



**ADVANCE MITIGATION PROGRAM
Gualala-Salmon, San Pablo Bay, and
Tomales-Drake Bays Sub-basins
Regional Advance Mitigation
Needs Assessment**

Version 1.0

**Establishing Caltrans' Need for Advance Mitigation
for Caltrans District 4 and Surroundings
forecast fiscal years 2019/20 to 2028/29**

California Department of Transportation – District 4

June 2022

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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	<i>Advance Mitigation Program Final Formal Guidelines</i>
ASBS	areas of special biological significance
Basin Plan	water quality control plan
BCDC	Bay Conservation and Development Commission
BEI	Bank Enabling Instrument
BLM	Bureau of Land Management
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CCA	Critical Coastal Area
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
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
FGC	California Fish and Game Code
FHWA	Federal Highway Administration
FishPAC	Fish Passage Advisory Committee
FWS	U.S. Fish and Wildlife Service
GAI	geographic area of interest
GAP	Gap Analysis Program
GIS	geographic information system
HAPC	habitat area of particular concern
HCP	habitat conservation plan
HU	hydrologic unit
HUC	hydrologic unit code
LCP	Local Coastal Program
LUP	land use plan
MCA	mitigation credit agreement
MPO	metropolitan planning organization
NCCP	natural community conservation plan
NEPA	National Environmental Policy Act
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
SHC	Streets and Highways Code

SHOPP	State Highway Operation and Protection Program
SHOPP Ten-Year Book	<i>State Highway Operation and Protection Program Ten-Year Project Book Fiscal Years 2019/20–2028/29</i>
SHS	State Highway System
SWRCB	State Water Resources Control Board
STIP	State Transportation Improvement Program
SWAP	State Wildlife Action Plan
TDS	total dissolved solids
UA	uncertified area
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WOTUS	waters of the U.S.

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EXECUTIVE SUMMARY

This *Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays Sub-basins Regional Advance Mitigation Needs Assessment* (“RAMNA”) was developed with the goal of realizing the benefits of long-range planning to help manage the risks and priorities of the California Department of Transportation (“Caltrans”) Advance Mitigation Program (“AMP”). It was developed in accordance with the AMP Final Formal Guidelines (“AMP Guidelines”)¹ and incorporates information and feedback received from outreach to the natural resource regulatory agencies,² the Federal Highway Administration, other transportation agencies, Native American tribes, interested parties, and the public. Caltrans District 4 is the lead district for this planning-level effort.

Background. In 2017, 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 Mitigation Account (“AMA”), to be operated by Caltrans as a revolving account. The stated intent of the legislation was 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 11 specific activities as authorized allowable expenditures under the AMA and provides for the AMA to be replenished under specific conditions. The 11 activities authorized by SHC § 800 et seq. consist of purchasing or establishing compensatory mitigation credits^{3,4} developed through an authorized regulatory mechanism.⁵ Upon delivery, the credits are expected to be both available and at hand for Caltrans and natural resource regulatory agencies to use as offsets to transportation project impacts. The actual finding, however, of a specific credit’s adequacy and/or suitability to offset an impact, as well as the placement of natural resource regulatory agency compensatory mitigation conditions on transportation

¹ <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/amp-final-formal-guidelines-a11y.pdf>

² For the AMP, “natural resource regulatory agencies” refers specifically to the signatories to the 2020 *Master Process Agreement for Planning and Developing Advance Mitigation throughout California for the California Department of Transportation Advance Mitigation Program*. The signatories are California Department of Fish and Wildlife (“CDFW”); State Water Resources Control Board; U.S. Army Corps of Engineers Los Angeles, Sacramento, and San Francisco districts; U.S. Environmental Protection Agency; U.S. Fish and Wildlife Service; National Marine Fisheries Service; and California Coastal Commission (“CCC”).

³ 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.

⁴ Credits are the usual currency of mitigation established through an advance mitigation project; however, other values may also be established.

⁵ Authorized regulatory mechanisms include the regulatory processes to establish mitigation banks and in-lieu fee programs.

projects, is conducted in the future through each transportation project's environmental studies and permits.

Purpose. Described in the AMP Guidelines, advance mitigation planning is the AMP's process for justifying, proposing, scoping, and securing internal Caltrans AMA funding approval for advance mitigation projects. Advance mitigation planning consists of five steps. Steps 1 and 2 serve to focus the assessment (see Section ES.1, below). Step 3 is this RAMNA. Steps 4 and 5 of the AMP's advance mitigation planning process narrow down the suite of potential advance mitigation projects to a few that have a high probability of meeting the AMP's goals (see Section ES.9, below).

A RAMNA is a desktop study that consists of the best readily available information for Caltrans Districts to refer to when scoping and proposing advance mitigation projects to be funded by the AMA. The information was sensibility checked by other Caltrans functional units, natural resource regulatory agencies, and others before it was finalized. When the Caltrans AMP invests in advance mitigation projects to purchase compensatory mitigation credits, Caltrans assumes that the credits are aligned with existing natural resource regulatory agency goals and objectives. When the Caltrans AMP invests in advance mitigation projects to establish compensatory mitigation, it will aim to establish credits approved by multiple natural resource regulatory agencies. Whether purchased or established, Caltrans intends for credits to be delivered on a schedule that will revolve the AMA.

Through the RAMNA's review process, the conservation goals and objectives provided in the RAMNA were vetted with the natural resource regulatory agencies. Caltrans thinks incorporating natural resource regulatory agency goals and objectives into advance mitigation project scopes improves the chances that the compensatory mitigation credits will be (1) usable as transportation project impact offsets and (2) "protect natural resources through transportation project [compensatory] mitigation" [SHC § 800(a)]. Each chapter is briefly summarized below.

Figure ES-1 shows the geographic area of interest ("GAI") road infrastructure.

ES.1 Geographic Area of Interest and Resource Focus

Focusing this assessment 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. Focusing the assessment also improves the chances that resultant credits will be available on a timeframe that will revolve the AMA. Hence, for advance mitigation planning, Caltrans focused the RAMNA on a specific time period, a specific area, and typical compensatory mitigation needs.

The time period assessed in this RAMNA is for fiscal years 2019/20 through 2028/29, a planning period consistent with Caltrans:

- Long-term transportation plans conceptualized in the *State Highway Operation and Protection Program Ten-Year Project Book Fiscal Years 2019/20—2028/29* (“SHOPP Ten-Year Book”; Caltrans 2021a). Transportation projects in the SHOPP Ten-Year Book have not undergone the environmental and permitting process.
- Modeled compensatory mitigation needs published in the *Statewide Advance Mitigation Needs Assessment⁶ Report Second Quarter 2019/20 Fiscal Year* (“SAMNA Report”; Caltrans 2021b). Compensatory mitigation needs in the SAMNA Report are modeled and do not reflect an environmental and permitting process.

The GAI assessed in this RAMNA consists of three eight-digit hydrological unit code (“HUC-8”) sub-basins. GAIs are established at a HUC-8 or ecoregion scale to define appropriate planning areas for mitigation implementation and anticipated use areas that align with natural resource regulatory agency practices (Caltrans 2019). Caltrans District 4, in communication with other transportation agencies, selected the GAI because SAMNA model results for fiscal years 2019/20 through 2028/29 (Caltrans 2021b) indicate that investing AMP funds to implement landscape-scale mitigation in these subcoregions is likely to maximize State Highway Operation and Protection Program (“SHOPP”) and State Transportation Improvement Program (“STIP”) funded transportation project acceleration while maximizing environmental benefits.

Because the SAMNA model forecast impacts on hundreds of species’ habitats, to further focus the planning effort, Caltrans District 4 identified species for which natural resource regulatory agencies condition transportation projects with off-site compensatory mitigation and transportation projects that would most likely benefit from the credits, if available. These “species of mitigation need”⁷ are Myrtle’s silverspot butterfly (*Speyeria zerene myrtleae*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*) Central California and Sonoma County Distinct Population Segment (“DPS”), Swainson’s hawk (*Buteo swainsoni*), Central California Coast evolutionarily significant unit (“ESU”) coho salmon (*Oncorhynchus kisutch*), Northern California Coast DPS and Central California Coast DPS steelhead (*O. mykiss*), longfin smelt (*Spirinchus thaleichthys*), and Southern DPS green sturgeon (*Acipenser medirostris*). Compensatory mitigation for aquatic resources⁸ and riparian habitat were also identified as both a historical transportation project compensatory mitigation need

⁶ The SAMNA Reporting Tool is a geographic information system (“GIS”) overlay model developed by Caltrans to support advance mitigation planning (Caltrans 2018a).

⁷ Species of mitigation need are selected to focus the assessment.

⁸ For the purposes of this document, aquatic resources include all wetlands and non-wetland waters that may be subject to CCC, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, State Water Resources Control Board and Regional Water Quality Control Board, and/or CDFW regulations, as well as special-status fish that may be subject to CCC, CDFW, U.S. Fish and Wildlife Service, and National Marine Fisheries Service regulations.

and an anticipated future transportation project compensatory mitigation need within the GAI.

While the GAI predominantly overlaps Caltrans District 4, a portion of it overlaps Caltrans District 1 in Mendocino County (Figure ES-1).

ES.2 Environmental Setting

Information on the GAI's environmental setting is provided in Chapter 2. To develop an understanding of the GAI that is consistent with natural resource regulatory agency tools and references, geospatial data from the SAMNA Reporting Tool, CDFW's BIOS, and other readily available information are summarized and presented. Climate change resiliency, wildlife connectivity, biodiversity, and conserved lands are among the information presented. A critical habitat map is provided.

The GAI consists of approximately 1.1 million acres in northern California. The Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays sub-basins within California define its boundaries, which are overlapped by portions of the Central California Coast, Northern California Coast, and Northern California Coast Ranges ecoregion sections.

ES.3 Relevant Plans, Policies, and Regulations

Compensatory mitigation is informed by regulatory requirements, regulatory mechanisms 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 192 documents that may be relevant to advance mitigation planning and advance mitigation project delivery: 39 laws, guidelines, and regulations; 28 statewide and regional planning documents; 41 plans and permits and other documents focused on species of mitigation need; 22 state agency, federal agency, Native American tribal, and local government land management plans; 9 water resources plans and documents; 41 county, city, and local government general plans; and 12 nongovernmental organization conservation and management documents. A summary and links to these documents can be found in Chapter 3.

ES.4 Existing Mitigation Opportunities

For the purposes of the RAMNA, existing mitigation opportunities are potential opportunities for Caltrans to use AMA funds to purchase compensatory mitigation credits or values that were previously approved by one or more natural resource regulatory agencies. In accordance with SHC § 800.6(a), the approved credits or values eligible for purchase may have been established through a conservation bank, mitigation bank, natural community conservation plan ("NCCP"), habitat conservation plan ("HCP"), in-lieu fee program, or mitigation credit agreement ("MCA") developed in accordance with a CDFW-approved regional conservation investment strategy ("RCIS").

Chapter 4 presents readily available information regarding existing mitigation opportunities for the GAI. In brief, Caltrans identified no HCPs/NCCPs where Caltrans is a participant or may be eligible to participate, 16 pending or active conservation and mitigation banks, no in-lieu fee programs, 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 objectives⁹ and may be suitable for concurrent transportation project mitigation.

ES.5 Estimated Impacts

Prior to developing a focused advance mitigation project scope to purchase or establish mitigation credits or values, as authorized by SHC § 800.6(a), Caltrans must determine whether it needs advance mitigation credits. Since environmental and permitting processes have not yet taken place, Caltrans must rely on estimating future SHOPP transportation project¹⁰ impacts through the SAMNA model, as well as qualitative assessments of STIP-eligible transportation project needs,¹¹ to define the range of its potential advance mitigation needs.

Chapter 5 provides transportation project impact estimates for fiscal years 2019/20 through 2028/29. In the GAI, 45 SHOPP transportation projects and 22 non-SHOPP STIP-eligible transportation projects are in their conceptualization phase for the planning period. Many of these planned transportation improvements are not forecast to affect terrestrial or aquatic resources and many forecast impacts may be avoided during transportation project delivery. Nevertheless, the compensatory mitigation estimates presented reflect the best available information about compensatory mitigation needs at this time.

Impact estimates for the species of mitigation need are summarized in Tables ES-1 and ES-2. Since natural resource regulatory agencies routinely place species of mitigation need conditions on transportation projects, it is likely that Caltrans transportation project schedules would benefit from available credits for these species.

Similarly, impact estimates for wetland and non-wetland aquatic resources are summarized in Tables ES-3 and ES-4, while riparian habitat impact forecasts are provided in Table ES-5. When Caltrans scopes advance mitigation projects to establish mitigation, Caltrans intends to center the advance mitigation projects on the species of

⁹ 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.

¹⁰ Caltrans undertakes SHOPP transportation projects to address maintenance, safety, operation, and rehabilitation of the SHS; such projects do not add new capacity to the system.
<https://catc.ca.gov/programs/state-highway-operation-and-protection-program>

¹¹ Metropolitan planning organizations, regional transportation planning agencies, and other public agencies also undertake transportation projects to address non-SHOPP STIP-funded transportation improvements.

mitigation need and/or aquatic resources, and to address conservation benefits and values for other special-status terrestrial species and resources. It is likely that STIP-eligible transportation projects would have compensatory mitigation conditions placed on them by natural resource regulatory agencies, similar to conditions placed on SHOPP transportation projects.

Table ES-1. Summary of Estimated SHOPP Impacts on Terrestrial Species of Mitigation Need in the GAI

Ecoregion Section	California Red-legged Frog Habitat: Number of Caltrans SHOPP Projects ^a	California Red-legged Frog: Estimated Habitat Impact (acres)	California Tiger Salamander Habitat: Number of Caltrans SHOPP Projects ^a	California Tiger Salamander: Estimated Habitat Impact (acres)	Myrtle's Silverspot Butterfly Habitat: Number of Caltrans SHOPP Projects ^a	Myrtle's Silverspot Butterfly: Estimated Habitat Impact (acres)	Swainson's Hawk: Number of Caltrans SHOPP Projects ^a	Swainson's Hawk: Estimated Habitat Impact (acres)	Total
Northern California Coast	34	13.6	0	0.0	6	99.8	See footnote ^b	See footnote ^b	Not available ^c
Northern California Coast Ranges	2	2.1	1	0.3	0	0.0	See footnote ^b	See footnote ^b	Not available ^c
Central California Coast	2	2.0	0	0.0	0	0.0	See footnote ^b	See footnote ^b	Not available ^c
Total^d	36	17.7	1	0.3	6	99.8	See footnote ^b	See footnote ^b	Not available ^c

Source: Caltrans 2021b

^a Transportation projects are listed in Table 5-1.

^b The SAMNA identifies no transportation projects and no impacts on Swainson's hawk for the planning period. However, recent Swainson's hawk observations suggest that the SAMNA's underlying California Wildlife Habitat Relationships information is out of date. Consequently, the SAMNA is likely not predicting Swainson's hawk impacts appropriately. The result is inconclusive.

^c Total could not be calculated because impact estimates overlap.

^e Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one ecoregion.

Table ES-2. Summary of Estimated SHOPP Impacts on Threatened and Endangered Fish in the GAI (acres)^a

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Central California Coast ESU Coho Salmon ^b	Central California Coast DPS Steelhead ^b	Northern California DPS Steelhead ^b	Longfin Smelt ^b	Southern DPS Green Sturgeon ^b	Chinook Salmon ^c	Tidewater Goby ^c	Total
Gualala-Salmon	18010109	7	0.0	0.1	0.3	0.0	2.5	0.0	0.1	Not available ^d
San Pablo Bay	18050002	22	0.0	1.9	0.0	3.7	1.8	0.9	0.0	Not available ^d
Tomaes-Drake Bays	18050005	8	1.3	0.4	0.0	1.3	<0.1	0.0	0.3	Not available ^d
Total^{e,f}	Not applicable	34	1.3	2.4	0.3	5.0	4.3	0.9	0.4	Not available ^d

Source: Caltrans 2021b

^a Stream/river habitat impacts are provided. Stream/river habitat impacts are assumed to be representative of fish habitat impacts.

^b Species of mitigation need for this assessment.

^c Species is forecast to be affected but was not identified as a species of mitigation need.

^d Total could not be calculated because impact estimates overlap.

^e Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect fish.

^f Totals may be different on account of rounding.

Table ES-3. Summary of Estimated SHOPP Impacts on Wetlands in the GAI (acres)

Sub-basin (HUC-8)	Sub- basin Number	Number of Transportation Projects	Depressional Natural Vegetated	Depressional Unnatural Vegetated	Estuarine and Marine Wetland	Estuarine Saline Natural Intertidal Emergent	Estuarine Saline Natural Intertidal Non-vegetated	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Slope Natural	Total
Gualala-Salmon	18010109	8	0.0	0.0	0.1	0.0	0.0	1.8	2.2	0.0	4.1
San Pablo Bay	18050002	15	0.0	0.0	1.8	0.0	0.0	0.1	0.3	0.0	2.2
Tomales-Drake Bays	18050005	7	<0.1	<0.1	0.1	0.3	0.1	<0.1	0.5	0.1	1.1
Total^{a,b}	Not applicable	27	<0.1	<0.1	2.0	0.3	0.1	1.9	3.0	0.1	7.3

Source: Adapted from Caltrans 2021b

^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.

^b Totals may be different on account of rounding.

Table ES-4. Summary of Estimated SHOPP Impacts on Non-wetland Waters in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Coastline	Lake/Pond	Sea/Ocean	Stream/River	Total
Gualala-Salmon	18010109	8	<0.1	0.0	<0.1	3.3	3.3
San Pablo Bay	18050002	22	0.1	<0.1	<0.1	3.0	3.1
Tomales-Drake Bays	18050005	8	0.2	0.0	<0.1	1.2	1.3
Total^{a,b}	Not applicable	35	0.2	<0.1	<0.1	7.5	7.7

Source: Adapted from Caltrans 2021b

^a Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect non-wetland waters.

^b Totals may be different on account of rounding.

Table ES-5. Summary of Estimated SHOPP Impacts on Riparian Habitat in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Montane Riparian	Ecoregion Section(s)
Gualala-Salmon	18010109	0	0.0	Northern California Coast
San Pablo Bay	18050002	7	81.3	Northern California Coast, Northern California Coast Ranges
Tomales-Drake Bays	18050005	2	21.1	Northern California Coast
Total	Not applicable	9	102.4	Northern California Coast, Northern California Coast Ranges

Source: Adapted from Caltrans 2021b

ES.6 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 (June of fiscal year 2021/2022), Caltrans is almost 2 years into the SHOPP Ten-Year Book planning period. Hence, for the time period under consideration, fiscal years 2019/20 through 2028/29, Caltrans District 4 intends to prioritize purchasing or developing mitigation credits or values that are planned for the middle and end of the 10-year planning period.

Given the expected timing of mitigation need, at this time (June of fiscal year 2021/2022) credits or values that can be purchased or established by 2023/2024 (within the next 2 years) could address a subset of the impacts presented in Chapter 5. For example, mitigation credits purchased or established in 2 years could potentially address:

- Northern California Coast Ecoregion:
 - 99.8 acres of Myrtle's silverspot butterfly habitat and 10.4 acres of California red-legged frog habitat, potentially contributing to the acceleration of 6 and 26 transportation projects, respectively
- Northern California Coast Ranges Ecoregion:
 - 2.2 acres of California red-legged frog habitat, potentially contributing to the acceleration of 2 transportation projects
- Central California Coast Ecoregion:
 - 2.3 acres of California red-legged frog habitat, potentially contributing to the acceleration of 2 transportation projects

Organized by species of mitigation need and aquatic resources, the complete temporal analysis of Caltrans needs is provided in Chapter 6.

It should be noted that at this time, several transportation projects have been delayed or eliminated and the timing of Caltrans needs may change. Caltrans will consider the updated transportation schedule when scoping and funding advance mitigation projects. The feasibility of addressing the needs through the SHC § 800.6(a) authorized activities is discussed in Chapter 9.

ES.7 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 these agencies and their comments and suggestions were incorporated.

Wildlife Resources Goals and Objectives

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 encompasses 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 summarize how state and federal natural resource regulatory agencies, land managers, and other 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 of mitigation need habitats in the GAI; however, advance mitigation for the benefit of species of mitigation need 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 species of mitigation need
- Preserving, enhancing, and increasing connectivity between blocks of species of mitigation need habitat
- Supporting resiliency of the landscape to climate change
- Decreasing mortality and protecting population health of species of mitigation need
- Providing multi-species and multi-resource 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.

Aquatic Resources Goals and Objectives

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 area, functions, values, and conditions of wetland and non-wetland water resources

- Restoring and/or enhancing the chemical, physical, and biological integrity of wetlands and non-wetland waters
- Restoring or enhancing and expanding habitat for fish species of mitigation need
- Supporting resiliency of aquatic resources to climate change
- Providing multi-resource benefits

Sub-objectives are included for each goal in Chapter 8 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.8 Authorized Activity Summary

A summary of Caltrans' need for compensatory mitigation credits in the GAI and the feasibility of each SHC § 800.6(a) authorized activity to address such needs is provided in Chapter 9. As pointed out in Chapter 6, given the expected timing of mitigation need, at this time (June of fiscal year 2021/22) mitigation that can be purchased or established by 2023/24 (within the next 2 years) could potentially address the following:

- **Gualala-Salmon Sub-basin:**
 - There are currently no mitigation banks with a service area to purchase wetland and non-wetland waters credits from in this sub-basin. Mitigation credits established for an anticipated 4.0 acres of wetlands and 3.2 acres of non-wetland waters impacts have the potential to accelerate seven transportation projects.
 - Mitigation credits purchased or established for an anticipated 2.9 acres of threatened and endangered fish habitat impact have the potential to accelerate six transportation projects.
- **San Pablo Bay Sub-basin:**
 - Mitigation credits purchased or established for an anticipated 2.0 acres of wetland impact have the potential to accelerate 10 transportation projects.
 - Mitigation credits purchased or established for an anticipated 2.5 acres of non-wetland waters impact have the potential to accelerate 14 transportation projects.
 - Mitigation credits purchased or established for an anticipated 6.8 acres of threatened and endangered fish habitat impact have the potential to accelerate 14 transportation projects.
 - Mitigation credits purchased or established for an anticipated 30.3 acres of riparian habitat impact have the potential to accelerate five transportation projects.

- **Tomales-Drake Bays Sub-basin:**

- Mitigation credits purchased or established for an anticipated 1.1 acres of wetland and 1.2 acres of non-wetland waters impact have the potential to accelerate seven transportation projects.
- Mitigation credits purchased or established for an anticipated 2.8 acres of threatened and endangered fish habitat impact have the potential to accelerate seven transportation projects.
- Mitigation credits purchased or established for an anticipated 2.7 acres of riparian habitat impact have the potential to accelerate one transportation project.

- **Northern California Coast Ecoregion:**

- Mitigation credits purchased or established for an anticipated 99.8 acres of Myrtle's silverspot butterfly habitat impacts have the potential to accelerate six transportation projects.
- Mitigation credits purchased or established for an anticipated 10.4 acres of California red-legged frog habitat impacts have the potential to accelerate 26 transportation projects.
- Mitigation credits purchased or established for an anticipated 2.2 acres of California red-legged frog habitat impacts have the potential to accelerate two transportation projects.

- **Central California Coast Ecoregion:**

- Mitigation credits purchased or established for an anticipated 2.3 acres of California red-legged frog habitat impacts have the potential to accelerate two transportation projects.

All or some of these needs could form the basis for the Caltrans District to develop an advance mitigation project scope implementing one or more of the SHC § 800.6(a) authorized activities.

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 Districts will consider all feasible options when developing advance mitigation project scopes. At this time (June of fiscal year 2021/2022), purchasing credits approved through a bank or in-lieu fee instrument, or establishing new credits through a bank or in-

lieu fee instrument, is likely feasible. The feasibility of each authorized activity to meet the forecast mitigation need in time to accelerate transportation projects will depend on the availability of a regulatory and administrative pathway and other conditions.

As pointed out above, when Caltrans scopes advance mitigation projects to establish mitigation, Caltrans intends to center the advance mitigation projects on the species of mitigation need and aquatic resources, as well as address conservation benefits and values for other special-status terrestrial species and resources. Caltrans also intends to scope credit establishment projects that align with conservation goals and objectives, address multi-resource benefits, and address overlapping jurisdictions.

ES.9 Next Steps

Caltrans Districts 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, the Caltrans District 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 *Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays Sub-basins Regional Advance Mitigation Needs Assessment* ("RAMNA"), the California Department of Transportation ("Caltrans") District 4 presents its forecast of natural resource compensatory mitigation¹ needs for the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays sub-basins (eight-digit hydrologic unit code "HUC-8") 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 units² 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: www.advancemitigation.dot.ca.gov.

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.

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.

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 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 (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 a mitigation credit agreement (“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 ^e 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 ^f 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 the California Fish and Game Code ("FGC") § 1850–1861.

^e The State Water Resources Control Board ("SWRCB") and Regional Water Quality Control Boards ("RWQCBs") do not typically approve establishment of or accept preservation credits.

^f 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 2019). 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 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.

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 to inform advance mitigation project scopes that will 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.

Figure 1-1. Advance Mitigation Planning Phase



Source: Caltrans (2019)

Figure 1-2. Advance Mitigation Project Delivery Phase



Source: Caltrans (2019)

This RAMNA satisfies Step 3 (Figure 1-1; Caltrans 2019) and provides the results of a regional assessment of Caltrans' advance mitigation needs in the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays sub-basins.³

Caltrans District 4 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 when Caltrans justifies, proposes, and scopes an advance mitigation project based on its needs (Figure 1-1; Caltrans 2019). 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 Caltrans District 4 advance mitigation project for funding (Step 5; Figure 1-1; Caltrans 2019). Thereafter, Caltrans District 4 will use the RAMNA as a reference (Caltrans 2019).

³ 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).

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 has been programmed⁴ (Caltrans 2019; see Figure 1-2). This phase consists of implementing one or more of the 11 authorized advance mitigation activities (Table 1-1).

1.1.4. Program Constraints

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

- Gas tax-derived funds may be used to develop only those 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 that the advance compensatory mitigation will be considered adequate and/or suitable by a natural resource regulatory 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. For example, using mitigation credits from a conservation bank where only preservation exists would not qualify for wetland or riparian impacts at some regulatory agencies.
- Natural resource regulatory agency approvals are discretionary and often conditional; well-executed advance mitigation does not necessarily increase the likelihood of obtaining agency approval for any particular transportation project.
- The 2008 Mitigation Rule expresses a preference for advance mitigation (in several forms) but also provides flexibility for off-site and out-of-kind mitigation where important aquatic resources in a watershed area have been identified as

⁴ Programming refers to the process Caltrans employs to set priorities for funding advance mitigation projects at the Caltrans District and project level. Through programming, Caltrans commits revenues over a multiyear period to a specific advance mitigation project.

priority areas because of the importance of such resources, widespread loss of such resources, and/or the likelihood of successful execution of mitigation at priority sites.

- 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 and require a scope, schedule, and budget.
- Advance mitigation projects to establish credits allow for longer timelines for plant establishment, which is crucial to success.
- 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 AMA is a revolving account. With a revolving account, reimbursed funds are reinvested into new advance mitigation projects.

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

1.2 Caltrans District 4 Transportation Infrastructure

Headquartered in Oakland, Caltrans District 4 covers the San Francisco Bay Area, which consists of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, San Francisco, Santa Clara, and San Mateo Counties. Caltrans District 4 headquarters and field offices maintain and operate over 1,486 centerline miles of freeway, expressways, and conventional highways. These SHS roadways range from scenic two-lane highways to controlled-access freeways. State Route 1, U.S. Highway 101, and Interstate 80, major north-to-south routes connecting northern and southern California, and State Route 37 and State Route 12, east-to-west routes between the two U.S. highways, traverse Caltrans District 4. Other transportation agencies that implement transportation improvements within the GAI's boundaries (MPOs, RTPAs, and other public agencies) are the Metropolitan Transportation Commission, Sonoma County Transportation Authority, and Mendocino Council of Governments. The aforementioned transportation agencies are eligible for State Transportation Improvement Program ("STIP") funding.

Figure 1-3 shows the road infrastructure in the geographic area of interest ("GAI") evaluated for this RAMNA.

Figure 1-3. GAI 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 Coastal Act (Public Resources Code § 30000 et seq.)
- California Endangered Species Act (“CESA”) (California FGC § 2050 et seq.)
- California Environmental Quality Act (“CEQA”) (Public Resources Code § 21000 et seq.)
- Federal Clean Water Act (“CWA”), Sections 401 and 404 (33 USC § 1251–1376)
- Federal Endangered Species Act of 1973 (“ESA”) (16 USC § 1531–1543), as amended
- Lake and Streambed Alteration Program (FGC § 1600 et seq.)
- National Environmental Policy Act (“NEPA”) (42 USC § 4321 et seq.)
- Porter-Cologne Water Quality Control Act (California Water Code § 13000 et seq.)
- Rivers and Harbors Act of 1800, Section 10 (33 USC § 403)

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

Table 1-2. Natural Resource Regulatory Agencies with the Authority to Approve Compensatory Mitigation Credits (or Values) in the GAI

Partner	Web Address
California Coastal Commission (“CCC”)	https://www.coastal.ca.gov/
CDFW, Northern Region	https://wildlife.ca.gov/Regions/1
CDFW, Bay Delta Region	https://wildlife.ca.gov/Regions/3
CDFW, Marine Region	https://wildlife.ca.gov/Regions/Marine
State Water Resources Control Board (“SWRCB”)	https://www.waterboards.ca.gov/
California Regional Water Quality Control Board (“RWQCB”), North Coast Region	https://www.waterboards.ca.gov/northcoast/
RWQCB, San Francisco Bay Region	https://www.waterboards.ca.gov/sanfrancisco bay/
RWQCB, Central Valley	http://www.waterboards.ca.gov/centralvalley/
National Marine Fisheries Service (“NMFS”) West Coast Region	https://www.fisheries.noaa.gov/about/west-coast-region
U.S. Army Corps of Engineers (“Corps”), South Pacific Division, San Francisco District	https://www.spn.usace.army.mil/
U.S. Environmental Protection Agency (“EPA”), Region 9	http://www.epa.gov/region9/
U.S. Fish and Wildlife Service (“FWS”), Arcata	https://www.fws.gov/arcata/

Partner	Web Address
FWS, Bay Delta Office	https://www.fws.gov/sfbaydelta/
FWS, Sacramento	https://www.fws.gov/sacramento/

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 established regulatory frameworks for establishing compensatory mitigation. These are defined under environmental laws, regulations, policies, and guidelines including, but not limited to:

- *Memorandum of Understanding Concerning Mitigation and Conservation Banking and In-Lieu Fee Programs in California* (California Natural Resources Agency ["CNRA"] et al. 2011)
- *Conservation Bank and Mitigation Bank Applications and Fees* (FGC § 1797 et seq.)
- *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)

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,⁵ and in-lieu fee programs require 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 HCPs and 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 2020, consistent

⁵ 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.

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 2019/20—2028/29* ("SHOPP Ten-Year Book") for fiscal years 2020 to 2029 (Caltrans 2021a). The forecast was performed using the Caltrans 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 2021b). Potential impacts for all 12 Caltrans Districts were estimated. Statewide, 765 transportation projects and more than 600 wildlife and aquatic resources were evaluated through the SAMNA Reporting Tool, yielding thousands of results (Caltrans 2021b). The results for Caltrans District 4 are provided in Appendix D of Caltrans 2021b.

For consistency and as appropriate, tables, figures, and information presented throughout this document, including in 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 2021b. Results are presented in four different reports: terrestrial and aquatic species and subspecies, threatened and endangered fish, wetlands, and non-wetland waters. 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 2021b). 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 (1) having compensatory mitigation credit purchase transactions completed and/or (2) having 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

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 HUC-8 sub-basin and ecoregion, and not political boundaries, would steer advance mitigation planning toward better ecological outcomes—the 2008 Mitigation Rule specifies the HUC-8 as the basis of service areas for mitigation banks, and CDFW’s State Wildlife Action Plan (“SWAP”) is organized by ecoregion. With regard to the Caltrans District 4 GAI, three HUC-8 sub-basins within Caltrans District 4 were identified as locations where transportation improvement projects will occur and compensatory mitigation will be needed during the 10-year planning period, as described below.

To identify a focus area, consistent with Step 2 of the advance mitigation planning process (Figure 1-1), in 2021, Caltrans District 4 subject matter specialists:

- Reviewed the entirety of Caltrans District 4’s SAMNA results by HUC-8 and ecoregion (Caltrans 2021b; available on www.advancemitigation.dot.ca.gov);
- Reviewed the SAMNA results’ associated potential future transportation project locations and activities anticipated for the State Highway Operation and Protection Program (“SHOPP”) (Caltrans 2021a);
- Reviewed non-SHOPP STIP-eligible transportation improvement plans for the next 10 years;
- Observed that the portions of Caltrans District 4 located within three HUC-8s in the GAI have forecast compensatory mitigation needs during the planning period; and
- Identified the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays sub-basins as locations where Caltrans and other public agencies that implement transportation improvements could benefit from advance mitigation planning, hereafter called the “GAI” (Figure ES-1, Figure 1-3).

Because these HUC-8s represent a drainage area and not political boundaries, some portions of the GAI overlap Caltrans District 1 (Figure 1-3). In addition to Caltrans

District 4, Caltrans District 1 may choose to take the lead on an advance mitigation project that would address its needs within the GAI.

1.5.2. Species of Mitigation Need

Compensatory mitigation for species in the GAI was identified as both a historical and anticipated future transportation project compensatory mitigation need within Caltrans District 4. 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.

Caltrans does not typically need compensatory mitigation credits for species where impacts can be avoided or minimized. Hence, to further focus the planning effort, Caltrans District 4 identified species that, if compensatory mitigation credits were available, transportation projects could potentially benefit. The determination is made after reviewing SAMNA results for the planning period. These “species of mitigation need” are as follows:

- Myrtle’s silverspot butterfly (*Speyeria zerene myrtleae*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*) Central California and Sonoma County Distinct Population Segments (“DPSs”), and Swainson’s hawk (*Buteo swainsoni*) are terrestrial species of mitigation need. Myrtle’s silverspot butterfly is federally listed as endangered. California red-legged frog is federally listed as threatened and state listed as a species of special concern. The Central California DPS of California tiger salamander is federally and state threatened. The Sonoma County DPS of California tiger salamander is federally listed as endangered and state listed as threatened. Swainson’s hawk is state listed as threatened.
- Central California Coast evolutionarily significant unit (“ESU”) coho salmon (*Oncorhynchus kisutch*), Northern California Coast DPS and Central California Coast DPS steelhead (*O. mykiss*), longfin smelt (*Spirinchus thaleichthys*), and Southern DPS green sturgeon (*Acipenser medirostris*) were chosen as aquatic species of mitigation need. Coho salmon in the GAI is federally and state listed as endangered, steelhead in the GAI is federally listed as threatened, longfin smelt is a candidate for listing as threatened under the ESA and is state listed as threatened, and green sturgeon is federally listed as threatened and is a state species of special concern. Note that threatened and endangered fish species were evaluated as aquatic resources (Section 1.5.3).

These species inform the analysis of estimated impacts provided in Chapter 5, *Modeled Estimated Impacts*, and Chapter 6, *Benefiting Transportation Project Considerations*, and the discussion in Chapter 7, *Wildlife Resources Conservation Goals and Objectives*, and Chapter 8, *Aquatic Resources Conservation Goals and Objectives*.

1.5.3. Aquatic Resources

For the purposes of this document, aquatic resources include all wetlands and non-wetland waters that may be subject to CCC, Corps, EPA, RWQCB, and/or CDFW

regulations, as well as special-status fish that may be subject to CCC, CDFW, FWS, and/or NMFS regulations. Compensatory mitigation for aquatic resources and riparian habitat in the GAI was identified as both a historical transportation project compensatory mitigation need and an anticipated future transportation project compensatory mitigation need within District 4. SHOPP transportation projects have historically been conditioned by natural resource regulatory agencies for aquatic resources and have benefited from mitigation credits, when available. The GAI overlaps three HUC-8 sub-basins where compensatory mitigation for aquatic resources impacts is anticipated:

- Gualala-Salmon (18010109)
- San Pablo Bay (18050002)
- Tomales-Drake Bays (18050005)

These sub-basins inform the analysis of estimated impacts provided in Chapter 5, *Modeled Estimated Impacts*, and Chapter 6, *Benefiting Transportation Project Considerations*, as well as the discussion in Chapter 8, *Aquatic Resources Conservation Goals and Objectives*. Note that threatened and endangered fish species were identified as species of mitigation need (Section 1.5.2).

1.6 RAMNA

This RAMNA is a planning-level document that:

- Provides a desktop analysis of relevant available information pertaining to the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays sub-basins, referred to as the GAI;
- Applies to fiscal years 2019/20 to 2028/29 (planning period), which is concurrent with the time period addressed by the SHOPP Ten-Year Book (Caltrans 2021a);
- Discusses potential compensatory mitigation conditions that may be placed on future transportation projects by the seven natural resource regulatory agency signatories⁶ 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 compensatory mitigation needs for the GAI and planning period, as reported by the SAMNA (Caltrans 2021b);
- 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;

⁶ Natural resource regulatory signatories are CDFW; SWRCB; Corps Los Angeles, Sacramento, and San Francisco Districts; EPA; FWS; NMFS; and CCC.

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

1.7 Coordination History

With respect to external communications, the AMP Guidelines describe three communication milestones within the advance mitigation project planning process (Caltrans 2019). 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 2019). District 4 Transportation Planning conducted outreach and contacted the partners listed in Table 1-3.

Table 1-3. Regional Transportation Interaction and Outreach Summary

Date	Description
December 8, 2020	Caltrans-regional partner advance mitigation coordination
December 10, 2020	Bay Area Regional Advance Mitigation Program Technical Advisory Committee meeting
January 20, 2021	Bay Area County Transportation Authorities Project Delivery Committee meeting
March 17, 2021	Bay Area County Transportation Authorities Project Delivery Committee meeting
June 3, 2021	Bay Area Regional Advance Mitigation Program Technical Advisory Committee meeting

1.7.2. RAMNA Review

The AMP Guidelines (Caltrans 2019) 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 16, 2022, 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 27, 2022
CCC	April 18, 2022
Corps, San Francisco District	April 18, 2022
EPA	April 15, 2022
FWS	April 18, 2022
NMFS	May 31, 2022
SWRCB	April 21, 2022

^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 Date	Meeting Participants
March 30, 2022	CCC; CDFW; Corps, San Francisco District; EPA; FWS; NMFS; RWQCBs; and EPA
April 25, 2022	FWS
May 2, 2022	Corps, San Francisco District
May 6, 2022	SWRCB
May 10, 2022	CCC
May 16, 2022	CDFW

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 the 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 near the GAI.
Chapter 5	Modeled Estimated Impacts	This chapter summarizes the SAMNA forecast and regional estimates of compensatory mitigation need for the GAI.

Chapter	Title	Content
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 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	<p>Appendices supporting this document:</p> <p>Appendix A – GIS Sources</p> <p>Appendix B – Land Cover Types</p> <p>Appendix C – Local Coastal Programs</p> <p>Appendix D – Complete SAMNA Species Results</p> <p>Appendix E – List of 303(d) Impaired Waters</p> <p>Appendix F – Aquatic Resource Locations</p>

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2. ENVIRONMENTAL SETTING

In this chapter, Caltrans describes the GAI in terms of ecoregion sections, land ownership, topography, coastal zone, climate, land cover types, invasive species, special-status species, critical habitat, essential fish habitat, connectivity, sub-basins, hydrology, flood hazard areas, water quality, wild and scenic rivers, aquatic resources, riparian habitat, areas of special biological significance (“ASBSs”), the San Francisco Bay Conservation and Development Commission, and fire severity zones. For the purposes of advance mitigation planning, aquatic resources consist of wetlands and non-wetland waters that may be subject to CCC, Corps, EPA, RWQCB, and/or CDFW regulations, as well as special-status fish that may be subject to CCC, managed by CDFW, FWS, and/or NMFS regulations. 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 2021b). 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 and STIP-eligible 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, *Introduction*, and additional information about planned SHOPP and STIP-eligible transportation projects is provided in Chapter 5, *Modeled Estimated Impacts*.

2.1 Ecoregion Sections

The GAI consists of approximately 1.1 million acres in northern California within the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays sub-basins (HUC-8s), which overlap portions of the Central California Coast, Northern California Coast, and Northern California Coast Ranges Ecoregion Sections (Table 2-1, Figure 2-1). Ecoregion sections are defined as the largest ecological unit of the U.S. Department of Agriculture (“USDA”), U.S. Forest Service (“USFS”) National Hierarchical Framework of Ecological Units, which are nested within larger provinces (Cleland et al. 1997).

The Central California Coast Ecoregion Section is within the larger California Coastal Chaparral Forest and Shrub Province; the Northern California Coast Ecoregion Section is within the larger California Coastal Steppe, Mixed Forest, and Redwood Forest Province; and the Northern California Coast Ranges Ecoregion Section is within the larger Sierran Steppe – Mixed Forest – Coniferous Forest Province (McNab et al. 2007).

Table 2-1. Ecoregion Sections in the GAI

Section	Acreage ^a	Ecoregion Section as Percentage of GAI
Central California Coast	121,137	11
Northern California Coast	992,380	87
Northern California Coast Ranges	24,159	2
Total	1,137,676	100%

Source: Caltrans 2021c

^a Numbers were rounded to the nearest whole number.

2.2 Land Ownership in the GAI

The GAI spans parts of Alameda, Contra Costa, Marin, Mendocino, Napa, San Francisco, Solano, and Sonoma Counties (Figure 2-2). Most of the land in the GAI (62.8 percent) is privately owned and managed (Table 2-2, Figure 2-2). Approximately 12.4 percent of land in the GAI is owned or managed by nonprofit conservancies and land trusts and 11 percent is governed by counties, cities, and special districts. Federal lands, which encompass 7.1 percent of land in the GAI, are administered and managed by the U.S. Department of the Interior’s Bureau of Land Management (“BLM”), FWS, and National Park Service (“NPS”); the U.S. Department of Defense, on its military bases; and the Corps. National park land includes the Eugene O’Neill National Historic Site, John Muir National Historic Site, Muir Woods National Monument, and Point Reyes National Seashore. State lands, which encompass 6.6 percent of land in the GAI, include lands owned and managed by the California Department of Parks and Recreation, CDFW, California Department of Forestry and Fire Protection, Caltrans, California Department of Veterans Affairs, California Department of Water Resources, California State Coastal Conservancy, California State Lands Commission, University of California, and other public lands. Less than 0.1 percent of land in the GAI is owned and managed by Native American tribes (Table 2-2, Figure 2-2).

Figure 2-2. Land Ownership

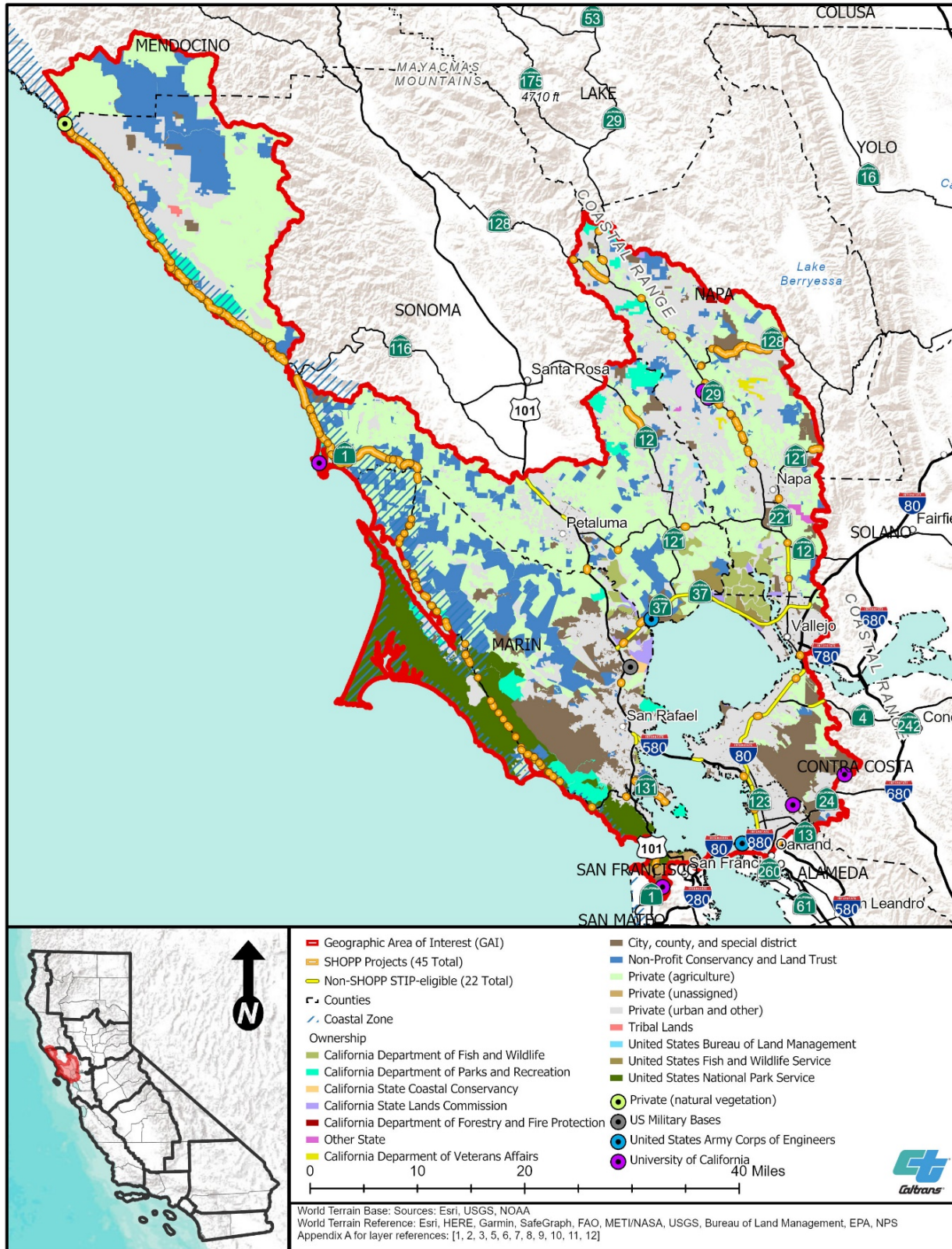


Table 2-2. Land Ownership

Land Owner or Land Use	Number of Parcels	Total Acreage per Agency/Owner ^a	Ownership as Percentage of GAI
Private (urban and other)	6	432,099	32.2
Private (agricultural)	1	405,164	30.2
Nonprofit conservancy and land trust	575	166,538	12.4
City, county, and special district	1,676	148,087	11.0
NPS	30	81,801	6.1
California Department of Parks and Recreation	113	38,966	2.9
California State Lands Commission	36	24,741	1.8
CDFW	103	18,561	1.4
FWS	24	12,928	1.0
Private (unassigned)	1	5,319	0.4
Other state ^b	42	3,591	0.3
California Department of Forestry and Fire Protection	8	832	<0.1
BLM	19	749	<0.1
University of California	6	671	<0.1
Tribal lands	2	560	<0.1
Corps	4	72	<0.1
Private (natural vegetation)	1	35	<0.1
U.S. military bases	1	3	<0.1
Total		1,340,716	100%

Sources: Bureau of Indian Affairs; California Protected Lands Database; California Conservation Easement Database; Caltrans 2021c; U.S. Census Bureau; USDA; and California Department of Technology for land parcels

^a Numbers were rounded to the nearest whole number.

^b Includes, but is not limited to, California Department of General Services, California Department of Water Resources, California Department of Veterans Affairs, California State Coastal Conservancy, and Caltrans.

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 more than 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 and STIP-eligible transportation projects are in areas with a GAP status of 3. Lands with conservation easements are also identified in the California Protected Areas Database; some of the planned SHOPP and STIP-eligible transportation projects are proximate to conservation easements (Figure 2-3).

2.3 Topography

The three sub-basins (HUC-8s) that make up the GAI are bound by the Pacific Ocean to the west, San Francisco Bay to the south, the Sacramento Valley to the east, and Napa Valley and the Northern Coast Ranges to the north (Figure 2-4). The GAI includes low-to moderate-elevation parallel ranges with rounded crests of unequal heights, steep slopes, and valleys (McNab et al. 2007). Elevations in the GAI range from sea level to approximately 4,012 feet above mean sea level in the coastal range.

Figure 2-3. Protected Lands

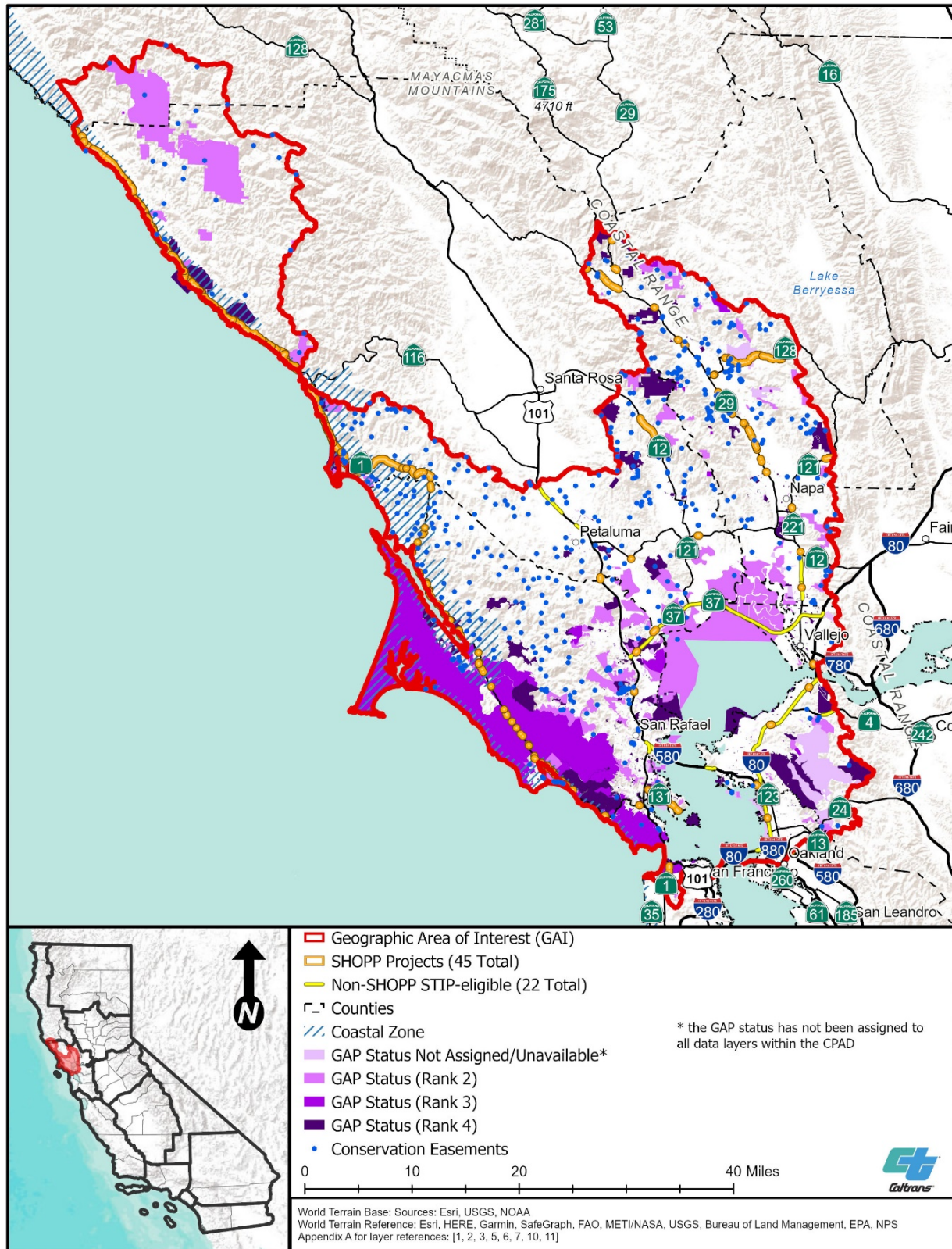


Figure 2-4. Topography



2.4 Coastal Zone

Public Resources Code § 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 with 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 2-5, the coastal zone covers a relatively narrow band along the coast; numerous planned transportation projects on Highway 1 are expected to occur in the coastal zone.

2.4.1. Local Coastal Programs

The Coastal Act requires mitigation for impacts on coastal habitats, which are within the scope of this document, and other types of coastal resource impacts (for example, visual impacts), which 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).

Mapped in Appendix C, there are four CCC-certified LCPs used by local governments to guide development in the coastal zone in coordination with the CCC (Mendocino, Marin, and Sonoma Counties, and the City of San Francisco). There is one uncertified area: the Calle del Arroyo Lots Area of Deferred Certification. 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. A type of uncertified area, Areas of Deferred Certification 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 permitting authority until an LCP is effectively certified for these areas.

Figure 2-5. Coastal Zone



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 the Coastal Act Section 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 on-the-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. Specific ESHA definitions and policies vary among the three CCC-certified LCPs in the GAI (Appendix C). LCPs may list specific species habitats or specific natural communities as ESHAs or may designate geographic areas as ESHAs because of the presence of rare or valuable plants species or animal species, natural communities, or habitat. Designation of ESHAs is not limited to habitat for federally or state listed species or designated critical habitat. SWRCB designated ocean ASBSs (see Section 2.19); coastal wetlands and lagoons, tidepools, wilderness and primitive areas, and more may also be considered ESHAs. ESHAs are often threatened by habitat fragmentation, disturbance, degradation, or other anthropogenic factors, but while a type of ESHA may be determined to be sensitive because of demonstrated effects of such threats as those listed, it does not necessitate that a particular location must be so threatened itself to qualify as an ESHA. Areas identified as ESHAs in the LCPs in the GAI include, but are not limited to, anadromous fish streams, sand dunes, rookeries and marine mammal haulout areas, pygmy vegetation containing species of rare or endangered plants, coastal bluff scrub, oak woodland, rocky intertidal shoreline, salt and freshwater marshes, and kelp areas (Marin County 2021a; Mendocino County 2009; Sonoma County 2001).

2.4.3. Critical Coastal Areas

California’s Critical Coastal Areas (“CCAs”) 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, SWRCB, RWQCBs, 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 Code of California Regulations § 632(a)(1)(A–C).

For more information on water quality and the 303(d) list, see Appendix E. ASBSs are discussed in Section 2.19.

Statewide, 119 CCAs have been identified, 13 of which occur in the GAI. These are listed below by sub-basin:

- Gualala-Salmon Sub-basin CCAs:
 - Del Mar Landing
 - Gerstle Cove
 - Russian River
- Tomales-Drake Bays Sub-basin CCAs:
 - Bird Rock
 - Bodega
 - Double Point
 - Ducksbury Reef
 - Estero Americano
 - Estero de San Antonio
 - Lagunitas Creek
 - Point Reyes Headlands
 - Tomales Bay
 - Walker Creek

There are no CCAs in the San Pablo Bay 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 maritime, Mediterranean climate with mild, wet winters and cool summers with a short period of summer drought along the coast and hotter and drier conditions farther inland. The amount of precipitation is strongly influenced by altitude and direction of the mountain ranges, with most occurring during the winter as snow. Dense coastal fog is common (McNab et al. 2007). Average annual rainfall ranges from 30 to 80 inches (North Coast RWQCB 2019). Average annual temperatures range from 50 to 63 degrees Fahrenheit (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

CNRA and the 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 multiagency 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 Point Reyes and San Francisco tide gauges are located along the northern California coast in the GAI (Figure 2-6).

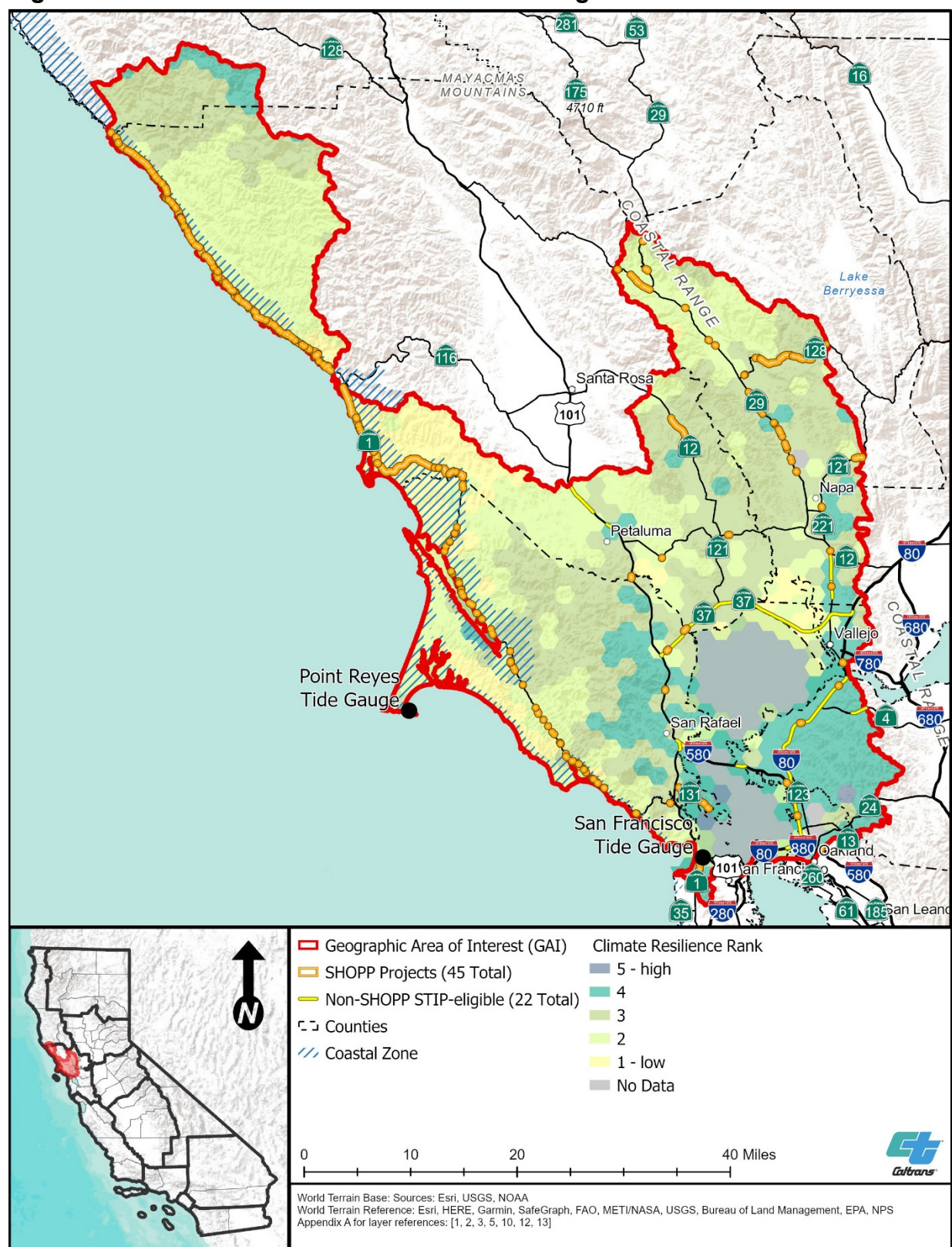
Sea-level rise projections for 2030 are based on the representative concentration pathway 8.5 (high emissions scenario) because that represents expected conditions over the next 10 years. The 2030 sea-level rise projections range from 0.6 to 0.8 foot for the Point Reyes tide gauge and 0.5 to 0.8 foot for the San Francisco tide gauge (CNRA and OPC 2018).

2.5.2. Climate Vulnerability Assessment

In 2019, Caltrans performed a statewide climate change vulnerability assessment for the SHS (Caltrans 2018b). The analysis provided in the *Caltrans Climate Change Vulnerability Assessments: District 4 Technical Report* (Caltrans 2018b) 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 disrupt and damage the SHS. Predicted climate change effects consist of increased summer temperatures and extreme heat events; increased heavy precipitation events, 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 2018b). Climate change effects during the three future 30-year periods are expected to exacerbate coastal hazards, including storm surges that increase tidal bay flooding in coastal areas, erosion, scour, and washouts underneath the SHS, damaging highways, drainage infrastructure, and rock slope shore protection; increase flooding, landslide, and mudslide frequency; and worsen the severity of wildfires, which can destabilize slopes, destroy roadside infrastructure, and cause debris to collect in drainage infrastructure (Caltrans 2018b).

Figure 2-6. Terrestrial Climate Resilience Rankings



Local relative sea-level trends based on tide gauge measurements of monthly mean sea level data from 1975 to 2020 for the Point Reyes tide gauge and from 1897 to 2020 for the San Francisco tide gauge indicate that sea levels along the coast of the GAI have risen at a rate equivalent to 0.71 foot and 0.65 foot in 100 years, respectively (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 4 Technical Report*, State Route 37 and U.S. Highway 101 are sections of the SHS that could become more vulnerable to high surf damage and periodic storm surges as sea levels rise (Caltrans 2018b).

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 (“CO₂”) scenarios—one with no reductions in CO₂ emissions and one with a peak in 2040 followed by a significant decline in CO₂ 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 2-6. Higher resilience is clearly shown in the northernmost part of the GAI in the Coast Ranges and in the southern part of the GAI by San Francisco and San Pablo Bays (Figure 2-6). Resilience in these areas ranges from 3 to 4. Resilience in the remainder of the GAI ranges from 1 to 2 and is generally lowest along the coast.

2.6 Land Cover Types

General land cover types are depicted on the maps provided in Appendix B. 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 2021d). Based on these data,

tree-dominated habitats account for the largest habitat type, encompassing 42 percent of the GAI, with montane hardwood the most common (Table 2-3, Appendix B). Developed habitats and non-vegetated habitat types (barren areas) combined account for 26.5 percent of the GAI, with cropland the most common. Herbaceous-dominated habitats account for 23.5 percent of the GAI, with annual grassland the most common. Shrub-dominated habitats account for 6.2 percent of the GAI, with coastal scrub the most common. Aquatic habitats account for 1.9 percent of the GAI, with lacustrine the most common. Land cover is generally shown on Figure 2-7.

Table 2-3. Land Cover Types

CWHR Habitat Type	Acres^a	Cover as Percentage of GAI^b (%)
Tree-dominated Habitats	477,554	41.98
Blue Oak Woodland	4,826	0.42
Blue Oak-Foothill Pine	755	0.07
Closed-Cone Pine-Cypress	15,567	1.37
Coastal Oak Woodland	88,066	7.74
Douglas Fir	64,821	5.70
Eucalyptus	4,896	0.43
Montane Hardwood	152,679	13.42
Montane Hardwood-Conifer	66,350	5.83
Montane Riparian	8,588	0.75
Ponderosa Pine	122	0.01
Redwood	69,265	6.09
Sierran Mixed Conifer	1	<0.01
Valley Foothill Riparian	236	0.02
Valley Oak Woodland	1,382	0.12
Shrub-dominated Habitats	69,927	6.15
Chamise-Redshank Chaparral	13,043	1.15
Coastal Scrub	29,808	2.62
Desert Scrub	3	<0.01
Mixed Chaparral	27,073	2.38
Herbaceous-dominated Habitats	267,646	23.53
Annual Grassland	240,479	21.14
Fresh Emergent Wetland	3,123	0.27

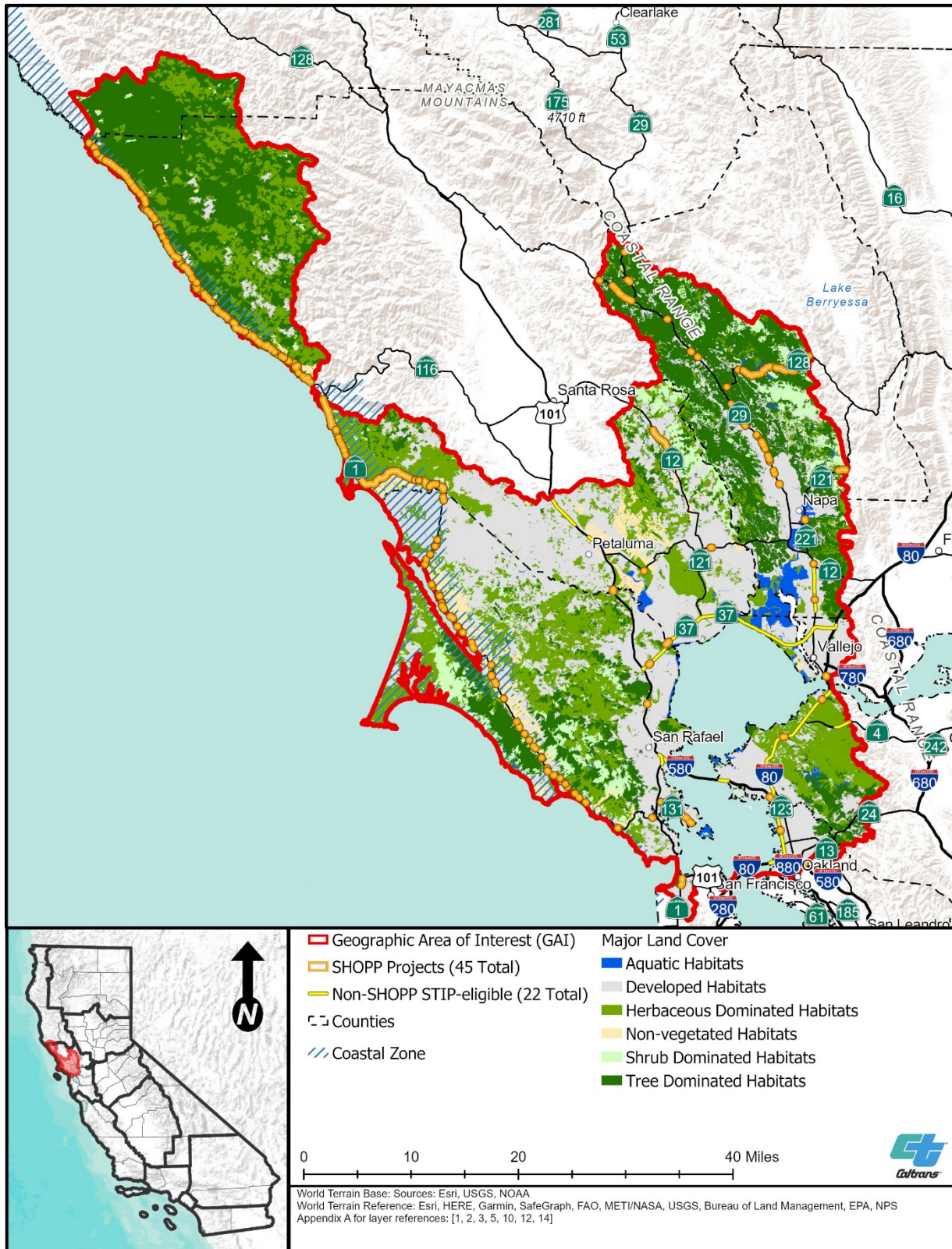
CWHR Habitat Type	Acres ^a	Cover as Percentage of GAI ^b (%)
Freshwater Emergent Marsh	110	0.01
Pasture	10,629	0.93
Perennial Grassland	511	0.04
Saline Emergent Wetland	12,640	1.11
Wet Meadow	154	0.01
Aquatic Habitats	21,194	1.86
Estuarine	17	<0.01
Lacustrine	19,867	1.75
Marine	128	0.01
Riverine	1,182	0.10
Water	0.01	<0.01
Developed Habitats	290,549	25.55
Cropland	117,952	10.37
Deciduous Orchard	4	<0.01
Orchard-Vineyard	55,042	4.84
Urban	117,477	10.33
Vineyard	74	0.01
Non-vegetated Habitats	10,817	0.95
Barren	10,817	0.95
Total	1,137,687	100%

Source: Caltrans 2021d

^a Numbers were rounded to the nearest whole number.

^b Numbers were rounded to the hundredths.

Figure 2-7. Major Land Cover^a



^a For greater detail, see Appendix B.

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 (CDFW 2018b; FWS 2012).

Three organizations 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 2021).

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 2015a). 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 (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 in the California SWAP as problematic for areas in northern California that encompass the GAI include, but are not limited to, European beachgrass (*Ammophila arenaria*), barb goatgrass (*Aegilops triuncialis*), tree-of-heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), iceplant (*Carpobrotus chilensis*), highway iceplant (*Carpobrotus edulis*), yellow starthistle (*Centaurea solstitialis*), jubata grass (*Cortaderia jubata*), Scotch broom (*Cytisus scoparius*), medusahead (*Elymus caput-medusae*), French broom (*Genista monspessulana*), perennial pepperweed (*Lepidium latifolium*), pennyroyal (*Mentha pulegium*), Himalayan blackberry (*Rubus armeniacus*), and nonnative cordgrass species (*Spartina* spp.) (CDFW 2015a).

Additional invasive plant species that occur in the GAI include wild oat (*Avena* spp.), ripgut brome (*Bromus diandrus*), Italian thistle (*Carduus pycnocephalus*), tocalote (*Centaurea*

melitensis), bull thistle (*Cirsium vulgare*), poison hemlock (*Conium maculatum*), pampas grass (*Cortaderia jubata* or *Cortaderia selloana*), hedgehog dogtailgrass (*Cynosurus echinatus*), rattail fescue (*Festuca myuros*), Italian ryegrass (*Festuca perennis*), fennel (*Foeniculum vulgare*), English ivy (*Hedera helix*), rough cat's-ear (*Hypochaeris radicata*), hyssop loosestrife (*Lythrum hyssopifolium*), Harding grass (*Phalaris aquatica*), red sorrel (*Rumex acetosella*), and greater periwinkle (*Vinca major*) (Cal-IPC 2021).

Nonnative animals that are/may be present in the GAI and that can negatively affect aquatic species include New Zealand mudsnails (*Potamopyrgus antipodarum*), American bullfrog (*Lithobates catesbiana*), barred tiger salamander (*Ambystoma tigrinum mavortium*), red-eared slider (*Trachemys scripta elegans*), overbite clam (*Corbula amurensis*), and introduced sport and bait fish, including sunfish, bass, brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), and yellow perch (*Perca flavescens*) (CDFW 2009, 2015a, 2021a). Introduced nonnative animals such as American bullfrog, African clawed frog (*Xenopus laevis*), red swamp crayfish (*Procambarus clarkia*), signal crayfish (*Pacifastacus leniusculus*), western mosquitofish (*Gambusia affinis*), and fish can negatively affect native animals such as California red-legged frog (*Rana draytonii*) and other aquatic species by competing for food resources, acting as disease vectors, and preying on the native animals (FWS 2002; Hayes et al. 2016).

Nonnative animals that are/may be present in the GAI and that can negatively affect terrestrial wildlife or habitat through competition, predation, or parasitism include feral animals, brown-headed cowbirds (*Molothrus ater*), and European starling (*Sturnus vulgaris*) (CDFW 2015a, 2021a). 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 European starlings (CDFW 2015a). The 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 Terrestrial Species

Special-status terrestrial species are discussed below. Threatened and endangered fish species with the potential to occur in the GAI are discussed in Section 2.17.4.

Special-status terrestrial 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 2021b). Special-status terrestrial species included in the SAMNA are 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). Based on a search of the SAMNA Reporting Tool's species-attributed vegetation layer, 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 Central California Coast Ecoregion Section, 76 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 Section, and 38 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 Section.

Special-status species forecast to be affected by transportation projects during the planning period are listed, by habitat, in Appendix D and their counts are shown in Tables 2-4 to 2-6. Although it is the best information currently available, the SAMNA Reporting Tool's species list highlights the uncertainties in this foundational information. 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 2021b). As described in the up-to-date Appendix D, CWHR home ranges are not always available. As an example, for subspecies for which CWHR does not include up-to-date subspecies home ranges, the SAMNA results are provided at the species level; those special-status subspecies that do not have the potential to occur in the GAI are identified with a footnote in Appendix D of this document. Hence, 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 – Central California Coast Ecoregion Section in the GAI^a

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
Blue Oak Woodland	0.42	0	0	1	0	11	8
Coastal Oak Woodland	7.74	0	0	1	0	11	8
Valley Oak Woodland	0.12	0	0	1	0	11	8
Herbaceous-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Annual Grassland	21.14	11	0	3	0	12	9
Saline Emergent Wetland	1.11	3	0	0	0	7	1
Developed Habitats	See below	See below	See below	See below	See below	See below	See below
Orchard-Vineyard	4.84	0	0	0	0	4	5
Urban	10.33	0	0	0	0	12	5

Source: Appendix D

^a Because a species may use more than one habitat, the numbers here are not additive.

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

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
Closed-Cone Pine-Cypress	1.37	1	0	2	0	6	5
Coastal Oak Woodland	7.74	0	0	2	0	13	8
Douglas Fir	5.70	0	0	2	0	10	10

Land Cover Type	Cover as Percentage of GAI	Plants	Invertebrates	Amphibians	Reptiles	Birds	Mammals
Eucalyptus	0.43	0	0	2	0	15	8
Montane Hardwood	13.42	2	0	2	0	11	8
Montane Hardwood-Conifer	5.83	0	0	2	0	12	10
Montane Riparian	0.75	1	0	2	0	12	8
Redwood	6.09	0	0	2	0	11	10
Shrub-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Coastal Scrub	2.62	18	1	2	0	11	8
Mixed Chaparral	2.38	1	0	2	0	9	8
Herbaceous-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Annual Grassland	21.14	19	1	2	0	14	8
Pasture	0.93	0	0	0	0	2	8
Saline Emergent Wetland	1.11	3	0	0	0	7	0
Aquatic Habitats	See below	See below	See below	See below	See below	See below	See below
Lacustrine	1.75	0	0	1	0	5	4
Marine	0.01	0	0	0	0	9	3
Developed Habitats	See below	See below	See below	See below	See below	See below	See below
Orchard-Vineyard	4.84	0	0	0	0	3	5
Urban	10.33	0	0	0	0	11	5
Non-vegetated Habitats	See below	See below	See below	See below	See below	See below	See below
Barren	0.95	0	1	0	0	9	9

Source: Appendix D

^a Because a species may use more than one habitat, the numbers here are not additive.

Table 2-6. Number of Potentially Occurring Special-status Species, by Land Cover Type – Northern California Coast Ranges Ecoregion Section in the GAI^a

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
Blue Oak Woodland	0.42	0	0	2	1	11	12
Blue Oak-Foothill Pine	0.07	0	0	2	1	12	12
Coastal Oak Woodland	7.74	0	0	2	1	12	12
Montane Hardwood	13.42	1	0	2	1	10	11
Montane Riparian	0.75	0	0	2	1	13	12
Shrub-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Chamise-Redshank Chaparral	1.15	0	0	1	1	11	10
Mixed Chaparral	2.38	1	0	2	1	11	12
Herbaceous-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Annual Grassland	21.14	6	0	2	0	14	10
Perennial Grassland	0.04	0	0	1	0	14	12
Aquatic Habitats	See below	See below	See below	See below	See below	See below	See below
Lacustrine	1.75	0	0	1	0	5	4
Developed Habitats	See below	See below	See below	See below	See below	See below	See below
Orchard-Vineyard	4.84	0	0	0	0	6	7
Non-vegetated Habitats	See below	See below	See below	See below	See below	See below	See below
Barren	0.95	0	0	0	0	6	6

Source: Appendix D

^a Because a species may use more than one habitat, the numbers here are not additive.

2.9 Critical Habitat

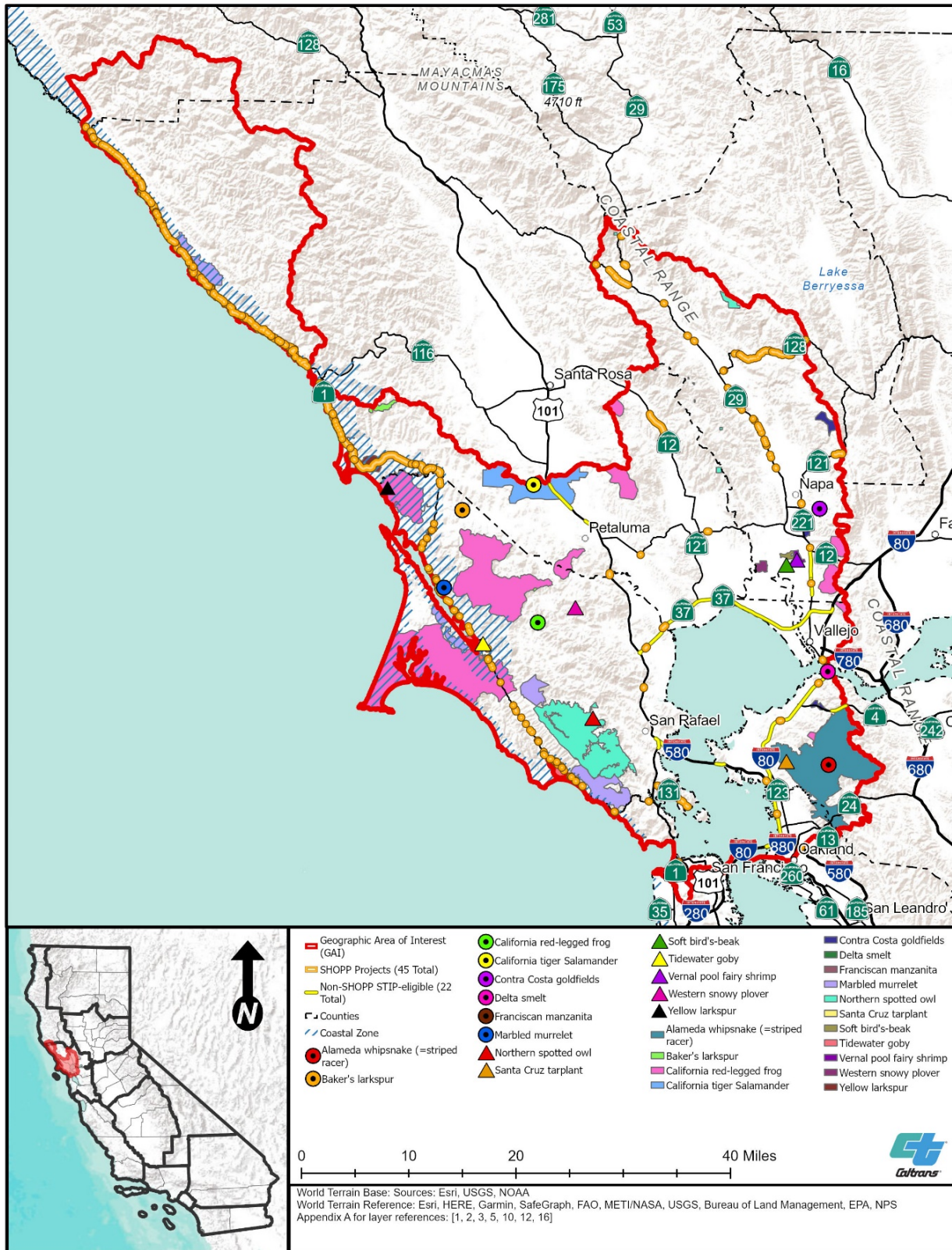
FWS and NMFS regulate impacts on critical habitat under the ESA. The ESA (16 USC § 1531–1544) defines critical habitat for a threatened or endangered species as (i) “specific areas within the geographical area occupied by the species at the time it is listed ... on which are found those physical or biological 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 2017).

The GAI includes federally designated final critical habitat for 15 species (FWS 2021a; NMFS 2021a):

- Alameda whipsnake (*Coluber lateralis euryxanthus*)
- Baker’s larkspur (*Delphinium bakeri*)
- California red-legged frog
- California tiger salamander (*Ambystoma californiense*)
- Contra Costa goldfields (*Lasthenia conjugens*)
- Delta smelt (*Hypomesus transpacificus*)
- Franciscan manzanita (*Arctostaphylos franciscana*)
- Marbled murrelet (*Brachyramphus marmoratus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Santa Cruz tarplant (*Holocarpha macradenia*)
- Soft bird’s-beak (*Cordylanthus mollis* ssp. *mollis*)
- Tidewater goby (*Eucyclogobius newberryi*)
- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- Western snowy plover (*Charadrius nivosus nivosus*)
- Yellow larkspur (*Delphinium luteum*)

Critical habitat is an important consideration when establishing compensatory mitigation. Designated critical habitat for these species is indicated on Figure 2-8. Note that designated critical habitat represented by points on Figure 2-8 are units too small to depict at the regional level assessed in this RAMNA.

Figure 2-8. Federally Designated Critical Habitat



2.10 Essential Fish Habitat

NMFS is responsible for ensuring impacts on essential fish habitat (“EFH”) are addressed. 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 fresh water 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 2-9).

2.10.1. Habitat Areas of Particular Concern

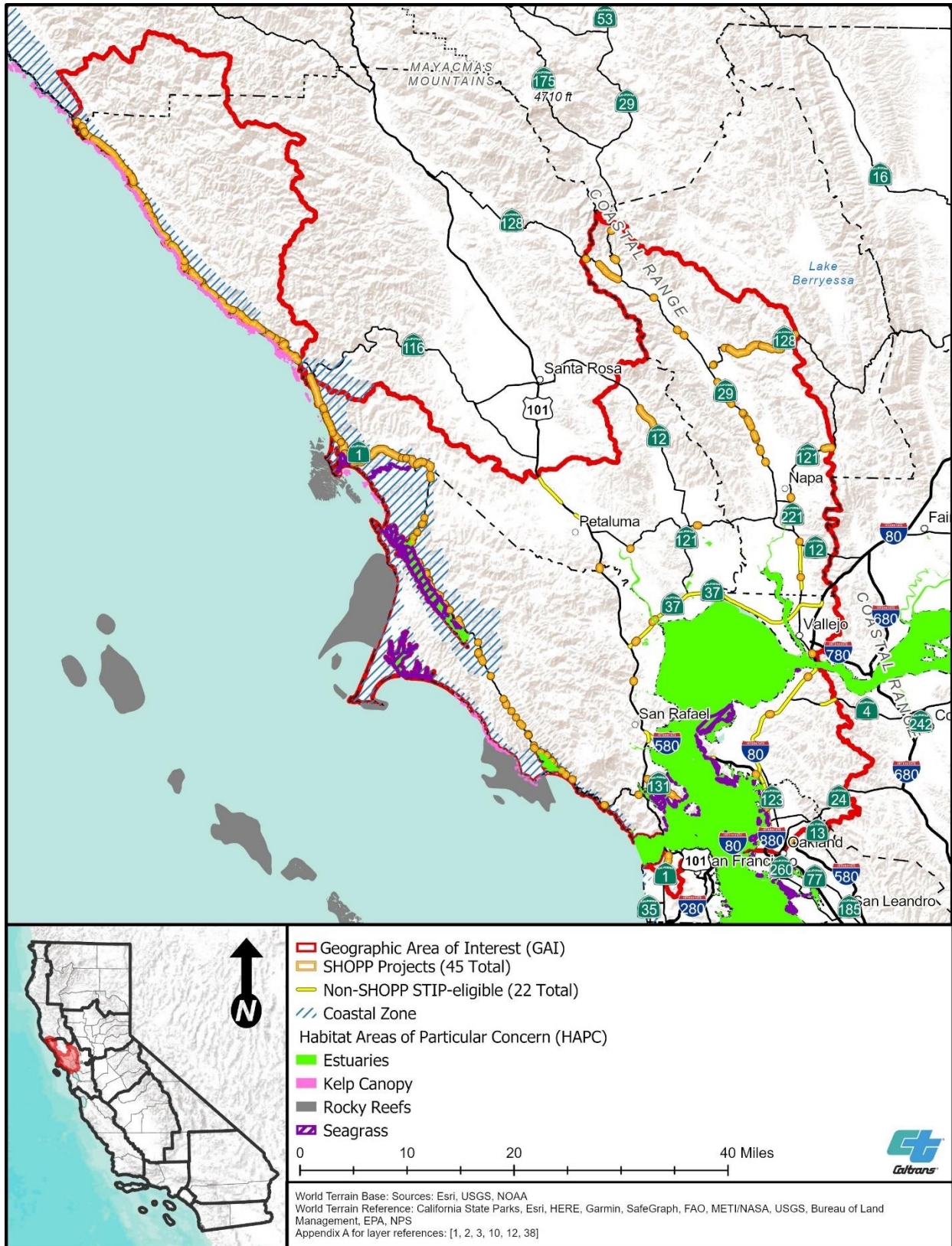
The Pacific Fishery Management Council identifies habitat areas of particular concern (“HAPCs”) and recommends HAPCs to NOAA Fisheries consistent with the Magnuson-Stevens Act. HAPCs are a discrete subset of EFH that consist of areas considered a high priority for conservation, management, or research because they provide important ecosystem functions that can be especially sensitive to degradation as a result of human activities, can be stressed by development, or are notable because of their rarity. An area designated as an HAPC prioritizes and focuses conservation efforts rather than automatically requiring its protection or restrictions. HAPCs may be important for healthy fish populations; however, other EFH areas can also provide ecological functions necessary to support and maintain sustainable fisheries and a healthy ecosystem (NMFS 2021b).

Within the GAI, HAPCs include estuaries, kelp canopies, rocky reefs, and seagrass near or in Bolinas Lagoon, Drakes Bay, San Francisco Bay, and Tomales Bay (Figure 2-10). HAPCs consisting of seagrass (eelgrass species *Zostera marina* and *Z. pacifica*) can be found within Drakes Bay, San Francisco Bay, and Tomales Bay.

Figure 2-9. Essential Fish Habitat



Figure 2-10. Habitat Areas of Particular Concern



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 four connectivity assessments applicable and relevant to the GAI: California Essential Habitat Connectivity ("CEHC") Project, ACE, CDFW's *California Wildlife Barriers 2020* report, and the Bay Area Critical Linkages Project. 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 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).

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 2-11). It also incorporates species-specific, fine-scale linkage information developed at a regional scale, where available, and includes areas 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

Connectivity is an important consideration when establishing compensatory mitigation. Most of the planned SHOPP and STIP-eligible transportation projects occur in areas with a connectivity rank of 1, 3, 4, or 5, with fewer projects occurring in areas with a connectivity rank of 2 (Figure 2-11).

CDFW's California Wildlife Barriers 2020 Report

CDFW's *California Wildlife Barriers 2020* report identified priority wildlife movement barriers created by linear infrastructure across the state to focus financial resources on improving 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.

One priority wildlife movement barrier was identified in the GAI. This barrier is Highway 12 near Glen Ellen and the target species for movement include mountain lion, mule deer, and mesocarnivores (CDFW 2020).

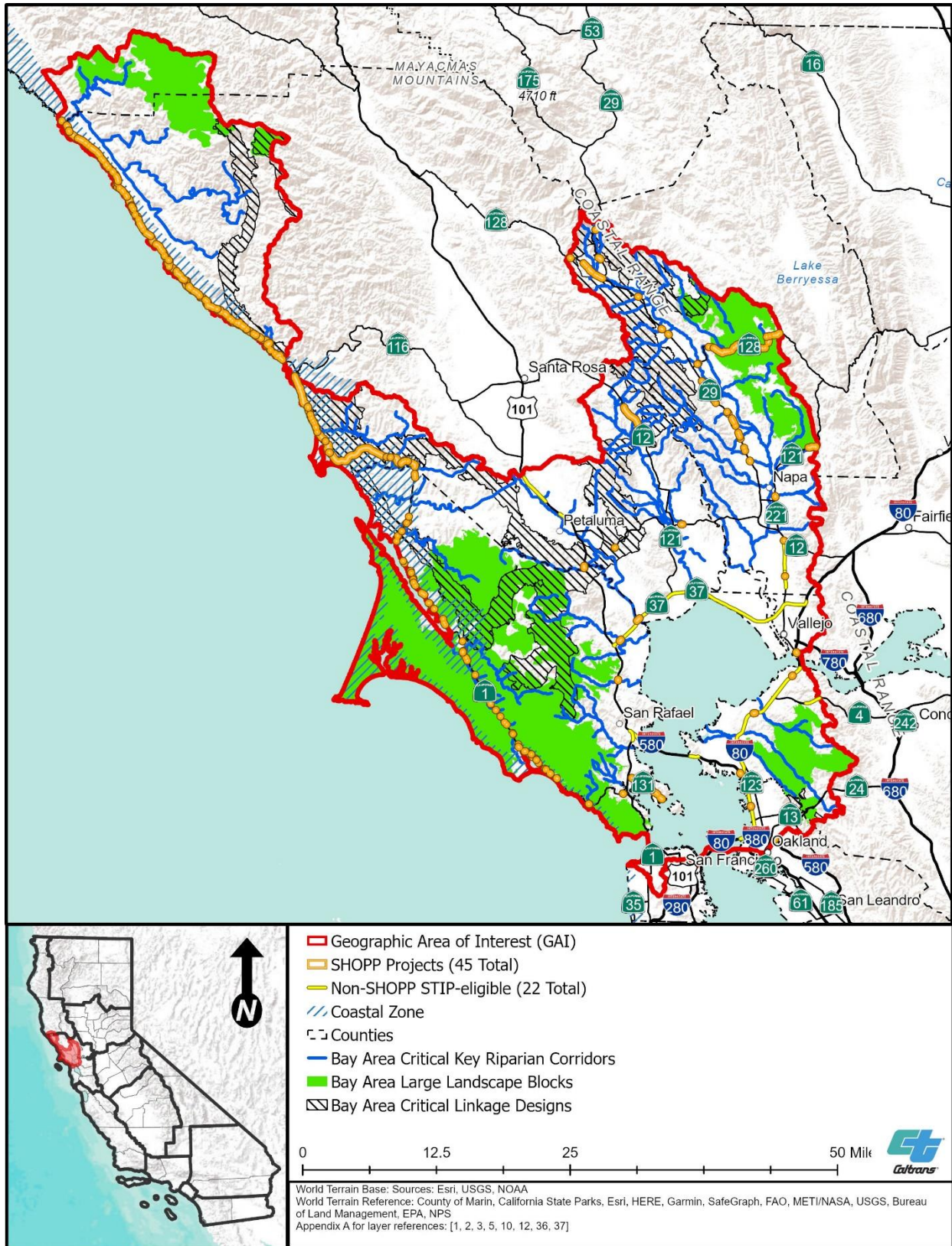
Bay Area Critical Linkages Project

Available from CDFW's Biogeographic Information and Observation System, the Bay Area Critical Linkages Project report is the result of collaboration among conservation biologists, ecologists, wildlife and transportation agencies, land managers and planners, conservation organizations, and other experts to identify priority landscape linkages deemed vital for connectivity between existing wildlands in the San Francisco Bay Area. These linkages were identified for their potential to maintain ecological and evolutionary processes throughout the region by considering habitat and movement needs of specific species (Figure 2-12) (Penrod et al. 2013).

The area covered by the Bay Area Critical Linkages Project extends beyond the GAI to the north, east, and south. The goal of this project is to provide functional connections to maintain movements of wide-ranging species, such as mountain lion (*Puma concolor*)—a species listed as a candidate under CESA in April 2020 and specially protected under the California Wildlife Protection Act of 1990—and American badger (*Taxidea taxus*), a California species of special concern. Species of mitigation need that are identified as focal species within the Bay Area Critical Linkages Project report include coho salmon, Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*), California red-legged frog, California tiger salamander, and steelhead trout. Each linkage design identifies potential barriers, opportunities for habitat restoration and improvement of road crossings, and management needs for the linkage (Penrod et al. 2013).

The Bay Area Critical Linkages Project identifies many of the same landscape blocks as the CEHC Project; however, more key riparian connections are identified (Figure 2-12).

Figure 2-12. Bay Area Critical Linkages



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 upgrades of SHS facilities that prevent or impede the passage of salmon and steelhead (*Oncorhynchus mykiss*). Most 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, with the most recent report at: <https://dot.ca.gov/programs/legislative-affairs/reports>.
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 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 be 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 (*Oncorhynchus tshawytscha*), and Southern California DPS steelhead
- Seven identified species currently listed as state and/or federally threatened: Southern Oregon/Northern California 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 shows the six California Fish Passage Advisory Committee (“FishPAC”) locations throughout the state. The FishPAC is a partnership between Caltrans, CDFW, NMFS, FWS, San Francisco BCDC, CCC, CalTrout, Pacific States Marine Fisheries Commission, and other local fish passage advocates. The FishPACs share science and data related to known fish barriers and 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

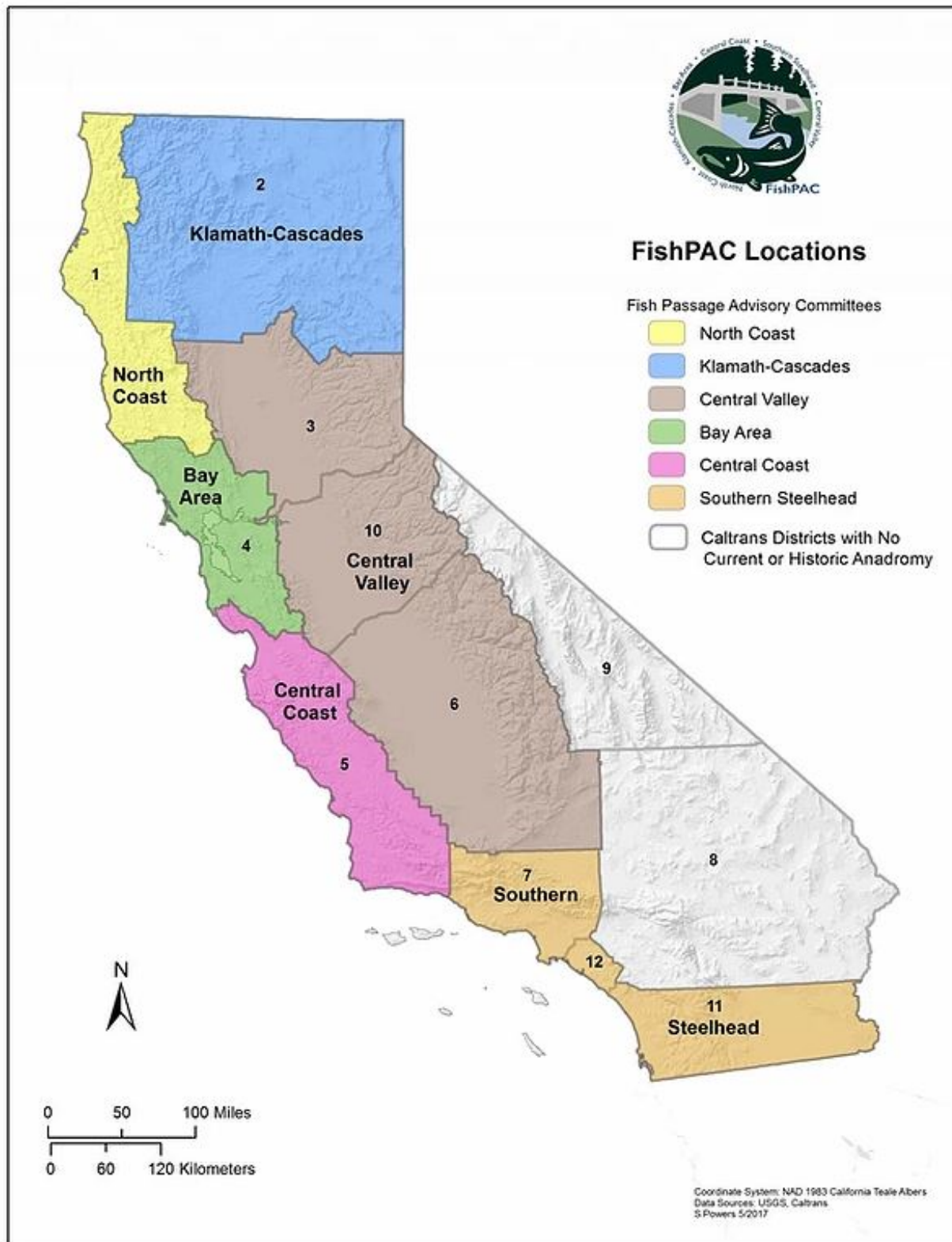
potential funding mechanisms for both new barrier removal projects and the long-term maintenance of existing fish passage facilities for the SHS. Stream simulation designs and full-span solutions to fish passage also consider and incorporate benefits for both terrestrial and wildlife species, and can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

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 more than 200 fish passage experts, advocates, and partners throughout the range of salmon and steelhead work 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). Since 2006, in collaboration with FishPAC, Caltrans has partially or fully remediated 51 barriers on the SHS and identified 556 additional barriers to salmon and steelhead statewide. Results of Caltrans and FishPAC's efforts to locate, assess, prioritize, and remediate fish passage barriers on the SHS are documented in the 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.¹ Information regarding verified SHS fish passage barriers is available through the appropriate FishPAC.

¹ 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 Hydrologic Unit Code (“HUC”) that is georeferenced to USGS topographic maps (USGS 2014). Each HUC classification consists of 2 to 12 digits. For example, 6-digit HUCs, or “HUC-6s,” map to the basin level; 8-digit HUCs, or “HUC-8s,” map to the sub-basin level; and 12-digit HUCs, or “HUC-12s,” map to the sub-watershed level.

The SAMNA Reporting Tool expresses the landscape in terms of USGS HUC-8 sub-basins and, hence, information in this RAMNA is also presented by HUC-8 (Caltrans 2021c; USGS 2014). However, SWRCB and the RWQCBs do not exclusively use HUC-8 codes (California Department of Water Resources 2016). SWRCB and the RWQCBs also use the Calwater system (that is, hydrologic units, or “HUs”) for state-level purposes such as assigning beneficial uses to waters. The Calwater system is a hierarchical system similar to USGS HUCs. Calwater levels begin with the division of the state into 10 hydrologic regions. Each hydrologic region is progressively subdivided into five smaller, nested levels: HUs, hydrologic areas, hydrologic sub-areas, super planning watersheds, and planning watersheds.

Table 2-7 provides a crosswalk between the HUC-8 and HU classifications for each HUC-8 in the GAI. The GAI overlaps the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays HUC-8 sub-basins, which loosely correspond to the Bay Bridges, Bodega, Marin Coastal, Mendocino Coast, Putah Creek, Russian River, San Mateo, San Pablo, South Bay, and Suisun HUs. Figure 2-14 shows the overlap between sub-basins and state-level HUs in the GAI.

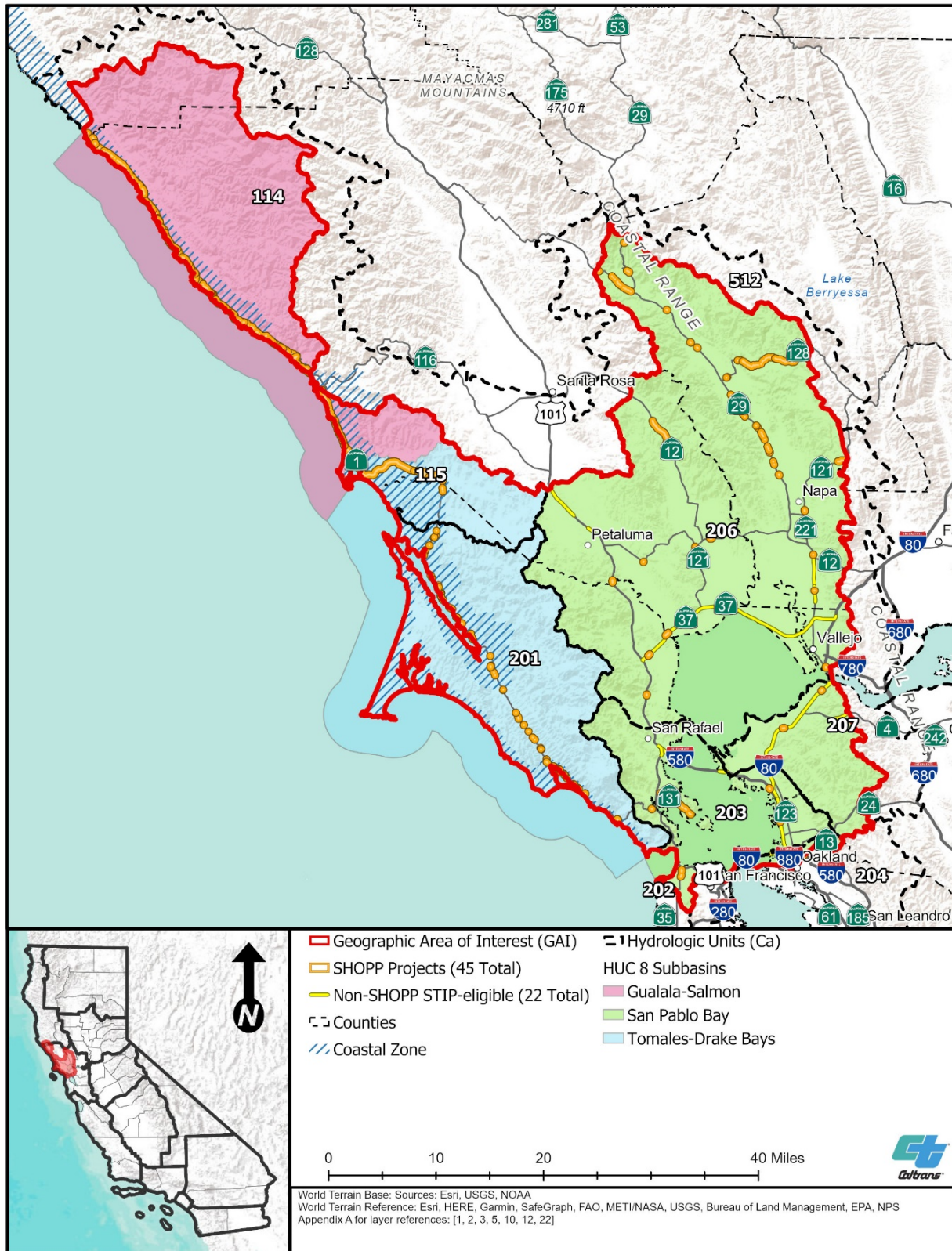
Table 2-7. Crosswalk of HUC-8 Sub-basins with HUs in the GAI

HUC-8 #	HUC-8 Name	HUC-8 Acreage ^a	HU #	HU Name	HU Acreage ^a
18010109	Gualala-Salmon	354,854	115	Bodega	94,485
18010109	Gualala-Salmon	354,854	113	Mendocino Coast	1,547,668
18010109	Gualala-Salmon	354,854	114	Russian River	1,547,668
18050002	San Pablo Bay	784,983	203	Bay Bridges	122,491
18050002	San Pablo Bay	784,983	115	Bodega	94,485
18050002	San Pablo Bay	784,983	201	Marin Coastal	218,836
18050002	San Pablo Bay	784,983	512	Putah Creek	363,072
18050002	San Pablo Bay	784,983	114	Russian River	1,547,668
18050002	San Pablo Bay	784,983	202	San Mateo	164,493
18050002	San Pablo Bay	784,983	206	San Pablo	734,398
18050002	San Pablo Bay	784,983	207	San Pablo	482,024
18050002	San Pablo Bay	784,983	204	South Bay	780,667
18050002	San Pablo Bay	784,983	207	Suisun	482,024
18050005	Tomaes-Drake Bays	489,068	203	Bay Bridges	122,491
18050005	Tomaes-Drake Bays	489,068	115	Bodega	94,485
18050005	Tomaes-Drake Bays	489,068	201	Marin Coastal	218,836
18050005	Tomaes-Drake Bays	489,068	114	Russian River	1,547,668
18050005	Tomaes-Drake Bays	489,068	206	San Pablo	734,398

Source: Caltrans 2021b

^a Numbers were rounded to the nearest whole number.

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



2.13 Hydrology

The Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays Sub-basins of the GAI drain an area of 1,628,906 acres (2,545 square miles) (Table 2-8). These sub-basins in the GAI include 1,502 rivers and streams that traverse 2,025 miles in the North Coast and San Francisco Bay RWQCB boundaries (Table 2-8). Descriptions of these sub-basins and HUs, which may include water features outside the GAI, are provided below.

Table 2-8. Sub-basins

Sub-basin Name	Sub-basin Code (HUC-8)	Drainage Area (acres) ^a	Rivers and Streams (count)	Total Reach Length (miles) ^a
Gualala-Salmon	18010109	354,854	434	517
Tomales-Drake Bays	18050005	489,068	331	432
San Pablo Bay	18050002	784,984	737	1,077
Total		1,628,906	1,502	2,025

Source: California Department of Water Resources

^a Numbers were rounded to the nearest whole number and include the area within each sub-basin outside the GAI.

2.13.1. Gualala-Salmon Sub-basin

The Gualala-Salmon Sub-basin drains an area of 252,146 acres (394 square miles) and includes 434 rivers and streams that traverse 517 miles (Table 2-8). The Gualala-Salmon Sub-basin includes the Bodega, Mendocino Coast, and Russian River HUs (Table 2-7).

Bodega HU. The main waterbodies in the Bodega HU include Bodega Bay, Estero Americano and Stemple Creek, Estero de San Antonio and San Antonio Creek, and Salmon Creek (North Coast RWQCB 2018). These creeks flow from the Coast Range through steep terrain and enter the Pacific Ocean south of the Russian River (North Coast RWQCB 2019). This watershed does not have significant surface water storage and includes one groundwater basin (North Coast RWQCB 2018).

Mendocino Coast HU. The Mendocino Coast HU includes the Alder Creek and Gualala River. This watershed also includes 11 groundwater basins (North Coast RWQCB 2018). The watersheds are characterized by rugged mountainous terrain with erodible soils (North Coast RWQCB 2019).

Russian River HU. The Russian River HU is bounded by the Coast Ranges on both the east and west. The mainstem of the Russian River flows 110 miles southward from Redwood and Potter valleys north of Ukiah to its confluence with Mark West Creek, where it flows west, cutting through the Coast Ranges and entering the Pacific Ocean at Jenner. The main tributaries to the Russian River within the GAI include Big Sulfur, Dry, Mark West (including the Laguna de Santa Rosa), Green Valley, and Austin Creeks (North Coast RWQCB 2019). This watershed also includes 13 groundwater basins and two reservoirs for flood protection and water supply storage, of which the Warm Springs Dam and Lake Sonoma on Dry Creek, a tributary to the Russian River west of Healdsburg, are within the GAI (North Coast RWQCB 2018, 2019).

2.13.2. San Pablo Bay Sub-basin

The San Pablo Bay Sub-basin drains an area of 655,039 acres (1,023 square miles) and includes 737 rivers and streams that traverse 1,077 miles (Table 2-8). The San Pablo Bay Sub-basin includes the Bay Bridges, Bodega, Marin Coastal, Putah Creek, Russian River, San Mateo, San Pablo, South Bay, and Suisun HUs (Table 2-7). Descriptions of the Bodega and Russian River HUs are provided in Section 2.13.1. Descriptions of the Bay Bridges, Marin Coastal, and San Pablo HUs are provided in Section 2.13.3.

Putah Creek HU. The Putah Creek HU major aquatic resources do not occur within the GAI; however, the HU includes Putah Creek and its tributaries. Putah Creek empties into Lake Berryessa, which was formed by the Monticello Dam, and continues downstream of the dam, eventually feeding into the Yolo Bypass (Sacramento River Watershed Program 2021).

San Mateo HU. The San Mateo HU includes the Butano Creek, Lake Merced, Pescadero Creek, Pescadero Marsh, Pilarcitos Creek, Pomponio Creek, Purisima Creek, San Gregorio Creek, and San Pedro Creek watersheds (San Francisco Bay RWQCB 2019). The northern area of the HU occurs within the GAI, including Lake Merced.

South Bay HU. The South Bay HU includes the following aquatic features within the GAI: Arroyo del Valle, Dry Creek, and San Antonio Creek watersheds. Surface water storage within the HU but not within the GAI includes Calaveras Reservoir, Crystal Springs Reservoir, Del Valle Reservoir, Lake Chabot, San Antonio Reservoir, and San Leandro Reservoir (San Francisco Bay RWQCB 2019).

Suisun HU. The Suisun HU aquatic features within the GAI include Grayson Creek and Green Valley Creek. Surface water storage within the GAI includes Lake Frey and Lake Madigan (San Francisco Bay RWQCB 2019).

2.13.3. Tomales-Drake Bays Sub-basin

The Tomales-Drake Bays Sub-basin drains an area of 273,117 acres (427 square miles) and includes 331 rivers and streams that traverse 432 miles (Table 2-8). The Tomales-Drake Bays Sub-basin includes the Bay Bridges, Bodega, Marin Coastal, Russian River, and San Pablo HUs (Table 2-7). Descriptions of the Bodega and Russian River HUs are provided in Section 2.13.1.

Bay Bridges HU. The Bay Bridges HU, which is referred to as the Central Basin in the water quality control plan (“Basin Plan”), includes the Bay Waters, San Rafael, Berkeley, and San Francisco Bayside hydrologic areas (Gunther 1987). The primary waterbodies in this HU include Berkeley Aquatic Park Lagoon, Central San Francisco Bay, Corte Madera Creek, Golden Gate Channel, Richardson Bay, San Rafael Creek, and Temescal Creek (San Francisco Bay RWQCB 2019).

Marin Coastal HU. The Marin Coastal HU includes Laguna Lake, Lagunitas Creek and its tributaries, Nicasio Creek, Pine Gulch Creek, Redwood Creek, Rodeo Creek, San Geronimo Creek, and Walker Creek and its tributaries. These waterbodies flow into Abbotts Lagoon, Bolinas Lagoon, Drakes Estero, Limantour Estero, Rodeo Lagoon, and

Tomales Bay. Surface water storage includes: (1) Alpine Dam and Alpine Lake, (2) Peters Dam and Kent Lake on Lagunitas Creek, and (3) Seeger Dam and Nicasio Reservoir on Nicasio Creek (San Francisco Bay RWQCB 2019).

San Pablo HU. The San Pablo HU includes the Gallinas Creek, Miller Creek, Napa River, Novato Creek, Petaluma River, Pinole Creek, Rodeo Creek, San Pablo Creek, Sonoma Creek, and Wildcat Creek watersheds, which feed into San Pablo Bay. Surface water storage includes Bell Canyon Reservoir, Briomes Reservoir, Lake Hennessey, Rector Reservoir, San Pablo Reservoir, and Stafford Lake (San Francisco Bay RWQCB 2019).

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 2020). 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 the majority of flood hazard risk in the GAI include Drakes Estero, Lagunitas Creek, Limantour Estero, Napa River, San Francisco Bay, San Pablo Bay, and Tomales Bay. 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 North Coast and San Francisco Bay Basin Plans that cover the GAI (North Coast RWQCB 2018; San Francisco Bay RWQCB 2019). Water quality objectives identified in the Basin Plans 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.

Beneficial uses for surface waters, groundwater, and coastal features are also identified in the basin plans (North Coast RWQCB 2018; San Francisco Bay RWQCB 2019). 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. Therefore, 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 2-9).

Table 2-9. Beneficial Uses

Beneficial Use	North Coast Basin Plan	San Francisco Bay Basin Plan	Relevant to RAMNA?^a
Agricultural Supply	Applicable	Applicable	No
Aquaculture	Applicable	Not applicable	No
Cold Freshwater Habitat	Applicable	Applicable	Yes
Commercial and Sport Fishing	Applicable	Applicable	No
Estuarine Habitat	Applicable	Applicable	Yes
Fish Migration	Not applicable	Applicable	Yes
Flood Peak Attenuation/ Flood Water Storage	Applicable	Not applicable	Yes
Freshwater Replenishment	Applicable	Applicable	Yes
Groundwater Recharge	Applicable	Applicable	Yes
Hydropower Generation	Applicable	Not applicable	No
Industrial Process Supply	Applicable	Applicable	No
Industrial Service Supply	Applicable	Applicable	No
Inland Saline Water Habitat	Applicable	Not applicable	Yes
Marine Habitat	Applicable	Applicable	Yes
Migration of Aquatic Organisms	Applicable	Applicable	Yes
Municipal and Domestic Supply	Applicable	Applicable	No
Native American Culture	Applicable	Not applicable	No
Navigation	Applicable	Applicable	No
Non-Contact Water Recreation	Applicable	Applicable	No
Preservation of Areas of Special Biological Significance	Applicable	Applicable	Yes

Beneficial Use	North Coast Basin Plan	San Francisco Bay Basin Plan	Relevant to RAMNA? ^a
Rare, Threatened, or Endangered Species	Applicable	Applicable	Yes
Shellfish Harvesting	Applicable	Applicable	No
Spawning, Reproduction, and/or Early Development	Applicable	Applicable	Yes
Subsistence Fishing	Applicable	Not applicable	No
Warm Freshwater Habitat	Applicable	Applicable	Yes
Water Contact Recreation	Applicable	Applicable	No
Water Quality Enhancement	Applicable	Not applicable	Yes
Wetland Habitat	Applicable	Not applicable	Yes
Wildlife Habitat	Applicable	Applicable	Yes

Sources: North Coast RWQCB 2018; San Francisco Bay RWQCB 2019

^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 SWRCB CWA Section 303(d) List of Total Maximum Daily Load 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 49 waterbodies in the GAI (SWRCB 2021). This RAMNA considers a waterbody's CWA Section 303(d) impairment designation as relevant to the RAMNA when it indicates a waterbody's loss of a relevant aquatic resource-related beneficial use (Table 2-9). These waterbodies, their impairments, and whether total maximum daily loads have been established are provided in Appendix E. 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.

2.16 Wild and Scenic Rivers

The purpose of the federal Wild and Scenic Rivers Act of 1968 (16 USC Chapter 28) and the California Wild and Scenic Rivers Act of 1972 (Public Resources Code § 5093.50) is to protect and enhance the wild, scenic, and recreational values of designated rivers (National Wild and Scenic Rivers System 2021; Water Education Foundation 2021).

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.

No nationally or state designated wild and scenic rivers are found in the GAI (National Wild and Scenic Rivers System 2021; Omnibus Public Land Management Act of 2009).

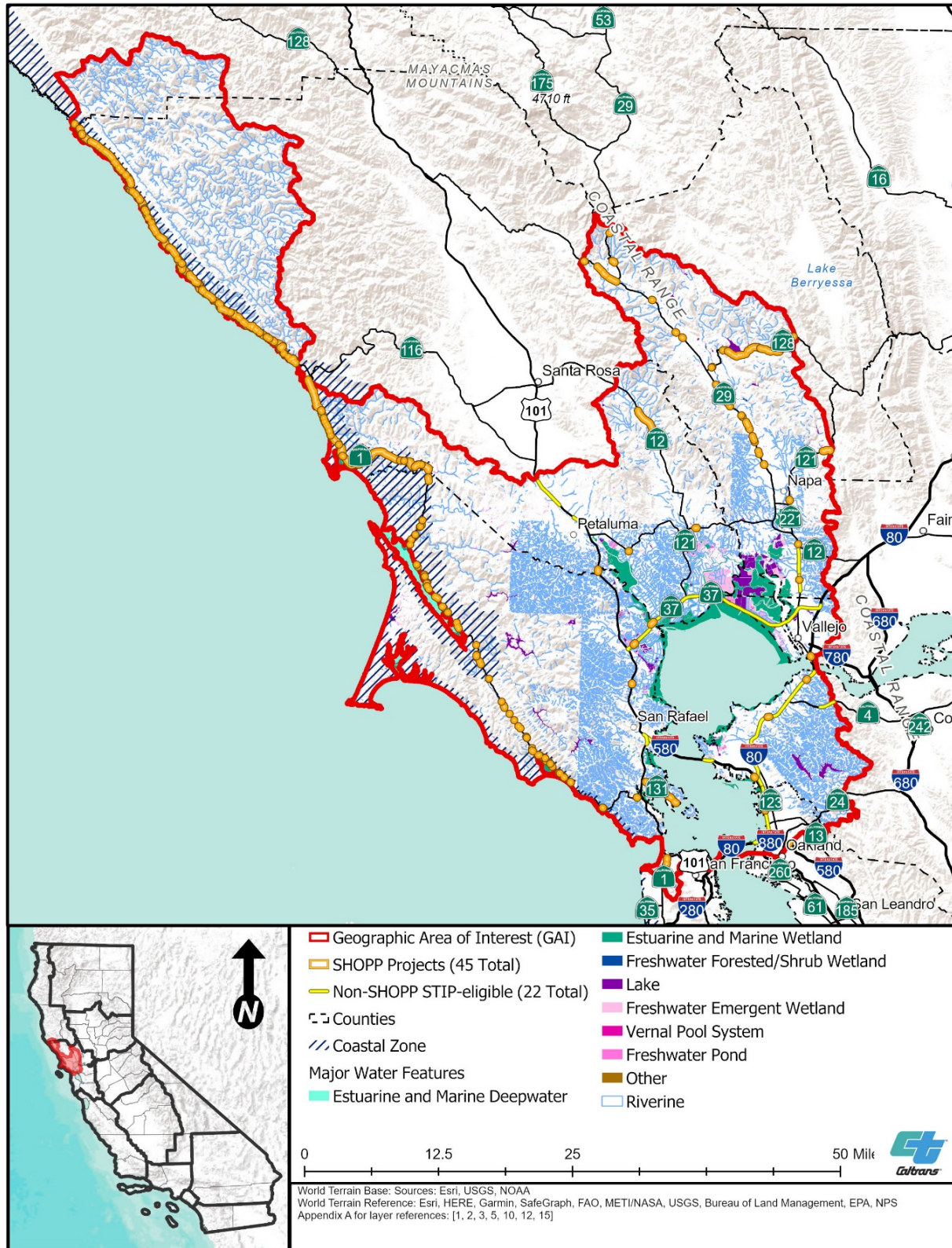
2.17 Aquatic Resources

A high-level view of major aquatic resources in the GAI is provided on Figure 2-16, and detailed maps of aquatic resources are provided in Appendix F. For the purposes of advance mitigation planning, aquatic resources in the GAI include wetlands and non-wetland waters that may be subject to CCC, Corps, EPA, RWQCB, and/or CDFW regulations, as well as special-status fish that may be subject to CCC, CDFW, FWS, and/or NMFS regulations. Riparian habitat is discussed separately in Section 2.18.

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 under Section 404 of the CWA 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 WOTUS, 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 WOTUS, rivers, streams, and lakes, including ephemeral, intermittent, and perennial watercourses, and wetlands, seeps, and springs. 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 lake²; use material from any river, stream, or lake; and deposit or dispose of material into any river, stream, or lake.

² Rivers, streams, and lakes include ephemeral, intermittent, and perennial watercourses.

Figure 2-16. Aquatic Resource Features and Major Stream Systems^a



^a For greater detail, see Appendix F.

2.17.1. Historical Context

Historically, tidal marshes and mudflat ecosystems were more extensive in the San Francisco estuary, including in the Tomales-Drake and San Pablo Bays, with unimpaired freshwater flows into the estuary. Over the past 200 years, tidal marsh and tidal flats acreage has declined significantly, largely as a result of diking from tidal action, which has converted many of these areas to managed wetlands, agricultural baylands, salt ponds, and wastewater treatment ponds (San Francisco BCDC 2020; San Francisco Bay RWQCB 2019; San Francisco Estuary Partnership 2019). In addition, freshwater flows into the Estuary and the frequency, magnitude, and duration of floodplain inundation have been highly altered, resulting in reductions in interannual and seasonal variability and peak flows as well as reduced sedimentation, which is essential in the creation, maintenance, and growth of tidal marsh and tidal flat habitat (San Francisco BCDC 2020; San Francisco Estuary Partnership 2019).

Within the Tomales-Drake Bays watershed, construction of roads and development in the upper parts of the watershed have destabilized hill slopes and increased the frequency of landslides, mudslides, and road failures during storm events. Landslides and mudslides lead to deposition of sediment in the downstream, lower-gradient areas of the watershed and reduced sediment transport out to the bay compared with historic conditions (Marin County 2021b).

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 2021b), and data from the San Francisco Estuary Institute (2016) California Aquatic Resource Inventory (Table 2-10, Appendix F; Caltrans 2021e). 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, and provide no information on plant species associated with mapped areas and are, therefore, relatively coarse. Although suitable for advance mitigation project scoping, site-specific wetland studies that result in more detailed mapping and classification of wetland aquatic resources would be required for advance mitigation projects to establish compensatory mitigation credits. For example, under Section 404 of the CWA, the Corps considers wetlands to be jurisdictional WOTUS only if they have the three parameters of hydrology, hydrophytic vegetation, and hydric soils, and satisfy criteria to be connected to a traditionally navigable water.

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 2021e).

Table 2-10. Wetland Types in the GAI

Type	Gualala-Salmon (acres) 18010109	San Pablo Bay (acres) 18050002	Tomaes-Drake Bays (acres) 18050005	Total (acres)
Depressional Natural Non-vegetated	Not mapped	0.89	15.44	16.33
Depressional Natural Vegetated	Not mapped	19.64	65.47	85.11
Depressional Perennial Natural Emergent	Not mapped	Not mapped	<0.01	<0.01
Depressional Perennial Natural Non-vegetated	Not mapped	Not mapped	<0.01	<0.01
Depressional Perennial Non-vegetated	Not mapped	94.95	Not mapped	94.95
Depressional Perennial Unnatural Non-vegetated	Not mapped	Not mapped	1.38	1.38
Depressional Perennial Unnatural Vegetated	Not mapped	Not mapped	<0.01	<0.01
Depressional Seasonal Natural Emergent	Not mapped	Not mapped	<0.01	<0.01
Depressional Seasonal Natural Forested	5.92	Not mapped	<0.01	5.92
Depressional Seasonal Natural Shrub-Scrub	<0.01	Not mapped	<0.01	<0.01
Depressional Seasonal Unnatural Emergent	<0.01	Not mapped	<0.01	<0.01
Depressional Seasonal Unnatural Shrub-Scrub	<0.01	Not mapped	<0.01	<0.01
Depressional Unnatural Non-vegetated	Not mapped	628.21	130.68	758.89
Depressional Unnatural Vegetated	Not mapped	111.10	280.77	391.87
Estuarine and Marine Wetland	467.96	33,789.16	4,657.94	38,915.07
Estuarine and Marine Wetland/Estuarine Saline Natural Intertidal Non- vegetated	Not mapped	<0.01	Not mapped	<0.01
Estuarine and Marine Wetland/Estuarine Saline Natural Subtidal Non- vegetated	Not mapped	<0.01	Not mapped	<0.01

Type	Gualala-Salmon (acres) 18010109	San Pablo Bay (acres) 18050002	Tomaes-Drake Bays (acres) 18050005	Total (acres)
Estuarine Saline Natural Intertidal Emergent	Not mapped	9.42	241.18	250.60
Estuarine Saline Natural Intertidal Non-vegetated	Not mapped	9.04	135.99	145.03
Estuarine Saline Natural Subtidal Non-vegetated	57.18	115,885.64	Not mapped	115,942.82
Freshwater Emergent Wetland	662.73	10,558.85	3,930.45	15,152.03
Freshwater Forested/Shrub Wetland	552.92	1,773.64	2,300.92	4,627.48
Freshwater Pond	100.50	4,146.26	770.06	5,016.82
Individual Vernal Pool	Not mapped	1.53	Not mapped	1.53
Lacustrine Natural Non-vegetated	Not mapped	0.54	158.73	159.27
Lacustrine Natural Vegetated	Not mapped	Not mapped	4.16	4.16
Lacustrine Unnatural Non-vegetated	Not mapped	88.19	32.12	120.31
Lacustrine Unnatural Vegetated	Not mapped	9.92	12.91	22.83
Lagoon Natural Non-vegetated	Not mapped	Not mapped	12.22	12.22
Lagoon Natural Vegetated	Not mapped	Not mapped	6.47	6.47
Lagoon Unnatural Non-vegetated	Not mapped	<0.01	4.32	4.32
Lagoon Unnatural Vegetated	Not mapped	<0.01	1.19	1.19
Playa Natural Non-vegetated	Not mapped	0.92	Not mapped	0.92
Playa Unnatural Non-vegetated	Not mapped	0.01	Not mapped	0.01
Playa Vegetated	Not mapped	0.03	Not mapped	0.03
Riverine	2,164.18	8,321.63	1,979.12	12,464.93
Riverine Natural	Not mapped	6.60	4.01	10.61
Riverine Tidal Unnatural	Not mapped	0.05	3.43	3.48

Type	Gualala-Salmon (acres) 18010109	San Pablo Bay (acres) 18050002	Tomaes-Drake Bays (acres) 18050005	Total (acres)
Slope Natural	Not mapped	47.78	3,065.15	3,112.93
Slope Unnatural	Not mapped	4.51	61.09	65.60
Total^a	4,011	175,509	17,875	197,395

Source: Caltrans 2021e

^a Rounded to the nearest whole number.

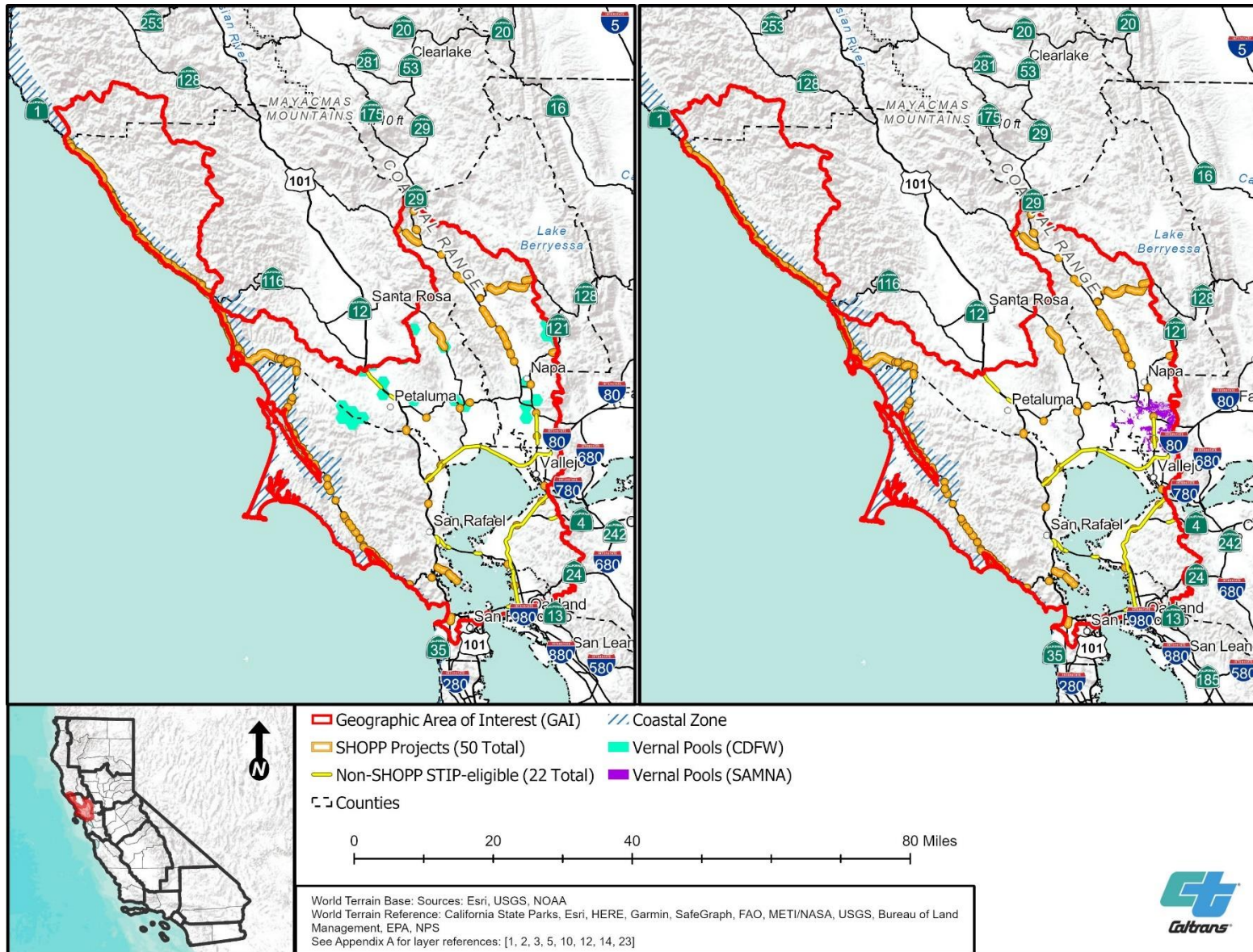
Vernal Pools

The SAMNA Reporting Tool's wetland layer does not include vernal pools. However, potential vernal pool habitat can be inferred from the modeled vernal pool fairy shrimp habitat developed for the SAMNA that is based on California Natural Diversity Database vernal pool species occurrences. Vernal pools do not have a continuous surface connection to a relatively permanent water but may still be considered jurisdictional WOTUS if they meet the current "significant nexus" criteria to a traditionally navigable water. Vernal pools mapped using CDFW's vernal pools ACE dataset [ds2732] are shown on the left side of Figure 2-17, and the California Natural Diversity Database occurrence of vernal pool invertebrate species and a 4-mile buffer mapped with the SAMNA Reporting Tool are shown on the right side of Figure 2-17.

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)], which is a broader category that may include aquatic resources that the Corps would not define as wetlands. 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 of 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 occur in the field.

Figure 2-17. Vernal Pools



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 2021f). Although suitable for advance mitigation project scoping, site-specific studies that result in more detailed mapping and classification of other, non-wetland aquatic 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 2021f).

Table 2-11. Non-wetland Types in the GAI

Type	Gualala-Salmon (acres) 18010109	San Pablo Bay (acres) 18050002	Tomaes-Drake Bays (acres) 18050005	Total (acres)
Estuarine and Marine Deepwater	2.64	71.71	8,236.07	8,310.42
Lake	22.46	9,549.02	2,319.59	11,891.07
Marine Natural Intertidal Non-vegetated	23.03	39.15	1.48	63.66
Riverine Unnatural	Not mapped	<0.01	Not mapped	<0.01
Riverine Unnatural Non- vegetated	Not mapped	Not mapped	0.43	0.43
Total^a	48	9,660	10,558	20,266

Source: Caltrans 2021f

^a Rounded to the nearest whole number.

2.17.4. Threatened and Endangered Fish Species

Special-status terrestrial species with the potential to occur in the GAI are discussed in Section 2.8. Special-status fish species are discussed below.

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 2021b, 2021g). Based on a search of the fish habitat layer, 10 federally or state listed threatened or endangered fish species are known to occur or have the potential to occur in the GAI:

- federally and state endangered Sacramento River winter-run ESU Chinook salmon
- federally threatened California Coastal ESU Chinook salmon
- federally and state endangered Central California Coast ESU coho salmon
- federally threatened Southern DPS green sturgeon

- federal candidate for listing and state threatened longfin smelt
- federally threatened Central California Coast DPS steelhead
- federally threatened Northern California DPS steelhead
- federally threatened California Central Valley DPS steelhead
- federally endangered tidewater goby
- federally threatened and state endangered delta smelt

As described previously in Sections 2.9 and 2.10, the GAI includes FWS- and NMFS-designated final critical habitat for tidewater goby and NMFS-designated EFH for Chinook and coho salmon. The Gualala, Napa, and Petaluma Rivers and the Sonoma, Salmon, Stemple, Lagunitas, and Codornices Creeks support salmon and/or steelhead (Napa County Conservation District 2002; North Coast RWQCB 2019; Sonoma Resource Conservation District 2015).

The complete SAMNA results are provided in Appendix D of the SAMNA Report (Caltrans 2021b). Extracted from the SAMNA Report, fish species impact forecasts are provided in Chapter 5 of this RAMNA. It should be noted that results reflect uncertainties in the foundational information. For example, delta smelt critical habitat, the basis of impact estimates, occurs east of Highway 80; however, delta smelt have been observed at other locations within the GAI (CDFW, pers. comm. 2022). Hence, 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.

2.18 Riparian Habitat

Riparian habitats may include portions that are wetlands or non-wetland waters, but they also may be outside of these categories. California does not have a GIS layer for riparian ecotones and the natural resource regulatory agencies with authority in California do not have a definition for riparian habitat. Nevertheless, CWHR does include three riparian habitat types: montane riparian, valley foothill riparian, and desert riparian, which are included in the SAMNA's terrestrial vegetation data layer (Caltrans 2021d). In the GAI, riparian habitat types are a subset of the land cover types in Table 2-3 and include montane riparian and valley foothill riparian.

2.19 Areas of Special Biological Significance

The California Ocean Plan, originally adopted by SWRCB 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 (SWRCB 2019a). It defines ASBS as “those areas designated by the SWRCB 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” (SWRCB 2019a). According to Resolution Nos. 74-28, 74-32, and 75-61, SWRCB designated 34 ocean areas along the coast of

California as ASBS (SWRCB 2019a). These areas typically support a variety of aquatic life and often host unique individual species (SWRCB 2017). Figure 2-18 shows ASBS located in proximity to the GAI.

From north to south, the GAI's coastline is adjacent to the following ASBS: (1) Del Mar Landing, which occupies 0.6 mile of coastline and is part of Del Mar Landing State Marine Park; (2) Gerstle Cove, which occupies 0.6 mile of coastline near Salt Point State Park; (3) Bodega, which occupies 1 mile of coastline on the Bodega headland and is part of the Bodega State Marine Reserve; (4) Bird Rock, which occupies 0.3 mile of coastline near the Point Reyes National Seashore; (5) Point Reyes Headlands, which occupies 4.8 miles of coastline in Marin County within the Gulf of the Farallones National Marine Sanctuary; (6) Double Point, which occupies 0.7 mile of coastline within the Gulf of the Farallones National Marine Sanctuary; and (7) Duxbury Reef, which occupies 3.4 miles of coastline within the Gulf of the Farallones National Marine Sanctuary (SWRCB 2017).

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



2.20 San Francisco Bay Conservation and Development Commission

San Francisco BCDC's authority derives from two statutes: the McAteer-Petris Act and the Suisun Marsh Preservation Act. The McAteer-Petris Act is the key legal provision in California state law to prevent indiscriminate Bay fill, while the Suisun Marsh Preservation Act provides special protection for the Suisun Marsh. San Francisco BCDC is also the federally designated state coastal management agency for the San Francisco Bay segment of the California coastal zone.

San Francisco BCDC jurisdiction includes any activity that includes placement of fill in, extraction of materials from, or change in land use of San Francisco Bay, a shoreline band of land extending inland for 100 feet, salt ponds, managed wetlands, and waterways subject to tidal action on certain tributaries that flow into San Francisco Bay.

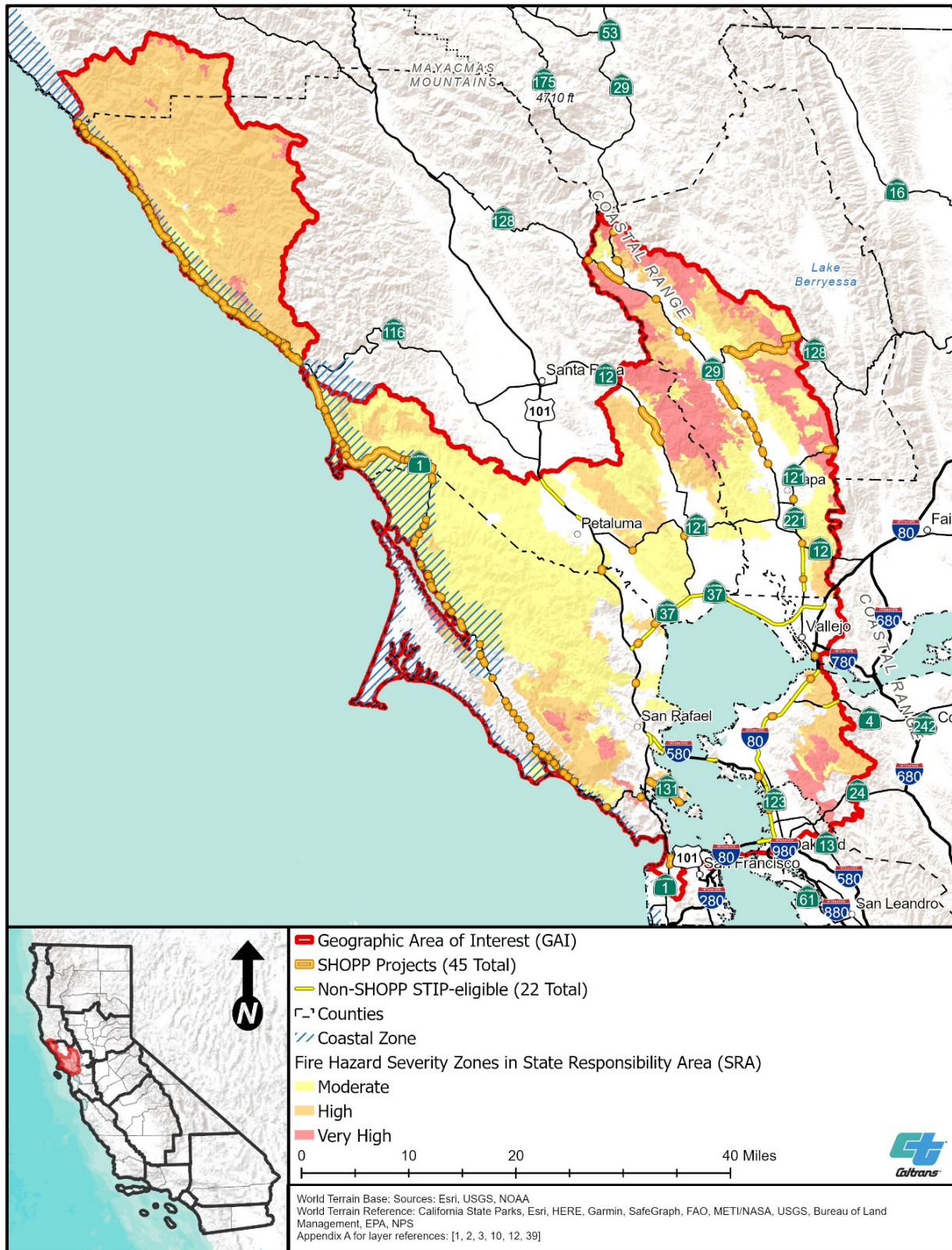
San Francisco BCDC's goals, objectives, and policies are expressed in the San Francisco Bay Plan, which is updated regularly so that the Bay and its shoreline are used responsibly and to address new issues as the San Francisco Bay Area changes (San Francisco BCDC 2020). The San Francisco Bay Plan includes policies on issues critical to San Francisco Bay, ranging from port activities and public access to urban development and transportation.

The San Francisco Bay Plan maps the entire Bay and designates areas for water-related purposes such as ports, industry, public recreation, airports, and wildlife refuges. Maps 1 through 4 in the Bay Plan overlap the GAI (San Francisco BCDC 2020). They are based on—and show how to apply—the Bay Plan policies. The maps also identify the shoreline priority use areas and illustrate the BCDC's tidal water jurisdiction.

2.21 Fire Hazard Severity Zones

Cal Fire prepares Fire Hazard Severity Zone maps that classify the severity of fire hazards in California (Figure 2-19). These maps are developed by assigning a hazard score based on factors that influence fire likelihood and behavior, including fire history, existing and potential fuel, predicted flame length, blowing embers, terrain, and typical fire weather. Hazard scores are averaged over zone areas to result in a moderate, high, or very high zone class. As indicated on Figure 2-19, high and very high fire hazard severity zones in the GAI primarily occur in the Coastal Range and foothills. This information is important for scoping advance mitigation projects and transportation projects undertaken within the GAI and it may inform the types of materials that can be used in an area based on their fire resistance capabilities.

Figure 2-19. Fire Hazard Severity Zones



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 project scopes informed by this RAMNA. Table 3-1 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, *Existing Mitigation Opportunities*, 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 of relevant documents, policies, and regulations in Table 3-1 is not exhaustive. Additional relevant resources may be consulted by Caltrans as advance mitigation planning is 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, *Introduction*, the GAI for this RAMNA was selected by Caltrans District 4 based on the SAMNA results and other information. District 4 specifically identified compensatory mitigation for longfin smelt, Northern California Coast

DPS and Central California Coast DPS steelhead, Central California Coast ESU coho salmon, Southern DPS green sturgeon, Myrtle's silverspot butterfly, California red-legged frog, California tiger salamander, Swainson's hawk, and aquatic resources as historical and anticipated mitigation needs. Therefore, 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 Chapter 7, *Wildlife Resources Conservation Goals and Objectives*, and Chapter 8, *Aquatic Resources Conservation Goals and Objectives*. 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	<p>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 to 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:</p> <ul style="list-style-type: none"> ▪ 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 PAD. ▪ Construct all new transportation projects in a way that does not pose or create a barrier to fish passage. <p>Caltrans collaborates with the FishPAC to identify passage priority locations for the SHS. The FishPAC is a partnership between CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, other local fish passage advocates, and Caltrans.</p>	https://leginfo.ca.gov/faces/condes_displaySection.xhtml?sectionNum=156.&lawCode=SHC	1/1/2006 (effective date)
California Coastal Act of 1976	Updated periodically (by California legislature)	No	<p>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 California 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 within the coastal zone, primarily through the issuance of Coastal Development Permits. In coastal local jurisdictions where the CCC has certified an LCP, the local government assumes Coastal Development Permit 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 C.</p>	https://www.coastal.ca.gov/coastact.pdf	10/9/2019 (last amended)
California Fish and Game Commission Wetlands Resources Policy	Updated periodically	No	<p>California Fish and Game Commission’s policy to seek to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California.</p>	https://fgc.ca.gov/About/Policies/Miscellaneous#Wetlands	8/18/2005 (last amended)
California Water Boards 2010 Update to Strategic Plan 2008–2012	Final	No	<p>Update to strategic plan from SWRCB and the 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 RWQCBs, enhance consistency across the RWQCBs, and ensure that the RWQCBs have access to information and expertise.</p>	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	<p>Report identifies priority fish passage barriers on the SHS. Priorities are determined through FishPAC collaboration and are based on the following:</p> <ul style="list-style-type: none"> ▪ 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. <p>Subject matter experts include CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, other local fish passage advocates, and Caltrans.</p>	https://dot.ca.gov/programs/legislative-affairs/reports	10/1/2019 (most recent)
CCC Regulations	Updated periodically	No	<p>California Code of Regulations section that allows CCC to implement provisions of the Coastal Act.</p>	https://www.law.cornell.edu/regulations/california/title-14/division-5.5	12/24/2021 (most recent update)

Title	Status	Spatial Data	Reference Purpose	Link	Date
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 Coastal Development Permits.	https://www.coastal.ca.gov/climate/slrguidance.html	11/7/2018 (last updated)
CESA	Updated periodically (by California legislature)	No	CESA prohibits the take of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species. CDFW may authorize the take of any such species by permit if the conditions set forth in Fish and Game Code § 2081, subdivisions (b) and (c) are met (see California Code of Regulations, Title 14, § 783.4).	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. Serves as a reference guide to help interpret CCC law and regulations, which, in part, define wetlands. Summarizes a wetland definition, set forth in the Coastal Act and California Code of Regulations, Title 14, Division 5.5, that uses 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
Native Plant Protection Act	Final	No	Enacted in 1977 and allows the Fish and Game Commission to designate plants as rare or endangered. There are 64 species, subspecies, and varieties of plants that are protected as rare under the Native Plant Protection Act. The Native Plant Protection Act prohibits take of endangered or rare native plants, but includes some exceptions for agricultural and nursery operations; emergencies; and after properly notifying CDFW for vegetation removal from canals, roads, and other sites, changes in land use, and in certain other situations.	https://leginfo.ca.gov/faces/codes_displayText.xhtml?division=2.&chapter=10.&lawCode=FGC	1/1/1977
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)
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 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
State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State	Final	No	Created by the SWRCB and implemented by the SWRCB and RWQCBs. 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)
Streambed Alteration Program Fish and Game Code § 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. In general terms, CDFW jurisdiction extends to top-of-bank of the outer extent of riparian habitat, if present.	https://www.wildlife.ca.gov/conservation/lsa	6/27/2017 (last amended)
Water Quality Control Plan for the North Coast Region	Updated periodically	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 (last amended)
Water Quality Control Plan for the San Francisco Bay Region	Updated periodically	Yes	Implemented by San Francisco Bay RWQCB. Establishes general and site-specific water quality standards and objectives in the San Francisco Bay Basin.	https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html	11/5/2019 (last amended)

Title	Status	Spatial Data	Reference Purpose	Link	Date
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
303(d) List of Impaired Water Bodies	Updated periodically	No	EPA and SWRCB'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 SWRCB. 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)
Corps Regulatory Guidance Letter 18-01	Final	No	Corps' guidance document on determining compensatory mitigation credits for the removal of obsolete dams and other structures from rivers and streams.	https://usace.contentdm.oclc.org/utis/gtf/ile/collection/p16021coll9/id/1473	9/25/2018
CWA	Updated periodically (by Congress)	No	Authorized by EPA and delegated to the Corps and SWRCB, 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 SWRCB. Regulates discharge of pollutants into WOTUS.	https://www.law.cornell.edu/uscode/text/33/1341	12/27/1977 (last amended)
CWA § 402 National Pollutant Discharge Elimination System MS4 Permit	Updated periodically (by Congress)	No	Implemented by EPA and SWRCB. Regulates discharge of stormwater from municipal sources that is a conveyance or system of conveyances that is: <ul style="list-style-type: none"> owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.; designed or used to collect or convey stormwater (for example, storm drains, pipes, ditches); not a combined sewer; and not part of a sewage treatment plant, or publicly owned treatment works. 	https://www.epa.gov/npdes/stormwater-discharges-municipal-sources	1/19/2019 (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
Federal Climate Action Plans	Updated periodically	No	Action plans by the federal government to broadly address the effects of climate change. These plans are individually tailored to each federal department. Those plans pertinent to this RAMNA are under the Departments of Agriculture, Commerce, and Interior, as well as plans specific to the Corps and EPA.	https://www.sustainability.gov/adaptation/	1/1/2021
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)
National Wetlands Mitigation Action Plan	Final	No	EPA and Corps' comprehensive, interagency document to further achievement of 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

Title	Status	Spatial Data	Reference Purpose	Link	Date
The Navigable Waters Protection Rule	In progress	No	The April 21, 2020, navigable waters protection rule has been vacated by the court and implementation has been halted. Rulemakings to revise the rule are currently in progress.	https://www.epa.gov/nwpr/final-rule-navigable-waters-protection-rule	6/9/2021 (announcement of rulemaking process)
Section 10 of the Rivers and Harbors Appropriation Act of 1899	Updated periodically (by Congress)	No	Authorizes the Corps to protect navigable WOTUS by requiring a permit for construction of any structure over a navigable WOTUS. A Section 10 permit is required if the structure or work affects the course, location, or condition of the waterbody. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable WOTUS.	https://www.epa.gov/cwa-404/section-10-rivers-and-harbors-appropriation-act-1899	7/26/1947 (last amended)
Section 14 of the Rivers and Harbors Appropriation Act of 1899	Updated periodically (by Congress)	No	Implemented by EPA and the Corps. Regulates the temporary occupation or use of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the U.S.	https://www.poa.usace.army.mil/Portals/34/docs/regulatory/Section%2014.pdf#:~:text=Section%2014%20of%20the%20Rivers%20and%20Harbors%20Act,or%20other%20work%20built%20by%20the%20United%20States.	10/23/2018 (last amended)
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 Planning Documents	See below	See below	See below	See below	See below
2018 Master Plan for Fisheries	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
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)
Baylands Ecosystem Habitat Goals	Final	No	A report on goals for overall habitat improvement of the San Francisco Bay and adjacent aquatic habitats with primary contributions from EPA, San Francisco RWQCB, and CDFW as well as oversight and review by FWS, San Francisco BCDC, NMFS, CCC, USGS, and a number of local water districts. Four subregions and 20 segments are included in the report, of which the North Bay and Central Bay subregions as well as the Napa River, Sonoma Creek, Petaluma River, North Marin, Contra Costa West, South Marin, San Francisco, and Berkeley segments are in the GAI.	https://www.waterboards.ca.gov/waterissues/programs/bay_delta/docs/cmmt081712/sldmwa/goalsproject1999.pdf	3/1/1999
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	9/2018

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California Coastal Trail Mapping Viewer	In progress	Yes	GIS map created by CCC and the Coastal Conservancy showing existing segments of the California Coastal Trail. The majority of California Coastal Trail segments are located in public open space or the Caltrans right-of-way, and Caltrans is a statutory partner in maintaining and advancing the trail. Caltrans should be aware of any potential trail alignments when planning and designing mitigation projects.	https://the-california-coastal-trail-1-coastalcomm.hub.arcgis.com/	Updated frequently
California Eelgrass Mitigation Policy and Implementing Guidelines	Final	No	NMFS document describing its policy for mitigation of impacts on eelgrass habitats, which includes no net loss of eelgrass habitat.	https://www.fisheries.noaa.gov/resource/document/california-eelgrass-mitigation-policy-and-implementing-guidelines	10/1/2014
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 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	Prepared for CNRA and the California Bay-Delta Authority. 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 4	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 affected by climate change in each Caltrans District.	https://dot.ca.gov/programs/transportation-planning/2020-adapation-priorities-reports	12/1/2020
Caltrans Climate Change Vulnerability Assessment, District 4 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	12/27/2017
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
Coastal Storm Modeling System (CoSMoS)	Updated periodically	Yes	A tool developed by USGS to allow for detailed predictions of coastal flooding attributable to projected sea-level rise and storm systems. Includes projections of storm scenarios under different sea-level rise conditions. This system is integrated with the Our Coast Our Future: Coastal Storm Modeling System noted below.	https://www.usgs.gov/centers/pcm/science/coastal-storm-modeling-system-cosmos?qt-science_center_objects=0#qt-science_center_objects	9/1/2021 (last piece added)
Conservation and Mitigation Banking	Updated periodically	No	CDFW's main public webpage describing the process for creating and using mitigation banks.	https://wildlife.ca.gov/Conservation/Planning/Banking	1/1/2022
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_Huijsen-and-Begley-FINAL-Report-Caltrans-Statewide-20190913-reduced-image-size.pdf	9/13/2019

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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
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 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
Sanctuary Integrated Monitoring Network	Updated periodically	Yes	A NOAA-administered program to collect original research, gather historical records, and monitor and report on the condition of National Marine Sanctuaries in California, including the Greater Farallones and Monterey Bay National Marine Sanctuaries in the GAI.	https://sanctuarysimon.org/	Information updated regularly
San Francisco BCDC 2017–2020 Strategic Plan Update	Draft	No	San Francisco BCDC's strategic plan, currently being updated, for management of the San Francisco Bay's resources. Includes general goals for habitat restoration	https://www.bcdc.ca.gov/reports/strategic_status_rpt.pdf	6/1/2017
San Francisco Bay Plan	Updated periodically	Yes	San Francisco BCDC's management and development plan for the San Francisco Bay. Includes seven sub-areas, of which the San Pablo Bay, Carquinez Strait, and Central Bay North sub-areas occur in the GAI. Includes general goals for restoration of tidal marsh and seasonal wetland habitat, particularly to restore the mouths of streams entering the bay and nearby sloughs.	https://www.bcdc.ca.gov/plans/sfbay_plan.html	10/1/2019 (last amended)
Sonoma Creek Baylands Strategy	Final	No	A report by the Sonoma Land Trust and San Francisco Bay Restoration Authority, with input from CDFW and input and funding by FWS, that creates a strategy for restoration and enhancement of Baylands habitats in the immediate watershed of Sonoma Creek and Tolay Creek, among other initiatives.	https://sonomalandtrust.org/current-initiatives/highway-37-redesign/	5/1/2020
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 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
SWAP Transportation 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 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

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Special-Status Taxa^a Documents	See below	See below	See below	See below	See below
Recovery Plan for the California Red-legged Frog (<i>Rana aurora draytonii</i>)	Final	Yes	FWS' recovery plan for California red-legged frog occurring in the GAI. The recovery criteria that must be achieved before delisting can occur are: <ul style="list-style-type: none"> ▪ All suitable habitats in Core Areas (5 of 35 are in the GAI) are protected in perpetuity and the ecological integrity of these areas is not threatened. ▪ Existing populations throughout the range are stable, and they are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite subpopulation fluctuations. ▪ There is successful reestablishment in portions of its historic range such that at least one reestablished population is stable/increasing in each core area where frogs are currently absent. ▪ The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for the California red-legged frog. 	https://ecos.fws.gov/ecp/species/2891	5/28/2002
California Red-legged Frog 5-Year Review	Updated periodically	Not applicable	FWS has not completed a formal 5-year review of this species.	https://ecos.fws.gov/ecp/species/2891	Not applicable
Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule	Final	Yes	FWS' designation of critical habitat for the California red-legged frog.	https://www.govinfo.gov/content/pkg/FR-2010-03-17/pdf/2010-4656.pdf#page=2	3/17/2010
California Red-legged Frog Biological Opinions	Updated periodically	No	FWS' list of the 242 most recent biological opinions that have been used for California red-legged frog, of which 33 were for projects in the GAI.	https://ecos.fws.gov/ecp/species/2891	8/17/2021 (latest document)
Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly	Final	No	FWS' recovery plan for Myrtle's silverspot butterfly occurring in the GAI. The recovery criteria that must be achieved before delisting can occur are: <ul style="list-style-type: none"> ▪ Nine populations of the species have been established (three existing, six discovered or reintroduced) on habitat protected in perpetuity. If appropriate sites have been identified in the screening and prioritization process, at least two of these populations should be south of the Golden Gate. ▪ Annual monitoring has shown the nine populations cumulatively to have a total of more than 45,000 adults in at least 8 of 10 years, no fewer than 10,000 adults cumulatively in any year, no individual population having fewer than 100 adults in any year, and no recent severe declines. 	https://ecos.fws.gov/ecp/species/6929	9/29/1998
Myrtle's Silverspot Butterfly (<i>Speyeria zerene myrtleae</i>) 5-Year Review	Updated periodically	Yes	FWS' most recent review of the condition of Myrtle's silverspot butterfly.	https://ecos.fws.gov/ecp/species/6929	3/22/2021
Critical Habitat Designation for Myrtle's Silverspot Butterfly	Not available	No	FWS' has not designated critical habitat for this species	https://ecos.fws.gov/ecp/species/6929	Not available
Myrtle's Silverspot Butterfly Biological Opinions	Updated periodically	No	FWS' list of two most recent biological opinions that have been used for Myrtle's silverspot butterfly, both of which occur in the GAI.	https://ecos.fws.gov/ecp/species/6929	6/4/2021 (latest document)
Five-Year Status Review for Swainson's Hawk (<i>Buteo swainsoni</i>)	Updated periodically	No	CDFW's most recent review of the condition of the Swainson's hawk species.	https://wildlife.ca.gov/Conservation/Birds/Swainson-Hawks	4/11/2016
Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (<i>Buteo swainsoni</i>) in the Central Valley of California	Final	No	CDFW's report on mitigation strategies and options for Swainson's hawk.	https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83992&inline	11/8/1994
Incidental Take Permits for Swainson's Hawk	Updated periodically	No	CDFW's list of incidental take permits issued for Swainson's hawk from its publicly available document search website. There are 60 documents in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	6/2/2021 (latest document)

Title	Status	Spatial Data	Reference Purpose	Link	Date
Recovery Plan for the Santa Rosa Plain	Final	Yes	<p>FWS' recovery plan for the California tiger salamander Sonoma County DPS in the GAI. The recovery criteria that must be achieved before downlisting can occur are:</p> <ul style="list-style-type: none"> At least one self-sustaining metapopulation in each of the three core areas: Wright-Kelly Core Area, Llano Crescent-Stony Point Core Area, and West Cotati Core Area. Each core area requires specific acreage requirements itemized under sections A/2 through A/4 of the downlisting criteria. Preserves ephemeral aquatic habitats to the greatest extent possible. Each core area must achieve a target population of approximately 5,409 individuals. Reduce predation such that it does not limit recruitment of the species. <p>The recovery criteria that must be achieved before delisting can occur are:</p> <ul style="list-style-type: none"> Sufficient habitat to support viable metapopulations is protected in two management areas of the four that have been identified as suitable for restoration: Alton Lane Management Area, Horn/Hunter Management Area, Americano/Stemple Management Area, and Southeast Cotati Management Area. Each core area requires specific acreage requirements itemized under section A/2 of the delisting criteria and sections A/2 through A/7 of the downlisting criteria. 	https://ecos.fws.gov/ecp/species/2076	5/31/2016
5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment (<i>Ambystoma californiense</i>)	Updated periodically	Yes	FWS' most recent review of the condition of the California tiger salamander Sonoma County DPS.	https://ecos.fws.gov/ecp/species/2076	6/29/2021 (latest document)
Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander	Draft	No	CDFW guidance on site assessment, survey, and reporting requirements for California tiger salamander.	https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83915&inline	10/1/2003
California Tiger Salamander Biological Opinions	Updated periodically	Yes	FWS' list of the 128 most recent biological opinions that have been issued for California tiger salamander, 26 of which were for projects in the GAI.	https://ecos.fws.gov/ecp/species/2076	8/13/2021 (latest document)
Incidental Take Permits for California Tiger Salamander	Updated periodically	No	CDFW's list of incidental take permits issued for California tiger salamander from its publicly available document search website. There are 133 documents in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	12/23/2021 (latest document)
Recovery Plan for the ESU of Central California Coast Coho Salmon	Final	Yes	<p>NMFS' recovery plan for the ESU of Central California Coast coho salmon occurring in the GAI. The recovery criteria that must be achieved before delisting can occur are:</p> <ul style="list-style-type: none"> Effective population size per generation is greater than 500 or total population size per generation is greater than 2,500 for all independent populations. No population decline apparent or probable for all independent populations. Catastrophic decline not apparent for all independent populations. Minimum spawner density achieved for all 28 populations. No evidence of adverse genetic, demographic, or ecological effects of hatchery fish on wild populations. <p>Populations selected to support connectivity within and between diversity strata (that is, supplemental populations) confirm presence of juveniles or adults for at least 1 year class over 12 years.</p>	https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/central-california-coast-coho-salmon	9/1/2012
2016 5-Year Review: Summary and Evaluation of Central California Coast Coho Salmon	Updated periodically	Yes	NMFS' most recent review of condition of this ESU population of coho salmon.	https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/central-california-coast-coho-salmon	4/1/2016

Title	Status	Spatial Data	Reference Purpose	Link	Date
Designated Critical Habitat; Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon	Final	No	<i>Federal Register</i> 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
Species in the Spotlight Priority Actions: 2016–2020 Central California Coast Coho Salmon	Final	No	NOAA document outlining priorities for improvement of the central California coast DPS of coho salmon. Includes goals and objectives for various aquatic features in the GAI.	https://repository.library.noaa.gov/view/noaa/17439/noaa_17439_DS1.pdf	1/1/2016
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 from its publicly available document search website. There are 4 documents in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	11/20/2018 (latest document)
Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (<i>Acipenser medirostris</i>)	Final	Yes	NMFS' recovery plan for the Southern DPS of green sturgeon occurring in the GAI. The recovery criteria that must be achieved before delisting can occur are: <ul style="list-style-type: none"> ▪ Census population remains at or above 3,000 for three generations (or at least 813 spawners for approximately 66 years). In addition, the effective population size must be at least 500 individuals in any given year and each annual spawning run must consist of a combined total, from all spawning locations, of at least 500 adult fish in any given year. ▪ Successful spawning in at least two rivers within their historical range, determined by the annual presence of larvae for at least 20 years. ▪ A net positive trend in juvenile and subadult abundance is observed over the course of at least 20 years. ▪ Population is characterized by a broad distribution of size classes representing multiple cohorts that are stable over the long term (20 years or more). 	https://www.fisheries.noaa.gov/species/green-sturgeon#conservation-management	8/8/2018
Southern DPS of the North American Green Sturgeon 5-Year Review	Updated periodically	Yes	NMFS' most recent review of the condition of this species population segment.	https://www.fisheries.noaa.gov/species/green-sturgeon#conservation-management	8/11/2015
Critical Habitat Designation for Southern DPS of North American Green Sturgeon	Final	Yes	NMFS' designation of critical habitat for the Southern DPS green sturgeon.	https://www.fisheries.noaa.gov/species/green-sturgeon#conservation-management	10/9/2009
Green Sturgeon Biological Opinions	Updated periodically	No	NMFS' list of the five most recent biological opinions that have been used for green sturgeon, none of which occur in the GAI.	https://repository.library.noaa.gov/	7/13/2021 (latest document)
Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes	Final	No	FWS' recovery plan for the Sacramento-San Joaquin Delta native fishes. Although not listed under ESA, and not a specific target for recovery in this plan, longfin smelt is included in this recovery plan with goals for population improvement as a requirement for delisting of other species. The goals for longfin smelt in this plan are: <ul style="list-style-type: none"> ▪ Longfin smelt must be captured in all recovery zones 5 of 10 years, in two recovery zones for an additional year, and at least one recovery zone for 3 of 4 remaining years, with no failure to meet site criteria in consecutive years. ▪ Longfin smelt abundance must be equal to or greater than predicted abundance for 5 of 10 years. 	https://ecos.fws.gov/ecp/species/321	11/26/1996

Title	Status	Spatial Data	Reference Purpose	Link	Date
Review of Domestic Species That are Candidates for Listing as Endangered or Threatened; Annual Notification of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions	Updated periodically	No	<i>Federal Register</i> listing with FWS' most recent status review of longfin smelt, which is currently a candidate for listing under the ESA.	https://www.govinfo.gov/content/pkg/FR-2020-11-16/pdf/2020-24198.pdf#page=1	11/16/2020 (most recent update)
Department of Fish and Game Report to the Fish and Game Commission: A Status Review of the Longfin Smelt (<i>Spirinchus thaleichthys</i>) in California	Final	No	CDFW's most recent formal review of the species condition.	https://wildlife.ca.gov/Conservation/Fishes/Longfin-Smelt	1/23/2009
Incidental Take Permits for Longfin Smelt	Updated periodically	No	CDFW's list of incidental take permits issued for longfin smelt from its publicly available document search website. There are 14 documents in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	6/2/2021 (latest document)
Recovery Plan for the California Freshwater Shrimp	Final	No	FWS' recovery plan for California freshwater shrimp. Watershed plans that include measures for restoration of specific creeks are required for creeks in the GAI. These are described in more detail in Table 8-3.	https://ecos.fws.gov/ecp/species/7903	7/31/1998
Final Coastal Multispecies Recovery Plan for California Coastal Chinook Salmon, Northern California Steelhead and Central California Coast Steelhead	Final	Yes	NMFS' recovery plan for the Northern and Central California Coast DPS of steelhead. Recovery criteria for this DPS of steelhead are complex and contained in Table 1 of the recovery plan. This table details populations in specific river systems with specific population sizes and densities that must be attained before delisting can occur.	https://www.fisheries.noaa.gov/resource/document/final-coastal-multispecies-recovery-plan-california-coastal-chinook-salmon	10/1/2016
2016 5-Year Review: Summary & Evaluation of California Coastal Chinook Salmon and Northern California Steelhead	Updated periodically	Yes	NMFS' most recent review of the condition of this species DPS.	https://www.fisheries.noaa.gov/resource/document/2016-5-year-review-summary-evaluation-california-coastal-chinook-salmon-and	4/1/2016
2016 5-Year Review: Summary & Evaluation of Central California Coast Steelhead	Updated periodically	Yes	NMFS' most recent review of the condition of this species DPS.	https://www.fisheries.noaa.gov/resource/document/2016-5-year-review-summary-evaluation-central-california-coast-steelhead	4/13/2016
Critical Habitat Designation for Steelhead	Final	Yes	NMFS' designation of critical habitat for the steelhead.	https://www.fisheries.noaa.gov/resource/map/steelhead-trout-critical-habitat-map	8/13/2018
Steelhead Biological Opinions	Updated periodically	No	A total of nine biological opinions have been issued for steelhead since 2019. One of these was issued for a project in the GAI.	https://repository.library.noaa.gov/	1/13/2020
Steelhead Restoration and Management Plan for California	Final	Yes	CDFW 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, of which the North Coast management area covers the GAI. This plan includes stream-specific recommendations pertaining to the Russian River and Lagunitas Creek.	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_fmAhXS_Hc0KHcG_CfY4ChAWMAB6BAgGEAE&usq=AOvVaw1GUboKPeGb7OoSOIkC7IH7	2/1/1996
California Endangered Species Act Status Review for Northern California Summer Steelhead (<i>Oncorhynchus mykiss</i>)	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

Title	Status	Spatial Data	Reference Purpose	Link	Date
Pacific Coast Salmon Fishery Management Plan	Updated periodically	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.	https://www.pcouncil.org/managed_fishery/salmon/	3/1/2016 (last amended)
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
Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California – Volume 1	Final	Yes	FWS recovery plan for tidal marsh species in northern and central California, which includes 3 plants, 1 bird, and salt marsh harvest mouse (<i>Reithrodontomys raviventris</i>), for a total of 5 species. 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. Five recovery units are identified, of which the Central Coast, San Pablo Bay, and Central/South San Francisco Bay units occur in the GAI. The Central Coast species target is California clapper rail (<i>Rallus longirostris obsoletus</i>) and the San Pablo Bay and Central/South San Francisco Bay species target is the salt marsh harvest mouse.	https://www.fws.gov/sfbaydelta/documents/tidal_marsh_recovery_plan_v1.pdf	8/27/2013
State Land Management Plans	See below	See below	See below	See below	See below
General Planning Handbook for California State Parks	Final	Yes	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. State park entities 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
Bothe-Napa Valley State Park and Bale Grist Mill State Historic Park General Development Plan	Final	No	Management plan for the Bothe-Napa Valley State Park and Bale Grist Mill State Historic Park, both of which occur in the GAI. California tiger salamanders and steelhead are known to occur in the Parks.	https://www.parks.ca.gov/?page_id=21299	9/1/1976
China Camp State Park General Plan	Final	No	Management plan for China Camp State Park. Includes goals for restoring wetland and marsh habitats in the park.	https://www.parks.ca.gov/?page_id=21299	2/1/1979
Eastshore State Park General Plan	Final	Yes	Management plan for Eastshore State Park. Includes goals to conduct habitat enhancement in the parks wetlands.	https://www.parks.ca.gov/?page_id=21299	12/6/2002
Mount Tamalpais State Park General Plan	Final	No	Management plan for the park. Steelhead are known to occur in the Redwood Creek portion of the park. Includes goals to remove nonnative plants from streams in the park and enhance habitat along Redwood Creek.	https://www.parks.ca.gov/?page_id=21299	12/1/1980
Petaluma Adobe State Historic Park General Plan	Final	No	Management plan for the park. Includes a goal to conduct restoration along Adobe Creek.	https://www.parks.ca.gov/?page_id=21299	6/14/1985
Sonoma Coast State Park Management Plan	Not publicly available	Not applicable	Management plan for Sonoma Coast State Park. The link for this document appears to be missing.	https://www.parks.ca.gov/?page_id=21299	5/1/2007
Sugarloaf Ridge State Park Final General Plan and Environmental Impact Report	Final	Yes	Management plan for Sugarloaf Ridge State Park. Steelhead and northern spotted owl are known to occur in the park. Includes a goal to restore water quality in the Sonoma, Bear, and Calabazas Creek watersheds, and to restore wetlands and riparian habitats in the park. The use of a watershed for this document is specific to those creeks and does not represent a HUC.	https://www.parks.ca.gov/?page_id=21299	5/14/2004

Title	Status	Spatial Data	Reference Purpose	Link	Date
Tomales Bay State Park General Plan	Final	Yes	Management plan for Tomales Bay State Park. California red-legged frog is known to occur in the park, and historic records of steelhead exist. The plan includes general goals for riparian corridor enhancement and restoration, removal of nonnative species of cordgrass (<i>Spartina</i> spp.), and the enhancement and re-creation of wildlife linkages.	https://www.parks.ca.gov/?page_id=21299	5/14/2004
FWS Land Management Plans	See below	See below	See below	See below	See below
Marin Islands National Wildlife Refuge Comprehensive Conservation Plan	Final	Yes	FWS' plan for the refuge. Longfin smelt are known to occur in the immediate vicinity of the islands in high numbers, and green sturgeon is known to occur as well. Includes goals to restore native coastal scrub and oak woodlands on East Marin Island.	https://www.fws.gov/refuge/Marin_Island/s/planning.html	9/26/2006
San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan	Final	Yes	FWS' plan for the refuge. Includes goals to restore tidal marsh habitat, associated uplands, sub-tidal areas, and some seasonal wetlands and to remove nonnative species from the refuge.	https://www.fws.gov/refuge/San_Pablo_Bay/Conservation/planning.html	10/5/2011
U.S. Military Land Management Plans	See below	See below	See below	See below	See below
Not applicable	Not applicable	Not applicable	The only active military facility in the GAI is the Skaggs Island Naval Security Group, which does not have a land management plan and is generally not staffed.	Not applicable	Not applicable
Native American Tribal Land Management Plans	See below	See below	See below	See below	See below
Not applicable	Not applicable	Not applicable	The Kashia Band of Pomo Indians of the Stewarts Point Rancheria and the Lytton Rancheria have lands in the GAI. Neither of these tribes appears to have a land management plan pertinent to this RAMNA, although the Kashia Band of Pomo Indians of the Stewarts Point Rancheria has a timber harvesting management plan.	Not applicable	Not applicable
NOAA Management Plans	See below	See below	See below	See below	See below
Gulf of the Farallones National Marine Sanctuary	Final	Yes	NOAA's management plan for the Greater Farallones National Marine Sanctuary; the southern half of the sanctuary occurs in the GAI.	https://farallones.noaa.gov/manage/management_plan.html	12/1/2014
Monterey Bay National Marine Sanctuary Final Management Plan	Final	Yes	NOAA's management plan for the Monterey Bay Marine Sanctuary, the northernmost part of which occurs in the GAI.	https://montereybay.noaa.gov/materials/reports.html	10/1/2008
USFS Land Management Plans	See below	See below	See below	See below	See below
USFS lands do not occur in the GAI	Not applicable	Not applicable	USFS lands do not occur in the GAI.	Not applicable	Not applicable
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
Southern Diablo Mountain Range and Central Coast of California Resource Management Plan	Final	Yes	BLM's management plan for BLM lands in Central Coast District.	https://eplanning.blm.gov/epl-front-office/eplanning/legacyProjectSite.do?methodName=renderLegacyProjectSite&projectId=68795	9/1/2007
Ukiah Resource Management Plan	Final	Yes	BLM's management plan for the Ukiah Field Office, which also includes nine specific management areas that do not occur in the GAI. Includes a general goal to restore riparian habitat in the plan area.	https://eplanning.blm.gov/eplanning-ui/project/79315/570	9/1/2006

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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. No listed national river segments are in or near the GAI.	https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm	9/10/2021
Golden Gate National Recreation Area Muir Woods National Monument Final General Management Plan	Final	Yes	NPS' management plan for Golden Gate National Recreation Area, including the Fort Point National Historic Site. Includes goal of improving habitat for California red-legged frog. Identifies presence of California red-legged frog in Redwood Creek watershed.	https://parkplanning.nps.gov/projectHome.cfm?projectId=15075	4/1/2014
Point Reyes National Seashore General Management Plan	Update in progress	Yes	NPS' management plan for Point Reyes National Seashore. California red-legged frog, Myrtle's silverspot butterfly, California freshwater shrimp, steelhead, and coho salmon are known to occur in the park. The preferred alternative for the amendment is primarily concerned with elements of park operations and zoning that are not pertinent to this RAMNA except for one goal to prioritize restoration in wetlands for habitat value and water quality in a newly established Scenic Landscape Zone. This plan is currently being amended with the amendment awaiting a final Record of Decision.	https://www.nps.gov/pore/getinvolved/planning_gmp.htm	9/1/2020 (date of last document)
Rosie the Riveter/World War II Home Front National Historical Park	Final	Yes	NPS' management plan for Rosie the Riveter/World War II Home Front National Historical Park.	https://parkplanning.nps.gov/document.cfm?parkID=338&projectId=19374&documentID=25995	8/1/2008
San Francisco Maritime National Historical Park	Final	No	NPS' management plan for San Francisco Maritime National Historical Park.	https://www.nps.gov/safr/learn/management/index.htm	10/6/1997
Local Government Land Management Plans	See below	See below	See below	See below	See below
Marin Ocean Coast Sea Level Rise Adaptation Report	Final	No	Written by the Marin County Community Development Agency, and funded in part by CCC, this document summarizes sea-level rise information and describes adaptation strategies.	https://www.marincounty.org/depts/cd/divisions/planning/csmart-sea-level-rise/marin-coast-adaptation-planning	2/1/2018
Marin Ocean Coast Sea Level Rise Vulnerability Assessment	Final	No	Written by the Marin County Community Development Agency, and funded in part by CCC, this document describes in detail sea-level rise information pertinent to the county.	https://www.marincounty.org/main/sea-level-rise/baywave/sea-level-rise-library?tabnum=3	5/1/2016
San Francisco Sea Level Rise Action Plan	Final	No	Written by the City and County of San Francisco, this document describes adaptation strategies for sea-level rise.	https://sfplanning.org/sea-level-rise-action-plan#info	3/1/2016
San Francisco Sea Level Rise Vulnerability and Consequences Assessment	Final	No	Written by the City and County of San Francisco, this document details sections of the city vulnerable to sea-level rise.	https://sfplanning.org/sea-level-rise-action-plan#info	2/1/2020
White Slough Specific Area Plan	Updated periodically	No	City of Vallejo and Solano County's plan for management of the White Slough. Included in the plan is a goal to conduct wetland enhancement.	https://cityofvallejo.net/common/pages/DisplayFile.aspx?itemId=30920	12/14/2010 (last amended)
Water Resources Plans and Documents	See below	See below	See below	See below	See below
North Coast – Total Maximum Daily Load Action Plans	Periodically updated	No	RWQCBs' list of projects on impaired water systems designed to improve water quality. In the GAI, a total maximum daily load action plan exists for the Russian River.	https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/	4/4/2018 (most recent approval date)
San Francisco Bay – Total Maximum Daily Load Action Plans	Periodically updated	No	RWQCBs' list of projects on impaired water systems designed to improve water quality. No action plans appear to exist for this region.	https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/	6/3/2021 (last updated)

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Lower Sonoma Creek Flood Management and Ecosystem Enhancement	Final	No	Document written for the California Coastal Conservancy and Sonoma County Water Agency, in part, by the Sonoma Resource Conservation District. Includes a set of restoration opportunities and recommendations for the Lower Sonoma Creek, which is conceptually the southern one-third of the stream system.	https://sonomarc.org/resources/	10/22/2012
Northern Napa River Watershed Plan	Final	No	Napa County Resource Conservation Districts' management plan for the northern Napa River watershed area, which corresponds to the Upper Napa River HUC-12 (180500020201). Identifies Ritchey Creek, Mill Creek, and Dutch Henry Creek as having significant populations of steelhead. Recommends a complex series of restoration priorities for streams in the plan area.	https://naparc.org/resources-documents/watershed-assessments/	4/1/2002
North Coast Integrated Water Management Plan	Draft	No	Water management plan from the North Coast Regional Partnership of seven counties, including Mendocino and Sonoma Counties. The plan includes a goal to convert 70 acres of Santa Rosa Plain lands from irrigated fields to California tiger salamander habitat.	https://www.waterbucket.ca/okw/sites/wbcokw/documents/media/170.pdf	7/1/2007
Draft Petaluma River Watershed Enhancement Plan	Draft	No	Sonoma Resource Conservation District's plan for management of the Petaluma River watershed. Includes goals to conduct habitat restoration of tidal marsh.	https://sonomarc.org/district-watersheds/petaluma-river/	2015
San Antonio Creek Watershed Plan	Final	No	Sonoma Resource Conservation District's management plan for San Antonio Creek HUC-12 (180500020602). Includes goals involving water quality improvement, flood reduction, and habitat enhancement.	https://sonomarc.org/resources/	3/1/2008
San Francisco Bay Area Integrated Water Management Plan	In progress	Not available	This document is pending approval from the State and does not seem to be publicly accessible.	https://ceganet.opr.ca.gov/2020060163/2	6/9/2020
Tomales Bay Integrated Coastal Watershed Management Plan	Final	Not available	Watershed management plan by the Tomales Bay Watershed Council. Links to chapters of the plan appear to be broken and the document is not accessible.	https://tomalesbaywatershed.org/icwmp/	9/1/2007
County General Plans	See below	See below	See below	See below	See below
Alameda County General Plan	Updated periodically	No	General plan for Alameda County. Includes a goal to enhance the water quality and fisheries condition of the San Francisco Bay-Delta estuary system. Requires a buffer between 50 and 100 feet from any wetland area. The County may also require compensatory mitigation of significant wetlands at a ratio of 3:1. Contains land use designations for open space, agricultural open space, and preservation open spaces.	https://www.acgov.org/cda/planning/generalplans/index.htm	5/5/1994 (last amended)
Contra Costa County General Plan 2005–2020	Final	Yes	General plan for Contra Costa County. Green sturgeon and longfin smelt are reported to occur in the Delta riverine and tidal areas in the County. Contains land use designations for open space, water, and watershed.	https://www.contracosta.ca.gov/4732/General-Plan	1/18/2005
Marin Countywide Plan	Final	Yes	General plan for Marin County. Steelhead and coho salmon are known to occur in the County. In the coastal, inland rural, and bayland corridors, a 100-foot buffer is required from wetlands. Elsewhere, a buffer of 100 feet from wetlands is required for impacts greater than 2 acres, 50 feet for impacts between 2 and 0.5 acres, and 20 feet for impacts less than 0.5 acres. Where avoidance of wetlands is not possible, replacement mitigation would be required at a 2:1 ratio on-site and 3:1 ratio off-site. A 2:1 mitigation ratio of replacement or enhancement is required where removal of native riparian vegetation in a Stream Conservation Area is unavoidable. The plan also includes policies to restore and enhance the wildlife and aquatic habitat value of diked bay marshlands.	https://www.marincounty.org/depts/cd/divisions/planning/plans-policies-and-regulations	11/6/2007
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 Corps' jurisdictional aquatic features. 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
Napa County General Plan	Updated periodically	No	General plan for Napa County. Contains land use designations for open space areas, including agriculture and watershed areas.	https://www.countyofnapa.org/1760/General-Plan	6/4/2013 (last amended)

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San Francisco General Plan	Final	Yes	General plan for the City and County of San Francisco. Identifies existing and proposed open spaces.	http://generalplan.sfplanning.org/	4/27/2015
Solano County General Plan	Final	Yes	General plan for Solano County. The California red-legged frog and Swainson's hawk are known to occur in the County. Contains land use designations for natural resources, including water bodies and courses, park and recreation, marsh, watershed, and agriculture areas.	https://www.solanocounty.com/depts/rm/planning/general_plan.asp	11/4/2008
Sonoma County General Plan 2020	Updated periodically	Yes	General plan for Sonoma County. Identifies policies for the restoration of various aquatic habitats. Requires a 100-foot buffer from the edge of wetlands in designated marshes and wetlands. Establishes impact buffers from the Russian River riparian corridor (200 feet), flatland riparian corridor (100 feet), and other riparian corridors (50 feet).	https://sonomacounty.ca.gov/PRMD/Long-Range-Plans/General-Plan/	9/2/2016 (last amended)
City General Plans	See below	See below	See below	See below	See below
Albany General Plan 2035	Final	Yes	General plan for Albany. Steelhead trout is known to occur in Codornices Creek in the city. Requires development to have a 100-foot buffer from Codornices, Cerrito, and Village Creeks. Contains land use designations for parks and open spaces and creek conservation areas.	https://www.albanyca.org/departments/planning-zoning/albany-2035-general-plan	4/18/2016
The City of American Canyon General Plan	Update in progress	No	General plan for American Canyon. Requires a 100-foot buffer between development and riparian corridors. Contains a land use designation for open space.	https://lf.cityofamericancanyon.org/WebLink/Browse.aspx?id=46453&dbid=1&repo=AmericanCanyon	1/1/1992
City of Belvedere General Plan 2030	Final	No	General plan for Belvedere. Steelhead trout is known to occur in the city's surrounding waters. Contains a land use designation for open space.	https://www.cityofbelvedere.org/213/General-Plan-Housing	6/9/2010
City of Berkeley General Plan: A Guide for Public Decision-Making	Final	No	General plan for Berkeley. Requires a 30-foot buffer between development and streambeds/creeks. Identifies policies for the restoration of natural habitats in the Aquatic Park lagoon and the enhancement of coastal and riparian areas in the city. Contains land use designations for open space and waterfront/marina areas.	https://www.cityofberkeley.info/Planning_and_Development/Home/General_Plan_A_Guide_for_Public_Decision-Making.aspx	4/23/2001
City of Calistoga General Plan	Updated periodically	No	General plan for Calistoga. Identifies policies for the enhancement of wetlands and freshwater marsh areas. Requires a 30-foot buffer for undeveloped waterway areas. Contains no land use designation for conservation.	https://www.ci.calistoga.ca.us/city-hall/departments-services/planning-building-department/plans-programs-and-land-use-regulations/calistoga-general-plan/calistoga-general-plan	1/1/2020 (last updated)
Town of Corte Madera General Plan	Final	Yes	General plan for Corte Madera. Identifies policies for the restoration and enhancement of riparian corridors and hillside/ridgeline habitats. Requires that impacts on Corps' jurisdictional features are mitigated at a minimum 2:1 ratio. In addition, 100-foot buffers from wetlands are required for impacts greater than 2 acres, 50 feet for impacts between 2 and 0.5 acres, and 20 feet for impacts less than 0.5 acre in size. Contains land use designations for open land, including parks, hillside open space, and wetlands and marshlands.	https://www.townofcortemadera.org/182/General-Plan	4/1/2009
Cotati General Plan	Final	Yes	General plan for Cotati. Identifies policies for the enhancement or replacement of affected special-status habitat and wetland/vernal pool habitat. Contains a land use designation for open space/parks.	http://cotati.generalplan.org/content/general-plan/index.html	3/24/2015
City of El Cerrito 1999 General Plan	Final	No	General Plan for El Cerrito. Requires development to have buffers of an indeterminate distance from creeks and major drainages. Contains a land use designation for parks and open areas.	https://el-cerrito.org/718/General-Plan	9/30/1999
Emeryville General Plan	Updated periodically	No	General plan for Emeryville. Contains land use designations for park/open space and the marina.	https://www.ci.emeryville.ca.us/385/General-Plan-and-Supporting-Documents	9/3/2019 (last amended)

Title	Status	Spatial Data	Reference Purpose	Link	Date
Town of Fairfax 2010–2030 General Plan	Final	Yes	General plan for Fairfax. Promotes the restoration of riparian habitat in the San Anselmo Creek and Fairfax Creek watersheds. Identifies objectives for the restoration of critical habitats for anadromous fish such as steelhead and coho salmon. Contains a land use designation for public/private open space.	https://www.townoffairfax.org/general-plan/	4/4/2012
Hercules General Plan	Updated periodically	No	General plan for Hercules. Contains land use designations for open space.	https://www.ci.hercules.ca.us/government/planning/general-plan	4/14/2015 (last amended)
City of Lafayette General Plan	Update in progress	No	General plan for Lafayette. Requires a development buffer of indeterminate distance from the centerline of major ridgelines and the city's watercourses. Contains a land use designation for open space and parkland.	https://www.lovelafayette.org/city-hall/city-departments/planning-building/general-master-specific-plans/general-plan	10/28/2002
City of Larkspur, California General Plan	Update in progress	No	General plan for Larkspur. Identifies goals to enhance a variety of open space features, including ridgelines, the wetlands along the Bay and the creeks, and wildlife habitats. Contains a land use designation for open space areas, including shoreline/marsh conservation, educational/ environmental resources, and water areas.	https://www.ci.larkspur.ca.us/152/General-Plan	1/1/1990
Mill Valley General Plan	Final	Yes	General plan for Mill Valley. Historically, coho salmon was known to occur in Arroyo Corte Madera del Presidio. Currently, steelhead and green sturgeon are known to occur in the city's area. Contains land use designations for open space areas.	https://www.cityofmillvalley.org/gov/generalcode/generalplan/default.htm	10/7/2013
City of Napa General Plan	Updated periodically	No	General plan for Napa. Contains land use designations for resource areas and greenbelt areas.	https://www.cityofnapa.org/259/General-Plan	9/3/2015 (last amended)
City of Novato General Plan 2035	Final	Yes	General plan for Novato. Steelhead, coho salmon, California freshwater shrimp, California red-legged frog, and longfin smelt are known to occur in the city. Identifies goals for the enhancement of wetlands, creeks, and streams. Contains land use designation for open space and conservation.	https://www.novato.org/government/community-development/general-plan-update	10/27/2020
City of Oakland General Plan	Update in progress	No	General plan for Oakland. Requires a 150-foot development buffer from riparian corridors. Contains land use designations for resource conservation and urban park and open space.	https://www.oaklandca.gov/topics/city-of-oakland-general-plan	3/1/1998
City of Orinda General Plan 1987–2007	Final	No	General plan for Orinda. Contains a land use designation for open space.	https://www.cityoforinda.org/269/General-Plan-Housing-Element	5/20/1987
City of Petaluma: General Plan 2025	Updated periodically	Yes	General plan for Petaluma. Identifies policies for the enhancement of the Petaluma River and its tributaries. Requires a minimum 50-foot buffer from the top of each bank of the Petaluma River. Steelhead is known to occur in the city. Contains land use designations for open space, regional park, and floodway areas.	https://cityofpetaluma.org/general-plan/	5/12/2021 (last revised)
Pinole, California General Plan Update	Final	No	General plan for Pinole. Includes policies for the support of riparian and stream restoration programs, especially for those regarding Pinole Creek. Requires a minimum 100-foot buffer from the top of creek banks. In addition, promotes habitat restoration through revegetation plans for areas that may provide special-status species habitat, connectivity of wildlife corridors, transitional zones in between natural areas and incompatible land uses, or expansion of ecological functions. Contains land use designations for open space and parks and recreation areas.	https://www.ci.pinole.ca.us/city_government/planning/general_plan	10/20/2010
Richmond General Plan 2030	Final	Yes	General plan for Richmond. Includes goals for the restoration of natural habitat and urban creeks. Contains land use designations for open space and shoreline conservation.	https://www.ci.richmond.ca.us/2608/General-Plan-2030	4/25/2012

Title	Status	Spatial Data	Reference Purpose	Link	Date
City of Rohnert Park General Plan	Updated periodically	No	General plan for Rohnert Park. Requires a minimum 50-foot buffer from creek banks. Contains land use designations for open space, including environmental conservation areas.	http://ci.rohnert-park.ca.us/city_hall/departments/development_services/business_development_resources/a_d_u_municipal_code_amendments/general_plan_special_area_plans/general_plan_2020	2/1/2017 (last amended)
Town of Ross General Plan 2007–2025	Final	No	General plan for Ross. Contains a land use designation for public park and open space.	https://www.townofross.org/planning/page/general-plan	6/1/2007
Town of San Anselmo General Plan	Updated periodically	No	General plan for San Anselmo. Contains a land use designation for parks/open space.	https://www.townofsananselmo.org/216/Plans-Policies-and-Regulations	2/12/2019 (last amended)
San Pablo General Plan 2030	Final	Yes	General plan for San Pablo. Steelhead is known to occur in San Pablo Bay. Includes policies for the enhancement of wetlands, creek systems, and rare and endangered species and their habitats. Requires development buffers of an indeterminate distance from the top of creek banks. Contains a land use designation for parks/recreation.	https://www.sanpabloca.gov/867/General-Plan-2030	4/18/2011
The City of San Rafael General Plan 2020	Updated periodically	Yes	General plan for San Rafael. Steelhead is known to occur in the city. Requires a mitigation ratio of 2:1 for impacts on wetlands. Requires a minimum 50-foot impact buffer from wetlands. Requires a minimum 25-foot impact buffer from the top of creek banks and a minimum 50-foot impact buffer for Miller Creek and its tributaries. Includes policies for the restoration and/or enhancement of steelhead habitat in Miller Creek and other creeks. Contains a land use designation for open space and conservation.	https://www.cityofsanrafael.org/generalplan-2020/	11/16/2016
Santa Rosa General Plan 2035	Final	Yes	General plan for Santa Rosa. Steelhead are known to occur in Santa Rosa Creek and several of its tributaries. Includes policies for the restoration of channelized waterways to a more natural condition. Requires that new development allow for ecological buffer zones of indeterminate distance between waterways and development. Contains a land use designation for open space.	https://srcity.org/392/General-Plan	11/3/2009
City of Sausalito General Plan	Final	Yes	General plan for Sausalito. Longfin smelt is known to occur in the city. Includes policies for the restoration of wetlands in the city. Contains a land use designation for open space, open area, and conservation areas.	https://www.sausalitogeneralplan.org/	2/9/2021
City of Sonoma 2020 General Plan	Final	Yes	General plan for Sonoma. Contains a land use designation for open space and hillside.	https://www.sonomacity.org/general-plan/	10/1/2006
St. Helena General Plan Update 2040	Final	Yes	General plan for St. Helena. Steelhead is known to occur in the city area or immediate vicinity. Includes policies for the enhancement of St. Helena's riparian corridors, especially those along the Napa River. Contains land use designations for woodlands and watershed and open space.	https://www.cityofstheleena.org/planning/page/general-plan	6/1/2019
Town of Tiburon General Plan	Updated periodically	No	General plan for Tiburon. The California red-legged frog is known to occur in the city area. Includes policies for the enhancement of wildlife and aquatic habitats in the city area. Requires buffer zones of at least 100 feet between development and wetland areas. Additionally, 50-foot buffers are required from the top of creek banks for development less than 5 acres and 100-foot buffers for development greater than 5 acres. Contains a land use designation for parks and open space.	http://www.townoftiburon.org/206/General-Plan	2/3/2016 (last amended)
Propel Vallejo General Plan 2040	Updated periodically	Yes	General plan for Vallejo. Promotes habitat enhancement at South White Slough and River Park. Includes policies for the restoration of riparian corridors and waterways, including Lake Chabot, Lake Dalwigk, and other detention basins. Contains a land use designation for parks, recreation, and open space.	https://www.cityofvallejo.net/city_hall/departments_divisions/planning_and_development_services/planning_division/general_plan_2040	7/24/2018 (last amended)
Yountville General Plan	Final	Yes	General plan for Yountville. California red-legged frog, California freshwater shrimp, longfin smelt, and steelhead are known to occur in the city area. Contains land use designations for community and natural resource areas.	https://www.townofyountville.com/departments-services/planning-building/general-plan	5/8/2019

Title	Status	Spatial Data	Reference Purpose	Link	Date
Other Conservation and Management Documents	See below	See below	See below	See below	See below
Bay Area Greenprint and Mitigation Wizard	Updated periodically	Yes	The Bay Area Greenprint is a tool that reveals the multiple benefits of natural and agricultural lands, empowering users to inform land use decisions with better data. The Bay Area Greenprint identifies, maps, and measures the values that natural resources contribute to the ecosystem, the economy, and the local and regional community. Included in the Bay Area Greenprint is a mitigation wizard, which is a tool to find the predicted impacts on species that might require mitigation, and then suggests where protection or restoration projects should be located.	https://www.bayareagreenprint.org/	9/8/2020 (date of latest document inclusion)
The Baylands and Climate Change	Final	No	California Coastal Conservancy document describing habitat restoration goals for the Bay area in response to climate change and sea-level rise.	https://scc.ca.gov/climate-change/climate-ready-program/natural-infrastructure/	10/1/2015
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.	https://www.ecoatlas.org/	Updated nearly daily
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
The Conservation Lands Network 2.0 A Regional Conservation Strategy for the San Francisco Bay Area	Final	Yes	Conservation plan by the Bay Area Open Space Council. Catalogues all streams in the plan area, which includes all but the northernmost portion of the GAI, into three categories and assigns goals to each. Steelhead, green sturgeon, coho salmon, longfin smelt, Myrtle's silverspot butterfly, California red-legged frog, California tiger salamander, and Swainson's hawk are specific conservation targets.	https://www.bayarealands.org/maps-data/	11/1/2019
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. Identifies observations of California red-legged frog in the study area.	https://www.conservationgateway.org/ConservationPractices/Marine/crr/library/Documents/TNC_SCC_CoastalAssessment_lo%20sngl.pdf	2018
Critical Linkages: Bay Area & Beyond	Updated periodically	Yes	Regional effort by Science & Collaboration for Connected Wildlands to identify 14 landscape connections for wildlife migration in the San Francisco Bay and Central Coast regions.	http://www.scwildlands.org/	2013
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
Restoring the Estuary: An Implementation Strategy for the San Francisco Bay Joint Venture	Updated periodically	No	An implementation strategy for conducting volunteer-based restoration of estuaries along San Francisco Bay.	https://sfbayjv.org/about-strategy.php#sfbjvimplementationplan	2003

Title	Status	Spatial Data	Reference Purpose	Link	Date
Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change	Updated periodically	No	Addresses adaptation, mitigation, and engagement strategies to achieve goals and objectives of minimizing the impact of climate change on fish and wildlife by applying science in managing species and habitats; reducing levels of greenhouse gases; and collaborating with other organizations to determine solutions to challenges and threats to fish and wildlife conservation posed by climate change.	https://climatechange.lta.org/usfws-strategic-plan/#:~:text=The%20primary%20purposes%20of%20Rising,the%20continuing%20benefit%20of%20the	2010
Russian River Estuary Adaptive Beach Management Plan	Updated periodically	Yes	A management plan for artificial breaching of the Russian River Estuary sand bar, updated annually, for the purpose of improving habitat for salmonid species.	https://www.sonomawater.org/russian-river-estuary/	5/23/2022
San Francisco Bay Subtidal Habitat Goals Report	Final	No	A report on goals centered on restoration of subtidal habitat in San Francisco Bay. This project was led by the California Coastal Conservancy and OPC, with contributions from San Francisco BCDC, NOAA, and the San Francisco Estuary Partnership.	http://www.sfbaysubtidal.org/report.html	2010
Sonoma Water Climate Adaptation Plan	Final	No	Sonoma Water's climate change adaptation plan for managing risks to their infrastructure. Appendix B includes a vulnerabilities assessment.	https://www.sonomawater.org/climate	10/1/2021
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.

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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.

4.1 SHOPP Advance Mitigation Credits

The 2016 SHOPP, with California Transportation Commission approval, released the first funds used to program Caltrans advance mitigation projects in several Caltrans Districts. The projects were programmed against the \$40 million reserve created in the 2016 SHOPP for advance mitigation project delivery. Thirteen pilot advance mitigation projects were programmed in the SHOPP and their delivery is underway. Two such projects are within Caltrans District 4 and may inform advance mitigation planning:

- 04-4J120: Bulk Credit Purchases
- 04-0P730: Financial Contribution to Restoration Project

The 04-4J120 advance mitigation project consisted of purchasing bulk credits from six existing conservation banks and mitigation banks with service areas within Caltrans District 4 (Table 4-1). SHOPP transportation projects have begun to seek natural resource regulatory agency approval to use these bulk credits to satisfy specific transportation project permit conditions; however, few have been applied to a transportation project yet, and many are still available.

The 04-0P730 SHOPP-funded advance mitigation project proposes to create advance mitigation credits through a financial contribution to the Napa Flood Control District to implement the Oakville to Oak Knoll Restoration Project restoration plan. Based on lessons learned from advance mitigation projects in Caltrans District 3, and discussions with natural resource regulatory agencies, it has been determined that, at this time, there may not be a viable path forward and the outcome of this effort remains to be determined.

Table 4-1. SHOPP Advance Mitigation Credits

Bank Where Mitigation Was Purchased	Credit Purchase Year	Signatories^a	Service Area	Credit Type and Quantity
East Austin Creek Conservation Bank	2017	NMFS	Marin County and portions of Sonoma and Mendocino Counties	10.9 steelhead/coho credits
Liberty Island Mitigation Bank	2018	NMFS, FWS, CDFW	San Francisco Bay-Delta portions of Yolo, Sacramento, Solano, Alameda, Contra Costa, and San Joaquin Counties	1 Delta smelt/longfin smelt credit
North Bay Highlands Mitigation Bank	2017	FWS	North Coast Range Foothills and Western Sacramento Valley, North Coast and North San Francisco Bay, and South and East San Francisco Bay	48.699 California red-legged frog credits
Ohlone West Conservation Bank	2018	CDFW, FWS	Central Alameda County	4.48 California tiger salamander (federal)/California red-legged frog/Alameda whipsnake (federal)/Callippe silverspot butterfly
Ohlone West Conservation Bank	2020	CDFW, FWS	Diablo Range from Alameda and San Mateo County south through San Benito County	5 California tiger salamander upland (state)/California tiger salamander (federal) credits
Ohlone West Conservation Bank	2018	CDFW, FWS	East and South San Francisco Bay Area	7.52 California tiger salamander (federal)/California red-legged frog/Alameda whipsnake (federal/state)
Oursan Ridge Conservation Bank	2018	CDFW, FWS	East San Francisco Bay Area	12 Alameda whipsnake/Calfornia red-legged frog credits
San Francisco Bay Wetland Mitigation Bank	2018	Corps, EPA	San Francisco Bay-adjacent portions of San Francisco, San Mateo, Santa Clara, and Alameda Counties, south of the Bay Bridge	0.6 tidal other WOTUS credits

^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).

4.2 HCPs and NCCPs

HCPs¹ and NCCPs² define covered activities that consist of specific projects and actions that may have adverse effects on covered species and natural communities. FWS and/or CDFW estimate adverse effects associated with the covered activities and issue incidental take permits. Once the HCP, NCCP, or 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, or HCP/NCCP streamlines permit processes by eliminating the need to obtain project-specific incidental take permits from FWS and/or CDFW and by providing early documentation of compliance with CESA and ESA.

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 other 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 and can be for profit or nonprofit. 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 its 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").

Caltrans identified 16 active or pending conservation and/or mitigation banks with service areas that overlap all or part of the GAI. Information on the agency approvals and the types of credits available—and brief descriptions of each bank with species of mitigation need, water, and non-wetland water credits—are provided in Table 4-2, and the location and extent of their service areas are depicted on Figures 4-1 through 4-4.

¹ Pursuant to Section 10 of the federal ESA or consultations under Section 7 of the federal ESA

² Pursuant to Section 2835 of the California Fish and Game Code

Table 4-2. Overview of Conservation and Mitigation Banks in the GAI^a

Name	Year Approved	Current Status	Signatories ^b	Area (acres)	Credit Types
Alton North Conservation Bank	2007	Active – credits available	FWS, CDFW	22.67	California tiger salamander (Sonoma DPS), Burke's goldfields, Sonoma sunshine
Alton South Conservation Bank	Pending	Pending	FWS	8.11	California tiger salamander (Sonoma DPS)
Burdell Ranch Mitigation Bank	2001	Active – credits available	FWS, CDFW, Corps, EPA	82.7	Wetlands
East Austin Creek Conservation Bank	2010	Active – credits available	NMFS	144	Steelhead, coho salmon
Mallard Farms Conservation Bank	Pending (anticipated 2022)	Pending	FWS, CDFW, NMFS are anticipated	700	Delta smelt, longfin smelt, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, Central California Coast steelhead, Southern DPS green sturgeon
Muzzy Ranch Conservation Bank	2008	Active – credits available	FWS, CDFW	1,209	Swainson's hawk, burrowing owl, and other raptor foraging habitat, California tiger salamander, vernal pool branchiopods, preserved stream channel, Delta green ground beetle, San Joaquin Valley Orcutt grass
Noonan Ranch Conservation Bank	2009	Active – credits available	FWS	189	Contra Costa goldfields, California tiger salamander
North Bay Highlands Conservation Bank	2014	Active – credits available	FWS	449.8	California red-legged frog
North Delta Fish Conservation Bank	Pending	Pending	FWS, CDFW, NMFS	190	Longfin smelt
North Suisun Mitigation Bank	2008	Active – credits available	FWS, CDFW, Corps, EPA	627	California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, San Joaquin Valley Orcutt grass, Contra Costa goldfields, vernal pool creation (sold out)

Name	Year Approved	Current Status	Signatories ^b	Area (acres)	Credit Types
Ohlone West Conservation Bank	2016	Active – credits available	FWS, CDFW	640	California red-legged frog, Alameda whipsnake, California tiger salamander, Callippe silverspot butterfly
Oursan Ridge Conservation Bank	2017	Active – credits available	FWS, CDFW	430	California red-legged frog, Alameda whipsnake
Ridge Top Ranch Wildlife Conservation Bank	2014	Active – credits available	FWS	745	California red-legged frog, Callippe silverspot butterfly
River Ranch VELB Conservation Bank	2005	Active – credits available	FWS	187	Valley elderberry longhorn beetle
Sparling Ranch Conservation Bank	2017	Active – credits available	FWS, CDFW	2002	California red-legged frog, California tiger salamander
Swift/Turner Conservation Bank	2006	Active – credits available	FWS	34.18	California tiger salamander, Burke's goldfields, Sebastopol meadowfoam, Sonoma sunshine

^a Up-to-date information on approved conservation and mitigation banks, including available credits, can be found at the following websites:

<https://www.wildlife.ca.gov/Conservation/Planning/Banking/Approved-Banks>

<https://ribits.ops.usace.army.mil/ords/f?p=107:2:.....>

<https://www.fws.gov/sacramento/es/Conservation-Banking/Banks/In-Area/>

<https://www.fws.gov/sacramento/es/Conservation-Banking/Banks/Sonoma/>

^b 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).

Figure 4-1. Conservation and Mitigation Bank Service Areas – Part 1

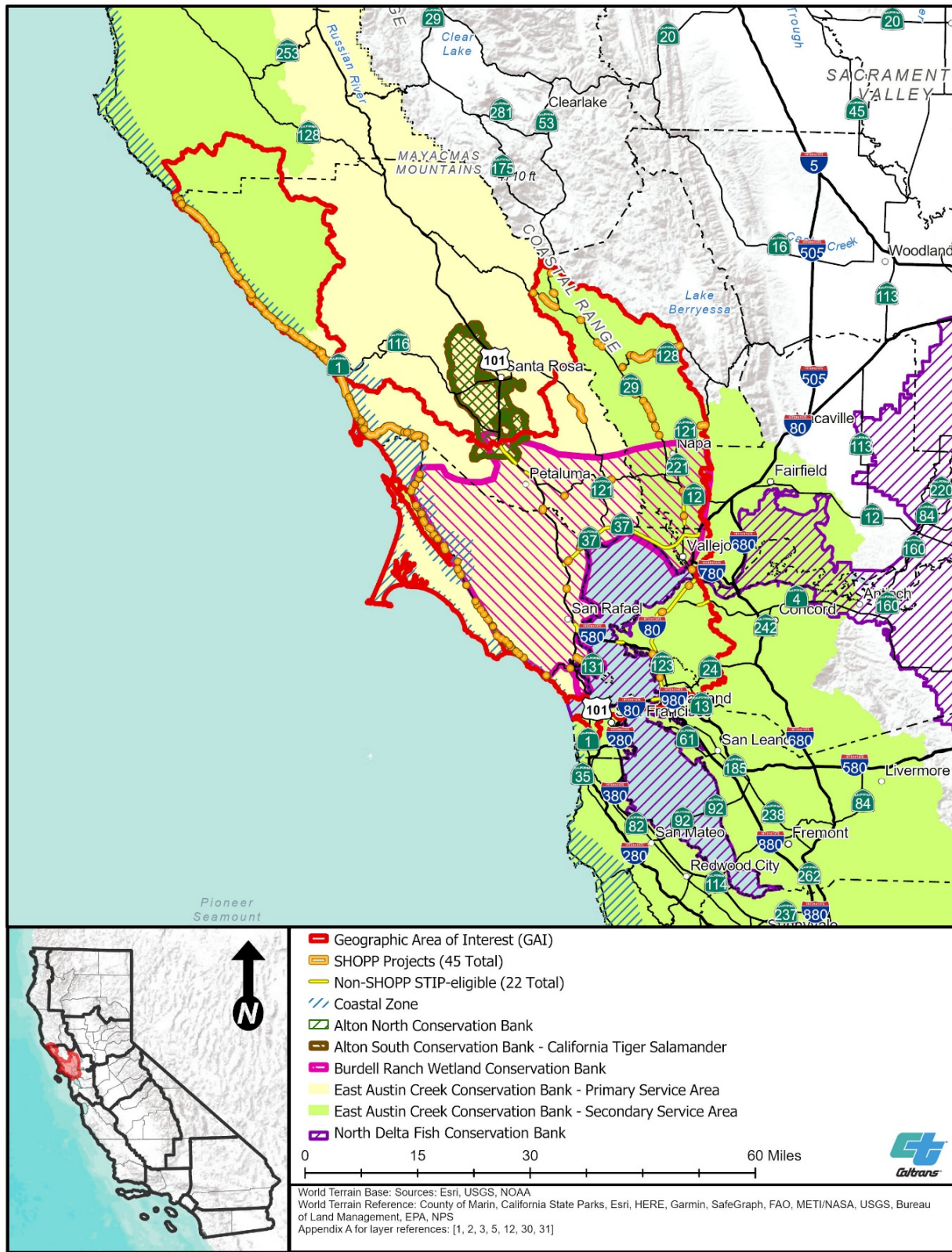


Figure 4-2. Conservation and Mitigation Bank Service Areas – Part 2

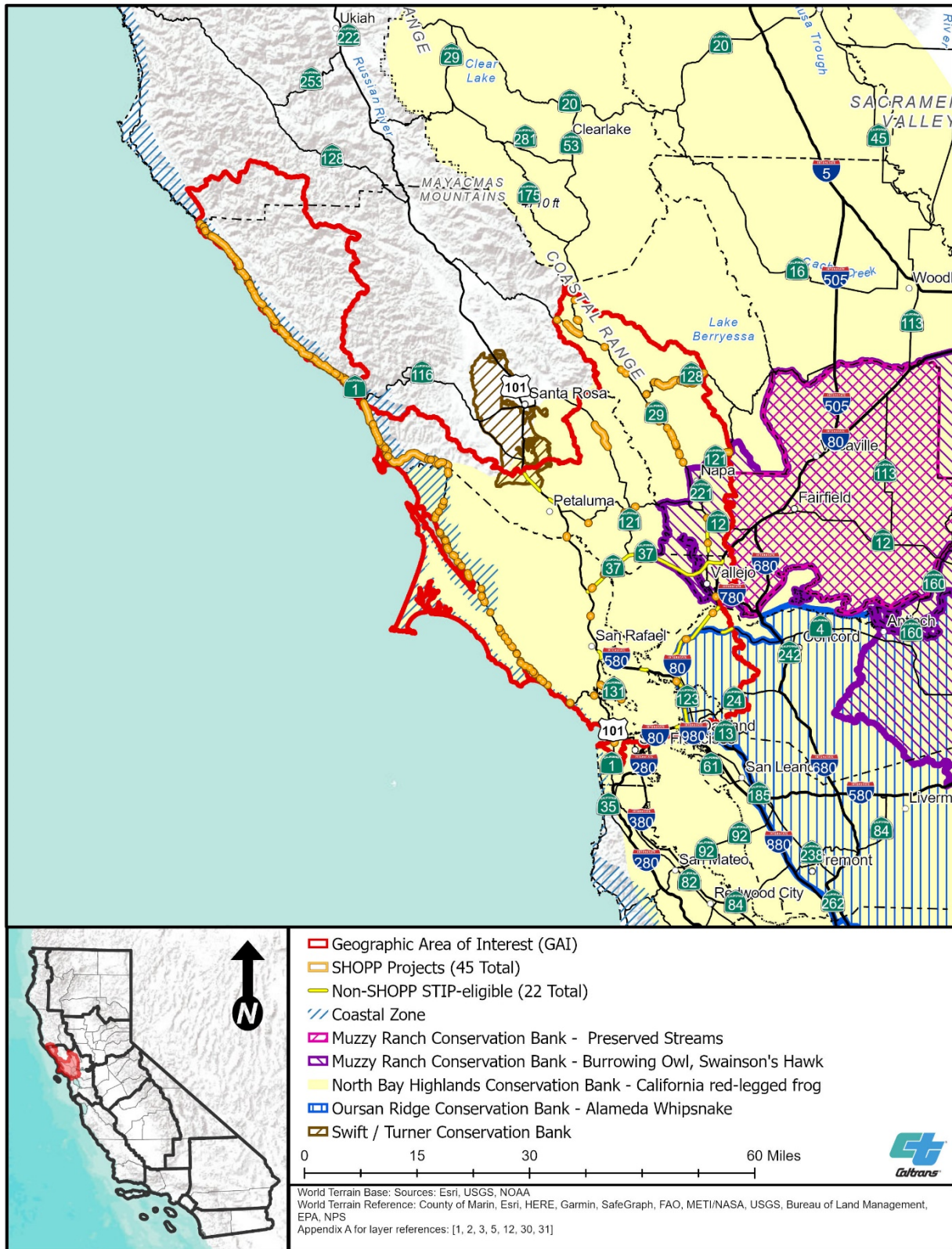


Figure 4-3. Conservation and Mitigation Bank Service Areas – Part 3

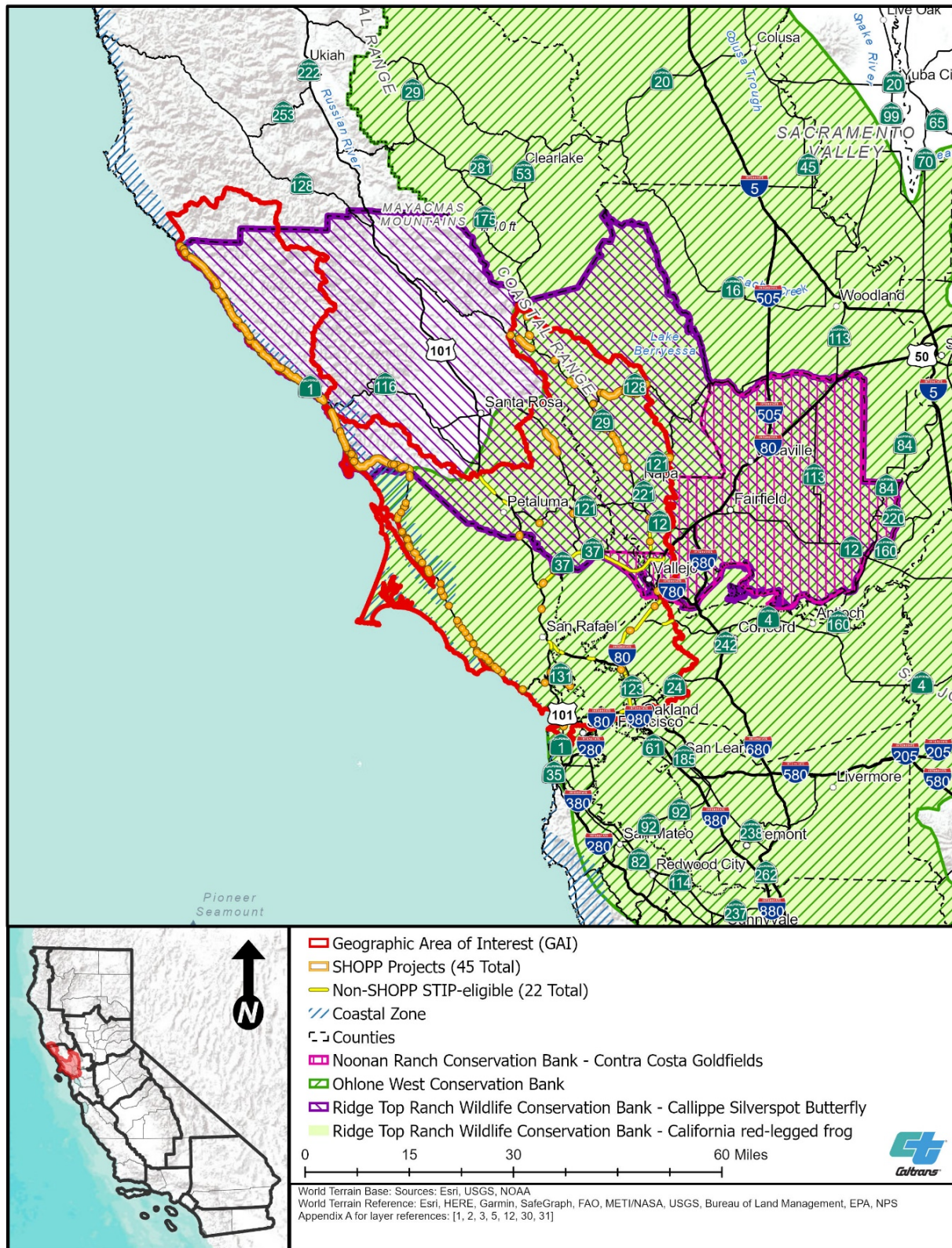
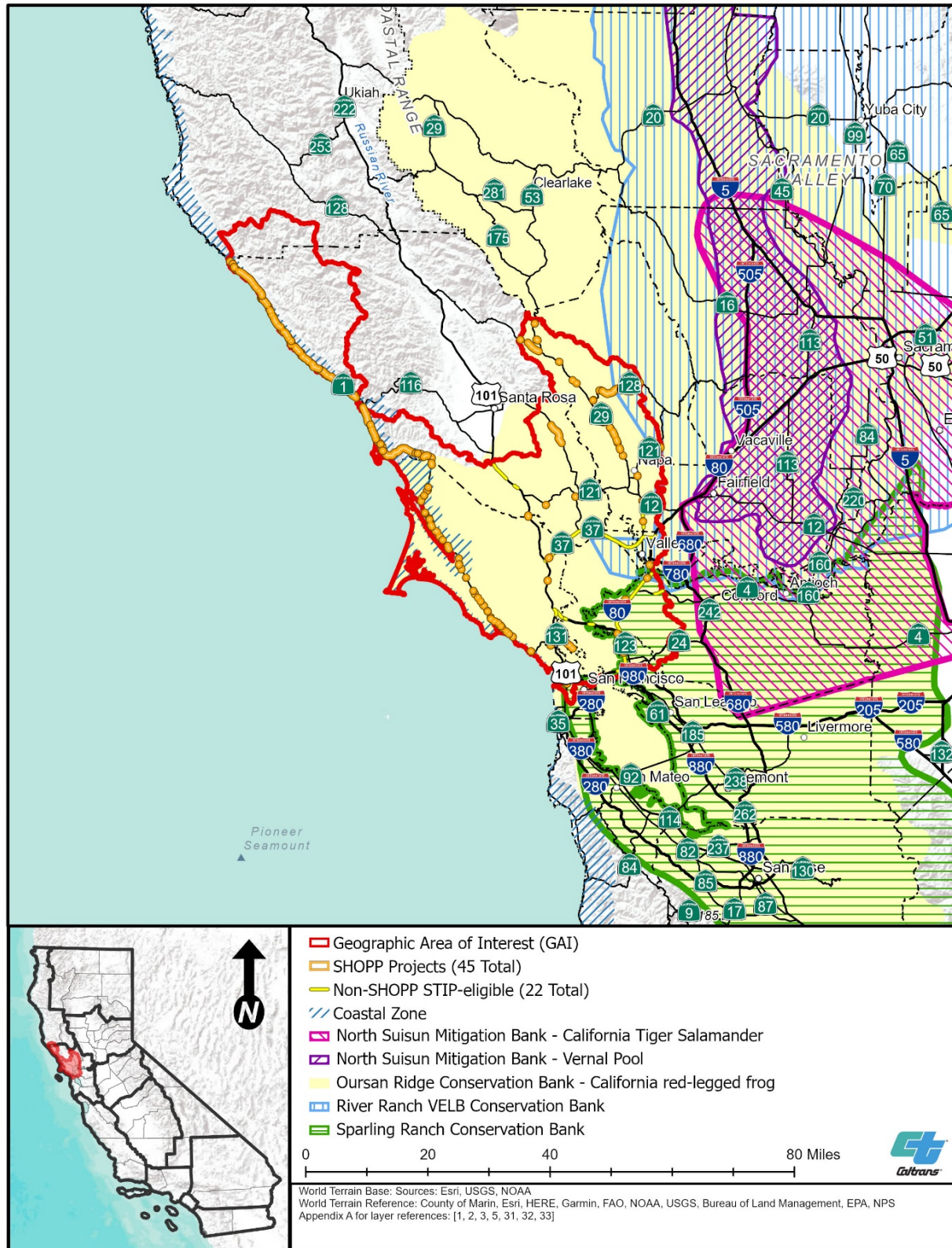


Figure 4-4. Conservation and Mitigation Bank Service Areas – Part 4



Several of these conservation and mitigation banks do not provide credits for the species of mitigation need identified in this RAMNA; however, credits for other listed species or habitats are available, as listed in Table 4-2. Table 4-2 is a summary of the conservation and mitigation banks available at the time of the writing of this RAMNA. Additional banks may become available in the future.

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 permittee-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 within the GAI. However, one is under development (Table 4-3).

Table 4-3. Overview of In-lieu Fee Programs in the GAI^a

Name	Year Approved	Signatories ^b	Location	Credit Types
Ducks Unlimited San Francisco Bay In-Lieu Fee Program	In progress	Corps , San Francisco RWQCB	San Francisco Bay (18050004), San Pablo Bay (18050002), Suisun Bay (18050001), and Coyote Creek (18050003)	<ul style="list-style-type: none"> ▪ Estuarine wetland credit ▪ Freshwater wetland credit

^a Up-to-date information on approved in lieu fee programs, including available credits, can be found at the following website:

<https://ribits.ops.usace.army.mil/ords/f?p=107:2:.....>

^b 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).

4.5 RCISs and MCAs

Assembly Bill 2087 established CDFW’s RCIS Program in 2016 (Fish and Game Code 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 2021c).

4.5.1. RCISs

Caltrans identified one approved RCIS that overlaps the GAI and one RCIS under development (Figure 4-1):

- East Bay RCIS
- Resilient Baylands North Bay RCIS (in process)

Because the Resilient Baylands North Bay RCIS is still in process, the area that it covers has not been finalized and is, therefore, not shown on Figure 4-5.

East Bay RCIS

The East Bay RCIS was finalized in January 2021 (ICF 2021). The California State Coastal Conservancy is the proponent. It covers both Contra Costa and Alameda Counties in their entirety, totaling a combined 1,040,000 acres. The East Bay RCIS analyzes 39 focal species, including 19 plant species and 20 wildlife species. The following RCIS focal species are also species of mitigation need in this RAMNA: Swainson's hawk, California red-legged frog, and Central California Coast DPS steelhead. The RCIS includes several goals and objectives related to acquiring, preserving, and maintaining natural habitats; enhancing and maintaining wildlife movement corridors, including fish passage improvements; enhancing tidal and estuarine areas to improve fish-rearing habitat; and incentivizing agricultural practices that benefit wildlife, such as low-growing crops suitable as Swainson's hawk foraging habitat. Climate change is addressed for each of the species of mitigation need, along with several other resources identified in the RCIS. Roadway infrastructure in the RCIS area is owned and operated by Caltrans District 4, the Contra Costa Transportation Authority, the Alameda County Transportation Commission, and several individual cities. Caltrans District 4 was a member of the East Bay RCIS Regional Advance Mitigation Planning Technical Advisory Committee (ICF 2021).

Resilient Baylands North Bay RCIS

The Resilient Baylands North Bay RCIS is currently in development, with the Metropolitan Transportation Commission as the proponent and Caltrans District 4 as a co-proponent. The proposed RCIS is located along the San Pablo Bay shoreline from the western touchdown of the Richmond-San Rafael Bridge to the northern touchdown of the Carquinez Bridge, extending approximately 1 mile inland from a projected future shoreline at 10.2 feet of sea-level rise plus a 100-year storm surge scenario, and bayward into San Pablo Bay along the existing shoreline to encompass adjacent mudflats. These terrestrial and aquatic extents were selected in consideration of climate change, with a focus on future sea-level rise inundation, and include creeks, rivers (Las Gallinas, Novato, Petaluma, Sonoma, and Napa), and smaller tributaries that deliver sediment to the San Pablo Baylands surrounding State Route 37 and U.S. Highway 101. The RCIS will include portions of Marin, Napa, Sonoma, and Solano Counties.

The RCIS is anticipated to analyze seven focal species, including six wildlife species and one plant species. Of these seven species, one (California red-legged frog) is also a species of mitigation need addressed in this RAMNA. Because it is in the preliminary phases of development, specific conservation goals and objectives of this RCIS have not yet been drafted. It is expected to focus on the vulnerability of species and ecosystems to sea-level rise, other climate change impacts, and other stressors in the proposed geographic area and to develop ecosystem-based conservation strategies to improve resiliency from identified stressors.

4.5.2. Mitigation Credit Agreements

As discussed previously, MCAs are developed when and where CDFW approves an RCIS and, with respect to the SHS, creates credits that may be used as compensatory mitigation to offset impacts identified under CESA and the Lake and Streambed Alteration Program. An MCA has numerous required elements, many of which parallel the requirements of a mitigation bank. These required elements can be found in the California Fish and Game Code § 1856. At this time, practical instructions and guidance for establishing MCAs are being developed by CDFW³ and no MCAs or MCA credits are available. The recent completion of the East Bay RCIS allows for future opportunities for Caltrans to enter into MCAs with CDFW in Contra Costa and Alameda Counties. Once an MCA has been approved by CDFW, mitigation credits may be created through the agreement that could be applied to Caltrans transportation projects.

³ <https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation>

Wildlife Crossing and Aquatic Corridor Enhancements

One potential benefit of the MCA process is that it, like conservation and mitigation banking, may provide a mechanism to generate compensatory mitigation credits by improving permeability of the SHS through wildlife crossings and aquatic corridor enhancements. Through an MCA developed under an RCIS, CDFW would be authorized to recognize CESA and Lake and Streambed Alteration credits established through wildlife crossing and aquatic corridor construction made separate and distinct from a specific transportation project. Connectivity information for the GAI is summarized in Section 2.11.

5. MODELED ESTIMATED IMPACTS

In this chapter, Caltrans documents the potential compensatory mitigation needs in the GAI for fiscal years 2019/20 to 2028/29. Needs were based on estimated potential compensatory mitigation requirements of Caltrans' anticipated SHOPP transportation projects and regional and local STIP-eligible transportation projects. Because the assessment is intended to inform advance mitigation project scoping, the impact estimates used to forecast compensatory mitigation needs do not distinguish between permanent or temporary impacts. Actual transportation project impacts, and natural resource regulatory agency compensatory mitigation conditions on transportation projects, 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;
- Identifies transportation projects that could potentially benefit from advance mitigation planning¹ for the 10-year planning period (summarized in Tables 5-1 and 5-3); and
- Provides its estimate of impacts for the 10-year planning period for species of mitigation need, special-status species potentially co-occurring with the species of mitigation need, aquatic resources, and riparian habitat.

Because Caltrans District 4 chose to focus the analysis on aquatic resources (Section 1.5.3), the results presented below are organized by the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays HUC-8 subbasins within Caltrans District 4, which is also the GAI.

5.1 Approach

Transportation projects eligible to use AMA-funded advance mitigation credits may only be SHOPP or STIP transportation projects (SHC § 800.7; Caltrans 2019). Therefore, the compensatory mitigation needs for wildlife and aquatic resources in the GAI are based on Caltrans' anticipated SHOPP transportation project impacts and Caltrans, regional, and local STIP-eligible transportation project impacts.

At this time:

- SHOPP transportation project needs are forecast quantitatively through the SAMNA model developed for the AMP.
- STIP-eligible needs are assessed qualitatively, through Caltrans District, MPO, RTPA, and other transportation agency coordination.

¹ Benefiting transportation projects are transportation projects whose delivery schedules benefit from advance mitigation credits.

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 2018a).

To identify the list of SHOPP projects planned for the GAI, Caltrans consulted the SHOPP Ten-Year Book for fiscal years 2019/20 to 2028/29 (Caltrans 2021a). 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 45 SHOPP transportation projects in the GAI that are currently in the planning and conceptual phases (Table 5-1). The general locations of all 45 planned 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 2021a. 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). Estimates are not precise and are not intended to be used for transportation project permitting; however, they are suitable for informing advance mitigation project scopes.

5.1.2. 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 2019, 2021b). The SAMNA model, its foundation, and assumptions are described in the *Statewide Advance Mitigation Needs Assessment Report* (Caltrans 2021b). All results are provided in acres. Some species and resources are not forecast to be affected.

Specific to this assessment, forecast impacts to aquatic resources can be found in Section 5.2 and forecast impacts to species of mitigation need can be found in Section 5.3. The SAMNA results for all habitats with at least one special-status species forecast to be affected are provided in Appendix D.

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

ID Number	HUC-8	Ecoregion Section	Route	Begin Mile	End Mile	Activity	Advertised Year ^a	County
20270	Gualala-Salmon	Northern California Coast	1	0	105.5	Replace/install culverts	2028/29	Mendocino
17510	Gualala-Salmon	Northern California Coast	1	30.8	40.6	Replace/install culverts	2021/22	Sonoma
17511	Gualala-Salmon	Northern California Coast	1	41.5	54.6	Replace/install culverts	2021/22	Sonoma
17574	Gualala-Salmon	Northern California Coast	1	45.4	45.4	Replace/install culverts	2023/24	Sonoma
22015	Gualala-Salmon	Northern California Coast	1	27.3	32.5	Replace/install culverts	2027/28	Sonoma
22016	Gualala-Salmon	Northern California Coast	1	32.9	41.3	Replace/install culverts	2026/27	Sonoma
22017	Gualala-Salmon	Northern California Coast	1	41.4	51	Replace/install culverts	2026/27	Sonoma
22018	Gualala-Salmon	Northern California Coast	1	51.1	55	Replace/install culverts	2025/26	Sonoma
13918	Gualala-Salmon, Tomales-Drake Bays	Northern California Coast	1	0	58.58	Widen shoulders	2023/24	Sonoma
17509	Gualala-Salmon, Tomales-Drake Bays	Northern California Coast	1	0.97	28.73	Replace/install culverts	2023/24	Sonoma
22014	Gualala-Salmon, Tomales-Drake Bays	Northern California Coast	1	3	27.1	Replace/install culverts	2025/26	Sonoma

ID Number	HUC-8	Ecoregion Section	Route	Begin Mile	End Mile	Activity	Advertised Year ^a	County
13703	Tomales-Drake Bays	Northern California Coast	1	13.05	45.1	Replace/install culverts	2023/24	Marin
16697	Tomales-Drake Bays	Northern California Coast	1	40.3	40.3	Replace/install culverts	2023/24	Marin
20116	Tomales-Drake Bays	Northern California Coast	1	13.1	44.9	Replace/install culverts	2023/24	Marin
20901	Tomales-Drake Bays	Northern California Coast	1	28.5	N/A	Bridge replacement new construction	2020/21	Marin
22013	Tomales-Drake Bays	Northern California Coast	1	6.6	49.9	Replace/install culverts	2024/25	Marin
14149	San Pablo Bay, Tomales-Drake Bays	Northern California Coast	1	0.42	22.96	Bridge rail	2023/24	Marin
13624	San Pablo Bay	Northern California Coast	128	5.1	N/A	Bridge replacement new construction	2021/22	Napa
15795	San Pablo Bay	Northern California Coast	121	6.4	6.5	Bridge replacement new construction	2023/24	Napa
15831	San Pablo Bay	Northern California Coast	29	14.1	19	Bridge rail	2021/22	Napa
16701	San Pablo Bay	Central California Coast	29	1.7	5.1	Replace/install culverts	2021/22	Napa
16820	San Pablo Bay	Northern California Coast	101	0	N/A	Bridge replacement new construction	2021/22	Sonoma
16948	San Pablo Bay	Northern California Coast	29	33.1	N/A	Bridge replacement new construction	2021/22	Napa
17755	San Pablo Bay	Northern California Coast	29	28.4	29.3	Bridge rail	2022/23	Napa

ID Number	HUC-8	Ecoregion Section	Route	Begin Mile	End Mile	Activity	Advertised Year ^a	County
17981	San Pablo Bay	Northern California Coast	101	16.5	19	Bridge rail	2021/22	Sonoma
18505	San Pablo Bay	Central California Coast	580	R41.4	44.5	Bridge replacement new construction	2023/24	Alameda
18572	San Pablo Bay	Northern California Coast	121	6.52	8.43	Bridge rail	2023/24	Sonoma
19083	San Pablo Bay	Central California Coast	1	6.18	6.67	Bridge rail	2026/27	San Francisco
20694	San Pablo Bay	Northern California Coast	37	R11.2	13.7	Bridge replacement new construction	2030/31 ^b	Marin
20749	San Pablo Bay	Northern California Coast	37	14.5	15	Bridge rail	2023/24	Marin
21301	San Pablo Bay	Northern California Coast	116	39.273	39.273	Roundabouts	2023/24	Sonoma
21364	San Pablo Bay	Northern California Coast	12	27.83	31.667	Widen shoulders	2024/25	Sonoma
21391	San Pablo Bay	Northern California Coast	29	38.9	42.9	Bridge rail	2020/21	Napa
22035	San Pablo Bay	Northern California Coast	121	13.2	22	Replace/install culverts	2027/28	Napa
22037	San Pablo Bay	Northern California Coast	128	0.2	8.4	Replace/install culverts	2026/27	Napa
22038	San Pablo Bay	Northern California Coast	128	8.5	12.3	Replace/install culverts	2028/29	Napa
22040	San Pablo Bay	Northern California Coast Ranges	128	12.3	15.7	Replace/install culverts	2026/27	Napa
22041	San Pablo Bay	Northern California Coast Ranges	128	15.7	24.1	Replace/install culverts	2027/28	Napa

ID Number	HUC-8	Ecoregion Section	Route	Begin Mile	End Mile	Activity	Advertised Year ^a	County
22048	San Pablo Bay	Northern California Coast	131	0.3	2.5	Replace/install culverts	2027/28	Marin
22049	San Pablo Bay	Northern California Coast	131	2.7	4.4	Replace/install culverts	2028/29	Marin
22051	San Pablo Bay	Northern California Coast	29	15.2	23.1	Replace/install culverts	2027/28	Napa
9223	San Pablo Bay	Central California Coast	580	1.2	N/A	Bridge replacement new construction	2019/20	Contra Costa
9379	San Pablo Bay	Central California Coast	80	5.8	N/A	Bridge replacement new construction	2019/20	Alameda
11282	San Pablo Bay	Central California Coast	80	7.6	12.75	Bridge rail	2023/24	Contra Costa
11336	San Pablo Bay	Central California Coast	80	1.1	N/A	Bridge rail	2019/20	Solano

Source: Caltrans 2021a

Notes: L = left, N/A = not applicable, R = right

^a Advertised year is correct, inclusive of long-lead projects included in the Ten-Year Book.

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

Activity	Buffer Distance (feet)
Bridge rail	20
Bridge replacement/new construction	40
Replace/install culverts	20
Roundabouts	40
Widen shoulders	15

Source: Caltrans 2021a, Table 1

5.1.3. Non-SHOPP STIP-eligible Needs Assessment

At this time, STIP-eligible needs are assessed qualitatively through coordination between the Caltrans 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. 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 need 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 constrained² regional transportation plan, with a Ready to List³ 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 1-3 of this document for the consultation summary). Provided as Table 5-3, the list consists of 22 STIP-eligible transportation projects that are planned in the GAI for fiscal years 2019/20 to 2028/29.

Non-SHOPP STIP-eligible Potential Impacts

Once the non-SHOPP STIP-eligible projects and their activities were identified, their potential impacts were assessed qualitatively. The qualitative analysis consisted of assessing the identified non-SHOPP STIP-eligible projects in the context of the landscape in which they occur and their proximity to SHOPP projects. The potential aquatic and wildlife resources predicted to be affected were identified from the same datasets used for the SAMNA analysis, but transportation project footprints were not generated, nor were areas of potential impact calculated.

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 and a transportation project has been approved to be advertised to bid for construction.

Table 5-3. STIP-eligible Transportation Projects

STIP Project Identifier	Caltrans District	County	Route	Begin Mile	End Mile
17-10-0037 MTC's Goods Movement Investment Strategy #10	4	Sonoma	37	0	R6.245
PBA2050	4	Sonoma	37	0	R6.245
17-09-0009	4	Sonoma	101	7.654	10.688
17-09-0013	4	Sonoma	101	5.2	5.9
17-04-0008	4	Napa	29	R2.05	4.71
17-04-0010	4	Napa	29	0.6	R2.1
17-03-0007	4	Marin	580	3.3	4.782
17-03-0007	4	Marin	101	9.3	10.3
17-03-0009	4	Marin	580	2.5	3.3
PBA2050	4	Marin	580	3.3	4.782
PBA2050	4	Marin	101	9.3	10.3
17-10-0037 MTC's Goods Movement Investment Strategy #10	4	Marin	37	R11.2	14.617
PBA2050	4	Marin	37	R11.2	14.617
17-10-0037 MTC's Goods Movement Investment Strategy #10	4	Solano	37	R0	R12.001L
PBA2050	4	Solano	37	R0	R12.001L
17-02-0020	4	Contra Costa	4	R3.32L	R20.12
17-02-0021	4	Contra Costa	80	4.34	4.34
17-02-0026	4	Contra Costa	80	0.23	0.23
17-03-0009	4	Contra Costa	580	R5.7	6.5
17-10-0053	4	Contra Costa	80	0	13.8
17-01-0037 MTC's Goods Movement Investment Strategy #5	4	Alameda	80	4.547	4.547
17-10-0053	4	Alameda	80	R1.6	8.036

Notes: R = right (north on south-to-north routes, east on west-to-east routes), L = left (north on south-to-north routes, east on west-to-east routes)

It is likely that these transportation projects would have compensatory mitigation conditions placed on them by natural resource regulatory agencies, similar to conditions placed on SHOPP transportation projects. In addition to the Caltrans SHOPP projects analyzed in this document, STIP-eligible transportation projects planned in Sonoma, Napa, Marin, Solano, Contra Costa, and Alameda Counties could benefit from advance mitigation planning efforts.

5.2 Estimated Aquatic Resources Impacts

The quantitative impacts presented in this document are estimates, pursuant to the SAMNA model. Specific aquatic resource impacts will be assessed in the future as part of each transportation project's environmental studies.

Below, estimated aquatic resource impacts are presented for the HUC-8 sub-basins that make up the GAI. Aquatic resources impacts are categorized as potential impacts on threatened and endangered fish, wetlands, and non-wetland waters. Riparian habitat is also discussed. Refer to Appendix F for maps depicting the location and extent of wetlands and non-wetland waters in the GAI. Riparian habitat is a land cover type mapped in Appendix B.

5.2.1. Estimated Impacts on Aquatic Species of Mitigation Need Habitat

Several threatened and endangered fish species with the potential to be affected during the planning period were identified as species of mitigation need. Species of mitigation need are species for whom a high probability of compensatory mitigation need is anticipated (Section 1.5). In almost all cases, because of how species of mitigation need are identified, species of mitigation need are forecast to be affected during the planning period.⁴ Each aquatic species of mitigation need is discussed briefly in the subsections below.

Using the methods described in Section 5.1.1, impacts on aquatic species of mitigation need habitat were estimated for the 45 transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 34 are forecast to affect approximately 5.0 acres of aquatic species of mitigation need habitat (Table 5-4; Caltrans 2021b). For example, 22 transportation projects are anticipated to affect 0.9 acre of Chinook salmon habitat, 1.8 acres of green sturgeon habitat, 3.7 acres of longfin smelt habitat, and 1.9 acres of Central California Coast DPS steelhead habitat in the San Pablo Bay sub-basin.

⁴ In contrast, species that are not forecast to be affected are not identified as species of mitigation need. For example, Delta smelt are not forecast to be affected during the planning period and were not identified as a species of mitigation need.

Table 5-4. Summary of Estimated SHOPP Impacts on Threatened and Endangered Fish in the GAI (acres)^a

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Central California Coast ESU Coho Salmon ^b	Central California Coast DPS Steelhead ^b	Northern California DPS Steelhead ^b	Longfin Smelt ^b	Southern DPS Green Sturgeon ^b	Chinook Salmon ^c	Tidewater Goby ^c	Total
Gualala-Salmon	18010109	7	0.0	0.1	0.3	0.0	2.5	0.0	0.1	Not available ^d
San Pablo Bay	18050002	22	0.0	1.9	0.0	3.7	1.8	0.9	0.0	Not available ^d
Tomales-Drake Bays	18050005	8	1.3	0.4	0.0	1.3	<0.1	0.0	0.3	Not available ^d
Total^{e,f}	Not applicable	34	1.3	2.4	0.3	5.0	4.3	0.9	0.4	Not available ^d

Source: Caltrans 2021b

^a Stream/river habitat impacts are provided. Stream/river habitat impacts are assumed to be representative of fish habitat impacts.

^b Species of mitigation need for this assessment.

^c Species is forecast to be affected but was not identified as a species of mitigation need.

^d Total could not be calculated because impact estimates overlap.

^e Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect fish.

^f Totals may be different on account of rounding.

Central California Coast ESU coho salmon

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. The Central California Coast ESU coho salmon is a federally and state endangered fish species that utilizes coastal rivers and streams. This ESU of coho salmon ranges from Punta Gorda in Humboldt County to Aptos Creek in Santa Cruz County, including the GAI (NMFS 2012). Coho salmon adults migrate into coastal streams to spawn and their progeny utilize these streams as rearing habitat prior to returning to the ocean.

Using the methods described in Section 5.1.1, impacts on Central California Coast ESU coho salmon were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 8 are forecast to affect 1.3 acres of Central California Coast ESU coho salmon habitat in the GAI (Table 5-4; Caltrans 2021b).

Northern California Coast DPS and Central California Coast DPS steelhead

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. The Northern California Coast and Central California Coast DPS steelhead are both federally threatened endangered fish species that utilize coastal rivers and streams. These two DPS of steelhead range from Redwood Creek in Humboldt County to Aptos Creek in Santa Cruz County, including the GAI (NMFS 2016d). Similar to coho, steelhead adults enter coastal streams in winter to spawn and their progeny remain in these streams until they return to the ocean to grow to adulthood.

Using the methods described in Section 5.1.1, impacts on Northern California Coast DPS and Central California Coast DPS steelhead were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 1 transportation project is forecast to affect 0.3 acre of Northern California Coast DPS steelhead habitat and 18 transportation projects are forecast to affect 2.4 acres of Central California Coast DPS steelhead habitat in the GAI (Table 5-4; Caltrans 2021b).

Longfin Smelt

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. Longfin smelt is a federal candidate for listing as threatened and is a state threatened fish species that utilizes coastal streams from the Klamath River to San Francisco Bay. Longfin smelt utilize coastal estuaries and ocean habitat before entering freshwater streams to spawn.

Using the methods described in Section 5.1.1, impacts on longfin smelt were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 30 are forecast to affect 5.0 acres of longfin smelt habitat in the GAI (Table 5-4; Caltrans 2021b).

Southern DPS Green Sturgeon

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. The

Southern DPS of green sturgeon in the GAI is a federally threatened species and a state species of special concern. This ESU of green sturgeon includes naturally spawned fish originating from the Sacramento, Feather, and Yuba Rivers. Green sturgeon use riverine, estuary, and marine habitats along the west coast of California, spending the majority of their life cycle in marine waters. Adults enter large river systems to spawn and their progeny utilize freshwater streams and brackish bay waters before returning to the ocean.

Using the methods described in Section 5.1.1, impacts on green sturgeon were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 12 are forecast to affect 4.3 acres of green sturgeon habitat in the GAI (Table 5-4; Caltrans 2021b).

5.2.2. Estimated Impacts on Wetlands

Using the methods described in Section 5.1.1, impacts on wetlands were estimated for the 45 transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 27 are forecast to affect 7.3 acres of wetland habitat in the GAI (Table 5-5; Caltrans 2021b). For example, 2.2 acres of impacts would affect wetlands in the San Pablo Bay sub-basin from 15 transportation projects, of which 1.8 acres would affect estuarine and marine wetlands, 0.1 acre would affect freshwater marsh wetlands, and 0.3 acre would affect freshwater forested/shrub wetlands.

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. Therefore, the wetland estimates below are based solely on the SAMNA's wetland data layer (Caltrans 2021b).

Estimated Impacts on Wetlands in the Coastal Zone

As pointed out in Section 2.17.2, Caltrans did not find any coastal wetland spatial data for the GAI. Further, no suitable species or other element from the SAMNA data layers was found to be a suitable proxy for coastal wetlands. 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. Hence, of the 45 SHOPP transportation projects evaluated, 13 are forecast to affect 5.1 acres of coastal wetlands in the GAI (Table 5-6).

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 5-6 are biased low.

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

Sub-basin (HUC-8)	Sub- basin Number	Number of Transportation Projects	Depressional Natural Vegetated	Depressional Unnatural Vegetated	Estuarine and Marine Wetland	Estuarine Saline Natural Intertidal Emergent	Estuarine Saline Natural Intertidal Non-vegetated	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Slope Natural	Total
Gualala-Salmon	18010109	8	0.0	0.0	0.1	0.0	0.0	1.8	2.2	0.0	4.1
San Pablo Bay	18050002	15	0.0	0.0	1.8	0.0	0.0	0.1	0.3	0.0	2.2
Tomales-Drake Bays	18050005	7	<0.1	<0.1	0.1	0.3	0.1	<0.1	0.5	0.1	1.1
Total^{a,b}	Not applicable	27	<0.1	<0.1	2.0	0.3	0.1	1.9	3.0	0.1	7.3

Source: Adapted from Caltrans 2021b

^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.

^b Totals may be different on account of rounding.

Table 5-6. Summary of Estimated SHOPP Impacts on Wetlands in the GAI's Coastal Zone (acres)

Sub-basin (HUC-8)	Sub- basin Number	Number of Transportation Projects	Depressional Natural Vegetated	Depressional Unnatural Vegetated	Estuarine and Marine Wetland	Estuarine Saline Natural Intertidal Emergent	Estuarine Saline Natural Intertidal Non-vegetated	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Slope Natural	Total
Gualala-Salmon	18010109	8	0.0	0.0	0.1	0.0	0.0	1.8	2.2	0.0	4.1
San Pablo Bay	18050002	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tomales-Drake Bays	18050005	7	<0.1	<0.1	0.1	0.3	0.1	<0.1	0.4	0.1	1.0
Total^{a,b}	Not applicable	13	<0.1	<0.1	0.2	0.3	0.1	1.8	2.6	0.1	5.0

Source: Adapted from Caltrans 2021b

^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.

^b Totals may be different on account of rounding.

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 45 transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 35 are forecast to affect 7.7 acres of non-wetland waters in the GAI (Table 5-7; Caltrans 2021b). For example, 22 transportation projects are forecast to have a total of 3.1 acres of impact in the San Pablo Bay sub-basin, including 0.1 acre of impact on coastline habitat, <0.1 acre of impact on lake/pond habitat, <0.1 of impact on sea/ocean habitat, and 3.0 acres of impact on stream/river habitat.

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

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Coastline	Lake/Pond	Sea/Ocean	Stream/River	Total
Gualala-Salmon	18010109	8	<0.1	0.0	<0.1	3.3	3.3
San Pablo Bay	18050002	22	0.1	<0.1	<0.1	3.0	3.1
Tomales-Drake Bays	18050005	8	0.2	0.0	<0.1	1.2	1.3
Total^{a,b}	Not applicable	35	0.2	<0.1	<0.1	7.5	7.7

Source: Adapted from Caltrans 2021b

^a Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect non-wetland waters.

^b Totals may be different on account of rounding.

Estimated Impacts on Non-wetland Waters in the Coastal Zone

Estimated impacts on non-wetland waters from planned SHOPP transportation projects within the GAI that are located in the coastal zone and under the jurisdiction of the CCC are shown in Table 5-8. A total of 4.5 acres of impact on five types of coastal non-wetland waters is anticipated from 14 projects. For example, 8 projects within the coastal zone are anticipated to have impacts on <0.1 acre of coastline habitat, <0.1 acre of impact on sea/ocean habitat, and 3.3 acres of impact on stream/river habitat in the Gualala-Salmon Sub-basin.

Table 5-8. Summary of Estimated SHOPP Impacts on Non-wetland Waters in GAI's Coastal Zone (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Coastline	Lake/Pond	Sea/Ocean	Stream/River	Total
Gualala-Salmon	18010109	8	<0.1	0.0	<0.1	3.3	3.3
San Pablo Bay	18050002	0	0.0	0.0	0.0	0.0	0.0
Tomales-Drake Bays	18050005	8	0.2	0.0	<0.1	1.0	1.2
Total^{a,b}	Not applicable	14	0.2	0.0	<0.1	4.3	4.5

Source: Adapted from Caltrans 2021b

^a Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect non-wetland waters.

^b Totals may be different on account of rounding.

5.2.4. Estimated Impacts on Riparian Habitat

The SAMNA does not directly estimate riparian impacts through its aquatic resource layers, but riparian impacts can be estimated by proxy using the SAMNA montane riparian forecast from the SAMNA's terrestrial layer. No impacts on valley foothill riparian habitat were forecast. Adapting the methods described in Section 5.1.1, impacts on riparian habitat were estimated for the 45 transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 9 are forecast to affect 102.4 acres of riparian habitat in the GAI (Table 5-9; Caltrans 2021b). For example, seven transportation projects are forecast to have a total of 81.3 acres of impact on riparian habitat in the San Pablo Bay sub-basin.

Estimated Impacts on Riparian Habitat in the Coastal Zone

Estimated impacts on riparian habitat from planned SHOPP transportation projects within the GAI that are located in the coastal zone and under the jurisdiction of the CCC are shown in Table 5-10. A total of 21.1 acres of impact on riparian habitat is anticipated from 2 projects. These impacts are limited to the Tomales-Drake Bays sub-basin.

Table 5-9. Summary of Estimated SHOPP Impacts on Riparian Habitat in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Montane Riparian	Ecoregion Section(s)
Gualala-Salmon	18010109	0	0.0	Northern California Coast
San Pablo Bay	18050002	7	81.3	Northern California Coast, Northern California Coast Ranges
Tomales-Drake Bays	18050005	2	21.1	Northern California Coast
Total	Not applicable	9	102.4	Northern California Coast, Northern California Coast Ranges

Source: Adapted from Caltrans 2021b

Table 5-10. Summary of Estimated SHOPP Impacts on Riparian Habitat in the GAI's Coastal Zone (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Montane Riparian	Ecoregion Section(s)
Gualala-Salmon	18010109	0	0.0	Northern California Coast
San Pablo Bay	18050002	0	0.0	Northern California Coast, Northern California Coast Ranges
Tomales-Drake Bays	18050005	2	21.1	Northern California Coast
Total	Not applicable	2	21.1	Northern California Coast

Source: Adapted from Caltrans 2021b

5.3 Estimated Wildlife Impacts

The quantitative impacts presented in this document are estimates, pursuant to the SAMNA model (Caltrans 2021b). Specific wildlife resource impacts will be assessed in the future, as part of each transportation project's environmental studies.

Below, estimated impacts are presented for the ecoregion sections that overlap the GAI for species of mitigation need identified by Caltrans District 4, as well as for species that may co-occur in their habitats. The complete results of the SAMNA, inclusive of the 45 transportation projects planned in the GAI and listed in Table 5-1 that may affect special-status plant and wildlife species, are provided in Appendix D.

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 (Caltrans 2021b). Based on

a search of the species-attributed vegetation layer, 45 special-status terrestrial species are known to occur or have the potential to occur in the portion of the GAI that lies within the Central California Coast Ecoregion Section, 76 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 Section, and 38 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 Section (Section 2.8, Appendix D; Caltrans 2021b). Using the methods described in Section 5.1.1, the SAMNA analysis determined that 41 SHOPP transportation projects could potentially affect 22 habitat types, which could support up to 85 special-status species (Table 5-11).

Table 5-11. Summary of Estimated SHOPP Impacts on Special-status Species Habitat

Ecoregion Section	Number of Caltrans SHOPP Projects ^a	Number of Habitats	Number of Special-status Species ^{b,c}	Estimated Total Habitat Impact (acres)
Northern California Coast	36	17	75	244.2
Northern California Coast Ranges	3	12	29	2.8
Central California Coast	3	6	43	2.3
Total^d	41	22	85	249.2

Source: Caltrans 2021b

^a Transportation projects are listed in Table 5-1.

^b 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.

^c Included in SAMNA. See SAMNA Report (Caltrans 2021b).

^d Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one ecoregion section. Some special-status species occur in more than one ecoregion section.

Species of mitigation need are species for whom a high probability of compensatory mitigation need is anticipated (Section 1.5). Each terrestrial species of mitigation need is discussed briefly in the subsections below: California red-legged frog (Section 5.3.1), California tiger salamander (Section 5.3.2), Myrtle's silverspot butterfly (Section 5.3.3), and Swainson's hawk (Section 5.3.4).

5.3.1. California Red-legged Frog

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. California red-legged frog is a federally threatened amphibian species and a California species of special concern that occurs in freshwater habitats such as slow-moving streams, pools within streams, and human-made ponds that can sustain water for at least 20 weeks during the year. During wet periods they are known to utilize a variety of upland habitats for dispersal and foraging.

Using the methods described in Section 5.1.1, impacts on California red-legged frog were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 36 are forecast to affect 17.2 acres of California red-legged frog habitat in the GAI (Table 5-12; Caltrans 2021b).

5.3.2. California Tiger Salamander

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. The Sonoma County DPS of California tiger salamander, the only population segment of the species found in the GAI, is federally listed as endangered and state listed as threatened.

Using the methods described in Section 5.1.1, impacts on California tiger salamander were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 1 is forecast to affect 0.3 acre of California tiger salamander habitat in the GAI (Table 5-12; Caltrans 2021b).

5.3.3. Myrtle's Silverspot Butterfly

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. Myrtle's silverspot butterfly is a federally endangered insect species endemic to the Northern California coast, where it occupies coastal dune and coastal bluff habitats (FWS 2021c).

Using the methods described in Section 5.1.1, impacts on Myrtle's silverspot butterfly were estimated for the transportation projects listed in Table 5-1. Because the CWHR does not specifically include invertebrates, a range polygon was developed by creating a 4-mile buffered polygon to the centroid of each California Natural Diversity Database occurrence (Caltrans 2019). Then, after reviewing the FWS' range map for Myrtle's silverspot butterfly (Cleckler, personal communication, 2021), it was determined that "barren habitat" and "coastal scrub" habitat within the Northern California Coast Ecoregion Section is adequate proxy habitat for sand dunes and coastal bluff habitat; estimated impact results for Myrtle's silverspot butterfly are identified as barren and coastal scrub habitat within the buffered polygon. Of the 45 SHOPP transportation projects evaluated, 6 are forecast to affect 99.8 acres of Myrtle's silverspot butterfly habitat in the GAI (Table 5-12; Caltrans 2021b).

Table 5-12. Summary of Estimated SHOPP Impacts on Terrestrial Species of Mitigation Need in the GAI

Ecoregion Section	California Red-legged Frog Habitat: Number of Caltrans SHOPP Projects ^a	California Red-legged Frog: Estimated Habitat Impact (acres)	California Tiger Salamander Habitat: Number of Caltrans SHOPP Projects ^a	California Tiger Salamander: Estimated Habitat Impact (acres)	Myrtle's Silverspot Butterfly Habitat: Number of Caltrans SHOPP Projects ^a	Myrtle's Silverspot Butterfly: Estimated Habitat Impact (acres)	Swainson's Hawk: Number of Caltrans SHOPP Projects ^a	Swainson's Hawk: Estimated Habitat Impact (acres)	Total
Northern California Coast	34	13.6	0	0.0	6	99.8	See text ^b	See text ^b	Not available ^c
Northern California Coast Ranges	2	2.1	1	0.3	0	0.0	See text ^b	See text ^b	Not available ^c
Central California Coast	2	2.0	0	0.0	0	0.0	See text ^b	See text ^b	Not available ^c
Total^d	36	17.7	1	0.3	6	99.8	See text ^b	See text ^b	Not available ^c

Source: Caltrans 2021b

^a Transportation projects are listed in Table 5-1.

^b See text in Section 5.3.4.

^c Total could not be calculated because impact estimates overlap.

^d Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one ecoregion section.

5.3.4. Swainson's Hawk

This species was chosen as a species of mitigation need because of its status and the ongoing need for compensatory mitigation for transportation projects in the GAI. Swainson's hawk is a state threatened bird species that nests throughout much of western North America, with an isolated breeding population in California's Central Valley (CDFW 2016b). Extensive surveys during the late twentieth century showed that Swainson's hawk appeared to no longer nest there. However, in recent years Swainson's hawks have been observed nesting at the northern end of the San Francisco baylands in Napa and Sonoma Counties, suggesting that the species may be beginning to reclaim parts of its historic range (CDFW 2016b).

Using the methods described in Section 5.1.1, impacts on Swainson's hawk habitat were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, none are forecast to affect Swainson's hawk habitat in the GAI (Table 5-12; Caltrans 2021b). In other words, while this species is included in the SAMNA, no impacts on the species or its habitat were forecast.

A forecast of no impacts was not expected and the lack of forecast impacts was overlooked when Caltrans selected the species of mitigation need for this RAMNA (Section 1.5). Upon examination, although Swainson's hawk are observed farther west, in Sonoma and Napa Counties, the SAMNA's foundational CWHR species range map includes only the far eastern part of the GAI. Hence, at this time, the SAMNA is not estimating Swainson's hawk impacts appropriately. Until the CWHR map is updated, SAMNA forecasts in the GAI will be inconclusive.

5.3.5. Estimated Impacts on Terrestrial Species of Mitigation Need in the Coastal Zone

A portion of the GAI is located within the coastal zone that is under the jurisdiction of CCC. SAMNA forecast results for the area within the coastal zone are presented below.

California Red-legged Frog

Using the methods described in Section 5.1.1, impacts on California red-legged frog were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 17 are forecast to affect 6.7 acres of California red-legged frog habitat in the coastal zone that is under the jurisdiction of CCC (Table 5-13; Caltrans 2021b).

California Tiger Salamander

Using the methods described in Section 5.1.1, impacts on California tiger salamander were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, none are forecast to affect California tiger salamander habitat in the coastal zone that is under the jurisdiction of CCC (Table 5-13; Caltrans 2021b).

Myrtle's Silverspot Butterfly

Using the methods described in Section 5.1.1, impacts on Myrtle's silverspot butterfly were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, 6 are forecast to affect 99.8 acres of Myrtle's silverspot butterfly habitat in the coastal zone that is under the jurisdiction of CCC (Table 5-13; Caltrans 2021b).

Swainson's Hawk

Using the methods described in Section 5.1.1, impacts on Swainson's hawk habitat were estimated for the transportation projects listed in Table 5-1. Of the 45 SHOPP transportation projects evaluated, none are forecast to affect Swainson's hawk habitat in the coastal zone that is under the jurisdiction of CCC (Table 5-13; Caltrans 2021b). In other words, while this species is included in the SAMNA, no impacts on the species or its habitat were forecast.

A forecast of no impacts was not expected and the lack of forecast impacts was overlooked when Caltrans selected the species of mitigation need for this RAMNA (Section 1.5). Upon examination, although Swainson's hawk are observed farther west, in Sonoma and Napa Counties, the SAMNA's foundational CWHR species range map includes only the far eastern part of the GAI. Hence, at this time, the SAMNA is not estimating Swainson's hawk impacts appropriately. Until the CWHR map is updated, SAMNA forecasts in the GAI will be inconclusive.

5.3.6. Potential Co-benefiting Species

The species of mitigation need co-occur with other protected plant, invertebrate, amphibian, reptile, bird, and mammal species. By procuring or establishing advance mitigation credits for one or more of the species of mitigation need, Caltrans District 4 will also benefit multiple special-status species that occur and utilize the same habitats.

Using the methods described in Section 5.1.1, the SAMNA forecast impacts on:

- an additional 68 special-status terrestrial species that potentially use the same habitats as the species of mitigation need in the Northern California Coast Ecoregion Section (Table 5-14);
- an additional 28 special-status terrestrial species that potentially use the same habitats as the species of mitigation need in the Northern California Coast Ranges Ecoregion Section (Table 5-15); and
- an additional 44 special-status terrestrial species that potentially use the same habitats as the species of mitigation need in the Central California Coast Ecoregion Section (Table 5-16).

Table 5-13. Summary of Estimated SHOPP Impacts on Terrestrial Species of Mitigation Need in the GAI's Coastal Zone

Ecoregion Section	California Red-legged Frog Habitat: Number of Caltrans SHOPP Projects^a	California Red-legged Frog: Estimated Habitat Impact (acres)	California Tiger Salamander Habitat: Number of Caltrans SHOPP Projects^a	California Tiger Salamander: Estimated Habitat Impact (acres)	Myrtle's Silverspot Butterfly Habitat: Number of Caltrans SHOPP Projects^a	Myrtle's Silverspot Butterfly: Estimated Habitat Impact (acres)	Swainson's Hawk: Number of Caltrans SHOPP Projects^a	Swainson's Hawk: Estimated Habitat Impact (acres)	Total
Northern California Coast	17	6.7	0	0.0	6	99.8	See text ^b	See text ^b	Not available ^c
Northern California Coast Ranges	0	0.0	0	0.0	0	0.0	See text ^b	See text ^b	Not available ^c
Central California Coast	0	0.0	0	0.0	0	0.0	See text ^b	See text ^b	Not available ^c
Total^d	17	6.7	0	0.0	6	99.8	See text ^b	See text ^b	Not available ^c

Source: Caltrans 2021b

^a Transportation projects are listed in Table 5-1.

^b The SAMNA identifies no transportation projects and no impacts on Swainson's hawk for the planning period. However, recent Swainson's hawk observations suggest that the SAMNA's underlying CWHR information is out of date. Consequently, the SAMNA is likely not predicting Swainson's hawk impacts appropriately. The result is inconclusive.

^c Total could not be calculated because impact estimates overlap.

^d Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one ecoregion section.

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Table 5-14. Estimated SHOPP Impacts on Species of Mitigation Need and Co-occurring Species Habitat: Northern California Coast Ecoregion Section (acres)

Common Name	Species Name	Status	Annual Grass	Barren	Closed-Cone Pine-Cypress	Coastal Oak Woodland	Coastal Scrub	Douglas-Fir	Eucalyptus	Lacustrine	Mixed Chaparral	Montane Hardwood	Montane Hardwood-Conifer	Montane Riparian	Redwood
Not applicable	Not applicable	Total	6.5	241.7	2.4	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
Species of Mitigation Need	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
California tiger salamander	<i>Abystoma californiense</i>	FE, ST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Myrtle's silverspot butterfly	<i>Speyeria zerene myrteleae</i>	FE	0.0	99.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
California red-legged frog	<i>Rana draytonii</i>	FT	6.1	0.0	1.8	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
Swainson's hawk	<i>Buteo swainsonii</i>	ST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amphibians	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
foothill yellow-legged frog	<i>Rana boylei</i>	FS	6.4	0.0	2.4	0.4	0.3	1.0	0.1	0.0	0.5	0.4	0.1	1.8	0.3
Birds	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
white-tailed kite	<i>Elanus leucurus</i>	FS	6.5	241.7	0.0	0.4	0.3	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.3
bald eagle	<i>Haliaeetus leucocephalus</i>	FS, SE	6.5	241.7	0.00	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
northern harrier	<i>Circus cyaneus</i>	SSC	6.2	228.5	2.4	0.1	0.3	0.1	0.1	1.3	0.0	0.1	0.1	0.4	0.3
golden eagle	<i>Aquila chrysaetos</i>	FS	6.5	241.7	0.0	0.4	0.3	1.0	0.1	0.0	0.5	0.4	0.1	1.9	0.3
peregrine falcon	<i>Falco peregrinus</i>	FS	6.5	241.7	2.4	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
snowy plover	<i>Charadrius nivosus</i>	FT	0.0	228.5	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0
burrowing owl	<i>Athene cunicularia</i>	FS	5.7	228.1	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
long-eared owl	<i>Asio otus</i>	SSC	6.5	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.5	0.4	0.1	1.9	0.0
short-eared owl	<i>Asio flammeus</i>	SSC	6.5	0.0	0.0	0.4	0.3	1.0	0.1	0.0	0.5	0.0	0.1	1.9	0.3
vaux's swift	<i>Chaetura vauxi</i>	SSC	0.0	0.0	2.4	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1		0.3
purple martin	<i>Progne subis</i>	SSC	5.5	0.0	2.4	0.4	0.0	1.0	0.1	0.0	0.0	0.4	0.1	0.7	0.3
loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	5.8	240.7	2.4	0.4	0.2	0.0	0.1	0.0	0.5	0.3	0.1	1.9	0.0
yellow warbler	<i>Setophaga petechia</i>	SSC	0.0	0.0	2.4	0.1	0.3	0.1	0.1	0.0	0.0	0.2	0.1	0.4	0.3
bryant's savannah sparrow	<i>Passerculus sandwichensis alaudinus</i>	SSC	5.7	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Common Name	Species Name	Status	Annual Grass	Barren	Closed-Cone Pine-Cypress	Coastal Oak Woodland	Coastal Scrub	Douglas-Fir	Eucalyptus	Lacustrine	Mixed Chaparral	Montane Hardwood	Montane Hardwood-Conifer	Montane Riparian	Redwood
grasshopper sparrow	<i>Ammodramus savannarum</i>	SSC	6.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
brant	<i>Branta bernicla</i>	SSC	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern spotted owl	<i>Strix occidentalis caurina</i>	FT, ST	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.1	0.5	0.3
olive-sided flycatcher	<i>Contopus cooperi</i>	SSC	0.0	0.0	0.0	0.0	0.0	1.0	0.1	0.0	0.5	0.4	0.1	1.9	0.3
yellow-breasted chat	<i>Icteria virens</i>	SSC	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
tricolored blackbird	<i>Agelaius tricolor</i>	FS, ST	3.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
ashy storm-petrel	<i>Oceanodroma homochroa</i>	FS	0.0	116.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mammals	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
yuma myotis	<i>Myotis yumanensis</i>	FS	6.5	0.0	2.4	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
long-eared myotis	<i>Myotis evotis</i>	FS	0.0	241.7	2.4	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
fringed myotis	<i>Myotis thysanodes</i>	FS	6.5	241.7	2.4	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
western red bat	<i>Lasiurus blossevillii</i>	SSC	6.5	0.0	0.0	0.4	0.3	1.0	0.1	1.3	0.5	0.4	0.1	1.9	0.3
townsend's big-eared bat	<i>Corynorhinus townsendii</i>	FS	6.5	241.7	0.0	0.4	0.3	1.0	0.1	0.0	0.5	0.4	0.1	1.9	0.3
pallid bat	<i>Antrozous pallidus</i>	FS	6.5	241.7	0.0	0.4	0.3	1.0	0.1	0.0	0.5	0.4	0.1	1.9	0.3
ringtail	<i>Bassariscus astutus</i>	SFP	6.5	241.7	2.4	0.4	0.3	1.0	0.1	0.0	0.5	0.4	0.1	1.9	0.3
american badger	<i>Taxidea taxus</i>	SSC	6.5	241.7	2.4	0.4	0.3	1.0	0.1	0.0	0.5	0.4	0.1	1.9	0.3
sonoma red tree vole	<i>Arborimus pomo</i>	SSC	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.3
fisher	<i>Pekania pennanti</i>	FS, ST	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.3
guadalupe fur-seal	<i>Arctocephalus townsendi</i>	FT, ST	0.0	116.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern (steller) sea-lion	<i>Eumetopias jubatus</i>	SSC	0.0	116.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern elephant seal	<i>Mirounga angustirostris</i>	SFP	0.0	116.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Common Name	Species Name	Status	Annual Grass	Barren	Closed- Cone Pine- Cypress	Coastal Oak Woodland	Coastal Scrub	Douglas- Fir	Eucalyptus	Lacustrine	Mixed Chaparral	Montane Hardwood	Montane Hardwood- Conifer	Montane Riparian	Redwood
Invertebrates	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
behren's silverspot butterfly	<i>Speyeria zerene behrensii</i>	FE	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plants	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
franciscan manzanita	<i>Arctostaphylos franciscana</i>	FE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
san bruno mountain manzanita	<i>Arctostaphylos imbricata</i>	SE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
presidio manzanita	<i>Arctostaphylos montana</i> ssp. <i>ravenii</i>	FE, SE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
pacific manzanita	<i>Arctostaphylos pacifica</i>	SE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
clara hunt's milk- vetch	<i>Astragalus claranus</i>	FE, ST	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0
sonoma sunshine	<i>Blennosperma bakeri</i>	FE, SE	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
point reyes blennosperma	<i>Blennosperma nanum</i> var. <i>robustum</i>	SR	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tiburon mariposa lily	<i>Calochortus tiburonensis</i>	FT, ST	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
salt marsh bird's- beak	<i>Chloropyron maritimum</i> ssp. <i>maritimum</i>	FE, SE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
robust spineflower	<i>Chorizanthe robusta</i> var. <i>robusta</i>	FE, FS	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sonoma spineflower	<i>Chorizanthe valida</i>	FE, SE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
presidio clarkia	<i>Clarkia franciscana</i>	FE, SE	2.6	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
vine hill clarkia	<i>Clarkia imbricata</i>	FE, SE	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
baker's larkspur	<i>Delphinium bakeri</i>	FE, SE	2.6	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
golden larkspur	<i>Delphinium luteum</i>	FE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
santa clara valley dudleya	<i>Dudleya abramsii</i> ssp. <i>setchellii</i>	FE	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Common Name	Species Name	Status	Annual Grass	Barren	Closed-Cone Pine-Cypress	Coastal Oak Woodland	Coastal Scrub	Douglas-Fir	Eucalyptus	Lacustrine	Mixed Chaparral	Montane Hardwood	Montane Hardwood-Conifer	Montane Riparian	Redwood
roderick's fritillary	<i>Fritillaria roderickii</i>	SE	6.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
gowen cypress	<i>Hesperocyparis goveniana</i>	FT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
marin western flax	<i>Hesperolinon congestum</i>	FT, ST	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
santa cruz tarplant	<i>Holocarpha macradenia</i>	FT, SE	1.8	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
contra costa goldfields	<i>Lasthenia conjugens</i>	FE	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
beach layia	<i>Layia carnosa</i>	FE, SE	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
san francisco lessingia	<i>Lessingia germanorum</i>	FE, SE	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mason's lilaeopsis	<i>Lilaeopsis masonii</i>	SR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
point reyes meadowfoam	<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i>	SE	1.8	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tidestrom's lupine	<i>Lupinus tidestromii</i>	FE, SE	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
few-flowered navarretia	<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i>	FE, ST	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
white-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	FE, SE	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
calistoga popcornflower	<i>Plagiobothrys strictus</i>	FE, ST	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
napa blue grass	<i>Poa napensis</i>	FE, SE	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tiburon jewelflower	<i>Streptanthus glandulosus</i> ssp. <i>niger</i>	FE, SE	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
two-fork clover	<i>Trifolium amoenum</i>	FE	2.9	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Caltrans 2021b

Notes: FE = federal endangered, FPT = federal proposed threatened, FS = federal sensitive (USFS and/or BLM sensitive), FT = federal threatened, SC = state candidate, SE = state endangered, SFP = state fully protected, SFS = state fire sensitive, SR = state rare, SSC = species of special concern (CDFW), ST = state threatened

Table 5-15. Estimated SHOPP Impacts on Species of Mitigation Need Habitat: Northern California Coast Ranges Ecoregion Section (acres)

Common Name	Species Name	Status	Annual Grass	Barren	Blue Oak Woodland	Blue Oak-Foothill Pine	Coastal Oak Woodland	Lacustrine	Mixed Chaparral	Montane Hardwood	Montane Riparian	Perennial Grass
Not applicable	Not applicable	Total	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
Species of Mitigation Need	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
California tiger salamander	<i>Abystoma californiense</i>	FE, ST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Myrtle's silverspot butterfly	<i>Speyeria zerene myrtleae</i>	FE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
California red-legged frog	<i>Rana draytonii</i>	FT	0.3	0.0	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
Swainson's hawk	<i>Buteo swainsonii</i>	ST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amphibians	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
foothill yellow-legged frog	<i>Rana boylei</i>	FS	0.3	0.0	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.0
Birds	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
white-tailed kite	<i>Elanus leucurus</i>	FS	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.0	0.0	0.1
bald eagle	<i>Haliaeetus leucocephalus</i>	FS & SE	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
northern harrier	<i>Circus cyaneus</i>	SSC	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
golden eagle	<i>Aquila chrysaetos</i>	FS	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
peregrine falcon	<i>Falco peregrinus</i>	FS	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
long-eared owl	<i>Asio otus</i>	SSC	0.3	0.0	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
short-eared owl	<i>Asio flammeus</i>	SSC	0.3	0.0	0.2	0.0	0.5	0.0	0.6	0.0	0.5	0.1
purple martin	<i>Progne subis</i>	SSC	0.3	0.0	0.2	0.0	0.5	0.0	0.0	0.5	0.5	0.1
loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
grasshopper sparrow	<i>Ammodramus savannarum</i>	SSC	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
northern spotted owl	<i>Strix occidentalis caurina</i>	FT & ST	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.2	0.0
olive-sided flycatcher	<i>Contopus cooperi</i>	SSC	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.5	0.0
yellow-breasted chat	<i>Icteria virens</i>	SSC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
tricolored blackbird	<i>Agelaius tricolor</i>	FS & ST	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Mammals	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
yuma myotis	<i>Myotis yumanensis</i>	FS	0.3	0.0	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
long-eared myotis	<i>Myotis evotis</i>	FS	0.0	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
fringed myotis	<i>Myotis thysanodes</i>	FS	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
western red bat	<i>Lasiurus blossevillii</i>	SSC	0.3	0.0	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
townsend's big-eared bat	<i>Corynorhinus townsendii</i>	FS	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
pallid bat	<i>Antrozous pallidus</i>	FS	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1

Common Name	Species Name	Status	Annual Grass	Barren	Blue Oak Woodland	Blue Oak-Foothill Pine	Coastal Oak Woodland	Lacustrine	Mixed Chaparral	Montane Hardwood	Montane Riparian	Perennial Grass
ringtail	<i>Bassariscus astutus</i>	None	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
american badger	<i>Taxidea taxus</i>	None	0.3	0.2	0.2	0.0	0.5	0.0	0.6	0.5	0.5	0.1
Plants	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
clara hunt's milk-vetch	<i>Astragalus claranus</i>	FE & ST	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.0	0.0
roderick's fritillary	<i>Fritillaria roderickii</i>	SE	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
few-flowered navarretia	<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i>	FE & ST	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
calistoga popcornflower	<i>Plagiobothrys strictus</i>	FE & ST	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
two-fork clover	<i>Trifolium amoenum</i>	FE	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Caltrans 2021b
Notes: FE = federal endangered, FPT = federal proposed threatened, FS = federal sensitive (USFS and/or BLM sensitive), FT = federal threatened, SC = state candidate, SE = state endangered, SFP = state fully protected, SFS = state fire sensitive, SR = state rare, SSC = species of special concern (CDFW), ST = state threatened

Table 5-16. Estimated SHOPP Impacts on Species of Mitigation Need Habitat: Central California Coast Ecoregion Section (acres)

Common Name	Species Name	Status	Annual Grass	Blue Oak Woodland	Coastal Oak Woodland	Valley Oak Woodland
Not applicable	Not applicable	Total	0.3	0.7	0.8	0.5
Species of Mitigation Need	See below	See below	See below	See below	See below	See below
California tiger salamander	<i>Ambystoma californiense</i>	FE, ST	0.3	0.0	0.0	0.0
Myrtle's silverspot butterfly	<i>Speyeria zerene myrtleae</i>	FE	0.0	0.0	0.0	0.0
california red-legged frog	<i>Rana draytonii</i>	FT	0.3	0.7	0.8	0.5
swainson's hawk	<i>Buteo swainsoni</i>	FS & ST	0.0	0.0	0.0	0.0
Amphibians	See below	See below	See below	See below	See below	See below
foothill yellow-legged frog	<i>Rana boylei</i>	FS	0.3	0.0	0.0	0.0
Birds	See below	See below	See below	See below	See below	See below
tricolored blackbird	<i>Agelaius tricolor</i>	FS & ST	0.3	0.0	0.0	0.0
grasshopper sparrow	<i>Ammodramus savannarum</i>	SSC	0.3	0.0	0.0	0.0
golden eagle	<i>Aquila chrysaetos</i>	FS	0.3	0.7	0.8	0.5
short-eared owl	<i>Asio flammeus</i>	SSC	0.3	0.7	0.8	0.5
long-eared owl	<i>Asio otus</i>	SSC	0.3	0.7	0.8	0.5
burrowing owl	<i>Athene cunicularia</i>	FS	0.3	0.7	0.8	0.5
vaux's swift	<i>Chaetura vauxi</i>	SSC	0.0	0.0	0.0	0.0
northern harrier	<i>Circus cyaneus</i>	SSC	0.3	0.7	0.8	0.5
white-tailed kite	<i>Elanus leucurus</i>	FS	0.3	0.7	0.8	0.5
peregrine falcon	<i>Falco peregrinus</i>	FS	0.3	0.7	0.8	0.5
bald eagle	<i>Haliaeetus leucocephalus</i>	FS, SE	0.3	0.7	0.8	0.5
loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	0.3	0.7	0.8	0.5
suisun song sparrow	<i>Melospiza melodia maxillaris</i>	SSC	0.0	0.0	0.0	0.0
alameda song sparrow	<i>Melospiza melodia pusillula</i>	SSC	0.0	0.0	0.0	0.0
bryant's savannah sparrow	<i>Passerculus sandwichensis alaudinus</i>	SSC	0.0	0.7	0.8	0.5
purple martin	<i>Progne subis</i>	SSC	0.0	0.0	0.0	0.0
bank swallow	<i>Riparia riparia</i>	FS, ST	0.0	0.0	0.0	0.0
yellow warbler	<i>Setophaga petechia</i>	SSC	0.0	0.7	0.8	0.5
bewick's wren	<i>Thryomanes bewickii</i>	SSC	0.0	0.7	0.8	0.5
Mammals	See below	See below	See below	See below	See below	See below
pallid bat	<i>Antrozous pallidus</i>	FS	0.3	0.7	0.8	0.5

Common Name	Species Name	Status	Annual Grass	Blue Oak Woodland	Coastal Oak Woodland	Valley Oak Woodland
ringtail	<i>Bassariscus astutus</i>	SFP	0.3	0.7	0.8	0.5
california pocket mouse	<i>Chaetodipus californicus</i>	SSC	0.3	0.0	0.0	0.0
townsend's big-eared bat	<i>Corynorhinus townsendii</i>	FS	0.3	0.7	0.8	0.5
heermann's kangaroo rat	<i>Dipodomys heermanni</i>	FE, SE, SFP	0.3	0.0	0.0	0.0
western mastiff bat	<i>Eumops perotis</i>	FS	0.3	0.7	0.8	0.5
western red bat	<i>Lasiurus blossevillii</i>	SSC	0.3	0.7	0.8	0.5
long-eared myotis	<i>Myotis evotis</i>	FS	0.0	0.7	0.8	0.5
fringed myotis	<i>Myotis thysanodes</i>	FS	0.3	0.7	0.8	0.5
yuma myotis	<i>Myotis yumanensis</i>	FS	0.3	0.7	0.8	0.5
big free-tailed bat	<i>Nyctinomops macrotis</i>	SSC	0.0	0.0	0.0	0.0
american badger	<i>Taxidea taxus</i>	SSC	0.3	0.7	0.8	0.5
red fox	<i>Vulpes vulpes</i>	None	0.0	0.0	0.0	0.0
Plants	See below	See below	See below	See below	See below	See below
tiburon mariposa lily	<i>Calochortus tiburonensis</i>	FT, ST	0.3	0.0	0.0	0.0
presidio clarkia	<i>Clarkia franciscana</i>	FE, SE	0.3	0.0	0.0	0.0
baker's larkspur	<i>Delphinium bakeri</i>	FE, SE	0.3	0.0	0.0	0.0
roderick's fritillary	<i>Fritillaria roderickii</i>	SE	0.3	0.0	0.0	0.0
marin western flax	<i>Hesperolinon congestum</i>	FT, ST	0.3	0.0	0.0	0.0
santa cruz tarplant	<i>Holocarpha macradenia</i>	FT, SE	0.3	0.0	0.0	0.0
contra costa goldfields	<i>Lasthenia conjugens</i>	FE	0.3	0.0	0.0	0.0
point reyes meadowfoam	<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i>	SE	0.3	0.0	0.0	0.0
white-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	FE, SE	0.3	0.0	0.0	0.0
tiburon jewelflower	<i>Streptanthus glandulosus</i> ssp. <i>niger</i>	FE, SE	0.3	0.0	0.0	0.0
two-fork clover	<i>Trifolium amoenum</i>	FE	0.3	0.0	0.0	0.0

Source: Caltrans 2021b
Notes: FE = federal endangered, FPT = federal proposed threatened, FS = federal sensitive (USFS and/or BLM sensitive), FT = federal threatened, SC = state candidate, SE = state endangered, SFP = state fully protected, SFS = state fire sensitive, SR = state rare, SSC = species of special concern (CDFW), ST = state threatened

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, *Modeled Estimated Impacts*, 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 will 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.

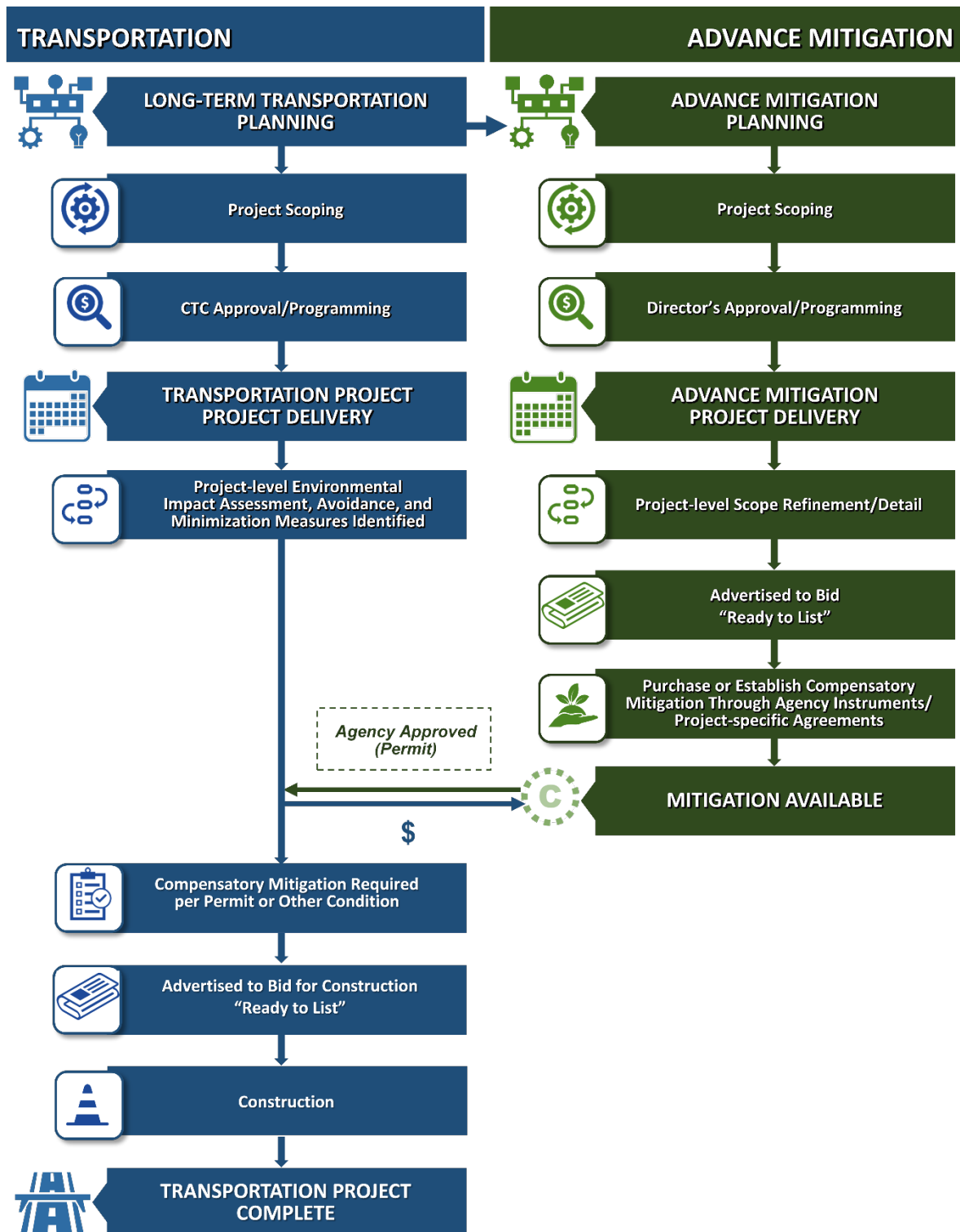
In this chapter, Caltrans summarizes the scheduling considerations and constraints of potential benefiting transportation projects in order to inform advance mitigation project schedules. A timeframe for the forecast advance mitigation needs is provided and analyzed. The potentially benefiting transportation 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, *Assessment of Authorized Activities*, 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).

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



The date when a Caltrans potential transportation project is expected to be Ready to List¹ is an appropriate estimate for identifying when a Caltrans advance mitigation project will need to deliver compensatory mitigation to a potential benefiting transportation project.

6.2 Patterns of Estimated Potential Impacts

Given that the planning horizon for this assessment covers the 2019/20 through 2028/29 fiscal years,² and that some of the transportation projects may have already gone to bid, it is necessary to consider which transportation projects:

- Would need to acquire compensatory mitigation before the AMP can deliver, and hence the AMP cannot 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 credits as an AMP advance mitigation project scope; and
- Would need compensatory mitigation farther out in time and, if so, whether there is time to establish new compensatory mitigation.

Initial estimated impact patterns are based on the planned SHOPP transportation project information provided in Table 5-1.

- As shown in Tables 6-1 through 6-3 and on Figures 6-2 through 6-4, when the SHOPP transportation projects identified previously have their aquatic resource impacts examined relative to their expected advertising date, the compensatory mitigation needs for wetlands and non-wetland waters are primarily focused on fiscal year 2023/24, with smaller needs spread throughout the 10-year planning period. Anticipated impacts on riparian habitat occur primarily in fiscal years 2020/21 and 2021/22, with smaller needs spread throughout the 10-year planning period. Anticipated impacts on threatened and endangered fish are focused on fiscal years 2023/24.
- As shown in Table 6-4 and on Figure 6-5, when the SHOPP transportation projects identified previously have their forecast species of mitigation need impacts examined relative to their expected advertising date, the compensatory mitigation needs for terrestrial species in the Northern California Coast Ecoregion Section are focused on fiscal year 2023/24 and largely consist of impacts on Myrtle's silverspot butterfly habitat.

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.

² SHOPP Project 20694 is scheduled to occur in 2030/31. It is a long-lead project and therefore included in this analysis.

- As shown in Table 6-5 and on Figure 6-6, when the SHOPP transportation projects identified previously have their forecast species of mitigation need impacts examined relative to their expected advertising date, the compensatory mitigation needs are focused solely on California red-legged frog during fiscal years 2026/27 and 2028/29 for the Northern California Coast Ranges Ecoregion Section.
- As shown in Table 6-6 and on Figure 6-7, when the SHOPP transportation projects identified previously have their forecast species of mitigation need impacts examined relative to their expected advertising date, the compensatory mitigation needs are focused on California red-legged frog during the latter portion of the 10-year planning period for the Central California Coast Ecoregion Section, with the greatest anticipated impacts during the 2026/27 fiscal year. Additionally, compensatory mitigation needs for California tiger salamander occur during the 2023/24 fiscal year.

Spatially, these transportation projects are distributed throughout the GAI.

Table 6-1. Gualala-Salmon: Estimated Impacts on Aquatic Resources, by Transportation Project Delivery Year

Expected Adver- tisement Year	Fish: Number of Transpor- tation Projects	Fish: Estimated Potential Impacts (acres)	Wetland: Number of Transpor- tation Projects	Wetland: Estimated Potential Impacts (acres)	Water: Number of Transpor- tation Projects	Water: Estimated Potential Impacts (acres)	Riparian: Number of Transpor- tation Projects	Riparian: Estimated Potential Impacts (acres)	% of Total Mitigation Need^a
2019/20	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2020/21	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2021/22	1	<0.1	1	0.1	1	0.1	0	0.0	1.9
2022/23	0	0.0	0	0.0	0	0.0	0	0.0	1.9
2023/24	1	2.4	1	3.1	1	2.5	0	0.0	78.1
2024/25	0	0.0	0	0.0	0	0.0	0	0.0	78.1
2025/26	2	0.1	2	0.3	2	0.1	0	0.0	82.9
2026/27	2	0.2	2	0.4	2	0.3	0	0.0	91.4
2027/28	1	0.2	1	0.1	1	0.3	0	0.0	97.1
2028/29	0	0.0	1	0.2	1	0.1	0	0.0	100
2029/30	0	0.0	0	0.0	0	0.0	0	0.0	100
2030/31	0	0.0	0	0.0	0	0.0	0	0.0	100
Total	7	2.9	8	4.2	8	3.4	0	0.0	100%

^a Indicative of the timing of mitigation need.

$$[\sum \text{impacts (year)} \div \sum \text{total impacts}] * 100$$

Figure 6-2. Gualala-Salmon: Estimated Impacts on Aquatic Resources, by Transportation Project Delivery Year

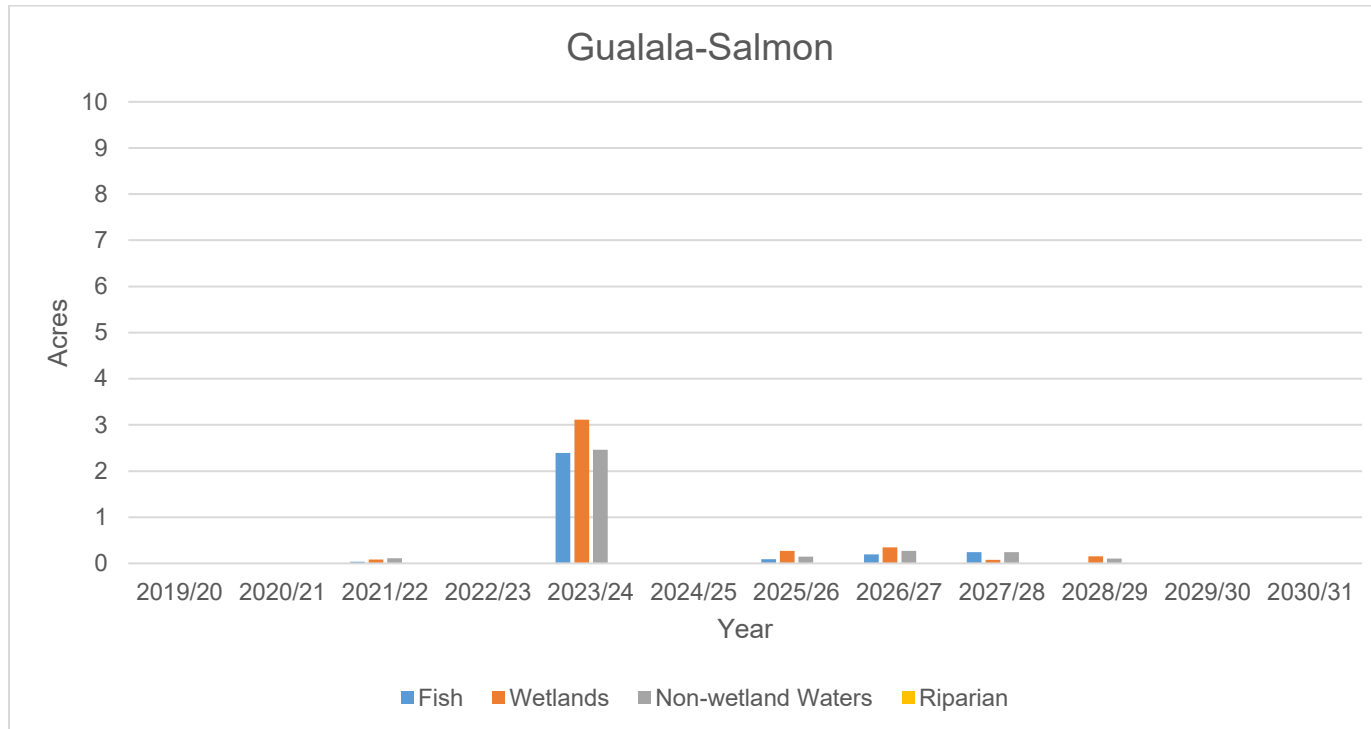


Table 6-2. Tomales-Drake Bays: Estimated Impacts on Aquatic Resources, by Transportation Project Delivery Year

Expected Adver- tisement Year	Fish: Number of Transpor- tation Projects	Fish: Estimated Potential Impacts (acres)	Wetland: Number of Transpor- tation Projects	Wetland: Estimated Potential Impacts (acres)	Water: Number of Transpor- tation Projects	Water: Estimated Potential Impacts (acres)	Riparian: Number of Transpor- tation Projects	Riparian: Estimated Potential Impacts (acres)	% Total Mitigation Need ^a
2019/20	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2020/21	1	0.4	0	0.0	1	0.1	1	18.4	70.8
2021/22	0	0.0	0	0.0	0	0.0	0	0.0	70.8
2022/23	0	0.0	0	0.0	0	0.0	0	0.0	70.8
2023/24	5	2.7	5	1.0	5	1.2	1	2.7	99.3
2024/25	1	0.1	1	0.1	1	<0.1	0	0.0	99.9
2025/26	1	<0.1	1	<0.1	1	<0.1	0	0.0	100
2026/27	0	0.0	0	0.0	0	0.0	0	0.0	100
2027/28	0	0.0	0	0.0	0	0.0	0	0.0	100
2028/29	0	0.0	0	0.0	0	0.0	0	0.0	100
2029/30	0	0.0	0	0.0	0	0.0	0	0.0	100
2030/31	0	0.0	0	0.0	0	0.0	0	0.0	100
Total	8	3.2	7	1.1	8	1.3	2	21.1	100%

^a Indicative of the timing of mitigation need.

$$[\sum \text{impacts (year)} \div \sum \text{total impacts}] * 100$$

Figure 6-3. Tomales-Drake Bays: Estimated Impacts on Aquatic Resources, by Transportation Project Delivery Year

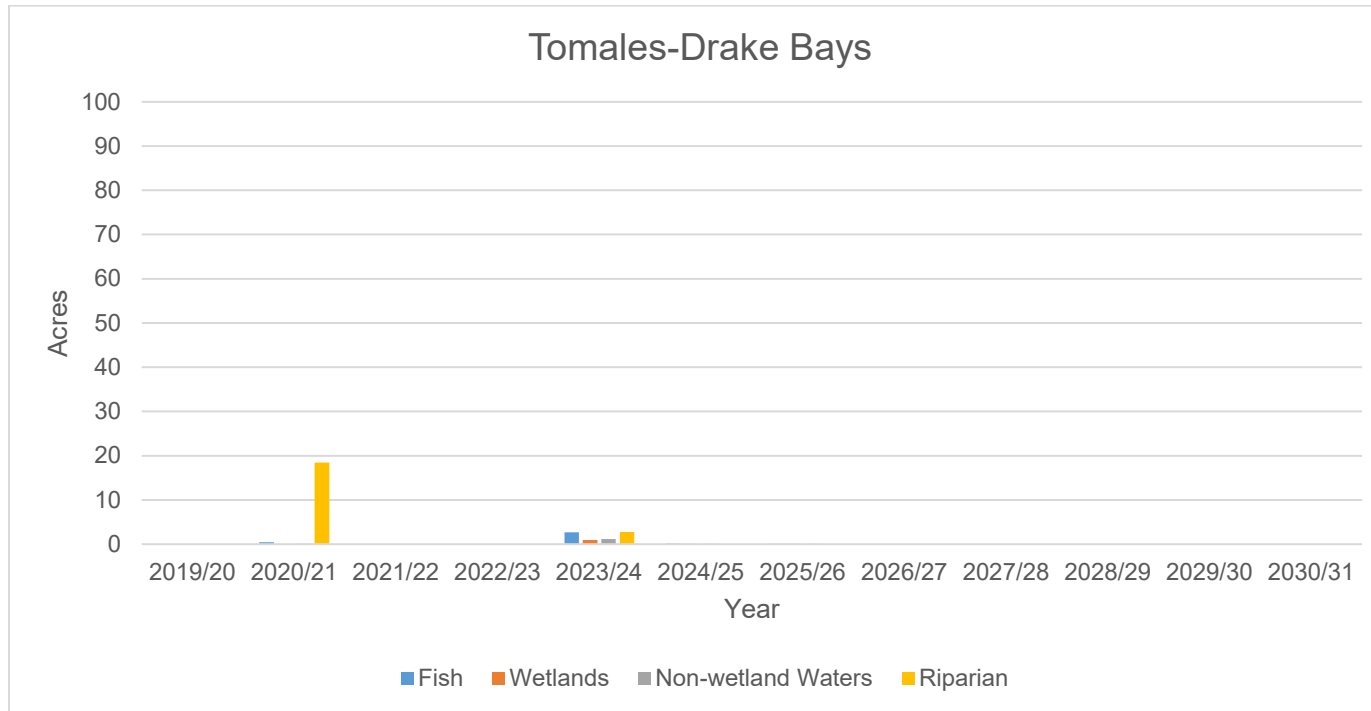


Table 6-3. San Pablo Bay: Estimated Impacts on Aquatic Resources, by Transportation Project Delivery Year

Expected Adver- tisement Year	Fish: Number of Transpor- tation Projects	Fish: Estimated Potential Impacts (acres)	Wetland: Number of Transpor- tation Projects	Wetland: Estimated Potential Impacts (acres)	Water: Number of Transpor- tation Projects	Water: Estimated Potential Impacts (acres)	Riparian: Number of Transpor- tation Projects	Riparian: Estimated Potential Impacts (acres)	% of Total Mitigation Need ^a
2019/20	1	0.1	1	<0.1	1	0.1	0	0.0	0.2
2020/21	1	0.2	0	0.0	1	0.1	0	0.0	0.5
2021/22	5	1.0	3	0.2	5	0.6	1	45.3	50.0
2022/23	1	0.1	1	<0.1	1	0.1	1	5.7	56.2
2023/24	5	5.0	2	0.5	5	1.2	1	4.7	68.2
2024/25	1	0.3	1	<0.1	1	0.2	0	0.0	68.7
2025/26	0	0.0	0	0.0	0	0.0	0	0.0	68.7
2026/27	2	0.1	1	0.1	2	0.1	2	14.7	84.5
2027/28	3	0.2	3	0.1	3	0.2	1	1.2	86.3
2028/29	2	0.2	2	0.1	2	0.1	1	9.7	96.9
2029/30	0	0.0	0	0.0	0	0.0	0	0.0	96.9
2030/31	1	1.0	1	1.2	1	0.7	0	0.0	100
Total	22	8.2	15	2.2	22	3.4	6	81.3	100%

^a Indicative of the timing of mitigation need.

$$[\sum \text{impacts (year)} \div \sum \text{total impacts}] * 100$$

Figure 6-4. San Pablo Bay: Estimated Impacts on Aquatic Resources, by Transportation Project Delivery Year

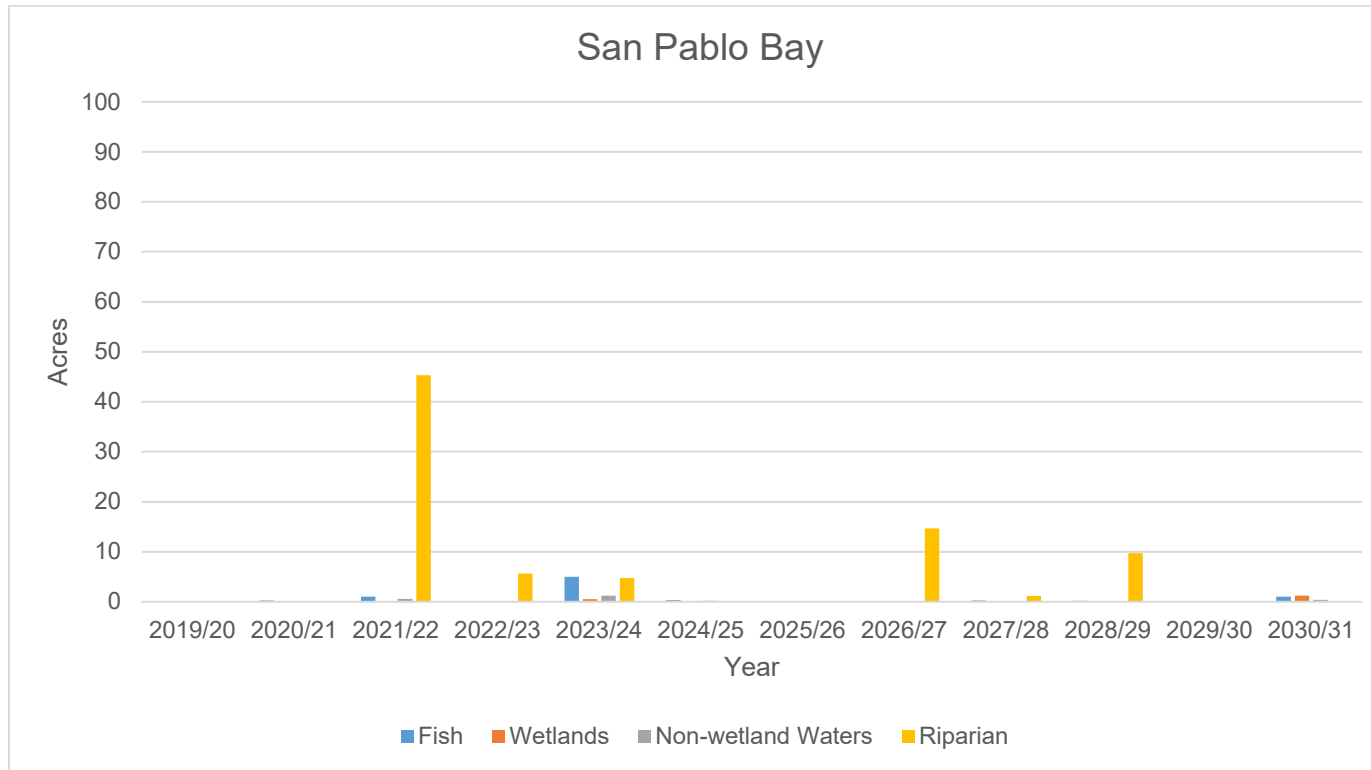


Table 6-4. Northern California Coast Ecoregion Section: Estimated Impacts on Species of Mitigation Need in the GAI, by Transportation Project Delivery Year

Expected Adver- tise- ment Year	Myrtle' s Silverspot Butterfly: Number of Transportation Projects	Myrtle' s Silverspot Butterfly: Estimated Potential Impacts (acres)	California Red- legged Frog: Number of Transportation Projects	California Red- legged Frog: Estimated Potential Impacts (acres)	California Tiger Salamander: Number of Transportation Projects	California Tiger Salamander: Estimated Potential Impacts (acres)	Swainson' s Hawk: Number of Transportation Projects	Swainson' s Hawk: Estimated Potential Impacts (acres)	% of Total Miti- gation Need ^a
2019/20	0	0.0	0	0.0	0	0.0	N/A ^b	N/A ^b	0.0
2020/21	0	0.0	2	1.0	0	0.0	N/A ^b	N/A ^b	0.9
2021/22	0	0.0	5	2.2	0	0.0	N/A ^b	N/A ^b	2.8
2022/23	0	0.0	1	0.1	0	0.0	N/A ^b	N/A ^b	2.9
2023/24	4	98.1	11	3.8	0	0.0	N/A ^b	N/A ^b	92.7
2024/25	1	0.3	2	0.4	0	0.0	N/A ^b	N/A ^b	93.3
2025/26	1	1.5	2	1.4	0	0.0	N/A ^b	N/A ^b	95.9
2026/27	0	0.0	3	1.3	0	0.0	N/A ^b	N/A ^b	97.0
2027/28	0	0.0	4	1.2	0	0.0	N/A ^b	N/A ^b	98.0
2028/29	0	0.0	3	1.8	0	0.0	N/A ^b	N/A ^b	99.6
2029/30	0	0.0	0	0.0	0	0.0	N/A ^b	N/A ^b	99.6
2030/31	0	0.0	1	0.5	0	0.0	N/A ^b	N/A ^b	100
Total	6	99.8	34	13.6	0	0.0	N/A ^b	N/A ^b	100%

^a Indicative of the timing of mitigation need.

$$[\sum \text{impacts (year)} \div \sum \text{total impacts}] * 100$$

^b N/A = not available. See Section 5.3.4. The SAMNA identifies no transportation projects and no impacts on Swainson's hawk for the planning period. However, recent Swainson's hawk observations suggests that the SAMNA's underlying CWHR information is out of date. Consequently, the SAMNA is likely not predicting Swainson's hawk impacts appropriately. Result is inconclusive.

Figure 6-5. Northern California Coast Ecoregion Section: Estimated Impacts on Species of Mitigation Need in the GAI, by Transportation Project Delivery Year

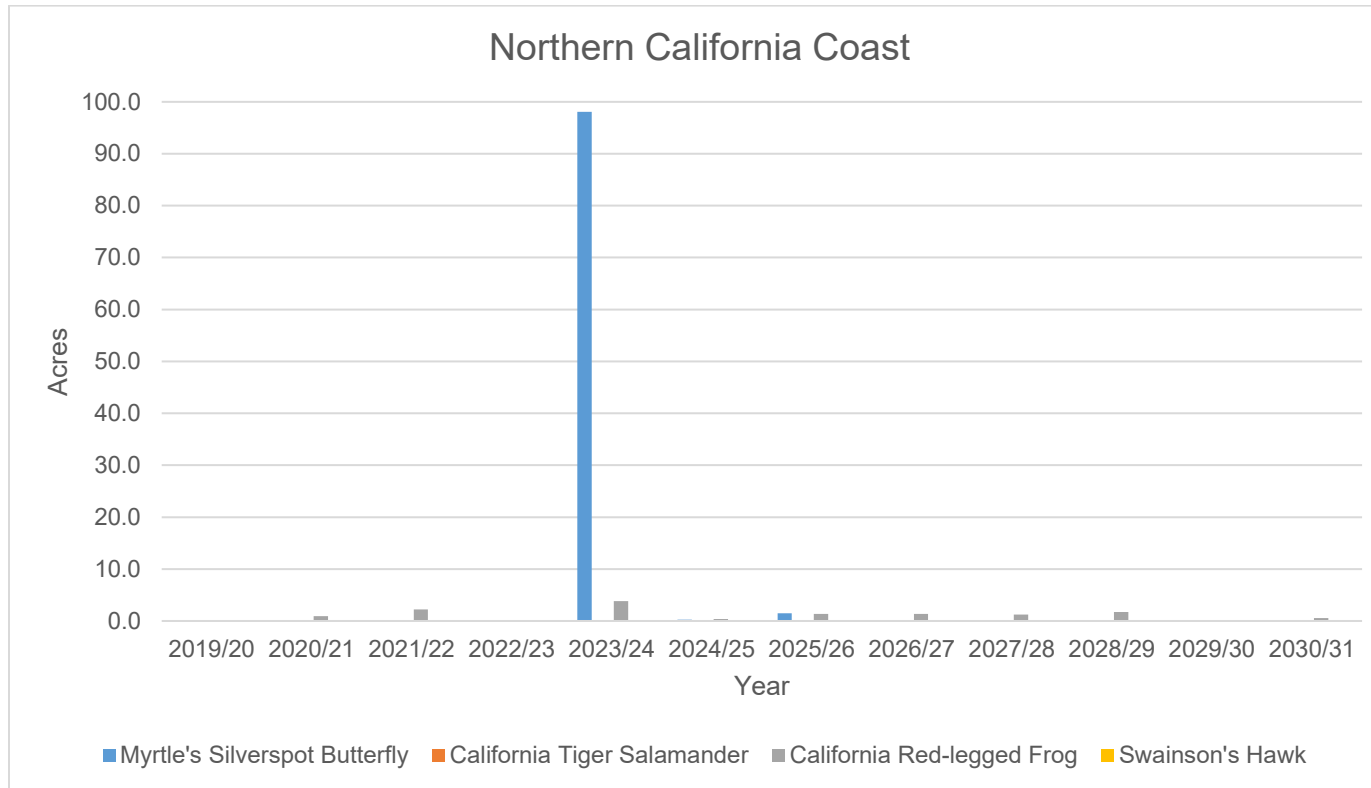


Table 6-5. Northern California Coast Ranges Ecoregion Section: Estimated Impacts on Species of Mitigation Need in the GAI, by Transportation Project Delivery Year

Expected Adver- tisement Year	Myrtle' s Silverspot Butterfly: Number of Transportation Projects	Myrtle' s Silverspot Butterfly: Estimated Potential Impacts (acres)	California Red-legged Frog: Number of Transportation Projects	California Red-legged Frog: Estimated Potential Impacts (acres)	California Tiger Salamander: Number of Transportation Projects	California Tiger Salamander: Estimated Potential Impacts (acres)	Swainson' s Hawk: Number of Transportation Projects	Swainson' s Hawk: Estimated Potential Impacts (acres)	% of Total Miti- gation Need ^a
2019/20	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2020/21	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2021/22	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2022/23	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2023/24	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2024/25	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2025/26	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2026/27	0	0.0	1	1.5	0	0.0	0	0.0	68.2
2027/28	0	0.0	0	0.0	0	0.0	0	0.0	68.2
2028/29	0	0.0	1	0.7	0	0.0	0	0.0	100
Total	0	0.0	2	2.2	0	0.0	0	0.0	100%

^a Indicative of the timing of mitigation need.

$$[\sum \text{impacts (year)} \div \sum \text{total impacts}] * 100$$

Figure 6-6. Northern California Coast Ranges Ecoregion Section: Estimated Impacts on Species of Mitigation Need in the GAI, by Transportation Project Delivery Year

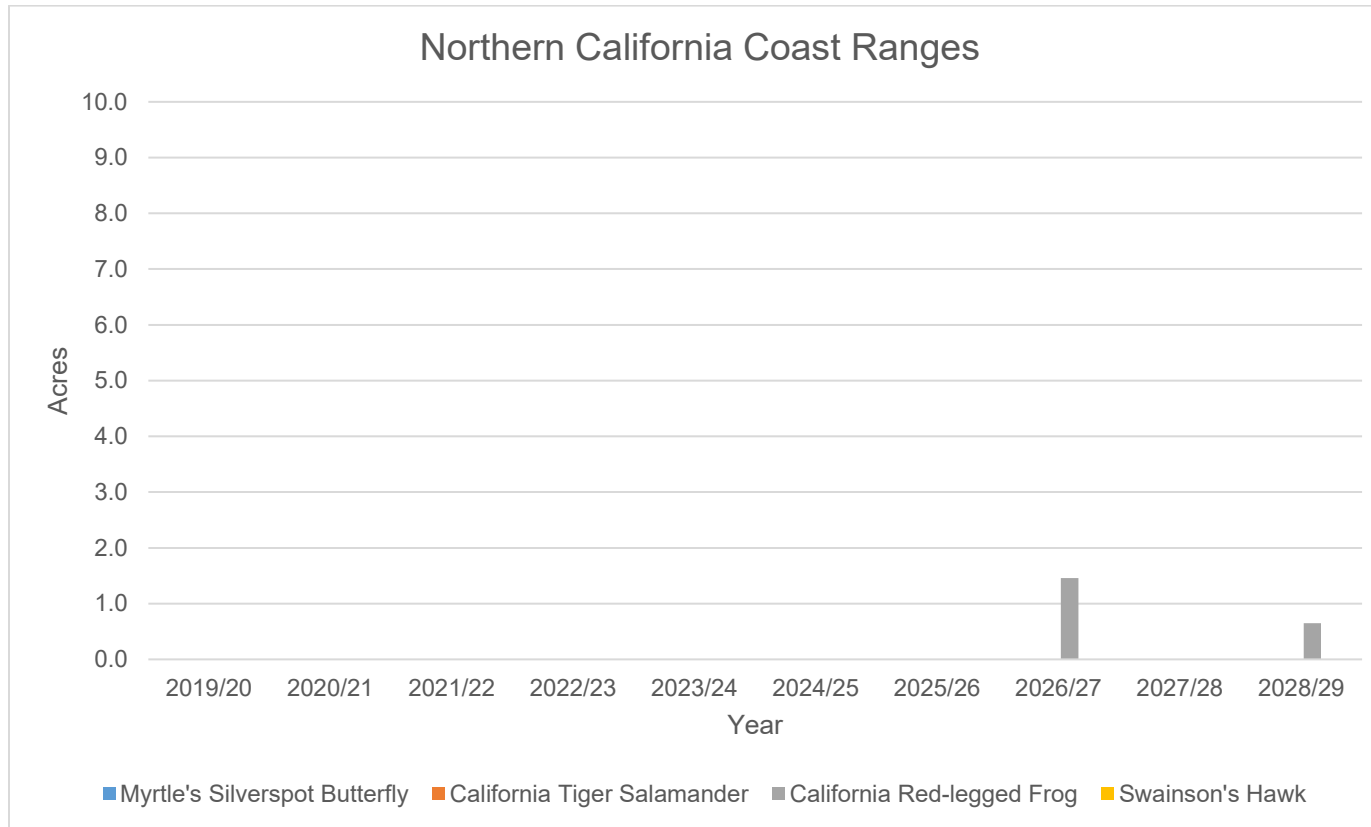


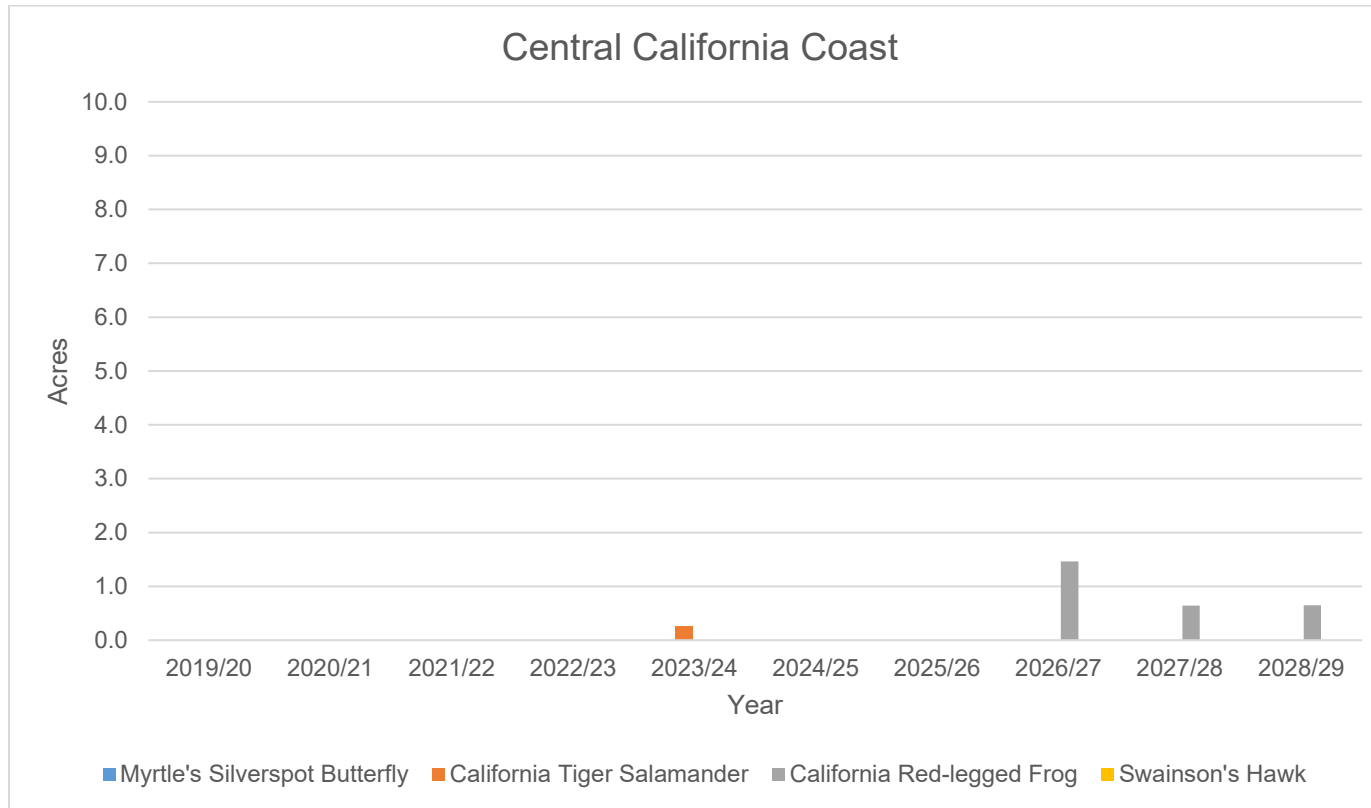
Table 6-6. Central California Coast Ecoregion Section: Estimated Impacts on Species of Mitigation Need in the GAI, by Transportation Project Delivery Year

Expected Adver- tisement Year	Myrtle' s Silverspot Butterfly: Number of Transportation Projects	Myrtle' s Silverspot Butterfly: Estimated Potential Impacts (acres)	California Red-legged Frog: Number of Transportation Projects	California Red-legged Frog: Estimated Potential Impacts (acres)	California Tiger Salamander: Number of Transportation Projects	California Tiger Salamander: Estimated Potential Impacts (acres)	Swainson' s Hawk: Number of Transportation Projects	Swainson' s Hawk: Estimated Potential Impacts (acres)	% of Total Miti- gation Need ^a
2019/20	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2020/21	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2021/22	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2022/23	0	0.0	0	0.0	0	0.0	0	0.0	0.0
2023/24	0	0.0	1	0.3	1	0.3	0	0.0	23.1
2024/25	0	0.0	0	0.0	0	0.0	0	0.0	23.1
2025/26	0	0.0	0	0.0	0	0.0	0	0.0	23.1
2026/27	0	0.0	1	2.0	0	0.0	0	0.0	100
2027/28	0	0.0	0	0.0	0	0.0	0	0.0	100
2028/29	0	0.0	0	0.0	0	0.0	0	0.0	100
Total	0	0.0	2	2.3	1	0.3	0	0.0	100%

^a Indicative of the timing of mitigation need.

$$[\sum \text{impacts (year)} \div \sum \text{total impacts}] * 100$$

Figure 6-7. Central California Coast Ecoregion Section: Estimated Impacts on Species of Mitigation Need in the GAI, by Transportation Project Delivery Year



6.3 Acceleration Priorities

The SHS Management Plan is a 10-year plan that integrates the maintenance, rehabilitation, and operation of the SHS into a single management plan. The SHS Management Plan framework allows Caltrans to optimize integration of multimodal transportation options into traditional rehabilitation work to provide a cost-effective way to expand modal choice and reduce transportation-related emissions. It enables Caltrans to make well-informed investment decisions, balance competing priorities, evaluate long-term performance outcomes, promote transparency, and communicate to stakeholders the value of investments in transportation infrastructure.

The SHS Management Plan results in a statewide performance plan to ensure that SHOPP funding is directed toward specific objectives to achieve statewide condition and performance goals. Each Caltrans District owns a portion of the statewide performance plan. Caltrans District-level SHOPP Performance Plans identify the inventory, current condition or performance levels, quantified pipelined performance, targets for the last 5 years of the 10-year plan period, and a target project portfolio budget. The Caltrans District-level SHOPP Performance Plans break down the SHS Management Plan Investment Plan to a District level. Each Caltrans District receives this plan after the approval of each SHS Management Plan. Districts are required to maintain a SHOPP portfolio that meets the District-level SHOPP Performance Plan requirements.

The SHOPP Ten-Year Book is the Caltrans Districts' SHOPP 10-year project portfolio. This project book should meet the fiscal and performance requirements of the District-level SHOPP Performance Plan. Caltrans Districts update their project books every quarter. Once the project books are certified, they become publicly available at: projectbook.dot.ca.gov. The most current project book, as of December 2021, is the Quarter 4 project book of fiscal year 2020/21. The projects in the first 5 years of the project book have typically completed formal planning and are currently being designed or are expected to begin design in the next few years. Most have funding approval from the California Transportation Commission for one or more phases of the project. These projects are well-defined but could still require changes in scope, cost, or schedule as they go through the environmental and design processes. Most of the projects in the second 5 years of the project book are still undergoing formal planning efforts. They are typically less defined than the projects in the first 5 years.

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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, therefore, 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 and STIP-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.

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 Fish and Game Code § 1852, subdivision (c)(8).

To determine the wildlife resource conservation goals and objectives applicable to the GAI, Caltrans:

- 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, summarizes the life history information for the four wildlife species of mitigation need chosen to focus the assessment, as identified in Section 1.5.
- Next, in Sections 7.4, 7.5, and 7.6, for the species of mitigation need, 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 enhance the conservation benefits through advance mitigation projects
 - Opportunities to benefit other special-status and native wildlife species through advance mitigation
- Last, analyzes the aforementioned information in relation to the transportation-related activities that could potentially affect the species of mitigation need, and the potential range of compensatory mitigation that could satisfy a future transportation project condition associated with the activities.

The results of this analysis are 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 regulated by other natural resource regulatory agencies. This RAMNA identifies goals and objectives for aquatic resources, including threatened and endangered fish species, separately in Chapter 8, *Aquatic Resources Conservation Goals and Objectives*.

Table 7-1. Natural Resource Regulatory Agencies with the Authority to Approve Wildlife Resource Compensatory Mitigation Credits (or Values)

Agency ^a	Summary
CCC	<p>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 Coastal Development Permits, CCC implements the policies of the Coastal Act, including protecting sensitive resources (for example, wetlands, waters, ESHAs), water quality, public access to the coast, and more, and requires mitigation for unavoidable impacts on these resources. CCC also coordinates with local governments in developing and certifying LCPs, which allow local governments to assume the authority to issue Coastal Development Permits 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.</p>
CDFW	<p>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. 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.</p>
FWS	<p>FWS has jurisdiction over a broad range of fish and wildlife resources. FWS authorities related to these resources are codified under multiple statutes, including, but not limited to, the ESA. Most statutes give FWS an advisory role in mitigation. However, if a non-federal entity applies for an incidental take permit for a listed animal species, Section 10(a)(2)(b) of the ESA requires that the impact of any incidental take be minimized and mitigated to the maximum extent practicable. Section 7(a)(1) of the ESA also requires all federal agencies to use their authorities to conserve listed species. Many federal agencies have developed programs to include mitigation as part of the Section 7(a)(2) consultation on their proposed actions to partially fulfill this Congressional mandate.</p> <p>Conservation banking can assist federal and non-federal participants in the Section 7 and Section 10 process. In May 2003, FWS issued comprehensive federal guidelines designed to promote conservation banks as a tool for mitigating adverse impacts on species; the guidelines foster national consistency by standardizing establishment and operational criteria. Many activities conducted under Section 7 and Section 10 of the ESA result in adverse effects on listed species, including habitat loss or modification. One way to offset these types of impacts is to include in the project design a plan that involves the restoration and/or protection of similar habitat on site and/or off site. Purchasing credits in conservation banks is one method of protecting habitat on site or off site.</p>

Agency ^a	Summary
NMFS	<p>NMFS has jurisdiction over marine species listed as threatened or endangered under the ESA. Federal agencies must consult with NMFS to ensure that their actions do not jeopardize the continued existence of ESA listed species or result in the destruction or adverse modification of designated critical habitat.</p> <p>NMFS also manages and conserves wildlife and fisheries resources in the marine and estuarine environment under the Magnuson-Stevens Fishery Conservation and Management Act. Federal agencies must consult with NMFS on any action that might adversely affect EFH. NMFS will advise federal agencies to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH. Magnuson-Stevens Fishery Conservation and Management Act EFH consultation can be done in tandem with ESA consultation.</p> <p>NMFS protects marine mammals under the Marine Mammal Protection Act, with the exception of sea otters, walruses, manatees, and polar bears, which are managed by FWS. With some exceptions, the Marine Mammal Protection Act prohibits the take of marine mammals, including harassment, hunting, capturing, collecting, or killing, in U.S. waters and by U.S. citizens on the high seas.</p>

^a In addition to the agencies listed above, the RWQCBs may exert jurisdiction over species to the extent that wildlife habitat; rare, threatened, or endangered species; cold freshwater habitat; or spawning, reproduction, and/or early development beneficial uses exist and would be affected by a project.

7.3 Species of Mitigation Need

An overview of wildlife resources is provided in Chapter 2, *Environmental Setting*. As described in Section 1.5, species of mitigation need were selected to focus the planning effort and improve the probability that advance mitigation projects undertaken by Caltrans will yield credits (or similar) that will be usable during the planning period. To this end, the species of mitigation need identified for the GAI are Myrtle’s silverspot butterfly, California red-legged frog, California tiger salamander, and Swainson’s hawk. Each species is briefly described below.

7.3.1. Myrtle’s Silverspot Butterfly

Myrtle’s silverspot butterfly is a federally endangered insect species that is endemic to the northern California coast, where it occupies coastal grasslands and prairies, often adjacent to coastal bluff and dune habitats (FWS 2021c). They are thought to have once ranged from the mouth of the Russian River on the Sonoma County coast south to Point Año Nuevo in San Mateo County. However, they are believed to have been extirpated south of the Golden Gate Bridge since at least the 1970s and are now known from only a few sites in western Marin and southwestern Sonoma Counties. Multiple populations likely inhabit Point Reyes National Seashore in Marin County (FWS 2021c), and one population is known from near Scotty Creek and Gleason Beach just north of Bodega Bay in Sonoma County.

The host plant of Myrtle’s silverspot butterfly is western dog violet (*Viola adunca*), upon the dried leaves and stems of which the females oviposit their single eggs. After a few weeks, the larvae emerge from their eggs, make their way into nearby foliage, and enter diapause through the fall and winter. In spring, the larvae begin feeding on the fresh violet leaves, eventually forming a chrysalis and entering the pupal stage, from which they

emerge 2 weeks later for a summer flight season that lasts approximately 5 weeks (FWS 2021c).

7.3.2. California Red-legged Frog

California red-legged frog is a federally threatened amphibian species and a California species of special concern that has been extirpated from 70 percent of its historical range. Most California red-legged frog occurrences have been recorded below 3,500 feet; however, they can be found from sea level up to elevations of 5,200 feet (FWS 2002). Eight Recovery Units were established by the *Recovery Plan for the California Red-legged Frog* (FWS 2002). The GAI falls within the North Coast and North San Francisco Bay and South and East San Francisco Bay California red-legged frog Recovery Units.

California red-legged frog habitat consists of the following components: aquatic breeding habitat, non-breeding aquatic habitat, upland habitat, and dispersal habitat. Aquatic breeding habitat includes natural or artificial, ephemeral or permanent standing bodies of fresh water, slow-moving streams, or pools within streams that can sustain all the aquatic life stages of the species. These areas must hold water for at least 20 weeks during the year, which is the minimum amount of time needed for breeding and tadpole development and metamorphosis (FWS 2010; Hayes and Jennings 1988). It is also critical that aquatic breeding habitat for the species be free of predatory bullfrogs, or at least provide sufficient vegetative cover as protection from predation. Ephemeral aquatic features often prove to be better breeding habitat for California red-legged frogs because the drying period helps to prevent establishment of bullfrog populations.

Non-breeding aquatic habitat includes springs, seeps, moist cracks within dried ponds, and vegetated areas growing within the floodplains of rivers and streams. These areas do not hold enough water for frog breeding but provide cover and space needed for foraging and dispersal to other breeding habitats, and they are particularly important during drought periods (Alvarez 2004; FWS 2010).

Upland habitat consists of areas where California red-legged frogs can seek shelter, such as under boulders, rocks, animal burrows, fallen logs, and agricultural debris such as watering troughs and haystacks (FWS 2010; Jennings and Hayes 1994). Upland habitats are also important because they buffer aquatic habitats from degradation and provide space for foraging, sheltering, and avoiding predation (FWS 2010).

Dispersal habitats are the least clearly defined component of California red-legged frog habitat but are nevertheless very important to the survival of the species. They are migration corridors that allow the frogs to disperse overland to and from breeding sites, sometimes as far as 1.5 miles apart. Dispersal habitat can take many forms; a riparian woodland corridor between aquatic breeding habitat and upland refugia provides a more obvious dispersal opportunity; however, in some areas California red-legged frogs may make use of pastures, row crop fields, or other less natural habitats for dispersal.

7.3.3. California Tiger Salamander

California tiger salamander is an amphibian species that is endemic to California. There are three DPSs of California tiger salamander: the Central California DPS, Santa Barbara County DPS, and Sonoma County DPS. The Sonoma County DPS occurs only in the Sonoma County portion of the GAI between the city of Petaluma and the town of Valley Ford, while the Central California DPS only overlaps the southeastern corner of the GAI in Contra Costa and Alameda Counties. This species is found from near sea level up to a maximum elevation of approximately 3,940 feet above mean sea level. Typical habitat associations include grassland, oak savanna, edges of mixed woodland, and lower-elevation coniferous forest (FWS 2021d).

California tiger salamanders require both suitable upland (terrestrial) habitat for refuge and aquatic habitat for breeding and larval development. They spend most of their lives underground, relying on a network of burrows created by small mammal species such as Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), and moles (*Scapanus* spp.). Historic California tiger salamander breeding habitat was primarily natural vernal pools and ponds, but now includes modified ephemeral and permanent ponds such as livestock ponds (FWS 2021d). Optimal breeding ponds are ephemeral, forming in winter and drying in summer, and free of predatory nonnative fish and bullfrogs.

7.3.4. Swainson's Hawk

Swainson's hawk is a state threatened bird species that nests throughout much of western North America, with an isolated breeding population in California's Central Valley (CDFW 2016b). They are primarily a neotropical migrant species, with most birds spending the winter months in Latin America as far south as Argentina, then returning to California to nest in March and early April. A few individuals remain in California over the winter, mostly in the Sacramento-San Joaquin River Delta (CDFW 2019a). While this species is included in the SAMNA, no impacts on the species or its habitat were forecast (see Chapter 5, *Modeled Estimated Impacts*).

Historically, Swainson's hawks nested in coastal valleys, including the Napa and Santa Rosa Valleys in the eastern portion of the GAI. Extensive surveys during the late twentieth century showed that the species appeared to no longer nest there. However, in recent years, Swainson's hawks have been observed nesting at the northern end of the San Francisco baylands in Napa and Sonoma Counties, suggesting that the species may be beginning to reclaim parts of its historic range in the GAI (CDFW 2016b).

Swainson's hawks nest in mature cottonwood-willow riparian woodland, oak savanna, and in large isolated trees (including nonnative trees such as gum [*Eucalyptus* spp.] and Australian pine [*Casuarina equisetifolia*]) in or on the periphery of agricultural fields. Historically, Swainson's hawks foraged primarily in grasslands and open shrublands. However, as those habitats have been converted for urban development and agricultural production, Swainson's hawks have increasingly foraged in agricultural fields, especially alfalfa and row crops, and some have taken to nesting in urban areas with agricultural

fields nearby, such as in the cities of Davis and Sacramento (England et al. 1995). Orchards and vineyards provide little to no value as foraging habitat for Swainson's hawks because the dense structure of the vegetation incumbers their ability to stoop on prey. Swainson's hawks mainly prey on small mammals, especially California vole (*Microtus californicus*), as well as a variety of small birds and insects. They are largely monogamous, forming strong pair bonds, and they also exhibit strong site fidelity, often returning to the same nest tree for many successive seasons (CDFW 2016b).

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, relevant to the species of mitigation need, identify key habitats or designate specific lands or areas to protect for conservation of the species of mitigation need in the GAI. For example, several LCPs listed in Appendix C include ESHAs with species attributes. These conservation and land management plans are presented in Table 7-2.

The conservation and land management plans include measures to address specific known, ongoing threats to individuals and populations, which are incorporated into and/or inform the advance mitigation conservation goals and objectives compiled below. Caltrans may also use this information during advance mitigation project scoping to help compensatory mitigation efforts in the GAI align with the goals and objectives of natural resource regulatory agencies that approve mitigation.

Table 7-2. Documents Identifying Areas for Species of Mitigation Need Conservation in the GAI

Document	Reference	Areas of Important Habitat
Special-status Species and Sensitive Habitat Documents	See below	See below
<i>Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly</i>	FWS 1998	FWS' recovery plan for Myrtle's silverspot butterfly occurring in the GAI. Identifies known populations of Myrtle's silverspot, all of which occur in coastal areas that are within the GAI.
<i>5-Year Review: Myrtle's Silverspot Butterfly</i> (Speyeria zerene myrtleae)	FWS 2021c	Identifies the known populations of Myrtle's silverspot butterfly, including dune habitats in Point Reyes National Seashore and several coastal locations northward into southern Sonoma County. The entire known range of the Myrtle's silverspot falls within the GAI.
<i>Recovery Plan for the California Red-legged Frog</i> (Rana aurora draytonii)	FWS 2002	<p>FWS' recovery plan for California red-legged frog occurring in the GAI. Identifies California red-legged frog Recovery Units and their respective Core Areas, including those wholly or partially within the GAI:</p> <ul style="list-style-type: none"> ▪ North Coast and North San Francisco Bay Recovery Unit ▪ South and East San Francisco Bay Recovery Unit ▪ Upper Sonoma Creek Core Area ▪ Petaluma Creek – Sonoma Creek Core Area ▪ Point Reyes Peninsula Core Area ▪ Belvedere Lagoon Core Area ▪ Jameson Canyon – Lower Napa River Core Area ▪ East San Francisco Bay Core Area
<i>Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule</i>	FWS 2010	FWS' designation of critical habitat for the California red-legged frog. The following Critical Habitat units are wholly or partially within the GAI: CCS-1, MRN-1, MRN-2, MRN-3, SOL-1, SON-1, SON-2, and SON-3.
<i>Recovery Plan for the Santa Rosa Plain</i>	FWS 2016	<p>Identifies the current core range of the California tiger salamander Sonoma County DPS in southwest Santa Rosa and south Cotati, including known breeding ponds within the GAI near Roblar Road and Stony Point Road. Identifies Core and Management Areas for the DPS, including those wholly or partially within the GAI:</p> <ul style="list-style-type: none"> ▪ Americano-Stemple Management Area ▪ East Cotati Management Area ▪ West Cotati Core Area

Document	Reference	Areas of Important Habitat
<i>5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment</i> (Ambystoma californiense)	FWS 2021d	Identifies known range of the Sonoma County DPS on the Santa Rosa Plain, including known breeding ponds within the GAI northwest of Petaluma.
<i>Five-Year Status Review for Swainson's Hawk</i> (Buteo swainsoni)	CDFW 2016b	Identifies breeding range and status of the species within the GAI. Notes that nests have recently been observed in upland areas near Highway 37, which is within the GAI.
Conservation and Land Management Documents	See below	See below
<i>California Wildlife Movement Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region</i>	CDFW 2020	Within the GAI, identifies the section of Highway 12 near Glen Ellen as a wildlife passage priority for mule deer, mountain lion, and general mesocarnivores. The SHOPP Ten-Year Book does not include transportation projects in this area. Priority passage locations for other special-status species that share their habitat were not identified.
<i>CEHC</i>	Spencer et al. 2010	Identifies Natural Landscape Blocks and Essential Connectivity Areas in the Central Coast and North Coast Ecoregions, which overlap the GAI. There are 24 Essential Connectivity Areas in the Central Coast Region and another 24 in the North Coast Ecoregion.
<i>City of Albany General Plan 2035</i>	City of Albany 2016	Includes a measure requiring preconstruction surveys and impact analysis for California red-legged frogs and other special-status species prior to construction near Cerrito and Codornices Creeks.
<i>East Bay Regional Conservation Investment Strategy</i>	ICF 2021	Includes California red-legged frog as a focal species and defines conservation targets for the preservation of 8,110 acres of breeding habitat, 18,500 acres of refugia habitat, and 446,180 acres of dispersal habitat. Includes Swainson's hawk as a focal species and defines conservation targets for the preservation of 1,700 acres of nesting habitat, 24,420 of natural foraging habitat, and 43,900 acres of agricultural foraging habitat. However, all areas of modeled Swainson's hawk habitat within the RCIS area are outside of the GAI.

Document	Reference	Areas of Important Habitat
<i>Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan/Environmental Impact Statement</i>	NPS 2014	Notes the presence of California red-legged frogs at many sites within the Golden Gate National Recreation Area. Identifies suitable habitat and management priorities for California red-legged frog at several locations, including Sweeney Ridge, Tennessee Valley, Lower Redwood Creek, and Mori Point.
<i>Point Reyes National Seashore General Management Plan Amendment Final Environmental Impact Statement</i>	NPS 2020	NPS' management plan for Point Reyes National Seashore. California red-legged frog and Myrtle's silverspot butterfly are known to occur in the park. The preferred alternative for the amendment is primarily concerned with elements of park operations and zoning that are not pertinent to this RAMNA except for one goal to prioritize restoration in wetlands for habitat value and water quality in a newly established Scenic Landscape Zone. This plan is currently being amended, with the amendment awaiting a final Record of Decision.
<i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i>	FWS 2011	Notes that 15.5 acres of upland habitat at Sears Point was planned for enhancement to benefit California red-legged frog. Identifies Swainson's hawk as occurring in the refuge.
<i>Sonoma Creek Baylands Strategy Final Report – May 2020</i>	Sonoma Land Trust and San Francisco Bay Restoration Authority 2020	Includes a goal to enhance and restore aquatic areas of the Sonoma Creek and Tolay Creek watersheds.
<i>Sugarloaf Ridge State Park Final General Plan and Environmental Impact Report</i>	California Parks and Recreation 2004a	Identifies California red-legged frog as potentially occurring with the park. Includes general measures such as maintenance of wildlife corridors and avoiding intensive public use of wildland areas.

Document	Reference	Areas of Important Habitat
SWAP	CDFW 2015a	<p>The GAI lies within two adjacent ecoregions: the North Coast and Klamath Ecoregion and the Bay Delta and Central Coast Ecoregion:</p> <ul style="list-style-type: none"> ▪ In the North Coast and Klamath Ecoregion, identifies freshwater marsh as a conservation target, which is also identified as a habitat type for California red-legged frog. ▪ In the Bay Delta and Central Coast Ecoregion, identifies California grassland, vernal pools, and flowerfields, coastal sage scrub, American southwest riparian forest and woodland, north coast deciduous scrub and terrace prairie, freshwater marsh, and coastal lagoons as conservation targets, which are also identified as habitat types for California red-legged frog. California grassland, vernal pools, and flowerfields are also identified as habitat for Swainson's hawk in this ecoregion. <p>The SWAP defines a broad target of increasing the acreage of specific vegetation types and habitats available to focal species by 5% over their 2015 levels by 2025.</p>
<i>Tomales Bay State Park General Plan</i>	California Parks and Recreation 2004b	<p>States that California red-legged frog is present within the park, and that Myrtle's silverspot may potentially be present, although its status in the park is unknown. Includes measures to establish development setbacks from riparian areas to protect California red-legged frog and to investigate removal of barriers to natural stream flows.</p>

7.5 Pressures and Stressors

Pressures and stressors refer to environmental trends or physical, chemical, or biological factors or conditions that affect the species of mitigation need or its habitat. According to the SWAP (CDFW 2015a), 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 2015a). The *5-Year Review: Myrtle’s Silverspot Butterfly* (FWS 2021c), the *Recovery Plan for the California Red-legged Frog* (FWS 2002), the *5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment* (FWS 2021d), and the *Five-Year Status Review for Swainson’s Hawk* (CDFW 2016b) refer to these pressures and stressors as threats.

The plans included in Table 7-2 identify multiple pressures and stressors contributing to the decline of the species of mitigation need within their ranges. These pressures and stressors were evaluated with regard to whether they are types of effects that could result from, or be worsened by, transportation projects funded through SHOPP and STIP and whether the species of mitigation need could benefit from in-kind compensatory mitigation purchased or established through an advance mitigation project.

7.5.1. 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 existing habitat for all species of mitigation need. Additionally, roads and urbanization have resulted in habitat fragmentation and a decrease in connectivity between habitats that support species of mitigation need populations.

Destruction and adverse modification of habitat are considered to be the greatest threats to Myrtle’s silverspot butterfly. Because the species exists as a series of disjunct populations, loss or modification of habitat anywhere within its range may lead to loss of an entire population. Vehicle strikes have also been documented as a significant source of mortality of adult butterflies near roads (FWS 2009, 2021c).

Habitat loss and alteration have been the primary cause of California red-legged frog and California tiger salamander population declines. Current suitable habitats are often small remnants of what were historically much larger habitats covering entire watersheds. Roads in particular have been implicated in causing habitat fragmentation, often causing mass mortality of amphibians attempting to cross. Roads and highways hinder the movement of California red-legged frogs and California tiger salamanders and are considered permanent physical barriers leading to increased habitat fragmentation and isolation of populations. Artificial light pollution from urban and roadway illumination can affect California red-legged frogs and California tiger salamanders by causing spatial

disorientation, disruption in circadian rhythms, and alteration to natural foraging, breeding, and migration activity, which can negatively affect populations (Bliss-Ketchum et al. 2016). Roads near aquatic habitats that are poorly constructed or inadequately maintained may lead to increased erosion, sedimentation, and petrochemical runoff, negatively affecting amphibian populations (FWS 2002) including California red-legged frog and California tiger salamander.

Conversion of non-orchard/vineyard agricultural fields to urbanization is seen as a significant threat to Swainson's hawks, which extensively utilize such fields as foraging habitat. Swainson's hawks are known to use lone trees along roadsides near suitable foraging areas for nesting, and loss of these types of trees as a result of road maintenance activities would negatively affect breeding habitat availability for the species (CDFW 2016b).

7.5.2. Invasive Species

Transportation projects and associated ongoing maintenance activities have the potential to introduce and/or spread nonnative, invasive species. The entry of invasive, nonnative species into an ecosystem may reduce biodiversity, degrade habitats, alter native genetic diversity, shift habitat type, and further threaten already endangered or threatened natural resources.

Invasive plants, notably iceplant and European beachgrass (*Ammophila arenaria*), are considered a significant threat to Myrtle's silverspot butterflies because they may outcompete and overgrow the native host plant and/or nectar plants of those butterflies (FWS 2009).

California red-legged frogs are susceptible to predation at various life stages from several nonnative invasive species, including American bullfrog, African clawed frog, red swamp crayfish, signal crayfish, western mosquitofish, and centrarchid fish (such as bass). It is often unclear whether these species are directly eliminating California red-legged frogs from the habitats that they invade, or whether conditions within those habitats have changed and now favor the invasive species. California red-legged frogs may persist in the presence of some of these invasive species depending on site-specific factors, although reproductive success is often severely depressed (FWS 2002).

Proliferation of dense invasive weeds in vernal pool habitats can render them unsuitable as breeding habitat for California tiger salamanders (FWS 2021d). When the Sonoma County DPS of California tiger salamander was first listed in 2003, the nonnative barred tiger salamander, which predates and hybridizes with the native California tiger salamanders, had yet to be recorded on the Santa Rosa Plain. However, a 2020 genetic analysis of salamanders at the Alton Lane management area just north of Santa Rosa found that hybridization had started occurring there (FWS 2021d).

Invasive species are not thought to be a significant threat to Swainson's hawks, and in fact they have been documented using nonnative trees such as gums (*Eucalyptus* spp.) and Australian pine (*Casuarina equisetifolia*) as nesting habitat (CDFW 2016b).

7.5.3. Disease and Predation

There have been no studies of the effects of disease in Myrtle's silverspot butterfly, so the degree of this threat to the species is unknown (FWS 2009).

Diseases, such as various forms of ranavirus and a chytrid fungus that can lead to mortality in certain amphibians and has the potential to affect their populations, may affect California red-legged frogs and California tiger salamanders. Although the effects of the chytrid fungus, often referred to as "Bd," on California red-legged frogs are not well-known, it is known to cause a deadly amphibian disease called chytridiomycosis (FWS 2002).

Swainson's hawks have been documented suffering mortality from West Nile virus, although relatively few cases have been confirmed and the disease has not been implicated in any population declines (CDFW 2016b).

As described above, predation is considered a major threat to many of the species of mitigation need in the GAI. Introduced fish, crayfish, and bullfrogs are known to predate all life stages of California red-legged frog (FWS 2002). Besides being outcompeted by them, California tiger salamanders are also often preyed upon by the larger nonnative barred tiger salamanders (FWS 2021d). Predation is not thought to be a disproportionate threat to Swainson's hawks or Myrtle's silverspot butterflies.

7.5.4. Climate Change, Drought, Wildfire, and Sea-level Rise

Section 2.5 provides a brief overview of the GAI's climate and available planning-level predictions for climate change in the region. In the next 30 years, the climate is expected to change. 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 drought, wildfires, and landslides (Caltrans 2018b). Figure 2-6 depicts the terrestrial climate change resilience rank from the ACE dataset (CDFW 2018a). Resilience is highest in the northernmost part of the GAI in the Coast Ranges and in the southern part of the GAI by San Francisco and San Pablo Bays. Resilience in these areas ranges from 3 to 4. Resilience in the remainder of the GAI ranges from 1 to 2 and is generally lowest along the coast. Terrestrial connectivity in the GAI is depicted in Figure 2-11, which shows large remaining blocks of intact habitat and natural landscapes. These areas are expected to provide opportunities for the species of mitigation need 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.

The anticipated changes to California's climate may lead to situations where the Myrtle's silverspot butterfly life cycle falls out of sync with that of western dog violet, meaning that host plant resources may not be available to the butterfly during its reproductive period. In addition, more extreme weather events may deplete the metabolic resources of larvae that are in diapause (FWS 2021c), causing them either to metamorphose to adults in

deteriorated body condition, or causing mortality before they are able to metamorphose at all.

Large populations of California red-legged frog can survive stochastic events such as fires, floods, or drought; however, many populations are small and isolated because of habitat loss and other stressors. These smaller and more vulnerable populations are in danger of extirpation because of climate change. Shorter hydroperiods in aquatic habitats during droughts have the potential to prevent successful reproduction by not allowing sufficient time for larval metamorphosis. Local extirpations could occur if extended periods of drought prevent successful reproduction for several sequential years. However, because of differing life history traits, invasive species such as bullfrogs may be more strongly affected by drought, thus providing a beneficial scenario for the survival of California red-legged frogs, which are better adapted to drought conditions (FWS 2002). Conversely, studies have shown that hybrid salamanders are able to tolerate higher water temperatures than pure California tiger salamanders, and thus the hybrid salamanders may be more resilient to climate change than the native salamanders (FWS 2021d).

The more extreme weather events predicted by climate change models may affect Swainson's hawks in a variety of ways. Increased wildfires may make incidences of nest trees being incinerated more frequent, while increasing temperatures earlier in the nesting season may make incidences of nestlings succumbing to overheating more frequent. Swainson's hawks may also be affected by increased winter flooding potentially affecting riparian habitats and sea-level rise inundating low-lying nesting and foraging habitats. Decreased water availability also has the potential to incentivize the agriculture industry to shift away from crops providing suitable foraging habitat such as alfalfa to crops that require less water but are lower-quality foraging habitats. A widespread shift away from low-growing crops to taller-stature crops would likely cause significant impacts on Swainson's hawk populations because they require shorter vegetation for effective foraging (CDFW 2016b).

7.5.5. Contaminants

Pesticides, herbicides, mineral fertilizers, industrial chemicals, and airborne pollutants are known to have negative effects on wildlife. Contaminants are not known to be a significant threat to Myrtle's silverspot butterfly populations. However, California red-legged frogs are especially affected by aqueous pesticides because of their many life stages that take place within aquatic environments (FWS 2002). Likewise, California tiger salamanders are subjected to contaminants from mosquito abatement, ground squirrel and gopher control measures, as well as roadway and agricultural runoff (FWS 2021d).

Mass mortality of Swainson's hawks attributable to organophosphate and carbamide pesticide toxicity has been documented near agricultural fields in Argentina, which is the southern extent of the species' migratory range. Such mass mortality events have not been documented in California, although this does demonstrate that pesticides can have severe impacts if not regulated properly (CDFW 2016b). Anticoagulant rodenticides are

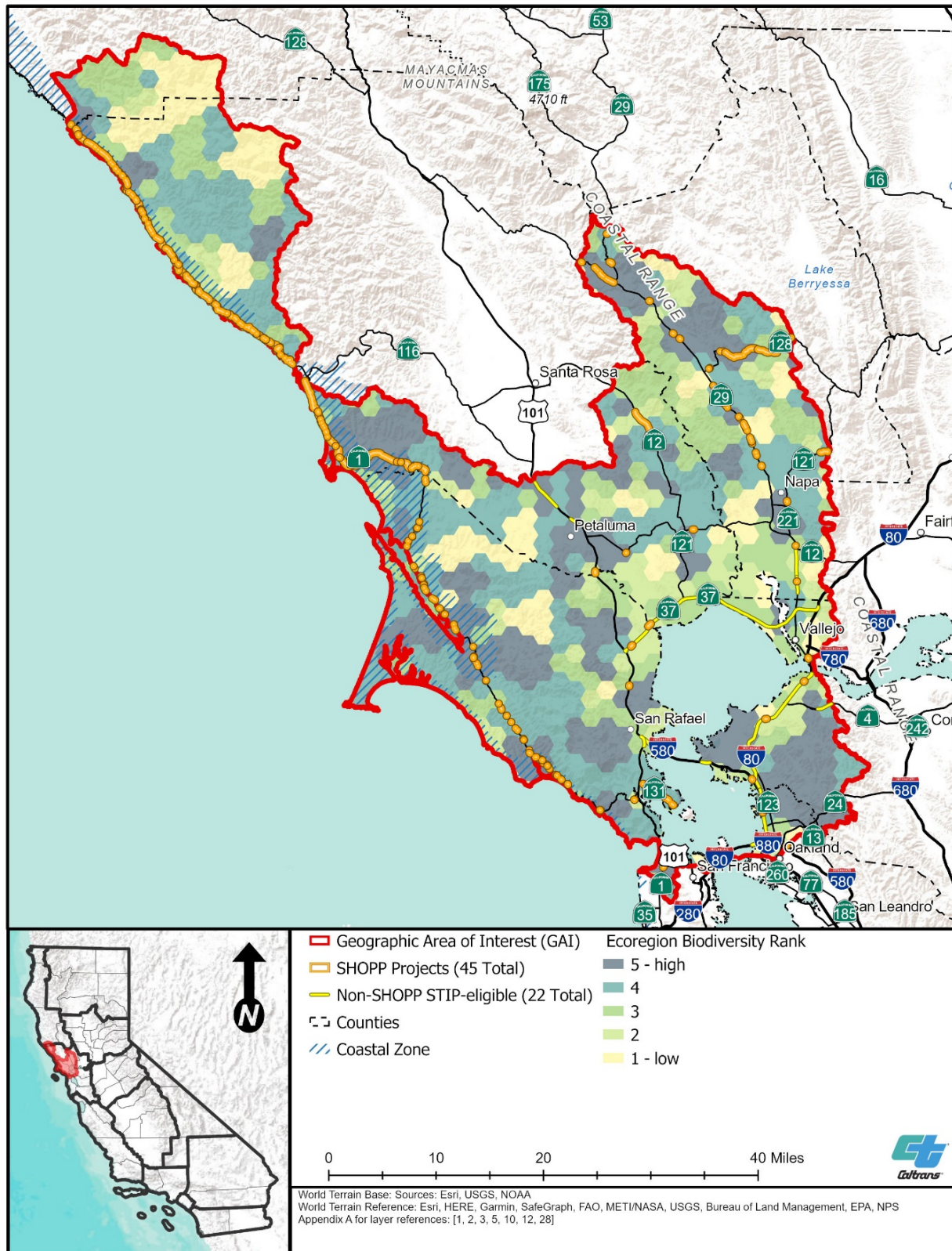
widely used in agricultural areas where Swainson's hawk forage and may cause secondary toxicity through ingestion of poisoned prey. CDFW's Wildlife Investigations Laboratory has documented at least one case of direct mortality of a Swainson's hawk in California attributable to anticoagulant rodenticide toxicity, although this does not appear to be a major source of impacts on the species (CDFW 2016b).

7.6 Multi-species Benefits

While the species of mitigation need identified for this GAI are Myrtle's silverspot butterfly, California red-legged frog, California tiger salamander, and Swainson's hawk, several other special-status species share habitat with these species and could potentially be affected by Caltrans transportation projects that will need compensatory mitigation to satisfy natural resource regulatory agency conditions on a transportation project. This includes species such as western pond turtle (*Emys marmorata*), tricolored blackbird (*Agelaius tricolor*), and Point Reyes jumping mouse (*Zapus trinotatus orarius*), which may be addressed under CDFW's lake and streambed alteration agreement program. Advance mitigation planning provides Caltrans an opportunity to prioritize multi-species and multi-resource benefits through acquisition, protection, restoration, and/or enhancement of habitat that provides the most multi-species benefits within the GAI. 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 almost all of the SHS with SHOPP projects within the GAI. Habitats are mapped in Appendix B, and the other special-status species that may occur in these habitats are provided in Appendix D.

The installation of artificial bat roosts, culvert ramps, undercrossings, and deer jumpouts to facilitate safe movement across highways would also benefit numerous terrestrial wildlife species. Advance mitigation purchased or established to address anticipated impacts on species of mitigation need may also provide mitigation to compensate for impacts on these other species. Caltrans will consider the special-status species with the potential to co-occur in habitat in order to inform advance mitigation scoping and thereby improve the conservation benefits of mitigation in the GAI.

Figure 7-1. Terrestrial Biodiversity in the GAI



7.7 Advance Mitigation Conservation Goals and Objectives

The conservation goals and objectives compiled in Table 7-3 were intended to be relevant to anticipated future SHOPP and STIP transportation project mitigation needs, be consistent with the goals and objectives of natural resource regulatory agencies for the species of mitigation need, address pressures and stressors, and support species of mitigation need population recovery and success in the GAI. Each conservation goal is supported by one or more conservation objectives and is meant to further guide Caltrans District 4 toward scoping advance mitigation projects to achieve the desired result specified by the goal. Project-specific objectives will be developed for advance mitigation projects in the future during their project delivery phase in accordance with an instrument, MCA, or other project-specific agreement (Figure 1-2). Project-specific advance mitigation project objectives will be specific, measurable, achievable, relevant, and time-bound.

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 and project scoping toward those authorized actions that would create the greatest functional lift² or conservation benefit for the species of mitigation need in the GAI. Sub-objectives also capture specific measures from conservation and land management plans that address threats to the species of mitigation need.³ 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. They are not presented in order of importance.

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

³ In accordance with both law and Caltrans policy, standard best management practices are followed on all Caltrans transportation projects. Hence, they are presumed and they are not itemized as goals and objectives for the AMP.

Table 7-3. Advance Mitigation Conservation Goals and Objectives for the Species of Mitigation Need

Objective	Sub-objective	Affected Species ^a	Alignment with Conservation and Management Plans ^b
Goal WILD-1: Conserve and expand habitat for species of mitigation need within the GAI to support ecosystem functions that are essential to recovery of the species	See below	See below	See below
Objective WILD-1.1: Acquire, protect, restore, and/or enhance habitat of sufficient quantity to offset estimated impacts on species of mitigation need within the GAI in advance of transportation project impacts.	<p>Sub-Objective WILD-1.1.1: Identify habitat for species of mitigation need in the GAI and acquire, protect, restore, and/or enhance this habitat such that the greatest functional lift to the species of mitigation need is provided, including consolidating compensatory mitigation.</p> <p>Sub-Objective WILD-1.1.2: Prioritize key areas, such as designated critical habitat, movement corridors, and buffer zones.</p> <p>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.</p> <p>Sub-Objective WILD-1.1.4: Prioritize land acquisition and/or protection that supports key populations.</p> <p>Sub-Objective WILD-1.1.5: Prioritize acquisition, protection, and/or enhancement of SWAP (CDFW 2015a) conservation targets: American southwest riparian forest and woodland, north coast deciduous scrub and terrace prairie, freshwater marsh, and coastal lagoons, as shown in Figure 7-2, that coincide with the species of mitigation need range, as well as other locally or regionally important habitat types.</p> <p>Sub-Objective WILD-1.1.6: Create, enhance, or restore breeding habitat in protected areas where it is limited.</p> <p>Sub-Objective WILD-1.1.7: Align with LCP ESHA requirements to prioritize restoration and/or enhancement in ESHAs containing species of mitigation need such that a functional lift to the ESHA is provided, when feasible.</p>	<ul style="list-style-type: none">▪ Myrtle's silverspot butterfly▪ California red-legged frog▪ California tiger salamander▪ Swainson's hawk	<ul style="list-style-type: none">▪ SWAP (CDFW 2015a) and companion plans▪ CEHC (Spencer et al. 2010)▪ <i>Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly</i> (FWS 1998)▪ <i>Five-Year Review: Myrtle's Silverspot Butterfly</i> (<i>Speyeria zerene myrtlae</i>) (FWS 2021c)▪ <i>Recovery Plan for the California Red-legged Frog</i> (<i>Rana aurora draytonii</i>) (FWS 2002)▪ <i>Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule</i> (FWS 2010)▪ <i>Recovery Plan for the Santa Rosa Plain</i> (FWS 2016)▪ <i>5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment</i> (FWS 2021d)▪ <i>Five-Year Status Review for Swainson's Hawk</i> (<i>Buteo swainsoni</i>) (CDFW 2016b)▪ <i>California Wildlife Movement Barrier Priorities 2020</i> (CDFW 2020)▪ <i>City of Albany General Plan 2035</i> (City of Albany 2016)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan</i> (NPS 2014)▪ <i>Point Reyes National Seashore General Management Plan</i> (NPS 2020)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sugarloaf Ridge State Park Final General Plan</i> (California Parks and Recreation 2004a)▪ <i>Tomaes Bay State Park General Plan</i> (California Parks and Recreation 2004b)

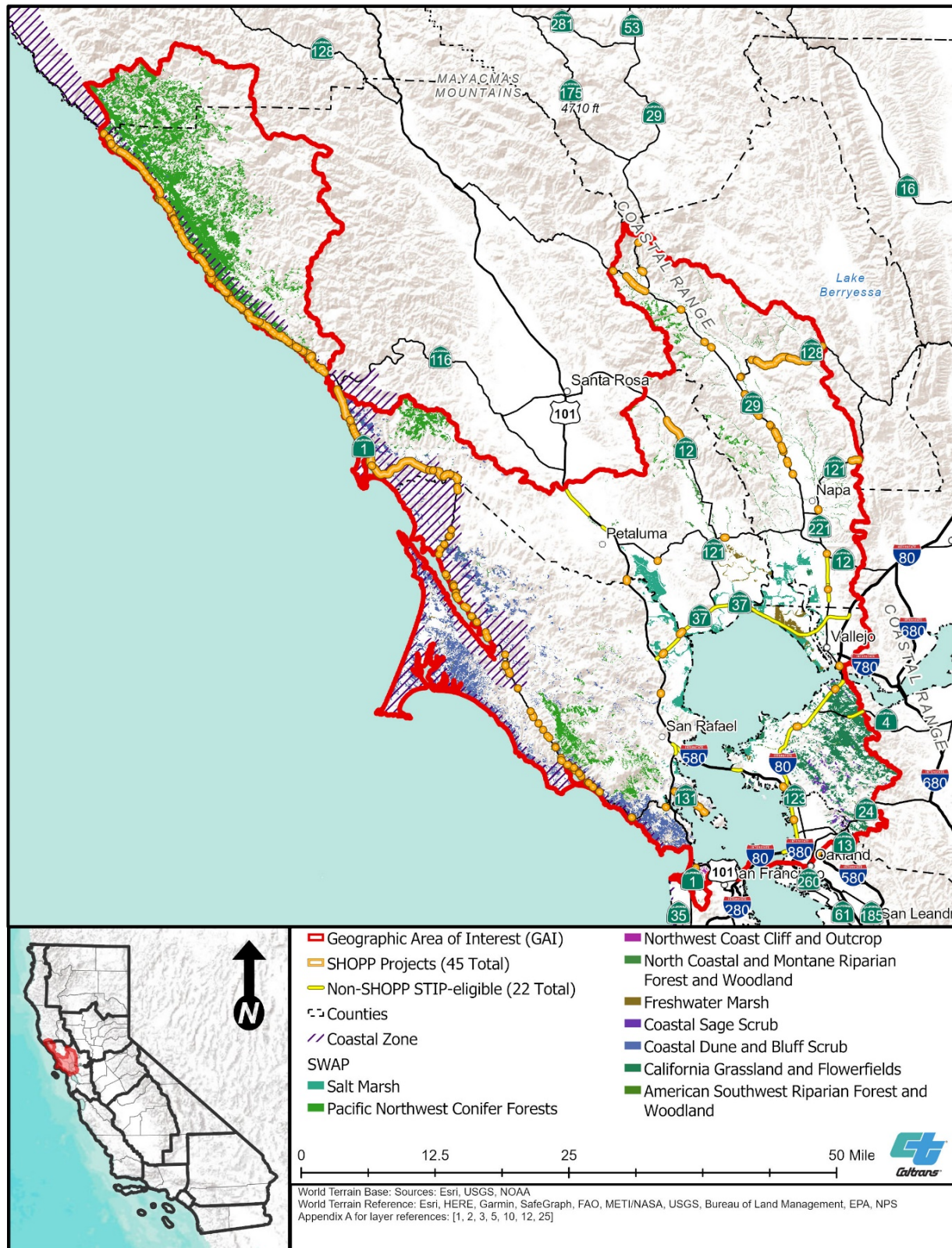
Objective	Sub-objective	Affected Species ^a	Alignment with Conservation and Management Plans ^b
Goal WILD-2: Preserve, enhance, and increase connectivity between blocks of wildlife habitat to allow for dispersal that will maintain resilience and variability of wildlife populations	See below	See below	See below
Objective WILD- 2.1: Acquire, protect, restore, and/or enhance movement corridors within the GAI in advance of transportation project impacts.	<p>Sub-Objective WILD-2.1.1: Identify movement corridors for the species of mitigation need in the GAI and acquire, protect, restore, and/or enhance corridors such that the greatest functional lift for the species of mitigation need is provided.</p> <p>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.</p> <p>Sub-Objective WILD-2.1.3: Identify areas that will enhance connectivity between existing protected breeding locations and create new breeding habitat for the species of mitigation need.</p>	<ul style="list-style-type: none">▪ Myrtle's silverspot butterfly▪ California red-legged frog▪ California tiger salamander	<ul style="list-style-type: none">▪ SWAP (CDFW 2015a) and companion plans▪ CEHC (Spencer et al. 2010)▪ <i>Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly</i> (FWS 1998)▪ <i>Five-Year Review: Myrtle's Silverspot Butterfly</i> (Speyeria zerene myrtlae) (FWS 2021c)▪ <i>Recovery Plan for the California Red-legged Frog</i> (Rana aurora draytonii) (FWS 2002)▪ <i>Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule</i> (FWS 2010)▪ <i>Recovery Plan for the Santa Rosa Plain</i> (FWS 2016)▪ <i>5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment</i> (FWS 2021d)▪ <i>California Wildlife Movement Barrier Priorities 2020</i> (CDFW 2020)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan</i> (NPS 2014)▪ <i>Point Reyes National Seashore General Management Plan</i> (NPS 2020)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sugarloaf Ridge State Park Final General Plan</i> (California Parks and Recreation 2004a)▪ <i>Tomaes Bay State Park General Plan</i> (California Parks and Recreation 2004b)
Goal WILD-3: Support resiliency of the landscape to climate change and sea-level rise	See below	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 within the GAI in advance of transportation project impacts.	<p>Sub-Objective WILD-3.1.1: Identify, acquire, protect, restore, and/or enhance habitat critical to climate resilience for the species of mitigation need in the GAI (Figure 2-6).</p> <p>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 the species of mitigation need and ESHAs.</p>	<ul style="list-style-type: none">▪ Myrtle's silverspot butterfly▪ California red-legged frog▪ California tiger salamander▪ Swainson's hawk	<ul style="list-style-type: none">▪ SWAP (CDFW 2015a) and companion plans▪ CEHC (Spencer et al. 2010)▪ <i>Five-Year Review: Myrtle's Silverspot Butterfly</i> (Speyeria zerene myrtlae) (FWS 2021c)▪ <i>Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule</i> (FWS 2010)▪ <i>Recovery Plan for the Santa Rosa Plain</i> (FWS 2016)▪ <i>5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment</i> (FWS 2021d)▪ <i>California Wildlife Movement Barrier Priorities 2020</i> (CDFW 2020)▪ <i>City of Albany General Plan 2035</i> (City of Albany 2016)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan</i> (NPS 2014)▪ <i>Point Reyes National Seashore General Management Plan</i> (NPS 2020)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)

Objective	Sub-objective	Affected Species ^a	Alignment with Conservation and Management Plans ^b
Goal WILD-4: Decrease mortality and competition, and protect population health for species of mitigation need	See below	See below	See below
Objective WILD-4.1: Reduce impacts of invasive species on populations of species of mitigation need within the GAI in advance of transportation project impacts.	<p>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 the species of mitigation need. Prioritize areas where invasive species reduction would provide the greatest functional lift to species of mitigation need and their habitat.</p> <p>Sub-Objective WILD-4.1.2: Prioritize restoration of native plant species in key areas, such as critical habitat, movement corridors, and buffer zones.</p>	<ul style="list-style-type: none">Myrtle's silverspot butterflyCalifornia red-legged frogCalifornia tiger salamanderSwainson's hawk	<ul style="list-style-type: none">SWAP (CDFW 2015a) and companion plansCEHC (Spencer et al. 2010)Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly (FWS 1998)Five-Year Review: Myrtle's Silverspot Butterfly (Speyeria zerene myrtlae) (FWS 2021c)Recovery Plan for the California Red-legged Frog (Rana aurora draytonii) (FWS 2002)Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule (FWS 2010)Recovery Plan for the Santa Rosa Plain (FWS 2016)5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment (FWS 2021d)City of Albany General Plan 2035 (City of Albany 2016)East Bay RCIS (ICF 2021)Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan/Environmental Impact Statement (NPS 2014)Point Reyes National Seashore General Management Plan Final Environmental Impact Statement (NPS 2020)San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan (FWS 2011)Sugarloaf Ridge State Park Final General Plan and EIR (California Parks and Recreation 2004a)Tomales Bay State Park General Plan (California Parks and Recreation 2004b)
Objective WILD-4.2: Reduce impacts from nonnative predators within the GAI in advance of transportation project impacts.	<p>Sub-Objective WILD-4.2.1: Identify and implement measures to reduce predation, such as ponds that dry up on an annual basis, to discourage bullfrogs from establishing.</p>	<ul style="list-style-type: none">California red-legged frogCalifornia tiger salamander	<ul style="list-style-type: none">SWAP (CDFW 2015a) and companion plansCEHC (Spencer et al. 2010)Recovery Plan for the California Red-legged Frog (Rana aurora draytonii) (FWS 2002)Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule (FWS 2010)Recovery Plan for the Santa Rosa Plain (FWS 2016)5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment (FWS 2021d)East Bay RCIS (ICF 2021)Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan/Environmental Impact Statement (NPS 2014)Point Reyes National Seashore General Management Plan Final Environmental Impact Statement (NPS 2020)San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan (FWS 2011)Tomales Bay State Park General Plan (California Parks and Recreation 2004b)
Objective WILD-4.3: Reduce road-associated mortality within the GAI in advance of transportation project impacts.	<p>Sub-Objective WILD-4.3.1: Identify locations to develop safe SHS wildlife crossing areas in the GAI and direct the species of mitigation need to them.</p> <p>Sub-Objective WILD-4.3.2: Identify areas where Myrtle's silverspot butterflies occur adjacent to the SHS and investigate lowering speed limits to reduce butterfly mortality from vehicle strikes.</p>	<ul style="list-style-type: none">Myrtle's silverspot butterflyCalifornia red-legged frogCalifornia tiger salamander	<ul style="list-style-type: none">SWAP (CDFW 2015a) and companion plansCEHC (Spencer et al. 2010)Five-Year Review: Myrtle's Silverspot Butterfly (Speyeria zerene myrtlae) (FWS 2021c)Recovery Plan for the California Red-legged Frog (Rana aurora draytonii) (FWS 2002)Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule (FWS 2010)Recovery Plan for the Santa Rosa Plain (FWS 2016)5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment (FWS 2021d)California Wildlife Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region (CDFW 2020)East Bay RCIS (ICF 2021)Point Reyes National Seashore General Management Plan Final Environmental Impact Statement (NPS 2020)

Objective	Sub-objective	Affected Species ^a	Alignment with Conservation and Management Plans ^b
Goal WILD-5: Prioritize multi-species and multi-resource benefits	See below	See below	See below
Objective WILD-5.1: Acquire, protect, restore, and/or enhance habitat that provides multi-species benefits within the GAI in advance of transportation project impacts.	<p>Sub-Objective WILD-5.1.1: Prioritize mitigation to provide benefits to special-status species that may co-occur with the species of mitigation need in key areas and that will provide functional lift to other special-status species within the GAI.</p> <p>Sub-Objective WILD-5.1.2: Identify SHS right-of-way areas where enhancement efforts may benefit species of mitigation need.</p> <p>Sub-Objective WILD-5.1.3: Consider the needs of other co-occurring species when planning site-specific actions to restore or create aquatic habitat for California red-legged frog.</p> <p>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.</p>	<ul style="list-style-type: none">▪ Myrtle’s silverspot butterfly▪ California red-legged frog▪ California tiger salamander▪ Swainson’s hawk	<ul style="list-style-type: none">▪ SWAP (CDFW 2015a) and companion plans▪ CEHC (Spencer et al. 2010)▪ <i>Recovery Plan for Seven Coastal Plants and the Myrtle’s Silverspot Butterfly</i> (FWS 1998)▪ <i>Five-Year Review: Myrtle’s Silverspot Butterfly</i> (<i>Speyeria zerene myrtlae</i>) (FWS 2021c)▪ <i>Recovery Plan for the California Red-legged Frog</i> (<i>Rana aurora draytonii</i>) (FWS 2002)▪ <i>Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule</i> (FWS 2010)▪ <i>Recovery Plan for the Santa Rosa Plain</i> (FWS 2016)▪ <i>5-Year Review California Tiger Salamander Sonoma County Distinct Population Segment</i> (FWS 2021d)▪ <i>Five-Year Status Review for Swainson’s Hawk</i> (<i>Buteo swainsoni</i>) (CDFW 2016b)▪ <i>California Wildlife Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region</i> (CDFW 2020)▪ <i>City of Albany General Plan 2035</i> (City of Albany 2016)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Golden Gate National Recreation Area/Muir Woods National Monument Final General Management Plan/Environmental Impact Statement</i> (NPS 2014)▪ <i>Point Reyes National Seashore General Management Plan Final Environmental Impact Statement</i> (NPS 2020)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sugarloaf Ridge State Park Final General Plan and EIR</i> (California Parks and Recreation 2004a)▪ <i>Tomales Bay State Park General Plan</i> (California Parks and Recreation 2004b)

^a This column includes species of mitigation need that could benefit from these objectives.
^b More information on these plans is provided in Chapter 3, *Relevant Plans, Policies, and Regulations*, and Chapter 4, *Existing Mitigation Opportunities* .

Figure 7-2. SWAP Terrestrial Conservation Target Habitats



7.8 Summary

Caltrans anticipates that future SHOPP and STIP-eligible transportation projects may be conditioned by CCC, CDFW, FWS, and NMFS to address the pressures and stressors that threaten species of mitigation need in the GAI. The pressures and stressors include:

- habitat loss, fragmentation, and degradation;
- invasive species;
- disease and predation;
- climate change, drought, wildfire, and sea-level rise; and
- contaminants.

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 7-3:

- **Goals WILD-1 and WILD-2** seek to conserve existing habitat for species of mitigation need 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 the species of mitigation need and that provide a conservation benefit in terms of size, connectivity, quality, and contribution to the climate resilience of habitat within the GAI. By increasing connectivity for species of mitigation need, Caltrans anticipates that co-occurring species will realize these same benefits. These goals and objectives were selected to address habitat loss, fragmentation, and degradation and to address impacts from climate change, drought, and sea-level rise. Further, Caltrans anticipates that actions completed through restoration, enhancement, and/or preservation may also provide opportunities to address invasive species, predation, and road-associated mortality.
- **Goal WILD-3** seeks to support landscape resiliency for species of mitigation need habitat in the GAI. The primary objectives are to reduce the effects of climate change and sea-level rise on these species by increasing the protection and functionality of land that is identified as crucial for climate resiliency, including corridors that provide the ability for these 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 address habitat loss, fragmentation, and degradation as well as invasive species.

- **Goal WILD-4** seeks to decrease mortality of species of mitigation need from known immediate and ongoing threats to individuals or populations by protecting native vegetation, reducing conditions that favor predators and competitors, and protecting species of mitigation need from road-associated mortality. These objectives address issues related to habitat loss, fragmentation, and degradation as well as threats from invasive species and predation.
- **Goal WILD-5** seeks to guide advance mitigation scoping to prioritize multi-species and multi-resource benefits to maximize ecological benefits to the GAI. Advance mitigation provides the opportunity to maximize Caltrans' benefit to conservation in the GAI, including to species other than the species of mitigation need and other land management objectives. Goal WILD-5 was developed to include conservation for multiple species and to provide compensatory mitigation for impacts on species of mitigation need.

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 the species of mitigation need 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, non-wetland waters, and riparian habitat 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 compensatory mitigation options, including restoration, enhancement, and preservation, 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 and STIP-eligible 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 and riparian habitat 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

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 Fish and Game Code § 1852, subdivision (c)(8).

regulatory requirements and conservation science. To determine the aquatic resource conservation goals and objectives applicable to the GAI, Caltrans:

- First, in Section 8.2, identifies natural resource regulatory agencies with the authority to condition transportation projects with aquatic resource-related and riparian habitat 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.
- Next, in Sections 8.4, 8.5, and 8.6, for aquatic resources identifies:
 - 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 information in relation to the transportation-related activities that could potentially affect aquatic resources and riparian habitats and the potential range of compensatory mitigation that could satisfy a 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 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, *Wildlife Resources Conservation Goals and Objectives*.

Table 8-1. Natural Resource Regulatory Agencies with the Authority to Approve Aquatic Resource Compensatory Mitigation Credits (or Values)

Agency	Summary
CCC	<p>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 Coastal Development Permits, CCC implements the policies of the Coastal Act, including protecting sensitive resources (for example, wetlands, waters, ESHAs), water quality, public access to the coast, and more, and requires mitigation for unavoidable impacts on these resources. CCC also coordinates with local governments in developing and certifying LCPs, which allow local governments to assume the authority to issue Coastal Development Permits 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.</p>
CDFW	<p>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. Under CESA, CDFW also has authority to issue incidental take permits for state-listed fish species. Additionally, CDFW's Environmental Review and Permitting, Conservation and Mitigation Banking, NCCP, and RCIS programs implement sections of the Fish and Game Code, 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.</p>
Corps	<p>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 the 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. According to the 2008 mitigation rule, in general 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, but the preference may change based on what is environmentally preferable.</p>

Agency	Summary
EPA	<p>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 the 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. EPA has been delegated the responsibility of implementing CWA Section 401 for projects on tribal land, unless EPA has delegated 401 authority to a recognized tribe.</p>
FWS	<p>FWS has jurisdiction over a broad range of fish and wildlife resources. FWS does not, however, have jurisdiction over anadromous fish. FWS authorities related to these resources are codified under multiple statutes, including, but not limited to, the ESA. Most statutes give FWS an advisory role in mitigation. However, if a non-federal entity applies for an incidental take permit for a listed animal species, Section 10(a)(2)(b) of the ESA requires that the impact of any incidental take be minimized and mitigated to the maximum extent practicable. Section 7(a)(1) of the ESA also requires all federal agencies to use their authorities to conserve listed species. Many federal agencies have developed programs to include mitigation as part of the Section 7(a)(2) consultation on their proposed actions to partially fulfill this Congressional mandate.</p> <p>Conservation banking can assist federal and non-federal participants in the Section 7 and Section 10 process. In May 2003, FWS issued comprehensive federal guidelines designed to promote conservation banks as a tool for mitigating adverse impacts on species; the guidelines foster national consistency by standardizing establishment and operational criteria. Many activities conducted under Section 7 and Section 10 of the ESA result in adverse effects on listed species, including habitat loss or modification. One way to offset these types of impacts is to include in the project design a plan that involves the restoration and/or protection of similar habitat on site and/or off site. Purchasing credits in conservation banks is one method of protecting habitat on side or off site.</p>
NMFS	<p>NMFS has jurisdiction over marine species listed as threatened or endangered under the ESA. Federal agencies must consult with NMFS to ensure that their actions do not jeopardize the continued existence of ESA-listed species or result in the destruction or adverse modification of designated critical habitat.</p> <p>NMFS also manages and conserves wildlife and fisheries resources in the marine and estuarine environment under the Magnuson-Stevens Fishery Conservation and Management Act. Federal agencies must consult with NMFS on any action that might adversely affect EFH. NMFS will advise federal agencies to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH. Magnuson-Stevens Fishery Conservation and Management Act EFH consultation can be done in tandem with ESA consultation.</p> <p>NMFS protects marine mammals under the Marine Mammal Protection Act, with the exception of sea otters, walruses, manatees, and polar bears, which are managed by FWS. With some exceptions, the Marine Mammal Protection Act prohibits the take of marine mammals, including harassment, hunting, capturing, collecting, or killing, in U.S. waters and by U.S. citizens on the high seas.</p>

Agency	Summary
SWRCB and RWQCB	The Porter-Cologne Act governs water quality regulation in California and gives the SWRCB and RWQCBs 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 RWQCBs, 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 SWRCB and RWQCBs have been delegated the responsibility of implementing CWA Section 401, which regulates the discharge of pollutants into WOTUS. The SWRCB and RWQCBs may determine that compensatory mitigation is necessary to offset unavoidable impacts on aquatic resources. Compensatory mitigation can be achieved through purchase of credits as outlined in the <i>State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State</i> (SWRCB, adopted 2019). Projects that occur in one region are regulated by that regional board, whereas projects that cross regions are regulated by the SWRCB.

8.3 Aquatic Resources

An overview of aquatic resources was provided in Chapter 2, *Environmental Setting*, and is summarized below.

8.3.1. Wetlands and Non-wetland Waters

The GAI conforms to the following HUC-8 boundaries: Gualala-Salmon (HUC-8 18010109), San Pablo Bay (HUC-8 18050002), and Tomales-Drake Bays (HUC-8 18050005). In the GAI, the Gualala and Russian Rivers are major stream systems (North Coast RWQCB 2018). Although the term “major stream system” is not used in the *Water Quality Control Plan for the San Francisco Bay Region* (San Francisco Bay RWQCB 2019), based on their size and number of tributaries, the Petaluma River, Napa River, and Sonoma Creek can also be considered major stream systems of the GAI. 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.

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 217,661 acres of aquatic habitat, consisting of 40 wetland habitats that are listed in Table 2-10 and 5 non-wetland waters habitats that are listed in Table 2-11 (Caltrans 2021e, 2021f). Sixteen 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 2-9.

8.3.2. Riparian Habitat

Because there is currently no detailed riparian GIS layer available, riparian habitat information was excerpted from the SAMNA’s vegetation layer. The riparian habitats identified in the GAI are valley foothill riparian, montane riparian, and riverine (Table 2-3).

8.3.3. Coho Salmon

The Central California Coast ESU of coho salmon in the GAI is a federal and state endangered species, and designated critical habitat for this species does not occur in the GAI (see Sections 2.9 and 2.17.4). This ESU includes naturally spawned coho salmon originating from coastal streams and rivers between Punta Gorda in Humboldt County, California, to Aptos Creek in Santa Cruz County, California [79 *Federal Register* 20802]. Adult coho salmon migrate from the ocean to natal streams in the fall and spawn from November to March based on latitude. Spawning occurs in streams that flow directly into the ocean or in large tributaries, typically at the head of riffles with medium- to small-sized gravel (NMFS 2012).

8.3.4. Steelhead

Two DPS of steelhead overlap the GAI: Northern California Coast DPS and Central California Coast DPS (Section 2.17.4). Both of these DPSs are federally listed as threatened. Designated critical habitat for this species does not occur in the GAI (Section 2.9). The Northern California Coast 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]. The Central California Coast DPS includes all naturally spawned anadromous steelhead originating below natural and human-made impassable barriers from the Russian River to and including Aptos Creek, and all drainages of San Francisco and San Pablo Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers [71 *Federal Register* 834]. Additionally, two artificial propagation programs are considered as part of the DPS; however, the programs are not in the GAI (NMFS 2016d).

Steelhead in these DPSs exhibit both winter- and summer-run migration timing. The summer-run steelhead is also currently a state candidate endangered species (CDFW 2021b). 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. Steelhead will then spawn in tributaries of main rivers and then return to the ocean after spawning. Spawning habitat consists of freshwater streams with cold, clear water and suitable spawning substrates (Moyle 2002).

8.3.5. Longfin Smelt

Longfin smelt is a candidate for listing as threatened under the ESA and is state listed as threatened. Critical habitat has not been designated for this species (see Sections 2.9 and 2.17.4). In California, longfin smelt occur from the Klamath River to San Francisco Bay and in rivers that exit into the bay such as the Sacramento and San Joaquin Rivers. Longfin smelt larvae flow outward to the ocean in winter-spring with short to long retention in coastal bays and estuaries. Mature longfin smelt return to river waters for spawning, which typically occurs in late fall through spring. Longfin smelt require cool water, no

warmer than 22 degrees centigrade, and spawn in sandy substrates in low-velocity streams (CDFW 2009).

8.3.6. Green Sturgeon

The Southern DPS of green sturgeon in the GAI is a federally threatened species and a state species of special concern, and designated critical habitat for this species does not occur in the GAI (see Sections 2.9 and 2.17.4). This DPS includes naturally spawned green sturgeon originating in the Sacramento, Feather, and Yuba Rivers [71 *Federal Register* 17757]. Green sturgeon use riverine, estuary, and marine habitats along the west coast of California, spending the majority of their life cycle in marine waters. Adults enter San Francisco Bay in late winter through early spring and spawn in the upper portions of the Sacramento River, then returning toward the Pacific Ocean starting in July. Juveniles leave from the Sacramento River and either pass through the San Francisco Bay area quickly into the Pacific Ocean, taking at most 10 days to pass through the bay, or remain in the bay for several months before moving into the Pacific Ocean (NMFS 2015).

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

Gualala-Salmon HUC-8 18010109	San Pablo Bay HUC-8 18050002	San Pablo Bay HUC-8 18050002 (continued)	San Pablo Bay HUC-8 18050002 (continued)	Tomales-Drake Bays HUC-8 18050005
<ul style="list-style-type: none"> ▪ Bear Creek^a ▪ Gualala River ▪ Russian River ▪ Salmon Creek^a 	<ul style="list-style-type: none"> ▪ Adobe Creek ▪ Arroyo Avichi ▪ Arroyo Corte Madera Del Presidio ▪ Arroyo San José ▪ Berkeley Meadow ▪ Burdell Ranch ▪ Calabazas Creek ▪ Capri Creek ▪ Codornices Creek ▪ Corona Creek ▪ Corte Madera Creek and Marsh ▪ Coyote Creek ▪ Cullinan Ranch ▪ Cyrus Creek ▪ Davis Creek ▪ Fairfax Creek ▪ Gallinas Creek 	<ul style="list-style-type: none"> ▪ Garnett Creek ▪ Hoffman Marsh ▪ Lake Chabot ▪ Lake Dalwigk ▪ Larkspur Creek ▪ Lichau Creek ▪ Lower Tubbs Island Marshes ▪ Lynch Creek ▪ Mare Island Marshes ▪ Miller Creek ▪ Napa River ▪ Novato Creek ▪ Petaluma River ▪ Pinole Creek ▪ Richardson Bay ▪ Ritchey Creek ▪ Ross Creek ▪ Rush Creek 	<ul style="list-style-type: none"> ▪ San Anselmo Creek ▪ San Antonio Creek ▪ San Pablo Creek and Marsh ▪ San Rafael Marsh ▪ Schoolhouse Creek ▪ Sonoma Creek ▪ South Richmond Marshes ▪ Steamboat Slough ▪ Strawberry Creek ▪ Strip Marsh ▪ Tolay Creek ▪ Waugh Creek ▪ White Slough ▪ Wildcat Creek^b and Marsh ▪ Willow Brook 	<ul style="list-style-type: none"> ▪ Bolinas Lagoon ▪ Cold Stream ▪ Drakes Bay ▪ Easkoot Creek ▪ Estero Americano ▪ Green Gulch ▪ Heart's Desire Beach Estuary ▪ Lagunitas Creek ▪ Pine Gulch Creek ▪ Redwood Creek^c ▪ Stemple Creek ▪ Tomasini Point Estuary ▪ Walker Creek

^a Although multiple features called Bear Creek and Salmon Creek occur in the GAI, the plans in Table 8-3 refer to the creeks in the Gualala-Salmon HUC-8.

^b Although multiple features called Wildcat Creek occur in the GAI, the plans in Table 8-3 refer to the Wildcat Creek in the San Pablo Bay HUC-8.

^c Although multiple features called Redwood Creek occur in the GAI, the plans in Table 8-3 refer to the Redwood Creek in the Tomales-Drake Bays HUC-8.

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
<i>2008 Final Compensatory Mitigation Rule</i>	<i>73 Federal Register</i> 19593	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).
<i>2018 Fish Passage Annual Legislative Report</i>	Caltrans 2021h	<p>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:</p> <ul style="list-style-type: none"> ▪ 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 <p>Subject matter experts include CDFW, NMFS, FWS, CCC, CalTrout, Pacific States Marine Fisheries Commission, and other local fish passage advocates.</p>
<i>303(d) List of Impaired Water Bodies</i>	SWRCB 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 (Appendix F), 41 waterbodies are listed as impaired in the GAI. Of the 41, 25 have an established total maximum daily load.
<i>California Coastal Act of 1976</i>	CCC 2022	California law that, in part, establishes and protects a coastal zone, sets forth a wetland definition to be regulated, creates broad management policies in the coastal zone, and establishes regulations for coastal zone protection.
<i>California Wetlands Conservation Policy</i>	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.”

Document	Reference	Information Identified
<i>Definition and Delineation of Wetlands in the Coastal Zone</i>	CCC 2011	Identifies wetland delineation procedures and the use of a one-parameter approach for identifying a wetland.
<i>National Wetlands Mitigation Action Plan</i>	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 <i>National Wetlands Mitigation Action Plan</i> were incorporated into the 2008 Final Compensatory Mitigation Rule, which was updated in 2015 and includes the no net loss policy.
<i>Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division</i>	Corps 2015	Provides guidelines for compensatory mitigation site selection. A watershed approach should be used when selecting sites to establish compensatory mitigation.
<i>State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State</i>	SWRCB 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.
<i>Water Quality Control Plan for the North Coast Basin</i>	North Coast RWQCB 2018	Identifies water quality objectives and beneficial uses for the North Coast basin.
<i>Water Quality Control Plan for the San Francisco Bay Basin</i>	San Francisco Bay RWQCB 2019	Identifies water quality objectives and beneficial uses for the San Francisco Bay Basin.

Document	Reference	Information Identified
Special-status Species and Sensitive Habitat Documents	See below	See below
<i>Recovery Plan for the ESU of Central California Coast Coho Salmon</i>	NMFS 2012	<p>Requirements for delisting coho salmon are complex and contained in Tables 21 and 22 of the plan; however, the plan identifies general goals to enhance and restore stream habitats where coho salmon occur.</p> <p>The Coastal, Navarro Point-Gualala River, and San Francisco Bay diversity strata occur in the GAI. Independent populations of coho salmon occur in the Gualala River, Russian River, Walker Creek, and Lagunitas Creek. Dependent populations of coho salmon occur in Salmon Creek, Pine Gulch Creek, and Redwood Creek. In this plan, independent populations are likely to persist beyond 100 years and dependent populations are not likely to persist beyond 100 years if they are isolated.</p>
<i>Recovery Strategy for California Coho Salmon</i>	California Department of Fish and Game 2004	Identifies goals related to recovery units of the Central California Coast ESU, of which the Bodega-Marin Coastal, Mendocino Coast, and San Francisco Bay 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.
<i>Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (Acipenser medirostris)</i>	NMFS 2018	Nearly all strategies to achieve the recovery criteria for this species center on restoration of stream habitats and removal of barriers outside of the GAI. Strategies in the GAI are limited to reducing contaminants and reducing the risk of entrainment in San Francisco Bay.
<i>Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes</i>	FWS 1996	Although this document centers on recovery of delta smelt (<i>Hypomesus transpacificus</i>), it does include restoration recommendations for longfin smelt that involve having detections for 10 consecutive years at a number of locations. In the GAI, this consists of the eastern portion of San Pablo Bay.
<i>Final Coastal Multispecies Recovery Plan Volume III: Northern California Steelhead</i>	NMFS 2016a	Refer to the document for population type and diversity strata definitions. The Central Coastal diversity strata for steelhead occurs in the GAI. Gualala River is the stream in the GAI that contains an essential independent population that must attain low extinction risk before the species can be delisted. No streams in the GAI contain supporting independent populations or dependent populations that contribute to redundancy and occupancy criteria for delisting.

Document	Reference	Information Identified
<i>Final Coastal Multispecies Recovery Plan Volume IV: Central California Steelhead</i>	NMFS 2016b	<p>Refer to the document for population type and diversity strata definitions. The Coastal San Francisco Bay, Interior San Francisco Bay, and North Coastal diversity strata for steelhead occur in the GAI.</p> <p>Corte Madera Creek, Lagunitas Creek, Napa River, Novato Creek, Petaluma River, Salmon Creek, Sonoma Creek, Stemple Creek, and Walker Creek are the streams in the GAI that contain essential independent populations that must attain low extinction risk before the species can be delisted.</p> <p>Arroyo Corte Madera Del Presidio, Codornices Creek, Estero Americano, Miller Creek, Pine Gulch Creek, Pinole Creek, Redwood Creek, San Pablo Creek, and Wildcat Creek are the streams in the GAI that contain supporting independent populations that must attain moderate extinction risk before the species can be delisted.</p> <p>Arroyo Corte Madera Del Presidio, Miller Creek, San Pablo Creek, Pine Gulch Creek, and Redwood Creek have dependent populations in the GAI that contribute to redundancy and occupancy criteria.</p> <p>Codornices Creek, Pinole Creek, Wildcat Creek, and unnamed tributaries that lead into Drakes Bay have supporting dependent populations that do not have intrinsic potential described by the southwest fisheries science center but do contribute to redundancy and occupancy criteria in the GAI.</p>
<i>Steelhead Restoration and Management Plan for California</i>	California Department of Fish and Game 1996	<p>Identified restoration recommendations in the Russian River and Lagunitas Creek. Recommendations consist generally of habitat restoration, improving instream flow, and removing fish passage barriers.</p>

Document	Reference	Information Identified
<i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i>	FWS 2013	<p>The Central Coast, Central/South San Francisco Bay, and San Pablo Bay recovery units, and all of the specific species that are identified in the plan, except for Suisin thistle (<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>) and California sea-blite (<i>Suaeda californica</i>), occur in the GAI.</p> <p>The following factors must be met for soft bird's beak (<i>Chloropyron molle</i> ssp. <i>molle</i>) to be delisted. In the San Pablo Bay recovery unit</p> <ul style="list-style-type: none"> ▪ 2,500 acres of habitat (coastal salt marshes and swamps) must be inhabited by this species for 8 years and at least 8 separate populations must exist for this species. ▪ Perennial pepperweed must be reduced to less than 10 percent cover from tidal zones where this species occurs. ▪ Cover of perennial non-native species and winter annual grass species must be less than 10 percent cover in 50 feet of soft bird's beak populations.
<i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i>	FWS 2005	<p>Regions in the GAI covered by the plan are Lake-Napa, containing the Berryessa, Diamond Mountain, and Napa River core areas; and the Solano-Colusa region, containing the Rodeo Creek core area. Listed species for recovery that use aquatic habitat in these core areas include vernal pool fairy shrimp, Contra Costa goldfields (<i>Lasthenia conjugens</i>), few-flowered navarretia (<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i>), and Loch Lomond button-celery (<i>Eryngium constancei</i>). Legenere (<i>Legenere limosa</i>) and California fairy shrimp (<i>Linderiella occidentalis</i>) are also expected to benefit from this plan.</p>

Document	Reference	Information Identified
Conservation and Land Management Documents	See below	See below
<i>Baylands Ecosystem Habitat Goals</i>	EPA and San Francisco RWQCB 1999	<p>Includes overall goals for restoration of tidal marsh and sub-tidal habitats as well as seasonal wetland enhancement. Broad targets for the North Bay subregion are to increase tidal marsh habitat by 22,000 acres and to create 17,000 acres of diked wetlands to optimize seasonal wetland function. Broad targets for the Central Bay subregion are to restore several hundred acres of tidal marsh and remove smooth cordgrass (<i>Spartina alterniflora</i>).</p> <p>The plan also includes the following segment specific goals pertinent to the GAI:</p> <ul style="list-style-type: none"> ▪ Napa River Area – Restore tidal marsh on both sides of the river as well as inactive salt ponds at Cullinan Ranch, enhance seasonal wetlands on Mare Island, restore a band of tidal marsh along the Bayshore, and enhance riparian vegetation. ▪ Sonoma Creek Area – Restore tidal marsh along the San Pablo Bayshore exit of Sonoma Creek and on both sides of the creek upstream from State Route 37, enhance riparian vegetation in the creek, and restore Tolay Creek. ▪ Petaluma River Area – Restore a band of tidal marsh between Tolay Creek and Petaluma River outlets and between State Route 37 and False Bay, create seasonal wetlands and managed marshes at Burdell Ranch, and remove perennial pepperweed infestations. ▪ North Marina – Restore tidal marsh between Black Point and Gallinas Creek and along Gallinas Creek and Novato Creek and also establish enhanced seasonal pond habitat on agricultural lands not converted to tidal marsh. ▪ Contra Costa West – Enhance existing tidal marsh habitats, restore tidal marsh along the eastern edge of the Richmond landfill to connect Wildcat Marsh and San Pablo Marsh, restore vernal pools in adjacent upland areas, and control the spread of perennial pepperweed. ▪ South Marin – Enhance seasonal wetland features in the Corte Madera and San Rafael marshes, eliminate nonnative cordgrass from, and enhance, Corte Madera Creek, restore fringing marsh along the northwest edge of Richardson Bay to benefit Point Reyes bird's-beak, and control perennial pepperweed. ▪ Enhance and restore tidal marsh between Hoffman Marsh and the Richmond Marina and restore riparian vegetation along Codornices Creek.
<i>China Camp State Park General Plan</i>	California Parks and Recreation 1979	Includes a goal to remove French broom, scotch broom, and pampas grass, and to restore 70 acres of wetland and marsh habitat that were subject to off-highway vehicle use.

Document	Reference	Information Identified
<i>City of Petaluma: General Plan 2025</i>	City of Petaluma 2021	Includes a goal for the enhancement of Petaluma River and tributaries.
<i>The City of San Rafael General Plan 2020</i>	City of San Rafael 2016	Includes a goal for enhancement and restoration of steelhead habitat in creeks that occur in city limits, particularly Miller Creek.
<i>East Bay RCIS</i>	ICF 2021	Includes the following goals that are pertinent to the GAI to aid in recovery of the Central California Coast DPS of steelhead: <ul style="list-style-type: none"> ▪ Enhance and restore spawning and rearing habitat along fish bearing streams. ▪ Enhance and restore migratory habitat in the San Pablo and San Francisco Bay areas. ▪ Remove fish passage barriers. ▪ Prioritize actions in Pinole, Wildcat, Codornices, and San Pablo Creeks.
<i>Eastshore State Park General Plan</i>	California Parks and Recreation 2002	Includes goals to eliminate nonnative cordgrass, kikuyu grass, pampas grass, and perennial pepperweed from wetlands in the park; expand tidal salt marsh habitat in South Richmond Marshes, Hoffman Marsh, and Strawberry Creek; enhance seasonal wetlands at Berkeley Meadow; create a freshwater marsh adjacent to Schoolhouse Creek; and conduct wetland restoration at Hoffman Marsh.
<i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i>	ESA, PWA, and Sonoma Resource Conservation District 2012	Includes the following opportunities and recommendations for Lower Sonoma Creek, which is functionally the southern one-third of Sonoma Creek, in part to address flooding issues for Schellville: <ul style="list-style-type: none"> ▪ Riparian habitat enhancement south of the State Route 121 bridge. ▪ Tidal marsh restoration at Camp Two, which is between Sonoma Creek and Steamboat Slough.
<i>Marin County LCP</i>	Marin County 2021a	Includes goals for restoration of degraded ESHAs, which include wetlands and riparian corridors, and goals for the removal of nonnative species such as pampas grass. Identifies Pine Gulch Creek, Redwood Creek, and Bolinas Lagoon as priorities for restoration.
<i>Mount Tamalpais State Park General Plan</i>	California Parks and Recreation 1980	Includes goals to remove gum species (<i>Eucalyptus</i> spp.) from Cold Stream and the north side of Green Gulch.
<i>Northern Napa River Watershed Plan</i>	Napa County Conservation District 2002	The plan recommends a number of restoration activities along Cyrus Creek, Garnett Creek, Napa River, and Ritchey Creek, including the removal of giant reed where found.

Document	Reference	Information Identified
<i>Pacific Coast Salmon Fishery Management Plan</i>	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.
<i>Petaluma Adobe State Historic Park General Plan</i>	California Parks and Recreation 1985	Includes a goal to conduct restoration along Adobe Creek.
<i>Draft Petaluma River Watershed Enhancement Plan</i>	Sonoma Resource Conservation District 2015	Includes goals to restore 1,000 acres to tidal marsh and to restore large patches of tidal marsh along the entire shoreline of San Pablo Bay, particularly near the mouths of sloughs and major streams. Identifies the following areas as suitable for enhancement and restoration: <ul style="list-style-type: none"> ▪ Lichau Creek east of Petaluma Hill Road ▪ The lower and middle reaches of Willow Brook ▪ Waugh and Davis Creeks, which drain into Willow Brook ▪ Corona and Capri Creeks, southeast of Willow Brook ▪ Lynch Creek outside the urban boundary ▪ Adobe Creek ▪ San Antonio Creek
<i>Point Reyes National Seashore General Management Plan</i>	NPS 2020	Includes a goal to prioritize restoration in wetlands for habitat value and water quality in a newly established Scenic Landscape Zone.
<i>Propel Vallejo General Plan 2040</i>	City of Vallejo 2018	Includes goals for restoration of Lake Chabot, Lake Dalwigk, and other detention basins in the city limits and the enhancement of White Slough.
<i>San Antonio Creek Watershed Plan</i>	Sonoma Resource Conservation District 2008	Includes the following recommended goals for the San Antonio Creek HUC-12: <ul style="list-style-type: none"> ▪ Reduce sedimentation and flooding and improve groundwater recharge through culvert redesign and drainage reestablishment at the confluence with the Petaluma River. ▪ Enhance habitat and riparian corridors in the HUC-12, with a focus on those corridors that do or can support steelhead.

Document	Reference	Information Identified
<i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i>	FWS 2011	Includes the following goals: <ul style="list-style-type: none"> ▪ Restore 1,500 acres of tidal marsh habitat and associated uplands, specifically identifying Cullinan Ranch and Skaggs Island as locations for restoration. ▪ Conduct tidal marsh habitat enhancement at Sonoma Creek, Tolay Creek, Lower Tubbs Island, and the Strip Marsh. ▪ Restore sub-tidal areas of the refuge. ▪ Reduce the cover of perennial pepperweed by 90 percent in the refuge. ▪ Eliminate any population of nonnative cordgrass species in the refuge. ▪ If Sears Point can be acquired, conduct habitat enhancement and restoration of seasonal wetlands present.
<i>Sonoma Creek Baylands Strategy</i>	Sonoma Land Trust and San Francisco Bay Restoration Authority 2020	Includes a goal to enhance and restore aquatic areas of the Sonoma Creek and Tolay Creek watersheds.
<i>Sonoma County General Plan 2020</i>	Sonoma County 2016	Identifies goals for the restoration of: <ul style="list-style-type: none"> ▪ Marshes and shoreline habitat associated with San Pablo Bay ▪ Marshes around Petaluma
<i>St. Helena General Plan Update 2040</i>	City of St. Helena 2019	Includes a goal for the enhancement of riparian corridors in city limits, particularly those along the Napa River.
<i>Strategic Plan to Protect California's Coast and Ocean 2020–2025</i>	OPC 2019	Identifies a number of targets for specific actions, including: <ul style="list-style-type: none"> ▪ 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.
<i>Sugarloaf Ridge State Park Final General Plan and Environmental Impact Report</i>	California Parks and Recreation 2004a	Includes a goal to restore water quality in the Sonoma, Bear, and Calabazas Creek watersheds, and to restore wetlands and riparian habitats in the park. The use of “watershed” for this document is specific to those creeks and does not represent a HUC.
SWAP	CDFW 2015a	Identifies freshwater marsh, salt marsh, and American southwest riparian forest and woodland as conservation targets. Also included are 14 species of fish (including green sturgeon, coho salmon, steelhead, and longfin smelt) as targets for population increase in relation to conservation of aquatic habitats.

Document	Reference	Information Identified
<i>Tomales Bay State Park General Plan</i>	California Parks and Recreation 2004b	The plan includes general goals for riparian corridor enhancement and restoration and the removal of nonnative species of cordgrass from the park. Specific area goals are to restore the outlet of the Heart's Desire Beach estuary and restore the Tomasini Point estuary area.
<i>Town of Fairfax 2010-2030 General Plan</i>	Town of Fairfax 2012	Includes objectives for restoration of riparian habitat in San Anselmo Creek, Fairfax Creek, and critical habitats for coho salmon and steelhead.
<i>White Slough Specific Area Plan</i>	City of Vallejo and Solano County 2010	The plan includes a goal to enhance at least 379 acres of tidal wetlands in the North White Slough area and 144 acres of tidal wetlands in the portion of the management area south of State Route 37.

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 2015a), 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 directly² or indirectly from negative impacts of pressures (e.g., habitat fragmentation)” (CDFW 2015a). 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 or STIP and could benefit from in-kind mitigation purchased or established through an advance mitigation project. When designating an area as an 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, barriers, 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 2015a, 2016a). In the GAI, the majority of urbanization and development occurs along the Interstate 80 and State Route 29 corridors, around the margin of San Francisco Bay, and in the central portion of the GAI westward of Petaluma (Figure 2-7).

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

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

pollutants (FWS 2013). A recent study found that salmonid populations were affected by artificial light in habitats by attracting predators at night into areas inhabited by salmonid smolts, showing evidence that light pollution can also degrade habitat quality (Nelson et al. 2021).

Habitat loss is not cited as a cause for longfin smelt decline, but degradation of water quality in its habitat is cited as a cause for decline (CDFW 2009). Habitat loss is a more serious threat to green sturgeon given the reduction of spawning habitat to a narrow range of the Sacramento River, upstream of the GAI. While habitat loss in the GAI is not considered a factor in green sturgeon decline, reduction of water flows into the San Francisco Bay is a factor (NMFS 2015).

Reduced habitat complexity, removal of native riparian vegetation, degradation of water quality, removal of instream wood, and sedimentation are all listed as factors for steelhead and coho salmon being listed under the ESA and are still affecting both DPSs of steelhead (NMFS 2012, 2016c, 2016d). Both DPSs of steelhead and 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 2012, 2016c, 2016d). Human-induced threats from road building and construction have altered the connections between the types of habitat, and the amount of sediment supply into streams and rivers. Increased sedimentation has direct negative effects on both DPSs of steelhead by interfering with their physiological and biological processes, and indirect effects through degradation of their habitat (NMFS 2016c, 2016d). Juvenile coho salmon and both DPSs of 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 2012).

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, disruption of aquatic and terrestrial connectivity, and further threats to already endangered or threatened natural resources (FWS 2013). Invasive plant species that affect riparian systems in the GAI include perennial pepperweed, heart-podded hoary cress (*Lepidium draba*), Himalayan blackberry, tree-of-heaven, giant reed, water hyacinth, pampas grass and several nonnative cordgrass species (*Spartina* spp.) (Cal-IPC 2021).

Overbite clam (*Corbula amurensis*) has been observed to cause reductions in food availability for longfin smelt and is a factor in their decline (CDFW 2009). The degree to which invasive species play a role in limiting coho salmon populations in the GAI is not well-understood; however, it is known that the rapidly invading New Zealand mudsnail (*Potamopyrgus antipodarum*) has a high potential to negatively affect coho salmon and both DPSs of steelhead based on disruptions to the food web (NMFS 2012, 2016d,

2016e). Additionally, outside of the Eel River system, neither predation nor direct competition by invasive species is considered a factor in the decline of steelhead and these factors are not known to be a factor in green sturgeon decline at all (CDFW 2021b; NMFS 2018). Although no single invasive species is a known direct threat to coho salmon, steelhead, or green sturgeon in the GAI, invasive species are a threat to native ecosystems overall and would indirectly affect these species (CDFW 2015a).

8.5.3. Altered Hydrology, Geomorphology, and Water Quality

Water quality and hydrology can be directly altered by physical barriers such as culverts, dams (including cofferdams), dikes, trash racks, bridges, roads, canals, and other human-made infrastructure, which can have effects both upstream and downstream by truncating connectivity, altering sediment transport processes, altering natural flow regimes, and changing water surface elevations, adding to the downstream loss of habitat. Stable geomorphology and sediment transport are critical to maintaining healthy streams so that degradation and aggradation do not destroy habitats in the stream and riparian and wetland habitats downstream. The loss of wetlands can result in increased 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 2015a).

These stressors affect coho salmon, longfin smelt, and steelhead by reducing survival rates for juvenile steelhead and reproductive rates for adult coho salmon and steelhead. Flow reductions through water use also increase the likelihood for fish stranding and contaminant concentration and can cause tissue damage to coho salmon and steelhead (CDFW 2009; NMFS 2012, 2016c). One of the most widespread stressors for coho salmon, longfin smelt, 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 through agriculture runoff and sedimentation (CDFW 2009; NMFS 2012, 2016c).

In many river systems, the creation of dikes, levees, tide gates, and culverts has affected water quality, geomorphology, and hydrology directly and/or indirectly. Removing or altering hydrologic connections can negatively affect the ability of coho salmon, longfin smelt, green sturgeon, and steelhead to migrate to and from their natal streams. Other aquatic species are also affected by the loss of hydrologic connectivity. 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 (CDFW 2009; NMFS 2012, 2016c, 2018).

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 increases in heavier-than-

average precipitation events coupled with increased risk of flash flood events, sea-level rise, storm surges, and an increased risk of wildfire, which is coupled with increases flooding and erosion risk (Caltrans 2018b).

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 2015a). For the northern portion of the GAI, 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). For the rest of the GAI, greater aridity in summer months, even in areas where increased winter rainfall is expected, is projected to occur. Sea-level rise is expected to be the most threatening effect in the San Francisco Bay area because it can couple with land subsidence, and the pathways for migration for coastal wetlands into the interior are limited by urbanization. Other modeled changes to aquatic ecosystems of the San Francisco Bay area include increased storm intensity and decreased sediment availability for intertidal habitats (Ackerly et al. 2019).

Climate change is listed as a threat to longfin smelt (CDFW 2009); however, the direct effects of climate change on green sturgeon are not known. Generally, the shifting and reduction of estuary habitat, which allows time for fish species to adjust from freshwater to saltwater environments, as caused by sea-level rise, could also have a detrimental effect on longfin smelt and green sturgeon (NMFS 2012).

Steelhead and 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 coho salmon, longfin smelt, and steelhead and would most likely affect summer-rearing juveniles (CDFW 2009; NMFS 2012, 2016c). 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 2016c). A recent study found that steelhead in California were most at risk from 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 2015a). 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 2021b; Grantham 2018). These issues are listed as factors involved with coho salmon, longfin smelt, and green sturgeon declines and

continue to plague these species (CDFW 2009; NMFS 2012, 2018); however, steelhead are more resistant to temperature changes and do not have this issue listed as a stressor beyond wildfire damage to riparian systems in a more general way (NMFS 2016c).

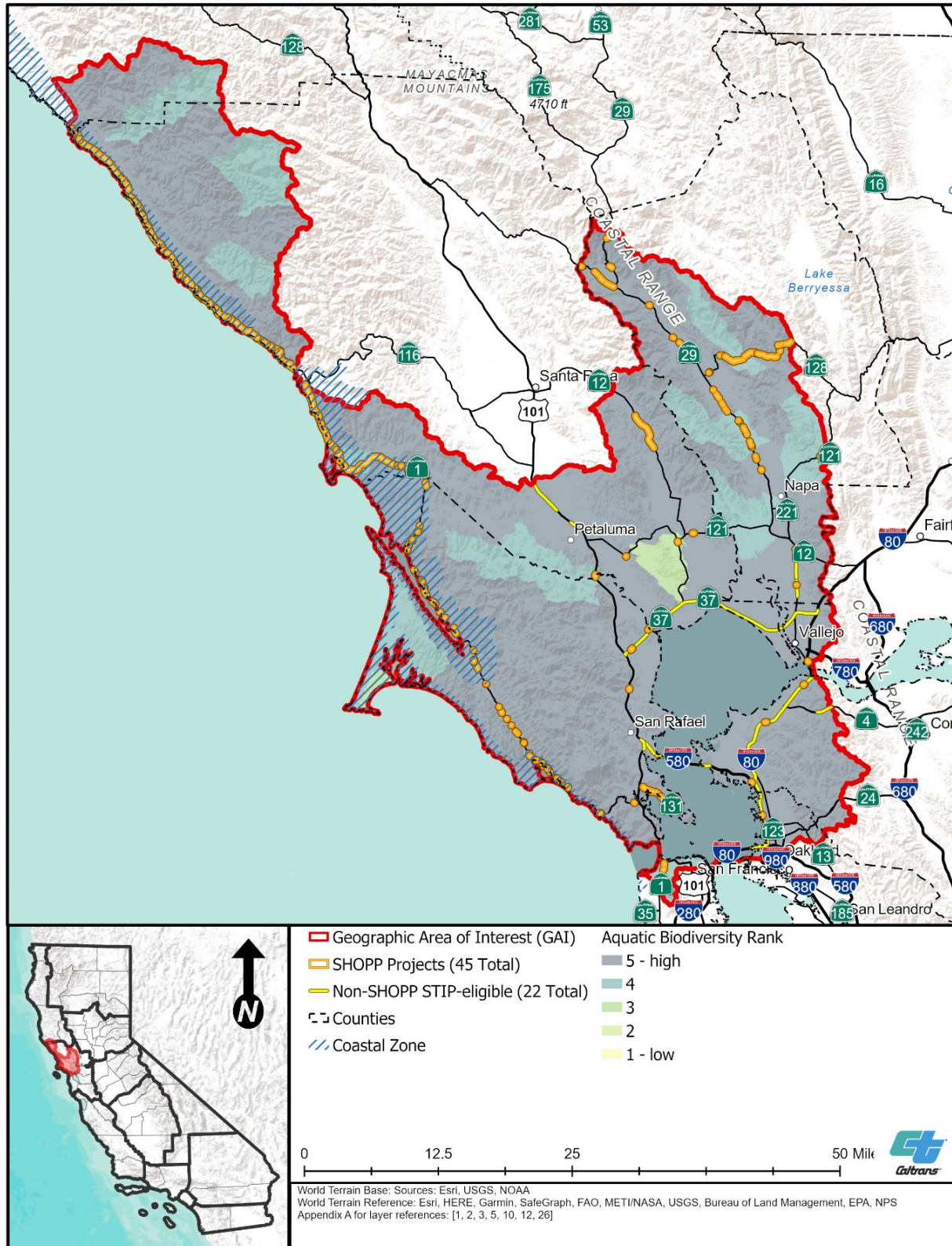
8.6 Multi-resource Benefits

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, aquatic and terrestrial connectivity, 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, with one small area in the center of the GAI having medium aquatic biodiversity. These areas are located along the SHS with planned SHOPP and STIP-eligible projects.
- 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 aquatic species such as Chinook and delta smelt in addition to coho salmon, steelhead, longfin smelt, green sturgeon, and other species that use aquatic habitat, such as few-flowered navarretia.
- Enhancing and/or restoring the aquatic resources of the GAI is expected to support or contribute to beneficial uses of wetland and 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 waters could sequester contaminants on waters identified as 303(d) impaired and/or with an established Total Maximum Daily Load.

Caltrans will consider aquatic resources' biodiversity values, special-status species with the potential to co-occur in aquatic habitats, ESHAs, the beneficial uses of waters, and impaired waters 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 and STIP-eligible 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, protect and restore hydrologic processes such as channel stability, 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, objectives, and sub-objectives presented in Table 8-4 reflect Caltrans' intention to develop advance mitigation project scopes for in-kind mitigation and are intended to reflect the watershed approach, as practiced by natural resource regulatory agencies. The watershed approach is an analytical process through which the Corps, EPA, SWRCB, 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 resources through strategic selection of compensatory mitigation sites. The Corps subscribes to a watershed approach for compensatory mitigation that uses the HUC-based classification system, a topographic watershed-based system, or littoral cell boundary, in the case of coastal and marine resources, depending on the size and location of a transportation or other project (Corps 2015). SWRCB and the 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 (SWRCB 2019c). Additionally, coho salmon, green sturgeon, longfin smelt, and steelhead have goals separate from those pursued by the Corps and the RWQCBs, including the elimination of fish passage barriers and aquatic invasive species such as overbite clam (CDFW 2009; NMFS 2015).

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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.	<p>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.</p> <p>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.</p> <p>Sub-Objective AR-1.1.3: Enhance and/or rehabilitate riparian vegetation in the GAI, particularly in the Petaluma and Napa Rivers; Sonoma, Salmon, Stemple, Lagunitas, and Codornices Creeks; and other named and unnamed tributaries into San Francisco Bay and the Pacific Ocean, many of which are listed in Table 8-2.</p> <p>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 and increase basin-wide value of resources.</p>	<ul style="list-style-type: none">▪ <i>2008 Final Compensatory Mitigation Rule</i> (73 Federal Register 19593)▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>California Wetlands Conservation Policy</i> (Executive Order W-59-93)▪ <i>China Camp State Park General Plan</i> (California Parks and Recreation 1979)▪ <i>City of Petaluma: General Plan 2025</i> (City of Petaluma 2021)▪ <i>The City of San Rafael General Plan 2020</i> (City of San Rafael 2016)▪ <i>Definition and Delineation of Wetlands in the Coastal Zone</i> (CCC 2011)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Marin County LCP</i> (Marin County 2021b)▪ <i>Mount Tamalpais State Park General Plan</i> (California Parks and Recreation 1980)▪ <i>National Wetlands Mitigation Action Plan</i> (EPA and Corps 2002)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Petaluma Adobe State Historic Park General Plan</i> (California Parks and Recreation 1985)▪ <i>Propel Vallejo General Plan 2040</i> (City of Vallejo 2018)▪ <i>Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division</i> (Corps 2015)▪ <i>Recovery Plan for the ESU of Central California Coast Coho Salmon</i> (NMFS 2012)▪ <i>Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon</i> (<i>Acipenser medirostris</i>) (NMFS 2018)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (FWS 2005)▪ <i>Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division</i> (Corps 2015)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Sonoma Creek Baylands Strategy</i> (Sonoma Land Trust and San Francisco Bay Restoration Authority 2020)▪ <i>State Wetland Definition and Procedures for Discharges of Dredged or Fill Material in Waters of the State</i> (SWRCB 2019b)▪ <i>Steelhead Restoration and Management Plan for California</i> (California Department of Fish and Game 1996)▪ <i>Strategic Plan to Protect California’s Coast and Ocean 2020–2025</i> (OPC 2019)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>Tomaes Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Town of Fairfax 2010-2030 General Plan</i> (Town of Fairfax 2012)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Objective AR-1.2: Avoid a net loss of aquatic resource acreage by establishing aquatic resources.	<p>Sub-Objective AR-1.2.1: Establish and/or reestablish wetland and non-wetland waters, particularly in 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.</p> <p>Sub-Objective AR-1.2.2: Establish and/or reestablish riparian vegetation in the HUC-8s included in Table 8-2, particularly the Petaluma and Napa Rivers; Sonoma, Salmon, Stemple, Lagunitas, and Codornices Creeks; and other named and unnamed tributaries into the Pacific Ocean, many of which are listed in Table 8-2.</p>	<ul style="list-style-type: none">▪ <i>2008 Final Compensatory Mitigation Rule</i> (73 <i>Federal Register</i> 19593)▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>California Wetlands Conservation Policy</i> (Executive Order W-59-93)▪ <i>China Camp State Park General Plan</i> (California Parks and Recreation 1979)▪ <i>City of Petaluma: General Plan 2025</i> (City of Petaluma 2021)▪ <i>The City of San Rafael General Plan 2020</i> (City of San Rafael 2016)▪ <i>Definition and Delineation of Wetlands in the Coastal Zone</i> (CCC 2011)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Marin County LCP</i> (Marin County 2021b)▪ <i>Mount Tamalpais State Park General Plan</i> (California Parks and Recreation 1980)▪ <i>National Wetlands Mitigation Action Plan</i> (EPA and Corps 2002)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Petaluma Adobe State Historic Park General Plan</i> (California Parks and Recreation 1985)▪ <i>Propel Vallejo General Plan 2040</i> (City of Vallejo 2018)▪ <i>Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division</i> (Corps 2015)▪ <i>Recovery Plan for the ESU of Central California Coast Coho Salmon</i> (NMFS 2012)▪ <i>Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon</i> (<i>Acipenser medirostris</i>) (NMFS 2018)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (FWS 2005)▪ <i>Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division</i> (Corps 2015)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Sonoma Creek Baylands Strategy</i> (Sonoma Land Trust and San Francisco Bay Restoration Authority 2020)▪ <i>State Wetland Definition and Procedures for Discharges of Dredged or Fill Material in Waters of the State</i> (SWRCB 2019b)▪ <i>Steelhead Restoration and Management Plan for California</i> (California Department of Fish and Game 1996)▪ <i>Strategic Plan to Protect California’s Coast and Ocean 2020–2025</i> (OPC 2019)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>Tomaes Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Town of Fairfax 2010-2030 General Plan</i> (Town of Fairfax 2012)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)

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 wetlands and non-wetland waters	See below	See below
Objective AR-2.1: Protect and enhance water quality.	<p>Sub-Objective AR-2.1.1: In coordination with the RWQCB, restore and/or enhance of wetland and non-wetland waters with RWQCB biology-related beneficial use designations, such as cold freshwater habitat; estuarine habitat; fish migration; flood peak attenuation/flood water storage; freshwater replenishment; groundwater recharge (where there is a surface water connection); inland saline water habitat; marine habitat; migration of aquatic organisms; preservation of ASBSs; rare, threatened, or endangered species; spawning, reproduction, and/or early development; warm freshwater habitat; water quality enhancement; wetland habitat; and wildlife habitat.</p> <p>Sub-Objective AR-2.1.2: In coordination with natural resource regulatory agencies, address aggradation, erosion, nutrients, contaminants, sedimentation, and temperatures in the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays HUC-8s.</p> <p>Sub-Objective AR-2.1.3: In coordination with the RWQCB, implement restoration and enhancement actions that address water quality for aquatic resources, for example, at Gualala River, Salmon Creek, and Lagunitas Creek, and freshwater and coastal marshes.</p> <p>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.</p> <p>Sub-Objective AR-2.1.5: Restore or create adjacent wetlands and non-wetland aquatic features to enhance water quality in tributaries.</p> <p>Sub-Objective AR-2.1.6: Rehabilitate and/or enhance small streams and sections of larger streams to remove nonnative plant species that degrade stream water quality, such as perennial pepperweed, heart-podded hoary cress, Himalayan blackberry, tree-of-heaven, giant reed, water hyacinth, and nonnative cordgrass species.</p> <p>Sub-Objective AR-2.1.7: Improve stream temperatures by increasing shaded riverine aquatic habitat in the Petaluma and Napa Rivers and in Sonoma, Salmon, Stemple, Lagunitas, and Codornices Creeks for fish and other aquatic life.</p>	<ul style="list-style-type: none">▪ <i>303(d) List of Impaired Water Bodies</i> (SWRCB 2018)▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Mount Tamalpais State Park General Plan</i> (California Parks and Recreation 1980)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Point Reyes National Seashore General Management Plan</i> (NPS 2020)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (FWS 2005)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Sugarloaf Ridge State Park Final General Plan and Environmental Impact Report</i> (California Parks and Recreation 2004a)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>Tomales Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Water Quality Control Plan for the North Coast Region</i> (North Coast RWQCB 2018)▪ <i>Water Quality Control Plan for the San Francisco Bay Basin</i> (San Francisco Bay RWQCB 2019)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Objective AR-2.2: Improve surface water hydrology.	Sub-Objective AR-2.2.1: Restore and/or enhance natural hydrologic regimes, natural sediment transport, and geomorphic processes.	<ul style="list-style-type: none">▪ <i>303(d) List of Impaired Water Bodies</i> (SWRCB 2018)▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Mount Tamalpais State Park General Plan</i> (California Parks and Recreation 1980)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Point Reyes National Seashore General Management Plan</i> (NPS 2020)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (FWS 2005)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Sugarloaf Ridge State Park Final General Plan and Environmental Impact Report</i> (California Parks and Recreation 2004a)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>Tomales Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Water Quality Control Plan for the North Coast Region</i> (North Coast RWQCB 2018)▪ <i>Water Quality Control Plan for the San Francisco Bay Basin</i> (San Francisco Bay RWQCB 2019)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)
	Sub-Objective AR-2.2.2: Reconnect severed aquatic systems and improve connectivity in aquatic and riparian systems, with particular focus on reconnecting higher watershed areas with lower watershed areas, such as reconnecting tributaries to the Petaluma and Napa Rivers and the Sonoma, Salmon, Stemple, Lagunitas, and Codornices Creeks.	
	Sub-Objective AR-2.2.3: Reestablish hydrologic regimes or drainage patterns for better function of depressional wetlands, estuarine and marine wetlands, freshwater emergent wetlands, forested/shrub wetlands, slope wetlands, freshwater ponds, lakes, marine intertidal and subtidal systems, riverine habitats, and coastal wetlands.	
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.	<ul style="list-style-type: none">▪ <i>303(d) List of Impaired Water Bodies</i> (SWRCB 2018)▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Mount Tamalpais State Park General Plan</i> (California Parks and Recreation 1980)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Point Reyes National Seashore General Management Plan</i> (NPS 2020)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (FWS 2005)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Sugarloaf Ridge State Park Final General Plan and Environmental Impact Report</i> (California Parks and Recreation 2004a)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>Tomales Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Water Quality Control Plan for the North Coast Region</i> (North Coast RWQCB 2018)▪ <i>Water Quality Control Plan for the San Francisco Bay Basin</i> (San Francisco Bay RWQCB 2019)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)
	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 wetlands adjacent to streams to enhance groundwater-surface water dynamics in tributaries.	

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.	<p>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.</p> <p>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 the 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.</p> <p>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.</p>	<ul style="list-style-type: none">▪ <i>Caltrans Fish Passage Annual Legislative Reports</i> (Caltrans 2021h)▪ <i>Final Coastal Multispecies Recovery Plan Volume III: Northern California Steelhead</i> (NMFS 2016a)▪ <i>Final Coastal Multispecies Recovery Plan Volume IV: Central California Steelhead</i> (NMFS 2016b)▪ <i>Pacific Coast Salmon Fishery Management Plan</i> (Pacific Fishery Management Council 2016)▪ <i>Recovery Plan for the ESU of Central California Coast Coho Salmon</i> (NMFS 2012)▪ <i>Recovery Strategy for California Coho Salmon</i> (California Department of Fish and Game 2004)▪ <i>Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (Acipenser medirostris)</i> (NMFS 2018)▪ <i>Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes</i> (FWS 1996)▪ <i>Steelhead Restoration and Management Plan for California</i> (California Department of Fish and Game 1996)▪ <i>SWAP</i> (CDFW 2015a)

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.	<p>Sub-Objective AR-4.1.1: Enhance and/or restore aquatic resource function and value in areas of lower climate resilience, such as the central portion of the GAI, and at tidal flats, salt pannes, and freshwater wetlands to reduce climate change and sea-level rise effects on aquatic resources.</p> <p>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 San Pablo Bay, San Francisco Bay, Bolinas Lagoon, Tomales Bay, White Slough, and the entrances to the Russian, Petaluma, and Napa Rivers, such that the potential for aquatic resource migration increases by the enhancement and/or restoration of ecotones that transition from aquatic to upland habitats.</p> <p>Sub-Objective AR-4.1.3: Prioritize riparian areas of the Gualala-Salmon, San Pablo Bay, and Tomales-Drake Bays HUC-8s for enhancement and/or restoration to improve freshwater quantity and quality, floodplain connectivity, and instream cover continuity.</p> <p>Sub-Objective AR-4.1.4: Enhance, rehabilitate, establish and/or reestablish aquatic habitats by using native species such as box elder (<i>Acer negundo</i>), Fremont's cottonwood (<i>Populus fremontii</i>), willows (<i>Salix</i> sp.), cattails (<i>Typha</i> spp.), rushes (<i>Juncus</i> sp.), and bulrushes (<i>Schoenoplectus</i> sp.) to reduce the effects of climate change.</p> <p>Sub-Objective AR-4.1.5: Reduce adverse instream flooding effects by restoring affected headwater and tributary hydrological functions for the Gualala River, Napa River, Petaluma River, and Sonoma Creek.</p> <p>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 Adobe Creek, Gualala River, Napa River, Petaluma River, San Antonio Creek, and Sonoma Creek.</p>	<ul style="list-style-type: none">▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Propel Vallejo General Plan 2040</i> (City of Vallejo 2018)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Strategic Plan to Protect California's Coast and Ocean 2020–2025</i> (OPC 2019)▪ <i>St. Helena General Plan Update 2040</i> (City of St. Helena 2019)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>The City of San Rafael General Plan 2020</i> (City of San Rafael 2016)▪ <i>Tomales Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Town of Fairfax 2010-2030 General Plan</i> (Town of Fairfax 2012)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)
Objective AR-4.2: Improve aquatic habitat resiliency.	<p>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.</p> <p>Sub-Objective AR-4.2.2: Prioritize management of invasive species that occur in large contiguous areas in aquatic habitats, such as perennial pepperweed, Himalayan blackberry, giant reed, water hyacinth, nonnative cordgrass species, and overbite clam that may be exacerbated by climate change such that the greatest functional lift is provided.</p> <p>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 Petaluma and Napa Rivers as well as Sonoma, Salmon, Stemple, Lagunitas, and Codornices Creeks.</p>	<ul style="list-style-type: none">▪ <i>Baylands Ecosystem Habitat Goals</i> (EPA and San Francisco RWQCB 1999)▪ <i>Draft Petaluma River Watershed Enhancement Plan</i> (Sonoma Resource Conservation District 2015)▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Eastshore State Park General Plan</i> (California Parks and Recreation 2002)▪ <i>Lower Sonoma Creek Flood Management and Ecosystem Enhancement</i> (ESA, PWA, and Sonoma Resource Conservation District 2012)▪ <i>Northern Napa River Watershed Plan</i> (Napa County Conservation District 2002)▪ <i>Propel Vallejo General Plan 2040</i> (City of Vallejo 2018)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>San Antonio Creek Watershed Plan</i> (Sonoma Resource Conservation District 2008)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>Sonoma County General Plan 2020</i> (Sonoma County 2016)▪ <i>Strategic Plan to Protect California's Coast and Ocean 2020–2025</i> (OPC 2019)▪ <i>St. Helena General Plan Update 2040</i> (City of St. Helena 2019)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>The City of San Rafael General Plan 2020</i> (City of San Rafael 2016)▪ <i>Tomales Bay State Park General Plan</i> (California Parks and Recreation 2004b)▪ <i>Town of Fairfax 2010-2030 General Plan</i> (Town of Fairfax 2012)▪ <i>White Slough Specific Area Plan</i> (City of Vallejo and Solano County 2010)

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: Maximize mitigation opportunities for multiple environmental benefits.	<p>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.</p> <p>Sub-Objective AR-5.1.2: Enhance, rehabilitate, establish, and/or reestablish habitats for other aquatic species such as chinook salmon, delta smelt, and tidewater goby.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none">▪ <i>East Bay RCIS</i> (ICF 2021)▪ <i>Marin County LCP</i> (Marin County 2021a)▪ <i>Pacific Coast Salmon Fishery Management Plan</i> (Pacific Fishery Management Council 2016)▪ <i>Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes</i> (FWS 1996)▪ <i>Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California</i> (FWS 2013)▪ <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (FWS 2005)▪ <i>San Pablo Bay National Wildlife Refuge Final Comprehensive Conservation Plan</i> (FWS 2011)▪ <i>SWAP</i> (CDFW 2015a)▪ <i>Water Quality Control Plan for the North Coast Region</i> (North Coast RWQCB 2018)▪ <i>Water Quality Control Plan for the San Francisco Bay Basin</i> (San Francisco Bay RWQCB 2019)

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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 *Fish Passage Annual Legislative Report* (Caltrans 2021h). 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.

8.8 Summary

Caltrans anticipates that future SHOPP and STIP-eligible transportation projects may be conditioned by the Corps, SWRCB, RWQCBs, NMFS, CCC, and/or CDFW to address the pressures and stressors that threaten aquatic resources in the GAI. These pressures and stressors include:

- Habitat loss, fragmentation, and degradation;
- Invasive species;
- Altered hydrology, geomorphology, 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 generally 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, geomorphology, 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, improve surface water hydrology, and improve water storage and groundwater recharge. The sub-objectives were selected to address the following pressures and stressors: altered hydrology, geomorphology, 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 4 will nominate advance mitigation projects to the Caltrans Director and request funding approval (see Step 4 in Figure 1-1, Figure 6-1; Caltrans 2019). 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 4 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 and 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 be consistent with natural resource regulatory agency goals and objectives expressed in an approved regulatory instrument or interagency agreement and/or aligned with conservation goals and objectives identified in Chapter 7, *Wildlife Resources Conservation Goals and Objectives*, or Chapter 8, *Aquatic Resources Conservation Goals and Objectives*.

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 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 and non-SHOPP STIP-eligible transportation projects to natural resources is shown in figures throughout this document. Estimated transportation project mitigation needs within the GAI for fiscal years 2019/20 to 2028/29 are presented in Chapter 5, *Modeled Estimated Impacts*, and the timing of the needs is analyzed in Chapter 6, *Benefiting Transportation Project Considerations*. For the time interval under consideration, 2019/20 to 2028/29,¹ Caltrans District 4 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 that are planned for the middle and end of the planning period. Given the expected timing of mitigation need, at this time (June of fiscal year 2021/22) mitigation that can be purchased or established by 2023/24 (within the next 2 years) could potentially address approximately:

- Gualala-Salmon Sub-basin:
 - 4.0 acres of wetlands, 3.2 acres of non-wetland waters, 2.9 acres of threatened and endangered fish habitat, and no acres of riparian habitat impacts, potentially contributing to the acceleration of seven, seven, six, and zero transportation projects, respectively

¹ SHOPP Project 20694 is scheduled to occur in 2030/31. It is a long-lead project and therefore included in this analysis.

- San Pablo Bay Sub-basin:
 - 2.0 acres of wetlands, 2.5 acres of non-wetland waters, 6.8 acres of threatened and endangered fish habitat, and 30.3 acres of riparian habitat impacts potentially contributing to the acceleration of 10, 14, 14, and 5 transportation projects, respectively
- Tomales-Drake Bays Sub-basin:
 - 1.1 acres of wetlands, 1.2 acres of non-wetland waters, 2.8 acres of threatened and endangered fish habitat, and 2.7 acres of riparian habitat impacts, potentially contributing to the acceleration of seven, seven, seven, and one transportation projects, respectively

In addition, mitigation that can be purchased or established by 2023/24 (within the next 2 years) for terrestrial resources could potentially address approximately:

- Northern California Coast Ecoregion:
 - 99.8 acres of Myrtle's silverspot butterfly habitat and 10.4 acres of California red-legged frog habitat, potentially contributing to the acceleration of 6 and 26 transportation projects, respectively
- Northern California Coast Ranges Ecoregion:
 - 2.2 acres of California red-legged frog habitat, potentially contributing to the acceleration of two transportation projects
- Central California Coast Ecoregion:
 - 2.3 acres of California red-legged frog habitat, potentially contributing to the acceleration of two transportation projects

All or some of these needs could form the basis for Caltrans District 4 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. Others have potential but may 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 (wildlife resources) and Table 9-5 (aquatic resources) later in 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
Caltrans acquires, restores, manages, monitors, enhances, and preserves lands, waterways, aquatic resources, or fisheries, or funds the acquisition, restoration, management, monitoring, enhancement, and preservation ^e 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

Advance Mitigation Project Type	Authorization	Section
When the other mitigation options (above) are not practicable, Caltrans may perform mitigation in accordance with a programmatic mitigation plan ^f 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 SWRCB and the RWQCBs do not typically approve establishment of or accept preservation credits.

^f 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. HCP and/or NCCP Fees

HCPs and NCCPs are discussed in Section 4.2. HCPs and NCCPs are species-focused and are aligned with and plan for natural resource protection. HCPs, including multiple species HCPs, and NCCPs provide for incidental take under CESA and ESA, respectively. FWS is the signatory agency to HCPs. CDFW is the signatory agency to NCCPs.

Caltrans identified no HCPs or NCCPs with plan areas that overlap the GAI and that include transportation-related projects.

Feasibility. This authorized activity is not currently feasible because there are currently no HCPs or NCCPs in the GAI.

9.3.2. Conservation Bank Credit Purchase

Conservation banks are discussed in Section 4.3. Conservation banks are species-focused, and each bank's alignment with natural resource protection is documented through its BEI. In the GAI, CDFW is a signatory to six conservation banks, three of which offer California red-legged frog credits, one of which offers Swainson's hawk credits, and one of which offers longfin smelt and green sturgeon habitat (Table 4-2). FWS is a signatory to 12 banks, 5 of which offer California red-legged frog credits. NMFS is a signatory to two banks, one of which offers coho salmon and steelhead credits and one (with FWS and CDFW) that offers longfin smelt and green sturgeon credits (Table 4-2).

Conservation bank service areas are shown in Figures 4-1 to 4-4, and the anticipated transportation project impact forecast on species of mitigation need is presented by year on Figures 6-5 through 6-7. When placed side-by-side, it is possible to see that multiple transportation projects may need species of mitigation need credits and which bank's service areas might have them available by 2023/24, when the credits might contribute to transportation project acceleration.

Feasibility. This authorized activity may be feasible. Caltrans District 4 may be able to address some of its California red-legged frog, Swainson's hawk, coho salmon,

steelhead, longfin smelt, and green sturgeon mitigation needs through credits purchased from conservation banks in the GAI. After the Caltrans Director's approval for funding, delivering an advance mitigation project to purchase credits or fees is expected to take 1 to 3 years, at which point the credits or values would be available to transportation projects. The Caltrans District will need to approach each bank to confirm the availability of credits and bulk credit purchase terms. Bulk credits purchased through an advance mitigation project might, with CDFW approval, be applied to meet future CDFW permit conditions on transportation projects. Since coho salmon is a dually listed species, it is probable that compensatory mitigation will be incorporated into future ESA biological assessments/opinions in coordination with NMFS. For existing banks, a BEI amendment would be required to formalize a process for bulk pre-transfer credit purchases, and additional time for amending the bank instrument should be considered. In 2021, the Interagency Project Delivery Team finalized new bank templates that incorporate pre-transfer purchase terms; additional Caltrans-specific terms would also need to be negotiated with bank sponsors. The decision to amend a BEI is at the discretion of the bank sponsor.

9.3.3. Mitigation Bank Credit Purchase

Mitigation banks are discussed in Section 4.3. Mitigation banks are wetlands- and non-wetland waters-focused, and each bank's alignment with natural resource protection is documented through its BEI. Two mitigation banks occur in the GAI, one of which provides wetland and/or non-wetland water credits. The other mitigation bank has sold out of wetland credits but still provides credits for a variety of special-status species. The Corps is a signatory on both mitigation banks in the GAI (Table 4-2).

Feasibility. This authorized activity may be feasible. After the Caltrans Director's approval for funding, delivering an advance mitigation project to purchase credits or fees is expected to take 1 to 3 years, at which point the credits or values would be available to transportation projects. For existing banks, a BEI amendment would be required to formalize a process for bulk pre-transfer credit purchases, and additional time for amending the bank instrument should be considered. In 2021, the Interagency Project Delivery Team finalized new bank templates that incorporate pre-transfer purchase terms; additional Caltrans-specific terms would also need to be negotiated with bank sponsors. The decision to amend a BEI is at the discretion of the bank sponsor.

9.3.4. In-lieu Fee Credit Purchase

In-lieu fee programs are 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 and offers permittees an in-lieu fee option to satisfy their compensatory mitigation obligations as determined by the applicable regulatory agencies for impacts on aquatic resources authorized under the CWA, Rivers and Harbors Act, ESA, Porter-Cologne Water Quality Control Act, and other applicable laws. Once enough money is received by an in-lieu fee program, it implements wetland, stream, or threatened or endangered species habitat

restoration, creation, enhancement, or preservation activities in a watershed or other defined area.² The in-lieu fee program's alignment with natural resource protection is documented through its enabling instrument and will be incorporated into future biological opinions on transportation projects.

There are no in-lieu fee programs with service areas that overlap the GAI; however, one is under development from Ducks Unlimited (Table 4-3).

Feasibility. This authorized activity is not currently feasible because there are currently no in-lieu fee programs 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 (June of fiscal year 2021/22), instructions and guidance for establishing MCAs are currently under development by CDFW.³ In addition, although two are in progress, the required foundational RCISs underway in the GAI are not yet CDFW-approved.

Feasibility. At this time (June of fiscal year 2021/22), this authorized activity is not feasible because no MCA credits are available for purchase in the GAI. However, one existing and one pending RCIS within the GAI may allow for future opportunities for Caltrans to enter into MCAs with CDFW in Contra Costa or Alameda Counties.

9.3.6. Conservation Bank Establishment

Instructions and guidance for establishing conservation banks are available from CDFW⁴ and FWS.⁵ Conservation banks are species-focused, and each bank's alignment with natural resource protection will be documented through its BEI. CDFW and FWS are potential signatories, and there also may be circumstances where the Corps and/or SWRCB 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*
- Chapter 8, *Aquatic Resources Conservation Goals and Objectives*
- Appendix B, *Land Cover Types*
- Appendix D, *Complete SAMNA Species Results*

² https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/banking_faq.pdf

³ <https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation>

⁴ <https://wildlife.ca.gov/Conservation/Planning/Banking/Templates>

⁵ https://www.fws.gov/endangered/esa-library/pdf/Conservation_Banking_Guidance.pdf

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, *Wildlife Resources Conservation Goals and Objectives*, Caltrans analyzed and synthesized the relevant and applicable information listed in Chapter 3, *Relevant Plans, Policies, and Regulations*, 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 the following goals would be consistent with CDFW and FWS goals:

- Conserve and expand existing habitat for species of mitigation need within the GAI (WILD-1)
- Preserve, enhance, and increase connectivity between blocks of wildlife habitat (WILD-2)
- Support resiliency of the landscape to climate change and sea-level rise (WILD-3)
- Decrease mortality and competition, and protect population health for species of mitigation need (WILD-4)
- Prioritize multi-species and multi-resource benefits (WILD-5)

Additionally, for each objective, Table 7-3 presents 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 Corps⁶ and CDFW.⁷ 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*
- Appendix F, *Aquatic Resource Locations*

⁶ https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/mitig_info/

⁷ <https://wildlife.ca.gov/Conservation/Planning/Banking/Templates>

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.

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

An understanding of Corps, RWQCB, FWS, CDFW, and NMFS' 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, *Aquatic Resources Conservation Goals and Objectives*, Caltrans analyzed and synthesized the relevant and applicable information listed in Chapter 3, *Relevant Plans, Policies, and Regulations*, to develop its understanding of natural resource regulatory goals and objectives for the GAI. In brief, it is Caltrans' understanding that a mitigation bank that addresses the following goals would be consistent with natural resource regulatory agency goals:

- Ensure no net loss to area, functions, values, and condition of WOTUS and waters of the state to ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetland acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property, as described in Executive Order W-59-93⁸ (AR-1)
- Restore and/or enhance the chemical, physical, and biological integrity of wetlands and non-wetland waters (AR-2)
- Restore or enhance and expand habitat for fish species of mitigation need (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 presents 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 credits or values would be available to transportation projects. Caltrans may contract or subcontract bank establishment and/or implementation tasks, including site selection.

⁸ Preservation alone is not recognized by the Corps or RWQCB as providing no net loss.

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 instrument. Instructions and guidance for establishing in-lieu fee programs are available from the federal agencies.⁹ With respect to wildlife, like the Corps, FWS also 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 Corps, EPA, SWRCB, and/or RWQCB 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 2 to 6 years. 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 focus on species and species habitat, and can include credits for riparian habitat to meet mitigation needs under a Lake and Streambed Alteration Agreement. An MCA's alignment with natural resource protection will be documented through the foundational RCIS and the MCA itself

⁹ <https://www.spl.usace.army.mil/Missions/Regulatory/Mitigation/>

(CDFW 2019c). 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, in which a third party is the MCA sponsor. The MCA sponsor, CDFW, and 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 credits¹⁰ and CDFW would be the signatory. Caltrans may also request other natural resource regulatory agencies to be signatories to the MCA or may 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 (June of fiscal year 2021/22), instructions and guidance for establishing MCAs are under development by CDFW,¹¹ and the RCIS Program is conducting pilot efforts to inform the 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 are going, but given the nature of the AMP's revolving account, Caltrans has determined that it cannot commit AMA funds to a pilot effort.

¹⁰ Caltrans is the Lead Agency under CEQA; CDFW's permitting authority does not include conditioning transportation projects under CEQA (Section 7).

¹¹ <https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation>

Nevertheless, in the future, Caltrans anticipates that when a CDFW-approved RCIS is in place¹² and after the Caltrans Director's approval for funding, 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 action¹³ to establish the credits or values. Credits would become available to Caltrans' 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 enhancements 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 preserve, enhance, and increase connectivity between blocks of species of mitigation need habitat (WILD-2), support resiliency of the landscape and aquatic resources to climate change and sea-level rise (WILD-3 and AR-3), and provide multi-resource benefits (WILD-5 and AR-4).

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 the 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, aquatic resources, or fisheries that would measurably advance a conservation

¹² 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.

¹³ <https://wildlife.ca.gov/Conservation/Planning/Regional-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 (June of fiscal year 2021/22), 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 is 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, 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 (June of fiscal year 2021/22), a number of the authorized activities listed in Table 9-3 appear to be feasible (see Tables 9-4 and 9-5). 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 2019/20 through 2028/29 (Chapter 5, *Modeled Estimated Impacts*) and evaluated its needs in light of when transportation projects might need the mitigation (Chapter 6, *Benefiting Transportation Project Considerations*, and Section 9.2, above). As summarized in Tables 9-4 and 9-5, 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 through 9.3.11).

Table 9-4. Wildlife Resources Credit Options and Feasibility, June 2022

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	No	Not applicable	Not applicable	Not applicable
Purchase conservation bank credits	Yes, may require instrument amendment	Yes, five FWS or CDFW and FWS-approved banks in GAI with California red-legged frog credits, one NMFS-approved bank with coho and steelhead credits, ^c and one FWS, CDFW, and NMFS-approved bank with longfin smelt and green sturgeon credits	Yes, with CDFW, FWS, and NMFS	1 to 3 years
Purchase in-lieu fee credits	Yes, may require instrument amendment	No, no species in-lieu fee programs exist in GAI	Not applicable	1 to 3 years
Purchase MCA credits	No	Not applicable	Not applicable	Not applicable
Establish conservation bank	Yes	Yes, with CDFW, FWS, and NMFS	Yes, with CDFW, FWS, NMFS, and CCC	2 to 6 years
Establish in-lieu fee program	Yes	Yes, with FWS and NMFS	Yes, with FWS, NMFS, and CCC Potential to align with Corps in-lieu fee program	2 to 8 years
Establish MCA credits or values ^b	Yes, in part; one RCIS in the GAI; MCA guidelines in progress	Maybe—MCA guidelines in progress	Maybe, CDFW, SWRCB, FWS, NMFS, and CCC Potential for parallel evaluations	Unknown (pilot underway)
Establish RCIS and MCA ^b	Yes, in part; RCIS guidelines available; MCA guidelines in progress	Maybe—RCIS guidelines available; MCA guidelines in progress	Maybe, CDFW, SWRCB, FWS, NMFS, and CCC Potential for parallel evaluations	Unknown (pilot underway)

Authorized Activity	Regulatory and Administrative Pathway Available	Available/Opportunity Exists in the GAI	Potential to Address Overlapping Jurisdictions	Time to Complete ^a
Establish mitigation that meets an RCIS objective	No	Not available	Not available	Not available
Establish mitigation in accordance with a programmatic mitigation plan	No	Not available	Not available	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.

^c Steelhead and coho salmon bank credits are available at NMFS approved East Austin Creek Conservation Bank

Table 9-5. Aquatic Resources Credit Options and Feasibility, June 2022

Authorized Activity	Regulatory and Administrative Pathway Available	Available/Opportunity Exists in the GAI	Potential to Address Overlapping Jurisdictions	Time to Complete ^a
Purchase mitigation bank credits	Yes, with instrument amendment	Yes, two established Corps banks	Yes, Corps, EPA, CDFW, FWS, and NMFS	1 to 3 years
Purchase in-lieu fee credits	Yes	Maybe—one Corps in-lieu fee program under establishment in GAI	Corps, RWQCB	1 to 3 years
Purchase MCA credits	No	Not available	Not available	Not available
Establish mitigation bank	Yes	Yes, Corps, FWS, and NMFS	Yes, CDFW, CCC, RWQCB, Corps, EPA, FWS, and NMFS	2 to 8 years
Establish in-lieu fee program	Yes	Yes, for Corps, EPA, FWS, and NMFS	Maybe, Corps, FWS, NMFS, EPA, CDFW, and RWQCB	2 to 8 years
Establish MCA credits or values ^b	Yes, in part; one RCIS in the GAI; MCA guidelines in progress	Maybe—MCA guidelines in progress	Maybe, CDFW, CCC, RWQCB, and NMFS Potential for parallel evaluation(s)	Unknown (pilot underway)
Establish RCIS and MCA ^b	Yes, in part; RCIS guidelines available; MCA guidelines in progress	Maybe—RCIS guidelines available; MCA guidelines in progress	Maybe, CDFW, CCC, RWQCB, and NMFS Potential for parallel evaluation(s)	Unknown (pilot underway)
Establish mitigation that meets an RCIS objective	No	Not available	Not available	Not available
Establish mitigation in accordance with a programmatic mitigation plan	No	Not available	Not available	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.

Based on its evaluation, Caltrans found that, at this time (June of fiscal year 2021/22), a number of authorized activities appear to be feasible and, under several scenarios, advance mitigation project scopes could cover multiple resources and address overlapping natural resource regulatory agency jurisdictions. For example, when available, credits purchased by 2023/24 (within the next 2 years) have the potential to address the following within Caltrans District 4:

- **Gualala-Salmon Sub-basin:**

- There are currently no mitigation banks with a service area to purchase wetland and non-wetland waters credits from in this sub-basin.
- Mitigation credits purchased for an anticipated 2.9 acres of threatened and endangered fish habitat impact have the potential to accelerate six transportation projects.

- **San Pablo Bay Sub-basin:**

- Mitigation credits purchased for an anticipated 2.0 acres of wetland impact have the potential to accelerate 10 transportation projects.
- Mitigation credits purchased for an anticipated 2.5 acres of non-wetland waters impact have the potential to accelerate 14 transportation projects.
- Mitigation credits purchased for an anticipated 6.8 acres of threatened and endangered fish habitat impact have the potential to accelerate 14 transportation projects.
- Mitigation credits purchased for an anticipated 30.3 acres of riparian habitat impact have the potential to accelerate five transportation projects.

- **Tomales-Drake Bays Sub-basin:**

- Mitigation credits purchased for an anticipated 1.1 acres of wetland and 1.2 acres of non-wetland waters impact have the potential to accelerate seven transportation projects.
- Mitigation credits purchased for an anticipated 2.8 acres of threatened and endangered fish habitat impact have the potential to accelerate seven transportation projects.
- Mitigation credits purchased for an anticipated 2.7 acres of riparian habitat impact have the potential to accelerate one transportation project.

- **Northern California Coast Ecoregion:**

- Mitigation credits purchased for an anticipated 99.8 acres of Myrtle's silverspot butterfly habitat impacts have the potential to accelerate six transportation projects.
- Mitigation credits purchased for an anticipated 10.4 acres of California red-legged frog habitat impacts have the potential to accelerate 26 transportation projects.

- Mitigation credits purchased for an anticipated 2.2 acres of California red-legged frog habitat impacts have the potential to accelerate two transportation projects.
- **Central California Coast Ecoregion:**
 - Mitigation credits purchased for an anticipated 2.3 acres of California red-legged frog habitat impacts have the potential to accelerate two transportation projects.

When credits are not available, under some conditions, establishing new mitigation credits through existing mechanisms may also be possible.

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 4 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 as well as other conditions summarized in Tables 9-4 and 9-5. Not included in the tables is an explicit comparison of other desired qualities, outcomes, or other factors of performing any particular authorized activity, which Caltrans District 4 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 requesting that others be bank or in-lieu fee sponsors.

As described in the introduction to this chapter and in Section 9.1, to inform the advance mitigation project scope, Caltrans District 4 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 4 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 4 will commit to delivering the advance mitigation project within the scope, schedule, and budget communicated with nomination materials. At that

point, Caltrans District 4 will initiate project delivery (see Steps 6 through 10 in Figure 1-2; Caltrans 2021b). Advance mitigation project delivery includes stakeholder engagement, project alternatives 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 will 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 such as 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 Chapter 7, *Wildlife Resources Conservation Goals and Objectives*, and Chapter 8, *Aquatic Resources Conservation Goals and Objectives*.
- When appropriate for the advance mitigation project type, it may be necessary to identify the steps required to meet the goal of satisfying overlapping jurisdictional mitigation requirements.
- Instruments and advance mitigation project-specific interagency agreements 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-8s 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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