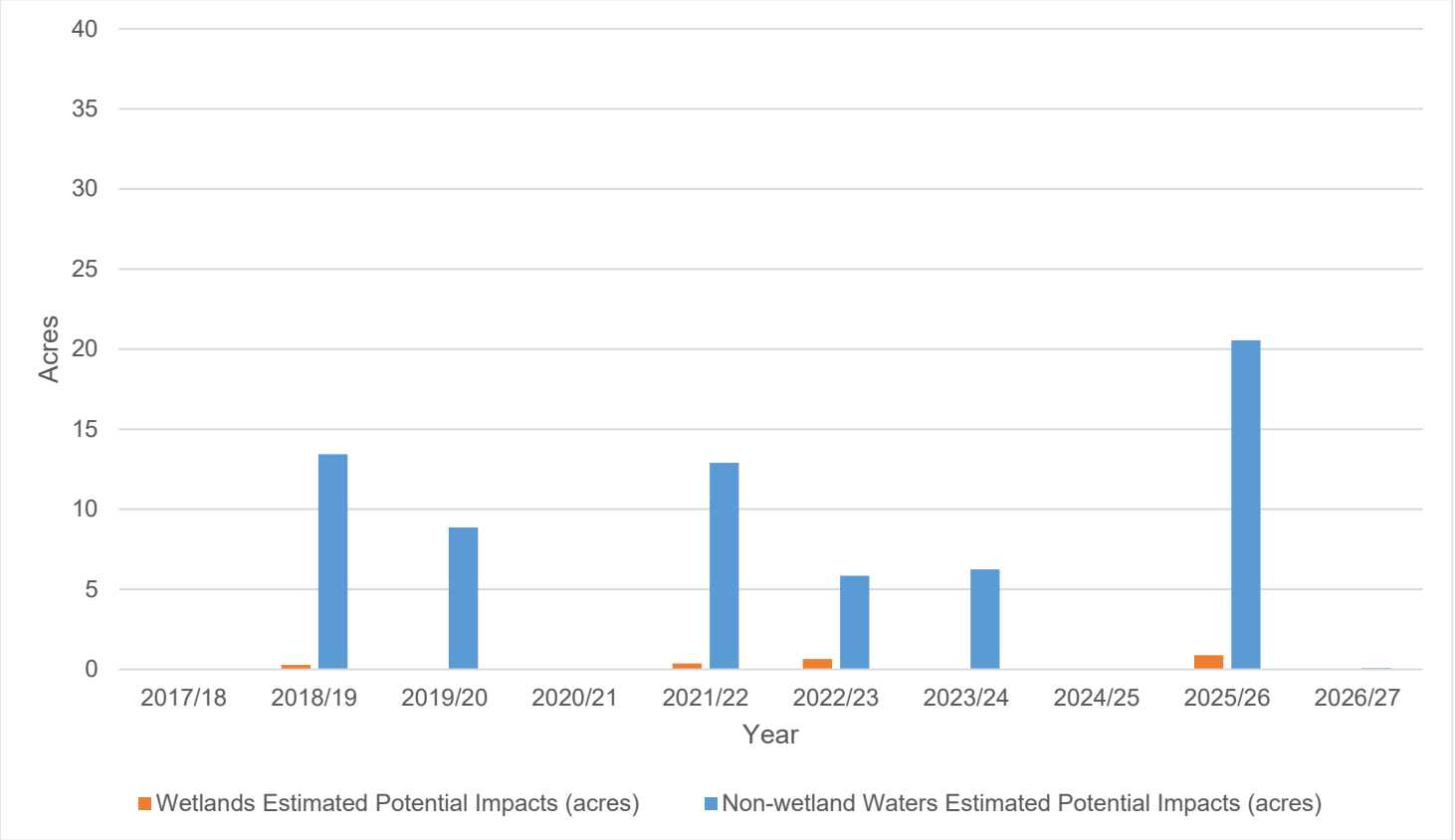


Table 6-4. Estimated Impacts on Wetland and Non-wetland Water Resources in the Lower Eel Sub-basin, by Transportation Project Delivery Year

Expected Advertisement Year	Non-wetland Waters Number of Transportation Projects	Non-wetland Waters Estimated Potential Impacts (acres)	Wetlands Number of Transportation Projects	Wetlands Estimated Potential Impacts (acres)	Forecast Percentage	Forecast Cumulative Percentage
2017/18	0	0	0	0	0	0
2018/19	3	13.4	2	0.3	19.5	19.5
2019/20	2	8.9	0	0	12.6	32.2
2020/21	0	0	0	0	0	32.2
2021/22	1	12.9	1	0.4	18.9	51.1
2022/23	1	5.9	1	0.7	9.3	60.3
2023/24	3	6.3	3	<0.1	9.0	69.3
2024/25	0	0	0	0	0	69.3
2025/26	1	20.5	1	0.9	30.5	99.8
2026/27	1	0.1	1	<0.1	0.2	100
Total	**12**	**67.9**	**9**	**2.3**	**100%**	**100%**

Figure 6-5. Estimated Impacts on Wetland and Non-wetland Water Resources in the Lower Eel Sub-basin, by Transportation Project Delivery Year



6.2.3. South Fork Eel Sub-basin

As shown in Table 6-5 and in Figure 6-6, when the SHOPP transportation projects identified for the South Fork Eel Sub-basin have their forecast impacts on threatened and endangered fish species examined relative to their expected advertising date, the compensatory mitigation needs for steelhead and Chinook salmon are clustered in the middle of the 10-year planning horizon, with the majority of impacts on these species anticipated to occur during the 2022/23 fiscal year.

As shown in Table 6-6 and in Figure 6-7, when the SHOPP transportation projects identified for the South Fork Eel Sub-basin have their wetland and non-wetland water resource impacts examined relative to their expected advertising date, the compensatory mitigation needs are spread throughout the 10-year planning horizon for both wetlands and non-wetland waters, with larger needs during the 2023/24 and 2025/26 fiscal years.

Table 6-5. Estimated Impacts on Threatened and Endangered Fish Species in the South Fork Eel Sub-basin, by Transportation Project Delivery Year

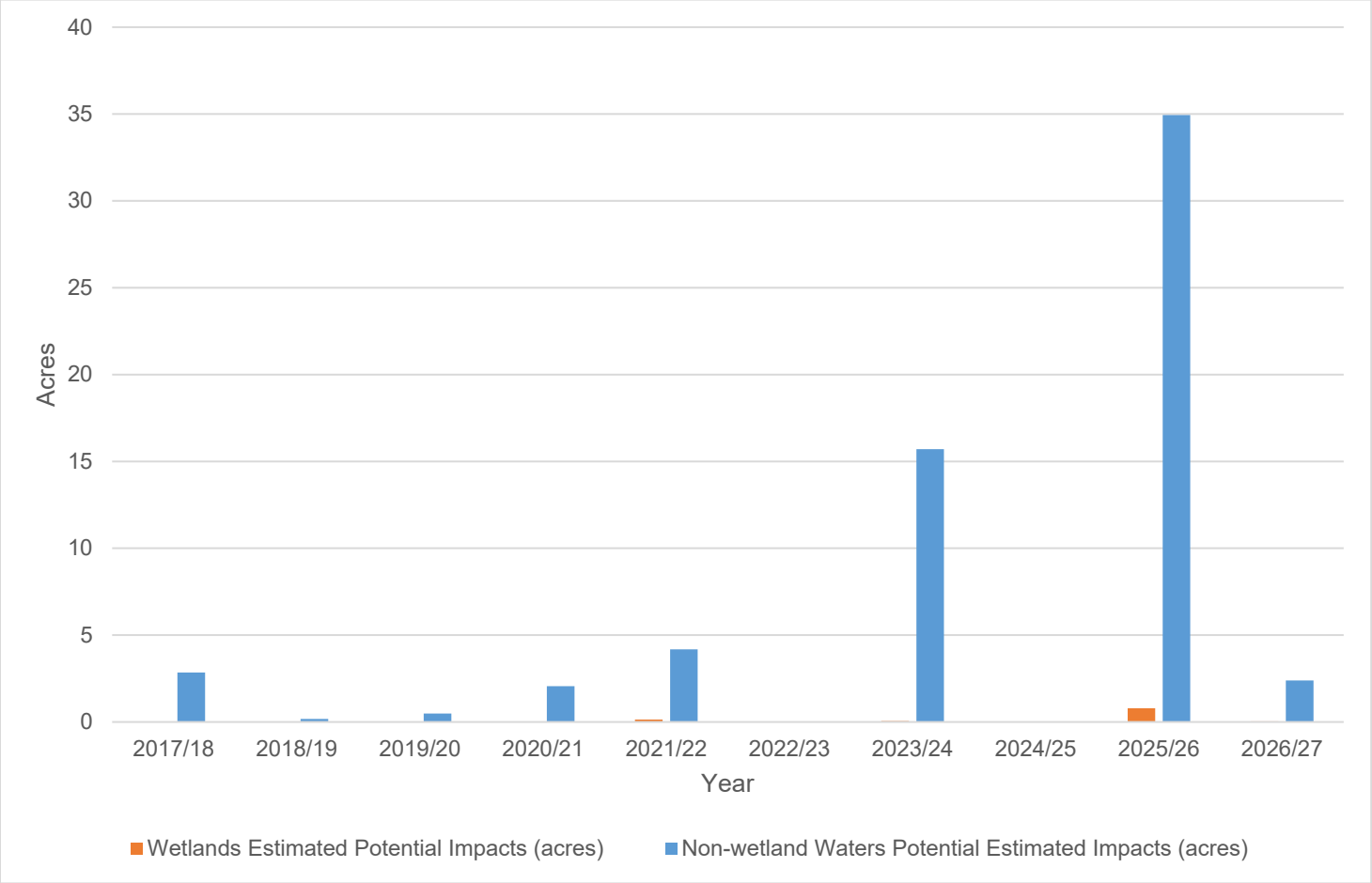
Expected Advertise-ment Year	Number of Transportation Projects	Coho Estimated Potential Impacts (acres)	Steelhead Estimated Potential Impacts (acres)	Chinook Estimated Potential Impacts (acres)	Green Sturgeon Estimated Potential Impacts (acres)	Longfin Smelt Estimated Potential Impacts (acres)	Tidewater Goby Estimated Potential Impacts (acres)	Forecast Percent-age	Forecast Cumulative Percentage
2017/18	1	0	0.1	0.1	0	0	0	8.5	8.5
2018/19	0	0	0	0	0	0	0	0	8.5
2019/20	1	0	0	<0.1	0	0	0	0.9	9.4
2020/21	1	0	<0.1	<0.1	0	0	0	0.9	10.2
2021/22	2	0	0.2	0.2	0	0	0	17.9	28.1
2022/23	0	0	0	0	0	0	0	0	28.1
2023/24	0	0	0	0	0	0	0	0	28.1
2024/25	0	0	0	0	0	0	0	0	28.1
2025/26	2	0	0.5	1.2	0	0	0	71.9	100
2026/27	0	0	0	0	0	0	0	0	100
Total	**7**	**0**	**0.8**	**1.6**	**0**	**0**	**0**	**100%**	**100%**

Figure 6-6. Estimated Impacts on Threatened and Endangered Fish Species in the South Fork Eel Sub-basin, by Transportation Project Delivery Year

Table 6-6. Estimated Impacts on Wetland and Non-wetland Water Resources in the South Fork Eel Sub-basin, by Transportation Project Delivery Year

Expected Advertisement Year	Non-wetland Waters Number of Transportation Projects	Non-wetland Waters Estimated Potential Impacts (acres)	Wetlands Number of Transportation Projects	Wetlands Estimated Potential Impacts (acres)	Forecast Percentage	Forecast Cumulative Percentage
2017/18	1	2.9	0	0	4.5	4.5
2018/19	1	0.2	1	<0.1	0.3	4.7
2019/20	1	0.5	1	<0.1	0.8	5.5
2020/21	1	2.1	0	0	3.2	8.7
2021/22	2	4.2	2	0.1	6.8	15.5
2022/23	0	0	0	0	0	15.5
2023/24	3	15.7	2	0.1	24.7	40.2
2024/25	0	0	0	0	0	40.2
2025/26	2	34.9	2	0.8	56.0	96.2
2026/27	1	2.4	1	<0.1	3.8	100
Total	**12**	**62.8**	**9**	**1.0**	**100%**	**100%**

Figure 6-7. Estimated Impacts on Wetland and Non-wetland Water Resources in the South Fork Eel Sub-basin, by Transportation Project Delivery Year



6.2.4. Co-occurring Wildlife Habitat Impacts

This RAMNA focuses on assessing aquatic resource compensatory mitigation needs. However, as described in Section 5.3, impacts on special-status wildlife species are anticipated to occur as a result of the 39 SHOPP transportation projects, as well. Because there may be an opportunity to benefit terrestrial species as well as aquatic resources through an advance mitigation project, the timing of estimated impacts on aquatic habitats utilized by terrestrial wildlife species within the GAI are described by ecoregion section below. Potentially co-occurring terrestrial wildlife species were identified in Table 5-9 and consist of those special-status terrestrial species that utilize aquatic habitats.

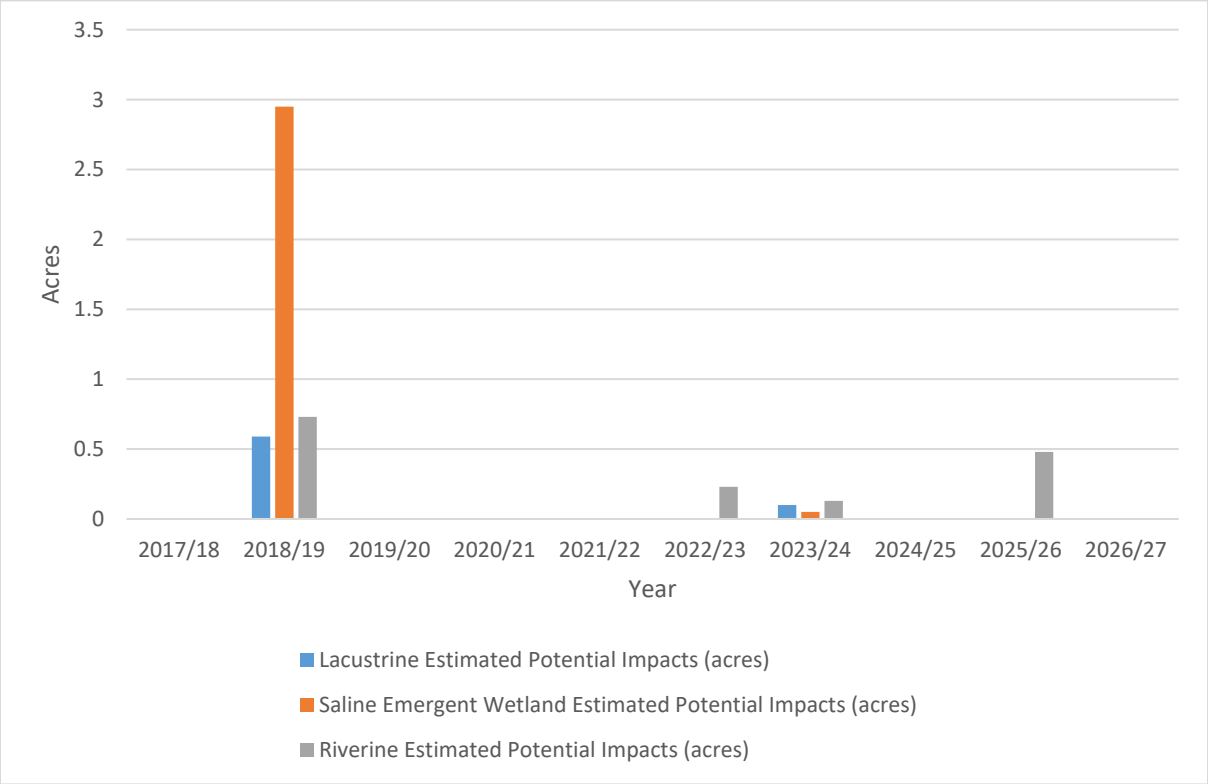
Northern California Coast Ecoregion Section

Ecoregion sections are described in Section 2.1. The majority of the GAI and the majority of planned transportation projects are located within the Northern California Coast Ecoregion Section. As shown in Table 6-7 and in Figure 6-8, when the SHOPP transportation projects identified for the Northern California Coast Ecoregion Section have their forecast impacts on co-occurring wildlife habitats examined relative to their expected advertising date, the compensatory mitigation needs for these habitats are largely focused during the 2018/19 fiscal year.

Table 6-7. Estimated Impacts on Co-occurring Terrestrial Wildlife Species in Northern California Coast Ecoregion Section, by Transportation Project Delivery Year

Expected Advertisement Year	Number of Transportation Projects	Co-occurring Wildlife Habitat Potential Impacts (acres)	Forecast Percentage	Forecast Cumulative Percentage
2017/18	0	0	0	0
2018/19	1	4.3	81.1	81.1
2019/20	0	0	0	81.1
2020/21	0	0	0	81.1
2021/22	0	0	0	81.1
2022/23	1	0.2	3.8	84.9
2023/24	4	0.3	5.7	90.6
2024/25	0	0	0	90.6
2025/26	2	0.5	9.4	100
2026/27	0	0	0	100
Total	**9**	**5.3**	**100%**	**100%**

Figure 6-8. Estimated Impacts on Co-occurring Terrestrial Wildlife Habitat in Northern California Coast Ecoregion Section, by Transportation Project Delivery Year



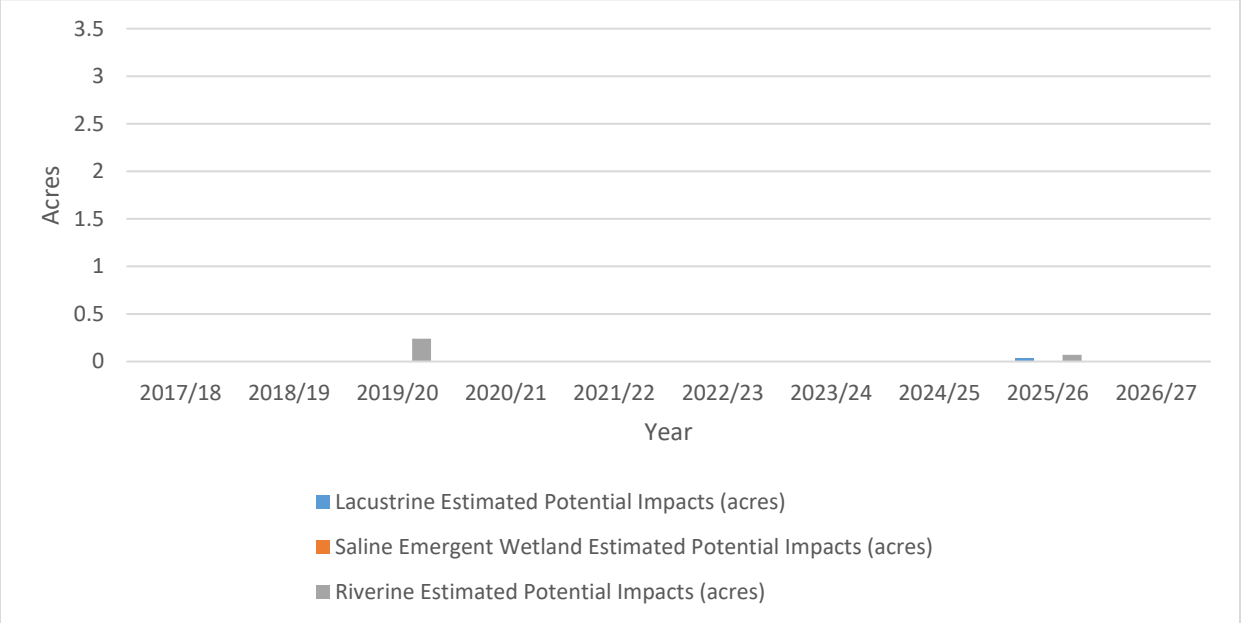
Northern California Coast Ranges Ecoregion Section

Ecoregion sections are described in Section 2.1. Although the GAI overlaps a larger area within the Northern California Coast Ranges Ecoregion Section, only a few transportation projects are planned in this section. As shown in Table 6-8 and in Figure 6-9, when the SHOPP transportation projects identified for the Northern California Coast Ranges Ecoregion Section have their forecast impacts on co-occurring wildlife habitats examined relative to their expected advertising date, the compensatory mitigation needs for these species occur primarily during the 2018/19 fiscal year, with smaller needs during the 2025/26 fiscal year.

Table 6-8. Estimated Impacts on Co-occurring Terrestrial Wildlife Habitat in Northern California Coast Ranges Ecoregion Section, by Transportation Project Delivery Year

Expected Advertisement Year	Number of Transportation Projects	Co-occurring Species Potential Impacts (acres)	Forecast Percentage	Forecast Cumulative Percentage
2017/18	0	0	0	0
2018/19	0	0	0	0
2019/20	2	0.2	66.7	66.7
2020/21	0	0	0	66.7
2021/22	0	0	0	66.7
2022/23	0	0	0	66.7
2023/24	0	0	0	66.7
2024/25	0	0	0	66.7
2025/26	1	0.1	33.3	100
2026/27	0	0	0	100
Total	**3**	**0.3**	**100%**	**100.0**

Figure 6-9. Estimated Impacts on Co-occurring Terrestrial Wildlife Habitat in Northern California Coast Ranges Ecoregion Section, by Transportation Project Delivery Year



6.3 Acceleration Priorities

Caltrans' transportation project sequence prioritization reflects the updated information provided in the 2017/18 to 2026/27 (Quarter 2) SHOPP Ten-Year Book and is based on meeting the District's needs and performance targets while financially balancing the District's accounts. As a result of the dynamic nature of transportation planning, since the 2017/18 to 2026/27 (Quarter 4) SHOPP Ten-Year Book was published, delivery schedules associated with 13 transportation projects have changed.

The following projects will be delayed, based on the current SHOPP Ten-Year Book (2021, Quarter 1):

- SHOPP Project ID 9246 will be delayed from 2018/19 to 2021/22.
- SHOPP Project ID 13533 will be delayed from 2019/20 to 2021/22.
- SHOPP Project ID 16442 will be delayed from 2019/20 to 2021/22.
- SHOPP Project ID 18636 will be delayed from 2019/20 to 2021/22.
- SHOPP Project ID 18710 will be delayed from 2023/24 to 2025/26.
- SHOPP Project ID 18757 will be delayed from 2022/23 to 2024/25.
- SHOPP Project ID 19296 will be delayed from 2023/24 to 2024/25.
- SHOPP Project ID 20270 will be delayed from 2026/27 to 2028/29
- SHOPP Project ID 20286 will be delayed from 2025/26 to 2028/29.

Additionally, at this time, the following project will be accelerated:

- SHOPP Project ID 20847 will be accelerated from 2023/24 to 2021/22.

The following projects have been excluded from the most current Ten-Year Book (2021, Quarter 1):

- SHOPP Project IDs 18709, 18823, 19426, and 20285

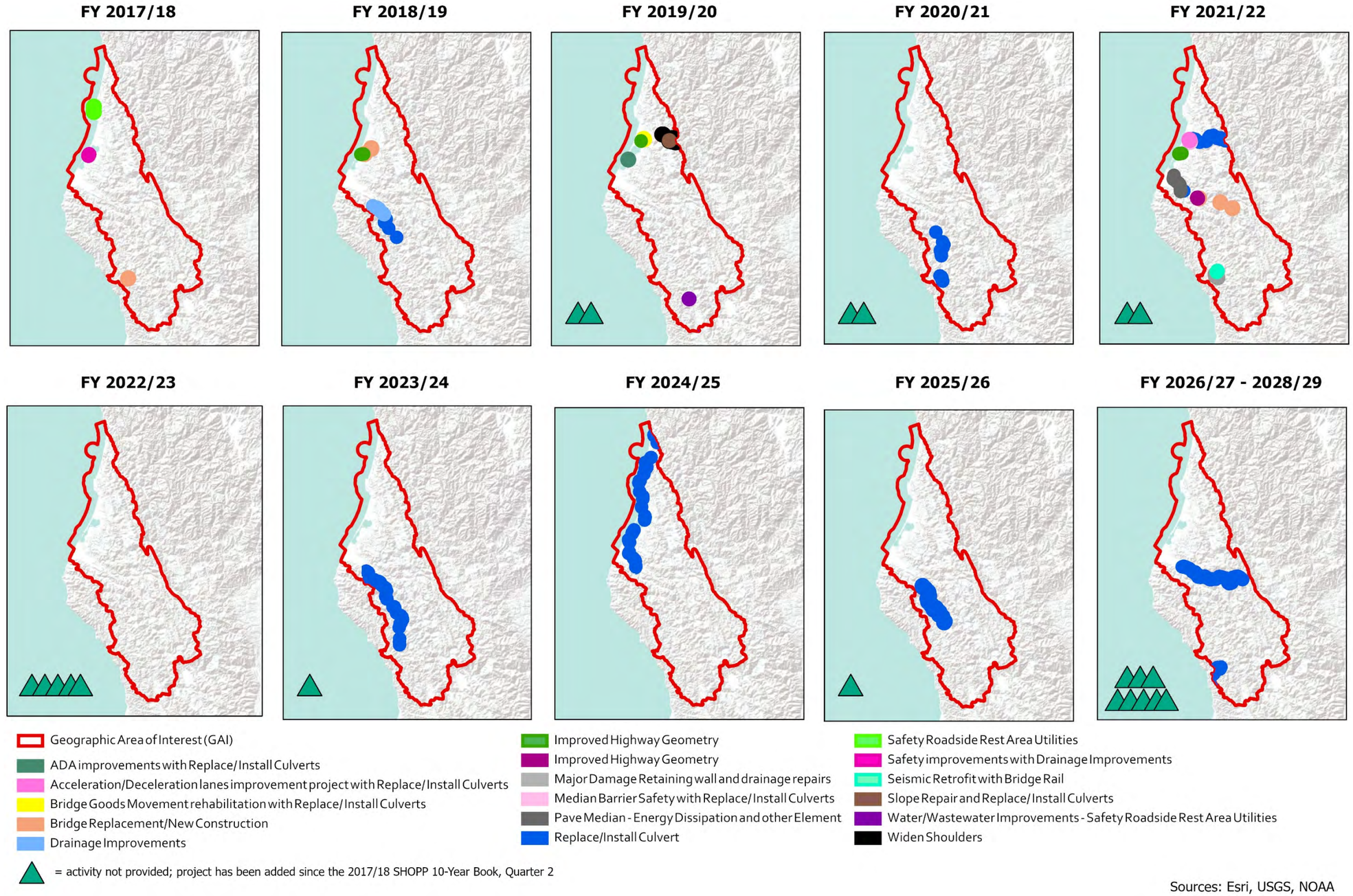
However, the following projects have been added to the most current Ten-Year Book (2021, Quarter 1):

- SHOPP Project IDs 19292, 16814, 13440, 18984, 21406, 21782, 21685, 11251, 16431, 13324, 16895, 22686, 16446, 22256, 21606, 21701, 21605, 22238, 18006, 22527, 20620, 21137, 22198, 17275, 20254, 21152, 21085, 20851, 19286, 19288, 20246, 22312, 21945, 18992, 19290, 20245, 20250, and 21336

As shown in Tables 6-1 through 6-6 and Figures 6-2 through 6-7, which are based on Quarter 2 of the Ten-Year Book, most impacts on aquatic resources in the Mad-River sub-basin are forecast for the beginning of the 10-year period evaluated in the SAMNA, while impacts on the Lower Eel and South Fork Eel sub-basins are forecast for the middle to late part of the 10-year period evaluated. Similarly, as shown in Tables 6-7 and 6-8 and Figures 6-8 and 6-9, most impacts on the species that co-occur with aquatic resources in both ecoregions were forecast toward the beginning of the 10-year period evaluated in the SAMNA, with additional impacts near the end of the 10-year period, 2017/18 to 2016/27.

At this time, the Road Repair and Accountability Act of 2017 (also known as Senate Bill 1) priorities are the District's priorities, which generally fall in the middle and end of the 10-year assessment period. Figure 6-10 illustrates the location of the prioritized transportation projects, by year.

Figure 6-10. Location of Estimated Impacts, by Transportation Project Delivery Year



Note: SHOPP transportation projects are listed in Table 5-1. SHOPP projects shown above are listed by year, below. Projects identified with a "*" are a priority for delivery based on Senate Bill 1 funding. Additionally, "^" indicates that a project has been added since the 2017/18 SHOPP Ten-Year Book, Quarter 2, and it is not shown in Figure 6-10.
2017/18: 13152, 13206, 13206
2018/19: 15896, 13148, 13032, 15649, 17391
2019/20: 9269, 13303*, 13439, 13475, 16450, 16610*, 17235, 17209, 11314, 13324^, 21606^
2020/21: 15993*, 11251^, 17275^
2021/22: 9246*, 13533, 16442, 18135, 18636, 14178, 16428, 17073*, 13636*, 18761, 20847, 16814^
2022/23: 19292^,19286^, 19288^, 19290^, 21336^
2023/24: 19295*, 21085^
2024/25: 18757*, 19296*
2025/26: 18710*, 20250^
2026/27: 16446^, 22256^, 20245^
2027/28: 21137^, 20246^
2028/29: 20286*, 20270*, 21685^, 20254^, 21152^

7. WILDLIFE RESOURCES CONSERVATION GOALS AND OBJECTIVES

Caltrans' primary objective for wildlife resources is to avoid and minimize all impacts on special-status species from Caltrans transportation projects in the GAI. However, when avoidance and minimization are insufficient or infeasible, compensatory mitigation may be used to offset impacts. Credits or values established through SHC § 800.6(a)-authorized advance mitigation projects offer the unique opportunity to consolidate needed compensatory mitigation. This consolidation helps to provide strategically placed and environmentally sound enhanced, restored, or created habitat and an improved environmental outcome that may not be available through the usual transportation project-by-project approach to compensatory mitigation.

Caltrans seeks to align its advance mitigation projects with natural resource regulatory agencies' goals and objectives, and thus contribute to an improved environmental outcome within the GAI. With this in mind, this chapter presents Caltrans' understanding of natural resource regulatory agencies' regional conservation goals and objectives that could be applied to advance mitigation projects undertaken in the GAI to offset forecast impacts on wildlife resources from SHOPP-eligible transportation projects.

The goals and objectives assembled for this chapter are intended to guide Caltrans' advance mitigation project scoping decisions toward those choices that provide the greatest environmental benefit available through the advance mitigation planning and delivery processes. Such projects undertaken by Caltrans should contribute to wildlife resource protection and enhancement and should yield compensatory mitigation usable by future transportation projects, as specified in SHC § 800.[1] Compensatory mitigation usable by future transportation projects should be expressed in standard units or terms recognized by the natural resource regulatory agencies.

Information presented in this chapter is for advance mitigation project scoping purposes only. Transportation projects must still go through environmental and permitting processes and must demonstrate avoidance and minimization efforts prior to compensation.

7.1 Approach

For the purposes of this RAMNA, conservation goals and objectives are a broad set of regional natural resource sustainability goals and objectives that are consistent with both regulatory requirements and conservation science. To determine the wildlife resource conservation goals and objectives applicable to the GAI, Caltrans:

[1] Pursuant to SHC § 800.9, to the maximum extent practicable, the information required for an RCIS is presented here. During CDFW's review of an RCIS, CDFW determines whether the goals and objectives presented in the RCIS are consistent with FGC § 1852, subdivision (c)(8).

- First, in Section 7.2, identifies the natural resource regulatory agencies with the authority to condition transportation projects with wildlife resource-related compensatory mitigation in the GAI.
- Then, in Section 7.3, considering that Caltrans has focused this assessment on aquatic resources (Section 1.5), from the hundreds of wildlife resources evaluated through the SAMNA (Appendix E), identifies special-status species that could potentially co-benefit from aquatic resources mitigation.
- Next, in Sections 7.4, 7.5, and 7.6, for special-status species that may benefit from aquatic resources mitigation, identifies:
  - Federal and state binding and non-binding regional conservation and land management plans.
  - Current and projected pressures and stressors for which there is a potential transportation nexus.
  - Opportunities to benefit wildlife resources along with aquatic resources through advance mitigation.
- Last, analyzes the aforementioned information in relation to the transportation-related activities that could potentially impact special-status species that might benefit from aquatic resources mitigation in the GAI, and the potential range of compensatory mitigation that could satisfy a future transportation project condition associated with the activities.

The result of this analysis is a framework of conservation goals and objectives for use in advance mitigation project scoping (Section 7.7).

7.2 Natural Resource Regulatory Agencies with Wildlife Resources Oversight

Table 7-1 lists the natural resource regulatory agencies with the authority to condition transportation projects delivered in the GAI with wildlife resource-related compensatory mitigation. The aquatic resources used by wildlife, such as streams, wetlands, and non-wetland waters, are also regulated by other natural resource regulatory agencies. This RAMNA identifies goals and objectives for aquatic resources, including fish species, separately in Chapter 8.

Table 7-1. Natural Resource Regulatory Agencies with Wildlife Resources Oversight

Agency[a]	Summary
CCC	CCC protects the coast by planning for and regulating new development in the coastal zone pursuant to the policies of the Coastal Act. Through the issuance of CDPs, CCC implements the policies of the Coastal Act, including protecting sensitive resources, water quality, public access to the coast, etc. CCC also coordinates with local governments in developing and certifying LCPs, which allow local governments to assume the authority to issue CDPs within their jurisdiction. The agency also provides comprehensive guidance to local governments and project applicants regarding planning for and adapting to climate change and sea-level rise. The CCC, agency, or authorized local government with a certified LCP also determines how an ESHA is defined, either as specific species habitats or as geographic areas because of the presence of rare or valuable plants or animal species or habitat. Areas designated as ESHAs are also typically threatened by habitat fragmentation, disturbance, degradation, or other anthropogenic factors.
CDFW – Region 1, Northern	CDFW oversees the conservation, protection, and management of fish, wildlife, native plants, and the habitats necessary for biologically sustainable populations of those species in California. Additionally, CDFW's Environmental Review and Permitting, Conservation and Mitigation Banking, NCCP, and RCIS programs implement sections of the FGC, Title 14 of the California Code of Regulations, and Public Resources Code § 21000, et seq. These programs help fulfill CDFW's mission to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values. CDFW issues permits and agreements to project proponents under its authorities including incidental take permits and consistency determinations under CESA, Lake and Streambed Alteration Agreements, approvals of conservation and mitigation banks, approvals of MCAs and RCISs, and NCCP permits. NCCP permits can authorize the take of fully protected species.
FWS	FWS regulates all federally protected wildlife species and critical habitats, and requires consultation and coordination to be in compliance with the ESA. FWS authorities, including its role in mitigation, are codified under multiple statutes that address management and conservation of natural resources from many perspectives including, but not limited to, the effects of land, water, and energy development on fish, wildlife, plants, and their habitats. FWS approves HCPs to address impacts on federally protected species, for projects lacking a federal nexus, under ESA § 10(a)1(B). For projects with a federal nexus and potential impacts on federally protected species, FWS issues biological opinions under Section 7 of the ESA and addresses impacts on specific marine mammals (sea otters in California) under the Marine Mammal Protection Act.
NMFS	NMFS regulates all federally protected fish and wildlife marine species and critical habitats and requires consultation and coordination to be in compliance with the ESA. Similar to FWS, NMFS manages wildlife and fisheries resources in the marine and estuarine environment. NMFS issues biological opinions under Section 7 of the ESA for projects that may affect federally listed species managed by the agency. In addition, NMFS manages marine mammals under the Marine Mammal Protection Act, with the exception of sea otters, which are managed by FWS. NMFS is also responsible for addressing impacts on EFH under the Magnuson-Stevens Fishery Conservation and Management Act.

[a] In addition to the agencies listed above, the Water Boards may exert jurisdiction over species to the extent that WILD/RARE/WARM/COLD/SPWN beneficial uses exist and would be affected by a project.

7.3 Wildlife Resources Overview

A summary of special-status species in the GAI is provided in Section 2.8 and a complete list of special-status terrestrial species, including wildlife, with potential to occur in the GAI is provided in Appendix E.

As described in Section 1.5, to improve the probability that advance mitigation projects undertaken by Caltrans will yield credits (or similar) that will be usable during the planning period, Caltrans focused this regional planning effort on aquatic resources. Because some wildlife species depend on aquatic habitats, there is potential for species to co-benefit from aquatic resources advance mitigation. Hence, special-status terrestrial wildlife species known to occur in the GAI and that utilize aquatic habitats during one or more of their life stages are listed in Table 7-2.

Table 7-2. Special-status Wildlife Species Known to Occur in the GAI that Utilize Aquatic Habitat for One or More Life Stages

Scientific Name	Common Name	Status	Aquatic Habitat Species is Known to Occur In
Amphibians	See below	See below	See below
Ascaphus truei	coastal tailed frog	SSC	Riverine
Rana aurora	northern red-legged frog	SSC, FS	Lacustrine and Riverine
Rana boylii	foothill yellow-legged frog	SSC, FS	Riverine
Rhyacotriton variegatus	southern torrent salamander	SSC, FS	Riverine
Reptiles	See below	See below	See below
Emys marmorata[a]	western pond turtle	SSC, FS	Lacustrine and Riverine
Birds	See below	See below	See below
Ardea alba	great egret	SFS	Lacustrine, Riverine, and Saline Emergent Wetland
Ardea herodias	great blue heron	SFS	Lacustrine, Riverine, and Saline Emergent Wetland
Asio flammeus	short-eared owl	SSC	Saline Emergent Wetland
Aythya americana	redhead	SSC	Lacustrine, Riverine, and Saline Emergent Wetland

Scientific Name	Common Name	Status	Aquatic Habitat Species is Known to Occur In
Branta bernicla	brant	SSC	Saline Emergent Wetland
Chaetura vauxi	Vaux's swift	SSC	Lacustrine and Riverine
Charadrius nivosus	western snowy plover	FT, SSC	Lacustrine
Circus hudsonius	northern harrier	SSC	Lacustrine, Riverine, and Saline Emergent Wetland
Elanus leucurus	white-tailed kite	FS, SFP	Saline Emergent Wetland
Falco peregrinus	peregrine falcon	FS, SFP	Lacustrine, Riverine, and Saline Emergent Wetland
Gavia immer	common loon	SSC	Lacustrine
Haliaeetus leucocephalus	bald eagle	FS, SE, SFP, SFS	Lacustrine, Riverine, and Saline Emergent Wetland
Histrionicus histrionicus	harlequin duck	SSC	Riverine
Pandion haliaetus	osprey	SFS	Lacustrine, Riverine, and Saline Emergent Wetland
Passerculus sandwichensis alaudinus	Bryant's savannah sparrow	SSC	Saline Emergent Wetland
Progne subis	purple martin	SSC	Lacustrine and Riverine
Mammals	See below	See below	See below
Antrozous pallidus	pallid bat	FS, SSC	Riverine
Coryrorhinus townsendi	Townsend's big-eared bat	FS, SSC	Riverine
Myotis evotis	long-eared myotis	FS	Lacustrine and Riverine
Myotis thysanodes	fringed myotis	FS	Lacustrine and Riverine
Myotis yumanensis	Yuma myotis	FS	Lacustrine and Riverine

Notes: FS = federal sensitive, FT = federal threatened, SE = state endangered, SSC = species of special concern (CDFW), SFP = state fully protected, SFS = state fire sensitive
[a] Not included in SAMNA results

7.4 Regional Conservation Efforts

Caltrans' understanding of natural resource regulatory agency conservation goals and objectives is that they are generally designed to protect existing populations and habitat, and include acquiring, protecting, restoring, and/or enhancing habitat and linkages. Several conservation and land management plans listed in Table 3-1 identify key habitats or designate specific lands or areas to protect for conservation of special-status wildlife species in the GAI. For example, several LCPs listed in Appendix D include ESHAs with species attributes. These conservation and land management plans are presented in Table 7-3.

7.5 Pressures and Stressors

Pressures and stressors refer to environmental trends or physical, chemical, or biological factors or conditions that affect special-status wildlife species in the GAI or their habitat. According to the SWAP (CDFW 2015), a pressure is defined as "an anthropogenic (human-induced) or natural driver that could result in changing the ecological conditions of the target. Pressures can be positive or negative depending on intensity, timing, and duration. Negative or positive, the influence of a pressure to the target is likely to be significant." Additionally, stress is defined in the SWAP as "[a] degraded ecological condition of a target that resulted directly or indirectly from negative impacts of pressures (e.g., habitat fragmentation)" (CDFW 2015).

The plans included in Table 7-3 identify multiple pressures and stressors contributing to the decline of species within the GAI (California Department of Parks and Recreation 2006; FWS 2009; Thorne et al. 2016). These pressures and stressors were evaluated in relation to the types of effects that could result from transportation projects funded through the SHOPP and could benefit from in-kind compensatory mitigation purchased or established through an advance mitigation project.

7.5.1. Habitat Loss, Fragmentation, and Degradation

Habitat loss, fragmentation, and degradation are some of the primary factors pressuring sensitive wildlife species in the GAI. Anthropogenic factors such as logging, transmission line corridors, and other infrastructure expansion have led to the loss and degradation of existing habitat for sensitive wildlife species.

As identified in the SWAP (CDFW 2015), shoreline development is a significant stressor on the North Coast region of California. Roads and highways along the coast contribute to habitat fragmentation, as well as the loss of sensitive coastal habitats. In riparian habitats within the GAI, erosion, sedimentation, and petrochemical runoff are all results of poorly constructed or poorly maintained roadways.

Table 7-3. Regional Conservation Plans Identifying Areas of Habitat Important for Species that Utilize Aquatic Habitat in the GAI

Document	Reference	Areas of Important Habitat
Conservation and Land Management Documents[a]	See below	See below
A Climate Change Vulnerability Assessment of California's Terrestrial Vegetation	Thorne et al. 2016	Separates California ecosystems into 29 natural vegetation community types, and analyzes the vulnerability of each ecosystem under different climate change models.
California Coastal National Monument Resource Management Plan	BLM 2005	Identifies goals to protect the geological formations (offshore rock islands) and the habitat that they provide for biological resources.
CEHC	Spencer et al. 2010	Identifies natural landscape blocks and essential connectivity areas in the North Coast Ecoregion.
Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation	Humboldt Redwood Company, LLC 2019	Identifies 13 sensitive terrestrial species that are protected by the plan, including marbled murrelet, northern spotted owl, southern torrent salamander, coastal tailed frog, California red-legged frog, foothill yellow-legged frog, western pond turtle, bald eagle, American peregrine falcon, western snowy plover, bank swallow, California red tree vole, and Pacific fisher.
Headwaters Forest Restoration Resource Management Plan Amendment and Environmental Assessment/ Mitigated Negative Declaration	BLM and CDFW 2017	Identifies special-status species that have a primary management emphasis within the plan area. These species include marbled murrelet, northern spotted owl, and fisher. Wetland and riparian areas are also identified as sensitive communities within the plan area.
Humboldt Bay Management Plan	Humboldt Bay Harbor, Recreation, and Conservation District 2007	Identifies 48 special-status plant and wildlife species and several aquatic and upland natural communities of concern within and surrounding the bay.
Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment	FWS 2009	Identifies natural communities within the park to be protected and restored including creeks, salt marshes, freshwater and brackish marshes, riparian swamps, eelgrass and mudflats, floodplains, dune mat/foredune grasslands, dune swales, dune riparian/swamps, and coniferous dune forests.

Document	Reference	Areas of Important Habitat
Sinkyone Wilderness State Park Final General Plan & Environmental Impact	California Department of Parks and Recreation 2006	Identifies 81 special-status species and 8 sensitive natural communities that will be protected by the plan. Protected communities include bulrush-cattail, spikerush, red alder, sand-verbena-beach bursage, Douglas-fir, Douglas-fir-tanoak and redwood series, coastal prairies, and aquatic habitats.
Six Rivers National Forest – Land and Resource Management Plan	USFS 1995	Identifies goals to maintain and protect numerous natural communities, including rivers, old-growth forests, riparian areas, and forested areas.
SWAP	CDFW 2015	Identifies Pacific Northwest Conifer Forests, Freshwater Marsh, North Coastal and Montane Riparian Forest and Woodland, and Coastal Dune and Bluff Scrub as conservation targets for the Northern California Coast Ecoregion Conservation Unit. Also identified North Coastal and Montane Riparian Forest and Woodland and Pacific Northwest Subalpine Forest as conservation targets for the Northern California Coast Ranges Ecoregion Conservation Unit. Both of these conservation units are partially within the GAI.
10 CCC-certified LCPs	See Appendix D	Identify habitats and resources that are important to local coastal programs.

[a] LCPs within the GAI are listed in Appendix D.

Culverts under roads may provide some connectivity for various species, but if not constructed properly, roads and highways can also act as barriers to terrestrial wildlife movements by separating and fragmenting populations (Clevenger et al. 2001). This can negatively affect the gene flow of a species, its ability to access multiple habitat types and resources required for various life stages, and its ability to access alternate habitat sources in the face of changing climate patterns (Carvalho et al. 2018).

7.5.2. Invasive Species

Transportation projects and associated ongoing maintenance activities have the potential to introduce and/or spread nonnative, invasive species. When invasive, nonnative species enter an ecosystem, they can disrupt the natural balance, resulting in a reduction of biodiversity, degradation of habitats, alteration of native genetic diversity, shifting of habitat type, and further threats to already endangered or threatened natural resources. Invasive plant species can facilitate habitat loss or alteration by limiting the quantity or quality of food resources for native species (Hayes et al. 2016). In addition to plants, introduced and nonnative wildlife can also have a negative impact on native species. Introduced crustacean and amphibian species such as red swamp crayfish and American bullfrogs are known to negatively affect native amphibian species that depend on aquatic resources, such as foothill yellow-legged frog (Hayes et al. 2016).

7.5.3. Climate Change, Drought, and Sea-level Rise

Section 2.5 provided a brief overview of the GAI's climate and available planning-level predictions for climate change and sea-level rise for the region. In the next 30 years, the climate is expected to change. Expected changes include extended periods of higher temperatures; large fluctuations in precipitation, with dry years becoming drier and wet years becoming wetter; sea-level rise; storm surges; cliff retreat attributable to coastal erosion; and an increased risk of wildfire and flooding (Caltrans 2019c).

The terrestrial climate change resilience rank from the ACE dataset (CDFW 2018a) is presented in Figure 2-8. Most of the GAI shows low-to-moderate climate resilience rankings of 2 or 3. However, there are significant portions of the GAI that include both lower and higher ranked climate resilience areas. The northern portion of the GAI consists of very low climate resilience areas, ranked at 1. This includes the low-lying coastal area from the town of Orick, north to the greater Klamath area. Additionally, the South Fork Eel River Valley from the town of Redway south to Piercy is also ranked at 1.

The mountainous, forested areas east of Eureka, Arcata, and Ferndale show the highest climate resilience, with large portions ranked at 4 or 5. This area of high climate resilience follows the Highway 36 corridor from Ferndale east to Bridgeville. Farther south in the GAI, there is another patch of moderately high climate resilience around the town of Laytonville and Black Rock Mountain, within the forested coastal mountains.

Areas of the GAI with lower climate resilience rankings are more susceptible to the expected effects of climate change. These effects could lead to a reduction in suitability to special-status wildlife species in the GAI. For example, the North Coast has seen a reduction in the density of fog by 33 percent from levels recorded before 1951 as a result

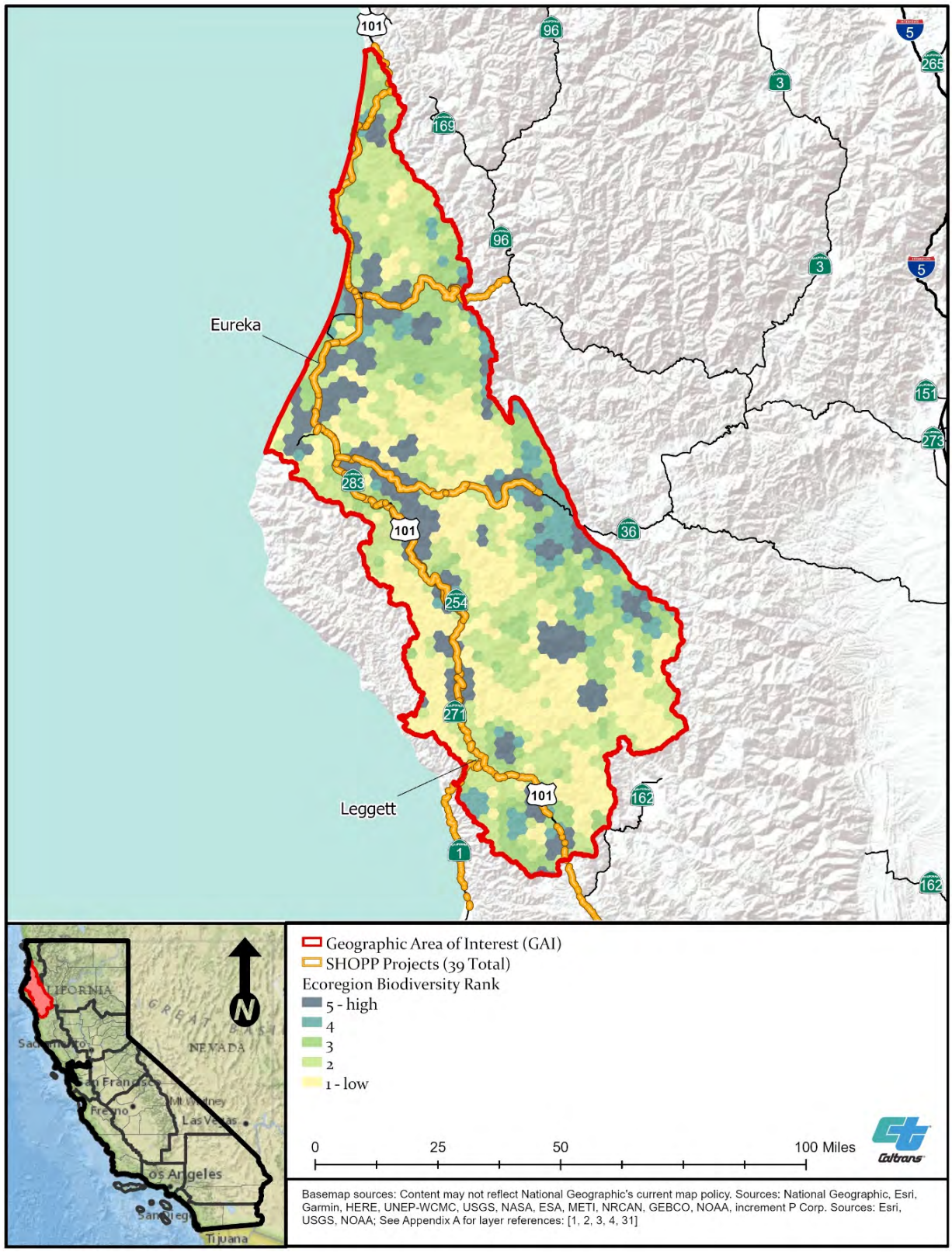
of climate change (Johnstone and Dawson 2010). This has caused the forests in the GAI to become increasingly drought-stressed, which may lead to increased wildfires, potentially reducing available breeding habitat for forest-dwelling special-status species such as bald eagle, purple martin, and Townsend's big-eared bat. This may also cause direct effects to special-status species in the GAI that are especially dependent on moisture in the environment such as southern torrent salamander. The increased variability and changes in the type, magnitude, and timing of precipitation suggested by climate change models will result in more variable and extreme flows in river systems that support wildlife species such as foothill yellow-legged frog. One potential effect of these changed flow regimes is an increase in the likelihood of egg mass and tadpole scouring and stranding for the foothill yellow-legged frog (CDFW 2019d).

Terrestrial habitat connectivity in the GAI, including large remaining blocks of intact habitat or natural landscape, is shown in Figure 2-12. These areas are expected to provide opportunities for wildlife species to respond to climate change stress by preserving large blocks of habitat and linkage areas that will allow migration toward more suitable habitat as the climate changes, and by providing protection for the ecological processes that support key habitat.

7.6 Multi-species Benefits

Several special-status species and their habitats could potentially be affected by Caltrans transportation projects that will need compensatory mitigation to satisfy natural resource regulatory agency conditions on a transportation project (Appendix E, Tables E-1 and E-2). Advance mitigation planning provides Caltrans an opportunity to integrate the protection and preservation of multiple California native species, biodiversity, and ecosystems into project scoping. Figure 7-1 illustrates the regional terrestrial biodiversity in the GAI, according to CDFW's ACE GIS dataset. According to these data, high to moderate terrestrial biodiversity is present along much of the SHS with SHOPP-eligible projects. However, some areas of low terrestrial diversity occur along the central portion of the GAI, along State Route 36 and Highway 101. Habitats are mapped in Appendix C, and the other special-status species that may occur in these habitats are provided in Appendix E, Tables E-1 and E-2.

Figure 7-1. Regional Terrestrial Biodiversity



Other efforts, such as planting Caltrans easements with species beneficial to pollinators, are expected to contribute to biodiversity protection and enhancement in the GAI. In addition, planting native plants in Caltrans easements enhances biodiversity by reducing invasive species cover. One or both of those factors can be associated with roadways, depending on location. Caltrans will consider the special-status species with potential to co-occur in habitat in order to inform advance mitigation scoping and thereby improve the conservation benefits of mitigation in the GAI.

For example, Caltrans is currently entering into a candidate conservation agreement, with assurances, with FWS to plant species beneficial to monarch butterflies, as well as other pollinators. Once approved, the agreement would allow FWS to issue an enhancement of survival permit under Section 10(a)1(A) of the ESA. While it is anticipated that Caltrans District 1 will be part of this agreement, it has not been formally approved at this time.

7.7 Advance Mitigation Conservation Goals and Objectives

The conservation goals and objectives compiled in Table 7-4 are intended to be relevant to anticipated future SHOPP transportation project mitigation needs, be consistent with the goals and objectives of natural resource regulatory agencies for special-status wildlife species that utilize aquatic resources for one or more life stage, address pressures and stressors, and support special-status wildlife population recovery and success in the GAI. Each conservation goal is supported by one or more conservation objectives; objectives are specific, measurable, achievable, relevant, and time-bound, aligning to a desired result specified by a goal. At the broad scale, these wildlife goals and objectives encompass large-scale ecological processes, environmental gradients, biological diversity, and regional wildlife linkages.

These goals and objectives prioritize regional conservation that preserves intact habitat and provides habitat linkages and connectivity. Sub-objectives are included for each objective to guide Caltrans advance mitigation project scoping toward those authorized actions that would create the greatest functional lift[2] or conservation benefit for wildlife species in the GAI. Sub-objectives also capture specific measures from conservation and land management plans that address threats to wildlife species in the GAI. Several of the goals are interrelated, and many objectives could apply to more than one goal; objectives were grouped with the goal to which they most specifically aligned. Goals and objectives are generally presented in order from general to more specific.

[2] For the purposes of this document, “functional lift” means the difference between an existing degraded condition and a restored or enhanced condition.

Table 7-4. Advance Mitigation Conservation Goals and Objectives for Special-status Wildlife Species in the GAI for District 1

Objectives	Sub-Objective	Alignment with Conservation and Management Plans[a]
Goal WILD-1: Conserve and expand existing habitat for sensitive wildlife species within the GAI.	See below	See below
Objective WILD-1.1: Acquire, protect, restore, and/or enhance existing habitat.	**Sub-Objective WILD-1.1.1:** Identify habitat for acquisition, protection, restoration, and/or enhancement that would provide the greatest functional lift for wildlife species in the GAI. **Sub-Objective WILD-1.1.2:** Prioritize key areas, such as critical habitat, movement corridors, and buffer zones. **Sub-Objective WILD-1.1.3:** Prioritize acquisition and/or protection of large blocks of suitable, occupied habitat for the species of mitigation need; lands adjacent to occupied habitat; and/or land that expands or buffers existing occupied protected habitats. **Sub-Objective WILD-1.1.4:** Prioritize acquisition, protection, and/or enhancement of SWAP (CDFW 2015) conservation targets Pacific Northwest Conifer Forests, Freshwater Marsh, North Coastal and Montane Riparian Forest and Woodland, Coastal Dune and Bluff Scrub, and Pacific Northwest Subalpine Forest, as shown in Figure 7-2.	▪ *SWAP* (CDFW 2015) ▪ *SWAP – Transportation Companion Plan* (CDFW 2016) ▪ *California Essential Habitat Connectivity Project* (Spencer et al. 2010) and *ACE Terrestrial Connectivity* (CDFW 2019e) ▪ *Sinkyone Wilderness State Park Final General Plan & Environmental Impact Report* (California Department of Parks and Recreation 2006) ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Six Rivers National Forest – Land and Resource Management Plan* (USFS 1995) ▪ *Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation* (Humboldt Redwood Company, LLC 2019) ▪ Multiple LCPs

Objectives	Sub-Objective	Alignment with Conservation and Management Plans[a]
Goal WILD-2: Preserve, enhance, and increase connectivity between blocks of sensitive species habitat.	See below	See below
Objective WILD-2.1: Acquire, protect, restore and/or enhance movement corridors.	**Sub-Objective WILD-2.1.1**: Identify movement corridors in the GAI and acquire, protect, restore, and/or enhance corridors such that the greatest functional lift is provided. **Sub-Objective WILD-2.1.2:** Prioritize habitat in key linkage areas, between habitat areas, and/or areas that provide a buffer to key or existing corridors. **Sub-Objective WILD-2.1.3:** Incorporate and consider bridges and culverts when enhancing wildlife passage. **Sub-Objective WILD-2.1.4:** Within movement corridors, prioritize land acquisition, protection, restoration, or enhancement of riparian areas.	▪ *SWAP* (CDFW 2015) ▪ *SWAP – Transportation Companion Plan* (CDFW 2016) ▪ *California Essential Habitat Connectivity Project* (Spencer et al. 2010) and ACE Terrestrial Connectivity (CDFW 2019e) ▪ *Sinkyone Wilderness State Park Final General Plan & Environmental Impact Report* (California Department of Parks and Recreation 2006) ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Six Rivers National Forest – Land and Resource Management Plan* (USFS 1995)

Objectives	Sub-Objective	Alignment with Conservation and Management Plans[a]
Goal WILD-3: Support resiliency of the landscape to climate change and sea-level rise.	See below	See below
Objective WILD-3.1: Acquire, protect, restore, and/or enhance habitat that supports resilience to climate change and sea-level rise.	**Sub-Objective WILD-3.1.1:** Identify, acquire, protect, restore, and/or enhance habitat critical to climate resilience for wildlife species in the GAI. **Sub-Objective WILD-3.1.2:** Prioritize management of invasive species in key areas, such as movement corridors and ESHAs, that may be exacerbated by climate change and sea-level rise and that would provide functional lift for wildlife species and ESHAs.	▪ *SWAP* (CDFW 2015) ▪ *SWAP – Transportation Companion Plan* (CDFW 2016) ▪ *California Essential Habitat Connectivity Project* (Spencer et al. 2010) and ACE Terrestrial Connectivity (CDFW 2019e) ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ Multiple LCPs

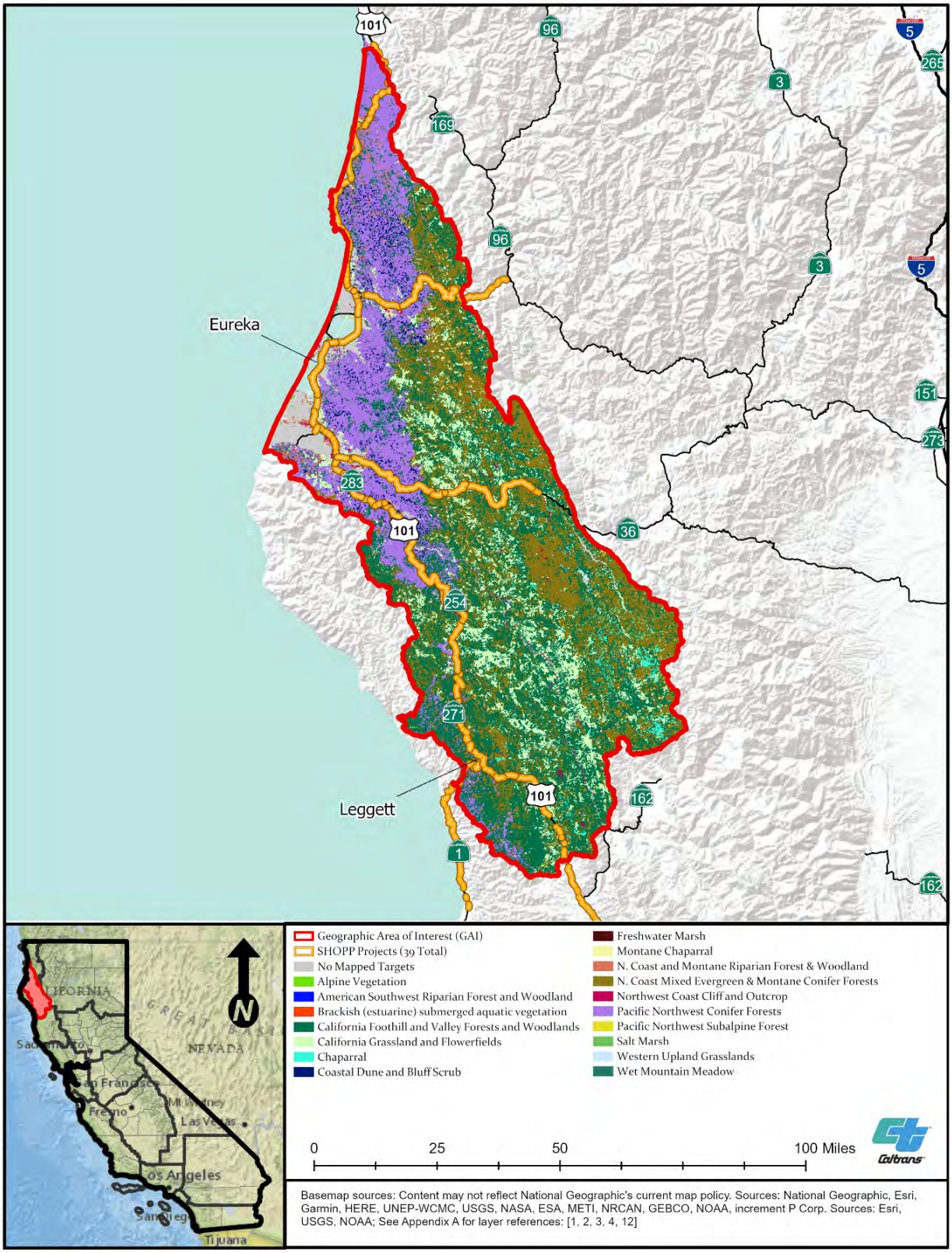
Objectives	Sub-Objective	Alignment with Conservation and Management Plans[a]
Goal WILD-4: Decrease mortality of sensitive species.	See below	See below
Objective WILD-4.1: Reduce impacts of invasive species on wildlife populations.	**Sub-Objective WILD-4.1.1:** Reduce invasive species in key habitat locations and/or in areas that provide a buffer to high-value habitat for wildlife species. Prioritize areas where invasive species reduction would provide the greatest functional lift to wildlife species and their habitat. **Sub-Objective WILD-4.1.2:** Prioritize restoration of native plant species in key areas such as critical habitat, movement corridors, and buffer zones.	▪ *SWAP* (CDFW 2015) ▪ *SWAP – Transportation Companion Plan* (CDFW 2016) ▪ *Sinkyone Wilderness State Park Final General Plan & Environmental Impact Report* (California Department of Parks and Recreation 2006) ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Six Rivers National Forest – Land and Resource Management Plan* (USFS 1995) ▪ *Headwaters Forest Restoration Resource Management Plan Amendment and Environmental Assessment/ Mitigated Negative Declaration* (BLM and CDFW 2017)

Objectives	Sub-Objective	Alignment with Conservation and Management Plans[a]
Objective WILD-4.2: Reduce impacts from predation.	**Sub-Objective WILD-4.2.1:** Identify and implement measures to reduce predation, such as developing landscape designs that decrease vulnerability to predation or funding predator removal programs.	▪ *SWAP* (CDFW 2015) ▪ *SWAP – Transportation Companion Plan* (CDFW 2016) ▪ *Sinkyone Wilderness State Park Final General Plan & Environmental Impact Report* (California Department of Parks and Recreation 2006). ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Six Rivers National Forest – Land and Resource Management Plan* (USFS 1995) ▪ *Headwaters Forest Restoration Resource Management Plan Amendment and Environmental Assessment/ Mitigated Negative Declaration* (BLM and CDFW 2017) ▪ *Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation* (Humboldt Redwood Company, LLC 2019)
Objective WILD-4.3: Reduce road-associated mortality.	**Sub-Objective WILD-4.3.1:** Identify locations to develop safe SHS wildlife crossing areas in the GAI and direct wildlife to them.	▪ *SWAP – Transportation Companion Plan* (CDFW 2016) ▪ *California Wildlife Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region* (CDFW 2020) ▪ *2020 California Action Plan Update. Implementation of Department of the Interior Secretarial Order 3362: "Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors"* (NFWF 2020)

Objectives	Sub-Objective	Alignment with Conservation and Management Plans[a]
Goal WILD-5: Provide multi-species benefits.	See below	See below
Objective WILD-5.1: Acquire, protect, restore, and/or enhance habitat that provides multi-species benefits.	**Sub-Objective WILD-5.1.1:** Prioritize mitigation to provide benefits to special-status species that utilize aquatic resources and key areas, such as SWAP priority conservation targets, that will provide functional lift to other special-status species within the GAI. **Sub-Objective WILD-5.1.2:** Identify SHS right-of-way areas where enhancement efforts may benefit pollinators. **Sub-Objective WILD-5.1.3:** Establish buffer zones (ideally ≥500 feet) to reduce edge effects, provide pollinator habitat, and allow for population expansion. **Sub-Objective WILD-5.1.4:** Align with LCP ESHA requirements to prioritize restoration and/or enhancement actions that provide a functional lift to the ESHA and their resource values, when feasible.	▪ *SWAP* (CDFW 2015) ▪ *California Essential Habitat Connectivity Project* (Spencer et al. 2010) ▪ *Sinkyone Wilderness State Park Final General Plan & Environmental Impact Report* (California Department of Parks and Recreation 2006). ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Six Rivers National Forest – Land and Resource Management Plan* (USFS 1995) ▪ *Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation* (Humboldt Redwood Company, LLC 2019) ▪ Multiple LCPs

[a] Complete citations for these plans are provided in Chapter 10.

Figure 7-2. SWAP Terrestrial Conservation Target Habitats



7.8 Summary

Caltrans anticipates that future SHOPP-eligible transportation projects may be conditioned by CCC, CDFW, FWS, or NMFS to establish mitigation credits while addressing the pressures and stressors that threaten sensitive species in the GAI. The pressures and stressors include:

- Habitat loss, fragmentation, and degradation;
- Invasive species; and
- Climate change, drought, and sea-level rise

Hence, Caltrans will seek to align advance mitigation project scopes with conservation goals and objectives that address the identified pressures and stressors, thereby aligning advance mitigation efforts with regional conservation efforts.

Regional conservation goals and objectives provide a framework for scoping compensatory mitigation credit establishment that would successfully offset future transportation project impacts on wildlife resources by creating functional lift or conservation benefit and by mitigating the pressures and stressors on wildlife resources in the GAI. To summarize Table 7-4:

Goals WILD-1 and WILD-2 seek to conserve existing habitat for sensitive species within the GAI and increase connectivity between blocks of habitat. The objectives to fulfill these goals are acquisition, protection, restoration, and/or enhancement of land. Caltrans intends to prioritize efforts that provide the greatest functional lift for sensitive species, and that provide a conservation benefit in terms of size, connectivity, quality, and contribution to the climate resilience of habitat within the GAI. These goals and objectives were selected to address habitat loss, fragmentation, and degradation and to address impacts from climate change and drought. Further, Caltrans anticipates that actions completed through restoration, enhancement, and/or preservation may also provide opportunities to address impacts from invasive species, predation, and road-associated mortality.

Goal WILD-3 seeks to support climate resiliency within the GAI. The primary objectives are to reduce effects of climate change and sea-level rise on sensitive species by increasing the protection and functionality of land that is identified as crucial for climate resiliency, including corridors that provide the ability for sensitive species to migrate from areas of low climate resilience into areas with higher resilience and addressing the climate change-related threat from invasive species. In addition to addressing climate change in general, these goals and objectives also address habitat loss, fragmentation, and degradation, and invasive species.

Goal WILD-4 seeks to decrease mortality of sensitive species from known immediate and ongoing threats to individuals or populations by protecting native vegetation, reducing conditions that favor predators, and protecting sensitive species from road-associated mortality. These objectives address issues related to habitat loss, fragmentation, and degradation, and threats from invasive species and predation.

Goal WILD-5 seeks to guide advance mitigation scoping to prioritize multi-species and multi-resource benefits. Advance mitigation provides the opportunity to maximize Caltrans' benefit to conservation and other land management objectives in the GAI. Goal WILD-5 was developed to include conservation for multiple species.

Each of the goals and objectives have sub-objectives intended to guide advance mitigation scoping toward natural resource regulatory agencies' regional conservation goals. These sub-objectives will prompt Caltrans to incorporate priority habitat or corridors into advance mitigation scopes and address important threats in the area through an advance mitigation project. This concept is an important way Caltrans seeks to use advance mitigation scoping to set the stage, once funding approval is received, for specific advance mitigation projects that will provide a functional lift for sensitive species and maximize conservation benefits from mitigation within the GAI.

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8. AQUATIC RESOURCES CONSERVATION GOALS AND OBJECTIVES

Caltrans' primary objective for aquatic resources is to avoid and minimize all impacts on fish, wetlands, and non-wetland waters from Caltrans transportation projects in the GAI. However, when avoidance and minimization are insufficient or infeasible, compensatory mitigation may be used to offset impacts. Credits or values established through SHC § 800.6(a)-authorized advance mitigation projects offer the unique opportunity to consolidate needed compensatory mitigation. This consolidation helps to provide strategically placed and environmentally sound restoration and enhancement and to provide an improved environmental outcome that may not be available through the usual transportation project-by-project approach to compensatory mitigation.

Caltrans seeks to align its advance mitigation projects with natural resource regulatory agencies' conservation goals and objectives, and to contribute to an improved environmental outcome in the GAI. With this in mind, this chapter presents Caltrans' understanding of natural resource regulatory agencies' regional conservation goals and objectives that could be applied to advance mitigation projects undertaken in the GAI to offset forecast impacts from SHOPP transportation projects.

The goals and objectives developed in this chapter are intended to guide advance mitigation scoping decisions toward those choices that will provide for the greatest environmental benefit available through the advance mitigation planning and delivery processes. Such advance mitigation projects undertaken by Caltrans should contribute to aquatic resource restoration and enhancement and should yield compensatory mitigation usable by future transportation projects, as specified in SHC § 800.[1] Compensatory mitigation usable by future transportation projects should be expressed in standard units or terms recognized by the natural resource regulatory agencies.

Information presented in this chapter is for advance mitigation project scoping purposes only. Transportation projects must still go through environmental and permitting processes and must demonstrate avoidance and minimization efforts prior to compensation.

8.1 Approach

For the purposes of this RAMNA, conservation goals and objectives are a broad set of regional natural resource sustainability goals and objectives that are consistent with both regulatory requirements and conservation science. To determine the aquatic resource conservation goals and objectives applicable to the GAI, Caltrans:

[1] Pursuant to SHC § 800.9, to the maximum extent practicable, the information required for an RCIS is presented in this RAMNA. During CDFW's review of an RCIS, CDFW determines whether the goals and objectives presented in the RCIS are consistent with FGC § 1852, subdivision (c)(8).

- First, in Section 8.2, identified natural resource regulatory agencies with the authority to condition transportation projects with aquatic resource-related compensatory mitigation in the GAI.
- Then, in Section 8.3, summarizes information for the wetland, non-wetland waters, and fish species addressed by the assessment (Section 1.5).
- Next, in Sections 8.4, 8.5, and 8.6, for aquatic resources identified:
  - Federal and state policies, and binding and non-binding regional conservation and land management plans
  - Current and projected pressures and stressors, including climate change and sea-level rise, for which there is a transportation nexus
  - Opportunities to enhance the conservation benefits through advance mitigation projects
  - Opportunities to provide co-benefits, where possible, to water quality, groundwater recharge, and species that require aquatic habitats
- Last, Caltrans analyzed the aforementioned data in relation to the transportation-related activities that could potentially affect aquatic resources, and the potential range of compensatory mitigation that could satisfy a transportation project condition associated with the activities.

The results of this analysis is a framework of conservation goals and objectives for use in advance mitigation project scoping (Section 8.7).

8.2 Natural Resource Regulatory Agencies with Aquatic Resources Oversight

Table 8-1 lists the natural resource regulatory agencies with the authority to condition transportation projects delivered in the GAI with aquatic resource-related compensatory mitigation. Terrestrial special-status wildlife species are known to use streams, wetlands, and other aquatic resources that are regulated by federal and state agencies specific to those habitat types. This RAMNA identifies goals and objectives for terrestrial species separately in Chapter 7.

Table 8-1. Natural Resource Regulatory Agencies that Regulate Aquatic Resources

Agency	Summary
CCC	CCC protects the coast by planning for and regulating new development in the Coastal Zone pursuant to the policies of the Coastal Act. Through the issuance of CDPs, CCC implements the policies of the Coastal Act, including protecting sensitive resources, water quality, public access to the coast, etc. CCC also coordinates with local governments in developing and certifying LCPs, which allow local governments to assume the authority to issue CDPs in their jurisdiction. The agency also provides comprehensive guidance to local governments and project applicants regarding planning for and adapting to climate change and sea-level rise. The CCC, agency, or authorized local government with a certified LCP also determines how ESHAs are defined, such as a specific species habitat or as a specific geographic area.
CDFW – Region 1, Northern	CDFW oversees the conservation, protection, and management of fish, wildlife, native plants, and the habitats necessary for biologically sustainable populations of those species in California. California law (FGC § 1602) also requires an entity to notify CDFW prior to commencing any activity that may substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other materials containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. CDFW issues agreements to project proponents under its authorities, including Lake and Streambed Alteration Agreements, approvals of conservation and mitigation banks, approvals of MCAs and RCISs, and NCCP permits. Additionally, CDFW's Environmental Review and Permitting, Conservation and Mitigation Banking, NCCP, and RCIS programs implement sections of the FGC, Division 1 of Title 14 of the California Code of Regulations, et seq. These programs help fulfill CDFW's mission to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values.
Corp – South Pacific Division – San Francisco District	It is the mission of the Corps' Regulatory Program (33 CFR Part 230 and Parts 320–332) to protect the nation's aquatic resources and navigation capacity while allowing reasonable development through fair, flexible, and balanced permit decisions. The Corps is responsible for administering laws for the protection and preservation of aquatic resources pursuant to Section 10 of the Rivers and Harbors Act of 1899 and CWA Section 404. Pursuant to the Rivers and Harbors Act, all work or structures in, over, or under navigable WOTUS require Corps authorization. The Corps authorizes, under CWA Section 404, the discharge of dredged or fill material into WOTUS, including wetlands. When Corps' civil works projects are proposed to be used or altered by another entity, CWA Section 408 permission (33 USC 408 or Section 14 of the Rivers and Harbors Act of 1899, as amended) must be obtained in addition to the CWA Section 404 authorization. It is the preference of the Corps to use the following order of priority for mitigation: mitigation bank, in-lieu fee program, on-site permittee responsible mitigation, and off-site permittee responsible mitigation.
EPA, Region 9	EPA has authority under the CWA (33 USC § 11251–1357) to restore and maintain the chemical, physical, and biological integrity of the nation's waters. EPA and Corps jointly implement the CWA Section 404 program, which regulates discharge of dredge or fill material into WOTUS. Federal authorizations also need to be reviewed for compliance with CWA Section 401.

Agency	Summary
FWS	FWS has jurisdiction over all federally protected wildlife, federally protected inland/non-anadromous fish species, and critical habitats, and requires consultation and coordination to comply with the ESA. FWS authorities, including its role in mitigation, are codified under multiple statutes that address management and conservation of natural resources from many perspectives, including, but not limited to, the effects of land, water, and energy development on fish, wildlife, plants, and their habitats. FWS approves HCPs to address impacts on federally protected species, for projects lacking a federal nexus, under ESA Section 10(a)1(B). For projects with a federal nexus and potential impacts on federally protected species, FWS issues biological opinions under ESA Section 7. FWS does not, however, have jurisdiction over anadromous fish.
NMFS, West Coast Region	NMFS has jurisdiction over all federally protected fish and wildlife marine species and critical habitats and requires consultation and coordination to comply with the ESA. NMFS manages wildlife and fisheries resources in the marine and estuarine environment. NMFS issues biological opinions under Section 7 of the ESA for projects that may affect federally listed species managed by the agency. In addition, NMFS manages marine mammals under the Marine Mammal Protection Act, with the exception of sea otters, which are managed by FWS. NMFS is also responsible for addressing impacts on EFH under the Magnuson-Stevens Fishery Conservation and Management Act.
State Water Board and RWQCB – Region 1, North Coast	The Porter-Cologne Act governs water quality regulation in California and gives the Water Boards the authority to condition projects, through waste discharge requirements, to protect water quality and the beneficial uses of waters of the state, as identified in basin plans. Basin plans, adopted by the Water Boards, incorporate the beneficial use designation of surface waters of the state and must take into consideration the use and value of water for protection and propagation of fish, shellfish, and wildlife. The Water Boards have been delegated the responsibility of implementing CWA Section 401, which regulates the discharge of pollutants into WOTUS. Projects that occur in one region are regulated by that regional board, whereas projects that cross regions are regulated by the State Water Board.

8.3 Aquatic Resources

An overview of aquatic resources was provided in Chapter 2 and is summarized below

8.3.1. Wetlands and Non-wetland Waters

The GAI conforms to the following HUC-8 boundaries: Mad-Redwood (HUC-8 18010102), Lower Eel (HUC-8 18010105), and South Fork Eel (HUC-8 18010106). In the GAI, the Mad, Eel, and Elk Rivers and Freshwater and Redwood Creeks are the major stream systems (Figure 2-14) (North Coast RWQCB 2018). Additionally, there are hundreds of named and unnamed tributaries, the majority of which flow into these rivers and/or the ocean. Flow into these systems originates from rainfall and snowmelt.

Aquatic habitat types with the potential to occur in the GAI are mapped in Appendix F. Based on the SAMNA Reporting Tool's wetlands and waters layer, the GAI has a total of 91,946 acres of aquatic habitat, consisting of 33 wetland habitats that are listed in Table 2-10 and 7 non-wetland waters habitats that are listed in Table 2-11 (Caltrans 2017c, 2017d). Fifteen beneficial uses that support the preservation and enhancement of wildlife habitat and aquatic resources in the GAI, also align with the AMP's objective to contribute to an improved environmental outcome through

transportation project mitigation and are relevant to this RAMNA. They are detailed in Table 2-8.

8.3.2. Coho Salmon

The SONCC ESU of coho salmon in the GAI is a federal and state threatened species, and designated critical habitat for this species occurs in the GAI (Section 2.9, Figure 2-10). This ESU includes naturally spawned coho salmon originating from coastal streams and rivers between Cape Blanco, Oregon, and Punta Gorda, California. Also, coho salmon from the following three artificial propagation programs are included: Cole Rivers Hatchery Program, Trinity River Hatchery Program, and Iron Gate Hatchery Program (70 *Federal Register* 37160–37204). Typical habitat for juveniles of this species is cool pools with overhead cover and a water depth of at least 1 meter, and a moderate amount of instream cover, such as logs and undercut banks.

8.3.3. Steelhead

The Northern California Coast DPS of steelhead is a federal threatened species, and designated critical habitat for this species occurs in the GAI (Section 2.9, Figure 2-10). This DPS contains all naturally spawned steelhead originating below natural and human-made impassable barriers in California coastal river basins from Redwood Creek to and including the Gualala River [70 *Federal Register* (123): 37160–37204]. Steelhead in this DPS exhibit both winter- and summer-run migration timing. The summer-run steelhead is also currently a state candidate endangered species (CDFW 2021). Winter-run adults enter freshwater rivers as early as September and October and continuing into April and May, then move upstream to spawn. Summer-run steelhead typically enter freshwater between April and June or July and spend the summer holding in freshwater streams before spawning the following winter. Spawning habitat consists of freshwater streams with cold, clear water and suitable spawning substrates.

8.4 Regional Conservation Efforts

Caltrans' understanding of natural resource regulatory agency conservation goals and objectives is that they are generally designed to protect aquatic resources. Several conservation and land management plans listed in Table 3-1, relevant to the aquatic resources, identify key habitats, specific designated waters, or areas for aquatic resource enhancement and restoration. For example, some LCPs include ESHAs with aquatic resource attributes. Others identify key qualities, such as water quality, that are essential for aquatic resource enhancement and restoration. Still others name specific National Hydrologic Dataset features, presented in Table 8-2, for aquatic resource enhancement and restoration. Additionally, the documents include strategies for aquatic resource protection and measures to address specific known, ongoing threats to aquatic resources. These conservation and land management plans are presented in Table 8-3.

Table 8-2. Named Aquatic Features in the GAI with Documented Aquatic Resource Goals and Objectives, by HUC-8

Mad-Redwood HUC-8 18010102	Lower Eel HUC-8 18010105	South Fork Eel HUC-8 18010106
▪ Arcata Bay ▪ Clapp Gulch ▪ Cloney Gulch ▪ Elk River ▪ Fay Slough ▪ Freshwater Creek ▪ Humboldt Bay ▪ Jacoby Creek ▪ Little Freshwater Creek ▪ Luffenholtz Creek ▪ Mad River ▪ Mad River Slough ▪ Maple Creek ▪ Martin Slough ▪ May Creek ▪ Mill Creek[a] ▪ North Fork Elk River ▪ Redwood Creek ▪ Ryan Creek ▪ Ryan Slough ▪ Salmon Creek ▪ South Fork Elk River ▪ Trinidad Bay ▪ Upper Freshwater Creek	▪ Bluff Creek ▪ Chamise Creek ▪ Dobbyn Creek ▪ Eel River ▪ Fox Creek ▪ Howe Creek ▪ Jackass Creek ▪ Larabee Creek ▪ North Fork Eel River ▪ Oil Creek ▪ Soda Creek ▪ Strongs Creek ▪ Van Duzen River ▪ Wilson Creek ▪ Woodman Creek	▪ Durphy Creek ▪ Elk Creek ▪ Lewis Creek ▪ Parker Creek

[a] Although multiple features called Mill Creek occur in all HUC-8s of the GAI, the Trinidad-Westhaven Integrated Coastal Watershed Management Plan refers to the Mill Creek in the northernmost part of the Mad-Redwood HUC-8, which drains directly into the Pacific Ocean.

Table 8-3. Documents Identifying Aquatic Resource Goals and Objectives in the GAI

Document	Reference	Information Identified
Policies, Procedures, Guidelines, and Water Quality Plans	See below	See below
2008 Final Compensatory Mitigation Rule	73 *Federal Register* 19670	Corps' ruling to establish standards and criteria for the use of all types of compensatory mitigation, including on- and off-site permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation to offset unavoidable impacts on WOTUS. Recognizes that consolidating mitigation may be environmentally preferable for linear projects (because advance or at least concurrent compensatory mitigation is environmentally preferable, but not always possible to achieve) (Preamble and 33 Section 332.3).
303(d) List of Impaired Water Bodies	State Water Board 2018	Section 303(d) of the CWA requires that every 2 years, each state submit to EPA a list of rivers, lakes, and reservoirs in the state for which pollution control or requirements have failed to provide for water quality. Based on a review of this list and its associated Total Maximum Daily Load Priority Schedule (Table 2-9 in this document), 27 waterbodies are listed as impaired in the GAI. Of the 27, 8 have an established TMDL.
California Wetlands Conservation Policy	Executive Order W-59-93	The "No Net Loss Policy" for wetlands aims to "[e]nsure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property."
Caltrans Fish Passage Annual Legislative Report	Caltrans 2019d	In compliance with SHC § 156, this report identifies priority fish passage barriers on the SHS. Priorities are determined through FishPAC collaboration and are based on the following: ▪ Species diversity – listed threatened and endangered salmon and steelhead species currently or historically present in the watershed ▪ Habitat – suitable habitat quality and quantity above each crossing, relative to recovery of threatened and endangered species ▪ Best professional knowledge – professional, discretionary value for science-based information known to fisheries and engineering subject matter experts Subject matter experts include CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, and other local fish passage advocates.
Definition and Delineation of Wetlands in the Coastal Zone	CCC 2011	Creates a CCC wetland definition and wetland delineation procedures; uses a one-parameter approach for identifying a wetland.

Document	Reference	Information Identified
National Wetlands Mitigation Action Plan	EPA and Corps 2002	An EPA and Corps comprehensive, interagency document to further achievement of the goal of no net loss of wetlands. The goals and objectives of the *National Wetlands Mitigation Action Plan* were incorporated into the 2008 Final Compensatory Mitigation Rule, which was updated in 2015 and includes the no net loss policy.
Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division	Corps 2015	Provides guidelines for compensatory mitigation site selection. A watershed approach should be used when selecting sites to establish compensatory mitigation.
State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State	State Water Board 2019b	Creates a State of California wetland definition, a framework for determining jurisdiction of state wetlands, wetland delineation procedures, and application procedures for discharges of dredge and fill material to waters of the state.
Water Quality Control Plan for the North Coast Basin	North Coast RWQCB 2018	Identifies water quality objectives and beneficial uses for the North Coast basin.
Conservation and Land Management Documents	See below	See below
Evaluation of Population Monitoring and Suppression Strategies for Invasive Sacramento Pikeminnow in the South Fork Eel River	FWS 2020a	Identifies monitoring and suppression strategies for removing Sacramento pikeminnow from the South Fork Eel River. Suppression strategies include boat electrofishing, netting and trapping, angling, and other more experimental methods, and generally applies to the South Fork Eel HUC-8. The study that generated this report was conducted between the USGS water gage on the South Fork Eel River in the Standish-Hickey State Recreation Area and river kilometer 120. Monitoring conducted for this report occurred at the confluence of the South Fork Eel River and Eel River up to river kilometer 120.
*Final Recovery Plan for the Southern Oregon/Northern California Coast ESU of Coho Salmon (*Oncorhynchus kisutch*)*	NMFS 2014	Recovery goals apply to core, non-core, and dependent coho salmon populations with separate criteria based on either a minimum number of spawners or occupancy of juveniles, all of which are grouped into diversity strata. The Central Coastal Basins and Southern Coastal Basins Diversity Strata occur in the GAI. The following core coho salmon populations occur in the GAI; Redwood Creek, Humboldt Bay Tributaries, Lower Eel – Van Duzen Rivers, Mainstem Eel River, and South Fork Eel River. The following non-core populations occur in the GAI: Little River, Mad River, and North Fork Eel River. Strawberry Creek and Norton – Widow White Creeks are the only dependent populations in the GAI.

Document	Reference	Information Identified
Final Coastal Multispecies Recovery Plan Volume III: Northern California Steelhead	NMFS 2016	Refer to the document for population type and diversity strata definitions. The Northern Coastal, North Mountain Interior, and Lower Interior diversity strata for steelhead occur in the GAI. Chamise Creek, Woodman Creek, Larabee Creek, North Fork Eel River, Van Duzen River, Maple Creek/Big Lagoon, Humboldt Bay Tributaries, Little River, South Fork Eel River, Mad River, and Redwood Creek are the streams in the GAI that contain essential independent populations that must attain low extinction risk before the species can be delisted. Elk Creek and Dobbyn Creek are the streams in the GAI that contain supporting independent populations that must attain moderate extinction risk before the species can be delisted. Soda Creek, Oil Creek, Howe Creek, Jackass Creek, and Eel River have dependent populations in the GAI that contribute to redundancy and occupancy criteria. Redwood Creek, Mad River, South Fork Eel River, Van Duzen River, Larabee Creek, North Fork Eel River, and Eel River have independent summer-run populations that are expected to meet effective population size criteria in the GAI before the species can be delisted.
Headwaters Forest Reserve Proposed Resource Management Plan and Final Environmental Impact Statement/Environmental Impact Report – Volume 1	BLM and CDFW 2003	Goals include maintenance and restoration of the South Fork Elk River and Salmon Creek, prioritizing hydrological stabilization or recontouring of degraded portions, and control of invasive species.
Humboldt Bay Management Plan	Humboldt Bay Harbor Recreation and Conservation District 2007	Includes a goal to enhance the watershed, broadly defined, of Humboldt Bay as well as eradicate or reduce nonnative species in the watershed.
Humboldt Bay Eelgrass Comprehensive Management Plan	Humboldt Bay Harbor Recreation and Conservation District 2018	Includes a history of eelgrass mitigation in Humboldt Bay, criteria by which mitigation sites succeeded or failed, and contains a goal to prioritize eelgrass mitigation/restoration opportunities in Humboldt Bay.

Document	Reference	Information Identified
Humboldt Bay National Wildlife Refuge Complex Comprehensive Conservation Plan and Final Environmental Assessment	FWS 2009	This plan includes the following goals applicable to the GAI: ▪ Restore habitat in Salmon Creek, connect it to salmonid rearing habitat in Cattail Creek, and enhance habitat in upper section of Hookton Slough. ▪ Maintain 313 acres of salt marsh habitat. ▪ Restore a total of 235 acres of salt marsh habitat as follows: 90 acres on Hookton Slough, 45 acres on White Slough, and 100 acres on Table Bluff Units. ▪ Maintain 630 acres of seasonal freshwater and brackish marsh on Salmon Creek Unit. ▪ Maintain 7 acres of seasonal freshwater and brackish marsh on White Slough Unit. ▪ Manage 35 acres and restore 20 acres of riparian swamp habitat on Salmon Creek Unit. ▪ Restore approximately 3 acres of riparian habitat on the White Slough Unit. ▪ Achieve all objectives in the North Coast RWQCB basin plan for inland surface waters, enclosed bays, and estuaries in the refuge. ▪ Restore 67 acres of dune swale. ▪ Restore 33 acres of riparian/swamp habitat on the Ma-le'l and Lanphere Dunes Units. ▪ Control the spread of dense-flowered cord grass (*Spartina densiflora*) and work to eradicate most of it.
Humboldt Bay Watershed Salmon and Steelhead Conservation Plan	Humboldt Bay Watershed Advisory Committee 2015	Conservation plan created for CDFW and the California Coastal Conservancy to improve habitat for salmonids and steelhead in the Humboldt Bay watershed (HUC-10 1801010206), which is part of the Mad-Redwood HUC-8 sub-basin. Identifies numerous goals to restore floodplain processes, restore estuary processes, restore natural sedimentation levels, increase large woody debris piles where appropriate, restore riparian habitat, and improve water quality in Jacoby Creek, Freshwater Creek, Elk River, Salmon Creek, and the urban creeks of Arcata and Eureka, and benefit coho salmon and steelhead.
Non-Natal Habitat Enhancement Planning for Endangered Species Act-Listed Salmonids in the Humboldt Bay Watershed	CDFW and Pacific Coast Fish, Wildlife, and Wetlands Restoration Association 2020	Identifies and ranks 21 locations for habitat restoration for the benefit of salmonid species, with SONCC coho salmon the primary focus, that are currently feasible. These locations are located on the following streams: Clapp Gulch, Elk Creek, Elk River, Freshwater Creek, Jacoby Creek, Redmond Creek, and Ryan Creek
Pacific Coast Salmon Fishery Management Plan	Pacific Fishery Management Council 2016	Includes numerous goals to ensure fisheries stock for chinook, coho, and pink salmon. The goal relevant to the GAI is the recovery of coho salmon.

Document	Reference	Information Identified
Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California	FWS 2013b	None of the five recovery units or five specific species that are identified occur in the GAI. The Humboldt Bay and North Coast area is covered under a regional-level recovery strategy focused on general habitat enhancement for the following rare species that use aquatic habitat: steelhead, tidewater goby, Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*), marsh locoweed (*Astragalus pycnostachyus* ssp. *pycnostachyus*), Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*), and Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*). Additional general recommendations include control of dense-flowered cordgrass (*Spartina densiflora*), particularly from Humboldt Bay, Eel River Estuary, and Mad River Estuary, as well as restoration at: diked baylands between the high tide line and Mad River Slough, tidal marshes at the north end of Arcata Bay, Salmon Creek, and the Eel River mouth.
Recovery Strategy for California Coho Salmon	California Department of Fish and Game 2004	Identifies goals related to recovery units of the SONCC ESU, of which the Mad River, Redwood Creek, Trinidad, Eureka Plain, Lower Eel-Van Duzen Rivers, South Fork Eel River, and Middle/Upper and North Fork Eel River recovery units occur in the GAI. Goals are to maintain or improve populations in 140 streams or rivers and to reintroduce populations to 64 streams or rivers cumulatively in these recovery units.
Redwood Creek Integrated Watershed Strategy	Redwood Creek Watershed Group 2006	Includes general goals to improve water quality, restore habitat for salmonid species such as steelhead and coho salmon and provide for flood control in Redwood Creek and its tributaries.
Redwood State and National Parks General Plan/General Management Plan	NPS and California Department of Parks and Recreation 2000	Includes goals to reduce erosion and sedimentation in the park by recontouring and restoring 155 miles of unused former logging roads in the park and 911 miles of variably used roads outside of the park, in cooperation with BLM and private landowners. Also includes a goal to restore Redwood Creek Estuary.
Six Rivers Aquatic Restoration Project Final Environmental Assessment	USFS 2018	Identifies restoration project design criteria to be met in various combinations at a given location based on restoration need. These criteria include placement of large woody material, boulders, and/or gravel for instream habitat enhancement, improvement or removal of fish passage barriers, placement of material to encourage beaver dam creation, creation or restoration of side channels to increase and improve fish rearing habitat, and general streambank and riparian enhancement and/or restoration. Areas identified for the enhancement and/or restoration types in the environmental assessment are numerous and complex in nature and can best be found in Table 2-3 of the document. Of the water features with potential for greater than 100 miles and/or 2,000 acres of habitat improvement, only the North Fork Eel River is in the GAI.

Document	Reference	Information Identified
Six Rivers National Forest - Land and Resource Management Plan	USFS 1995	Includes goals to restore the outer edge of all fish bearing and permanently flowing streams, lakes, and ponds, with the edge being the 100-year floodplain, riparian vegetation, or 300 feet of slope distance, whichever is greater, and seasonally flowing or intermittent streams, and wetlands less than 1 acre.
Steelhead Restoration and Management Plan for California	California Department of Fish and Game 1996	Identified restoration recommendations in Redwood Creek and the Eel River. Recommendations consist generally of habitat restoration, implementing catch limits for fishers, removing fish passage barriers, and removing Sacramento pikeminnow from the Eel River.
Strategic Plan to Protect California's Coast and Ocean 2020–2025	Ocean Protection Council 2019	Identifies a number of targets for specific actions including: ▪ Protect, restore, or create an additional 10,000 acres of coastal wetlands by 2025. ▪ Have a net increase in coastal wetlands of 20 percent by 2030 and 50 percent by 2040. ▪ Ensure the California coast is resilient to at least 3.5 feet of sea-level rise by 2050.
SWAP	CDFW 2015	Identifies north coastal and montane riparian forest and woodland, freshwater marsh, wet mountain meadow, fen, mountain riparian scrub, and wet meadow as conservation targets. Also included are 20 species of fish (including steelhead and coho salmon), 12 amphibians and aquatic reptiles, and 5 aquatic invertebrates as targets for population increase in relation to conservation of aquatic habitats.
The Eureka Area Watersheds Storm Water Resource Plan	Humboldt County 2018	Includes general goals to restore habitat, reduce localized flooding, reduce sedimentation/erosion, and improve water quality in the plan area, which includes the following aquatic systems: Cloney Gulch, Fay Slough, Little Freshwater Creek, Martin Slough, Ryan Slough, Upper Freshwater Creek, Elk River, South Fork Elk River, and North Fork Elk River.
Trinidad-Westhaven Integrated Coastal Watershed Management Plan	City of Trinidad 2008	Includes goals to improve water quality at the mouth of Mill Creek and Luffenholtz Creek and reduce road-related sediment entering Trinidad Bay and its tributary streams, which are primarily from Luffenholtz Creek and Parker Creek.

8.5 Pressures and Stressors

Pressures and stressors refer to environmental trends or physical, chemical, or biological factors or conditions that affect aquatic resources. According to the SWAP (CDFW 2015), a pressure is defined as "an anthropogenic (human-induced) or natural driver that could result in changing the ecological conditions of the target. Pressures can be positive or negative depending on intensity, timing, and duration. Negative or positive, the influence of a pressure to the target is likely to be significant." Additionally, stress is defined in the SWAP as "[a] degraded ecological condition of a target that resulted directly[2] or indirectly from negative impacts of pressures (e.g., habitat fragmentation)" (CDFW 2015). The Corps defines human stressors as human-caused sources of disturbance in an ecosystem, such as roads, urban areas, and agricultural lands (Corps 2015).

The documents in Table 8-3 identify multiple pressures and stressors on aquatic resources in the GAI where hydrology, land use and management, and climate intersect. These pressures and stressors were evaluated in relation to the types of direct and indirect effects that could result from transportation projects funded through SHOPP and could benefit from in-kind mitigation purchased or established through an advance mitigation project. When designating an area as ESHA, the CCC and LCPs also consider the pressures and stressors discussed below.

8.5.1. Habitat Loss, Fragmentation, and Degradation

Urbanization and other anthropogenic factors such as roads, poor grazing practices, and habitat invasion by nonnative species have led to the loss and degradation of aquatic resources. Additionally, the expansion of roads and urbanization have resulted in habitat fragmentation and a decrease in connectivity between habitats that support different life stages and have contributed to nonpoint source pollution from chemicals and toxins. Roads have also affected local hydrological conditions by changing sheet flow and altering water movement in drainages (CDFW 2015, 2016a).

Prior to Euro-American settlement in California, tidal marsh habitats gradually transitioned to low-lying moist grassland or willow thicket habitat, and then to upland areas. This buffer dissipated disturbances from upland areas such as predator intrusion, wildfire, and erosion and further provided additional habitat to aquatic species during high tides and flood events. Current human activities have reduced buffer zone widths by direct development and fragmentation. Reduced buffer zones increase edge effects on tidal marshes which include increased risk of localized species extirpation, direct population reduction, breeding capacity reduction, and increased infiltration of predators and pollutants (FWS 2013b).

Reduced habitat complexity, removal of native riparian vegetation, degradation of water quality, removal of instream wood, and sedimentation are all listed as factors for

[2] Direct effects occur at the time of construction and indirect effects are reasonably certain to occur, but later in time.

steelhead and SONCC coho salmon being listed under the ESA and are still affecting steelhead (NMFS 2014, 2016). Steelhead and SONCC coho salmon depend on a mix of stream and coastal habitats, including woodland-dominated inland streams, coastal estuaries, and seasonal lagoons in the GAI (NMFS 2014, 2016). Human-induced threats from road building and construction have altered the connections between the types of habitat, as well as the amount of sediment supply into streams and rivers. Increased sedimentation has direct negative effects on steelhead by interfering with their physiological and biological processes, and indirect effects through degradation of their habitat (NMFS 2016). Juvenile SONCC coho salmon and steelhead use estuaries to acclimate to saltwater while transitioning from freshwater streams to the ocean, and the loss of this buffer area to development and habitat degradation is a factor in the species' decline (NMFS 2014).

8.5.2. Invasive Species

Transportation projects and associated ongoing maintenance activities have the potential to introduce and/or spread nonnative, invasive species. When invasive, nonnative species enter an ecosystem, they can disrupt the natural balance, resulting in a reduction of biodiversity, degradation of habitats, alteration of native genetic diversity, shifting of wetland type, and further threats to already endangered or threatened natural resources. Invasive plant species that affect riparian systems in the GAI include tree-of-heaven, giant reed, water hyacinth, and dense-flowered cordgrass (Cal-IPC 2020). Reed canary grass (*Phalaris arundinacea*), although native to California, has recently been seen as a threat to coho salmon populations because of its inhibiting effect on riparian vegetation and crowding of habitat that coho salmon use (NMFS 2014). Invasive fishes such as Sacramento pikeminnow (which are not native to the Eel River), brown trout, and striped bass (*Morone saxatilis*) are major factors in coho salmon and steelhead declines, with Sacramento pikeminnow of particular concern to steelhead in the Eel River (CDFW 2021). All of these species have been observed in the freshwater systems of the northern coast and are predators limiting coho salmon and steelhead population size (NMFS 2014, 2016).

8.5.3. Altered Hydrology and Water Quality

Water quality and hydrology can be directly altered by physical barriers, such as dams, roads and canals, which can have effects both upstream and downstream by truncating connectivity and altering flow. The loss of wetlands can result in increased flash flooding and decreased water quality in downstream tributaries. Water diversions, in-channel construction, riparian vegetation reduction, agriculture, alteration of streambed and banks, components of timber management, and point and nonpoint source pollution have affected the aquatic ecosystem by altering historical flooding regimes, erosion, and deposition of sediments that maintain floodplains (CDFW 2015). Road construction, particularly opportunistic construction done for historic timber harvesting, is a primary contributor to increased sedimentation and erosion into northern California streams (NPS and California Department of Parks and Recreation 2000). This can alter the rates of sediment delivery to streams, thereby changing the natural channel morphology by filling

pools, widening channels, burying riparian vegetation, raising stream bank height, and disconnecting associated floodplains (NMFS 2014).

These stresses affect coho salmon and steelhead by reducing survival rates for juvenile steelhead and reproductive rates for adult coho salmon and steelhead. Flow reductions through water use also increases the likelihood for fish stranding and contaminant concentration, can cause tissue damage to coho salmon and steelhead (NMFS 2014, 2016). One of the most widespread stresses for coho salmon and steelhead is increased water temperature, which regulates feeding, spawning, growth, and migration. Proper levels of dissolved oxygen, pH, and ammonia can all be shifted to levels dangerous for coho salmon and steelhead by agriculture runoff and sedimentation (NMFS 2014, 2016).

In many river systems, the creation of dikes, levees, tide gates, and culverts has affected water quality and hydrology directly and/or indirectly. Removing or altering hydrologic connections can negatively affect the ability of coho salmon and steelhead to migrate to and from their natal streams. This, in turn, reduces overall reproductive success through a reduction in egg development, increased risk of mortality before spawning, and direct loss of spawning habitat (NMFS 2014, 2016).

Fish barrier removal priorities exist both on and off the SHS. However, on-system fish passage barriers take priority over off-system barriers until such time that no feasible on-system barriers exist. Caltrans and CDFW agree to a collaborative barrier prioritization process through the FishPACs. This prioritization is updated each year in the *Caltrans Fish Passage Annual Legislative Report* (Caltrans 2019d). The priorities on the SHS are dynamic, changing as they are addressed and as funding becomes available.

For the SHS, priority barriers are determined in coordination with the six regional FishPACs and reported to the Legislature in October of each year, in accordance with SHC § 156.1-3 (Senate Bill 857, Kuehl, Chapter 589, Statutes of 2005). Priority fish passage barriers currently account for an estimated 330 miles of currently blocked habitat for threatened and endangered salmon and steelhead along the California coastline and inland Central Valley. Full-span solutions allow Caltrans to reduce the overall number of known barriers on the SHS, provide access to the highest-quality habitat, and reduce rework and partial solutions, which require long-term monitoring and costly maintenance until the end of the facility's service life—when the full-span solution will be required. Priority locations are ranked by considering a species' listing status and diversity, quality and quantity of habitat for recovery, and related best professional knowledge. FishPAC's subject matter experts include CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, other local fish passage advocates, and Caltrans.

8.5.4. Climate Change, Drought, and Sea-level Rise

Section 2.5 provided a brief overview of the GAI's climate and available planning-level predictions for climate change and sea-level rise for the region. In the next 30 years, the climate is expected to change. Expected changes include extended periods of higher temperatures; large fluctuations in precipitation, with dry years becoming drier and wet

years becoming wetter; sea-level rise; storm surges; cliff retreat attributable to coastal erosion; and an increased risk of wildfire and flooding (Caltrans 2019c).

Climate change is expected to affect freshwater wetland habitats by reducing those away from the coast that are surrounded by upland habitat, with sea-level rise expected to flood those near the coast (CDFW 2015). Climate change is expected to amplify the pattern of wet high river flows in the winter and dry low river flows in the summer, which could contribute to water quality degradation through increased sedimentation and elevation of temperature in summer months attributable to lower-than-average flows (Grantham 2018). Sea-level rise may cause the loss of estuarine habitat, including coastal marshes, swamps, and beaches along Humboldt Bay, which help regulate nutrients and filter pollutants (NMFS 2014).

Steelhead and SONCC coho salmon have both been identified as having a critical level of concern with respect to their vulnerability to climate change (Grantham 2018). Increased temperature is detrimental to the survival of most life stages of SONCC coho salmon and steelhead and would most likely affect summer-rearing juveniles (NMFS 2014, 2016). Severe weather patterns have been observed to cause increased sedimentation during flood events and pool disconnection during drought events, which are listed as a high threat to steelhead (NMFS 2016). A recent study found that steelhead in California were most at risk to instream flooding, sea surface temperature changes, and ocean acidification (Crozier et al. 2019).

8.5.5. Wildfire Risk

Vegetation can be altered by large-scale wildfire effects by altering microclimatic regimes, increasing runoff and river discharge, and enhancing erosion and sediment inputs, transport, and deposition. Fires can also affect the physical characteristics of riparian and wetland ecosystems by transitioning vegetation from aquatic and riparian areas to uplands (Bixby et al. 2015).

Fire in riparian zones can reduce canopy cover, resulting in increased water temperatures (CDFW 2015). Increased wildfire occurrence is likely to create additional erosion and reduce large woody debris in riverine habitats already under increased pressures from extreme drought and floods (CDFW 2021; Grantham 2018). These issues are listed as factors involved with coho salmon declines and continue to plague the species (NMFS 2014); however, steelhead are more resistant to temperature changes and do not have this issue listed as a serious stress beyond wildfires damage to riparian systems in a more general way (NMFS 2016).

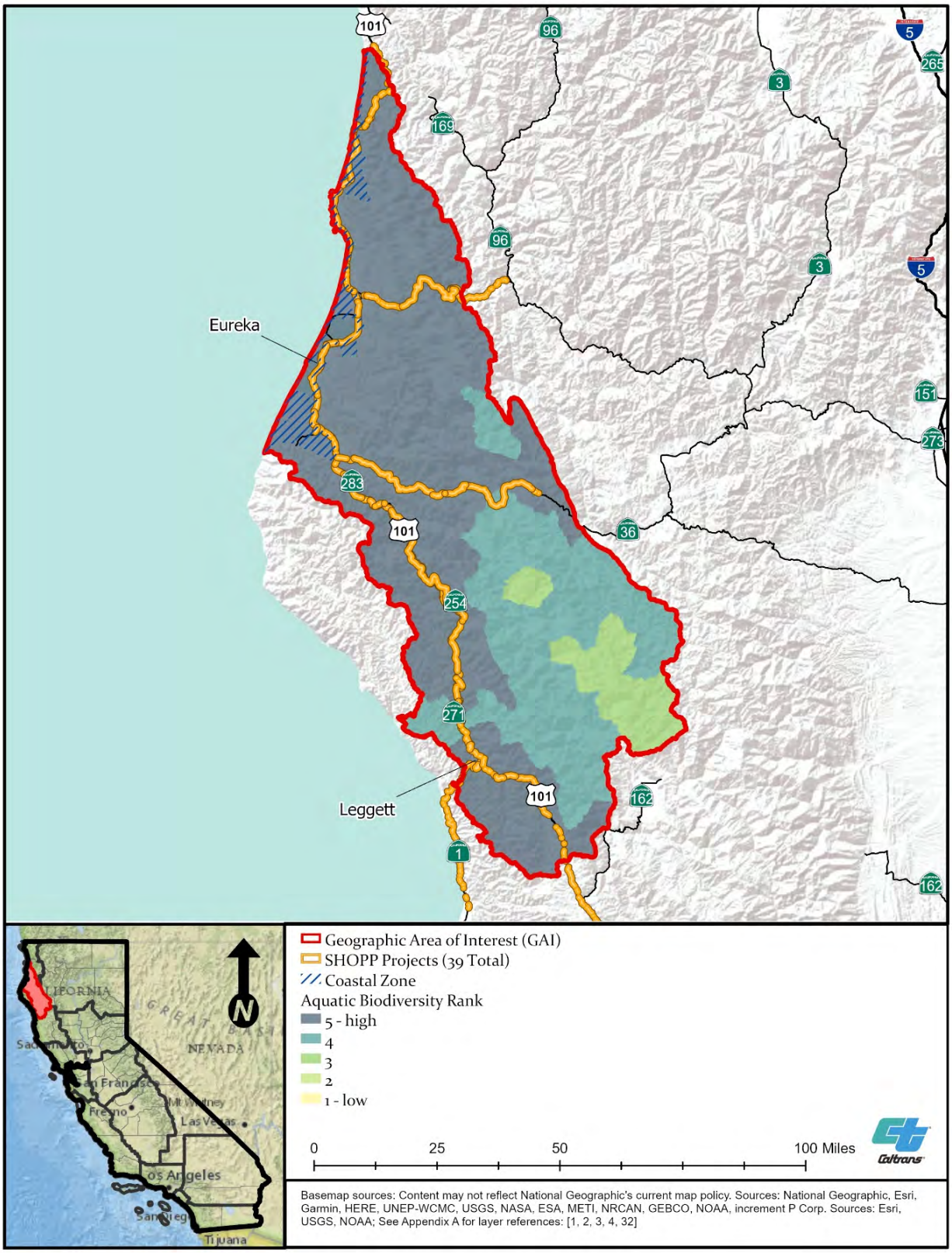
8.6 Multi-resource Benefits

Advance mitigation planning provides Caltrans an opportunity to integrate the enhancement and/or restoration of multiple aquatic resource related values into its advance mitigation scoping to benefit California native aquatic biodiversity, special-status species, wetlands, and non-wetland resources.

- Figure 8-1 illustrates the regional aquatic biodiversity in the GAI, as provided by CDFW's ACE GIS dataset. According to these data, high aquatic biodiversity dominates the GAI; however, some areas of medium to low aquatic biodiversity are located along the SHS with planned SHOPP projects, especially in the southeastern portion of the GAI.
- Enhancing and/or restoring the aquatic resources of the GAI is expected to contribute to biologically sustainable populations of special-status aquatic, wetland, and riparian plant and wildlife species. For example, increasing the amount, complexity, and connectivity of riparian habitat will provide additional shaded riverine aquatic habitat in the GAI that can benefit fish species such as chinook and tidewater goby in addition to coho salmon and steelhead, as well as other species that use aquatic habitat such as northern red-legged frog.
- Enhancing and/or restoring the aquatic resources of the GAI is expected to support or contribute to beneficial uses of non-wetland waters of the GAI. For example, enhancement and/or restoration of wetlands adjacent to spawning habitat would likely improve spawning habitat water quality. Further, enhancement and/or restoration of wetlands adjacent to GAI waterways could sequester contaminants on waterways identified as 303(d) impaired and/or with an established TMDL.

Caltrans will consider aquatic resources' biodiversity values, special-status species with the potential to co-occur in aquatic habitats, ESHAs, the beneficial uses of waterways, and impaired waterways during advance mitigation project scoping—thereby improving the conservation benefits of mitigation in the GAI.

Figure 8-1. Aquatic Biodiversity of the GAI



8.7 Advance Mitigation Conservation Goals and Objectives

The conservation goals and objectives compiled in Table 8-4 are intended to be relevant to anticipated future SHOPP transportation project compensatory mitigation needs, be consistent with the goals and objectives of natural resource regulatory agencies for aquatic resources, address pressures and stressors on aquatic resources, and support mitigation success in the GAI. Each conservation goal is supported by one or more conservation objective; objectives are more specific, measurable, achievable, relevant, and time-bound measures that align to a desired result specified by a goal. At the broad scale, these aquatic resources goals and objectives encompass ecological processes, address functions and values of aquatic systems, and prioritize regional conservation that preserves intact aquatic resources, restores aquatic function, and supports climate change planning. Sub-objectives are included for each objective to guide Caltrans' advance mitigation scoping toward those actions that would create the greatest functional lift or conservation benefit, support long-term preservation, restore surface water flows, and reduce climate change effects on aquatic resources in the GAI. Sub-objectives also capture specific measures from conservation and land management plans that address threats to aquatic resources. Several of the goals are interrelated, and many objectives could apply to more than one goal; objectives were grouped with the goal to which they most specifically aligned. Goals and objectives are generally presented in order from general to more specific.

The goals and objectives presented here are intended to support the watershed approach, as practiced by natural resource regulatory agencies. The watershed approach is an analytical process through which the Corps, State Water Board, CCC, and RWQCBs make decisions that support the sustainability or improvement of aquatic resources, with the goal of maintaining and improving the quality and quantity of aquatic resource through strategic selection of compensatory mitigation sites. The Corps subscribes to a watershed approach for compensatory mitigation that uses the HUC-based classification system, or a topographic watershed-based system, depending on the size and location of a transportation or other project (Corps 2015). The State Water Board and RWQCBs generally subscribe to an approach for compensatory mitigation decisions that follows the Corps' watershed approach; however, the HU classification system may be used on a case-by-case basis (State Water Board 2019c). Additionally, coho salmon and steelhead have goals separate from those pursued by the Corps and the Water Boards, including the elimination of fish passage barriers and aquatic predators such as pikeminnow and brown trout (NMFS 2014, 2016). The goals, objectives, and sub-objectives presented in Table 8-4 reflect Caltrans' intention to develop advance mitigation project scopes for in-kind mitigation.

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Table 8-4. Advance Mitigation Conservation Goals and Objectives for Aquatic Resources

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-1: No net loss of area, functions, values, and condition of wetland and non-wetland water resources	See below	See below
Objective AR-1.1: Improve quality and function of wetland and non-wetland water resources.	**Sub-Objective AR-1.1.1:** Enhance and/or rehabilitate wetland and non-wetland water resources such that the greatest functional lift to the aquatic resource is provided, including by consolidating compensatory mitigation consistent with Executive Order W59-93. **Sub-Objective AR-1.1.2:** Enhance and/or rehabilitate key wetland and non-wetland water habitats that are identified in the SWAP, FWS recovery plans, CDFW recovery plans, LCPs, and other land management plans identified in Table 8-3. **Sub-Objective AR-1.1.3:** Enhance and/or rehabilitate riparian vegetation in the Mad-Redwood, Lower Eel, and South Fork Eel HUC-8s, particularly the Mad, Eel, and Elk Rivers and Freshwater and Redwood Creeks as well as other named and unnamed tributaries into Humboldt Bay and the Pacific Ocean, many of which are listed in Table 8-2. **Sub-Objective AR-1.1.4:** Enhance and/or restore wetland and non-wetland water resource functions, such as connectivity, abundance of native plants, and water quality, that define habitat value for aquatic organisms.	▪ *SWAP* (CDFW 2015*)* ▪ *Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division* (Corps 2015*)* ▪ *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material in Waters of the State* (State Water Board 2019b) ▪ *Definition and Delineation of Wetlands in the Coastal Zone* (CCC 2011) ▪ *Humboldt Bay National Wildlife Refuge Complex - Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (FWS 2013b) ▪ *Six Rivers National Forest – Land and Resource Management Plan* (USFS 1995) ▪ *Six Rivers Aquatic Restoration Project Final Environmental Assessment* (USFS 2018) ▪ *Headwaters Forest Reserve Proposed Resource Management Plan and Final Environmental Impact Statement/Environmental Impact Report – Volume 1* (BLM and CDFW 2003) ▪ *Redwood State and National Parks General Plan/General Management Plan* (NPS and California Department of Parks and Recreation 2000) ▪ *The Eureka Area Watersheds Storm Water Resource Plan* (Humboldt County 2018) ▪ *Humboldt Bay Management Plan (*Humboldt Bay Harbor, Recreation, and Conservation District 2007) ▪ *Humboldt Bay Eelgrass Comprehensive Management Plan* (Humboldt Bay Harbor, Recreation, and Conservation District 2018)
Goal AR-1.2: Avoid a net loss of aquatic resource acreage by establishing aquatic resources.	**Sub-Objective AR-1.2.1**: Establish and/or re-establish wetland and non-wetland water aquatic resources. **Sub-Objective AR-1.2.2:** Establish and/or re-establish key wetland and non-wetland water habitats that are identified in the SWAP, FWS recovery plans, CDFW recovery plans, LCPs, and other land management plans identified in Table 8-3. **Sub-Objective AR-1.2.3:** Establish and/or re-establish riparian vegetation in the HUC-8s included in Table 8-2, particularly the Mad, Eel, and Elk Rivers and Freshwater and Redwood Creeks as well as other named and unnamed tributaries into the Pacific Ocean, many of which are listed in Table 8-2.	▪ *SWAP* (CDFW 2015*)* ▪ *Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division* (Corps 2015) ▪ *2008 Final Compensatory Mitigation Rule* (73 *Federal Register* 19670) ▪ *National Wetlands Mitigation Action Plan* (EPA and Corps 2002) ▪ *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material in Waters of the State* (State Water Board 2019b) ▪ *Definition and Delineation of Wetlands in the Coastal Zone* (CCC 2011) ▪ *California Wetlands Conservation Policy* (Executive Order W-59-93)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-2: Restore and/or enhance the chemical, physical, and biological integrity of non-wetland waters	See below	See below
Objective AR-2.1: Protect and enhance water quality.	**Sub-Objective AR-2.1.1:** Restore and/or enhance of non-wetland waters with RWQCB biology-related beneficial use designations, such as groundwater recharge (where there is a surface water connection); freshwater replenishment; biological habitats of special significance and rare, threatened, or endangered species; cold freshwater habitat; warm freshwater habitat; spawning, reproduction, and/or early development habitat for fish; migration of aquatic species; estuarine habitat; and wildlife habitat. **Sub-Objective AR-2.1.2:** Address erosion, nutrients, contaminants, and temperatures in the Mad-Redwood, Lower Eel, and South Fork Eel HUC-8s. **Sub-Objective AR-2.1.3:** Implement habitat restoration and enhancement actions that address water quality for aquatic resources, for example, Freshwater Creek and freshwater and coastal marshes. **Sub-Objective AR-2.1.4:** Restore and/or enhance areas upstream of places with high water quality protection and remediation values, such as ASBSs, ESHA designated areas, and CCAs. **Sub-Objective AR-2.1.5**: Restore or create adjacent wetlands to enhance water quality in tributaries. **Sub-Objective AR-2.1.6:** Identify small streams and sections of larger streams to remove nonnative plant species that degrade stream water quality, such as dense-flowered cordgrass, Himalayan blackberry, giant reed, water hyacinth, and tree-of-heaven. **Sub-Objective AR-2.1.7:** Improve stream temperatures by increasing shaded riverine aquatic habitat in the Mad, Eel, and Elk Rivers and Freshwater and Redwood Creeks for fish and other aquatic life.	▪ *Water Quality Control Plan for the North Coast Region* (North Coast RWQCB 2018) ▪ *Trinidad-Westhaven Integrated Coastal Watershed Management Plan* (City of Trinidad 2008) ▪ *The Eureka Area Watersheds Storm Water Resource Plan* (Humboldt County 2018) ▪ *Redwood Creek Integrated Watershed Strategy* (Redwood Creek Watershed Group 2006)
Objective AR-2.2: Improve surface water hydrology.	**Sub-Objective AR-2.2.1:** Restore and/or enhance natural hydrologic regimes. **Sub-Objective AR-2.2.2:** Reconnect severed aquatic systems and improve connectivity in aquatic systems. **Sub-Objective AR-2.2.3:** Reestablish hydrologic regimes or drainage patterns for better function of depressional wetlands, estuarine wetlands, freshwater emergent wetlands, forested/shrub wetland, freshwater pond, lake, marine intertidal systems, riverine habitats, and coastal wetlands.	▪ *SWAP* (CDFW 2015) ▪ *Headwaters Forest Reserve Proposed Resource Management Plan and Final Environmental Impact Statement/Environmental Impact Report – Volume 1* (BLM and CDFW 2003) ▪ *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (FWS 2013b) ▪ *Humboldt Bay National Wildlife Refuge Complex Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Redwood State and National Parks General Plan/General Management Plan* (NPS and California Department of Parks and Recreation 2000)
Objective AR-2.3: Improve water storage and groundwater recharge	**Sub-Objective AR-2.3.1:** Promote restoration of stream and riparian areas' natural functions to provide water storage and release. **Sub-Objective AR-2.3.2:** Reduce excessive and invasive vegetation along stream/riparian corridors to lower vegetative transpiration rates to sustainable levels and increase water storage in soils and streams. **Sub-Objective AR-2.3.3:** Create or restore adjacent wetlands to enhance groundwater-surface water dynamics in tributaries.	▪ *Water Quality Control Plan for the North Coast Region* (North Coast RWQCB 2018) ▪ *Trinidad-Westhaven Integrated Coastal Watershed Management Plan* (City of Trinidad 2008) ▪ *The Eureka Area Watersheds Storm Water Resource Plan* (Humboldt County 2018) ▪ *Redwood Creek Integrated Watershed Strategy* (Redwood Creek Watershed Group 2006)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-3: Restore or enhance and expand habitat for fish species of mitigation need	See below	See below
Objective AR-3.1: Restore and/or enhance habitat.	**Sub-Objective AR-3.1.1:** Consult with FishPAC to select and implement habitat restoration and enhancement actions that support key populations and important habitat and contribute to the recovery of threatened and endangered salmon and steelhead. Enhancement or restoration may include placement of large pieces of wood in alcoves and pools and stream channel restoration. **Sub-Objective AR-3.1.2:** Consult with FishPAC to select and implement FishPAC and legislative priorities in the GAI to restore access to habitats that support key populations for recovery of threatened and endangered salmon and steelhead. The highest value for fish passage remediation and habitat restoration should be given to the current high-priority locations on the SHS (listed in each years' Fish Passage Annual Report to Legislature). FishPAC priority locations have the highest biological value for recovery and should have the greatest support for remediating, both internally and from natural resource regulatory agencies. **Sub-Objective AR-3.1.3:** Align with LCP ESHA requirements to prioritize restoration and/or enhancement in ESHAs containing fish species of mitigation need such that a functional lift to the ESHA is provided, when feasible.	▪ *Caltrans Fish Passage Annual Legislative Reports* (Caltrans 2019d) ▪ *SWAP* (CDFW 2015) ▪ *Steelhead Restoration and Management Plan for California* (California Department of Fish and Game 1996) ▪ *Recovery Strategy for California Coho Salmon* (California Department of Fish and Game 2004) ▪ *Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (*Oncorhynchus kisutch*)* (NMFS 2014) ▪ *Final Coastal Multispecies Recovery Plan Volume III: Northern California Steelhead* (NMFS 2016) ▪ *Redwood Creek Integrated Watershed Strategy* (Redwood Creek Watershed Group 2006) ▪ *Humboldt Bay Watershed Salmon and Steelhead Conservation Plan* (Humboldt Bay Watershed Advisory Committee 2015) ▪ *Six Rivers Aquatic Restoration Project Final Environmental Assessment* (USFS 2018) ▪ *Non-Natal Habitat Enhancement Planning for Endangered Species Act-Listed Salmonids in the Humboldt Bay Watershed* (CDFW and Pacific Coast Fish, Wildlife, and Wetlands Restoration Association 2020)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-4: Support resiliency of aquatic resources to climate change and sea-level rise	See below	See below
Objective AR-4.1: Reduce impacts from climate change and sea-level rise.	**Sub-Objective AR-4.1.1:** Enhance and/or restore aquatic resource function and value in areas of lower climate resilience, such as the northern third of the coastline portion of the GAI and the southern third of the entire GAI, and at tidal flats, salt pannes, and freshwater wetlands to reduce climate change and sea-level rise effects on aquatic resources. **Sub-Objective AR-4.1.2:** Prioritize enhancement and/or restoration that will increase resilience to climate change and sea-level rise such as the estuaries around Arcata Bay, Humboldt Bay, and the Eel River. **Sub-Objective AR-4.1.3:** Prioritize riparian areas of the Mad-Redwood, Lower Eel, and South Fork Eel HUC-8s for enhancement and/or restoration to improve freshwater quantity and quality, floodplain connectivity, and in-stream cover continuity. **Sub-Objective AR-4.1.4:** Enhance, rehabilitate, establish and/or reestablish aquatic habitats by using native species such as box elder (*Acer negundo*), water birch (*Betula occidentalis*), Fremont's cottonwood (*Populus fremontii*), willows (*Salix* sp.), cattails (*Typha* spp.), rushes (*Juncus* sp.), and bulrushes (*Schoenoplectus* sp.), to reduce the effects of climate change. **Sub-Objective AR-4.1.5:** Reduce adverse instream flooding effects by restoring affected headwater and tributary hydrological functions for the Eel River, Mad River, Elk River, and Redwood Creek. **Sub-Objective AR-4.1.6:** Prioritize habitat establishment and reestablishment in areas that can also reduce risk in flood-prone systems, particularly in areas along Trinidad Bay, Luffenholtz Creek, Parker Creek, Elk River, Redwood Creek, and the Eel River.	▪ *SWAP* (CDFW 2015) ▪ *Strategic Plan to Protect California's Coast and Ocean 2020–2025* (Ocean Protection Council 2019) ▪ *Trinidad-Westhaven Integrated Coastal Watershed Management Plan* (City of Trinidad 2008) ▪ *The Eureka Area Watersheds Storm Water Resource Plan* (Humboldt County 2018) ▪ *Redwood Creek Integrated Watershed Strategy* (Redwood Creek Watershed Group 2006)
Objective AR-4.2: Improve aquatic habitat resiliency.	**Sub-Objective AR-4.2.1:** Promote native plant species that can stabilize banks, improve filtering of nutrient loads from water, and maintain the flood conveyance properties of streams and estuaries, such as rushes, bulrushes, cattail, and willows. **Sub-Objective AR-4.2.2:** Prioritize management of invasive species in aquatic habitats, such as giant reed, dense-flowered cordgrass, American bullfrog, and brown trout, that may be exacerbated by climate change such that the greatest functional lift is provided. **Sub-Objective AR-4.2.3:** Enhance, rehabilitate, establish and/or reestablish small (that is, low order) tributaries/streams that discharge into larger rivers such as the Eel River, Elk River, Freshwater Creek, Redwood Creek, and Mad River.	▪ *SWAP* (CDFW 2015) ▪ *Strategic Plan to Protect California's Coast and Ocean 2020-2025* (Ocean Protection Council 2019) ▪ *Humboldt Bay National Wildlife Refuge Complex Comprehensive Conservation Plan and Final Environmental Assessment* (FWS 2009) ▪ *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (FWS 2013b)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-5: Provide multi-resource benefits	See below	See below
Objective AR-5.1: Coordinate mitigation to provide benefits to other resources.	**Sub-Objective AR-5.1.1:** Enhance, rehabilitate, establish, and/or reestablish aquatic resource areas currently occupied by, or that provide habitat for, one or more special-status species, or areas that contribute to the protection of ecologically, geographically, and/or genetically distinct populations or sub-populations of obligate aquatic special-status species. **Sub-Objective AR-5.1.2:** Enhance, rehabilitate, establish, and/or reestablish habitats for other aquatic species such as tidewater goby and eelgrass. **Sub-Objective AR-5.1.3:** Address additional RWQCB beneficial use designations, such as recreation (for example, bird watching) through enhancement, rehabilitation, establishment, and/or reestablishment actions. **Sub-Objective AR-5.1.4:** Align with LCP ESHA requirements to prioritize enhancement, rehabilitation, establishment, and/or reestablishment actions that provide a functional lift to the ESHA, when feasible. **Sub-Objective AR-5.1.5:** Prioritize enhancement, rehabilitation, establishment, and/or reestablishment in areas that benefit EFH, such as spawning areas for chinook salmon.	▪ *SWAP* (CDFW 2015) ▪ *Humboldt Bay National Wildlife Refuge Complex – Comprehensive Conservation and Final Environmental Assessment* (FWS 2009) ▪ *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (FWS 2013b) ▪ *Headwaters Forest Reserve Proposed Resource Management Plan and Final Environmental Impact Statement/Environmental Impact Report – Volume 1* (BLM and CDFW 2003) ▪ *Redwood State and National Parks General Plan/General Management Plan* (NPS and California Department of Parks and Recreation 2000) ▪ *Pacific Coast Salmon Fishery Management Plan* (Pacific Fishery Management Council 2016) ▪ *Humboldt Bay Eelgrass Comprehensive Management Plan* (Humboldt Bay Harbor, Recreation, and Conservation District 2018)

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8.8 Summary

Caltrans anticipates that future SHOPP transportation projects may be conditioned by the Corps, State Water Board, RWQCB, NMFS, CCC, and/or CDFW to address the pressures and stressors that threaten aquatic resources in the GAI. The pressures and stressors include:

- Habitat loss, fragmentation, and degradation;
- Invasive species;
- Altered hydrology and water quality;
- Climate change, drought, and sea-level rise; and
- Wildfire risk.

Hence, Caltrans will seek to align advance mitigation scopes with conservation goals and objectives that address the identified pressures and stressors, thereby aligning advance mitigation efforts with regional conservation efforts. As noted in 33 CFR § 332.3, consolidating compensatory mitigation is ecologically preferable.

Regional conservation goals and objectives provide a framework for scoping mitigation credit establishment that would likely successfully offset future transportation project impacts on aquatic resources by creating functional lift or conservation benefit, and by mitigating the pressures and stressors on aquatic resources in the GAI. To summarize Table 8-4:

Goal AR-1 seeks to achieve no net loss of area, functions, values, and the condition of wetland and non-wetland water resources in the GAI. The primary objectives associated with this goal are to improve existing wetland and non-wetland water resources and create new ones. The sub-objectives were selected to address the following pressures and stressors: altered hydrology and water quality; habitat loss, fragmentation, and degradation; invasive species; and wildfire risk.

Goal AR-2 seeks to restore and maintain the chemical, physical, and biological integrity of waters. The primary objectives associated with this goal are to protect and enhance water quality and restore and enhance surface water hydrology. The sub-objectives were selected to address the following pressures and stressors: altered hydrology and water quality.

Goal AR-3 seeks to direct advance mitigation planning toward fish species of mitigation concern. The objectives are designed to restore and/or enhance habitat for steelhead and tidewater goby and increase the survivability of these species. The sub-objectives were selected to address the following pressures and stressors: altered hydrology and water quality; habitat loss, fragmentation, and degradation; and invasive species.

Goal AR-4 seeks to support climate resiliency for aquatic resources in the GAI. The primary objectives are to reduce impacts on aquatic resources from climate change and to improve aquatic habitat climate resiliency. The sub-objectives were selected to address the following pressures and stressors: climate change, drought, and sea-level rise; invasive species; and wildfire risk.

Goal AR-5 seeks to guide advance mitigation project scoping to prioritize multi-resource benefits, with the only objective being to coordinate mitigation efforts for multi-resource benefits. The sub-objectives of Goal AR-5 describe what additional benefits exist for other resources in the GAI, including benefits to upland terrestrial habitat. Goal AR-5 was developed to include conservation for multiple resources while seeking to address in-kind transportation projects' effects on aquatic resources.

Each of the goals and objectives have sub-objectives intended to further guide advance mitigation project scoping toward resource and regulatory agencies' regional conservation goals and objectives. These sub-objectives will prompt Caltrans to incorporate multiple benefits into advance mitigation project scopes and address important threats in the area through an advance mitigation project. This concept is an important way Caltrans seeks to use advance mitigation scoping to set the stage, once funding approval is received, for specific advance mitigation projects to provide a functional lift for aquatic resources and to maximize conservation benefits from mitigation in the GAI.

9. ASSESSMENT OF AUTHORIZED ACTIVITIES

Informed by this RAMNA and its reviewers' comments and feedback, Caltrans District 1 will nominate advance mitigation projects to the Caltrans Director and request funding approval (see Step 4 in Figure 1-1; Figure 6-1; Caltrans 2019a). Each advance mitigation project nominated to the Director will consist of a scope, schedule, and cost for an SHC § 800.6(a)-authorized activity. With respect to scope, in this chapter, Caltrans analyzes the information presented previously to identify advance mitigation project scope options that have a high probability of successfully meeting the AMP's transportation project and environmental objectives. Understanding the regulatory framework, environmental setting, available opportunities to purchase credits, impact forecasts, transportation project schedule needs, and natural resource regulatory agency goals and objectives will assist Caltrans District 1 with scoping of SHC § 800.6(a)-authorized activities to be considered further for potential funding by the AMA (see Step 4 of Figure 1-1; Section 9.4).

Note that the analysis presented in this chapter is for advance mitigation project scoping purposes only. Transportation projects must still go through environmental and permitting processes and must demonstrate avoidance and minimization efforts prior to compensation.

9.1 Overview of Advance Mitigation Project Scope Development

Advance mitigation project scopes will provide enough information, at the appropriate level of detail, for the Caltrans Director to concur with funding. Appropriately, advance mitigation project scopes will address transportation project delivery acceleration and environmental objectives:

- To meet the AMP's objective of accelerating transportation project delivery, advance mitigation project scopes will be consistent with the AMP's founding legislation and the state's competitive bid requirements and will address transportation project schedule milestones and constraints.
- To meet the environmental objectives through transportation project mitigation, an advance mitigation project scope will, at a minimum, be consistent with natural resource regulatory agency goals and objectives, may be expressed in an approved regulatory instrument or interagency agreement, and/or be aligned with conservation goals and objectives identified in Chapter 7 or Chapter 8.

Summaries of transportation-related advance mitigation project scope requirements and conservation-related advance mitigation project scope goals and objectives are provided in Tables 9-1 and 9-2, respectively.

Table 9-1. Summary of Transportation-related Advance Mitigation Project Scope Requirements

Advance mitigation project scopes must:
Be an authorized activity in accordance with SHC § 800.6(a)
Benefit multiple transportation projects' delivery schedules
Deliver mitigation anticipated to be needed to fulfill the mitigation requirements of transportation improvements[a]
Be consistent with natural resource regulatory agency's goals and objectives
Yield mitigation in units and terms approved by natural resource regulatory agencies with the authority to condition transportation project permits with compensatory mitigation
Employ, as appropriate, existing applicable state and federal standards and instruments, mitigation-related agreements, advance mitigation project-specific agreements,[b,c] and contracts with qualified third parties[d]
Address overlapping mitigation requirements
Implement the state's competitive proposal and bidding processes[d]
Strategically exercise the AMA
Manage the financial, technical, and strategic risks associated with Caltrans' investments

[a] California Constitution, Article XIX, § 2, subdivision (a)
[b] An advance mitigation project-specific interagency agreement is a general term to describe an agreement between natural resource regulatory agencies that attaches or binds advance mitigation requirements to a sponsor, qualified third party, or permittee; natural resource regulatory agencies agree that the action provides mitigation. Examples of advance mitigation project-specific interagency agreements include cooperative agreements, MCAs, or other interagency agreements. Advance mitigation project-specific interagency agreements are developed after a Caltrans advance mitigation project is funded.
[c] The authority for Caltrans to enter into interagency agreements with public entities such as CDFW is under SHC § 114 and SHC § 130.
[d] Procedures for Caltrans to enter in contracts with third parties are available at: http://ppmoe.dot.ca.gov/des/oe/contractor-info.html.

Table 9-2. Summary of Conservation-related Advance Mitigation Project Scope Goals and Objectives

Advance mitigation project scopes will strive to:
Benefit multiple wildlife species and aquatic resources
Be consistent with existing regional conservation planning expressed in a natural resource regulatory agency strategic plan, conservation plan, HCP, NCCP, watershed plan, restoration plan, investment strategy, RCIS, BEI, in-lieu fee program instrument, land management plan, or other documented conservation effort
Benefit regional biodiversity
Contribute to landscape climate change resiliency
Contribute to landscape connectivity
Contribute to federal and/or California special-status species population recovery
Mitigate effects of stressors on wildlife species and aquatic resources
Restore and rehabilitate wildlife habitat and aquatic resources

9.2 Benefiting Transportation Project Needs Summary

The proximity of planned SHOPP transportation projects to natural resources is shown in figures throughout this document; non-SHOPP STIP-eligible projects were not identified for the planning period, and so were not shown. Estimated transportation project mitigation needs within the GAI for fiscal years 2017/18 to 2026/27 are presented in Chapter 5, and the timing of the needs is analyzed in Chapter 6. For the time interval under consideration, 2017/18 to 2026/27, Caltrans District 1 intends to prioritize purchasing or developing mitigation credits or values that address Road Repair and Accountability Act of 2017 (also known as Senate Bill 1) priorities. Hence, given the expected timing of mitigation need, at this time (July of fiscal year 2020/21) mitigation that can be purchased or established by 2023/24 (within the next 2 years) could address approximately:

- 2.6 acres of threatened and endangered fish habitat mitigation need, potentially contributing to the acceleration of 5 transportation projects
- 2.2 acres of wetland mitigation need, potentially contributing to the acceleration of 11 transportation projects
- 4.1 acres of non-wetland waters mitigation need, potentially contributing to the acceleration of 9 transportation projects

All or some of these needs could form the basis for Caltrans District 1 to develop an advance mitigation project scope.

9.3 Authorized Activity Summary

Advance mitigation project scope options that have a high probability of successfully meeting the AMP's objectives are feasible. Below, a brief description of each of the 11 SHC § 800.6(a)-authorized advance mitigation project types is provided, followed by a discussion of its feasibility. Listed in Table 9-3, some advance mitigation project types are not currently feasible because they are not available in the GAI. Others are not currently feasible because a regulatory and administrative pathway is not available. Still others have potential but may be not be feasible to implement on a schedule to contribute to accelerated transportation project delivery. Further, the activity authorized by SHC § 800.6(a)(4) is only feasible if 800.6 (a)(1)–(3) options are not feasible. Results of the feasibility analysis are summarized in the subsections below and in Table 9-4 (for aquatic resources), located at the end of this chapter.

Table 9-3. Advance Mitigation Project Types[a]

Advance Mitigation Project Type	Authorization	Section
Caltrans pays mitigation fees or other costs, or payments associated with coverage of transportation projects under an approved NCCP[b] and/or an approved HCP.	SHC § 800.6(a)(2)	9.3.1
Caltrans purchases credits from an existing conservation bank.	SHC § 800.6(a)(1)	9.3.2
Caltrans purchases credits from an existing mitigation bank.	SHC § 800.6(a)(1)	9.3.3
Caltrans purchases credits from an existing in-lieu fee program.	SHC § 800.6(a)(1)	9.3.4
Caltrans purchases credits developed through an MCA, established under a CDFW-approved RCIS.[c]	SHC § 800.6(a)(3)(A)	9.3.5
Caltrans funds the establishment of a Caltrans or third-party sponsored and operated conservation bank, in accordance with applicable state and federal standards.	SHC § 800.6(a)(1)	9.3.6
Caltrans funds the establishment of a Caltrans or third-party sponsored and operated mitigation bank in accordance with applicable state and federal standards.	SHC § 800.6(a)(1)	9.3.7
Caltrans funds the establishment of a Caltrans or third-party sponsored and operated in-lieu fee program in accordance with applicable state and federal standards.	SHC § 800.6(a)(1)	9.3.8
Caltrans funds the implementation of conservation actions and habitat enhancement actions[c,d] to generate mitigation credits pursuant to an MCA[b] established under a CDFW-approved RCIS.[c] The scope may include Caltrans first entering into or funding the preparation of an MCA.[c] The scope may also include Caltrans first entering into or funding the preparation of an RCIS.[c]	SHC § 800.6(a)(3) SHC § 800.6(a)(3)(A)	9.3.9

Advance Mitigation Project Type	Authorization	Section
Caltrans acquires, restores, manages, monitors, enhances, and preserves lands, waterways, aquatic resources, or fisheries, or funds the acquisition, restoration, management, monitoring, enhancement, and preservation of lands, waterways, aquatic resources, or fisheries, that would measurably advance a conservation objective specified in an RCIS if the department concludes that the action or actions could conserve or create environmental values that are appropriate to mitigate the anticipated potential impacts of planned transportation improvements.	SHC § 800.6(a)(3)(B)	9.3.10
When the other mitigation options (above) are not practicable, Caltrans may perform mitigation in accordance with a programmatic mitigation plan[e] pursuant to SHC § 800.9. The programmatic mitigation plan shall include, to the maximum extent practicable, the information required for an RCIS.[c]	SHC § 800.6(a)(4) SHC § 800.9	9.3.11

[a] Caltrans intends to contract or subcontract implementation tasks when appropriate and as required.
[b] When Caltrans is a permittee under the NCCP, or if Caltrans qualifies as a Participating Special Entity and the project is a covered activity in the NCCP
[c] See: https://www.wildlife.ca.gov/Conservation/Planning/Regional-Conservation
[d] Under specific conditions, fish passage and wildlife crossing structures may qualify as enhancement actions under an RCIS in accordance with FGC § 1850–1861.
[e] Programmatic mitigation plans are defined in 23 USC § 169(a) (SHC § 800.9). No more than 25 percent of the funds in the AMA may be allocated for this purpose over a 4-year period [SHC § 800.6(a)(4)].

9.3.1. NCCP and/or HCP Fees

NCCPs and HCPs are discussed in Section 4.2. NCCPs and HCPs are species-focused and are aligned with and plan for natural resource protection. NCCPs and HCPs provide for incidental take under CESA and ESA, respectively. CDFW is the signatory agency to NCCPs. FWS is the signatory agency to HCPs. There are currently are no NCCPs in the GAI, and Caltrans is not a permittee to an HCP in the GAI.

Feasibility. This authorized activity is not feasible. At this time (July of fiscal year 2020/21), there are no HCPs or NCCPs that Caltrans can contribute or pay fees to in the GAI.

9.3.2. Conservation Bank Credit Purchase

Conservation banks were discussed in Section 4.3. Conservation banks are species-focused, and each bank's alignment with natural resource protection is documented through its BEI. There are currently are no conservation banks established in the GAI.

Feasibility. This authorized activity is not feasible. At this time (July of fiscal year 2020/21), no conservation bank credits are available for purchase in the GAI.

9.3.3. Mitigation Bank Credit Purchase

Mitigation banks were discussed in Section 4.3. Mitigation banks are wetlands- and waters-focused, and each bank's alignment with natural resource protection is documented through its BEI. Although a mitigation bank is being established through the

Caltrans SHOPP (Section 4.1), there are currently no mitigation banks established in the GAI.

Feasibility. This authorized activity is not feasible. At this time (July of fiscal year 2020/21), no mitigation bank credits are available for purchase in the GAI.

9.3.4. In-lieu Fee Credit Purchase

In-lieu fee programs were discussed in Section 4.4. In-lieu fee mitigation occurs when a permittee provides funds to an in-lieu fee sponsor instead of either completing project-specific mitigation or purchasing credits from a conservation or mitigation bank. Once enough money is received by an in-lieu fee program, it implements a wetland, stream, or threatened or endangered species habitat restoration, creation, enhancement, or preservation activity in the watershed.[1] The in-lieu fee program's alignment with natural resource protection is documented through its enabling instrument. There are currently no in-lieu fee programs established in the GAI.

Feasibility. This authorized activity is not feasible. At this time (July of fiscal year 2020/21), no in-lieu fee program credits are available for purchase in the GAI.

9.3.5. MCA Credit Purchase

As discussed in Section 4.5, MCAs are an advance mitigation tool that can be developed when and where an RCIS is approved by CDFW. At this time (July of fiscal year 2020/21), instructions and guidance for establishing MCAs are currently under development by CDFW, and the required foundational RCISs are not underway in the GAI. RCISs and MCAs are aligned with and plan for natural resource protection.

Feasibility. This authorized activity is not feasible. At this time (July of fiscal year 2020/21), no MCA credits are available for purchase in the GAI.

9.3.6. Conservation Bank Establishment

Instructions and guidance for establishing conservation banks are available from CDFW[2] and FWS.[3] Conservation banks are species-focused, and each bank's alignment with natural resource protection will be documented through its BEI. CDFW, FWS, and NMFS are potential signatories, and there also may be circumstances where the Corps and/or State Water Board would participate.

To support future transportation project conditions, a conservation bank funded through the AMA would establish CESA and ESA credits. At a minimum, conservation bank establishment project scopes will refer to and rely on GAI information provided in:

- Chapter 2, *Environmental Setting*
- Chapter 3, *Relevant Plans, Policies, and Regulations*
- Chapter 7, *Wildlife Resources Conservation Goals and Objectives*

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[1] https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/banking_faq.pdf
[2] https://wildlife.ca.gov/Conservation/Planning/Banking/Templates
[3] https://www.fws.gov/endangered/esa-library/pdf/Conservation_Banking_Guidance.pdf

- Chapter 8, *Aquatic Resources Conservation Goals and Objectives*
- Appendix C, *Land Cover Types*
- Appendix E, *Complete SAMNA Species Results*

An understanding of CDFW and FWS goals and objectives for wildlife resources in the GAI will improve the chances that credits established through an advance mitigation project will meet the compensatory mitigation needs of Caltrans' future transportation projects. In Chapter 7, Caltrans analyzed and synthesized the relevant and applicable information listed in Chapter 3 to develop its understanding of natural resource regulatory agency goals and objectives for the GAI. In brief, it is Caltrans' understanding that a conservation bank that addresses one or more of the following goals would be consistent with CDFW and FWS goals:

- Conserve and expand existing habitat for sensitive wildlife species within the GAI (WILD-1).
- Preserve, enhance, and increase connectivity between blocks of sensitive species habitat (WILD-2).
- Support climate resiliency (WILD-3).
- Decrease mortality of sensitive species (WILD-4).
- Prioritize multi-species benefits (WILD-5).

Further, for each objective, Table 7-4 presented sub-objectives, which are intended to help guide Caltrans advance mitigation project scoping toward protecting natural resources through transportation project mitigation.

Feasibility. This authorized activity may be feasible. As pointed out above, instructions and guidance for establishing conservation banks are available from CDFW and FWS. After the Caltrans Director's approval for funding, delivering an advance mitigation project to establish a conservation bank is expected to take 2 to 6 years before the initial credit release; the credits or values would be available to transportation projects according to the credit release schedule in the Interagency Review Team-approved BEI (CNRA et al. 2011). Caltrans may contract or subcontract bank establishment and/or implementation tasks, including site selection.

9.3.7. Mitigation Bank Establishment

Instructions and guidance for establishing mitigation banks are available from the Corps[4] and CDFW.[5] At a minimum, mitigation bank establishment project scopes will refer to and rely on GAI information provided in:

- Chapter 2, *Environmental Setting*
- Chapter 3, *Relevant Plans, Policies, and Regulations*
- Chapter 7, *Wildlife Resources Conservation Goals and Objectives*
- Chapter 8, *Aquatic Resources Conservation Goals and Objectives*

[4] https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/mitig_info/
[5] https://wildlife.ca.gov/Conservation/Planning/Banking/Templates

- Appendix F, *Aquatic Resource Locations*

To support future transportation project permits, Caltrans would prioritize wetland and water credit establishment under the Corps' jurisdiction (wetlands and WOTUS) and RWQCB jurisdiction (waters of the state), as well as riparian credit establishment under CDFW's Lake and Streambed Alteration jurisdiction. Within the coastal zone, Caltrans would also prioritize coastal wetland establishment in accordance CCC authorities.

Mitigation banks are wetland- and waters-focused, and each bank's alignment with natural resource protection is documented through its BEI. The CCC, CDFW, Corps, FWS, NMFS, and RWQCB are potential signatories. There also may be some circumstances where CDFW's participation in a bank would be documented through an MCA.

An understanding of CCC, CDFW, Corps, FWS, NMFS, and RWQCB, goals and objectives for aquatic resources in the GAI will improve the chances that credits established through an advance mitigation project will meet the compensatory mitigation needs of Caltrans' future transportation projects. In Chapter 8, Caltrans analyzed and synthesized the relevant and applicable information listed in Chapter 3 to develop its understanding of natural resource regulatory agency goals and objectives for the GAI. In brief, it is Caltrans' understanding that a mitigation bank that addresses the majority of the following goals would be consistent with natural resource regulatory agency goals:

- No net loss to area, functions, and values of WOTUS[8] and waters of the state to ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property, as described in Executive Order W-59-93[6] (AR-1).
- Restore and maintain the chemical, physical, and biological integrity of non-wetland waters (AR-2).
- Restore or enhance and expand habitat for coho salmon and steelhead (AR-3).
- Support resiliency of aquatic resources to climate change and sea-level rise (AR-4).
- Provide multi-resource benefits (AR-5).

Further, for each objective, Table 8-4 presented sub-objectives, which are intended to help guide Caltrans advance mitigation project scoping toward protecting natural resources through transportation project mitigation.

Feasibility. This authorized activity may be feasible. As discussed above, instructions and guidance for establishing mitigation banks are available from the Corps and CDFW and, hence, establishing credits is feasible. After the Caltrans Director's approval for funding, delivering an advance mitigation project to establish a mitigation bank is expected to take at least 2 to 6 years before the initial credit release, at which point the

[6] Preservation alone is not recognized by the Corps or RWQCB as providing no net loss.

credits or values would be available to transportation projects. Caltrans may contract or subcontract bank establishment and/or implementation tasks, including site selection.

9.3.8. In-lieu Fee Program Establishment

In-lieu fee programs are wetlands, water, and/or wildlife oriented, and their alignment with natural resource protection will be documented through its enabling. Instructions and guidance for establishing in-lieu fee programs are available from the federal agencies.[7] With respect to wildlife, like the Corps, FWS follows federal guidance for establishing an in-lieu fee program; however, a supportive regulatory and administrative pathway for CDFW to develop an in-lieu fee program has not been developed.

To support future transportation project conditions, in-lieu fee program establishment projects would rely on the same information as mitigation bank establishment (Section 9.3.7). At a minimum, in-lieu fee establishment project scopes will refer to and rely on GAI information provided in:

- Chapter 2, *Environmental Setting*
- Chapter 3, *Relevant Plans, Policies, and Regulations*
- Chapter 7, *Wildlife Resources Conservation Goals and Objectives*
- Chapter 8, *Aquatic Resources Conservation Goals and Objectives*
- Appendix F, *Aquatic Resource Locations*

To support future transportation project permits, Caltrans would seek CWA credit establishment under the Corps' jurisdiction (WOTUS) and RWQCB jurisdiction (waters of the state). The CCC, Corps, EPA, RWQCB, and/or State Water Board are potential signatories to the in-lieu fee program enabling instrument. Caltrans may also seek to establish credits that could be applied as compensatory mitigation to offset impacts as part of future ESA biological assessments/opinions in coordination with FWS and NMFS.

Feasibility. This authorized activity may be feasible. As pointed out above, instructions and guidance for establishing an in-lieu fee program for CWA credits are available from the federal agencies. After the Caltrans Director's approval for funding, delivering an advance mitigation project to establish an in-lieu fee program is expected to take 3 to 6 years: 2 to 3 years for set up, followed by 1 to 2 years to purchase credits (Section 9.3.4). Credits or values would be available to transportation projects according to the Interagency Review Team-approved in-lieu fee enabling instrument. Caltrans may contract or subcontract implementation tasks.

9.3.9. MCA Credit or Value Establishment

As pointed out in Section 4.5, MCAs are an advance mitigation tool that can be developed when and where an RCIS is approved by CDFW. In accordance with the *Regional Conservation Investment Strategies Program Guidelines*, MCAs are species- and species-habitat focused and can include credits for riparian habitat to meet mitigation needs under a Lake and Streambed Alteration Agreement. An MCAs' alignment with

[7] https://www.spl.usace.army.mil/Missions/Regulatory/Mitigation/

natural resource protection will be documented through the foundational RCIS and the MCA itself (CDFW 2018d). RCIS development is also an SHC § 800.6(a)-authorized advance mitigation project deliverable.

Caltrans envisions that credits or values created through an MCA and funded through the AMA could be established under three scenarios:

- Caltrans enters into or funds the preparation of an MCA, where Caltrans is the MCA sponsor. Caltrans, CDFW, and a third-party landowner would likely be signatories to the MCA. This scenario assumes an existing RCIS anticipates the requirements and needs for MCA credits. In other words, the focal species, non-focal species, or other conservation elements of the associated conservation or habitat enhancement actions proposed in the MCA included in the RCIS would directly apply to and address Caltrans needs.
- Caltrans funds performance of conservation actions and habitat enhancement actions as needed to generate mitigation credits pursuant to an MCA, where a third party is the MCA sponsor. The MCA sponsor, CDFW, and the landowner would be signatories to the MCA. This scenario assumes an existing RCIS anticipates the requirements and needs for MCA credits to apply to transportation projects.
- Caltrans prepares or funds the preparation of an RCIS that anticipates transportation project requirements and needs for MCA credits before entering into or funding the preparation of an MCA itself.

To support future transportation project permits, an MCA or, if needed, an RCIS in concert with an MCA, funded through the AMA, would establish CESA and/or Lake and Streambed Alteration Program credits[8] and CDFW would be the signatory. Caltrans may also request other agencies to be signatories to the MCA, such as the CCC, or seek project-specific interagency agreements with other natural resource regulatory agencies whose jurisdiction overlaps with CDFW's. However, participation in an MCA may be more feasible for state agencies than federal agencies. Under federal definitions, MCAs may be treated as permittee responsible mitigation. Federal agencies prioritize credits purchased or established through banking and in-lieu fee programs over permittee responsible mitigation.

Feasibility. At this time (July of fiscal year 2020/21), instructions and guidance for establishing MCAs are currently under development by CDFW[9] and the RCIS Program is conducting pilot efforts to inform their development of MCA Guidelines and associated agreements. Consequently, at this time, timelines and specifics related to the MCAs are uncertain and scoping and delivering an advance mitigation project within the AMP's timeline needs is unlikely. Caltrans will stay involved to understand how CDFW's pilots

[8] Caltrans is the Lead Agency under CEQA; CDFW's permitting authority does not include conditioning transportation projects under CEQA (Section 7).
[9] https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation

are going, but given the nature of the AMP's revolving account, has determined that it cannot commit AMA funds in a pilot effort.

Nevertheless, in the future, Caltrans anticipates that when a CDFW-approved RCIS is in place,[10] and after the Caltrans Director's approval for funding, it is expected that delivering an advance mitigation project to establish an MCA and its credits or values would take 4 to 9 years: 2 to 3 years to set up the MCA, followed by 2 to 6 years to perform a conservation action or habitat enhancement action[11] to establish the credits or values. Credits would become available to SHOPP and STIP transportation projects according to the credit release schedule in the CDFW-approved MCA. Caltrans would include seeking signatures from natural resource regulatory agencies with overlapping jurisdictions and/or conducting parallel evaluations with the other agencies into the scope and schedule.

Wildlife Crossing and Aquatic Corridor Enhancements

As described in Section 4.5 and pointed out above, the RCIS and MCA framework provides CDFW with a compensatory mitigation mechanism to approve credits for wildlife crossing and aquatic corridor enhancements. In other words, through an MCA developed under an RCIS, CDFW would be authorized to recognize credits established through wildlife crossing and aquatic corridor enhancement made separate from and distinct from specific transportation projects. An MCA for connectivity would be consistent with Caltrans' understanding of natural resource regulatory agency goals and objectives to restore or enhance and expand habitat for coho salmon and steelhead (AR-3), support resiliency of aquatic resources to climate change (AR-4), and provide multi-resource benefits (AR-5).

To support future transportation project permits, it would be necessary for a wildlife crossing or aquatic corridor improvement MCA funded through the AMA to establish CESA and/or Lake and Streambed Alteration Program credits. In addition to the uncertainty listed above related to MCA implementation and associated agreements, connectivity enhancements have additional uncertainty related to mitigation crediting framework and outputs (temporary versus permanent), cost feasibility, engineering, and delivery timelines. Caltrans will reassess wildlife crossing and aquatic corridor enhancements related to feasibility with respect to the AMA expenditures and mitigation needs covered in this RAMNA once the RCIS Program's MCA Guidelines for wildlife crossing and aquatic corridor enhancements are finalized.

9.3.10. Mitigation That Meets an RCIS Conservation Objective

SHC § 800.6(a)(3)(B) authorizes the following expenditure from the AMA:

> *Caltrans acquires, restores, manages, monitors, enhances, and preserves lands, waterways, aquatic resources, or fisheries, or funds the acquisition, restoration, management, monitoring, enhancement, and preservation of lands, waterways,*

[10] In accordance with SHC § 800.6(a)(3)(A), advance mitigation project scopes funded through the AMA may also include Caltrans first entering into or funding the preparation of an RCIS, which could add 2 to 3 years to the schedule.
[11] https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation

aquatic resources, or fisheries that would measurably advance a conservation objective specified in an RCIS if the department concludes that the action or actions could conserve or create environmental values that are appropriate to mitigate the anticipated potential impacts of planned transportation improvements.

Feasibility. At this time (July of fiscal year 2020/21), this authorized activity is not feasible. A supportive regulatory and administrative pathway for a natural resource regulatory agency to recognize credits or values outside of existing advance mitigation mechanisms, such as the procedures to establish banks, does not exist. Without an existing regulatory pathway, the time to establish credits or values for this advance mitigation project type is uncertain. Consequently, at this time, scoping and delivering an advance mitigation project within the AMP's timeline needs through this authorized activity are unlikely. Given the nature of the AMP's revolving account, the AMP has determined that Caltrans cannot commit AMA funds to a pilot effort.

9.3.11. Mitigation in Accordance with a Programmatic Mitigation Plan

This project type may be undertaken by Caltrans if all of the other advance mitigation project types discussed above are not feasible [SHC § 800.6(a)(4)]. In brief, SHC § 800.6(a)(4) and SHC § 800.9 authorize the following expenditure from the AMA:

Caltrans performs mitigation in accordance with a programmatic mitigation plan pursuant to SHC §800.9. The programmatic mitigation plan shall include, to the maximum extent practicable, the information required for a RCIS.

This authorized activity would likely require an advance mitigation project-specific agreement, such as a cooperative agreement, and the time needed to establish credits or values for this advance mitigation project type is uncertain. In general, unless otherwise prescribed in regulation, in this case, an advance mitigation project-specific interagency agreement should include the agency's jurisdiction, resource type, resource value, protection level, service area, time frame, performance and compliance requirements, mitigation accounting procedures, funding, monitoring, and the advance mitigation project's closeout terms and conditions.

Feasibility. At this time (July of fiscal year 2020/21), a number of the authorized activities listed in Table 9-3 appear to be feasible (Table 9-4). This suggests that addressing a Caltrans SAMNA-estimated need will not require another approach in accordance with SHC § 800.6(a)(4). At this time, management of the AMA does not need to consider limiting any advance mitigation project type to 25 percent of the fund.

9.3.12. Discussion

Caltrans modeled its compensatory mitigation needs in the GAI for fiscal years 2018 through 2027 (Chapter 5) and evaluated its needs in light of when transportation projects might need the mitigation (Chapter 6 and Section 9.2). Summarized in Table 9-4, Caltrans identified a number of options for how to meet its mitigation needs. The authorized activities consist of options to purchase existing mitigation credits (Sections 9.3.1 to 9.3.5) or establish additional mitigation (Sections 9.3.6 to 9.3.11).

Based on its evaluation, Caltrans found that, at this time (July of fiscal year 2020/21), a number of the authorized activities appear to be feasible and, under several scenarios, advance mitigation project scopes could cover multiple resources. For example, federal jurisdiction wetlands, waters of the state, and coho habitat could be addressed through the same credit establishment project. Caltrans estimates it may be able to address approximately:

- 0.6 acre of steelhead habitat mitigation need, potentially contributing to the acceleration of 4 transportation projects
- 2.2 acres of wetland mitigation need, potentially contributing to the acceleration of 11 transportation projects
- 10.6 acres of non-wetland waters[12] mitigation need, potentially contributing to the acceleration of 12 transportation projects

Under some conditions, establishing new mitigation credits through existing mechanisms may also be possible.

Table 9-4. Aquatic Resources Credit Options and Feasibility, July 2021

Authorized Activity	Regulatory and Administrative Pathway Available	Available/ Opportunity Exists in the GAI	Potential to Address Overlapping Jurisdictions	Time to Complete[a]
Pay NCCP and/or HCP fees	NA	NA	NA	NA
Purchase conservation bank credits	Yes	No	NA	NA
Purchase mitigation bank credits	Yes	No	NA	NA
Purchase in-lieu fee credits	Yes	No	NA	NA
Purchase MCA credits	No	NA	NA	NA
Establish conservation bank	Yes	Yes, CDFW and FWS	Yes, Corps, CCC, RWQCB, Corps, EPA, CDFW, and FWS	2 to 6 years
Establish mitigation bank	Yes	Yes, CCC, Corps, CDFW, and FWS	Yes, CCC, RWQCB, Corps, EPA, CDFW, and FWS	2 to 8 years

[12] "Waters" is a general term that can apply to WOTUS, waters of the state, or both. The SAMNA model does not distinguish between federal or state jurisdictions.

Authorized Activity	Regulatory and Administrative Pathway Available	Available/ Opportunity Exists in the GAI	Potential to Address Overlapping Jurisdictions	Time to Complete[a]
Establish in-lieu fee program	Yes	Yes, for CCC, Corps, FWS, and NMFS	Maybe, CCC, Corps, EPA, FWS, NMFS, and RWQCB	2 to 8 years
Establish MCA credits or values[b]	No. RCIS not available and not in progress.	NA	NA	NA
Establish RCIS and MCA[b]	Yes, in part. RCIS guidelines available. MCA guidelines in progress.	Maybe—RCIS guidelines available. MCA guidelines in progress.	Maybe CCC, RWQCB, others through parallel evaluation(s)	Unknown (pilot underway)
Establish mitigation that meets an RCIS objective	No	NA	NA	NA
Establish mitigation in accordance with a programmatic mitigation plan	Maybe	NA	NA	NA

Note: NA = not applicable or not available
[a] Caltrans contracting processes and agency interactions are incorporated into this time estimate.
[b] Either Caltrans or a third party would be the signatory with CDFW.
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9.4 Next Steps

Caltrans is required to avoid and minimize any impacts on the environment where practicable, but some impacts are unavoidable. When this is the case, as determined by a natural resource regulatory agency, Caltrans may use compensatory mitigation to offset these unavoidable impacts on the environment. Compensatory mitigation involves the restoration, establishment, enhancement, and/or preservation of the environment, including wetlands, non-wetland waters, and threatened or endangered species and/or their habitats, including riparian habitat.

Caltrans District 1 will consider all feasible options when developing advance mitigation project scopes. The feasibility of each authorized activity to meet the mitigation need depends on the availability of a regulatory and administrative pathway and other conditions summarized in Table 9-4. Not included in the table is an explicit comparison of other desired qualities, outcomes, or other factors of performing any particular authorized activity, which Caltrans District 1 will also consider based on its localized knowledge of delivering mitigation in its region. As just one example, Caltrans may prioritize advance

mitigation projects that reduce risk in implementation and long-term management by eliciting others to be bank or in-lieu fee sponsors.

As described in the introduction to this chapter, as well as Section 9.1, to inform the advance mitigation project scope, Caltrans District 1 will use information within the RAMNA. Each scope will consider mitigation needs, the timing of mitigation needs, conservation data and plans, input from natural resource regulatory agencies, interested parties and tribes, feasibility, timing, and other financial, strategic, and technical risks associated with transportation project delivery and conservation actions. Advance mitigation project scopes will also employ, as appropriate, existing applicable state and federal standards and instruments, mitigation-related agreements, advance mitigation project-specific agreements, and contracts with qualified third parties.

Caltrans District 1 will submit a nominated advance mitigation project's scope, schedule, and budget to the Caltrans Director for approval. When the Director concurs and funding is approved, Caltrans District 1 will commit to delivering the advance mitigation project within the scope, schedule, and budget communicated with nomination materials. At that point, Caltrans District 1 will initiate project delivery (see Steps 6 through 10 in Figure 1-2; Caltrans 2019a). Advance mitigation project delivery includes stakeholder engagement, project alternative analysis, coordination with natural resource regulatory agencies with the authority to approve compensatory mitigation, contracting with third parties and/or credit sponsors, and developing an agency-approved instrument and/or one or more advance mitigation project-specific interagency agreement. In addition:

- Stakeholder engagement will be conducted in accordance with each advance mitigation project's communication plan and be consistent with the applicable and appropriate requirements of existing applicable state and federal standards and instruments.
- When required by the advance mitigation project type, site selection may be performed by Caltrans or under contract to Caltrans through a competitive bid process, and may include existing mitigation providers—for example, banks, NCCPs, MCAs, and the identification of new acquisitions. When a competitive bid process is used, sites are subject to what bid respondents put forward in their proposals. Site selection should be consistent with appropriate conservation goals and objectives identified in Chapters 7 and 8.
- When appropriate for the advance mitigation project type, it may be necessary to identify steps required to meet the goal of satisfying overlapping jurisdictional mitigation requirements.
- Instruments and advance-mitigation project-specific interagency agreement(s) will specify the terms of use of the credits, including the service areas. Service areas will be defined based on feedback from the natural resource regulatory agencies. It is intended for the ecological units used for this RAMNA to lead to ecologically based advance mitigation project scopes and service areas; Caltrans uses HUC-8 sub-basins to be consistent with the 2008 Mitigation Rule and ecoregions to be consistent with the SWAP.

As with all credits and values established through advance mitigation processes, the credits' suitability for application to a specific transportation project is determined in the future, on a case-by-case basis, when transportation project mitigation requirements are known.

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