ADVANCE MITIGATION PROGRAM

Great Valley Ecoregion Section Within Caltrans District 10 Regional Advance Mitigation Needs Assessment

Version 1.0

Establishing Caltrans' Need for Advance Mitigation
for Caltrans District 10
forecast fiscal years 2019/20 to 2028/29

California Department of Transportation – District 10

July 2022

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LIST OF ACRONYMS

Acronym	Definition
ACE	Area of Conservation Emphasis
AMA	Advance Mitigation Account
AMP	Advance Mitigation Program
AMP Guidelines	*Advance Mitigation Program Final Formal Guidelines*
Basin Plan	Water Quality Control Plan
BEI	Bank Enabling Instrument
BLM	Bureau of Land Management
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
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
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
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
HCP	habitat conservation plan

HU	hydrologic unit
HUC	hydrologic unit code
HUC-6	hydrologic unit code 6-digit
HUC-8	hydrologic unit code 8-digit
HUC-12	hydrologic unit code 12-digit
I	Interstate
MCA	mitigation credit agreement
MPO	metropolitan planning organization
NCCP	natural community conservation plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
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	*State Highway Operation and Protection Program Ten-Year Project Book Fiscal Years 2019/20–2028/29*
SHS	State Highway System
SR	State Route
SWRCB	State Water Resources Control Board
STIP	State Transportation Improvement Program
SWAP	State Wildlife Action Plan
TMDL	total maximum daily load
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.

EXECUTIVE SUMMARY

This *Great Valley Ecoregion Section Within Caltrans District 10 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 10 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

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[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.

[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.

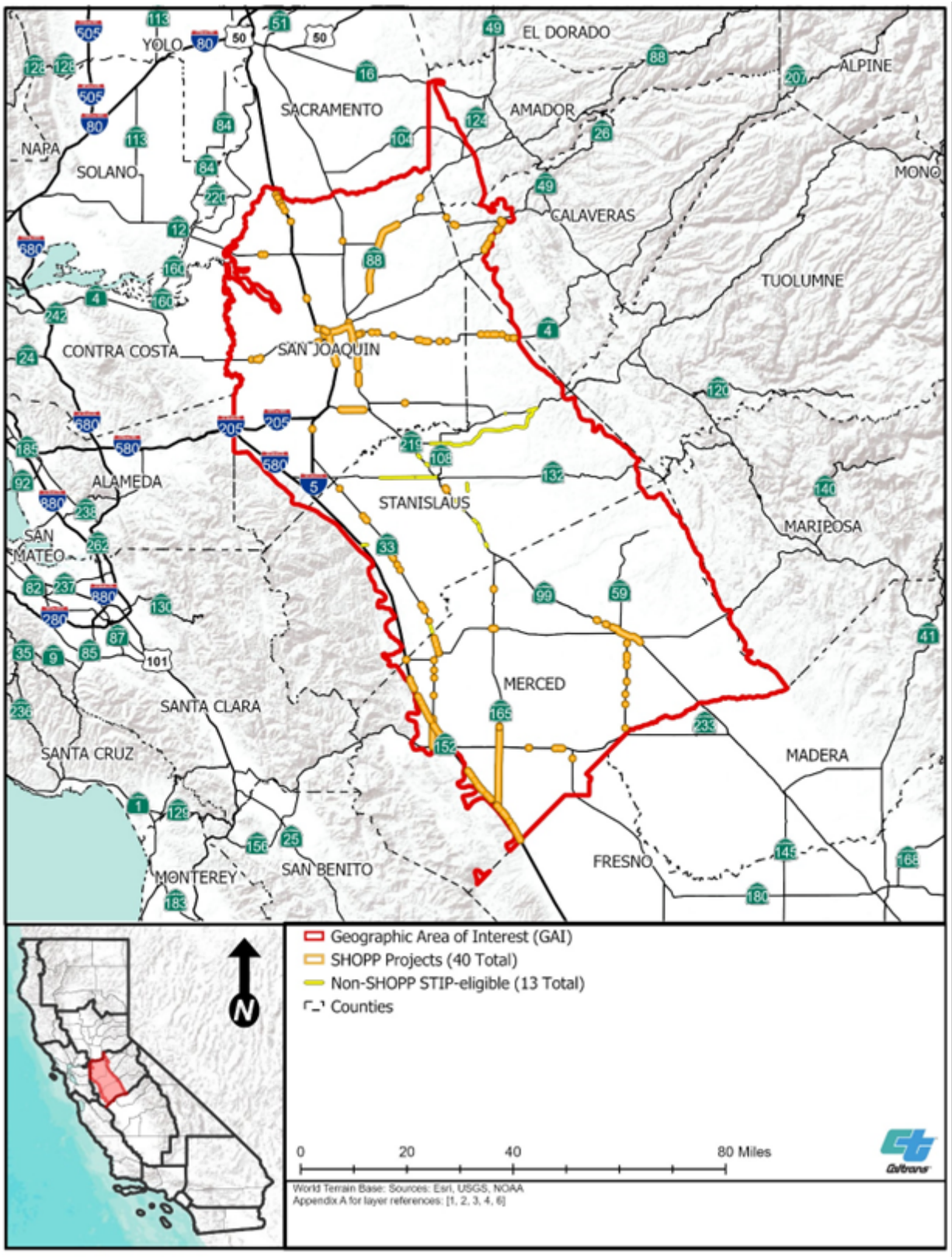
Through the RAMNA's review process, the conservation goals and objectives provided in the RAMNA were vetted with the natural resource regulatory agencies. Caltrans thinks incorporating natural resource regulatory agency goals and objectives into advance mitigation project scopes improves the chances 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.

Figure ES-1. GAI Road Infrastructure



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 Assessment*[6] *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 the Great Valley Ecoregion Section within Caltrans District 10 (Figure ES-1). GAIs are established at an ecoregion or hydrological unit code eight digit ("HUC-8") subbasin scale to define appropriate planning areas for mitigation implementation and anticipated use areas that align with natural resource regulatory agency practices (Caltrans 2019a). Caltrans District 10, 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 the Great Valley Ecoregion Section 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 10 identified species for which natural resource regulatory agencies condition transportation projects with off-site compensatory mitigation and transportation projects would most likely benefit from the credits if available. These "species of mitigation need"[7] are California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*) Central California Distinct Population Segment ("DPS"), giant garter snake (*Thamnophis gigas*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp, vernal pool tadpole shrimp, Central Valley spring-run and Sacramento River winter-run evolutionarily significant unit ("ESU") chinook salmon (*Oncorhynchus tshawytscha*), Central Valley DPS steelhead (*O. mykiss irideus*), Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), longfin smelt (*Spirinchus thaleichthys*), and Southern DPS green sturgeon (*Acipenser medirostris*). Compensatory mitigation for aquatic

[6] The SAMNA Reporting Tool is a geographic information system ("GIS") overlay model developed by Caltrans to support advance mitigation planning (Caltrans 2018).
[7] Species of mitigation need are selected to focus the assessment.

resources[8] and riparian habitat were also identified as both a historical transportation project compensatory mitigation need and an anticipated future transportation project compensatory mitigation need within the GAI.

ES.2 Environmental Setting

Information on the GAI's environmental setting is provided in Chapter 2 and its associated appendices. 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 2.7 million acres in central California, encompassing part of the Central Valley. The Great Valley Ecoregion Section within Caltrans District 10 defines its boundary, which overlaps portions of 11 HUC-8 subbasins: Fresno River, Lower San Joaquin River, Middle San Joaquin-Lower Chowchilla, Rock Creek-French Camp Slough, San Joaquin Delta, Upper Calaveras California, Upper Cosumnes, Upper Merced, Upper Mokelumne, Upper Stanislaus, and Upper Tuolumne.

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 115 documents that may be relevant to advance mitigation planning and advance mitigation project delivery: 28 laws, guidelines, and regulations; 15 statewide and regional planning documents; 21 plans and permits and other documents focused on species of mitigation need; 11 state agency, federal agency, Native American tribal, and local government land management plans; 8 water resources plans and documents; 36 county, city, and local government general plans; and 4 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

[8] For the purposes of this document, aquatic resources include all wetlands and non-wetland waters that may be subject to 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 CDFW, U.S. Fish and Wildlife Service, and National Marine Fisheries Service regulations.

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 one HCP/NCCP where Caltrans is a participant or may be eligible to participate, 35 pending or active conservation and mitigation banks, one in-lieu fee program, and no MCAs. Through the RAMNA review process, however, Caltrans became aware of an RCIS in its early development stage.

Existing mitigation opportunities can also inform both regional understanding and advance mitigation project scoping because they may be expressions of resource agency conservation goals and objectives[9] 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 project[10] 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, 40 SHOPP transportation projects and 13 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.

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[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.

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 vernal pool habitat impact and riparian habitat impact forecasts are provided in Tables ES-5 and ES-6, respectively. When Caltrans scopes advance mitigation projects to establish mitigation, Caltrans intends to center the advance mitigation projects on the species of 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: Number of Caltrans SHOPP Projects[a]	California Red-legged Frog: Estimated Habitat Impact (acres)	California Tiger Salamander: Number of Caltrans SHOPP Projects	California Tiger Salamander: Estimated Habitat Impact (acres)	Giant Garter Snake: Number of Caltrans SHOPP Projects	Giant Garter Snake: Estimated Habitat Impact (acres)	Valley Elderberry Longhorn Beetle: Number of Caltrans SHOPP Projects	Valley Elderberry Longhorn Beetle: Estimated Habitat Impact (acres)
Great Valley	8	9.3	28	38.4	29	38.8	1	0.4

Source: Caltrans 2021b
[a] Transportation projects are listed in Table 5-1.

Table ES-2. Summary of Estimated SHOPP Project Impacts on Threatened and Endangered Fish Habitat in the GAI (acres)[a,b]

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Chinook Salmon – Spring-run	Chinook Salmon – Winter-run	Delta Smelt	Green Sturgeon – Southern DPS	Longfin Smelt	Steelhead – California Central Valley DPS	Total
Rock Creek-French Camp Slough	18040051	1	0.2	0.2	0.2	0.2	<0.1	0.2	Not available[c]
San Joaquin Delta	18040003	10	3.3	3.3	5.0	3.3	6.0	3.6	Not available[c]
Upper Calaveras California	18040011	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not available[c]
Upper Mokelumne	18040012	3	<0.1	<0.1	0.6	<0.1	0.6	<0.1	Not available[c]
Total[d]	Not applicable	**12**	**3.6**	**3.6**	**5.9**	**3.6**	**6.6**	**3.9**	Not available[c]

Source: Caltrans 2021b
[a] Stream/river habitat impacts are provided. Stream/river habitat impacts are assumed to be representative of fish habitat impacts.
[b] For sub-basins with more than one species, co-occurrence of impacts is assumed. Acreage for the largest impact is provided.
[c] Total could not be calculated because impact estimates overlap.
[d] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect fish.

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	Freshwater Emergent Wetland	Freshwater Forested/Shrub Wetland	Total[a]
Middle San Joaquin-Lower Chowchilla	18040001	6	0.7	<0.1	**0.7**
Rock Creek-French Camp Slough	18040051	2	<0.1	0.1	**0.1**
San Joaquin Delta	18040003	3	0.3	<0.1	**0.3**
Total[a,b]	Not applicable	**11**	**1.0**	**0.2**	**1.2**

Source: Caltrans 2021b
[a] Totals may be different on account of rounding. [b] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

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	Canal/Ditch	Reservoir	Stream/River	Total[a]
Lower San Joaquin River	18040002	1	<0.1	0.0	0.0	**<0.1**
Middle San Joaquin-Lower Chowchilla	18040001	11	3.2	0.2	0.9	**4.2**
Rock Creek-French Camp Slough	18040051	4	0.2	0.0	0.4	**0.6**
San Joaquin Delta	18040003	10	2.1	0.0	3.8	**5.8**
Upper Calaveras California	18040011	2	0.0	0.0	0.1	**0.1**
Upper Mokelumne	18040012	3	0.6	0.0	0.0	**0.6**
Total[a,b]	Not applicable	**27**	**6.0**	**0.2**	**5.1**	**11.3**

Source: Caltrans 2021b
[a] Totals may be different on account of rounding. [b] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

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

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Conservancy Fairy Shrimp	Longhorn Fairy Shrimp	Vernal Pool Fairy Shrimp	Vernal Pool Tadpole Shrimp	Total
Middle San Joaquin-Lower Chowchilla	18040001	5	1.0	1.0	1.2	2.1	Not available[a]
Rock Creek-French Camp Slough	18040051	2	0.0	0.0	2.2	2.2	Not available[a]
San Joaquin Delta	18040003	2	0.0	0.0	0.4	0.2	Not available[a]
Upper Calaveras California	18040011	2	0.0	0.0	0.7	<0.1	Not available[a]
Upper Mokelumne	18040012	3	0.0	0.0	1.0	1.1	Not available[a]
Total[b,c]	Not applicable	**13**	**1.0**	**1.0**	**5.4**	**5.6**	Not available[a]

Source: Adapted from Caltrans 2021b
[a] Total could not be calculated because impact estimates overlap.
[b] Totals may be different on account of rounding. [c] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

Table ES-6. Summary of Estimated SHOPP Impacts on Riparian Habitat in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Total Estimated Riparian Impact[a]
Middle San Joaquin-Lower Chowchilla	18040001	1	7.6
Rock Creek-French Camp Slough	18040051	1	6.4
San Joaquin Delta	18040003	3	31.0
Upper Calaveras California	18040011	1	13.6
Upper Mokelumne	18040012	1	5.0
Total[b,c]	Not applicable	**7**	**63.6**

Source: Adapted from Caltrans 2021b
[a] Consists of the California Wildlife Habitat Relationship System habitat type valley foothill riparian.
[b] Totals may be different on account of rounding. [c] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

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 (July of fiscal year 2022/2023), Caltrans is almost 3 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 10 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 (July of fiscal year 2022/2023) credits or values that can be purchased or established by 2023/2024 (within the next 2 years) within the GAI could address a subset of the impacts presented in Chapter 5. For example, mitigation credits purchased or established in 2 years could potentially address:

- 0.7 acre of wetland, 6.6 acres of non-wetland waters, 2.4 acres of threatened and endangered fish habitat impacts, 10.6 acres of vernal pool habitat impacts, and 50.3 acres of riparian habitat, potentially contributing to the acceleration of 8, 19, 4, 9, and 6 transportation projects, respectively
- 9.2 acre of California red-legged frog habitat impacts, potentially contributing to the acceleration of 11 transportation projects
- 23.0 acres of California tiger salamander habitat impacts, potentially contributing to the acceleration of 19 transportation projects
- 23.7 acres of giant garter snake habitat impacts, potentially contributing to the acceleration of 20 transportation projects
- 0.4 acre of valley elderberry longhorn beetle habitat impacts, potentially contributing to the acceleration of 1 transportation project

Organized by species of mitigation need, aquatic resources, vernal pool habitat, and riparian habitat, 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 with the authority to approve wildlife resource-related credit establishment and with 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 is provided in Chapter 9. As pointed out in Chapter 6, given the expected timing of mitigation need, at this time (July of fiscal year 2022/23) mitigation that can be purchased or established by 2023/24 (within the next 2 years) could potentially address the following:

- 0.7 acre of wetland, 6.6 acres of non-wetland waters, 2.4 acres of threatened and endangered fish habitat impacts, 10.6 acres of vernal pool habitat impacts, and 50.3 acres of riparian habitat, potentially contributing to the acceleration of 8, 19, 4, 9, and 6 transportation projects, respectively
- 9.2 acre of California red-legged frog habitat impacts, potentially contributing to the acceleration of 11 transportation projects
- 23.0 acres of California tiger salamander habitat impacts, potentially contributing to the acceleration of 19 transportation projects
- 23.7 acres of giant garter snake habitat impacts, potentially contributing to the acceleration of 20 transportation projects
- 0.4 acre of valley elderberry longhorn beetle habitat impacts, potentially contributing to the acceleration of 1 transportation project

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 (July of fiscal year 2022/2023), 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 availably 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 *Great Valley Ecoregion Section Within Caltrans District 10 Regional Advance Mitigation Needs Assessment* ("RAMNA"), the California Department of Transportation ("Caltrans") District 10 presents its forecast of natural resource compensatory mitigation[1] needs for the Great Valley Ecoregion Section within Caltrans District 10 for a 10-year planning horizon. The RAMNA was developed with the goal of realizing the benefits of advance mitigation, which:

- anticipates that unavoidable transportation project impacts will be identified in the future, and
- consists of having compensatory mitigation credits (or values) available that have already been vetted and agreed upon by natural resource regulatory agencies as representing transportation project mitigation actions eligible to offset adverse impacts on natural resources.

For the Caltrans Advance Mitigation Program ("AMP"), the compensatory mitigation credits become available prior to and separate from transportation project environmental studies, design, and funding.

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

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

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[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 2019a). As shown in Figures 1-1 and 1-2, the AMP Guidelines present a 10-step process: the first 5 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 in order to inform advance mitigation project scopes that will be approved by the Caltrans Director. As elaborated below (Figures 1-1 and 1-2), 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 (2019a)

Figure 1-2. Advance Mitigation Project Delivery Phase

Source: Caltrans (2019a)

This RAMNA satisfies Step 3 (Figure 1-1; Caltrans 2019a) and provides the results of a regional assessment of Caltrans' advance mitigation needs in the portion of Caltrans District 10 that overlaps the Great Valley Ecoregion Section. [3]

Caltrans District 10 will first use the information and analysis presented in this RAMNA to inform Step 4 of the advance mitigation planning phase. Step 4 is the point in the advance mitigation planning process when Caltrans justifies, proposes, and scopes an advance mitigation project based on its needs (Figure 1-1; Caltrans 2019a). Advance mitigation project scopes informed by this RAMNA will provide enough information, at the appropriate level of detail, for an advance mitigation project to be nominated to the Caltrans Director for funding approval. The advance mitigation planning phase will conclude when the Caltrans Director approves a specific nominated Caltrans District 10 advance mitigation project for funding (Step 5; Figure 1-1; Caltrans 2019a). Thereafter, Caltrans District 10 will use the RAMNA as a reference (Caltrans 2019a).

[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 programmed[4] (Caltrans 2019a; see Figure 1-2). The phase consists of implementing the authorized activities under SHC § 800.6(a), which are existing advance mitigation mechanisms or procedures under development.

1.1.4. Program Constraints

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

- Gas tax-derived funds may be used 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 for 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

[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.

where important aquatic resources in a watershed area have been identified as 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 10 Transportation Infrastructure

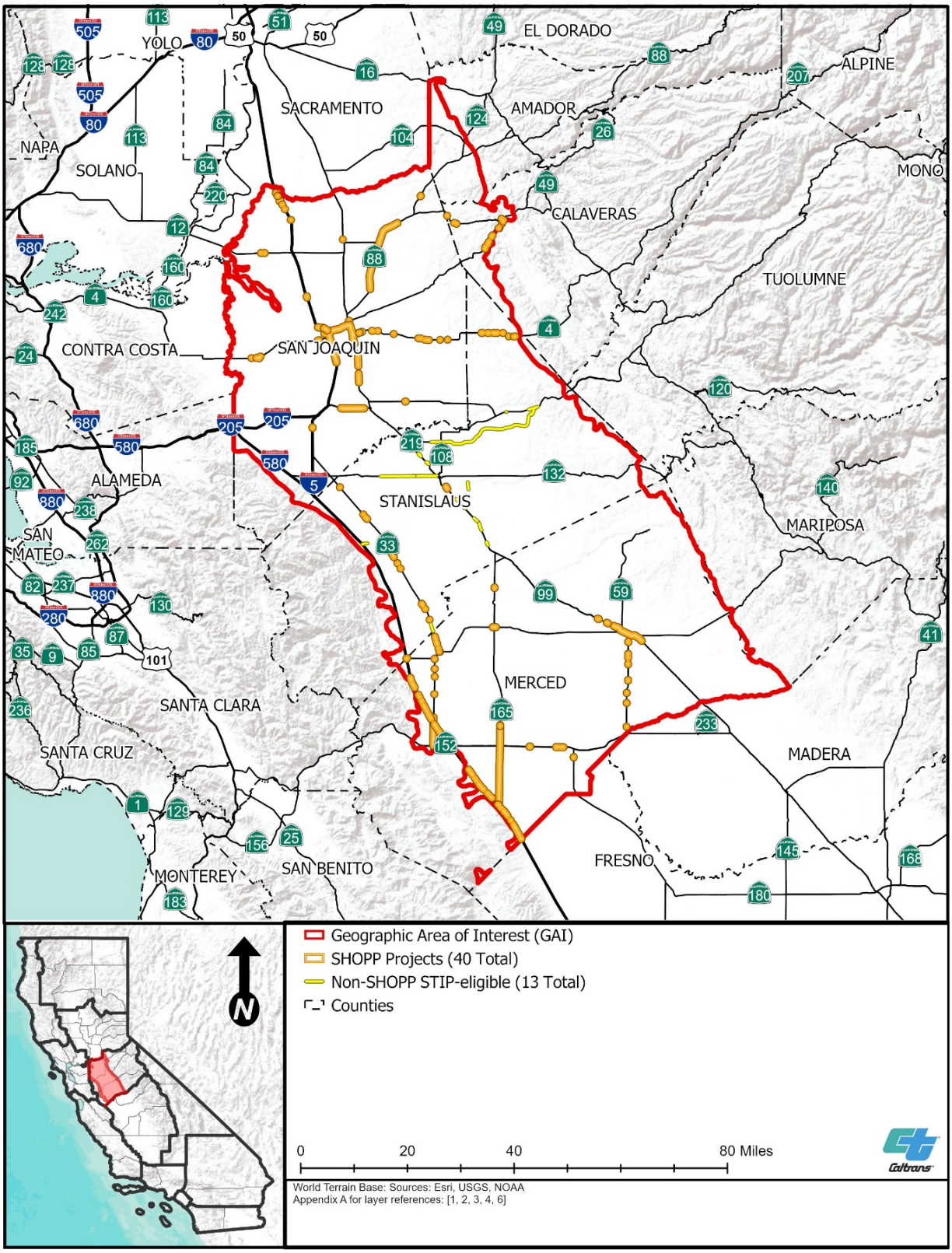
Caltrans District 10 is a geographically diverse district located in the northern San Joaquin Valley that encompasses 29 cities, 8 counties (3 urban counties on the valley floor and 5 rural counties in the foothills), and a mountain region of the Central Sierra. The counties include Alpine, Amador, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus, and Tuolumne. The District's transportation infrastructure encompasses 3,547 lane miles, 854 bridges, 715 acres of landscaped areas, roughly 11,000 culverts, 1,395 highway center-line miles open to pedestrians and bicycles, 4 Sierra snow passes, 3 rest areas, 24 maintenance stations, 19 airports, the Port of Stockton, and numerous transit and rail authorities.

The major urban areas located within the boundaries of District 10, which include the cities of Stockton, Modesto, and Merced, have a combined population of approximately 1.5 million people. The District borders the East Bay Area and continues to experience increased levels of congestion on account of heavy commuter traffic through Interstate ("I-") 580, the Altamont Pass, and other routes.

The five mountain counties also continue to experience rapid growth, with development primarily occurring next to the existing foothill communities. Two of the District's mountain counties, Mariposa and Tuolumne, border Yosemite National Park. The District has been very active in communication and inter-regional issues concerning Yosemite National Park access and the development of the Yosemite Area Regional Transportation Systems.

Figure 1-3 shows the road infrastructure in the geographic area of interest ("GAI") 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, 402, and 404 (33 USC § 1251–1376)
- Federal Endangered Species Act of 1973 ("ESA") (16 USC § 1531–1543), as amended
- Lake and Streambed Alteration Program (California 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
CDFW, North Central Region	https://wildlife.ca.gov/regions/2
CDFW, Bay Delta Region	https://wildlife.ca.gov/regions/3
CDFW, Central Region	https://wildlife.ca.gov/regions/4
CDFW, Habitat Conservation Planning Branch	https://wildlife.ca.gov/Orgaqnization/HCPB
State Water Resources Control Board ("SWRCB")	https://www.waterboards.ca.gov/
California Regional Water Quality Control Board ("RWQCB"), Central Valley	https://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, Sacramento District	https://www.spk.usace.army.mil/
U.S. Environmental Protection Agency ("EPA"), Region 9	http://www.epa.gov/region9/
U.S. Fish and Wildlife Service ("FWS"), Bay Delta Field Office	https://www.fws.gov/office/san-francisco-bay-delta-fish-and-wildlife
FWS, Sacramento Field Office	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 compensatory mitigation credit that was established through an instrument or other formal interagency agreement as satisfying a transportation project's compensatory mitigation conditions. As a lead agency under CEQA and NEPA, Caltrans may also determine compensatory mitigation is required.

Some natural resource regulatory agencies also have 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; 40 CFR Part 230)
- *Final Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division* (Corps 2015)
- Advance Mitigation and Regional Conservation Investment Strategies, mitigation credit agreements (FGC § 1856)

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 requires an instrument. Existing policies and regulations prescribe what an instrument must contain and address, as well as the terms of use for the credits generated by the mitigation bank, conservation bank, or in-lieu fee program. Similarly, establishing 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 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

[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 function and values of specific wetland habitats that will be adversely affected.

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 10 are provided in Appendix J 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, special-status fish, waters, and wetlands. The unit of measure for impacts is acres.

SAMNA Caveats:

The Statewide Advance Mitigation Needs Assessment ("SAMNA") is strictly and specifically intended to be used by Caltrans to justify, propose, and scope advance mitigation projects (Caltrans 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 the SAMNA 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 hydrologic unit code 8-digit ("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.

To identify a focus area, consistent with Step 2 of the advance mitigation planning process (Figure 1-1), in 2021 Caltrans District 10 subject matter specialists:

- Reviewed the entirety of Caltrans District 10's SAMNA results and the associated future transportation project locations and activities anticipated for the State Highway Operation and Protection Program ("SHOPP") (Caltrans 2021a);
- Reviewed non-SHOPP State Transportation Improvement Program ("STIP")-eligible transportation improvement plans for the next 10 years; and
- Identified the Great Valley Ecoregion Section as a location 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 the Great Valley Ecoregion Section forms an ecological boundary and not a political boundary, much of the ecoregion section is outside of Caltrans District 10. However, this document focuses on the portion of the Great Valley Ecoregion Section within Caltrans District 10.

1.5.2. Species of Mitigation Need

Compensatory mitigation for species in the GAI was identified as both a historical and a future anticipated transportation project compensatory mitigation need within Caltrans District 10. 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 10 identified species that, if compensatory mitigation credits were available,

transportation projects could potentially benefit. These terrestrial "species of mitigation need" are as follows:

- California red-legged frog (*Rana draytonii*), the Central California distinct population segment ("DPS") of California tiger salamander (*Ambystoma californiense*), giant garter snake (*Thamnophis gigas*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp, and vernal pool tadpole shrimp. California red-legged frog is a federally threatened amphibian species and a California species of special concern, the Central California DPS of California tiger salamander is a federally and state threatened amphibian, and giant garter snake is a federal and state threatened species.
- Central Valley spring-run and Sacramento River winter-run evolutionarily significant unit ("ESU") chinook salmon (*Oncorhynchus tshawytscha*), Central Valley DPS steelhead (*O. mykiss irideus*), longfin smelt (*Spirinchus thaleichthys*), delta smelt (*Hypomesus transpacificus*), and Southern DPS green sturgeon (*Acipenser medirostris*) were chosen as aquatic species of mitigation need. Chinook salmon in the GAI is federally and state listed as endangered (winter run) and threatened (spring run), steelhead in the GAI is federally listed as threatened, delta smelt is federally listed as threatened and state listed as endangered, 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*, as well as 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, vernal pool habitat, and riparian habitat in the GAI were identified as both a historical and an anticipated future transportation project compensatory mitigation need within Caltrans District 10. SHOPP transportation projects have historically been conditioned by natural resource regulatory agencies for aquatic resources and riparian habitat, and have benefited from mitigation credits, when available.

The GAI overlaps 11 hydrologic unit code ("HUC") sub-basins. Compensatory mitigation for aquatic resources impacts is forecast in the following 6 sub-basins (Caltrans 2021b):

- Lower San Joaquin River (18040002)
- Middle San Joaquin-Lower Chowchilla (18040001)
- Rock Creek-French Camp Slough (18040051)

- San Joaquin Delta (18040003)
- Upper Calaveras California (18040011)
- Upper Mokelumne River (18040012)

These sub-basins inform the analysis of estimated threatened and endangered fish, wetland, non-wetland water, vernal pool, and riparian impact estimates 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*.

1.6 RAMNA

This RAMNA is a planning-level document that:

- Provides a desktop analysis of relevant available information pertaining to the Great Valley Ecoregion Section within District 10, 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 signatories[6] 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;
- 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

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

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 2019a).

1.7 Coordination History

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

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

The AMP guidelines state that Caltrans will contact MPOs, RTPAs, and other public agencies that implement transportation projects to request specific information about their potential STIP transportation projects, to help inform the potential demand for compensatory mitigation in that area (Section 7.2 of Caltrans 2019a). District 10 Transportation Planning conducted outreach and contacted the partners listed in Table 1-3.

Table 1-3. Regional Transportation Interaction and Outreach Summary

Date	Description
April 12, 2021	Alpine County provided the Action Element of the 2020 Alpine County Regional Transportation Plan by email. At this time, only one transportation project is reasonably certain to be funded and delivered with STIP funds during the 10-year window ending in 2030. The region will begin a Regional Transportation Improvement Program exercise in the fall of 2022 and it is possible another project will move up to the unconstrained list.
May 28, 2021	Calaveras County (by email) has one STIP project underway but does not have future STIP-eligible projects identified at this time.
June 2, 2021	Stanislaus County provided a list of Regionally Significant Projects for consideration for the AMP in Stanislaus County (by email). Transportation projects are reasonably certain to be funded and delivered with STIP funds during a 10-year window that ends in the 2029-30 fiscal year.

1.7.2. RAMNA Review

The AMP Guidelines (Caltrans 2019a) state:

> *Before the RAMNA will be used to support advance mitigation project planning, Caltrans will, per 23 USC 169(a): consult with each natural resource regulatory agency with jurisdiction over the environmental resources considered in the RAMNA; make a draft of the RAMNA available for review and comment by applicable natural resource regulatory agencies, FHWA, Native American Tribes,*

local transportation agencies, local advance mitigation programs, local interested parties, and the public; request that, along with their review, natural resource regulatory agencies, Native American Tribes, FHWA, local transportation agencies, local advance mitigation programs, interested parties, and the public provide Caltrans any additional information relevant to and appropriate for the RAMNA; consider any comments and information received from natural resource regulatory agencies, FHWA, Native American Tribes, local transportation agencies, local advance mitigation programs, local interested parties, and the public on the draft RAMNA; and incorporate information and address such comments in the final RAMNA as appropriate.

In March 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]	May 17, 2022
CCC	May 2, 2022
Corps, Sacramento District	May 13, 2022
EPA	May 13, 2022
FWS	May 16, 2022
NMFS	May 31, 2022
SWRCB	May 16, 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. These discussions have informed this document.

Table 1-5. Interagency Meetings

Meeting Date	Meeting Participants
May 3, 2022	CDFW; Corps, Sacramento District; EPA; FWS; NMFS; SWRCB; RWQCB; and EPA
June 22, 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, conservation, and land management plans that are applicable and relevant to the GAI and 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 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	Title	Content
Chapter 9	Assessment of Authorized Activities	This chapter describes options and analyzes the feasibility of purchasing and/or establishing mitigation credits (or similar) in the GAI that have a high probability of successfully accelerating transportation project delivery and protect natural resources through transportation project mitigation.
Chapter 10	References	This chapter lists references cited in the RAMNA.
Appendices	Various	Appendices supporting this document: Appendix A – GIS Sources Appendix B – Land Cover Types Appendix C – Complete SAMNA Species Results Appendix D – Hydrologic Units Appendix E – List of 303(d) Impaired Waters Appendix F – Aquatic Resource Locations Appendix G – Conservation and Mitigation Bank Service Areas

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2. ENVIRONMENTAL SETTING

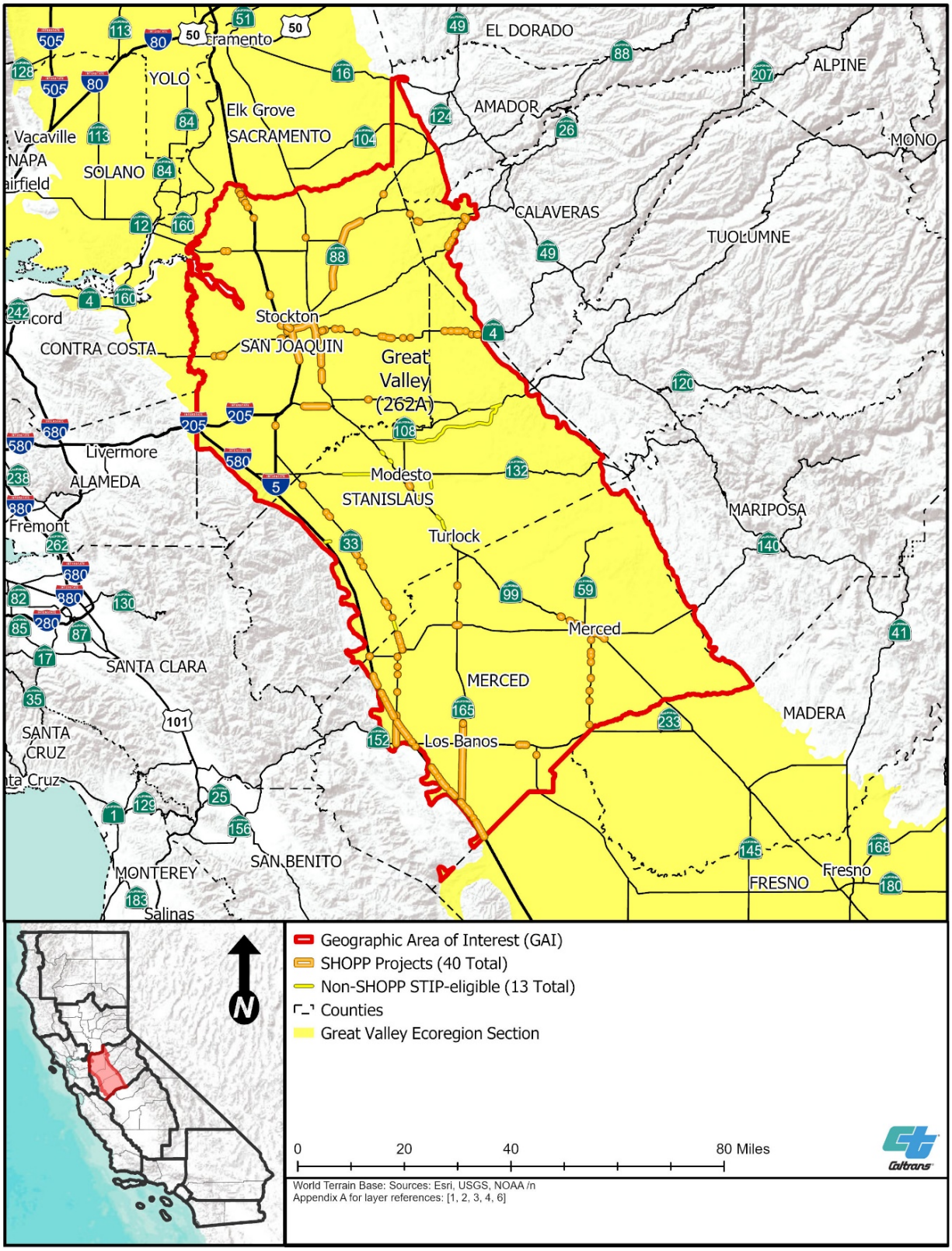
In this chapter, Caltrans describes the GAI in terms of ecoregion sections, land ownership, topography, climate, land cover types, invasive species, special-status species, critical habitat, connectivity, sub-basins, hydrology, flood hazard areas, water quality, wild and scenic rivers, aquatic resources, riparian habitat, 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 Corps, EPA, RWQCB, and/or CDFW regulations, as well as special-status fish that may be subject to 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 transportation projects is provided in Chapter 5, *Modeled Estimated Impacts*.

2.1 Ecoregion Sections in the GAI

The GAI consists of approximately 2.7 million acres in central California, encompassing part of the Central Valley. As shown in Figure 2-1, the Great Valley Ecoregion Section within District 10 defines its boundaries, which are overlapped by portions of the Upper Mokelumne River, San Joaquin Delta, Upper Calaveras California, Rock Creek-French Camp Slough, Lower San Joaquin River, Middle San Joaquin-Lower Chowchilla, Upper Stanislaus, Upper Tuolumne, and Upper Merced sub-basins (see Section 2.10). Ecoregion sections are defined as the largest ecological unit of the U.S. Department of Agriculture ("USDA"), Forest Service ("USFS") National Hierarchical Framework of Ecological Units, which are nested within larger provinces (Cleland et al. 1997). The Great Valley Ecoregion Section is within the larger California Dry Steppe Province (McNab et al. 2007).

Figure 2-1. Ecoregion Section



2.2 Land Ownership

The GAI spans parts of Amador, Calaveras, Mariposa, Merced, San Joaquin, and Stanislaus Counties (Figure 2-2). Most of the land in the GAI (89.1 percent) is privately owned and managed (Table 2-1, Figure 2-2). Federal lands, which encompass 2 percent of land in the GAI, include lands administered and managed by the Corps; the U.S. Bureau of Reclamation; the U.S. Department of the Interior's Bureau of Land Management ("BLM") and FWS; the U.S. Department of Defense's military bases; and other federal lands. Approximately 1.5 percent of land in the GAI is governed by counties, cities, and special districts. State lands, which encompass 1.1 percent of land in the GAI, include lands owned and managed by the California Department of Parks and Recreation, California Department of Water Resources, CDFW, Central Valley Flood Protection Board, University of California, and other state lands. Other lands in the GAI, which encompass 6.3 percent of land in the GAI, are owned or managed by Native American tribes and nonprofit conservancies and land trusts (Table 2-1, Figure 2-2).

Table 2-1. Land Ownership

Land Owner or Land Use	Total Acreage per Agency/Owner[a]	Ownership as Percentage of GAI
Private (agriculture)	2,010,706	75.3
Private (urban and other)	283,188	10.6
Nonprofit conservancy and land trust	168,693	6.3
Private (unassigned)	48,456	1.8
FWS	43,726	1.6
City, county, and special district	40,192	1.5
Private (natural vegetation)	37,668	1.4
CDFW	16,102	0.6
U.S. Bureau of Reclamation	7,986	0.3
California Department of Parks and Recreation	6,624	0.2
University of California	6,570	0.2
California Department of Water Resources	953	<0.1
BLM	528	<0.1
Corps	236	<0.1
U.S. military bases	159	<0.1
Tribal lands	67	<0.1
Central Valley Flood Protection Board	21	<0.1

Land Owner or Land Use	Total Acreage per Agency/Owner[a]	Ownership as Percentage of GAI
Other federal	8	<0.1
Other state	3	<0.1
Total	**2,671,886**	**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.

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 the 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 no assigned rank. 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).

Figure 2-2. Land Ownership

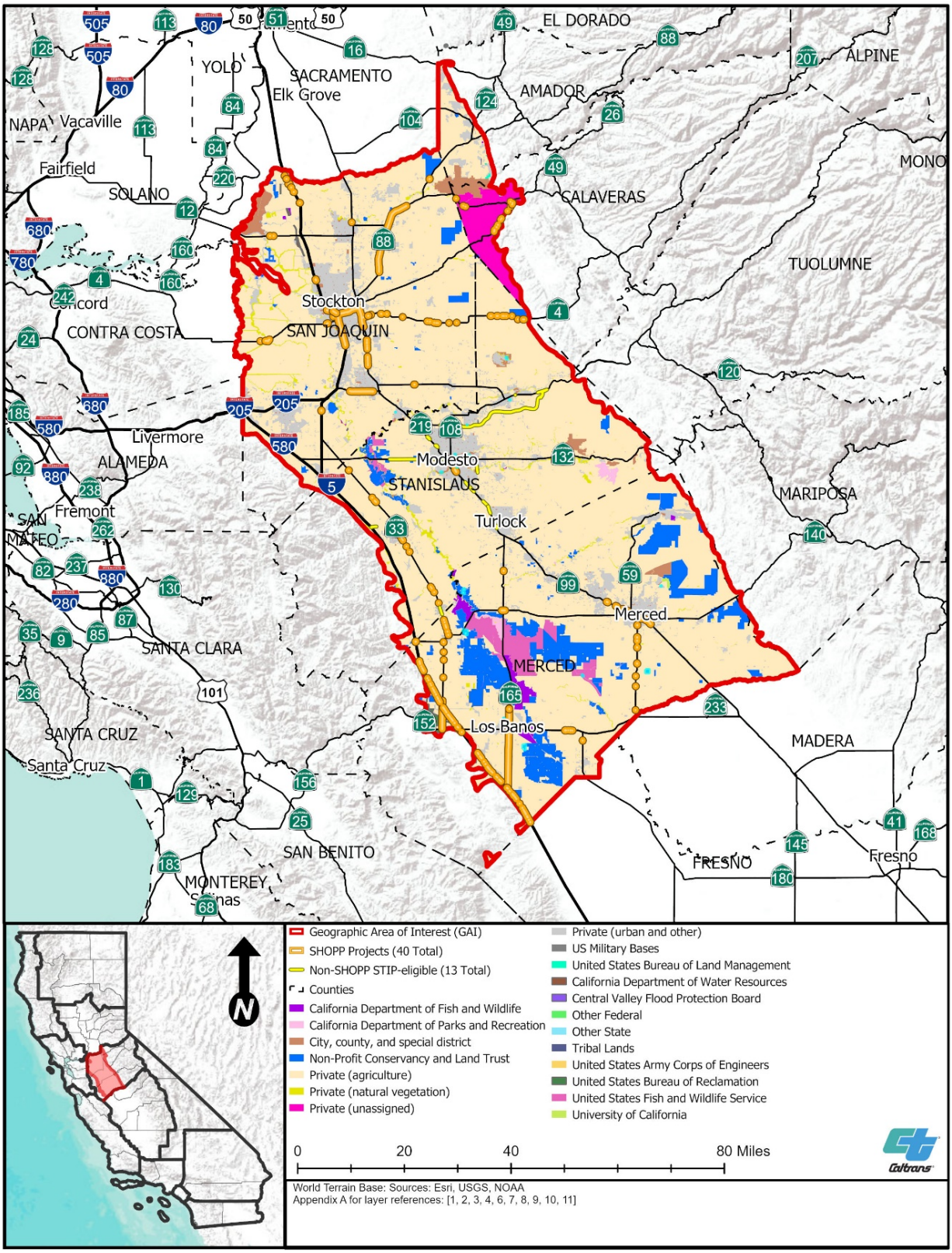
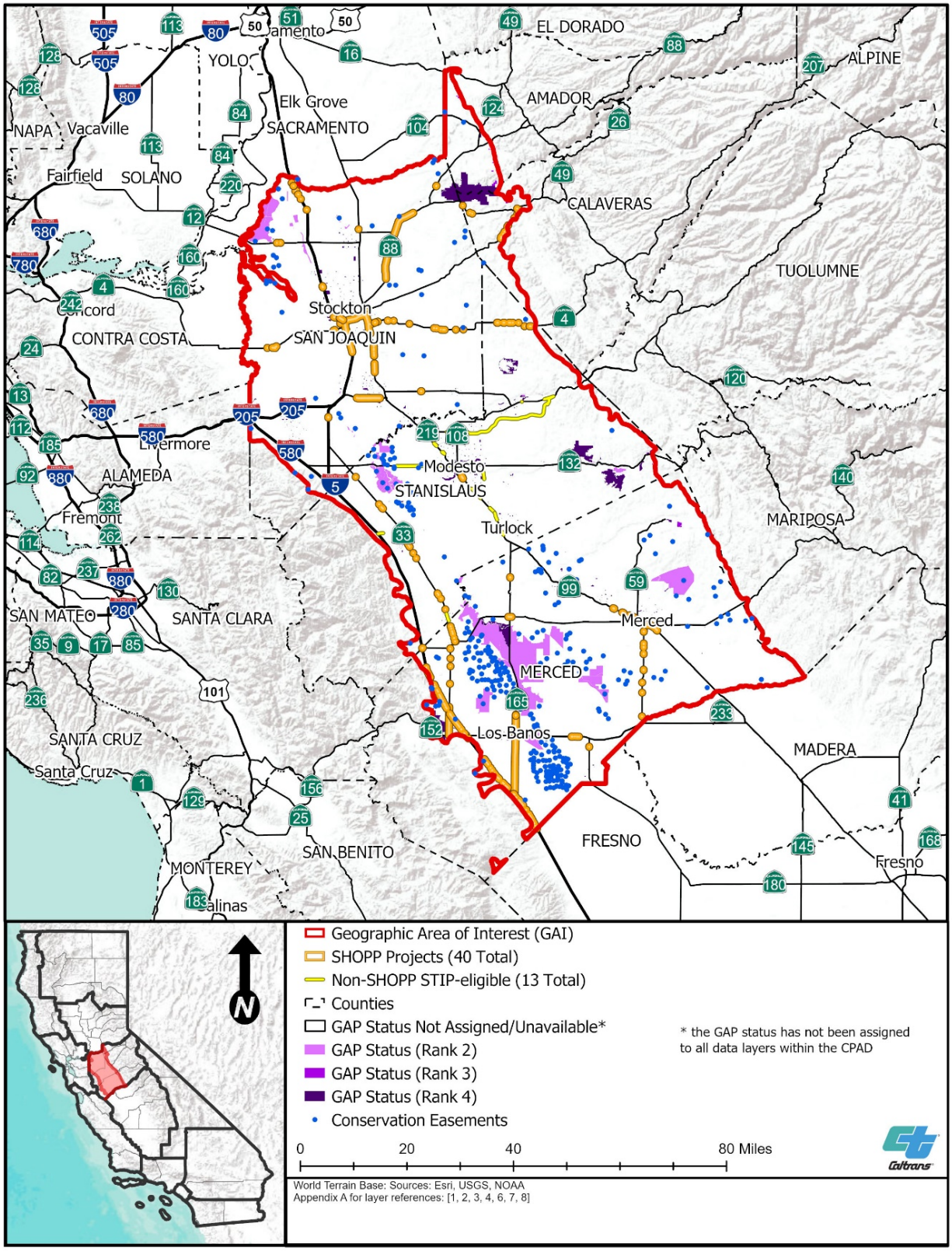


Figure 2-3. Protected Lands



2.3 Topography

The GAI is located within the central interior of California in the San Joaquin Valley, situated between the Sacramento Valley to the north and the Tulare Basin to the south. It lies south of the Sacramento-San Joaquin River Delta and is bound by the coastal mountains of the Diablo Range to the west and the Sierra Nevada to the east (Figure 2-4). Elevations in the GAI range from sea level in the Sacramento-San Joaquin Delta to 1,455 feet above mean sea level in the San Benito Mountains.

2.4 Climate

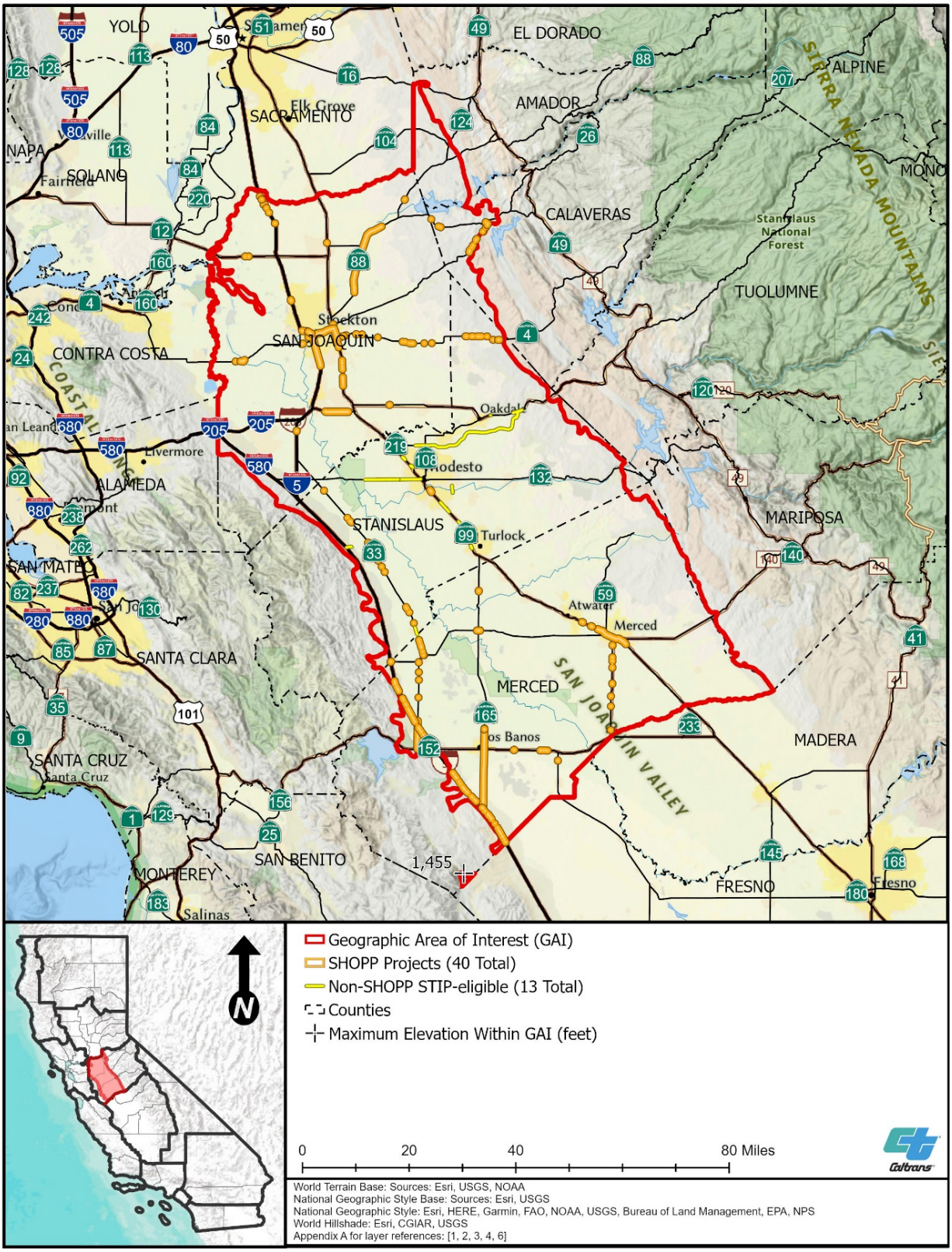
The GAI is characterized by hot, dry summers and mild winters, with precipitation occurring mostly during winter (McNab et al. 2007). The average temperature ranges from 55 to 66 degrees Fahrenheit, with peak temperatures of 90 to 100 degrees Fahrenheit in the summer and winter temperatures occasionally dropping below freezing (U.S. Bureau of Reclamation 2014; USFS 1994). The northern part of the GAI experiences a cooling effect during summer from the Delta breezes, which are winds that carry cooler coastal air into the valley at times when there is a strong temperature difference between the two regions (California Department of Water Resources 2005). Precipitation ranges from 5 to 30 inches, with the least rainfall occurring along the west side in the rain shadow of the coastal mountains (CDFW 2015a; USFS 1994).

In the next 30 years, the climate is expected to change. Results of Caltrans' climate vulnerability assessment are summarized in Section 2.4.1. The predicted resilience of the GAI to effects resulting from climate change are summarized in Section 2.4.2.

2.4.1. Climate Vulnerability Assessment

In 2019, Caltrans performed a statewide climate change vulnerability assessment for the SHS (Caltrans 2019b). The analysis provided in the *Caltrans Climate Change Vulnerability Assessments: District 10 Technical Report* (Caltrans 2019b) 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).

Figure 2-4. Topography



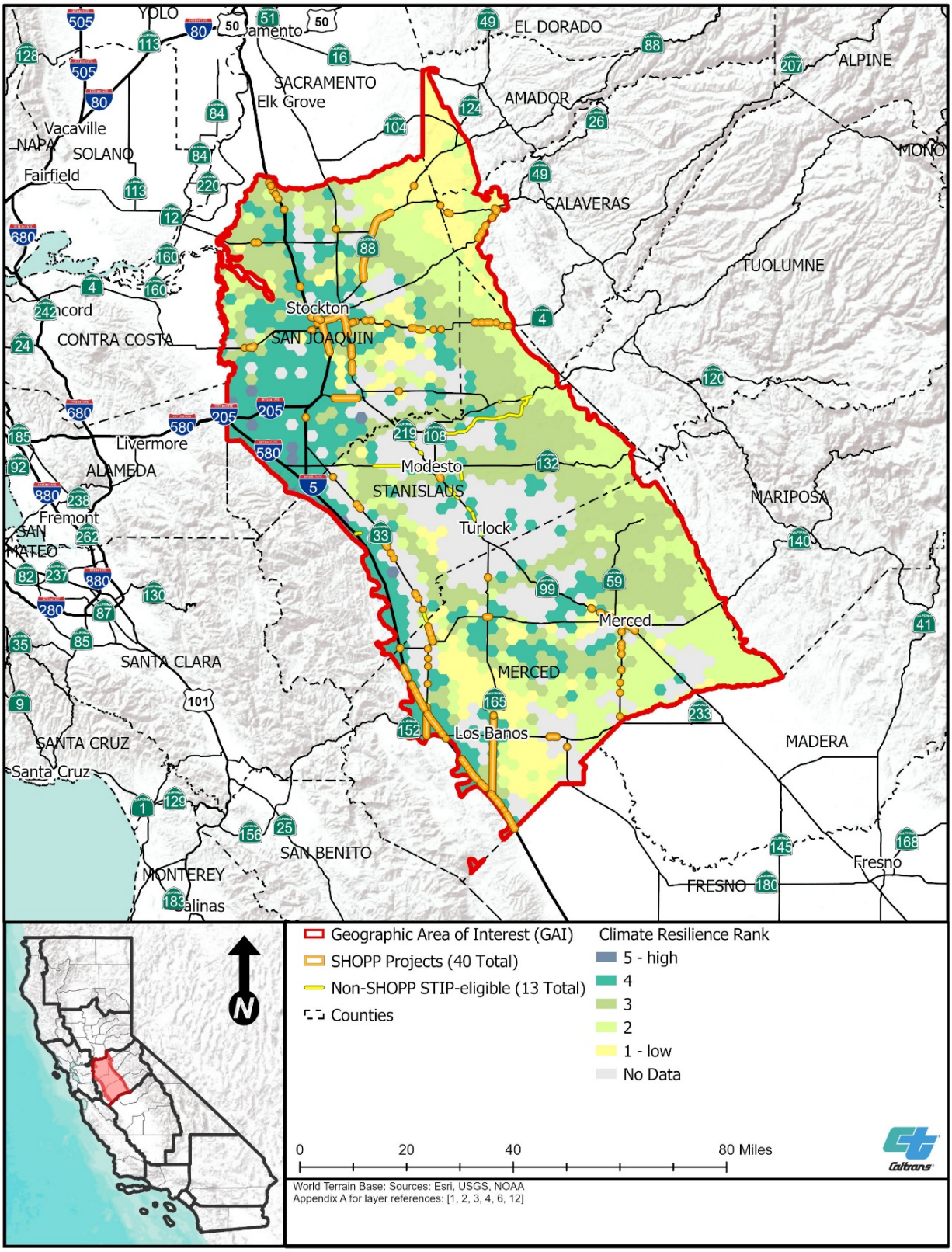
The effects of climate change in the GAI pose risks for transportation infrastructure, reliability, and capacity. Transportation systems were designed for historical climate conditions; changing climatic conditions, including an increased frequency of extreme weather events, are expected to cause disruptions and damage to the SHS. Predicted climate change effects consist of projected extended periods of higher temperatures in summer; large fluctuations in precipitation, with dry years becoming drier and wet years becoming wetter; and an increased risk of drought, wildfires, and landslides over the three time periods analyzed in the technical report (Caltrans 2019b).

2.4.2. 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—a hotter and drier future and a warmer and wetter future; two future carbon dioxide ("CO_2") scenarios—one with no reductions in CO_2 emissions and one with a peak in 2040 followed by a significant decline in CO_2 emissions; and two 29-year time intervals—2040 to 2069 and 2070 to 2099. Terrestrial locations were assigned climate resilience ranks ranging from 1 (low resilience or low probability that the terrestrial location will contain climate refugia) to 5 (high resilience or high probability that the terrestrial location will contain climate refugia) (CDFW 2018a).

Resiliency is an important consideration when establishing compensatory mitigation. The terrestrial climate change resilience rank from the ACE dataset (CDFW 2018a) is presented on Figure 2-5. There is a pattern of lower resilience in the southern and eastern parts of the GAI, with moderate resistance scattered primarily throughout the central and northern parts of the GAI. Areas with higher resilience occur in the western part of the GAI and in scattered locations in the central part of the GAI.

Figure 2-5. Terrestrial Climate Resilience Rankings



2.5 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, herbaceous-dominated habitats account for the largest habitat type, encompassing 47.7 percent of the GAI, with annual grassland the most common (Table 2-2, Appendix B). Developed and non-vegetated habitat types (barren areas) combined account for 46.9 percent of the GAI, with cropland the most common. Aquatic habitats account for 2.5 percent of the GAI, with lacustrine the most common. Tree-dominated habitats account for 2.4 percent of the GAI, with valley foothill riparian the most common. Shrub-dominated habitats account for 0.5 percent of the GAI, with alkali desert scrub the most common. Land cover is generally shown on Figure 2-6.

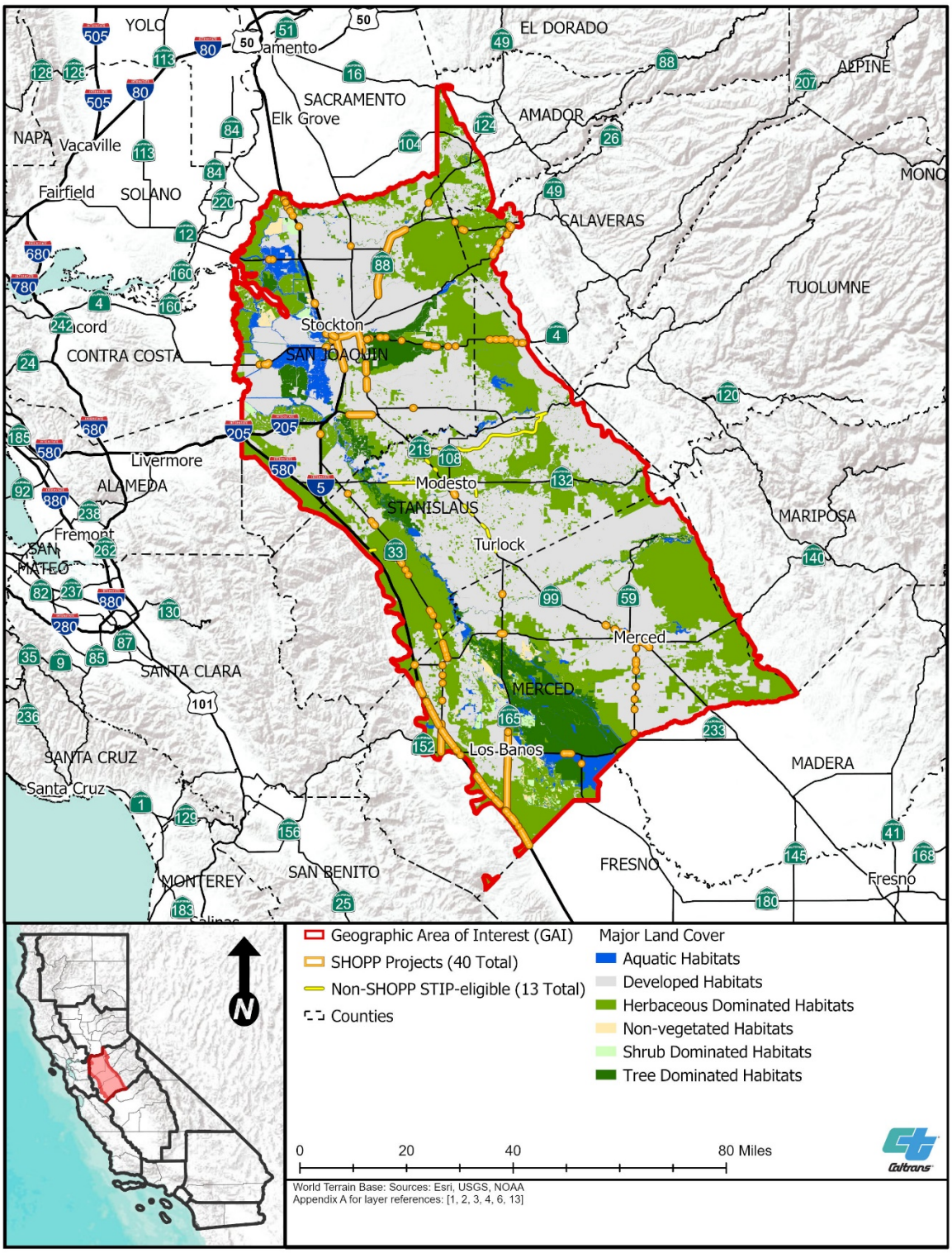
Table 2-2. Land Cover Types

CWHR Habitat Type	Acres[a]	Cover as Percentage of GAI[b]
Tree-dominated Habitats	**62,740**	**2.36**
Blue Oak-Foothill Pine	1,773	0.07
Blue Oak-Foothill Pine; Blue Oak Woodland	639	0.02
Blue Oak Woodland	24,028	0.90
Eucalyptus	332	0.01
Montane Hardwood	4,856	0.18
Montane Riparian	354	0.01
Ponderosa Pine	2	<0.01
Valley Foothill Riparian	30,077	1.13
Valley Oak Woodland	679	0.03
Shrub-dominated Habitats	**12,762**	**0.48**
Alkali Desert Scrub	5,415	0.20
Chamise - Redshank Chaparral	2,130	0.08
Coastal Scrub	791	0.03
Mixed Chaparral	4,426	0.17
Herbaceous-dominated Habitats	**1,268,497**	**47.74**
Annual Grassland	658,528	24.78
Fresh Emergent Wetland	87,925	3.31

CWHR Habitat Type	Acres[a]	Cover as Percentage of GAI[b]
Pasture	519,171	19.54
Perennial Grassland	0.001	<0.01
Saline Emergent Wetland	2,869	0.11
Wet Meadow	5	<0.01
Aquatic Habitats	**66,057**	**2.49**
Lacustrine; Riverine	0.4	<0.01
Lacustrine	36,383	1.37
Riverine	29,674	1.12
Developed Habitats	**1,229,956**	**46.29**
Cropland	605,570	22.79
Deciduous Orchard	356,580	13.42
Evergreen Orchard	3	<0.01
Irrigated Grain Crops	29	<0.01
Irrigated Row and Field Crops	77,867	2.93
Rice	1,386	0.05
Urban	178,229	6.71
Vineyard	10,292	0.39
Non-vegetated Habitats	**16,995**	**0.64**
Barren	16,995	0.64
Total	**2,657,006**	**100%**

Source: Caltrans 2021d
[a] Numbers were rounded to the nearest whole number.
[b] Numbers were rounded to the hundredths.

Figure 2-6. Major Land Cover[a]



[a] For greater detail, see Appendix B.

2.6 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).

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 as problematic for the ecoregion sections that overlap the GAI in the California SWAP or the Cal-IPC inventory include, but are not limited to, barbed goat grass (*Aegilops triuncialis*), tree of heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), wild oat (*Avena* spp.), black mustard (*Brassica nigra*), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), yellow star-thistle (*Centaurea solstitialis*), poison hemlock (*Conium maculatum*), pampas grass (*Cortaderia selloana*), Bermuda grass (*Cynodon dactylon*), Brazilian waterweed (*Egeria* sp.), water hyacinth (*Eichhornia* sp.), Russian olive (*Elaeagnus angustifolia*), medusa head (*Elymus caput-medusae*), eucalyptus (*Eucalyptus* spp.), rattail fescue (*Festuca myuros*), edible fig (*Ficus carica*), French broom (*Genista monspessulana*), cutleaf geranium (*Geranium dissectum*), Mediterranean barley (*Hordeum marinum*), hare barley (*Hordeum murinum*), hydrilla (*Hydrilla verticillata*), water pennywort (*Hydrocotyle* sp.), perennial pepperweed (*Lepidium latifolium*), Uruguayan primrose-willow (*Ludwigia hexapetala*), pennyroyal (*Mentha pulegium*), parrot's feather (*Myriophyllum aquaticum*), Eurasian watermilfoil (*Myriophyllum spicatum*), fountain grass (*Pennisetum setaceum*), annual beard grass (*Polypogon monspeliensis*), Himalayan blackberry (*Rubus armeniacus*), scarlet sesban (*Sesbania punicea*), tamarisk or saltcedar (*Tamarix parviflora* and *T. ramosissima*), and gorse (*Ulex* spp.) (Cal-IPC 2020; CDFW 2015a).

Nonnative animals that are/may be present in the GAI and that can negatively affect aquatic species include barred tiger salamander (*Ambystoma mavortium*), Asian clam

(*Corbicula fluminea*), quagga mussel (*Dreissena bugensis*), zebra mussel (*Dreissena polymorpha*), Chinese mitten crab (*Eriocheir sinensis*), mysid shrimp (Order Mysida), American bullfrog (*Lithobates catesbiana*), introduced water snakes (*Nerodia* sp.), New Zealand mud snail (*Potamopyrgus antipodarum*), red swamp crayfish (*Procambarus clarkia*), red-eared slider (*Trachemys scripta elegans*), and introduced fish such as striped bass (*Morone saxatilis*), white catfish (*Ameiurus catus*), channel catfish (*Ictalurus punctatus*), American shad (*Alosa sapidissima*), black crappie (*Pomoxis nigromaculatus*), largemouth bass (*Micropterus salmoides*), and bluegill (*Lepomis macrochirus*) (CDFW 2015a).

Nonnative animals that are/may be present in the GAI and that can negatively affect terrestrial wildlife through competition, predation, or parasitism include Argentine ants (*Linepithema humile*), brown-headed cowbirds (*Molothrus ater*), and the nonnative red fox (*Vulpes vulpes*). Invasive animal species that are/may be associated with urban areas include domestic dogs (*Canis lupus familiaris*), domestic cats (*Felis catus*), Argentine ants, and fire ants (*Solenopsis* sp.) (CDFW 2015a).

2.7 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 2.15.2.

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 2021a), and other information (Caltrans 2021b). Special-status terrestrial species 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, 69 non-fish special-status species are known to occur or have the potential to occur in the GAI.

Special-status species forecast to be affected by transportation projects during the planning period are listed, by habitat, in Appendix C and their counts are shown in Table 2-3. 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).

Table 2-3. Number of Potentially Occurring Special-status Species by Land Cover Type – Great Valley Ecoregion Section in the GAI[a]

Land Cover Type	Cover as % 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	0.90	0	0	4	2	13	9
Eucalyptus	0.01	0	0	2	2	12	6
Valley Foothill Riparian	1.13	0	1	1	3	14	8
Shrub-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Mixed Chaparral	0.17	7	0	2	2	11	7
Herbaceous-dominated Habitats	See below	See below	See below	See below	See below	See below	See below
Annual Grassland	24.78	9	4	4	4	18	14
Fresh Emergent Wetland	3.31	0	2	2	1	12	3
Pasture	19.54	0	0	0	1	5	12
Aquatic Habitats	See below	See below	See below	See below	See below	See below	See below
Lacustrine	1.37	0	0	3	1	8	2
Riverine	1.12	0	0	2	1	6	4
Developed Habitats	See below	See below	See below	See below	See below	See below	See below
Deciduous Orchard	13.42	0	0	1	0	5	7
Irrigated Row and Field Crops	2.93	0	0	1	1	6	6
Urban	6.71	0	0	0	0	10	6
Non-vegetated Habitats	See below	See below	See below	See below	See below	See below	See below
Barren	0.64	0	0	0	0	10	7

Source: Appendix C
[a] Because a species may use more than one habitat, the numbers shown here are not additive.

As described in the up-to-date Appendix C, CWHR home ranges are not always available. As an example, for subspecies for which CWHR does not include up-to-date 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 C 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.

2.8 Critical Habitat

FWS and NMFS regulate impacts on critical habitat under the ESA. The ESA (16 USC § 1531–1544) defines critical habitat for a threatened or endangered species as (i) "specific areas within the geographical area occupied by the species at the time it is listed … on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection;" and (ii) "specific areas outside the geographical area occupied by the species at the time it is listed … upon a determination by the Secretary that such areas are essential for the conservation of the species."

Further, the ESA clarifies that critical habitat "shall not include the entire geographical area which can be occupied by the threatened or endangered species." Critical habitat designations reflect a rigorous process. Before publishing the rule finalizing the critical habitat designation, FWS publishes proposals to designate critical habitat in the *Federal Register* and considers information received during the public comment period (FWS 2017a).

The GAI includes federally designated final critical habitat for 14 species (FWS 2021a; NMFS 2021):

- California red-legged frog (*Rana draytonii*)
- California tiger salamander (*Ambystoma californiense*)
- Colusa grass (*Neostapfia colusana*)
- Conservancy fairy shrimp (*Branchinecta conservatio*)
- Delta smelt (*Hypomesus transpacificus*)
- Fleshy owl's-clover (*Castilleja campestris* ssp. *succulenta*)
- Greene's tuctoria (*Tuctoria greenei*)
- Hairy Orcutt grass (*Orcuttia pilosa*)
- Hoover's spurge (*Chamaesyce hooveri*)
- Longhorn fairy shrimp (*Branchinecta longiantenna*)
- Sacramento Orcutt grass (*Orcuttia viscida*)
- San Joaquin Orcutt grass (*Orcuttia inaequalis*)
- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- Vernal pool tadpole shrimp (*Lepidurus packardi*)

Critical habitat is an important consideration when establishing compensatory mitigation. Designated critical habitat for these species is indicated on Figure 2-7. Note that designated critical habitat represented by points on Figure 2-7 are units too small to depict at the regional level assessed in this RAMNA.

2.9 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 2020a).

2.9.1. Wildlife Movement

Caltrans identified three connectivity assessments applicable and relevant to the GAI: the California Essential Habitat Connectivity ("CEHC") Project, ACE, and CDFW's *California Wildlife Barriers 2020* report. Each is briefly summarized below.

California Essential Habitat Connectivity

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

CDFW's Areas of Conservation Emphasis

CDFW's ACE version 3 terrestrial connectivity dataset (CDFW 2020b) builds on the CEHC Project and includes mapped corridors or linkages and where they occur in relation to large, contiguous natural areas (Figure 2-8). It also incorporates species-specific, fine-scale linkage information developed at a regional scale, where available, and includes areas that were not evaluated by the CEHC Project.

Figure 2-7. Federally Designated Critical Habitat

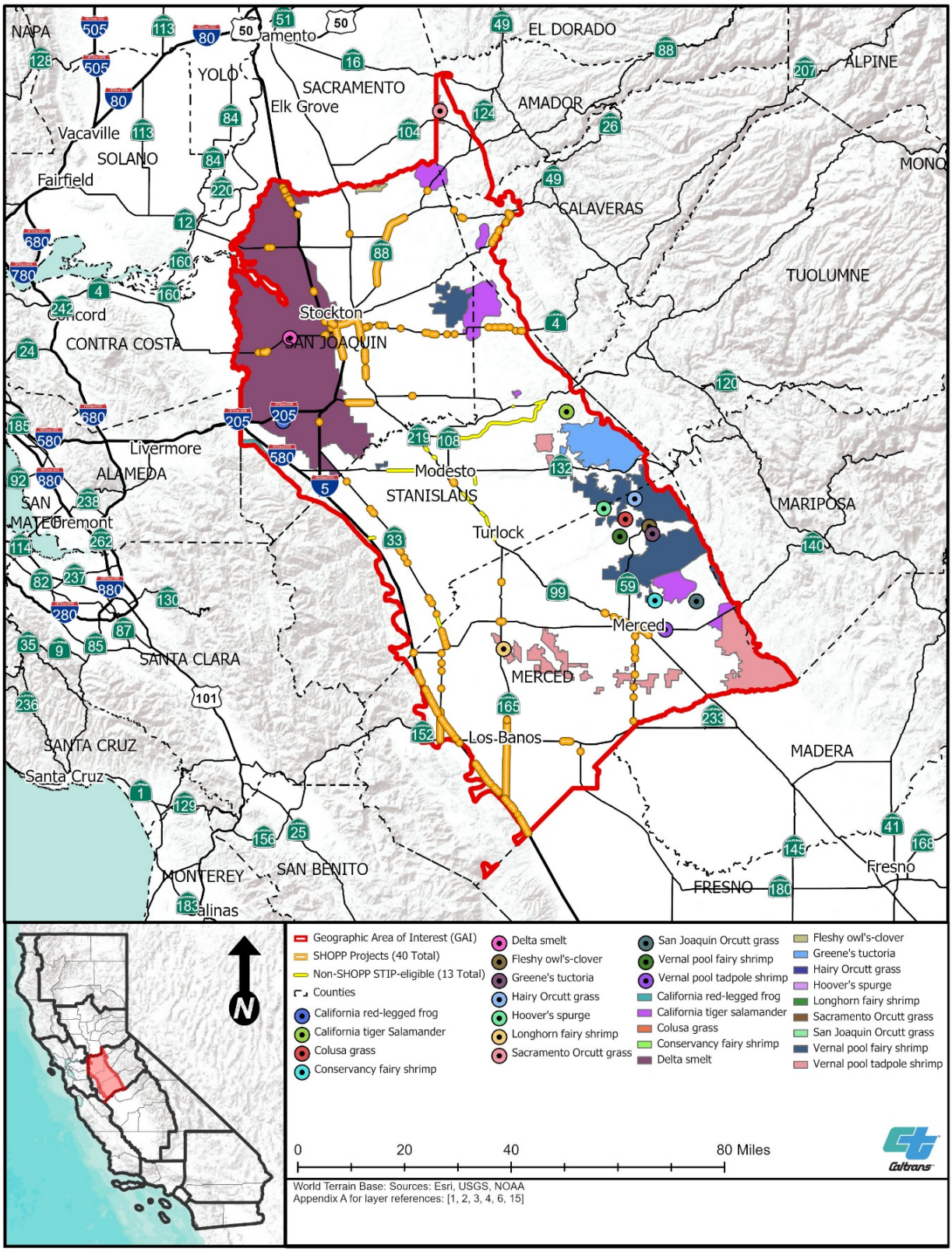
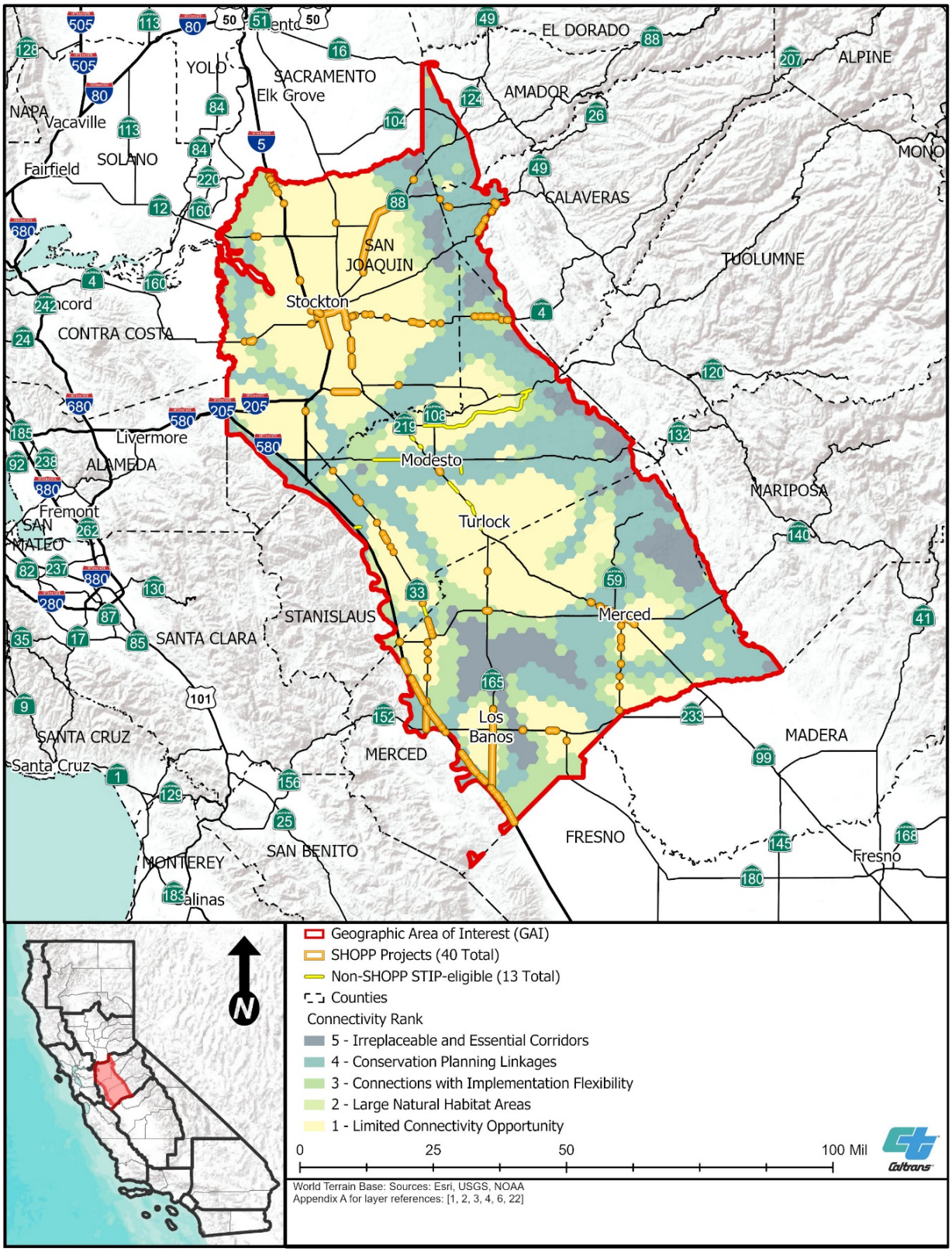


Figure 2-8. Terrestrial Connectivity



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, or 4, with fewer planned transportation projects occurring in areas with a connectivity rank of 2 or 5 (Figure 2-8).

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 2020a). 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.

Two priority wildlife movement barriers were identified in the GAI. These barriers and target species for movement include (1) a culvert on State Route ("SR") 12 in San Joaquin County (giant garter snake, Pacific pond turtle, mink, river otter, beaver, and all other reptiles and mammals in the area) and (2) a concrete canal in Los Banos in Merced County (mule deer, elk, and badger) (CDFW 2020a).

2.9.2. 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. The majority of salmon and steelhead in California are listed as either threatened or endangered, and barriers on the SHS further block fish from gaining access to upstream habitat.

SHC § 156.1 requires Caltrans to:

1. Provide an annual list of fish passage priorities for the SHS to the legislature. Fish Passage Annual Reports are available on the Caltrans Legislative Affairs

website, and the most recent report is available from: https://dot.ca.gov/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 become extinct in California in the next 40 years:

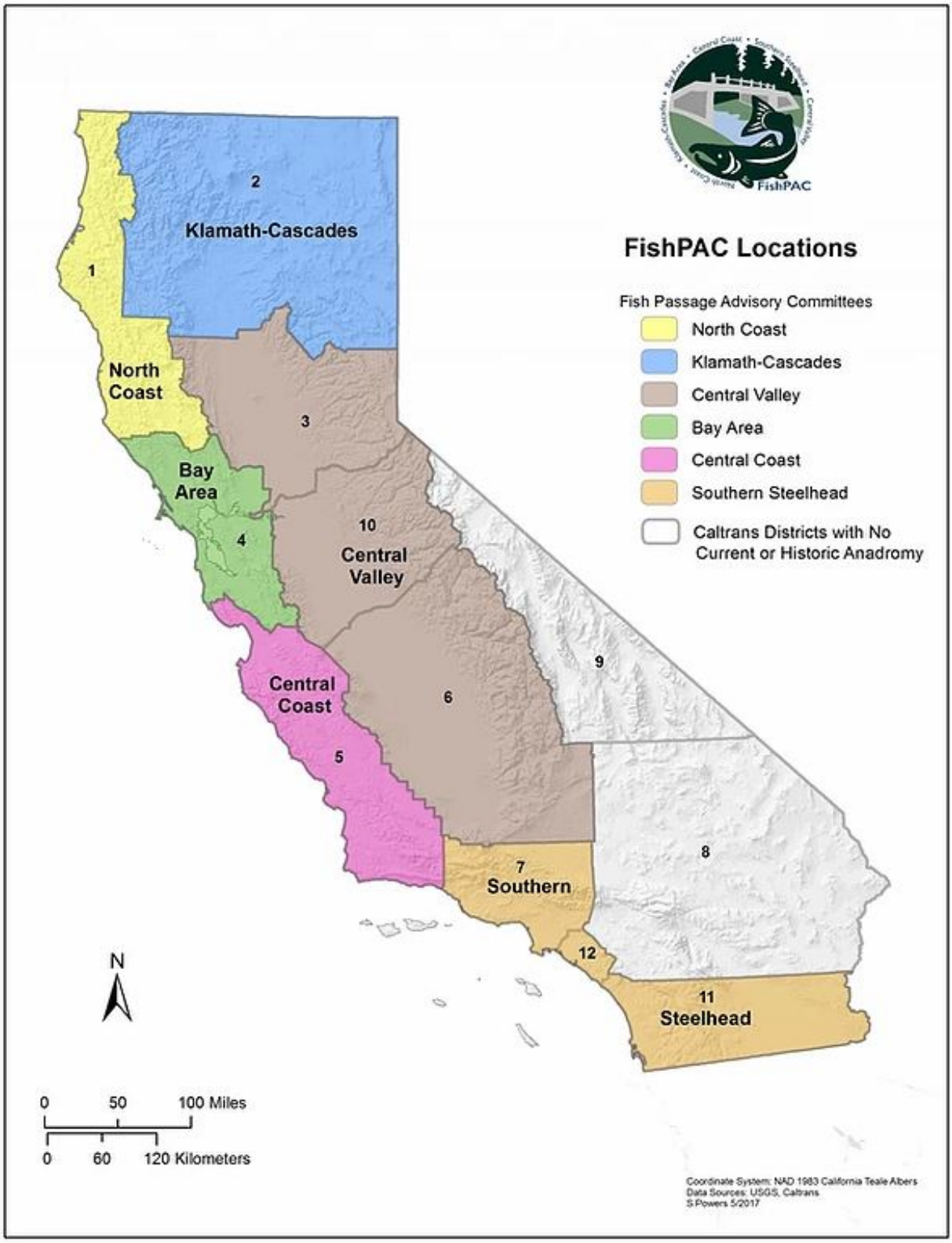
- Three identified species' units currently listed as state and/or federally endangered: Central California Coast ESU coho salmon, Sacramento River winter-run ESU chinook salmon, and Southern California DPS steelhead
- Seven identified species currently listed as state and/or federally threatened: Southern 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 2-9 depicts the six California Fish Passage Advisory Committee ("FishPAC") locations throughout the state. The FishPAC is a partnership between Caltrans, CalTrout, CCC, CDFW, FWS, NMFS, 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.

Figure 2-9. California Fish Passage Advisory Committee Locations



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.

2.10 Sub-basins

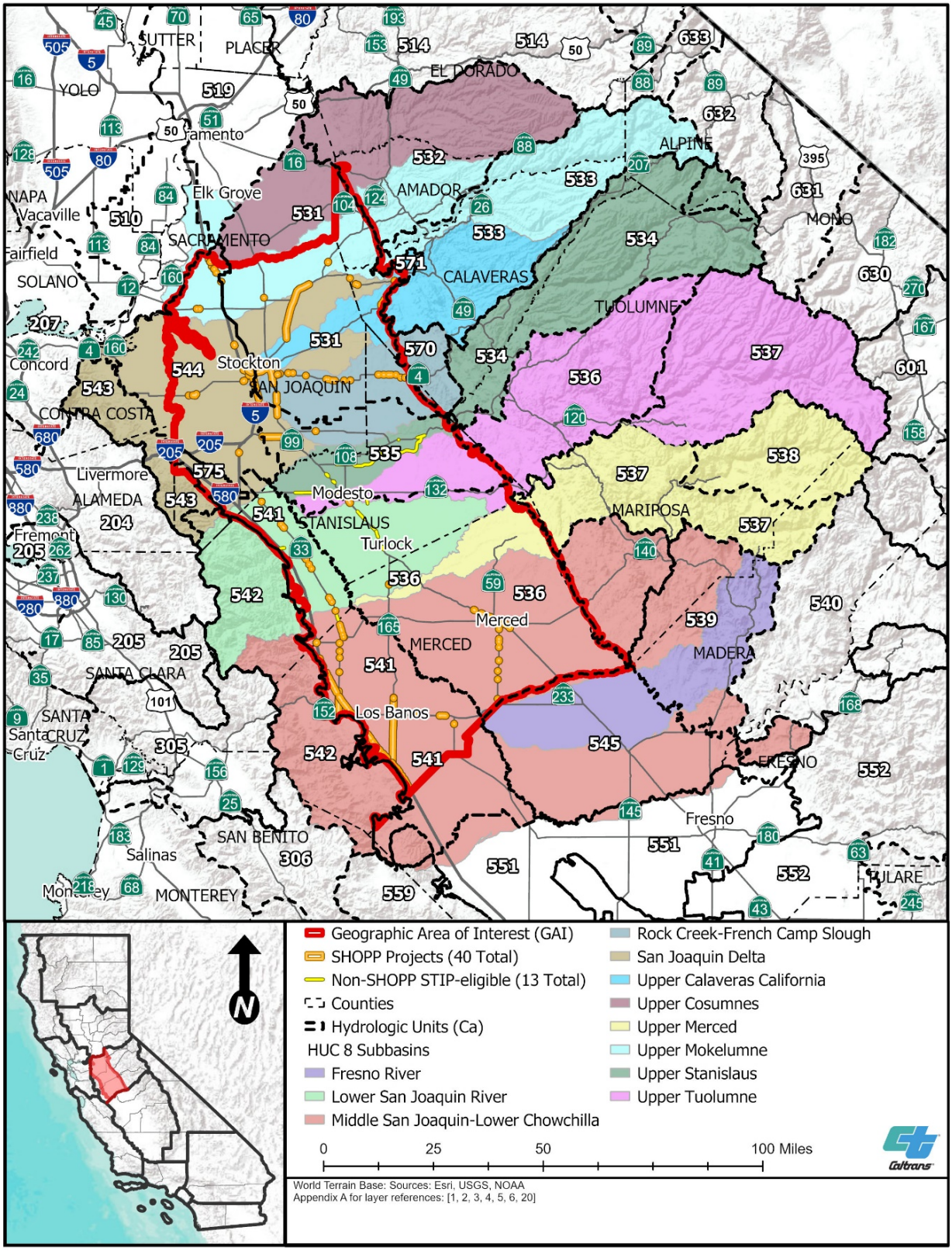
The Watershed Boundary Dataset maps the areal extent of surface water drainage in the U.S. It consists of a hierarchical system of nesting hydrologic units of various scales, each with an assigned HUC that is georeferenced to USGS topographic maps (USGS 2014). Each HUC classification consists of 2 to 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, the California Department of Water Resources, SWRCB, and the RWQCBs do not necessarily use HUC-8 codes (California Department of Water Resources 2016). SWRCB and the RWQCBs also use the Cal Water system (that is, hydrologic units, or "HUs") for state-level purposes such as assigning beneficial uses to waters. The Cal Water system is a hierarchical system similar to USGS HUCs. Cal Water 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.

Appendix D provides a crosswalk between the HUC-8 and HU classification systems for each HUC-8 in the GAI. The GAI overlaps 11 sub-basins, which loosely correspond to 17 HUs (Appendix D). Figure 2-10 shows the overlap between sub-basins and state-level HUs in the GAI.

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

Figure 2-10. HUC-8 Sub-basins and HUs



2.11 Hydrology

The 11 sub-basins of the GAI drain an area of 2,656,607 acres (4,151 square miles) (Table 2-4, Figure 2-10). Described individually in Appendix D, these sub-basins include 2,999 rivers and streams that traverse 3,314 miles in the Central Valley RWQCB boundary (Table 2-4). Sub-basin acreages shown in Table 2-4 may include areas outside of the GAI. Major rivers in the GAI include the San Joaquin, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, and Chowchilla Rivers. Snowmelt in the Sierra Nevada generates the majority of the flow into these rivers.

Table 2-4. Sub-basins

Sub-basin Name	Sub-basin Code (HUC-8)	Drainage Area (acres)[a]	Rivers and Streams (count)	Total Reach Length (miles)[a]
Fresno River	18040007	1,653	4	2
Lower San Joaquin River	18040002	373,654	241	227
Middle San Joaquin-Lower Chowchilla	18040001	850,005	566	972
Rock Creek-French Camp Slough	18040051	230,037	334	409
San Joaquin Delta	18040003	496,382	528	468
Upper Calaveras California	18040011	84,413	300	226
Upper Cosumnes	18040013	12,021	63	38
Upper Merced	18040008	107,368	225	253
Upper Mokelumne	18040012	213,741	398	341
Upper Stanislaus	18040010	125,361	67	89
Upper Tuolumne	18040009	161,971	273	289
Total	Not applicable	**2,656,607**	**2,999**	**3,314**

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

2.12 Flood Hazard Areas

As designated by the Federal Emergency Management Agency, a Special Flood Hazard Area is the land area 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).

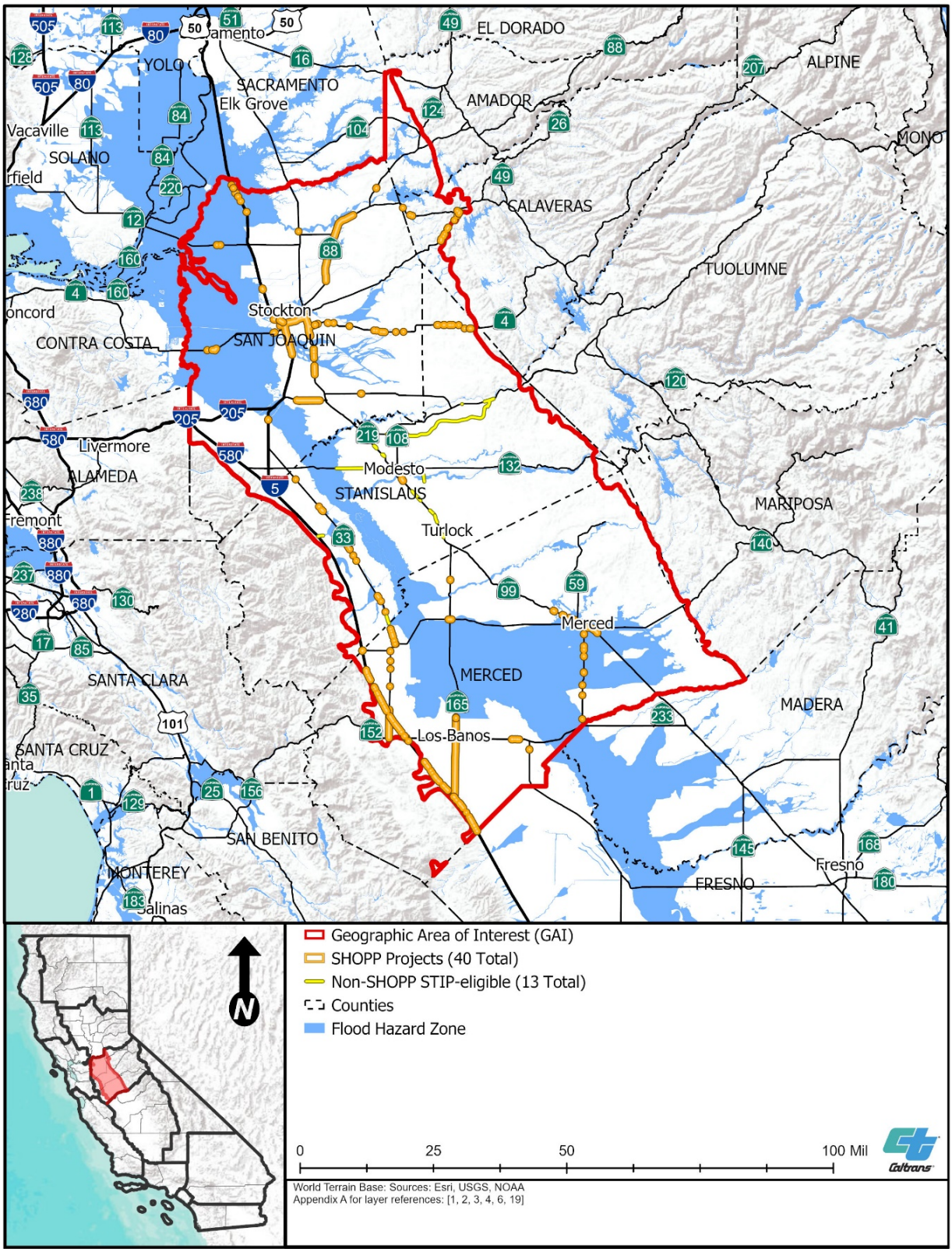
Flood hazard areas in the GAI are shown on Figure 2-11. Waterbodies associated with the majority of flood hazard risk in the GAI include the Sacramento-San Joaquin Delta and the Mokelumne, San Joaquin, Calaveras, Stanislaus, Tuolumne, Merced, and Chowchilla Rivers. This information is important for scoping advance mitigation projects and transportation projects undertaken in the GAI, which will need to comply with Executive Order 11988.

2.13 Water Quality

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

Surface water and groundwater beneficial uses are also identified in the Basin Plans (Central Valley RWQCB 2018). If it cannot be avoided, a waterbody's beneficial uses may be affected by the construction, operation, and maintenance of highways and bridges. Impacts on wildlife and aquatic resources can be adverse or beneficial. An example of an adverse impact would be the introduction of a variety of pollutants, including sediments, heavy metals, hydrocarbons, and toxic substances (EPA 2005). An example of a beneficial impact would be repairs or retrofit that improve permeability or flows.

Figure 2-11. Flood Hazard Areas



Hence, this RAMNA considers beneficial uses identified for waterbodies located in the GAI relevant to the RAMNA when they support the preservation and enhancement of wildlife habitat and aquatic resources and are consistent with the AMP's objective to protect natural resources through transportation project mitigation (Table 2-5).

Table 2-5. Beneficial Uses

Beneficial Use	Sacramento River and San Joaquin River Basin Plan	Relevant to RAMNA? [a]
Agricultural supply	Applicable	No
Cold freshwater habitat	Applicable	Yes
Freshwater replenishment	Applicable	Yes
Hydropower generation	Applicable	No
Industrial process supply	Applicable	No
Industrial service supply	Applicable	No
Migration of aquatic organisms	Applicable	Yes
Municipal and domestic supply	Applicable	No
Non-contact water recreation	Applicable	No
Spawning, reproduction, and/or early development	Applicable	Yes
Warm freshwater habitat	Applicable	Yes
Water contact recreation	Applicable	No
Wildlife habitat	Applicable	Yes

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

Through habitat and other improvements, advance mitigation projects have the potential to contribute to compliance with the 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 59 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 2-5). These waterbodies, their impairments, and whether total maximum daily loads ("TMDLs") 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.

2.14 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 2022). 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. There are no nationally or state designated wild and scenic rivers in the GAI (National Wild and Scenic Rivers System 2021; Omnibus Public Land Management Act of 2009).

2.15 Aquatic Resources

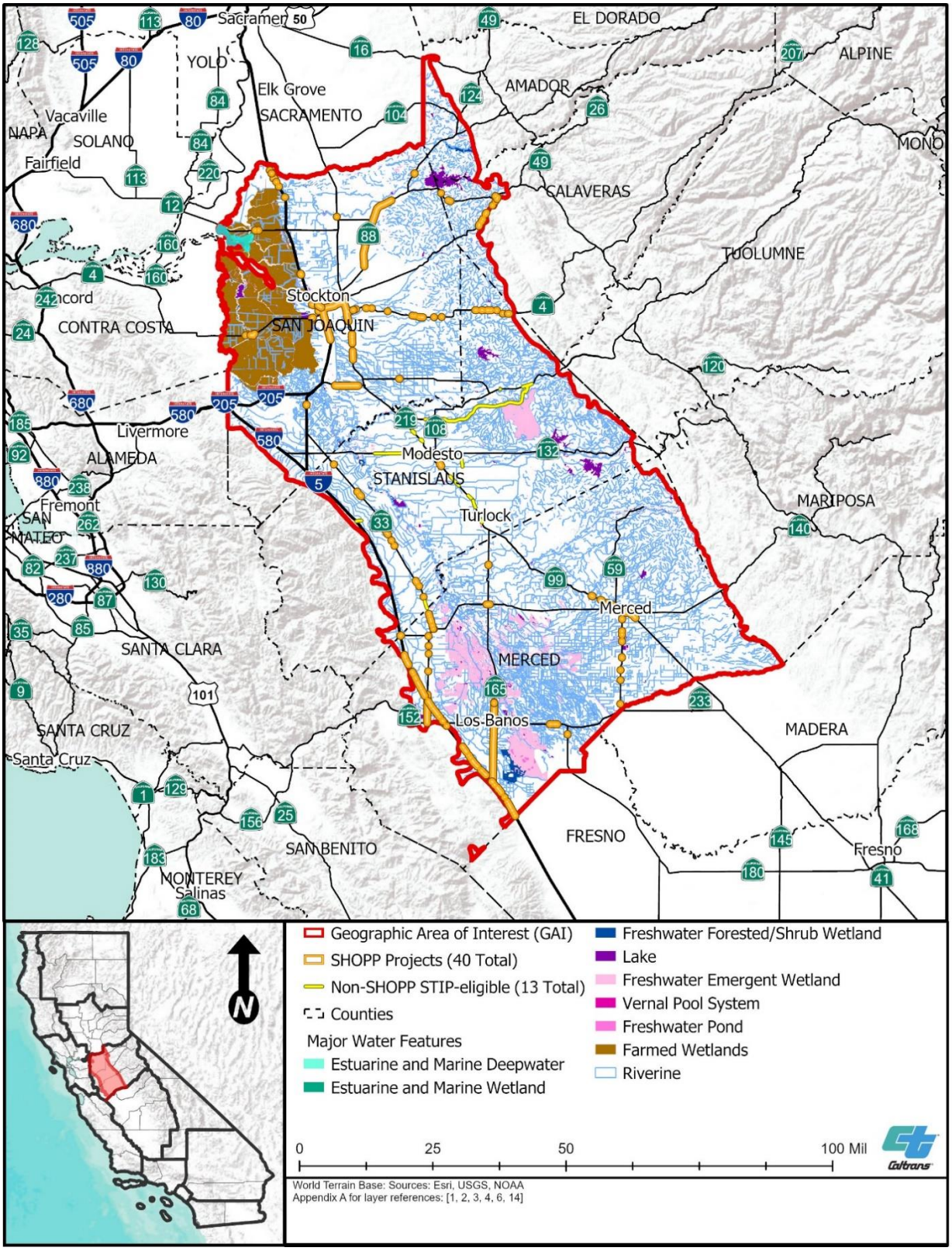
A high-level view of major aquatic resources in the GAI is provided on Figure 2-12, and detailed maps of aquatic resources are provided in Appendix F.

For the purposes of advance mitigation planning, aquatic resources in the GAI include wetlands and non-wetland waters that may be subject to Corps, EPA, RWQCB, and/or CDFW regulations, as well as special-status fish that may be subject to CDFW, FWS, and/or NMFS regulations. Riparian habitat is discussed separately in Section 2.16.

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 lake; use material from any river, stream, or lake;[2] and deposit or dispose of material into any river, stream, or lake.

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

Figure 2-12. Aquatic Resource Features and Major Stream Systems[a]



[a] For greater detail, see Appendix F.

2.15.1. Historical Context

Historically, flood flows drained from the San Joaquin River into the Tulare Basin when Tulare Lake was at a moderate to low elevation and the reverse happened when Tulare Lake was at high elevation or the Kings River was at high flow. Currently, it is rare for flood flows to drain from the San Joaquin River into the Tulare Basin. This change in hydrology from a natural flow regime is primarily attributable to irrigation storage, irrigation delivery, and flood control releases (McBain and Trush 2002).

Natural wetlands historically occupied more than 4 million acres in the Central Valley, with the majority consisting of freshwater emergent wetlands and seasonal wetlands created from overbank flooding of rivers and streams during the winter and spring. Over the past century, there has been a marked decrease in the size and magnitude of natural wetlands, with over 95 percent of wetlands lost or modified because of urban expansion and agricultural conversion. The building of dams, levees, and flood bypasses has affected historic flows and limited overbank flooding in the region (CNRA 2010; Frayer et al. 1989).

2.15.2. Threatened and Endangered Fish Species

Special-status terrestrial species with the potential to occur in the GAI are discussed in Section 2.7, above. 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, developed using the USGS National Hydrography Dataset and other information (Caltrans 2018, 2021e). Based on a search of the fish habitat layer, six 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 and state threatened Central Valley spring-run ESU Chinook salmon
- federally threatened and state endangered Delta smelt
- federally threatened Southern DPS green sturgeon
- federal candidate for listing and state threatened longfin smelt
- federally threatened Central Valley DPS steelhead
- federally threatened and state endangered Delta smelt

As described previously in Section 2.8, the GAI includes FWS-designated final critical habitat for Delta smelt. The San Joaquin, Mokelumne, Calaveras, Stanislaus, and Merced Rivers support salmon and/or steelhead (National Oceanic and Atmospheric Administration Fisheries 2020). Complete SAMNA results are in Appendix C of the SAMNA (Caltrans 2021b). Extracted from the SAMNA, fish species impact forecasts are provided in Chapter 5, *Modeled Estimated Impacts*. Note that results reflect uncertainties in foundational information. For example, Delta smelt critical habitat, the basis of impact estimates, primarily occurs west of Interstate 5, but Delta smelt have occurred at other locations in the GAI. Hence, while 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.

2.15.3. 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 (2018) California Aquatic Resource Inventory (Table 2-6, Appendix F; Caltrans 2021f). These data were used to estimate the extent of wetlands in the GAI; however, the data layers are largely based on aerial imagery, have not been ground-truthed, provide no information on plant species associated with mapped areas, and 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 2.5; therefore, total acreages of wetland land cover types presented in Table 2-2 may not align with those presented in Table 2-6 (Caltrans 2021f).

Vernal Pools

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. The SAMNA Reporting Tool’s wetland layer does not include vernal pools. However, potential vernal pool habitat can be inferred from the modeled Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp habitat developed for the SAMNA that is based on California Natural Diversity Database vernal pool species occurrences. Vernal pools mapped using CDFW’s ACE vernal pools layer [ds2732] are shown on the left side of Figure 2-13, 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 2-13.

2.15.4. 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 2-6, Appendix F; Caltrans 2021g). 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 2.5; therefore, total acreages of water land cover types presented in Table 2-6 may not align with those presented in Table 2-6 (Caltrans 2021g).

Figure 2-13. Vernal Pools

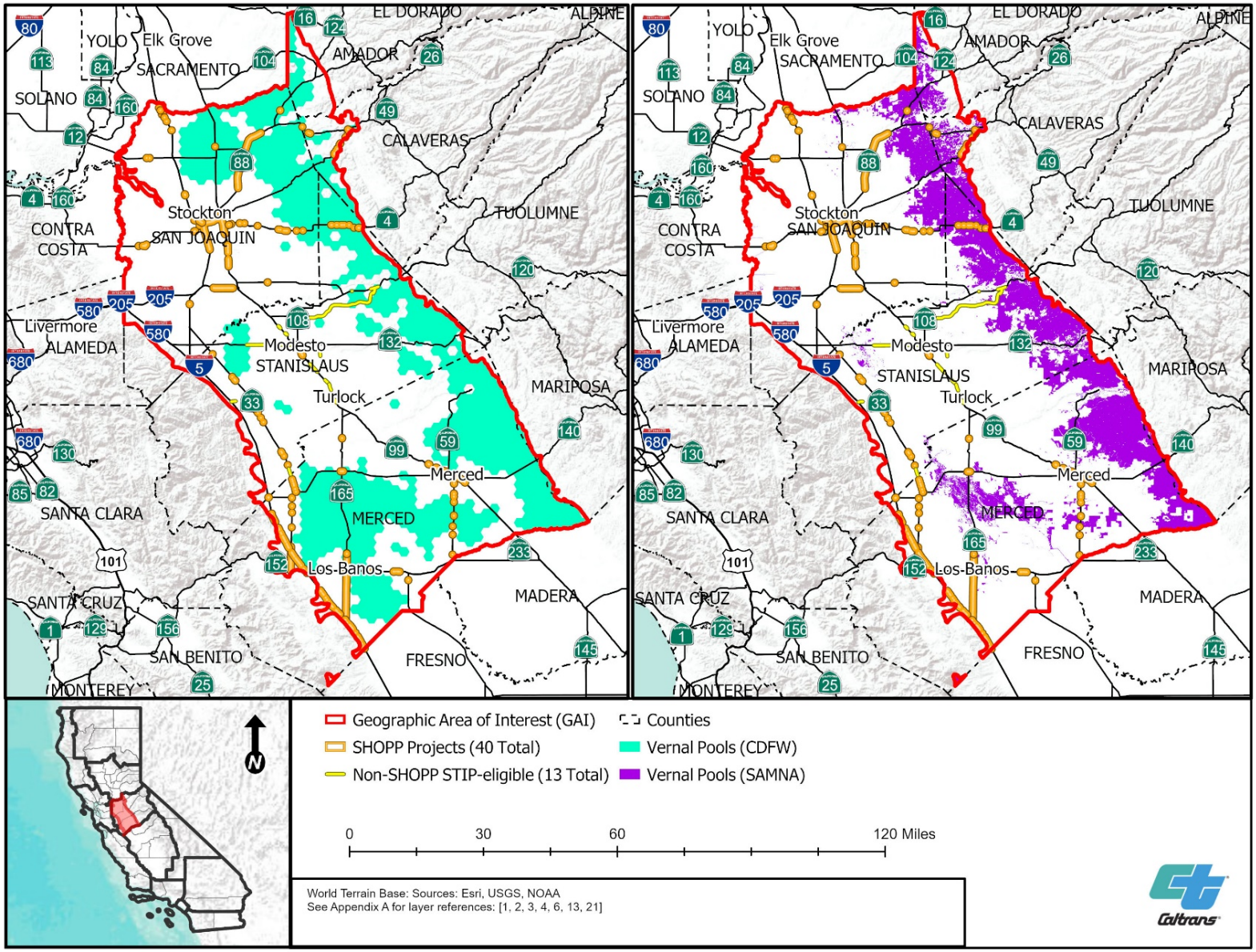


Table 2-6. Wetland and Non-Wetland Water Types in the GAI

Type	Fresno River (acres) 18040007	Lower San Joaquin River (acres) 18040002	Middle San Joaquin-Lower Chowchilla (acres) 18040001	Rock Creek-French Camp Slough (acres) 18040051	San Joaquin Delta (acres) 18040003	Upper Calaveras California (acres) 18040011	Upper Cosumnes (acres) 18040013	Upper Merced (acres) 18040008	Upper Mokelumne (acres) 18040012	Upper Stanislaus (acres) 18040010	Upper Tuolumne (acres) 18040009	Total (acres)
Delta wetlands	Not mapped	Not mapped	Not mapped	Not mapped	396.46	Not mapped	Not mapped	Not mapped	14,129.10	Not mapped	Not mapped	**14,525.56**
Depressional	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	0.05	Not mapped	44.44	Not mapped	Not mapped	**44.50**
Depressional Forested	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	34.96	Not mapped	Not mapped	**34.96**
Depressional Perennial Natural Emergent	Not mapped	<0.01	1.25	Not mapped	5.78	<0.01	Not mapped	Not mapped	Not mapped	<0.01	<0.01	**7.03**
Depressional Perennial Natural Non-Vegetated	Not mapped	<0.01	<0.01	Not mapped	<0.01	Not mapped	<0.01	Not mapped	<0.01	<0.01	Not mapped	**0.01**
Depressional Perennial Natural Vegetated	Not mapped	Not mapped	<0.01	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	0.27	<0.01	Not mapped	**0.27**
Depressional Perennial Non-Vegetated	Not mapped	Not mapped	80.57	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	**80.57**
Depressional Perennial Unnatural Emergent	Not mapped	<0.01	1.91	<0.01	<0.01	<0.01	Not mapped	<0.01	0.07	<0.01	Not mapped	**1.97**
Depressional Perennial Unnatural Non-vegetated	<0.01	<0.01	1.10	<0.01	<0.01	<0.01	0.11	<0.01	0.81	<0.01	<0.01	**2.03**
Depressional Perennial Unnatural Shrub-Scrub	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	<0.01	**<0.01**
Depressional Perennial Unnatural Vegetated	Not mapped	<0.01	<0.01	<0.01	<0.01	Not mapped	Not mapped	<0.01	0.30	<0.01	Not mapped	**0.30**
Depressional Seasonal	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	4.21	Not mapped	1.44	Not mapped	Not mapped	**5.65**
Depressional Seasonal Natural Emergent	56.72	<0.01	7.51	0.15	7.33	<0.01	80.07	<0.01	7.28	<0.01	<0.01	**159.06**
Depressional Seasonal Natural Forested	Not mapped	<0.01	0.99	<0.01	2.55	<0.01	Not mapped	<0.01	62.39	<0.01	<0.01	**65.93**
Depressional Seasonal Natural Non-Vegetated	Not mapped	<0.01	<0.01	<0.01	<0.01	Not mapped	Not mapped	Not mapped	Not mapped	<0.01	<0.01	**0.001**
Depressional Seasonal Natural Shrub-Scrub	<0.01	<0.01	13.86	<0.01	19.51	Not mapped	<0.01	<0.01	3.78	<0.01	<0.01	**37.16**
Depressional Seasonal Unnatural Emergent	Not mapped	<0.01	16.74	<0.01	<0.01	<0.01	Not mapped	<0.01	<0.01	<0.01	<0.01	**16.74**
Depressional Seasonal Unnatural Forested	Not mapped	<0.01	0.75	Not mapped	<0.01	Not mapped	Not mapped	<0.01	Not mapped	Not mapped	<0.01	**0.75**
Depressional Seasonal Unnatural Non-vegetated	Not mapped	<0.01	0.23	<0.01	<0.01	<0.01	Not mapped	<0.01	<0.01	<0.01	<0.01	**0.24**

Type	Fresno River (acres) 18040007	Lower San Joaquin River (acres) 18040002	Middle San Joaquin-Lower Chowchilla (acres) 18040001	Rock Creek-French Camp Slough (acres) 18040051	San Joaquin Delta (acres) 18040003	Upper Calaveras California (acres) 18040011	Upper Cosumnes (acres) 18040013	Upper Merced (acres) 18040008	Upper Mokelumne (acres) 18040012	Upper Stanislaus (acres) 18040010	Upper Tuolumne (acres) 18040009	Total (acres)
Depressional Seasonal Unnatural Shrub-Scrub	Not mapped	<0.01	0.05	Not mapped	Not mapped	<0.01	Not mapped	<0.01	0.57	<0.01	<0.01	**0.63**
Depressional Unnatural Non-vegetated	Not mapped	Not mapped	Not mapped	<0.01	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	**<0.01**
Freshwater Emergent Wetland	16.07	1,530.48	84,253.36	1,007.84	3,241.34	474.96	185.09	1,042.00	1,997.18	1,928.03	15,473.03	**111,149.38**
Freshwater Forested/ Shrub Wetland	11.74	2,946.73	7,042.56	176.80	2,692.19	153.37	17.02	2,267.10	2,578.32	800.40	1,257.42	**19,943.66**
Freshwater Pond	2.60	1,221.52	4,548.48	522.89	1,453.57	327.25	69.62	588.06	1,044.59	697.61	733.93	**11,210.11**
Individual Vernal Pool	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	10.06	Not mapped	Not mapped	Not mapped	Not mapped	**10.06**
Lacustrine	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	20.27	Not mapped	Not mapped	**20.27**
Lacustrine Natural Non-vegetated	Not mapped	Not mapped	Not mapped	Not mapped	188.98	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	Not mapped	**188.98**
Lacustrine Unnatural Non-vegetated	Not mapped	<0.01	<0.01	<0.01	<0.01	<0.01	Not mapped	Not mapped	<0.01	<0.01	<0.01	**0.003**
Lake	Not mapped	4,332.41	5,008.75	1,984.33	2,214.55	133.01	Not mapped	259.46	7,111.18	112.27	2,330.08	**23,486.04**
Other	Not mapped	Not mapped	Not mapped	Not mapped	133,334.69	7.61	Not mapped	Not mapped	28,441.25	Not mapped	Not mapped	**161,783.55**
Riverine	6.07	3,858.83	9,790.22	2,097.60	6,100.83	745.15	78.00	1,554.21	1,620.48	1,424.20	2,605.05	**29,880.64**
Riverine Tidal Low Gradient	Not mapped	Not mapped	Not mapped	53.20	6,929.17	Not mapped	Not mapped	Not mapped	1,526.71	Not mapped	Not mapped	**8,509.09**
Total[a]	**93**	**13,890**	**110,768**	**5,843**	**156,190**	**1,841**	**444**	**5,711**	**44,496**	**4,963**	**22,400**	**366,640**

Sources: Caltrans 2021f, 2021g
[a] Rounded to the nearest whole number.

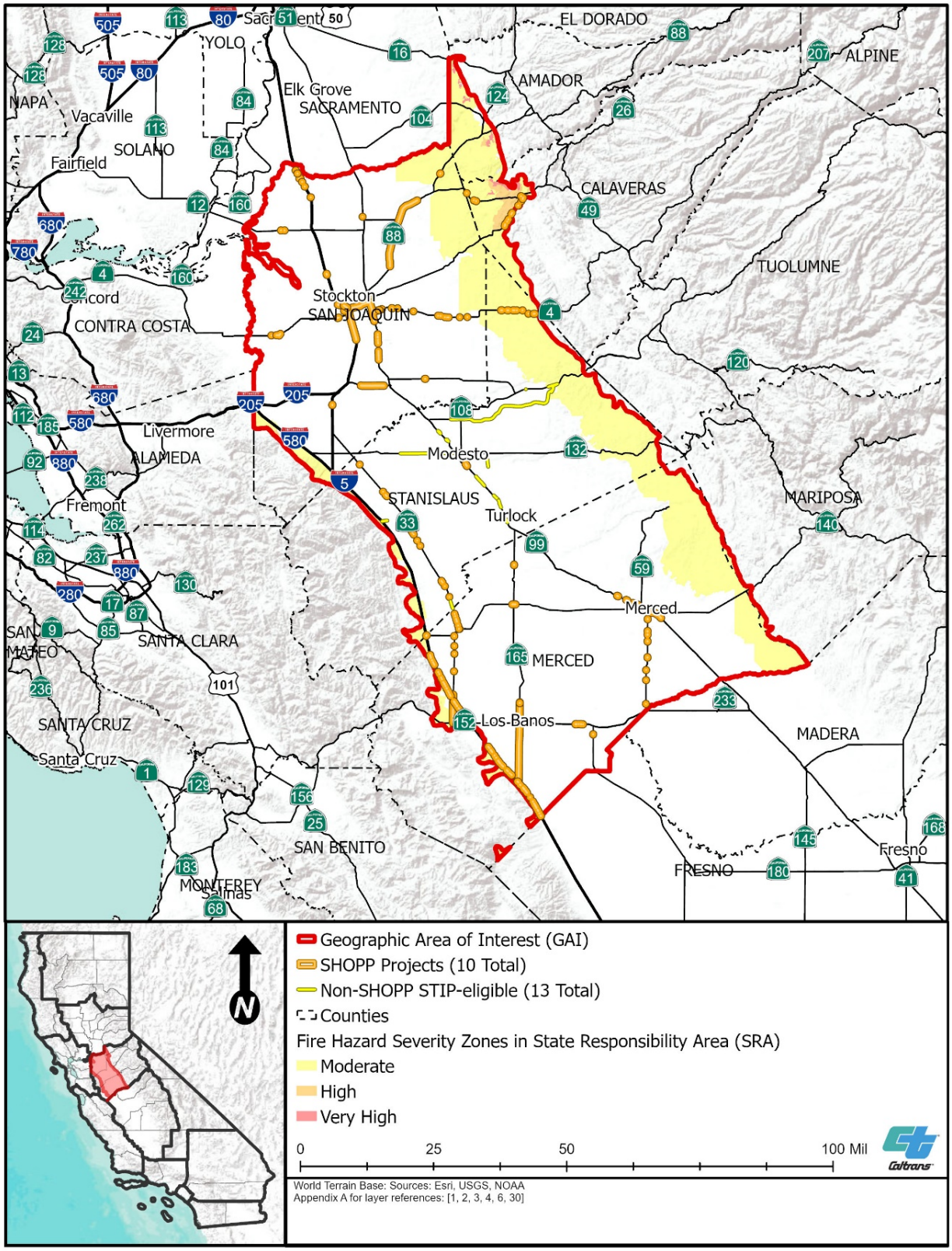
2.16 Riparian Habitat

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 listed in Table 2-2 and include montane riparian and valley foothill riparian.

2.17 Fire Hazard Severity Zones

The California Department of Forestry and Fire Protection prepares Fire Hazard Severity Zone maps that classify the severity of fire hazards in California (Figure 2-14). 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 2-14, high and very high fire hazard severity zones are only found in the far northeastern part of the GAI in the Sierra Nevada. 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 2-14. 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. 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 10 based on the SAMNA results and other information. District 10 specifically identified compensatory mitigation for California red-legged frog, California tiger salamander, giant garter snake, valley elderberry longhorn beetle, Sacramento River winter-run ESU chinook salmon, Central Valley spring-run ESU chinook salmon, Delta smelt, southern DPS green sturgeon, longfin smelt, Central Valley DPS steelhead, Lahontan cutthroat trout, 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
California Fish and Game Commission Wetlands Resources Policy	Updated periodically	No	California Fish and Game Commissions policy to seek to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California.	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	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.	https://www.waterboards.ca.gov/water_issues/hot_topics/strategic_plan/docs/2010/final_strategic_plan_update_report_062310.pdf	6/1/2010
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 Section 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)
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.legislature.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 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	Implemented by the SWRCB. 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 FGC § 1602	Updated periodically (by California legislature)	No	Implemented by CDFW. Regulates activities that may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. 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 Central Valley Region	Updated periodically	Yes	Implemented by Central Valley RWQCB. Establishes general and site-specific water quality standards and objectives in the Sacramento River Basin.	https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/#basinplans	5/24/2018 (last revision)

Title	Status	Spatial Data	Reference Purpose	Link	Date
Water Quality Control Plan for the Tulare Lake Basin	Updated periodically	Yes	Implemented by Central Valley RWQCB. Establishes general and site-specific water quality standards and objectives in the Tulare Lake Basin.	https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/#basinplans	5/1/2018 (last revision)
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 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/utils/getfile/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: ▪ owned by a state, city, town, village, or other public entity that discharges to WOTUS; ▪ 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)

Title	Status	Spatial Data	Reference Purpose	Link	Date
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
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)
Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change	Updated periodically	No	FWS document that 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/wp-content/uploads/cct/2015/03/CCStrategicPlan.pdf	9/1/2010
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 water body. 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 United States.	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
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)
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
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

Title	Status	Spatial Data	Reference Purpose	Link	Date
California Watershed Assessment Manual Volume I	Final	No	Provides guidance for conducting a watershed assessment in California.	http://www.cwam.ucdavis.edu/Manual_chapters.htm	5/1/2005
California Wildlife Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region	Final	Yes	CDFW's priority wildlife movement barriers across the state. This document is focused on large wild mammal game species; however, some priorities would benefit special-status species such as bighorn sheep.	http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178511	3/1/2020
Caltrans Adaptation Strategies Report: District 10	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 10 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	11/21/2019
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_Huijser-and-Begley-FINAL-Report-Caltrans-Statewide-20190913-reduced-image-size.pdf	9/13/2019
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
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 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 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

Title	Status	Spatial Data	Reference Purpose	Link	Date
Special-status Taxa[a] Documents	See below	See below	See below	See below	See below
Recovery Plan for the California Red-legged Frog	Final	Yes	FWS' recovery plan for California red-legged frog. The recovery criteria that must be achieved before delisting can occur are: ▪ All suitable habitats in Core Areas (none of which 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
California Red-legged Frog Designation of Critical Habitat	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
Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog	Final	No	FWS' protocol for conducting surveys for the California red-legged frog.	https://ipac.ecosphere.fws.gov/guideline/survey/population/205/office/11420.pdf	8/1/2005
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 6 were for projects in the GAI.	https://ecos.fws.gov/ecp/species/2891	8/17/2021 (latest document)
Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)	Final	Yes	FWS' recovery plan for the population of California tiger salamander occurring in the GAI. The recovery criteria are: ▪ Provide a sufficient number of habitat preserves, of sufficient quality, to meet the lifecycle needs of this species. These preserves also need to be free of contaminants and they must have a site-specific management plan. ▪ Show that each preserve has a minimum effective population of 132 individuals for at least 26 years. ▪ Reduce the threat of, and provide early detection of, known pathogens and control other aquatic species that predate on the salamanders. ▪ Show that subpopulations within the DPS are not hybridizing with other salamander species for at least 26 years and that hybrid populations are not within 1.3 miles of these subpopulations. ▪ Show that the issue of mortality from road crossings is being controlled or ameliorated to the point where road crossing is not a threat.	https://ecos.fws.gov/docs/recovery_plan/Signed%20Central%20CTS%20Recovery%20Plan.pdf	6/6/2017
California Tiger Salamander, Central California Distinct Population Segment (*Ambystoma californiense*) 5-year Review: Summary and Evaluation	Updated periodically	Yes	FWS' most recent formal review of the species condition.	https://ecos.fws.gov/docs/five_year_review/doc4466.pdf	12/21/2014
Designation of Critical Habitat for the California Tiger Salamander, Central Population; Final Rule	Final	Yes	FWS' designation of critical habitat for the California tiger salamander central California DPS.	https://www.govinfo.gov/content/pkg/FR-2005-08-23/pdf/05-16234.pdf#page=2	8/23/2005

Title	Status	Spatial Data	Reference Purpose	Link	Date
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 the 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, of which 9 of which were for projects in the GAI.	https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D01T	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 147 documents listed in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	12/23/2021 (latest document)
Recovery Plan for the Giant Garter Snake	Final	Yes	FWS' recovery plan for giant garter snake. The Cosumnes-Mokelumne Basin, Delta Basin, and San Joaquin Basin recovery units occur in the GAI. The plan includes the following requirements for delisting: ▪ Have protected habitat at general locations and acreage amounts detailed in Section D.1.A of the plan. ▪ Eradicate or significantly reduce nonnative water snakes (*Nerodia* sp.), largemouth bass (*Micropterus salmoides*), catfish, crayfish, and nonnative bullfrogs throughout the historic range of giant garter snake.	https://ecos.fws.gov/ecp/species/4482	9/28/2017
Giant Garter Snake 5-Year Review	Periodically updated	Yes	FWS' most recent 5-year review of this species.	https://ecos.fws.gov/ecp/species/4482	6/10/2020 (last updated)
Giant Garter Snake Designation of Critical Habitat	Not applicable	No	Critical habitat has not been designated for this species.	https://ecos.fws.gov/ecp/species/4482	Not applicable
Giant Garter Snake Biological Opinions	Periodically updated	No	FWS' list of the 68 most recent biological opinions that have been used for giant garter snake, of which 12 were for projects in the GAI.	https://ecos.fws.gov/ecp/species/4482	9/13/2021 (latest document)
Programmatic Consultation with the U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California. Appendix A Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat	Final	No	FWS' guidelines for restoration and replacement of habitat for giant garter snake.	https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/Documents/ggs%20appendix%20a.pdf	Unknown (document has no date and parent link is undated)
California Wildlife Habitat Relationships System, Giant Garter Snake	Periodically updated	No	CDFW's formal summary of ecological and biological information about giant garter snake.	https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3457&inline=1	11/1/2014 (last updated)
Incidental Take Permits for Giant Garter Snake	Periodically updated	No	CDFW's list of incidental take permits issued for giant garter snake from its publicly available document search website. There are 36 documents listed in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	6/22/2021 (latest document)

Title	Status	Spatial Data	Reference Purpose	Link	Date
Recovery Plan for the Valley Elderberry Longhorn Beetle	Final	Yes	FWS' recovery plan for valley elderberry longhorn beetle. The San Joaquin River management unit for the valley elderberry longhorn beetle occur in the GAI and six of the HUC-8s of the GAI are included in a management unit of the plan. Includes the following requirements for delisting: ▪ Maintain occupancy in at least 80% of the HUC-8s that occur in the management units. ▪ Protect and manage a system of connected habitat patches along each river or major drainage in each HUC-8, at least two of which need to show long-term population viability and be able to survive precipitation extremes. The number and location of patches are detailed in Table 1 of the document. ▪ Control or eradicate Argentine ants in each mitigation bank that supports valley elderberry longhorn beetle.	https://ecos.fws.gov/ecp/species/7850	10/4/2019 (recently revised)
Valley Elderberry Longhorn Beetle 5-Year Review	Periodically updated	Yes	FWS' most recent 5-year review of this species.	https://ecos.fws.gov/ecp/species/7850	9/26/2006
Valley Elderberry Longhorn Beetle Designation of Critical Habitat	Final	Yes	FWS' document describing critical habitat for this species.	https://ecos.fws.gov/ecp/species/7850	8/8/1980
Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle	Final	No	FWS' document to assess impacts on valley elderberry longhorn beetle and direction on how to survey for the species.	https://www.fws.gov/media/framework-assessing-impacts-valley-elderberry-longhorn-beetle	5/1/2017
Valley Elderberry Longhorn Beetle Biological Opinions	Periodically updated	No	FWS' list of the 73 most recent biological opinions that have been used for valley elderberry longhorn beetle, of which 19 were for projects in the GAI.	https://ecos.fws.gov/ecp/species/7850	8/2/2021 (latest document)
Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and the DPS of California Central Valley Steelhead	Final	Yes	NMFS' recovery plan for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and California Central Valley steelhead. The recovery criteria that must be achieved before delisting can occur are based on a complex formula of population levels in different diversity groups, as explained in detail in Section 4.0 of the recovery plan.	https://www.fisheries.noaa.gov/resource/document/recovery-plan-evolutionarily-significant-units-sacramento-river-winter-run	7/1/2014
Central Valley Spring-run ESU Chinook Salmon 5-Year Review	Updated periodically	Yes	NMFS' most recent formal review of the species' ESU condition.	https://www.fisheries.noaa.gov/resource/document/5-year-review-summary-and-evaluation-central-valley-spring-run-chinook-salmon	4/13/2016
Critical Habitat Designation for Central Valley Spring-run ESU Chinook Salmon	Final	No	NMFS' designation of critical habitat for this ESU of Chinook salmon.	https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/central-valley-spring-run-chinook-salmon	9/2/2005
A Status Review of the Spring-run Chinook Salmon (*Oncorhyncus tshawytscha*) in the Sacramento River Drainage	Final	No	CDFW's formal review of the species' ESU condition.	https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3518&inline	6/1/1998
5-Year Status Review: Summary and Evaluation of Sacramento River Winter-run Chinook Salmon ESU	Updated periodically	Yes	NMFS' most recent formal review of the species' ESU condition.	https://www.fisheries.noaa.gov/resource/document/5-year-status-review-summary-and-evaluation-sacramento-river-winter-run-chinook	12/12/2016
Critical Habitat Designation for Sacramento River Winter-run ESU	Final	No	NMFS' designation of critical habitat for this ESU of Chinook salmon.	https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/sacramento-river-winter-run-chinook-salmon	6/16/1993

Title	Status	Spatial Data	Reference Purpose	Link	Date
Chinook Salmon Biological Opinions	Updated periodically	No	NMFS' list of the most recent biological opinions that have been issued for Chinook salmon.	https://repository.library.noaa.gov/	5/17/2021 (latest document)
Incidental Take Permits for Chinook Salmon	Periodically updated	No	CDFW's list of incidental take permits issued for Chinook salmon from its publicly available document search website. There are 33 documents listed in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	8/4/2020 (latest document)
Central Valley Recovery Domain 5-Year Review: Summary and Evaluation California Central Valley Steelhead Distinct Population Segment	Updated periodically	Yes	NMFS' most recent formal review of the species' DPS condition.	https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/california-central-valley-steelhead	5/5/2016
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	NMFS' list of the most recent biological opinions for steelhead.	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 Central Valley management area covers the GAI. This plan includes stream-specific recommendations pertaining to the San Joaquin River and its tributaries.	https://www.google.com/url?client=internal-element-cse&cx=003744124407919529812:v2-t3gqht48&q=https://nrm.dfg.ca.gov/FileHandler.ashx%3FDocumentID%3D3490&sa=U&ved=2ahUKEwj1156Uz_fmAhXSHc0KHcG_CfY4ChAWMAB6BAgGEAE&usg=AOvVaw1GUboKPeGb7OoSOIkc7IH7	2/1/1996
Incidental Take Permits for Steelhead	Periodically updated	No	CDFW's list of incidental take permits issued for Chinook salmon from its publicly available document search website. There are 5 documents listed in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	11/23/2021 (latest document)
Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes	Final	Yes	FWS' recovery plan for Delta smelt. The recovery criteria that must be achieved before delisting can occur are: ▪ Catching Delta smelt in all recovery zones for 2 out of 5 years, in at least two zones in one of the remaining 3 years, and at least one zone for the remaining 2 years. ▪ Delta smelt numbers of total catch must equal or exceed 239 for 2 of 5 years, and not fall below 84 for more than 2 years in a row. These criteria can be achieved independently but must be based on data collected by CDFW during the Fall Midwater Trawl Survey in September and October.	https://ecos.fws.gov/ecp/species/321	11/26/1996
Delta Smelt 5-Year Review	Updated periodically	Yes	FWS' most recent formal review of the species condition.	https://ecos.fws.gov/ecp/species/321	9/13/2010
Critical Habitat Designation for Delta Smelt	Final	Yes	FWS' designation of critical habitat for this species.	https://ecos.fws.gov/ecp/species/321	12/19/1994
Delta Smelt Biological Opinions	Updated periodically	No	A total of 44 biological opinions have been issued for Delta smelt since 2012. Three of these have been issued for a project in the GAI.	https://ecos.fws.gov/ecp/species/321	12/13/2021 (latest document)
Delta Smelt Resiliency Strategy	Final	No	CDFW's management plan to improve the condition of Delta smelt.	https://wildlife.ca.gov/Conservation/Fishes/Delta-Smelt	7/1/2016
Incidental Take Permits for Delta Smelt	Periodically updated	No	CDFW's list of incidental take permits issued for Delta smelt from its publicly available document search website. There are 18 documents listed in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	8/4/2020 (latest document)

Title	Status	Spatial Data	Reference Purpose	Link	Date
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: ▪ 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
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	*Federal Register* 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 (*Spirinchus thaleichthys*) 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	Periodically updated	No	CDFW's list of incidental take permits issued for Delta smelt from its publicly available document search website. There are 20 documents listed in the search.	https://nrm.dfg.ca.gov/documents/docviewer.aspx	8/4/2020 (latest document)
Final Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon	Final	No	NMFS' recovery plan for the southern DPS of green sturgeon. The recovery criteria that must be achieved before delisting can occur are: ▪ 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://repository.library.noaa.gov/view/noaa/18695	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 most recent biological opinions that have been used for green sturgeon.	https://repository.library.noaa.gov/	7/13/2021 (latest document)

Title	Status	Spatial Data	Reference Purpose	Link	Date
Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon	Final	Yes	FWS recovery plan for vernal pool species in California and Oregon, which includes 25 plants, 7 invertebrates, and 1 amphibian, for a total of 33 species. In general, recovery criteria center on habitat protection and adaptive habitat management, which includes developing management plans, conducting status surveys, finding populations to be at least maintaining their population if not increasing, conducting research, and having additional public outreach and participation. Some species-specific criteria exist, such as seed banking for plants and preferential transition from intensive agriculture to grazing near western spadefoot toad conservation areas. Sixteen regions are identified in this plan, along with 41 core areas.	https://www.fws.gov/sacramento/es/Recovery-Planning/Vernal-Pool/	12/15/2005
State Land Management Plans	See below	See below	See below	See below	See below
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
San Luis Reservoir State Recreation Area Final Resource Management Plan/General Plan	Final	No	California Department of Parks and Recreation and Bureau of Reclamation's management plan for the recreation area. California tiger salamander was known to historically occur in the recreation area. The plan includes goals for habitat restoration and invasive plant removal.	https://www.parks.ca.gov/?page_id=21299	6/1/2013
FWS Land Management Plans	See below	See below	See below	See below	See below
San Luis National Wildlife Refuge, Merced National Wildlife Refuge, and Grasslands Wildlife Management Area Comprehensive Conservation Plan	In progress	Unknown	FWS' management plan for the San Luis National Wildlife Refuge, Merced National Wildlife Refuge, and Grasslands Wildlife Management Area. Document is in internal review and not available to the public. All three FWS entities occur in the GAI.	https://www.fws.gov/Refuge/Merced/what_we_do/conservation.html	In progress (last update in 9/2008)
San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan	Final	Yes	FWS' management plan for the refuge. Includes goals for aquatic habitat restoration and enhancement, as well as the removal of nonnative species from the refuge, including giant reed, perennial pepperweed, and tamarisk.	https://www.fws.gov/Refuge/San_Joaquin_River/what_we_do/conservation.html	9/29/2006
National Oceanic and Atmospheric Administration Management Plans	See below	See below	See below	See below	See below
Pacific Coast Salmon Fishery Management Plan	Final	Yes	A management plan for Pacific coast fisheries, which include fisheries in the GAI that lead to the Pacific Ocean. This plan includes information about essential fish habitat and a goal to restore essential fish habitat.	https://www.pcouncil.org/fishery-management-plan-and-amendments-3/	9/1/2021
U.S. Military Land Management Plans	See below	See below	See below	See below	See below
Not applicable	Not applicable	Not applicable	No active military facilities with a land management plan occur in the GAI.	Not applicable	Not applicable
U.S. Bureau of Indian Affairs Land Management Plans	See below	See below	See below	See below	See below
Not applicable	Not applicable	Not applicable	No federally recognized tribes occur in the GAI.	Not applicable	Not applicable
USFS Land Management Plans	See below	See below	See below	See below	See below
Not applicable	Not applicable	Not applicable	No USFS lands occur in the GAI.	Not applicable	Not applicable

Title	Status	Spatial Data	Reference Purpose	Link	Date
BLM Land Management Plans	See below	See below	See below	See below	See below
Resource Management Plan for the Southern Diablo Mountain Range & Central Coast of California	Final	Yes	BLM's management plan for the Southern Diablo Mountain Range and Central Coast. No Areas of Critical Environmental Concern occur in the GAI.	https://eplanning.blm.gov/epl-front-office/eplanning/legacyProjectSite.do?methodName=renderLegacyProjectSite&projectId=68795	9/7/2007
National Park Service ("NPS") Land Management Plans	See below	See below	See below	See below	See below
Nationwide Rivers Inventory	Final	Yes	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 occur in the GAI.	https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm	12/21/2017
Local Government Land Management Plans	See below	See below	See below	See below	See below
San Joaquin River Parkway Master Plan	Final	Yes	San Joaquin River Conservancy's master plan for the San Joaquin River Parkway. The Conservancy is a regionally governed agency associated with the State of California.	http://sjrc.ca.gov/	7/20/2000
San Joaquin River Parkway Master Plan Update	Draft	Yes	San Joaquin River Conservancy's updated master plan and environmental impact report for the San Joaquin River Parkway. Includes specific management goals to designate at least three areas of 100 acres each for conservation. For the portion of the San Joaquin River that this plan covers, it recommends that management and conservation actions result in a continuous corridor that is at least 200 feet wide with no more than 200 feet of protected gaps.	http://sjrc.ca.gov/Parkway-Master-Plan-Update/	1/1/2017
Water Resources Plans and Documents	See below	See below	See below	See below	See below
Central Valley Flood Protection Plan 2022 Update	Updated periodically (every 5 years)	Yes	California Department of Water Resources' plan to reduce flood risk in the Central Valley. Includes goals to use levee setbacks to provide habitat restoration in addition to flood protection, and to increase participation in the Central Valley Habitat Exchange to purchase land from farmers in flood zones and restore them to a natural ecosystem.	https://water.ca.gov/Programs/Flood-Management/Flood-Planning-and-Studies/Conservation-Strategy	12/1/2021
Central Valley Project Integrated Resource Plan Final Report	Final	Yes	U.S. Bureau of Reclamation's plan for the water supply of the Central Valley.	https://www.usbr.gov/mp/ssjbasinstudy/docs.html	11/1/2014
Eastern San Joaquin Integrated Region Water Management Plan	Periodically updated	No	Northeastern San Joaquin County Groundwater Banking Authority's plan for management of water resources in the plan area, which includes most of San Joaquin County.	http://www.esjirwm.org/IRWMP/2014-IRWMP	6/5/2014 (last updated)
East Stanislaus Integrated Region Water Management Plan	Periodically updated	No	East Stanislaus Regional Water Management Partnerships plan for management of water resources in the plan area, which includes the central portion of the GAI. The plan includes goals for native habitat restoration, groundwater replenishment, water quality improvement, and flood risk reduction.	http://www.eaststanirwm.org/documents/	2/1/2018 (last updated)
2018 Merced Integrated Regional Water Management Plan Update	Periodically updated	No	Merced Integrated Regional Water Management Authority's plan for management of water resources in Merced County. The plan includes goals for native habitat restoration, groundwater replenishment, water quality improvement, and flood risk reduction.	https://mercedirwmp.org/documents.html	2/1/2019 (last updated)

Title	Status	Spatial Data	Reference Purpose	Link	Date
San Joaquin River Restoration Program	Updated periodically	No	Implemented jointly by CDFW, California Department of Water Resources, Bureau of Reclamation, FWS, and NMFS as a result of the San Joaquin River Litigation Settlement, which is implemented under the San Joaquin River Restoration Settlement Act. The settlement is based on two goals: to restore and maintain fish populations in good condition in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, and to reduce or avoid water supply impacts on the Friant Division long-term contractors.	http://www.restoresjr.net/	3/30/2009 (date of the San Joaquin River Restoration Settlement Act)
TMDL Action Plans	Updated periodically	No	SWRCB and Central Valley RWQCB's list of TMDL action plans for the Central Valley and Tulare Lake Regions. In the GAI, TMDL action plans exist for water bodies within the Stockton city limits.	https://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/	5/6/2021 (last updated)
2019 Westside-San Joaquin Integrated Region Water Management Plan	Periodically updated	No	San Luis & Delta-Mendota Water Authority's plan for management of water resources in the plan area, which includes the southwestern portion of the GAI. The plan includes goals for native habitat restoration, groundwater replenishment, water quality improvement, and flood risk reduction.	https://sldmwa.org/integrated-regional-water-management-plan/	1/1/2019 (last updated)
County General Plans	See below	See below	See below	See below	See below
Amador County General Plan	Updated periodically	Yes	General plan for Amador County. Includes land use designations of open recreation, general forest, open forest, and open wilderness. Only open forest and open wilderness categorically exclude development.	https://www.amadorgov.org/departments/planning/general-plan-update-draft-environmental-impact-report-and-draft-general-plan	7/1/2016 (last updated)
Calaveras County General Plan	Updated periodically	Yes	General plan for Calaveras County. Includes a land use designation of resource management.	https://planning.calaverasgov.us/General-Plan	10/13/2020 (last amended)
2030 Merced County General Plan	Updated periodically	Yes	General plan for Merced County. Requires buffers around wetlands and riparian habitat, including an appropriate setback for developed and agricultural uses from the delineated edges of wetlands. Supports the restoration of the San Joaquin and Merced Rivers. Includes a land use designation for foothill pasture and open space.	https://www.co.merced.ca.us/100/General-Plan	7/12/2016 (last amended)
San Joaquin County General Plan	Updated periodically	Yes	General plan for San Joaquin County. Requires natural open space buffers along natural waterways. Includes a land use designation for resource conservation.	https://www.sjgov.org/commdev/cgi-bin/cdyn.exe?grp=planning&htm=gp2035	12/1/2016
Stanislaus County General Plan	Updated periodically	No	General plan for Stanislaus County. Requires mitigation for impacts on riparian habitat, vernal pools, and other sensitive areas.	http://www.stancounty.com/planning/pl/general-plan.shtm	8/21/2016
City General Plans	See below	See below	See below	See below	See below
City of Atwater General Plan	Final	Yes	General plan for Atwater. Does not include a land use designation for conservation.	https://www.atwater.org/community-development/	7/24/2000
Ceres General Plan 2035	Updated periodically	Yes	General plan for Ceres. Prohibits development in a 50-foot buffer from the limit of riparian vegetation or as measured from the top of the channel bank. Does not include a land use designation for conservation.	https://www.ci.ceres.ca.us/197/General-Plan	5/14/2018
Escalon General Plan	Updated periodically	No	General plan for Escalon. Does not include a land use designation for conservation.	http://escalon.hosted.civiclive.com/government/departments/development_services/planning/general_plan	10/18/2010 (last updated)
2030 Galt General Plan	Updated periodically	No	General plan for Galt. Contains policies supporting the restoration and expansion of wetland and riparian plant communities. Contains a land use designation for open space.	https://www.ci.galt.ca.us/city-departments/planning/general-plan	4/1/2009
City of Gustine General Plan	Final	No	General plan for Gustine. Contains a land use designation for greenway.	https://www.cityofgustine.com/documentlist.aspx?categoryid=12762	2/4/2002

Title	Status	Spatial Data	Reference Purpose	Link	Date
Hughson General Plan	Final	Yes	General plan for Hughson. Requires that new development avoid suitable habitat for Valley elderberry longhorn beetle and provide adequate mitigation for development within 100 feet of elderberry shrubs. Contains a land use designation for open space.	http://hughson.org/our-government/city-departments/community-development/planning/	12/12/2005
Comprehensive General Plan for the City of Lathrop, California	Updated periodically	Yes	General plan for Lathrop. Contains land use designations for open space and resource conservation, including one for open space river/Levee Park.	https://www.ci.lathrop.ca.us/planning/page/lathrop-general-plan-document	11/9/2004 (last amended)
Livingston General Plan	In progress	No	General plan for Livingston. Contains a land use designation for park/open space.	https://www.cityoflivingston.org/commdev/page/1999-general-plan-environmental-impact-report	12/1/1999
Lodi General Plan	Updated periodically	Yes	General plan for Lodi. Supports the restoration and expansion of wetland and riparian plant communities along the Mokelumne River for groundwater recharge and wildlife habitat. Contains a land use designation for open space.	https://www.lodi.gov/191/Plan-Documents	4/7/2010
City of Los Banos 2030 General Plan Update	In progress	No	General plan for Los Banos. Giant garter snakes are known to occur in the city. Includes implementing actions that establish and maintain a protection zone around wetlands, riparian corridors, and identified habitat areas where development shall not occur. Contains a land use designation for parks, trails, and open space.	https://losbanos2040.org/documents/	7/15/2009
Manteca General Plan Update	Draft	Yes	General plan for Manteca. Contains land use designations for open spaces and parks.	https://manteca.generalplan.org/content/documents	3/1/2021
Merced Vision 2030 General Plan	Updated periodically	Yes	General plan for Merced. California tiger salamander and giant garter snake are known to occur in the city. Requires a 50-foot buffer from the centerline of all creeks to be maintained as open space. Promotes the enhancement of Bear, Black Rascal, Cottonwood, and Fahrens Creeks. Contains a land use designation for open space.	https://www.cityofmerced.org/departments/development-services/planning-division/merced-vision-2030-general-plan	5/1/2017 (last amended)
City of Modesto General Plan	Updated periodically	Yes	General plan for Modesto. Contains a land use designation for open space.	https://www.modestogov.com/2069/General-Plan	3/5/2019
Newman 2030 General Plan	Updated periodically	Yes	General plan for Newman. Requires mitigation for any development within 100 feet of elderberry shrubs. Contains a land use designation for recreation and parks.	http://www.cityofnewman.com/departments/community-development/e-docs.html	4/10/2007
Oakdale 2030 General Plan	Updated periodically	Yes	General plan for Oakdale. Requires buffers between sensitive biological resources and adjacent urban uses. Contains a land use designation for open space.	https://www.oakdalegov.com/planning-division	9/8/2013
City of Patterson 2010 General Plan	Updated periodically	Yes	General plan for Patterson. Contains a land use designation for open space.	https://www.ci.patterson.ca.us/145/General-PlanCity-Maps	11/30/2010
City of Ripon General Plan	Updated periodically	Yes	General plan for Ripon. Valley elderberry longhorn beetle is known to occur in the city. Prohibits development in the riparian area associated with the Stanislaus River. Contains a land use designation for open space and resource reserve.	http://www.cityofripon.org/city_hall/city_government/forms_and_documents	10/10/2017 (last amended)
City of Riverbank General Plan 2005–2025	Updated periodically	Yes	General plan for Riverbank. Requires an open space buffer along the Stanislaus River and associated riparian areas. Contains land use designations for buffer/greenway/open spaces.	https://www.riverbank.org/194/General-Plan-Update	2/24/2014 (last amended)
Envision Stockton 2040 General Plan	Updated periodically	Yes	General plan for Stockton. Contains a land use designation for open space/agriculture.	http://www.stocktongov.com/government/departments/communityDevelop/cdPlanGenDocs.html	12/4/2018
City of Tracy General Plan	Updated periodically	Yes	General plan for Tracy. Contains a land use designation for park and open space.	https://www.cityoftracy.org/our-city/departments/planning/general-plan-zoning-ordinance	2/1/2011

Title	Status	Spatial Data	Reference Purpose	Link	Date
Turlock General Plan	Updated periodically	Yes	General plan for Turlock. Contains a land use designation for parks and urban reserves.	https://www.cityofturlock.org/buildinginturlock/planninglandusepermitting/generalplan/	9/1/2012
Waterford Vision 2025 General Plan	Updated periodically	Yes	General plan for Waterford. Requires a minimum 100-foot setback from the centerline (or 50-foot setback from the normal high-water mark) of Tuolumne River and Dry Creek. Contains a land use designation for parks and open space.	https://www.cityofwaterford.org/planning-department/	6/21/2007
Other Conservation and Management Documents	See below	See below	See below	See below	See below
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
California Riparian Habitat Restoration Handbook	Final	No	Guidelines for riparian habitat restoration in the Central Valley.	https://water.ca.gov/LegacyFiles/urbanstreams/docs/ca_riparian_handbook.pdf	7/1/2009
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 that is tracking wetland conditions statewide.	https://www.sccwrp.org/publications/	4/1/2015
Final Central Valley Salt & Nitrate Management Plan	Final	Yes	Management plan from Central Valley Salts to control the amount of salinity and nitrate levels in the region's water supply.	https://www.cvsalinity.org/docs/central-valley-snmp/final-snmp.html	12/1/2016
Wildlife Connectivity Across the Northern Sierra Nevada Foothills	Final	Yes	Builds on the CEHC project by taking a fine-scale look at connectivity within the Northern Sierra Nevada Forest and between the forest and adjacent lands in the Central Valley and Sierra Nevada.	https://conservationcorridor.org/cpb/Krause_et_al_2015.pdf	1/1/2015

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

4. EXISTING MITIGATION OPPORTUNITIES

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

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; one is a conservation bank under development within Caltrans District 6, with a service area that will extend north into the GAI:

- Bloss Ranch Conservation Bank (working title, in progress)

A contract is in progress for establishing a pending bank in Merced and Mariposa Counties, with a proposed service area covering roughly the area between the cities of Madera, Galt, and Dublin. Table 4-1 provides a brief description and available information.

Table 4-1. Overview of SHOPP-funded Advance Mitigation Projects in the GAI

Name	Year Approved	Signatories[a]	Area (acres)	Service Area	Credit Types
Bloss Ranch Conservation Bank (working title)	In progress	**CDFW**, **FWS**	3,545.663	Proposed within Central California tiger salamander range[b,c]	Caltrans dedicated: 3 aquatic California tiger salamander credits 88 upland California tiger salamander 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).
[b] The proposed service areas align with the existing Southern Sierra Foothills Vernal Pool Region, as identified in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (FWS 2005b); range of Central California tiger salamander, as presented in the *Recovery Plan of the Central California Distinct Population Segment of the California Tiger Salamander, Central Valley Recovery Unit* (FWS 2017b); and the upland species for the San Joaquin Valley as depicted in the *Recovery Plan for Upland Species of the San Joaquin Valley* (FWS 1998).
[c] Approximately between the cities of Madera, Galt, and Dublin

The Bloss Ranch Conservation Bank is intended to supply California tiger salamander conservation credits (3 aquatic acres and 88 terrestrial acres) for use by transportation-related projects to be delivered under Caltrans' SHOPP. Contracted credits are expected to be available starting in 2023 (first release), with contract completion by 2027. Credits generated in excess of the Caltrans contract will be made available by the contractor on

the open market. Additional credit types proposed by the contractor, such as San Joaquin kit fox and vernal pool, and the credit release schedule are pending Interagency Review Team approval. The contractor has submitted a draft prospectus to the Interagency Review Team.

4.2 HCPs and NCCPs

HCPs[1] and NCCPs[2] define covered activities that consist of specific projects and actions that may have adverse effects on covered species and natural communities. The 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 permits) 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 the following active and/or pending HCPs, NCCPs, and HCP/NCCPs in the GAI that apply to transportation-related activities, that Caltrans may be able to use to meet its compensatory mitigation needs, and that may offer Caltrans the opportunity to participate in pre-transfer mitigation purchases, as authorized in SHC § 800.6(a)(2):

- San Joaquin County Multi-Species Habitat Conservation and Open Space Plan

Figure 4-1 depicts the location of the above-listed HCP/NCCP. Table 4-2 summarizes the signatories, status or date of the plan, plan area, participating transportation agency, covered species, and covered natural communities. Multiple project-specific HCPs in the GAI were not included in Table 4-2 because they were determined to not be a viable mitigation option for Caltrans. For example, they applied to a non-Caltrans single user, covered activities that were not road infrastructure-related and could not be adapted to road infrastructure, or did not provide take coverage that would be usable for Caltrans projects.

[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 FGC

Figure 4-1. HCPs and NCCPs

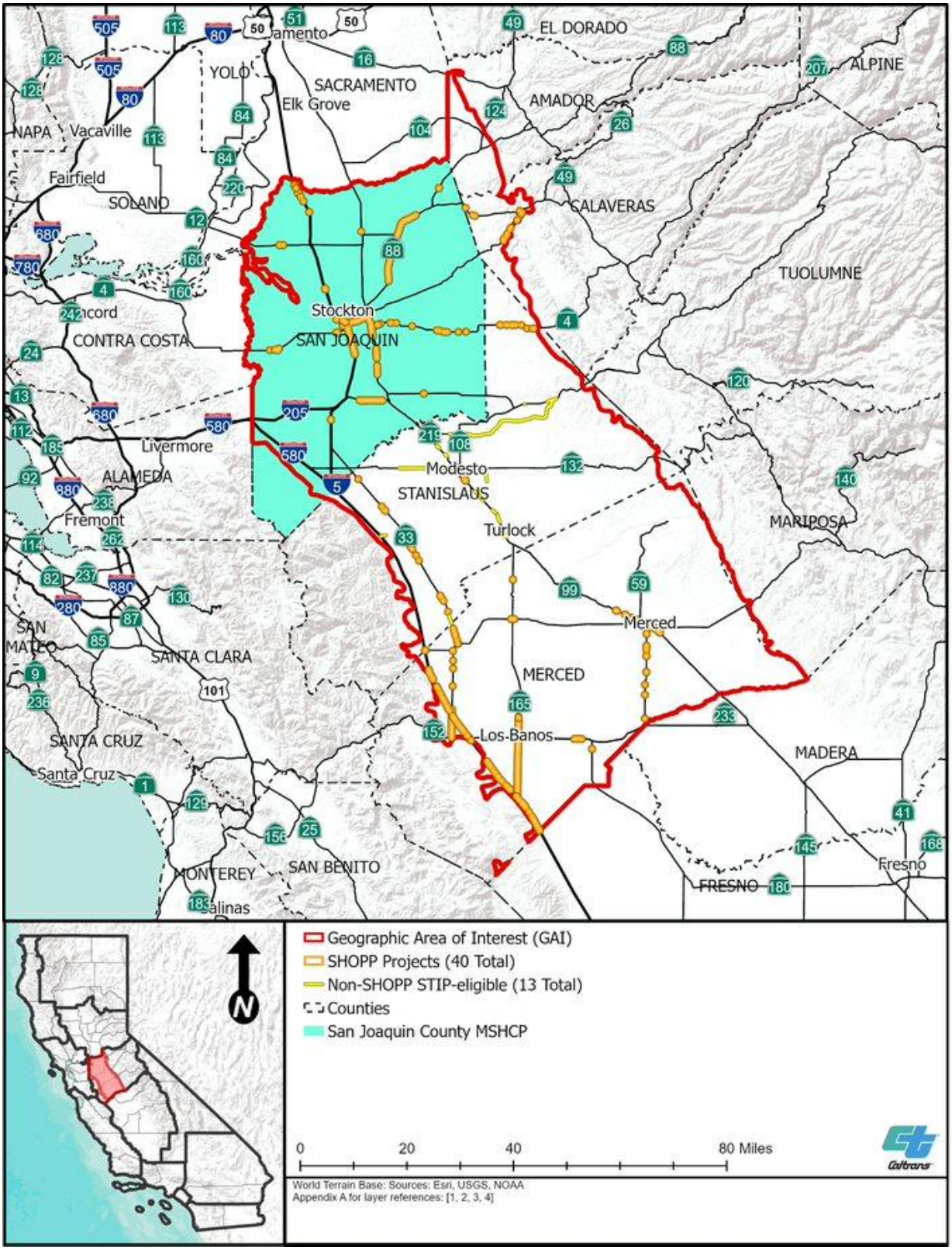


Table 4-2. Overview of HCPs and NCCPs in the GAI[a,b]

Name	Signatories[c]	Date	Area (acres)	Participating Transportation Agencies	Covered Species	Covered Natural Communities
San Joaquin County Multi-Species Habitat Conservation and Open Space Plan	**FWS, CDFW**	2000	900,000+	Caltrans	Valley elderberry longhorn beetle, California red-legged frog, California tiger salamander, giant garter snake, and 65 other wildlife and 27 plant species	Not applicable

[a] Up-to-date information on HCPs and NCCPs can be found at the following websites:
https://ecos.fws.gov/ecp/report/conservation-plans-region-summary?region=8&type=HCP
https://wildlife.ca.gov/conservation/planning/nccp
[b] This table lists HCPs and NCCPs that may be applied to Caltrans' mitigation needs.
[c] 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).

4.3 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 their project's unavoidable natural resource impacts. Conservation banks generally protect threatened and endangered species habitat, while mitigation banks generally protect, restore, create, and/or enhance aquatic resources. The legal document for the establishment, operation, and use of a conservation bank or mitigation bank is a Bank Enabling Instrument ("BEI").

Caltrans identified 35 active or pending conservation and/or mitigation banks with service areas that overlap all or part of the GAI. Information on the agency approvals, the types of credits available, and brief descriptions of each bank are provided in Table 4-3. 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 4-3.

Figures showing conservation and mitigation bank service areas that are publicly available for aquatic resources and the species of mitigation need in the GAI are included in Appendix G.

Table 4-3. Overview of Conservation and Mitigation Banks in the GAI[a]

Name	Year Approved	Current Status	Signatories[b]	Area (acres)	Credit Types
Alkali Sink Conservation Bank	2015	Active – credits available	**FWS, CDFW**	943.43	Swainson's hawk, vernal pool fairy shrimp (sold out), longhorn fairy shrimp, burrowing owl, San Joaquin kit fox
Antonio Mountain Ranch Mitigation Bank	2018	Active – credits available	**FWS, CDFW, Corps**	797.9	Swainson's hawk foraging habitat, tricolored blackbird foraging habitat, vernal pool fairy shrimp, intermittent stream, perennial stream, vernal pools and seasonal wetlands
Big Gun Conservation Bank	2010	Active – credits available	**FWS**	52	California red-legged frog
Bryte Ranch Conservation Bank	2002	Active – credits available	**FWS, CDFW**	589	Swainson's hawk foraging habitat, burrowing owl foraging habitat, vernal pool fairy shrimp, vernal pool tadpole shrimp
Bullock Bend Mitigation Bank	2016	Active – credits available	**FWS, CDFW, Corps, EPA, NMFS**	119.65	Swainson's hawk nesting buffer; Central Valley steelhead; Chinook salmon – Central Valley spring run, fall/late fall run, and winter run; riverine riparian; floodplain riparian
Burke Ranch Conservation Bank	2007	Active – credits available	**FWS, CDFW**	960	California tiger salamander, vernal pool preservation
Clay Station Mitigation Bank	1999	Active – credits available	**FWS, CDFW, Corps**	405	Seasonal wetlands/marsh, vernal pool establishment
Deadman Creek Conservation Bank	2007	Active – credits available	**FWS**	714	California tiger salamander, San Joaquin kit fox, vernal pool fairy shrimp, vernal pool tadpole shrimp
Dolan Ranch Conservation Bank	1999	Active – credits available	**FWS, CDFW**	252	Swainson's hawk, burrowing owl, vernal pool tadpole shrimp, vernal pool fairy shrimp, vernal pool creation, vernal pool preservation—giant garter snake credits sold out
Drayer Ranch Conservation Bank	2005	Active – credits available	**FWS**	254.4	California tiger salamander (sold out), San Joaquin kit fox (sold out), vernal pool preservation

Name	Year Approved	Current Status	Signatories[b]	Area (acres)	Credit Types
Dutchman Creek Conservation Bank	2014	Active – credits available	**FWS, CDFW**	501.23	California tiger salamander, Swainson's hawk (sold out), vernal pool invertebrates, western spadefoot (sold out), burrowing owl (sold out), San Joaquin kit fox (sold out)
Elsie Gridley Mitigation Bank	2006	Active – credits available	**FWS, CDFW, Corps**	1,815	Swainson's hawk, California tiger salamander, burrowing owl, vernal pool species, perennial wetlands, seasonal wetlands, riparian wetlands
Fitzgerald Ranch Conservation Bank	1999	Active – credits available	**FWS**	808	California tiger salamander, vernal pool fairy shrimp
Grasslands Mitigation Bank	2015	Active – credits available	**FWS, CDFW, Corps, EPA**	281	Giant garter snake, seasonal wetland
Great Valley Conservation Bank	2007	Active – credits available	**FWS**	1,067	California tiger salamander, San Joaquin kit fox, vernal pool fairy shrimp, vernal pool tadpole shrimp
Kennedy Table Conservation Bank	2004	Active – credits available	**FWS**	600	Vernal pool fairy shrimp, succulent owl's clover
Laguna Terrace East Conservation Bank	2008	Active – credits available	**FWS**	200	Swainson's hawk, vernal pool preservation (sold out)
Liberty Island Conservation Bank	2010	Active – credits available	**FWS, CDFW, NMFS**	186	Chinook salmon, Central Valley steelhead, delta smelt, longfin smelt, tule marsh shaded riverine aquatic habitat
Muzzy Ranch Conservation Bank	2008	Active – credits available	**FWS, CDFW**	1,209	Swainson's hawk and other raptor foraging habitat, California tiger salamander, burrowing owl nesting and foraging habitat, vernal pool branchiopods, Delta green ground beetle, San Joaquin Orcutt grass
Nicolaus Ranch VELB Conservation Bank	2016	Active – credits available	**FWS**	42	Valley elderberry longhorn beetle
Noonan Ranch Conservation Bank	2009	Active – credits available	**FWS**	189	California tiger salamander, Contra Costa goldfields, riparian preservation

Name	Year Approved	Current Status	Signatories[b]	Area (acres)	Credit Types
North Bay Highlands Conservation Bank	2014	Active – credits available	**FWS**	449.8	California red-legged frog
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 Orcutt grass, Contra Costa goldfields, vernal pool creation (sold out)
Ohlone West Conservation Bank	2005	Active – credits available	**FWS, CDFW**	640	California tiger salamander, California red-legged frog, Alameda whipsnake, 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
Sacramento River Ranch VELB Conservation Bank	2005	Active – credits available	**FWS**	211	Valley elderberry longhorn beetle
Sand Creek Conservation Bank	2007	Active – credits available	**FWS**	498	California tiger salamander, San Joaquin kit fox, vernal pool fairy shrimp (sold out)
Sparling Ranch Conservation Bank	2017	Active – credits available	**FWS, CDFW**	2002	California red-legged frog, California tiger salamander
Toad Hill Ranch Mitigation Bank	2010	Active – credits available	**FWS, Corps, EPA**	1,630	Vernal pool creation, vernal pool preservation, seasonal wetland (sold out)
Van Vleck Mitigation Bank	2009	Active – credits available	**FWS, CDFW, Corps, EPA**	775	Swainson's hawk, vernal pool preservation, vernal pool creation

Name	Year Approved	Current Status	Signatories[b]	Area (acres)	Credit Types
Vieira-Sandy Mush Road Conservation Bank	2006	Active – credits available	**FWS**	333	California tiger salamander, San Joaquin kit fox, vernal pool fairy shrimp, vernal pool tadpole shrimp
White Rock Road Properties – Scott Road Conservation Bank	2019	Active – credits available	**FWS**	191	Vernal pool fairy shrimp, vernal pool tadpole shrimp

[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/
[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).

4.4 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.

There is one active in-lieu fee program with a service area that overlaps the GAI: the Sacramento District California ILF Program (Table 4-4). This in-lieu fee program has three separate service areas for different resources in different regions under its jurisdiction that overlap the GAI, as shown on Figure 4-2.

Table 4-4. Overview of In-lieu Fee Programs in the GAI[a]

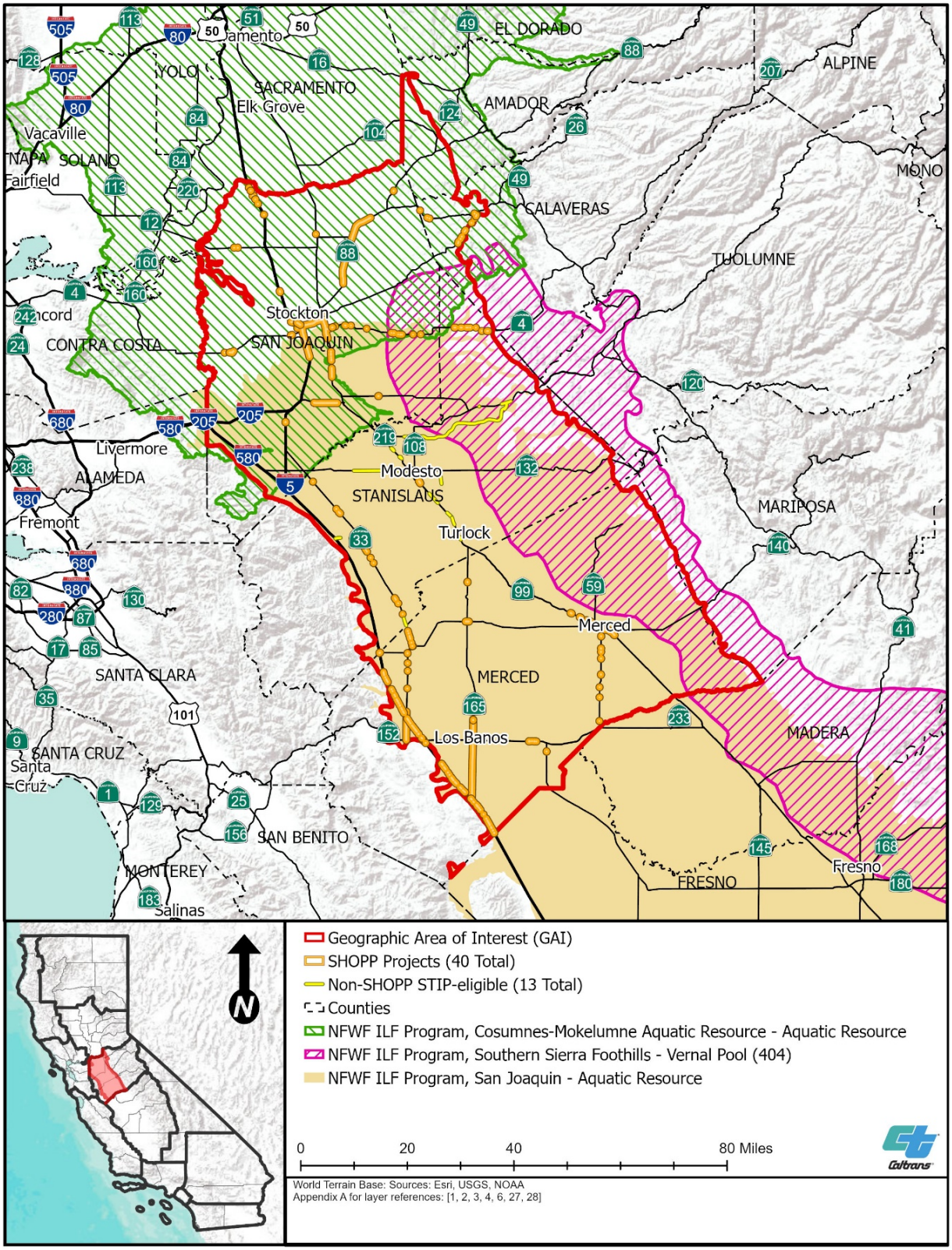
Name	Year Approved	Signatories[b]	Location	Credit Types
Sacramento District California ILF Program	2014	**Corps, EPA, NMFS, RWQCB,** NFWF	Multiple service areas within the Corps Sacramento District Boundary (entire)	▪ Cosumnes-Mokelumne – Aquatic Resource ▪ San Joaquin – Aquatic Resource ▪ Southern Sierra Foothills – Vernal Pool

Note: NFWF = National Fish and Wildlife Foundation
[a] Up-to-date information on approved in-lieu fee programs, including available credits, can be found at: https://ribits.ops.usace.army.mil/ords/f?p=107:47:13453394859366::NO
[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 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.

Figure 4-2. In-lieu Fee Programs in the GAI



At this time, practical instructions and guidance for establishing MCAs are being developed by CDFW[3] and no MCAs or MCA credits are available. 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 2021b).

Caltrans identified one pending RCIS that overlaps the GAI: the San Joaquin Basin RCIS. This RCIS is in the very early planning phases, and there is no information available yet about what resources will be covered or what the conservation goals and objectives will be. There are currently no approved RCISs that overlap the GAI. Because MCAs are issued once a RCIS has been approved, there are also currently no MCAs within the GAI.

4.5.1. 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 2.9.

[3] https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation

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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 projects and regional and local STIP-eligible 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 this chapter, Caltrans:

- Describes its approach to, and major assumptions when, estimating transportation-related compensatory mitigation needs for the GAI.
- Identifies transportation projects that could potentially benefit from advance mitigation planning[1] for the 10-year planning period (summarized in Tables 5-1 and 5-2).
- 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 10 chose to focus the analysis on terrestrial resources (Section 1.5), the results presented below are organized by the Great Valley Ecoregion Section within Caltrans District 10, which is also the GAI.

5.1 Approach

Transportation projects eligible to use advance mitigation credits funded by the AMA may only be SHOPP or STIP transportation projects (SHC § 800.7; Caltrans 2019a). Hence, 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.

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.

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

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 2018).

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 40 SHOPP transportation projects in the GAI that are currently in the planning and conceptual phases (Table 5-1). The general locations of all 40 planned transportation projects are shown on most of the maps in this document.

Each transportation project's potential impact was defined using an assumed 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.

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

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	County	Route	Begin Mile[a]	End Mile[a]	Activity
Lower San Joaquin River, Middle San Joaquin-Lower Chowchilla	2026/27	21249	Stanislaus County, Merced County	33	20.78	29.4	Replace/install culverts
Lower San Joaquin River	2023/24	22193	Merced County	165	32.9	32.9	Roundabouts
Middle San Joaquin-Lower Chowchilla	2028/29	21524	Merced County	152	26	R40.949	Replace/install culverts
Middle San Joaquin-Lower Chowchilla	2023/24	21562	Merced County	59	13.6	13.6	Roundabouts
Middle San Joaquin-Lower Chowchilla	2028/29	21923	Merced County	99	18.1	19.5	Bridge rail
Middle San Joaquin-Lower Chowchilla	2027/28	19403	Merced County	5	17	32.477	Bridge rail
Middle San Joaquin-Lower Chowchilla	2019/20	13813	Merced County	99	R12.7	17.6	Auxiliary lanes
Middle San Joaquin-Lower Chowchilla	2019/20	15691	Merced County	152	R1.43	R39.2	Replace/install culverts
Middle San Joaquin-Lower Chowchilla	2025/26	15894	Merced County	165	0	11.9	Replace/install culverts
Middle San Joaquin-Lower Chowchilla	2020/21	17444	Merced County	5	0.5	0.8	Water and wastewater treatment at safety roadside rest area
Middle San Joaquin-Lower Chowchilla	2023/24	18789	Merced County, Stanislaus County	165	11.73	11.73	Replace/install culverts
Middle San Joaquin-Lower Chowchilla	2024/25	19002	Fresno County, Merced County	5	0	17	Replace/install culverts

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	County	Route	Begin Mile[a]	End Mile[a]	Activity
Middle San Joaquin-Lower Chowchilla	2025/26	18122	Merced County	33	R13.2	17.5	Bridge rail
Middle San Joaquin-Lower Chowchilla	2025/26	18330	Merced County	152	18.5	23.02	Replace/install culverts
Middle San Joaquin-Lower Chowchilla	2023/24	18337	Merced County	140	16	16.5	Roundabouts
Middle San Joaquin-Lower Chowchilla	2023/24	19038	Merced County	59	R0	12.1	Bridge replacement/ new construction
Rock Creek-French Camp Slough, San Joaquin Delta	2026/27	19220	San Joaquin County	99	10	14	Replace/install culverts
Rock Creek-French Camp Slough	2023/24	18329	San Joaquin County, Stanislaus County	4	19.75	38.059	Bridge rail
Rock Creek-French Camp Slough, San Joaquin Delta	2021/22	18073	San Joaquin County	5	R21.44	27.9	Retaining wall
Rock Creek-French Camp Slough	2019/20	13855	San Joaquin County	4	19.8	VAR	Bridge replacement/ new construction
Rock Creek-French Camp Slough	2027/28	21300	Stanislaus County	4	7.28	7.28	Bridge replacement/ new construction
Rock Creek-French Camp Slough	2023/24	21502	San Joaquin County	120	11.6	11.6	Roundabouts
Rock Creek-French Camp Slough	2023/24	22250	San Joaquin County	4	20.7	20.7	Left-turn channelization
San Joaquin Delta	2024/25	22176	San Joaquin County	5	26.1	26.5	Bridge rail
San Joaquin Delta	2026/27	22177	San Joaquin County	5	26.5	26.5	Bridge rail
San Joaquin Delta	2019/20	21061	San Joaquin County	5	10.7	10.7	Bridge rail

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	County	Route	Begin Mile[a]	End Mile[a]	Activity
San Joaquin Delta, Upper Calaveras California	2027/28	21245	Calaveras County	12	0.85	9.65	Replace/install culverts
San Joaquin Delta, Upper Mokelumne	2019/20	13834	San Joaquin County	4	3.4	3.4	Replace/install culverts
San Joaquin Delta, Upper Mokelumne	2022/23	16734	San Joaquin County	5	32.5	49.8	Bridge rail
San Joaquin Delta	2025/26	17056	San Joaquin County	120	R2.5	R6.0	Energy dissipation and other element
San Joaquin Delta	2020/21	17099	San Joaquin County	26	1.11	1.11	Bridge replacement/ new construction
San Joaquin Delta	2019/20	17367	San Joaquin County	4	4.1	4.9	Improved highway geometry
San Joaquin Delta	2022/23	17442	San Joaquin County	4	R16.0	R19.4	Bridge rail
San Joaquin Delta	2025/26	18779	San Joaquin County	4	14.2	14.2	Bridge replacement/ new construction
San Joaquin Delta, Upper Calaveras California, Upper Mokelumne	2023/24	19020	San Joaquin County	88	5.1	16.4	Extend merging acceleration lane
Upper Calaveras California	2023/24	17507	Calaveras County	26	2.39	9.91	Replace/install culverts
Upper Mokelumne	2020/21	9298	San Joaquin County	88	0.28	2.56	Replace/install culverts
Upper Mokelumne	2019/20	16621	San Joaquin County	88	22.093	22.093	Roundabouts

Sub-basin (HUC-8)	Advertised Year	SHOPP Project ID	County	Route	Begin Mile[a]	End Mile[a]	Activity
Upper Mokelumne	2028/29	19027	San Joaquin County	12	M5.000	27.6	Replace/install culverts
Upper Tuolumne	2019/20	15693	Stanislaus County	99	13.4	13.8	Drainage improvements

Source: Caltrans 2021a
[a] R = right, L = left, M = middle, VAR = variable

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

Activity	Buffer Distance (feet)
Auxiliary lanes	20
Bridge rail	20
Bridge replacement/new construction	40
Drainage improvements	10
Energy dissipation and other element	10
Extend merging acceleration lane	10
Improved highway geometry	40
Left-turn channelization	15
Replace/install culverts	20
Retaining wall	15
Roundabouts	40
Water and wastewater treatment at safety roadside rest area	10

Source: Caltrans 2021a, Table 1

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 2019a, 2021b). The SAMNA model, its foundation, and assumptions are described in the *Statewide Advance Mitigation Needs Assessment Report* (Caltrans 2021b).

The SAMNA's impact estimates from District 10's planned transportation projects anticipated between fiscal years 2019/20 and 2028/29 are provided in the *Statewide Advance Mitigation Needs Assessment Report* (Caltrans 2021b). All results are provided in acres. The SAMNA results estimating impacts on special-status wildlife species can be found in Section 5.2. The SAMNA results estimating impacts on aquatic resources are summarized in Section 5.3 and are provided for all habitats and species in Appendix C.

5.1.3. Non-SHOPP STIP-eligible Needs Assessment

At this time, STIP-eligible needs are assessed qualitatively, through coordination between the District, MPOs, RTPAs, and other public agencies that implement transportation improvements. Obtaining a reliable list of STIP transportation projects within the 10-year planning horizon is problematic. 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 constrained[2] regional transportation plan, with a Ready to List[3] year identified as occurring in the 10-year planning horizon. The list would be further refined through consultation with the Districts and their regional and local transportation partners (see Table 1-3 of this document for the consultation summary).

Non-SHOPP STIP-eligible Potential Impacts

Once the non-SHOPP STIP-eligible projects and their activities were identified, their potential impacts were assessed qualitatively. 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.

Thirteen STIP-eligible transportation projects are planned in the GAI for fiscal years 2019/20 to 2028/29 (Table 5-3). 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.

[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.

Table 5-3. STIP-eligible Transportation Projects Planned within the GAI

EA Number	County	Route	Begin Mile	End Mile	Sub-basin	Activity
NP	Stanislaus	132	NP	NP	Upper Stanislaus, Upper Tuolumne	Phase 2. Four-lane facility between SR 99 and Dakota.
NP	Stanislaus	132	NP	NP	Upper Stanislaus	Dakota Avenue to Gates Road. Construct four-lane divided expressway or freeway (County).
NP	Stanislaus		NP	NP	Upper Tuolumne, Lower San Joaquin River	Faith Home Rd. Hatch Rd. to Garner Rd.; construct new two-lane expressway.
NP	Stanislaus	99	NP	NP	Upper Stanislaus	Briggsmore-Carpenter Interchange. Reconstruct to eight-lane interchange
NP	Stanislaus	99	NP	NP	Upper Stanislaus	Standiford-Beckwith Interchange. Reconstruct to eight-lane interchange.
NP	Stanislaus	99	NP	NP	Lower San Joaquin River	Mitchell-Service Rd. SR 99 in Stanislaus County and near Ceres from 0.7 mile south of Mitchell Rd. undercrossing to 0.1 mile north of Pine Street overcrossing.
NP	Stanislaus	33	NP	NP	Middle San Joaquin-Lower Chowchilla	Highway and pedestrian safety improvements from Merced County line northward to Yolo Avenue.
NP	Stanislaus	99	NP	NP	Lower San Joaquin River	SR 99-Keyes Rd to Taylor Rd. (auxiliary lanes). Construct auxiliary lane on SR 99 from Keyes Rd. to Taylor Rd.
NP	Stanislaus	99	NP	NP	Lower San Joaquin River	SR 99-Taylor Rd. to Monte Vista (auxiliary lanes). Construct auxiliary lane on SR 99 from Taylor Rd. to Monte Vista Ave.
NP	Stanislaus	99	NP	NP	Lower San Joaquin River	SR 99-West Main Interchange. Construct new interchange at SR 99 and West Main St.
NP	Stanislaus	5	NP	NP	Lower San Joaquin River	Zacharias Rd.-Raines Rd. to I-5 interchange. Construct new interchange at I-5 Raines Rd. to I-5.

EA Number	County	Route	Begin Mile	End Mile	Sub-basin	Activity
NP	Stanislaus	108/ 120	NP	NP	Upper Stanislaus	SR 108-SR 120-Stearns Rd. intersection project. Intersection improvements at Rodeo (SR 108/120 and Stearns Rd. intersection).
NP	Stanislaus	108/ 120	NP	NP	Upper Stanislaus, Upper Tuolumne	North County Corridor from Tully Rd. to SR 120/108. Construct two- to six- lane expressway.

Notes: EA = expenditure authorization, NP = not provided

5.2 Estimated Wildlife Impacts

The quantitative results given in this document are pursuant to the SAMNA model. Specific wildlife resource impacts will be assessed as part of each transportation project's environmental studies. The complete results of the SAMNA, inclusive of the 40 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 C.

The special-status terrestrial plant and wildlife species evaluated through the SAMNA consisted of federal and state threatened, endangered, or sensitive species; state fully protected or rare species; or state species of special concern. Based on a search of the species-attributed vegetation layer, 71 special-status terrestrial species are known to occur or have the potential to occur in the GAI (Section 2.7, Appendix C; Caltrans 2021b).

Using the methods described in Section 5.1.1, the SAMNA analysis determined that 31 SHOPP transportation projects could potentially affect 12 habitat types, which could support up to 69 special-status species in the GAI (Table 5-4). Complete terrestrial species SAMNA results for the 40 transportation projects planned within the GAI are provided in Appendix C.

Table 5-4. Summary of Estimated SHOPP Project Impacts on Special-status Species Habitat in the GAI

Ecoregion Section	Number of Caltrans SHOPP Projects	Number of Habitats	Special-status Species[a]	Estimated Total Habitat Impact (acres)
Great Valley	31[b]	12	69	3,788

[a] Special-status terrestrial plant and wildlife species evaluated through the SAMNA consisted of federal and state threatened, endangered, or sensitive species; state fully protected or rare species; or state species of special concern.
[b] Transportation projects are listed in Table 5-1.

5.2.1. Estimated Impacts on Species of Mitigation Need

As described in Section 1.5, to focus the assessment, Caltrans District 10 identified species of mitigation need, for which results are provided below. Species of mitigation need are species for which a high probability of compensatory mitigation need is anticipated. Each is discussed briefly in the subsections below:

- **California red-legged frog**. The SAMNA estimated that 9.3 acres of California red-legged frog habitat may be affected by 8 Caltrans SHOPP projects planned for the GAI (Caltrans 2021b).
- **California tiger salamander**. The SAMNA estimated that 38.4 acres of California tiger salamander habitat may be affected by 28 Caltrans SHOPP projects planned for the GAI (Caltrans 2021b).
- **Giant garter snake**. The SAMNA estimated that 38.8 acres of giant garter snake habitat may be affected by 29 Caltrans SHOPP projects planned for the GAI (Caltrans 2021b).
- **Valley elderberry longhorn beetle.** The SAMNA estimated that 0.4 acre of valley elderberry longhorn beetle habitat may be affected by 1 Caltrans SHOPP transportation project planned for the GAI (Caltrans 2021b).

Results are tabulated in Table 5-5.

5.2.2. Estimated Impacts on Other Special-status Species

As discussed further in Chapter 9, during advance mitigation project scoping, consideration will also be given to additional special-status species that the SAMNA identified as co-occurring with the species of mitigation need, because they could potentially be affected by the same habitat impacts that affect the species of mitigation need. The above-listed species of mitigation need co-occur with other protected plant, invertebrate, amphibian, reptile, bird, and mammal species in in seven habitats in the GAI. Using the methods described in Section 5.1.1, the SAMNA forecast impacts on an additional 64 special-status terrestrial species that potentially use the same habitats as the species of mitigation need in the GAI (Table 5-6).

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Table 5-5. Estimated SHOPP Project Impacts on Species of Mitigation Need in the GAI

Ecoregion Section	California Red-legged Frog: Number of Caltrans SHOPP Projects	California Red-legged Frog: Estimated Habitat Impact (acres)	California Tiger Salamander: Number of Caltrans SHOPP Projects	California Tiger Salamander: Estimated Habitat Impact (acres)	Giant Garter Snake: Number of Caltrans SHOPP Projects	Giant Garter Snake: Estimated Habitat Impact (acres)	Valley Elderberry Longhorn Beetle: Number of Caltrans SHOPP Projects	Valley Elderberry Longhorn Beetle: Estimated Habitat Impact (acres)
Great Valley	8	9.3	28	38.4	29	38.8	1	0.4

Source: Caltrans 2021b
[a] Transportation projects are listed in Table 5-1.

Table 5-6. Estimated SHOPP Project Impacts on Co-occurring Terrestrial Special-status Species in the GAI (acres)

Common Name	Scientific Name	Status	Annual Grassland	Blue Oak Woodland	Eucalyptus	Fresh Emergent Wetland	Lacustrine	Riverine	Valley Foothill Riparian
Not applicable	Not applicable	**Total[a]**	**32.28**	**0.19**	**0.05**	**1.50**	**0.77**	**2.69**	**1.59**
Species of Mitigation Need	See below	See below	See below	See below	See below	See below	See below	See below	See below
California red-legged frog	*Rana draytonii*	FT, SSC	9.02	0.09	0.00	0.00	0.19	0.00	0.00
California tiger salamander	*Ambystoma californiense*	FT, ST	32.28	0.19	0.05	1.50	0.77	0.00	1.59
Giant gartersnake	*Thamnophis gigas*	FT, ST	32.28	0.00	0.00	1.50	0.77	2.69	1.59
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	0.00	0.00	0.00	0.00	0.00	0.00	0.35
Plants	See below	See below	See below	See below	See below	See below	See below	See below	See below
Ione manzanita	*Arctostaphylos myrtifolia*	FT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinese Camp brodiaea	*Brodiaea pallida*	FT, SE	3.69	0.00	0.00	0.00	0.00	0.00	0.00
Stebbins' morning-glory	*Calystegia stebbinsii*	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Succulent owl's-clover	*Castilleja campestris* var. *succulenta*	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00
Palmate-bracted bird's-beak	*Chloropyron palmatum*	FE, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00
Ione buckwheat	*Eriogonum apricum* var. *apricum*	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Irish Hill buckwheat	*Eriogonum apricum* var. *prostratum*	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoover's spurge	*Euphorbia hooveri*	FT	31.86	0.00	0.00	0.00	0.00	0.00	0.00
Pine Hill flannelbush	*Fremontodendron decumbens*	FE, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Common Name	Scientific Name	Status	Annual Grassland	Blue Oak Woodland	Eucalyptus	Fresh Emergent Wetland	Lacustrine	Riverine	Valley Foothill Riparian
El Dorado bedstraw	*Galium californicum* ssp. *sierrae*	FE, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	FS, SE	32.28	0.00	0.00	0.00	0.00	0.00	0.00
Colusa grass	*Neostapfia colusana*	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00
Hairy Orcutt grass	*Orcuttia pilosa*	FE, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00
Layne's ragwort	*Packera layneae*	FT, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greene's tuctoria	*Tuctoria greenei*	FE, SR	31.86	0.00	0.00	0.00	0.00	0.00	0.00
Invertebrates	See below	See below	See below	See below	See below	See below	See below	See below	See below
Conservancy fairy shrimp	*Branchinecta conservatio*	FE	0.95	0.00	0.00	0.00	0.00	0.00	0.00
Longhorn fairy shrimp	*Branchinecta longiantenna*	FE	0.96	0.00	0.00	0.00	0.00	0.00	0.00
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	5.22	0.00	0.00	0.22	0.00	0.00	0.00
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	5.41	0.00	0.00	0.22	0.00	0.00	0.00
Amphibians	See below	See below	See below	See below	See below	See below	See below	See below	See below
Western spadefoot	*Spea hammondii*	FS, SSC	32.28	0.19	0.05	1.50	0.77	2.69	0.00
Foothill yellow-legged frog	*Rana boylii*	FS, SE, SSC	9.89	0.12	0.00	0.00	0.00	0.09	0.00
Reptiles	See below	See below	See below	See below	See below	See below	See below	See below	See below
Blunt-nosed leopard lizard	*Gambelia sila*	FE, SE, SFP	8.09	0.00	0.00	0.00	0.00	0.00	0.00
Blainville's horned lizard	*Phrynosoma blainvillii*	FS, SSC	32.28	0.19	0.05	0.00	0.00	0.00	1.59
California legless lizard	*Anniella pulchra*	FS, SSC	0.00	0.19	0.05	0.00	0.00	0.00	1.59
Coachwhip	*Masticophis flagellum*	SSC	8.95	0.00	0.00	0.00	0.00	0.00	0.00
Birds	See below	See below	See below	See below	See below	See below	See below	See below	See below
Redhead	*Aythya americana*	SSC	0.00	0.00	0.00	1.44	0.34	2.49	0.00
White-tailed kite	*Elanus leucurus*	FS, SFP	32.28	0.19	0.05	1.50	0.00	0.00	1.59
Bald eagle	*Haliaeetus leucocephalus*	FS, SE, SFP, SFS	32.28	0.19	0.05	1.50	0.77	2.69	1.59

Common Name	Scientific Name	Status	Annual Grassland	Blue Oak Woodland	Eucalyptus	Fresh Emergent Wetland	Lacustrine	Riverine	Valley Foothill Riparian
Northern harrier	*Circus hudsonius*	SSC	32.28	0.19	0.05	1.50	0.77	2.69	1.59
Golden eagle	*Aquila chrysaetos*	FS, SFP, SFS	32.28	0.19	0.05	1.50	0.00	0.00	1.59
Peregrine falcon	*Falco peregrinus*	SFP, SFS	32.28	0.19	0.05	1.50	0.77	2.69	1.59
Swainson's hawk	*Buteo swainsoni*	FS, ST	32.28	0.19	0.05	0.00	0.00	0.00	1.59
Black rail	*Laterallus jamaicensis*	FS, ST, SFP	0.00	0.00	0.00	0.00	0.00	1.59	0.00
Sandhill crane	*Antigone canadensis*	FS, ST, SFP	32.28	0.00	0.00	1.50	0.77	0.00	1.59
Lesser sandhill crane	*Antigone canadensis canadensis*	SSC	18.13	0.00	0.00	1.13	0.32	0.00	0.92
Snowy plover	*Charadrius nivosus*	FT, SSC	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mountain plover	*Charadrius montanus*	FS, SSC	17.08	0.00	0.00	0.00	0.00	0.00	0.00
Black tern	*Chlidonias niger*	SSC	0.00	0.00	0.00	0.00	0.32	0.00	0.00
Burrowing owl	*Athene cunicularia*	FS, SSC	32.28	0.19	0.05	0.00	0.00	0.00	1.59
Long-eared owl	*Asio otus*	SSC	14.09	0.14	0.00	0.00	0.00	0.00	0.04
Short-eared owl	*Asio flammeus*	SSC	32.28	0.19	0.05	1.50	0.00	0.00	1.59
Loggerhead shrike	*Lanius ludovicianus*	SSC	32.28	0.19	0.05	0.00	0.00	0.00	1.59
Yellow warbler	*Setophaga petechia*	SSC	0.00	0.14	0.00	0.00	0.00	0.00	0.00
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SSC	12.48	0.19	0.00	0.00	0.00	0.00	0.00
Grasshopper sparrow	*Ammodramus savannarum*	SSC	32.28	0.00	0.05	0.00	0.00	0.00	0.00
Modesto song sparrow	*Melospiza melodia mailliardi*	SSC	21.66	0.19	0.05	1.29	0.00	1.83	1.39
Tricolored blackbird	*Agelaius tricolor*	FS, ST, SSC	32.28	0.00	0.05	1.50	0.00	0.00	1.59
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	SSC	32.28	0.00	0.00	1.50	0.77	0.00	0.00
Mammals	*See below*	See below	See below	See below	See below	See below	See below	See below	See below
Yuma myotis	*Myotis yumanensis*	FS	32.28	0.19	0.05	1.50	0.77	2.69	1.59
Western red bat	*Lasiurus blossevillii*	SSC	32.28	0.19	0.05	1.50	0.77	2.69	1.59
Spotted bat	*Euderma maculatum*	FS, SSC	0.40	0.00	0.00	0.00	0.00	0.00	0.00

Common Name	Scientific Name	Status	Annual Grassland	Blue Oak Woodland	Eucalyptus	Fresh Emergent Wetland	Lacustrine	Riverine	Valley Foothill Riparian
Townsend's big-eared bat	*Corynorhinus townsendii*	FS, SSC	32.28	0.19	0.05	0.00	0.00	2.69	1.59
Pallid bat	*Antrozous pallidus*	FS, SSC	32.28	0.19	0.05	0.00	0.00	2.69	1.59
Western mastiff bat	*Eumops perotis*	FS, SSC	13.55	0.19	0.00	0.28	0.00	0.00	0.20
Riparian brush rabbit	*Sylvilagus bachmani riparius*	FE, SE	0.28	0.00	0.00	0.00	0.00	0.00	0.00
Nelson's antelope ground squirrel	*Ammospermophilus nelsoni*	FS, ST	1.83	0.00	0.00	0.00	0.00	0.00	0.00
San Joaquin pocket mouse	*Perognathus inornatus*	FS	31.86	0.05	0.00	0.00	0.00	0.00	0.00
Giant kangaroo rat	*Dipodomys ingens*	FE, SE	1.83	0.00	0.00	0.00	0.00	0.00	0.00
Fresno kangaroo rat	*Dipodomys nitratoides*	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dusky-footed woodrat	*Neotoma fuscipes*	FE, SSC	0.00	0.00	0.00	0.00	0.00	0.00	0.20
San Joaquin kit fox	*Vulpes macrotis mutica*	FE, ST	10.80	0.00	0.00	0.00	0.00	0.00	0.00
Ringtail	*Bassariscus astutus*	SFP	26.20	0.19	0.05	0.00	0.00	0.00	1.04
American badger	*Taxidea taxus*	SSC	32.28	0.19	0.05	0.00	0.00	0.00	1.59
Mountain lion	*Puma concolor*	SCT	11.62	0.14	0.00	0.00	0.00	0.00	0.00

Notes: FE = federally endangered; FPE = federally proposed endangered; FS = federally sensitive (USFS and/or BLM sensitive); FT = federally threatened; SCE = state candidate endangered; SE = state endangered; SFP = state fully protected; SFS = state fire sensitive; SR = state rare; SSC = species of special concern (CDFW); SCT = state candidate threatened; ST = state threatened

[a] These totals are not additive across all special-status species because each habitat type may provide suitable habitat for more than one special-status species or subspecies. The total acreage of each habitat type affected listed in the top row represents the largest number in each column, not the sum of the numbers.

5.3 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. Vernal pools and riparian habitat are also discussed. Refer to Appendix F for a series of maps depicting the location and extent of wetlands and non-wetland waters in the GAI.

5.3.1. Estimated Impacts on Threatened and Endangered Fish Habitat

Using the methods described in Section 5.1.1, impacts on fish habitat were estimated for the 40 transportation projects listed in Table 5-1. Of the 40 SHOPP transportation projects evaluated, 12 would result in impacts on threatened and endangered fish habitat (Table 5-7; Caltrans 2021b). For example, 10 transportation projects are anticipated to affect 3.3 acres of chinook salmon spring-run habitat, 3.3 acres of Chinook salmon winter-run habitat, 5.0 acres of delta smelt habitat, 3.3 acres of green sturgeon habitat, 6.0 acres of longfin smelt habitat, and 3.6 acres of California Central Valley steelhead habitat in the San Joaquin Delta Sub-basin.

5.3.2. Estimated Impacts on Wetlands

Using the methods described in Section 5.1.1, impacts on wetlands were estimated for the 40 transportation projects listed in Table 5-1. Table 5-8 summarizes the estimated impacts in relation to the number of planned SHOPP transportation projects in the GAI. Of the 40 SHOPP transportation projects evaluated, 11 would result in impacts on 1.2 acres of wetland habitat in the GAI (Caltrans 2021b). For example, 0.3 acre of impacts would affect wetlands in the San Joaquin Delta Sub-basin from three transportation projects, of which 0.3 acre is an impact on freshwater emergent wetlands and <0.1 acre is an impact on 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; hence, the wetland estimates below are based solely on the SAMNA's wetland data layer (Caltrans 2021b).

Table 5-7. Summary of Estimated SHOPP Project Impacts on Threatened and Endangered Fish Habitat in the GAI (acres)[a,b]

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Chinook Salmon – Spring-run	Chinook Salmon – Winter-run	Delta Smelt[c]	Green Sturgeon – Southern DPS	Longfin Smelt	Steelhead – California Central Valley DPS	Total
Rock Creek-French Camp Slough	18040051	1	0.2	0.2	0.2	0.2	< 0.1	0.2	Not available[c]
San Joaquin Delta	18040003	10	3.3	3.3	5.0	3.3	6.0	3.6	Not available[c]
Upper Calaveras California	18040011	1	<0.1	< 0.1	< 0.1	<0.1	< 0.1	<0.1	Not available[c]
Upper Mokelumne	18040012	3	<0.1	< 0.1	0.6	<0.1	0.6	<0.1	Not available[c]
Total[d]	Not applicable	**12**	**3.6**	**3.6**	**5.9**	**3.6**	**6.6**	**3.9**	Not available[c]

[a] Stream/river habitat impacts are provided. Stream/river habitat impacts are assumed to be representative of fish habitat impacts.
[b] For sub-basins with more than one species, co-occurrence of impacts is assumed. Acreage for the largest impact is provided.
[c] Total could not be calculated because impact estimates overlap.
[d] Totals do not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many do not affect fish.

Table 5-8. Summary of Estimated SHOPP Project Impacts on Wetlands in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Freshwater Emergent Wetland	Freshwater Forested/Shrub Wetland	Total[a]
Middle San Joaquin-Lower Chowchilla	18040001	6	0.7	<0.1	**0.7**
Rock Creek-French Camp Slough	18040051	2	<0.1	0.1	**0.1**
San Joaquin Delta	18040003	3	0.3	<0.1	**0.3**
Total[a,b]	Not applicable	**11**	**1.0**	**0.2**	**1.2**

Source: Caltrans 2021b
[a] Totals may be different on account of rounding.
[b] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

5.3.3. Estimated Impacts on Non-wetland Waters

Using the methods described in Section 5.1.1, impacts on non-wetland waters were estimated for the 40 transportation projects listed in Table 5-1. Of the 40 SHOPP transportation projects evaluated, 27 would result in impacts on 11.3 acres of non-wetland waters in the GAI (Caltrans 2021b). Table 5-9 summarizes the estimated impacts in relation to the number of planned SHOPP transportation projects in the GAI. For example, 11 transportation projects are forecast to have a total of 4.2 acres of impact in the Middle San Joaquin-Lower Chowchilla Sub-basin, including 3.2 acres of impact on canal/ditch habitat, 0.2 acres of impact on reservoir habitat, and 0.9 acres of impact on stream/river habitat.

5.3.4. Estimated Impacts on Vernal Pools

The SAMNA does not directly estimate vernal pool impacts, but vernal pool impacts can be estimated by proxy using the SAMNA vernal pool crustacean habitat impact forecast from the SAMNA's terrestrial layer. Critical habitat in the GAI for four vernal pool species, Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp, is shown on Figure 2-7, and available vernal pool location information is shown in Figure 2-13. Usually Caltrans avoids vernal pools; however, a number of planned SHOPP transportation projects are proximate to the areas displayed. Hence, using the methods described in Section 5.1.1, impacts on vernal pool crustacean habitat for the 40 transportation projects listed in Table 5-1 are shown in Table 5-10 and are estimated to be:

- 1.0 acre of Conservancy pool fairy shrimp habitat impact from 1 SHOPP transportation project;
- 1.0 acre of longhorn fairy shrimp habitat impacts from 3 SHOPP transportation projects,
- 5.4 acres of vernal pool fairy shrimp habitat impacts from 8 SHOPP transportation projects; and
- 5.6 acres of vernal pool tadpole shrimp habitat impact from 11 SHOPP transportation projects.

It is worth pointing out that vernal pools mapped with the SAMNA Reporting Tool are based on the California Natural Diversity Database occurrence of vernal pool invertebrate species and a 4-mile buffer (Figure 2-13, right-hand side; Caltrans 2021b). Hence, the 1,932.9 acres of annual grasslands total acreage were crosswalked to vernal pools by virtue of being within 4 miles of a listed vernal pool invertebrate database occurrence.

5.3.5. Estimated Impacts on Riparian Habitat

For this assessment, riparian habitat was considered to include the of the following CWHR type: valley foothill riparian. Estimated impacts on riparian habitat from planned SHOPP transportation projects within the GAI are shown in Table 5-11. A total of 63.6 acres of impact on riparian habitat is anticipated from 7 projects in five sub-basins in the GAI (Table 5-11). For example, 3 projects are anticipated to have impacts on 31.0 acres of riparian habitat in the San Joaquin Delta Sub-basin.

Table 5-9. Summary of Estimated SHOPP Project Impacts on Non-wetland Waters in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Canal/Ditch	Reservoir	Stream/River	Total[a]
Lower San Joaquin River	18040002	1	<0.1	0.0	0.0	**<0.1**
Middle San Joaquin-Lower Chowchilla	18040001	11	3.2	0.2	0.9	**4.2**
Rock Creek-French Camp Slough	18040051	4	0.2	0.0	0.4	**0.6**
San Joaquin Delta	18040003	10	2.1	0.0	3.8	**5.8**
Upper Calaveras California	18040011	2	0.0	0.0	0.1	**0.1**
Upper Mokelumne	18040012	3	0.6	0.0	0.0	**0.6**
Total[a,b]	Not applicable	**27**	**6.0**	**0.2**	**5.1**	**11.3**

Source: Caltrans 2021b
[a] Totals may be different on account of rounding.
[b] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

Table 5-10. Summary of Estimated SHOPP Project Impacts on Vernal Pool Habitat in the GAI (acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Conservancy Fairy Shrimp	Longhorn Fairy Shrimp	Vernal Pool Fairy Shrimp	Vernal Pool Tadpole Shrimp	Total
Middle San Joaquin-Lower Chowchilla	18040001	5	1.0	1.0	1.2	2.1	Not available[a]
Rock Creek-French Camp Slough	18040051	2	0.0	0.0	2.2	2.2	Not available[a]
San Joaquin Delta	18040003	2	0.0	0.0	0.4	0.2	Not available[a]
Upper Calaveras California	18040011	2	0.0	0.0	0.7	<0.1	Not available[a]
Upper Mokelumne	18040012	3	0.0	0.0	1.0	1.1	Not available[a]
Total[b,c]	Not applicable	**13**	**1.0**	**1.0**	**5.4**	**5.6**	Not available[a]

[a] Total could not be calculated because impact estimates overlap.
[b] Totals may be different on account of rounding.
[c] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect non-wetland waters.

Table 5-11. Summary of Estimated SHOPP Project Impacts on Riparian Habitat in GAI (in acres)

Sub-basin (HUC-8)	Sub-basin Number	Number of Transportation Projects	Estimated Riparian Impact (acres)[a]
Middle San Joaquin-Lower Chowchilla	18040001	1	**7.6**
Rock Creek-French Camp Slough	18040051	1	**6.4**
San Joaquin Delta	18040003	3	**31.0**
Upper Calaveras California	18040011	1	**13.6**
Upper Mokelumne	18040012	1	**5.0**
Total[b,c]	Not applicable	**7**	**63.6**

Source: Adapted from Caltrans 2021b
[a] Consists of the CWHR System habitat type valley foothill riparian.
[b] Totals may be different on account of rounding.
[c] Totals may not reflect numbers presented in rows above. Some SHOPP transportation projects cross more than one sub-basin; many are not forecast to affect riparian habitat.

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6. BENEFITING TRANSPORTATION PROJECT CONSIDERATIONS

Benefiting transportation projects have delivery schedules that would likely benefit from advance mitigation credits. Potentially benefiting transportation projects were identified in Chapter 5 for advance mitigation planning to guide advance mitigation project scoping. Actual benefiting transportation projects will be determined in the future. Caltrans and relevant natural resource regulatory agencies 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.

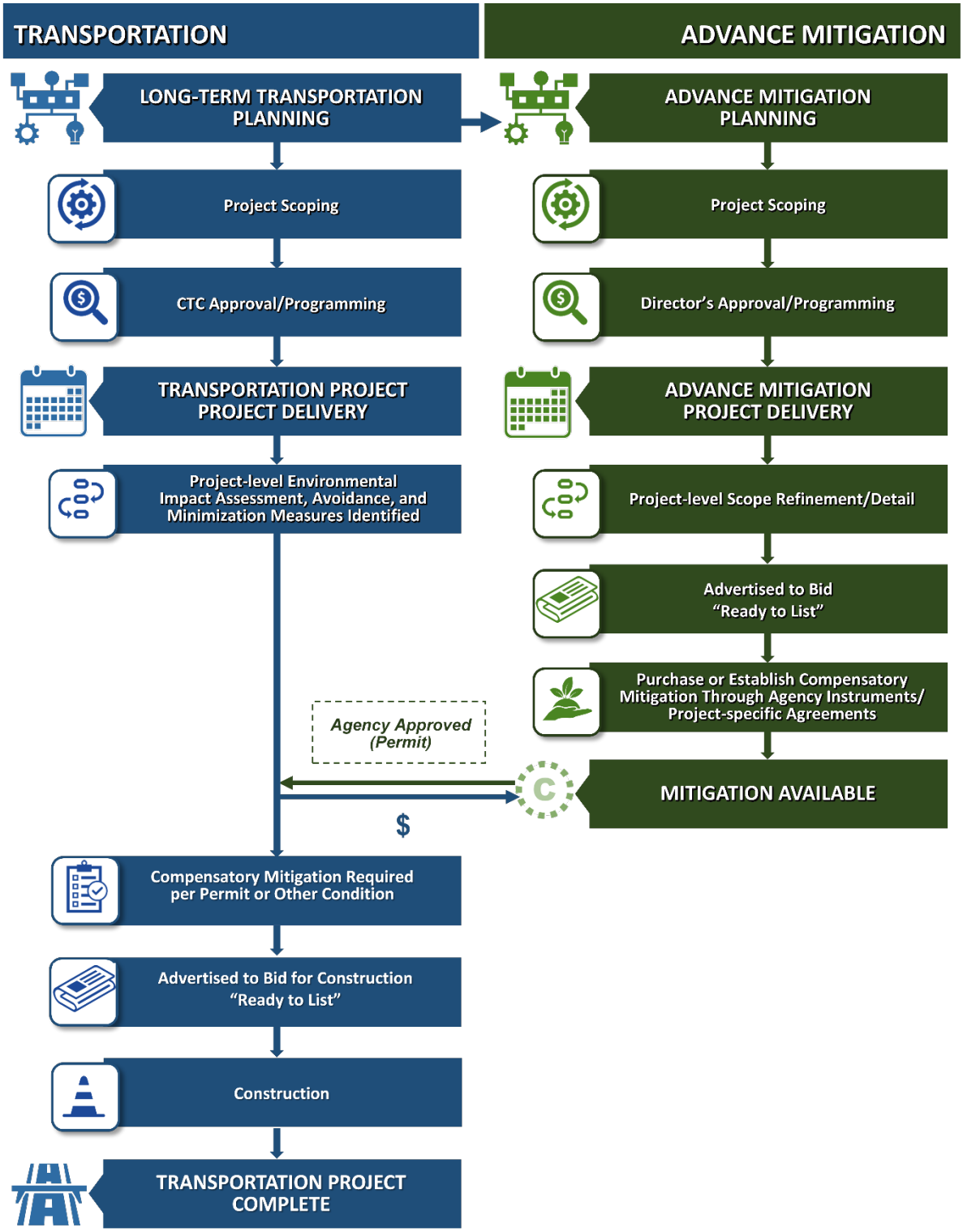
In this chapter, Caltrans summarizes the scheduling considerations and constraints of potential benefiting transportation projects in order to inform advance mitigation project schedules. A timeframe for the forecast advance mitigation needs is provided and analyzed. The potentially benefiting transportation 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 List[1] 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, and that some of the transportation projects may have already gone to bid, it is necessary to consider which of the transportation projects:

- Would need to acquire compensatory mitigation before the AMP can deliver, and hence the AMP 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; or
- Would need compensatory mitigation farther out in time and, if so, whether there is time to establish new compensatory mitigation.

6.2.1. Great Valley Ecoregion Section

Initial estimated impact patterns are based on the SHOPP transportation projects planned for the GAI, that is, the Great Valley Ecoregion within Caltrans District 10, as summarized in Table 5-1.

- As shown in Table 6-1 and on Figure 6-2, when the SHOPP transportation projects identified previously have their forecast species of mitigation need impacts examined relative to their expected advertising date, the estimated compensatory mitigation needs are spread throughout the 10-year planning period.
- As shown in Tables 6-2 through 6-6 and on Figures 6-3 through 6-7, when the SHOPP transportation projects identified previously have their aquatic resource impacts examined relative to their expected advertising date, the estimated compensatory mitigation needs are spread throughout the 10-year planning horizon, depending on sub-basin, with greater anticipated impacts during fiscal years 2019/20, 2023/24, 2025/26, and 2027/28.

[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.

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Table 6-1. Estimated Impacts on Species of Mitigation Need within the GAI, by Transportation Project Delivery Year (acres)

Species of Mitigation Need	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	Total[a]
California red-legged frog: number of transportation projects	0	0	0	0	3	1	1	0	3	0	**8**
California red-legged frog: estimated potential impacts (acres)	0.0	0.0	0.0	0.0	1.0	1.9	3.5	0.0	2.8	0.0	**9.3**
California tiger salamander: number of transportation projects	6	0	1	2	5	2	4	2	3	3	**28**
California tiger salamander: estimated potential impacts (acres)	5.2	0.0	7.4	0.8	5.9	2.5	11.1	0.1	3.0	0.4	**36.4**
Giant garter snake: number of transportation projects	6	0	1	2	5	2	4	3	3	3	**29**
Giant garter snake: estimate potential impacts (acres)	6.5	0.0	7.6	0.8	5.7	2.7	11.7	0.1	3.2	0.4	**38.8**
Valley elderberry longhorn beetle: number of transportation projects	0	0	0	0	1	0	0	0	0	0	**1**
Valley elderberry longhorn beetle: estimated potential impacts (acres)	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	**0.4**
Percentage of total mitigation need[b]	**100**	**82.7**	**82.0**	**55.2**	**49.1**	**38.7**	**34.3**	**7.1**	**5.2**	**1.0**	**100%**

[a] Totals may not equal sum of rows on account of rounding. [b] Indicative of the timing of mitigation need. [∑ impacts (year) ÷ ∑ total impacts]*100

Figure 6-2. Estimated Impacts on Species of Mitigation Need within the GAI, by Transportation Project Delivery Year

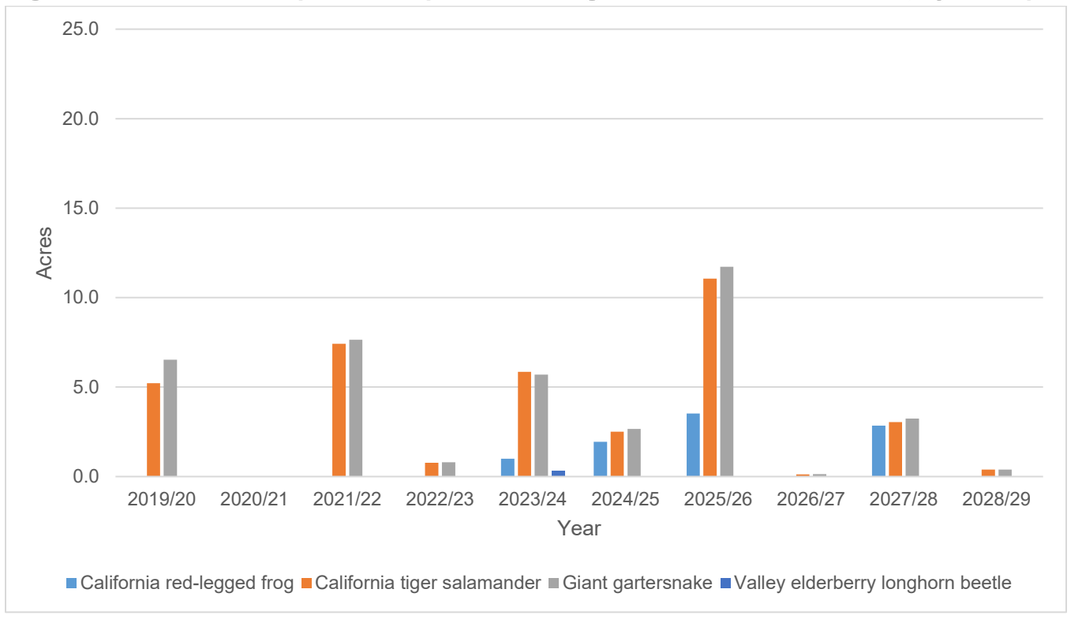


Table 6-2. Estimated Impacts on Threatened and Endangered Fish Habitat within the GAI, by Transportation Project Delivery Year

Sub-basin	2019/20 Projects	2019/20 Impacts (acres)	2020/21 Projects	2020/21 Impacts (acres)	2021/22 Projects	2021/22 Impacts (acres)	2022/23 Projects	2022/23 Impacts (acres)	2023/24 Projects	2023/24 Impacts (acres)	2024/25 Projects	2024/25 Impacts (acres)	2025/26 Projects	2025/26 Impacts (acres)	2026/27 Projects	2026/27 Impacts (acres)	2027/28 Project	2027/28 Impacts (acres)	2028/29 Projects	2028/29 Impacts (acres)	Total Projects	Total Impacts[a] (acres)
Rock-Creek-French Camp Slough	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	**0.2**
San Joaquin Delta	3	3.8	0	0.0	1	1.1	1	0.1	1	0.2	1	0.5	2	1.1	1	0.6	0	0.0	0	0.0	**10**	**7.4**
Upper Calaveras California	0	0.0	0	0.0	0	0.0	0	0.0	1	<0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	**<0.1**
Upper Mokelumne	1	0.3	0	0.0	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	<0.1	**3**	**0.6**
Total[b]	**3**	**4.1**	**0**	**0.0**	**1**	**1.3**	**2**	**0.4**	**1**	**0.2**	**1**	**0.5**	**2**	**1.1**	**1**	**0.6**	**0**	**0.0**	**1**	**<0.1**	**12**	**8.2**
% of total mitigation need	**N/A**	**100**	**N/A**	**50.0**	**N/A**	**50.0**	**N/A**	**34.1**	**N/A**	**29.2**	**N/A**	**26.8**	**N/A**	**20.7**	**N/A**	**7.3**	**N/A**	**<1.0**	**N/A**	**<1.0**	**N/A**	**100%**

Note: N/A = not applicable
[a] Totals may not equal sum of rows on account of rounding. [b] Totals may not equal sum of rows because some projects cross over multiple sub-basins.

Figure 6-3. Estimated Impacts on Threatened and Endangered Fish Habitat within the GAI, by Transportation Project Delivery Year

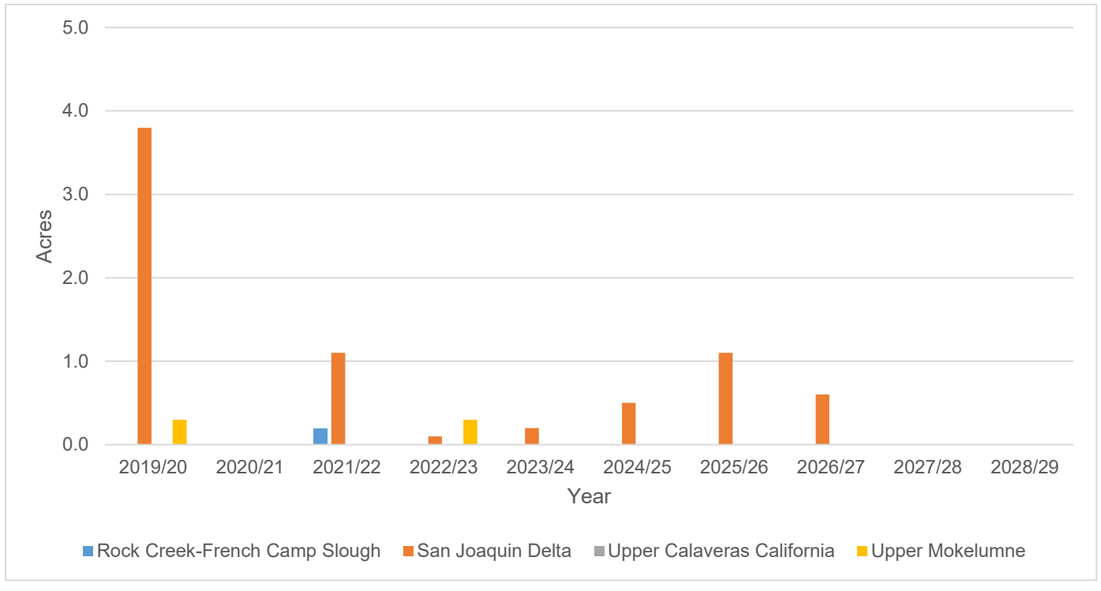


Table 6-3. Estimated Impacts on Wetlands within the GAI, by Transportation Project Delivery Year

Sub-basin	2019/20 Projects	2019/20 Impacts (acres)	2020/21 Projects	2020/21 Impacts (acres)	2021/22 Projects	2021/22 Impacts (acres)	2022/23 Projects	2022/23 Impacts (acres)	2023/24 Projects	2023/24 Impacts (acres)	2024/25 Projects	2024/25 Impacts (acres)	2025/26 Projects	2025/26 Impacts (acres)	2026/27 Projects	2026/27 Impacts (acres)	2027/28 Project	2027/28 Impacts (acres)	2028/29 Projects	2028/29 Impacts (acres)	Total Projects	Total Impacts[a] (acres)
Middle San Joaquin-Lower Chowchilla	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	1	<0.1	1	<0.1	1	0.1	1	0.1	**6**	**0.7**
Rock Creek-French Camp Slough	0	0.0	0	0.0	1	0.1	0	0.0	1	<0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**2**	**0.1**
San Joaquin Delta	1	0.3	0	0.0	1	<0.1	0	0.0	1	<0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**3**	**0.3**
Total[b]	**1**	**0.3**	**0**	**0.0**	**1**	**0.2**	**0**	**0.0**	**4**	**0.5**	**0**	**0.0**	**1**	**<0.1**	**1**	**<0.1**	**1**	**0.1**	**1**	**0.1**	**10**	**1.2**
% of total mitigation need	**N/A**	**100**	**N/A**	**75.0**	**N/A**	**75.0**	**N/A**	**58.3**	**N/A**	**58.3**	**N/A**	**16.6**	**N/A**	**16.6**	**N/A**	**16.6**	**N/A**	**16.6**	**N/A**	**8.3**	**N/A**	**100%**

Note: N/A = not applicable
[a] Totals may not equal sum of rows on account of rounding. [b] Totals may not equal sum of rows because some projects cross over multiple sub-basins

Figure 6-4. Estimated Impacts on Wetlands in the GAI, by Transportation Project Delivery Year

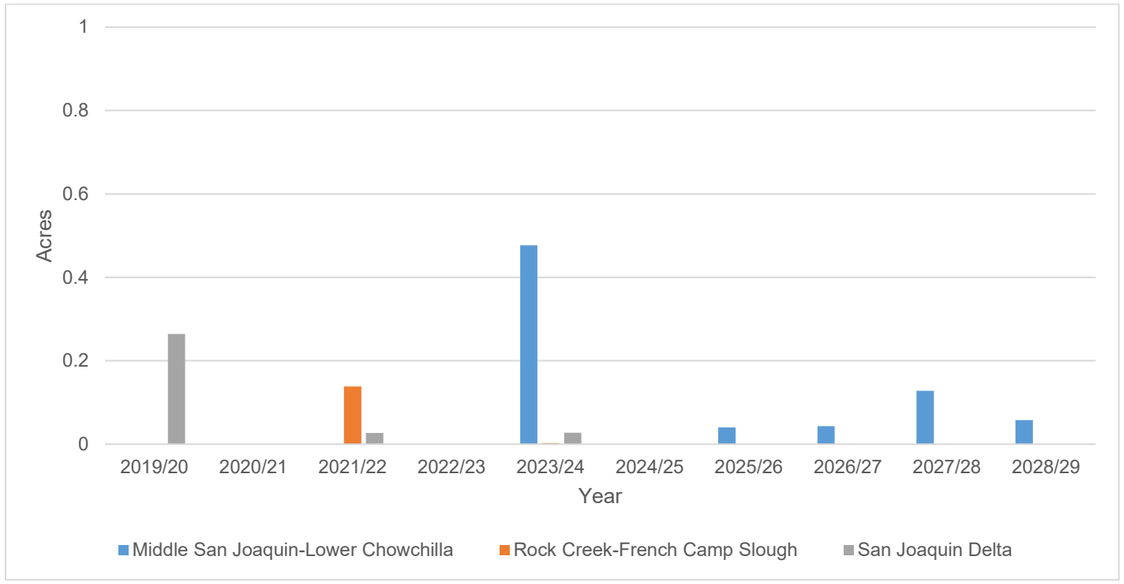


Table 6-4. Estimated Impacts on Non-wetland Waters for within the GAI, by Transportation Project Delivery Year

Sub-basin	2019/20 Projects	2019/20 Impacts (acres)	2020/21 Projects	2020/21 Impacts (acres)	2021/22 Projects	2021/22 Impacts (acres)	2022/23 Projects	2022/23 Impacts (acres)	2023/24 Projects	2023/24 Impacts (acres)	2024/25 Projects	2024/25 Impacts (acres)	2025/26 Projects	2025/26 Impacts (acres)	2026/27 Projects	2026/27 Impacts (acres)	2027/28 Project	2027/28 Impacts (acres)	2028/29 Projects	2028/29 Impacts (acres)	Total Projects	Total Impacts[a] (acres)
Lower San Joaquin River	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	<0.1	0	0.0	0	0.0	**1**	**<0.1**
Middle San Joaquin-Lower Chowchilla	1	0.4	0	0.0	0	0.0	1	0.1	2	0.5	1	0.2	2	2.5	1	0.1	1	0.3	2	0.2	**11**	**4.2**
Rock Creek-French Camp Slough	0	0.0	0	0.0	1	0.2	0	0.0	2	0.2	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	**4**	**0.5**
San Joaquin Delta	3	2.2	0	0.0	1	1.1	1	0.1	1	0.2	1	0.5	2	1.1	1	0.6	0	0.0	0	0.0	**10**	**5.8**
Upper Calaveras California	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**2**	**0.1**
Upper Mokelumne	1	0.2	0	0.0	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	<0.1	**3**	**0.6**
Total[b]	**4**	**2.9**	**0**	**0.0**	**1**	**1.3**	**3**	**0.6**	**6**	**1.0**	**2**	**0.7**	**4**	**3.6**	**2**	**0.7**	**2**	**0.4**	**3**	**0.2**	**27**	**11.3**
% of total mitigation need	**N/A**	**100**	**N/A**	**75.2**	**N/A**	**75.2**	**N/A**	**63.7**	**N/A**	**58.4**	**N/A**	**49.6**	**N/A**	**43.4**	**N/A**	**11.5**	**N/A**	**5.3**	**N/A**	**1.8**	**N/A**	**100%**

Note: N/A = not applicable
[a] Totals may not equal sum of rows on account of rounding. [b] Totals may not equal sum of rows because some projects cross over multiple sub-basins.

Figure 6-5. Estimated Impacts on Non-wetland Waters in the GAI, by Transportation Project Delivery Year

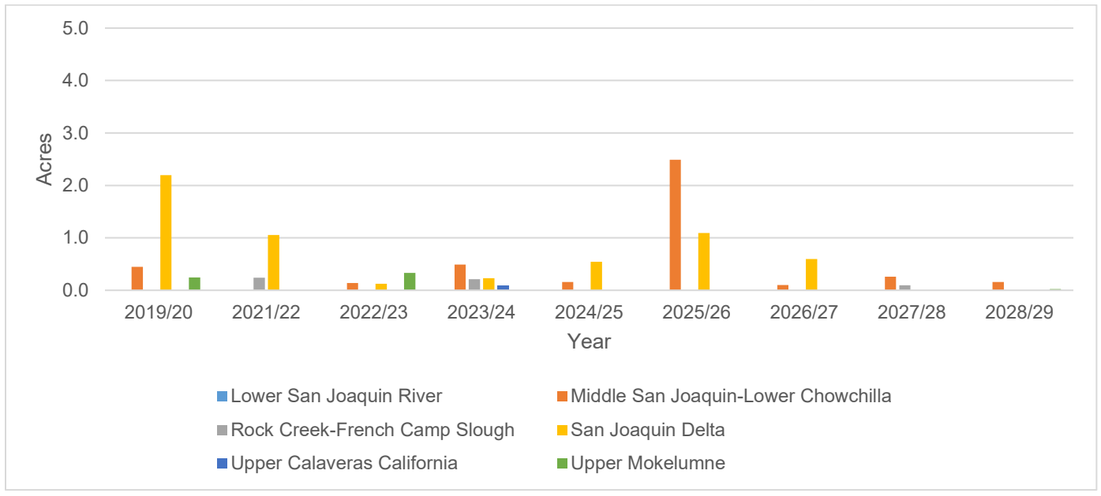


Table 6-5. Estimated Impacts on Vernal Pool Habitat in the GAI, by Transportation Project Delivery Year

Sub-basin	2019/20 Projects	2019/20 Impacts (acres)	2020/21 Projects	2020/21 Impacts (acres)	2021/22 Projects	2021/22 Impacts (acres)	2022/23 Projects	2022/23 Impacts (acres)	2023/24 Projects	2023/24 Impacts (acres)	2024/25 Projects	2024/25 Impacts (acres)	2025/26 Projects	2025/26 Impacts (acres)	2026/27 Projects	2026/27 Impacts (acres)	2027/28 Project	2027/28 Impacts (acres)	2028/29 Projects	2028/29 Impacts (acres)	Total Projects	Total Impacts[a] (acres)
Middle San Joaquin-Lower Chowchilla	0	0.0	0	0.0	0	0.0	0	0.0	2	3.4	0	0.0	1	1.3	0	0.0	0	0.0	2	0.5	**5**	**5.1**
Rock Creek-French Camp Slough	0	0.0	0	0.0	0	0.0	0	0.0	1	0.6	0	0.0	0	0.0	0	0.0	1	3.9	0	0.0	**2**	**4.4**
San Joaquin Delta	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	**2**	**0.6**
Upper Calaveras California	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0	**2**	**0.7**
Upper Mokelumne	2	2.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**3**	**2.1**
Total[b]	**3**	**2.4**	**0**	**0.0**	**0**	**0.0**	**1**	**0.1**	**4**	**4.4**	**0**	**0.0**	**1**	**1.3**	**0**	**0.0**	**2**	**4.4**	**2**	**0.5**	**13**	**13.0**
% of total mitigation need	**N/A**	**100**	**N/A**	**82.2**	**N/A**	**82.2**	**N/A**	**82.2**	**N/A**	**81.4**	**N/A**	**47.6**	**N/A**	**47.6**	**N/A**	**37.6**	**N/A**	**37.6**	**N/A**	**3.8**	**N/A**	**100%**

Note: N/A = not applicable
[a] Totals may not equal sum of rows on account of rounding. [b] Totals may not equal sum of rows because some projects cross over multiple sub-basins.

Figure 6-6. Estimated Impacts on Vernal Pool Habitat in the GAI, by Transportation Project Delivery Year

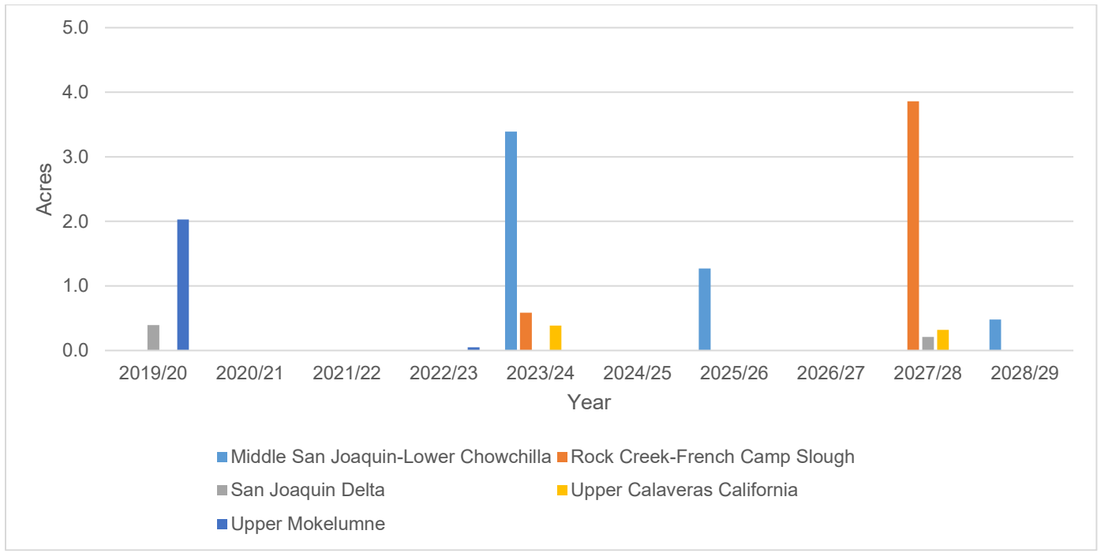
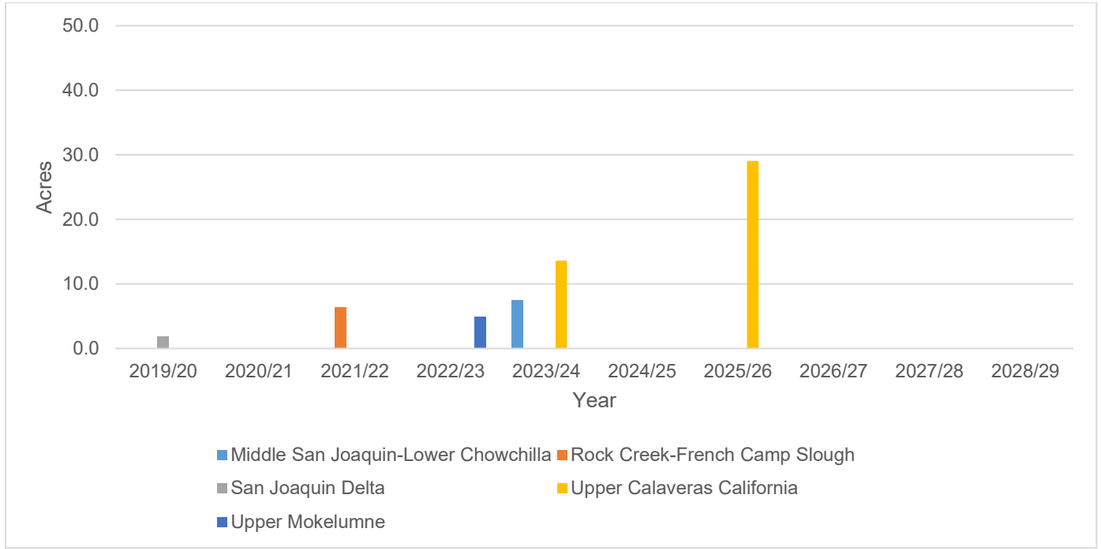


Table 6-6. Estimated Impacts on Riparian Habitat in the GAI, by Transportation Project Delivery Year

Sub-basin	2019/20 Projects	2019/20 Impacts (acres)	2020/21 Projects	2020/21 Impacts (acres)	2021/22 Projects	2021/22 Impacts (acres)	2022/23 Projects	2022/23 Impacts (acres)	2023/24 Projects	2023/24 Impacts (acres)	2024/25 Projects	2024/25 Impacts (acres)	2025/26 Projects	2025/26 Impacts (acres)	2026/27 Projects	2026/27 Impacts (acres)	2027/28 Project	2027/28 Impacts (acres)	2028/29 Projects	2028/29 Impacts (acres)	Total Projects	Total Impacts[a] (acres)
Middle San Joaquin-Lower Chowchilla	0	0.0	0	0.0	0	0.0	0	0.0	1	7.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	**7.6**
Rock Creek-French Camp Slough	0	0.0	0	0.0	1	6.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	**6.4**
San Joaquin Delta	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	29.1	0	0.0	0	0.0	0	0.0	**3**	**31.0**
Upper Calaveras California	0	0.0	0	0.0	0	0.0	0	0.0	1	13.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	**13.6**
Upper Mokelumne	0	0.0	0	0.0	0	0.0	1	5.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	**5.0**
Total	**1**	**2.0**	**0**	**0.0**	**1**	**6.4**	**1**	**5.0**	**2**	**21.2**	**0**	**0.0**	**2**	**29.1**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**7**	**63.6**
% of total mitigation need	**N/A**	**100**	**N/A**	**97.1**	**N/A**	**97.1**	**N/A**	**87.0**	**N/A**	**79.1**	**N/A**	**45.8**	**N/A**	**45.8**	**N/A**	**0.0**	**N/A**	**0.0**	**N/A**	**0.0**	**N/A**	**100%**

Note: N/A = not applicable
[a] Totals may not equal sum of rows on account of rounding.

Figure 6-7. Estimated Impacts on Riparian Habitat in the GAI, by Transportation Project Delivery Year



6.3 Acceleration Priorities

At the time of an advance mitigation project proposal, Caltrans' transportation project sequence prioritization will reflect the updated information provided in the most current SHOPP Ten-Year Book and will be based on meeting the District's needs and performance targets while financially balancing the District's and AMA accounts.

As shown in Table 6-1 and on Figure 6-2, which are based on Quarter 2 of the Ten-Year Book, most impacts on species of mitigation need in the GAI are spread throughout of the 10-year period evaluated in the SAMNA. Similarly, as shown in Tables 6-2 through 6-6 and on Figures 6-3 through 6-7, most impacts on aquatic resources are spread throughout the 10-year planning period.

Most of the projects that are anticipated to advertise in the 2022/23 fiscal year or prior to this have already required specific project mitigation when they obtained their permits in the current 2021/22 fiscal year (July 1, 2021, to June 30, 2022) (Figure 6-8). Therefore, most projects that could benefit from an advance mitigation project initiated post RAMNA would need to be advertised in the 2026/27, 2027/28, and 2028/29 fiscal years.

At this time, the Road Repair and Accountability Act of 2017 (also known as Senate Bill 1) priorities are the District's priorities, which generally fall in the middle and end of the 10-year assessment period. As a result of the dynamic nature of transportation planning, since the 2019/20 to 2028/29 (Quarter 2) SHOPP Ten-Year Book was published, delivery schedules associated with many transportation projects have changed. For example, the following transportation project was delayed:

- SHOPP Project ID 15691 (10-0G830) Merced Seismic Restoration on Route 152 was expected to advertise in the 2019/20 fiscal year but is not expected now until the 2022/23 fiscal year.

Other transportation projects may be accelerated.

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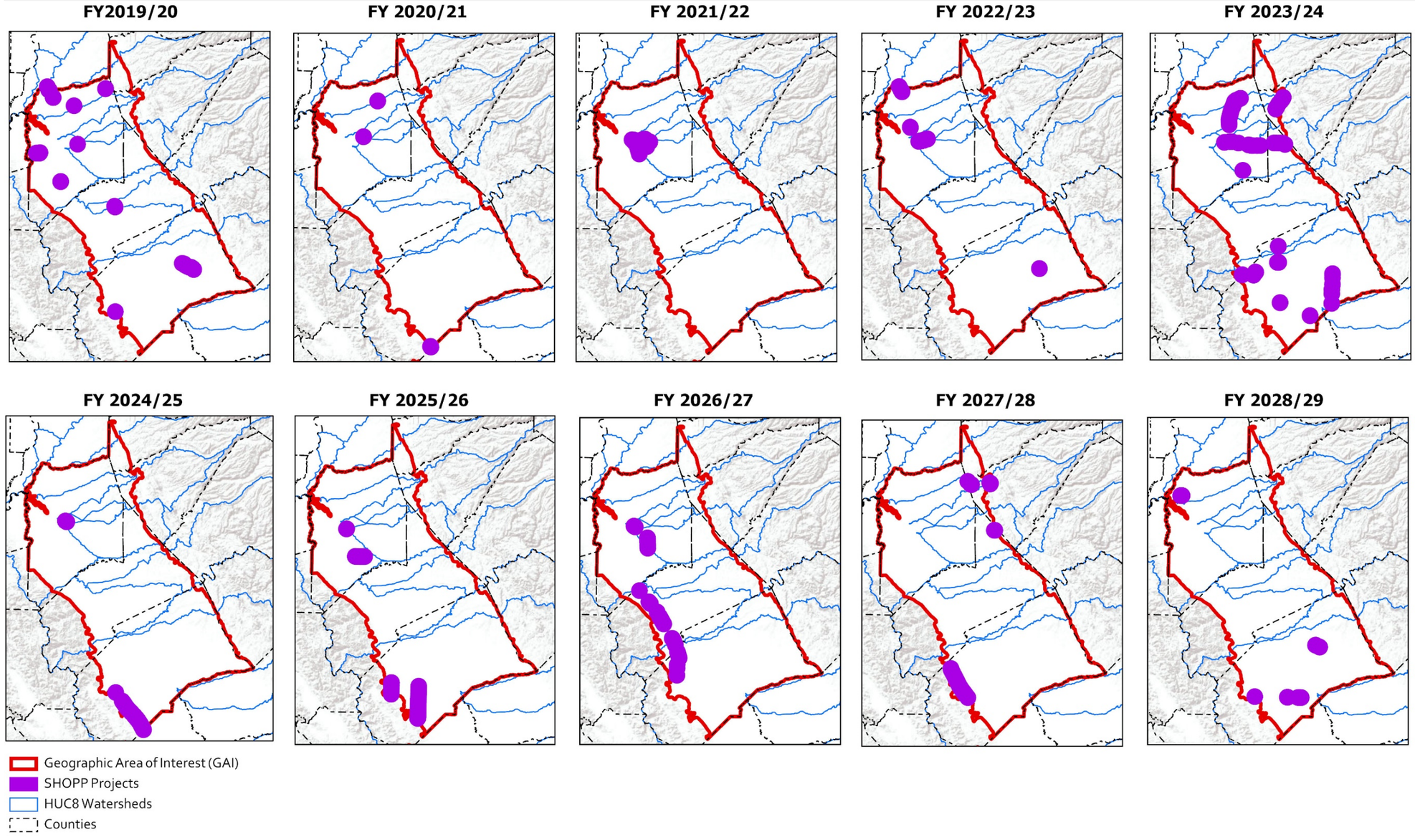
Figure 6-8. Location of SHOPP Estimated Impacts, by Transportation Project Delivery Year



Sources: Esri, USGS, NOAA, USGS

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

7.2 Natural Resource Regulatory Agencies with Wildlife Resources Oversight

Table 7-1 lists the natural resource regulatory agencies with the authority to condition transportation projects delivered in the GAI with wildlife resource-related compensatory mitigation. The aquatic resources used by wildlife, such as streams, wetlands, and non-wetland waters, are 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
CDFW	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.
FWS	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. 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.
NMFS	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. 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. 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.

[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 terrestrial species of mitigation need identified for the GAI are California red-legged frog, California tiger salamander, giant garter snake, and valley elderberry longhorn beetle. Each species is briefly described below.

7.3.1. 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. The GAI falls within the Sierra Nevada Foothills and Central Valley, South and East San Francisco Bay, and Diablo Range and Salinas Valley California red-legged frog Recovery Units (FWS 2002).

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.

7.3.2. California Tiger Salamander

California tiger salamander is a federally and state threatened amphibian. There are three DPSs of California tiger salamander: the Central California DPS, Santa Barbara County DPS, and Sonoma County DPS. The Central California DPS is the only one that occurs in the GAI. Historically, this DPS occurred in the valleys and bordering foothills of the Central Valley and Inner Coast Range from San Luis Obispo, Kern, and Tulare Counties in the south to Sacramento and Yolo County in the north. Most of the historical Central Valley populations of this California endemic species have been extirpated. Typical habitat associations include grassland, oak savanna, and edges of mixed woodland and lower-elevation coniferous forest. This species is found from near sea level up to a maximum elevation of approximately 3,940 feet above mean sea level in the Coast Ranges and 1,640 feet above mean sea level in the Sierra Nevada foothills (FWS 2017b).

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. Optimal breeding ponds are ephemeral, forming in winter and drying in summer, and free of predatory nonnative fish and bullfrogs.

7.3.3. Giant Garter Snake

Giant garter snake is a federal and state threatened reptile species. They are endemic to California, and formerly ranged throughout much of the Central Valley from as far north as Chico to as far south as Bakersfield. However, the species is now considered extirpated from much of its historical range, including Stanislaus County and everywhere south of Fresno (Stebbins and McGinnis 2012).

Typical habitat for this species includes perennial aquatic habitat such as freshwater marshes and sloughs for foraging, bankside basking areas with nearby emergent vegetation for cover, and upland refugia such as small mammal burrows for extended periods of inactivity. In the absence of their natural habitat, giant garter snakes frequently occupy flooded rice fields, irrigation canals, and ditches that simulate their preferred habitat and that have connectivity to upland refugia (FWS 2017c).

Giant garter snakes emerge from their overwintering sites in March and begin mating shortly thereafter. Females bear live young from July through September, and most giant garter snakes have returned to underground refugia by October (Stebbins and McGinnis 2012).

7.3.4. Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle is a federally threatened insect species that is endemic to California, occurring in much of the Central Valley from southern Shasta County to northern Fresno County, including the valley floor and lower foothills up to approximately 500 feet in elevation (FWS 2017d).

Valley elderberry longhorn beetles are entirely dependent on their host plant, elderberry (*Sambucus* spp.), upon which they spend their entire life cycle, most of it developing within the pith of the elderberry stems. Adults are only active on the surface of the shrubs for a 1- to 3-week window between March and July, typically coinciding with the elderberry blooming period (FWS 2017d). During this time, they mate, the females lay their eggs on the leaves of the shrub, then when the larvae hatch, they bore into an elderberry stem where they feed and pupate—a process that can take as long as 2 years (Talley et al. 2006). When pupation is complete, the adult beetle emerges from an exit hole it had previously created in the stem. These exit holes are the most readily observed evidence of the presence of the species.

Valley elderberry longhorn beetles most often occupy elderberry shrubs within riparian woodland habitats, although they are sometimes found in elderberry shrubs that are not associated with riparian corridors in habitats such as valley oak woodland and annual grassland (FWS 2017d).

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. 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 Taxa Documents	See below	See below
*Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)*	FWS 2002	Identifies California red-legged frog Recovery Units and their respective Core Areas. The GAI falls within the Sierra Nevada Foothills and Central Valley Recovery Unit.
Revised Designation of Critical Habitat for the California Red-legged Frog	FWS 2010	Identifies critical habitat for the California red-legged frog.
California Tiger Salamander Central California DPS Designation of Critical Habitat	FWS 2005a	Identifies critical habitat for the Central California DPS California tiger salamander.
California Tiger Salamander Central California DPS 5-Year Review	FWS 2014b	Identifies protected lands that have known occurrences of California tiger salamander.
*Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)*	FWS 2017b	Identifies California tiger salamander Recovery Units and their respective Management Units. The GAI falls within the Central Valley Recovery Unit.
*Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)*	FWS 2017c	Identifies giant garter snake Recovery Units, including those wholly or partially within the GAI: ▪ Cosumnes-Mokelumne Basin Recovery Unit ▪ Delta Basin Recovery Unit ▪ San Joaquin Basin Recovery Unit
Giant Garter Snake 5-Year Review	FWS 2020	Identifies protected lands that have known occurrences of giant garter snake.
Revised Recovery Plan for Valley Elderberry Longhorn Beetle	FWS 2019	Identifies valley elderberry longhorn beetle Management Units. The GAI falls within the San Joaquin River Management Unit.
Valley Elderberry Longhorn Beetle 5-Year Review	FWS 2006b	Identifies the range and status of the species within the GAI.

Document	Reference	Areas of Important Habitat
Conservation and Land Management Documents	See below	See below
California Wildlife Movement Barriers: 2020 Priority Wildlife Movement Barrier Locations by Region	CDFW 2020a	Within the GAI, identifies a culvert on SR 12 in San Joaquin County and a concrete canal in Los Banos in Merced County as wildlife passage priorities for giant garter snake, Pacific pond turtle, mink, river otter, beaver, mule deer, elk, badger, and other reptiles and mammals. The SHOPP Ten-Year Book does not include transportation projects in these areas.
San Joaquin County MSHCP and Open Space Plan	San Joaquin County 2000	California red-legged frog, California tiger salamander, giant garter snake, and valley elderberry longhorn beetle are all covered species under the plan.
San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan	FWS 2006a	California tiger salamanders are known to occur in a vernal pool complex within the refuge. Includes an objective to avoid impacts on vernal pools during refuge management activities and maintain proper vegetation structure through grazing.
San Joaquin River Parkway Master Plan	San Joaquin River Conservancy 2017	Notes that valley elderberry longhorn beetles are known to occur in the plan area. Includes a conservation goal to restore a continuous distribution of elderberry shrubs along the parkway with a distance no greater than 0.25 mile between plants.
California Essential Habitat Connectivity Project	Spencer et al. 2010	Identifies Natural Landscape Blocks and Essential Connectivity Areas in a set of defined ecoregions. The GAI falls entirely within the Central Valley Ecoregion. Notes that there are very few opportunities for upland connectivity in the Central Valley Ecoregion because of habitat conversion for agricultural and urban uses. Most connectivity opportunities are confined to riparian and riverine areas.

Document	Reference	Areas of Important Habitat
SWAP	CDFW 2015a	The GAI overlaps two of the SWAP's defined geographic provinces: ▪ Central Valley and Sierra Nevada Province: o In the Central Valley and Sierra Nevada Province, all of the species of mitigation need (valley elderberry longhorn beetle, California tiger salamander, California red-legged frog, and giant garter snake) are considered Species of Greatest Conservation Need. ▪ Bay Delta and Central Coast Province: o In the Bay Delta and Central Coast Province, California tiger salamander, California red-legged frog, and giant garter snake are considered Species of Greatest Conservation Need. ▪ The SWAP defines a broad target of increasing the acreage of specific vegetation types and habitats available to focal species by 5 percent over their 2015 levels by 2025.
Wildlife Connectivity across the Northern Sierra Nevada Foothills	CDFW 2015b	▪ Builds on the statewide CEHC work as recommended in the CEHC project report. ▪ Project objectives were to take a fine-scale look at connectivity within the Northern Sierra Nevada Foothills and between there and adjacent lands in the Central Valley and Sierra Nevada, using species-specific data to model connections between blocks of protected lands. ▪ The study area encompasses much of the eastern half of the GAI.
County and City General Plans	See below	See below
City of Atwater General Plan	City of Atwater 2000	Identifies suitable habitat in the planning area for valley elderberry longhorn beetle, California red-legged frog, California tiger salamander, and giant garter snake.
City of Newman General Plan 2030	City of Newman 2007	Identifies valley elderberry longhorn beetle as occurring in the plan area, and includes a measure requiring avoidance of elderberry shrubs and mitigation for development within 100 feet of elderberry shrubs.
City of Patterson General Plan	City of Patterson 2010	Identifies valley elderberry longhorn beetle, California red-legged frog, and California tiger salamander as occurring or having the potential to occur within the plan area. Includes measures requiring surveys, avoidance, and mitigation for impacts for all of these species.

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 *Recovery Plan for the California Red-legged Frog* (FWS 2002), the *California Tiger Salamander Central California DPS 5-year Review:* (FWS 2014b), and the *Recovery Plan for the Giant Garter Snake* (FWS 2017c) 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 (FWS 2002, 2014b, 2017c). 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.

Roads and highways hinder the movement of California tiger salamanders, California red-legged frogs, and giant garter snakes, and are considered permanent physical barriers leading to increased habitat fragmentation and isolation of populations (FWS 2002, 2017c, 2020). Roads near aquatic habitats may lead to increased erosion, sedimentation, and contaminant-laden runoff, negatively affecting amphibian populations including California tiger salamander and California red-legged frog (FWS 2002, 2017c). Artificial light pollution from urban and roadway illumination can affect wildlife 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).

Conversion of riparian areas and isolation of remaining habitat patches are considered to be significant ongoing threats to valley elderberry longhorn beetle. Because the species has limited dispersal capabilities, roads and highways are believed to be major barriers constraining the species' ability to move between areas of suitable habitat (FWS 2019).

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 types, and further threaten already endangered or threatened natural resources.

Introduced fish and bullfrogs are known to predate California tiger salamanders and California red-legged frogs (FWS 2002, 2017c). The invasive barred tiger salamander is known to hybridize with the California tiger salamander, producing offspring that are more likely to survive than either parent species. These hybrids also were shown to negatively affect populations of the native California tiger salamander (Ryan et al. 2009).

Invasive grasses can be a major problem for California tiger salamander. Improper grazing practices and habitat management can lead to a buildup of thatch consisting of nonnative grasses, which has been cited by FWS as a threat to California tiger salamander (FWS 2017b). Invasive plant species such as giant reed and cape ivy (*Delairea odorata*) may alter the structure of native riparian habitat and decrease available surface water for California red-legged frog (FWS 2002).

Introduced fish, crayfish, and bullfrogs are also known to predate and compete with giant garter snakes. In addition, giant garter snakes face competition from introduced water snakes, which have recently established populations in some Central Valley waterways (FWS 2017c). Invasive plant species such as water hyacinth and water-primrose (*Ludwigia* spp.) may have both negative and positive effects on giant garter snakes, choking out open water and thereby reducing edge habitats that are preferred as foraging areas, while simultaneously providing them with cover for basking and predator avoidance (FWS 2020).

Valley elderberry longhorn beetles may be negatively affected by Argentine ants, a widespread invasive species, which have been documented predating the beetle's eggs and larvae. Argentine ants are known to occur in several areas occupied by valley elderberry longhorn beetles (FWS 2019). Impacts from invasive plant species are largely unknown, although the increasing prevalence of nonnative plants in California ecosystems is expected to have negative impacts on native elderberry populations, which are the beetle's obligate host plants (FWS 2014a).

7.5.3. Disease and Predation

Disease is considered a threat to the California tiger salamander, which is affected by various forms of ranavirus and a chytrid fungus that can lead to mortality and has the potential to affect populations (FWS 2017b). California red-legged frogs may be affected by chytridiomycosis, a disease caused by a fungal pathogen called chytrid. Although the effects of chytrid on California red-legged frogs are not well-understood, it is known to have caused mass mortality and population declines in other amphibian species (FWS 2002). Giant garter snakes may be susceptible to snake fungal disease, an emerging disease caused by the fungal pathogen *Ophidiomyces ophiodiicola*. This

disease has only recently been documented in California and may be spread by invasive water snakes (FWS 2020). Disease is not thought to be a significant threat to valley elderberry longhorn beetles.

Predation is considered a major threat to several of the species of mitigation need in the GAI. As noted above, California tiger salamanders, California red-legged frogs, and giant garter snakes are all susceptible to predation from invasive species including bullfrogs, crayfish, and nonnative fish (FWS 2002, 2017b, 2020). Valley elderberry longhorn beetles face predation risks from invasive Argentine ants, which may prey on eggs and larvae (FWS 2019), as mentioned above.

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

Section 2.4 provides a brief overview of the GAI's climate and available planning-level predictions for climate change and sea-level rise for the region. In the next 30 years, the climate is expected to change. Expected changes include extended periods of higher temperatures and more frequent heat waves 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 2019b).

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, differing life history traits of invasive species such as bullfrogs may be more 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).

California tiger salamander may be affected by climate change through a decrease in hydroperiods necessary to support this species' life cycle (that is, inundation during winter rains and breeding habitat that holds water for a minimum of 12 weeks in a year of average rainfall). A change in hydroperiods in this way may reduce the ability of this species to reproduce and for larval salamanders to develop, while favoring nonnative hybrid tiger salamanders that are known to travel farther and faster than native salamanders under higher temperatures (FWS 2017b). In addition, climate change may affect California tiger salamander through altered prey-predator relationships, increased effects from ultraviolet radiation, and increased effects from diseases (FWS 2014b).

Less available water will decrease habitat availability and suitability and has the potential to exacerbate other factors affecting giant garter snake populations (FWS 2020). More prolonged droughts may lead to an increase in instances of water transfer from rice agriculture to other uses. Although giant garter snakes are not solely dependent on rice agriculture, the fallowing of rice fields or a reduction in the amount of rice agriculture can decrease adult giant garter snake survival within the Central Valley (Halstead et al. 2019).

Potential impacts on valley elderberry longhorn beetles from climate change are difficult to predict and quantify. However, available models broadly indicate that climate change will have negative effects on available habitat for the species throughout its range (FWS 2014a).

Essential habitat connectivity in the GAI, including large remaining blocks of intact habitat or natural landscape, is shown on Figure 2-8. 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 terrestrial climate change resilience rank from the ACE dataset (CDFW 2018a) is presented on Figure 2-5. Climate resilience is low throughout the floor of the Central Valley, with much of the area having a rank of only 1 or 2. It is in these low-elevation locations that impacts from climate change are expected to be the most severe in the GAI.

7.5.5. Contaminants

Pesticides, herbicides, mineral fertilizers, industrial chemicals, and airborne pollutants are known to have negative effects on amphibians. California-red legged frog is especially affected by aqueous pesticides because of the many life stages that take place within aquatic environments (FWS 2002). While not directly related to contaminants, the application of rodenticides and other rodent control methods pose a threat to California tiger salamander by removing rodents from the landscape and preventing new burrow construction, thus reducing habitat for the California tiger salamander (FWS 2017b). Contaminants are not thought to be a significant threat to giant garter snakes (FWS 2017c).

While the specific effects of contaminants on valley elderberry longhorn beetles have not been well-studied, it is likely that they are susceptible to impacts from drift of broad-spectrum pesticides near habitats that they are occupying (FWS 2014a). Areas where pesticides are in use may also function as dispersal barriers if they are located between patches of suitable elderberry shrub habitat (FWS 2019).

7.6 Multi-species Benefits

While the species of mitigation need identified for this GAI are California red-legged frog, California tiger salamander, giant garter snake, and valley elderberry longhorn beetle, 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. Specific species that may require compensatory mitigation as part of an AMP proposal include the following species:

- Colusa grass
- Foothill yellow-legged frog (*Rana boylii*)
- Hairy Orcutt grass

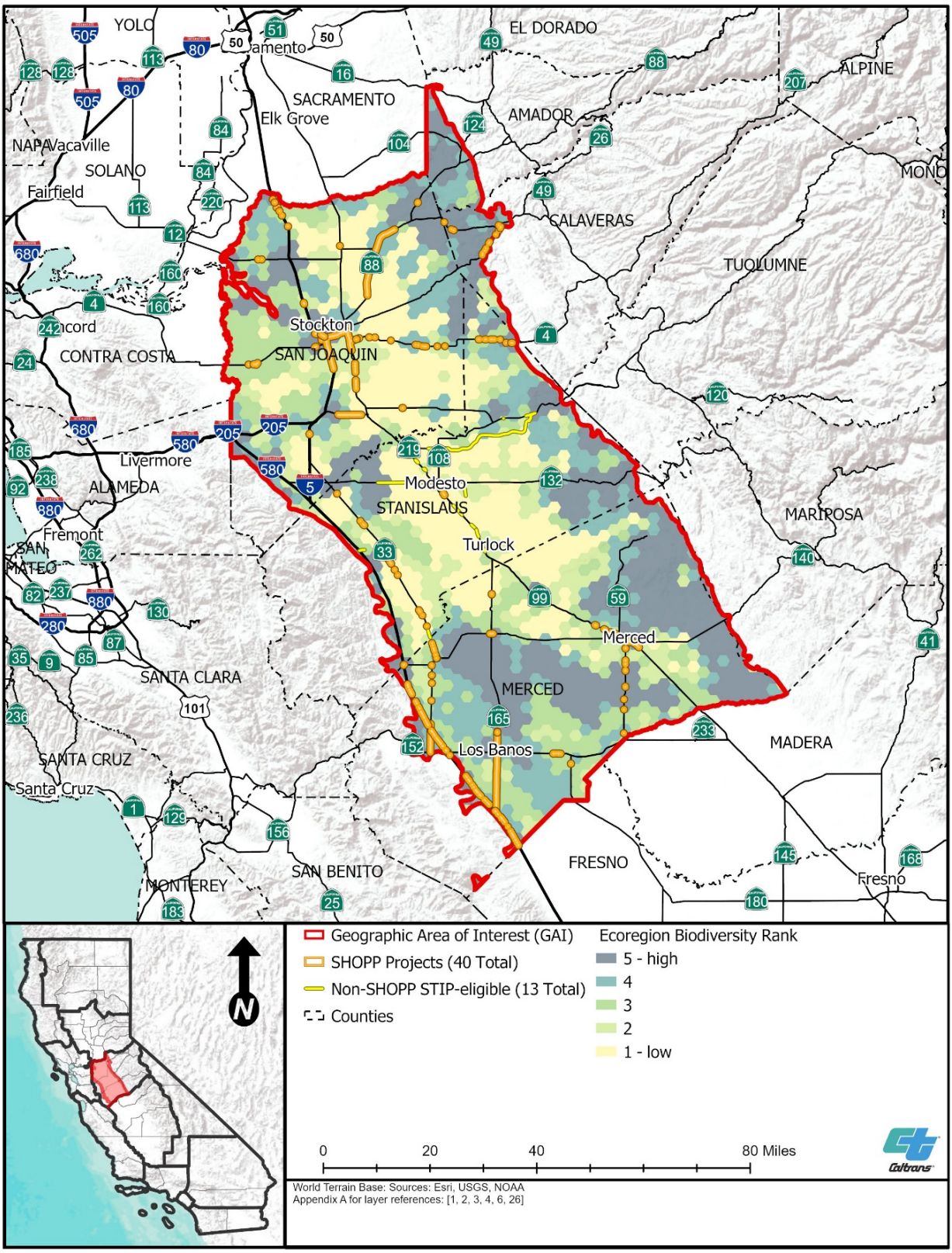
- Hoover's spurge
- Nelson's antelope squirrel (*Ammospermophilus nelsoni*)
- Riparian brush rabbit (Sylvilagus bachmani riparius)
- San Joaquin kit fox (*Vulpes macrotis mutica*)
- San Joaquin Orcutt grass
- Townsend's big-eared bat (*Corynorhinus townsendii*)

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 much of the SHS with SHOPP and STIP-eligible projects, while other portions of the SHS within the GAI with SHOPP and STIP-eligible projects show low biodiversity. Habitats are mapped in Appendix B, and the other special-status species that may occur in these habitats are provided in Appendix C.

As described in Chapter 4, one HCP covering multiple species occurs within the GAI: the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan. While the primary purpose of this plan is to benefit the plan's covered species through acquisition, protection, and restoration of covered species habitat, these actions will benefit a variety of species that utilize these habitats. It is likely that any Caltrans mitigation requirements that are addressed through this plan will also provide benefits to other co-occurring species in addition to the covered species.

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 (Caltrans 2021h). 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 species of mitigation need 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 are 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 10 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 lift[2] 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.	**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. **Sub-Objective WILD-1.1.2:** Prioritize key areas, such as designated critical habitat, movement corridors, and buffer zones. **Sub-Objective WILD-1.1.3:** Prioritize acquisition and/or protection of large blocks of suitable, occupied habitat for the species of mitigation need; lands adjacent to occupied habitat; and/or land that expands or buffers existing occupied protected habitats. **Sub-Objective WILD-1.1.4:** Prioritize land acquisition and/or protection that supports key populations. **Sub-Objective WILD-1.1.5:** Prioritize acquisition, protection, and/or enhancement of SWAP (CDFW 2015a) conservation targets: salt marsh, freshwater marsh, chaparral, California grassland and flowerfields, California foothill and valley forests and woodlands, and American southwest riparian forest and woodland (Figure 7-2) that coincide with the species of mitigation need range, as well as other locally or regionally important habitat types. **Sub-Objective WILD-1.1.6:** Create, enhance, or restore breeding habitat in protected areas where it is limited.	▪ California red-legged frog ▪ California tiger salamander ▪ giant garter snake ▪ valley elderberry longhorn beetle	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *CEHC* (Spencer et al. 2010) ▪ *Wildlife Connectivity across the Northern Sierra Nevada Foothills* (CDFW 2015b) ▪ *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)* (FWS 2002) ▪ *Revised Designation of Critical Habitat for the California Red-legged Frog* (FWS 2010) ▪ *California Tiger Salamander Central California DPS Designation of Critical Habitat* (FWS 2005a) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (FWS 2017c) ▪ *Giant Garter Snake 5-Year Review* (FWS 2020) ▪ *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (FWS 2019) ▪ *Valley Elderberry Longhorn Beetle 5-Year Review* (FWS 2006b) ▪ *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Joaquin River Parkway Master Plan* (San Joaquin River Conservancy 2017) ▪ *City of Newman General Plan 2030* (City of Newman 2007) ▪ *City of Patterson General Plan* (City of Patterson 2010)

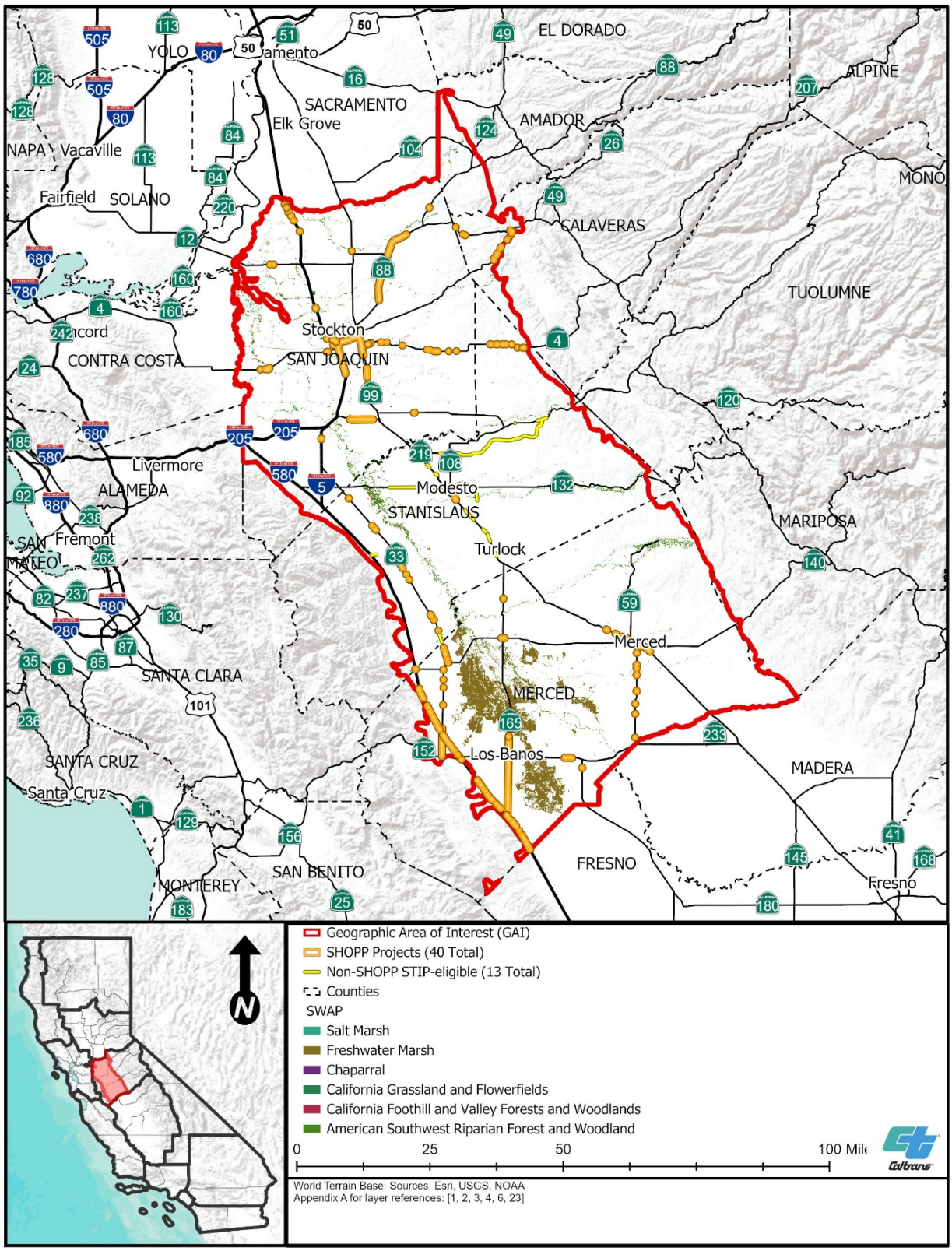
Objective	Sub-Objective	Affected Species[a]	Alignment with Conservation and Management Plans[b]
Goal WILD-2: Preserve, enhance, and increase connectivity between blocks of habitat supporting species of mitigation need to allow for dispersal that will maintain resilience and variability of populations	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.	**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. **Sub-Objective WILD-2.1.2:** Prioritize habitat in key linkage areas, between habitat areas, and/or areas that provide a buffer to key or existing corridors. **Sub-Objective WILD-2.1.3:** Identify areas that will enhance connectivity between existing protected breeding locations and create new breeding habitat for the species of mitigation need.	▪ California red-legged frog ▪ California tiger salamander ▪ giant garter snake ▪ valley elderberry longhorn beetle	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *CEHC* (Spencer et al. 2010) ▪ *Wildlife Connectivity across the Northern Sierra Nevada Foothills* (CDFW 2015b) ▪ *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)* (FWS 2002) ▪ *Revised Designation of Critical Habitat for the California Red-legged Frog* (FWS 2010) ▪ *California Tiger Salamander Central California DPS Designation of Critical Habitat* (FWS 2005a) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (FWS 2017c) ▪ *Giant Garter Snake 5-Year Review* (FWS 2020) ▪ *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (FWS 2019) ▪ *Valley Elderberry Longhorn Beetle 5-Year Review* (FWS 2006b) ▪ *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Joaquin River Parkway Master Plan* (San Joaquin River Conservancy 2017) ▪ *City of Newman General Plan 2030* (City of Newman 2007) ▪ *City of Patterson General Plan* (City of Patterson 2010)
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.	**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 2-5). **Sub-Objective WILD-3.1.2:** Prioritize management of invasive species in key areas, such as movement corridors, that may be exacerbated by climate change and sea-level rise and that would provide functional lift for the species of mitigation need.	▪ California red-legged frog ▪ California tiger salamander ▪ giant garter snake ▪ valley elderberry longhorn beetle	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *CEHC* (Spencer et al. 2010) ▪ *Wildlife Connectivity across the Northern Sierra Nevada Foothills* (CDFW 2015b) ▪ *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)* (FWS 2002) ▪ *Revised Designation of Critical Habitat for the California Red-legged Frog* (FWS 2010) ▪ *California Tiger Salamander Central California DPS Designation of Critical Habitat* (FWS 2005a) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (FWS 2017c) ▪ *Giant Garter Snake 5-Year Review* (FWS 2020) ▪ *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (FWS 2019) ▪ *Valley Elderberry Longhorn Beetle 5-Year Review* (FWS 2006b) ▪ *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Joaquin River Parkway Master Plan* (San Joaquin River Conservancy 2017) ▪ *City of Newman General Plan 2030* (City of Newman 2007) ▪ *City of Patterson General Plan* (City of Patterson 2010)

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.	**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. **Sub-Objective WILD-4.1.2:** Prioritize restoration of native plant species in key areas, such as critical habitat, movement corridors, and buffer zones.	▪ California red-legged frog ▪ California tiger salamander ▪ giant garter snake ▪ valley elderberry longhorn beetle	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *CEHC* (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* (FWS 2010) ▪ *California Tiger Salamander Central California DPS Designation of Critical Habitat* (FWS 2005a) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (FWS 2017c) ▪ *Giant Garter Snake 5-Year Review* (FWS 2020) ▪ *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (FWS 2019) ▪ *Valley Elderberry Longhorn Beetle 5-Year Review* (FWS 2006b) ▪ *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Joaquin River Parkway Master Plan* (San Joaquin River Conservancy 2017) ▪ *City of Newman General Plan 2030* (City of Newman 2007) ▪ *City of Patterson General Plan* (City of Patterson 2010)
Objective WILD-4.2: Reduce impacts from nonnative predators within the GAI in advance of transportation project impacts.	**Sub-Objective WILD-4.2.1:** Identify and implement measures to reduce predation, such as designing ponds that dry up on an annual basis to discourage bullfrogs from establishing.	▪ California red-legged frog ▪ California tiger salamander	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *CEHC* (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* (FWS 2010) ▪ *California Tiger Salamander Central California DPS Designation of Critical Habitat* (FWS 2005a) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Joaquin River Parkway Master Plan* (San Joaquin River Conservancy 2017) ▪ *City of Newman General Plan 2030* (City of Newman 2007) ▪ *City of Patterson General Plan* (City of Patterson 2010)
Objective WILD-4.3: Reduce road-associated mortality within the GAI in advance of transportation project impacts.	**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 such crossing areas.	▪ California red-legged frog ▪ California tiger salamander ▪ giant garter snake	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *Wildlife Connectivity across the Northern Sierra Nevada Foothills* (CDFW 2015b) ▪ *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)* (FWS 2002) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (FWS 2017c) ▪ *Giant Garter Snake 5-Year Review* (FWS 2020) ▪ *Measures to Reduce Road Impacts on Amphibians and Reptiles in California: Best Management Practices and Technical Guidance* (Caltrans 2021h)

Objective	Sub-Objective	Affected Species[a]	Alignment with Conservation and Management Plans[b]
Goal WILD-5: Provide 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.	**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. **Sub-Objective WILD-5.1.2:** Identify SHS right-of-way areas where enhancement efforts may benefit pollinators, as well as the species of mitigation need. **Sub-Objective WILD-5.1.3:** Consider the needs of other co-occurring species when planning site-specific actions to restore or create aquatic breeding habitat for California red-legged frog.	▪ California red-legged frog ▪ California tiger salamander ▪ giant garter snake ▪ valley elderberry longhorn beetle	▪ *SWAP* (CDFW 2015a) and companion plans ▪ *CEHC* (Spencer et al. 2010) ▪ *Wildlife Connectivity across the Northern Sierra Nevada Foothills* (CDFW 2015b) ▪ *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)* (FWS 2002) ▪ *Revised Designation of Critical Habitat for the California Red-legged Frog* (FWS 2010) ▪ *California Tiger Salamander Central California DPS Designation of Critical Habitat* (FWS 2005a) ▪ *California Tiger Salamander Central California DPS 5-Year Review* (FWS 2014b) ▪ *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (FWS 2017b) ▪ *Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (FWS 2017c) ▪ *Giant Garter Snake 5-Year Review* (FWS 2020) ▪ *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (FWS 2019) ▪ *Valley Elderberry Longhorn Beetle 5-Year Review* (FWS 2006b) ▪ *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Joaquin River Parkway Master Plan* (San Joaquin River Conservancy 2017) ▪ *City of Newman General Plan 2030* (City of Newman 2007) ▪ *City of Patterson General Plan* (City of Patterson 2010)

[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 Conservation Target Habitats



7.8 Summary

Caltrans anticipates that future SHOPP and STIP-eligible transportation projects may be conditioned by CDFW, FWS, or 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, sea level rise, and wildfire; 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 function 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 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, vernal pools, 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 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' conservation goals and objectives and, therefore, 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, vernal pool, and/or 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 FGC § 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, identified 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, summarized 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 identified:
  - Federal and state policies and binding and non-binding regional conservation and land management plans.
  - Current and projected pressures and stressors, including climate change and sea-level rise, for which there is a transportation nexus.
  - Opportunities to enhance the conservation benefits through advance mitigation projects.
  - Opportunities to provide co-benefits, where possible, to water quality, groundwater recharge, and species that require aquatic habitats.
- Last, Caltrans analyzed the aforementioned 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
CDFW	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 FGC, Division 1 of Title 14 of the California Code of Regulations, et seq. These programs help fulfill CDFW's mission to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values.
Corps	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. Per 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.
EPA	EPA has authority under the CWA (33 USC § 11251–1357) to restore and maintain the chemical, physical, and biological integrity of the nation's waters. EPA and Corps jointly implement the CWA Section 404 program, which regulates discharge of dredge or fill material into WOTUS. Federal authorizations also need to be reviewed for compliance with CWA Section 401. 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.

Agency	Summary
FWS	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 the 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. 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 off site or on site.
NMFS	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. Pursuant to an MOU with FHWA, Caltrans has assumed the responsibilities of the Secretary of Transportation under the ESA for consultations with NMFS. Consultation with NMFS is required if the proposed project may affect listed species or designated critical habitat. The consultation process can vary depending on the complexity of the project or action. Caltrans prepares a biological assessment to determine the project's effect on the listed species and critical habitat. If Caltrans finds, and NMFS agrees, that the proposed project is not likely to adversely affect any listed species or designated critical habitat, NMFS provides a letter of concurrence and no further consultation is required. If Caltrans determines that its action is likely to adversely affect a listed species and/or its designated critical habitat, formal consultation is required. NMFS will issue a biological opinion describing the amount and extent of incidental take expected, which will include terms and conditions to minimize the incidental take. If NMFS determines that the project will jeopardize the continued existence of the species or result in the destruction or adverse modification of designated critical habitat, NMFS will provide reasonable and prudent alternatives to the proposed action. 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 the ESA consultation. 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.

Agency	Summary
SWRCB and RWQCB	The Porter-Cologne Act governs water quality regulation in California and gives SWRCB and the 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 RWCQBs, 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. SWRCB and the RWQCBs have been delegated the responsibility of implementing CWA Section 401, which regulates the discharge of pollutants into WOTUS. SWRCB and the 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 *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (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 portions of the following HUC-8 boundaries: Fresno River (HUC-8 18040007), Lower San Joaquin River (HUC-8 18040002), Middle San Joaquin-Lower Chowchilla (HUC-8 18040001), Rock Creek-French Camp Slough (HUC-8 18040051), San Joaquin Delta (HUC-8 18040003), Upper Calaveras California (HUC-8 18040011), Upper Merced (HUC-8 18040008), Upper Mokelumne (HUC-8 18040012), Upper Stanislaus (HUC-8 18040010), and Upper Tuolumne (HUC-8 18040009). In the GAI, the Merced, San Joaquin, Stanislaus, and Tuolumne Rivers are the major stream systems (Central Valley RWQCB 2018). Additionally, there are hundreds of named and unnamed tributaries, the majority of which flow into the San Joaquin River. Flow into these systems originates from rainfall and occasionally from snow melting in the Sierra Nevada.

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 146,086 acres of aquatic habitat, consisting of 24 wetland habitats and 8 non-wetland waters habitats that are listed in Table 2-6 (Caltrans 2021f, 2021g). Six 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 2-5.

Vernal Pools

Vernal pool habitat was discussed in Section 2.15.3. Because no detailed vernal pool GIS layer is currently available, vernal pool habitat information was excerpted from and is consistent with the SAMNA's invertebrate layer (Figure 2-13).

8.3.2. Riparian Habitat

Riparian habitat is discussed in Section 2.16. Because no detailed riparian GIS layer is currently available, riparian habitat information was excerpted from the SAMNA's vegetation layer. The riparian habitats identified in the GAI are valley foothill riparian and riverine (Table 2-2).

8.3.3. Special-status Fish Species of Mitigation Need

Special-status fish species were identified in Section 2.15.2. In brief, all special-status fish species with SAMNA results and expected to be present in the GAI were identified as species of mitigation need for this RAMNA.

Chinook Salmon

Two ESUs of chinook salmon overlap the GAI: Central Valley spring-run ESU and Sacramento River winter-run ESU (Section 2.15.2). The Central Valley spring-run ESU is federally and state listed as threatened. The Sacramento River winter-run ESU is federally and state listed as endangered. The known ranges of both of these ESUs overlap the GAI only in its far northwestern corner in waters surrounding the Delta islands west of Stockton. There is no designated critical habitat for either ESU of this species in the GAI (Section 2.8). The Central Valley spring-run ESU includes all naturally spawned spring-run chinook salmon originating from the Sacramento River and its tributaries and also spring-run chinook salmon from the Feather River Hatchery Spring-run Chinook Program (70 *Federal Register* 37159). The Sacramento River winter-run ESU includes all spawned winter-run chinook salmon originating from the Sacramento River and its tributaries. It also includes winter-run chinook salmon from the Livingston Stone National Fish Hatchery (81 *Federal Register* 72761).

Adult spring-run chinook salmon migrate through the Bay Delta and into the lower Sacramento River between March and September, primarily between May and June. They remain in the lower Sacramento River for several months as they mature and move into the mainstem of the Sacramento River to spawn between mid-August and early October, primarily in September. Embryos generally require 40 to 60 days to hatch, remaining as alevins for another 4 to 6 weeks, and then emerge as fry between November and March. They generally remain in the river for 12 to 16 months before migrating down through the Bay Delta and out to the ocean (NMFS 2014).

Adult winter-run chinook salmon migrate through the Bay Delta and into the lower Sacramento River between December and July. They remain in the lower Sacramento River as they mature before moving up to the mainstem of the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam. Winter-run chinook salmon spawn between late April and mid-August, but mostly between June and July. Migration of juvenile chinook salmon past the Red Bluff Diversion Dam occurs primarily from July to November (NMFS 2014).

Habitat requirements for both runs of chinook salmon generally consist of deep, cool, well-oxygenated water for immature adults migrating to spawn, clean loose gravel in swift

shallow waters for spawning, and cold water during and after spawning to protect eggs and embryos from ambient heat. Juvenile chinook salmon require riparian vegetation and substrates that allow for sources of invertebrates for food and strongly prefer shallow water habitats as they migrate outward from the Sacramento River (NMFS 2014).

Steelhead

The Central Valley DPS of steelhead occurs in the GAI (Section 2.15.2) and is federally listed as threatened. Designated critical habitat for this species occurs in many of the rivers and streams across much of the GAI including the Mokelumne, Calaveras, San Joaquin, Stanislaus, Tuolumne, and Merced Rivers (Section 2.8). The Central Valley DPS includes all naturally spawned steelhead originating below natural and human-made impassable barriers in rivers and streams that are tributaries to the Sacramento and San Joaquin Rivers (63 *Federal Register* 53: 13347–13371).

The Central Valley DPS of steelhead exhibits winter-run migration timing. The summer-run steelhead is currently a state candidate for listing as endangered; however, summer-run steelhead do not occur in the GAI. Winter-run adults enter freshwater rivers as early as September and October and continuing into April and May, then move upstream to spawn. Spawning habitat consists of freshwater streams with cold, clear water and suitable spawning substrates (Moyle 2002).

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 2.8 and 2.15.2). 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 72 degrees Fahrenheit, and spawn in sandy substrates in low-velocity streams (California Department of Fish and Game 2009).

Delta Smelt

Delta smelt is federally listed as threatened and state listed as endangered. Critical habitat has been designated for this species (Sections 2.8 and 2.15.2). Delta smelt are endemic to the upper Sacramento-San Joaquin estuary and occur in the Sacramento-San Joaquin River Delta primarily below Isleton on the Sacramento River, below Mossdale on the San Joaquin River, and in Suisun Bay. They move into freshwater between January and July for spawning. Spawning generally takes place in areas of relatively cool water and high oxygen concentrations in the Sacramento River as far upstream as the city of Sacramento, the Mokelumne River system, the Cache Slough region, the Sacramento-San Joaquin River Delta, and the Montezuma Slough area of the estuary. During high outflow periods, they may be washed into San Pablo Bay, but they do not establish permanent populations there. Delta smelt tolerate a wide range of

salinities but generally occur in areas of no more than one-third the salinity of sea water (FWS 1996).

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 2.8 and 2.15.2). This DPS includes naturally spawned green sturgeon originating in the Sacramento, Feather, and Yuba Rivers (71 *Federal Register* 17757). Green sturgeon use riverine, estuarine, 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, returning toward the Pacific Ocean starting in July. Juveniles leave from the Sacramento River and either pass through the San Francisco Bay area 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 2021b).

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. 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

Lower San Joaquin River HUC-8 18040002	Middle San Joaquin-Lower Chowchilla HUC-8 18040001	San Joaquin Delta HUC-8 18040003	Upper Calaveras California HUC-8 18040011
▪ Christman Island ▪ Gardner's Cove ▪ Little Salado Creek ▪ Salado Creek ▪ San Joaquin River	▪ Bear Creek[a] ▪ Black Rascal Creek ▪ Cottonwood Creek ▪ Fahrens Creek ▪ Los Banos Creek ▪ San Joaquin River	▪ San Joaquin Delta ▪ San Joaquin River	▪ Calaveras River
Upper Merced HUC-8 18040008	**Upper Mokelumne HUC-8 18040012**	**Upper Stanislaus HUC-8 18040010**	**Upper Tuolumne HUC-8 18040009**
▪ Merced River	▪ Mokelumne River	▪ Stanislaus River	▪ Tuolumne River

[a] Although two features called Bear Creek occur in the GAI, the Merced Vision 2030 General Plan (City of Merced 2017) refers to the feature in the Middle San Joaquin-Lower Chowchilla 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
2008 Final Compensatory Mitigation Rule	73 *Federal Register* 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).
303(d) List of Impaired Water Bodies	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 E), 53 waterbodies are listed as impaired in the GAI. Of the 53, 12 have an established TMDL.
California Wetlands Conservation Policy	Executive Order W-59-93	The "No Net Loss Policy" for wetlands aims to "[e]nsure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property."
National Wetlands Mitigation Action Plan	EPA and Corps 2002	An EPA and Corps comprehensive, interagency document to further achievement of the goal of no net loss of wetlands. The goals and objectives of the *National Wetlands Mitigation Action Plan* were incorporated into the 2008 Final Compensatory Mitigation Rule, which was updated in 2015 and includes the no net loss policy.
Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division	Corps 2015	Provides guidelines for compensatory mitigation site selection. A watershed approach should be used when selecting sites to establish compensatory mitigation.
State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State	SWRCB 2019	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.

Document	Reference	Information Identified
Water Quality Control Plan for the Central Valley Region	Central Valley RWQCB 2018	Identifies water quality objectives and beneficial uses for the Central Valley region.
Special-status Species and Sensitive Habitat Documents	See below	See below
Delta Smelt Resiliency Strategy	CDFW 2016	Includes a number of goals for improving the Delta smelt population condition, which include the removal of aquatic invasive species and the addition of supplemental sediment into the low-salinity zone of the San Joaquin River delta.
Department of Fish and Game Report to the Fish and Game Commission: A Status Review of the Longfin Smelt (Spirinchus thaleichthys) *in California*	California Department of Fish and Game 2009	Includes recovery measures to attempt to determine the extent of their benefit to longfin smelt. These measures include: ▪ reduce water pollution ▪ manage nonnative fish that consume longfin smelt ▪ enhance and/or create habitat for longfin smelt
Pacific Coast Salmon Fishery Management Plan	National Oceanic and Atmospheric Administration 2021	Includes a goal to restore essential fish habitat in the GAI. Includes conservation objectives for the Sacramento River winter-run ESU chinook salmon within stock ponds.

Document	Reference	Information Identified
Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the DPS of California Central Valley Steelhead	NMFS 2014	Includes a general goal to improve the chinook salmon and steelhead population condition in the San Joaquin River delta by conducting aquatic habitat restoration such that it contributes to an overall goal of 17,000 to 20,000 acres of restored habitat in the Sacramento and San Joaquin River delta. Includes goals to generally restore habitat for salmonids at the following locations with specific measures: ▪ Calaveras River – specifically complete TMDL projects for all listed pollutants entering the river and improve refuge cover for steelhead to reduce predation by nonnative species. ▪ Merced River – specifically increase spawning habitat downstream of Crocker-Huffman, Merced Falls, and New Exchequer dams through long-term gravel management. ▪ Mokelumne River – specifically restore riparian habitat in particular to promote shading in the river and reduce predation by nonnative species. ▪ San Joaquin River – specifically restore natural river processes, improve treatment of wastewater and stormwater flows into the river, complete TMDL projects for all listed pollutants entering the river, and restore riparian and floodplain habitats. ▪ Stanislaus River – specifically implement side channel restoration projects to improve floodplain habitat, habitat diversity, and river function; minimize predation from nonnative species at mine pits and deep pools; increase instream habitat complexity including through the addition of large woody material; and complete TMDL projects for all listed pollutants entering the river. ▪ Tuolumne River – specifically implement side channel restoration projects to improve floodplain habitat, habitat diversity, and river function; restore riparian habitat to promote shading and habitat diversity; improve instream refuge cover to minimize predation from nonnative species; and complete TMDL projects for all listed pollutants entering the river.
Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes	FWS 1996	Includes general goals to restore the population of Delta smelt and longfin smelt sufficient to delist Delta smelt and prevent longfin smelt from becoming listed.
Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (Acipenser medirostris)	NMFS 2018	Includes general goals to reduce contaminants, enhance and/or restore habitat, and reduce the presence of nonnative species that likely consume green sturgeon.

Document	Reference	Information Identified
Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon	FWS 2005b	Regions in the GAI covered by the plan are the San Joaquin Valley region, containing the Caswell and Grassland Ecological Area core areas, as well as the Southern Sierra Foothills region containing the Farmington, Madera, San Joaquin, Turlock, and Waterford core areas. Listed species for recovery that use aquatic habitat in these core areas include conservancy fairy shrimp, vernal pool fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, Hoover's spurge (*Euphorbia hooveri*), Colusa grass (*Neostapfia colusana*), Green's tuctoria (*Tuctoria greenei*), San Joaquin Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*Orcuttia pilosa*), succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*). Midvalley fairy shrimp, western spadefoot toad, vernal pool small scale (*Atriplex persistens*), alkali milk-vetch (*Astragalus tener* var. *tener*), California fairy shrimp (*Linderiella occidentalis*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), and spiny sepaled button-celery (*Eryngium spinosepalum*), which are also expected to benefit from this plan.
Steelhead Restoration and Management Plan for California	California Department of Fish and Game 1996	Identifies the San Joaquin River and its tributaries as a restoration priority for steelhead.
Conservation and Land Management Documents	See below	See below
2018 Merced Integrated Regional Water Management Plan Update	Merced Integrated Regional Water Management Authority 2019	Includes goals for native habitat restoration, groundwater replenishment, water quality improvement, and flood risk reduction.
2019 Westside-San Joaquin Integrated Region Water Management Plan	San Luis & Delta-Mendota Water Authority 2019	Includes goals for native habitat restoration, groundwater replenishment, water quality improvement, and flood risk reduction. Projects identified for habitat restoration in the plan target Los Banos, Little Salado, and Salado Creeks.
Central Valley Flood Protection Plan 2022 Update	California Department of Water Resources 2022	Includes goals to conduct habitat restoration in areas of levee setback and areas purchased from farmers in flood zones.
East Stanislaus Integrated Region Water Management Plan	East Stanislaus Regional Water Management Partnership 2018	Includes goals for native habitat restoration, groundwater replenishment, water quality improvement, and flood risk reduction.

Document	Reference	Information Identified
Lodi General Plan	City of Lodi 2010	Includes a goal for the restoration and expansion of wetland and riparian habitats along the Mokelumne River.
Merced Vision 2030 General Plan	City of Merced 2017	Includes a goal for the enhancement of Bear, Black Rascal, Cottonwood, and Fahrens Creeks.
San Joaquin County MSHCP and Open Space Plan	San Joaquin County 2000	Includes the following goals: ▪ Remove tamarisk, bull frogs, feral cats, and nonnative fish from the plan area. ▪ Plant bulrush and cattail thickets at suitable ponding areas in the San Joaquin Delta. ▪ Enhance or expand riparian habitat. ▪ Create vernal pools in areas that are geologically suitable.
San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan	FWS 2006a	Includes the following goals: ▪ Restore and enhance 1,000 acres of habitat, which includes wetlands and riparian habitat, per year in the refuge. ▪ Remove giant reed, perennial pepperweed, and tamarisk from the refuge. ▪ Enhance riparian habitat at Christman Island and Gardner's Cove. ▪ Enhance habitat for steelhead, Sacramento splittail, and chinook by providing 7 miles of shaded riparian habitat and 3,500 acres of floodplain habitat.
San Luis Reservoir State Recreation Area Final Resource Management Plan/General Plan	U.S. Bureau of Reclamation and California Department of Parks and Recreation 2013	Includes goals to restore degraded habitats, which include aquatic habitats.
SWAP	CDFW 2015a	Identifies freshwater marsh and American southwest riparian forest and woodland as conservation targets. Also included are 11 species of fish as targets for population increase in relation to conservation of aquatic habitats, which include green sturgeon, chinook salmon, and steelhead.

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 directly[2] 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.

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 has happened around the cities of Stockton, Modesto, Turlock, and Merced (Figure 2-6).

Habitat loss, fragmentation, and degradation have been described as factors in the decline of Delta smelt, longfin smelt, chinook salmon, and steelhead (California Department of Fish and Game 2009; FWS 1996; NMFS 2014, 2016a, 2016b, 2016c). Although habitat loss is not cited as a cause for longfin smelt decline, degradation of water quality in its habitat is cited as a cause for decline (California Department of Fish and Game 2009). 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 considered a factor (NMFS 2021b).

Central Valley steelhead depend on a mix of stream habitats, including woodland-dominated inland streams in the GAI. Human-induced threats from road building and

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

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 Central Valley steelhead by interfering with their physiological and biological processes, and indirect effects through degradation of their habitat (NMFS 2016a).

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. As invasive plant species, such as Mediterranean barley (*Hordeum marinum*) and annual beard grass (*Polypogon monspeliensis*), enter into vernal pool systems, many native aquatic species can get phased out (CDFW 2015a). Invasive plant species that affect riparian systems in the GAI include perennial pepperweed, gum, black locust, Himalayan blackberry, tree-of-heaven, giant reed, water hyacinth, and pampas grass (Cal-IPC 2021).

Invasive animal species that can damage aquatic ecosystems include nutria, barred tiger salamander, bullfrog, and western mosquito fish. These species prey on native aquatic species and disrupt the food web of aquatic ecosystems. A total of 51 new fish species have become established in the Central Valley, including striped bass (*Morone saxatilis*), white catfish (*Ameiurus catus*), American shad (*Alosa sapidissima*), and others (CDFW 2015a).

Invasive species in general are considered a threat to native ecosystems and could directly or indirectly affect species of mitigation need (CDFW 2015a). Predation in the San Joaquin Delta, primarily by high densities of nonnative fish such as striped bass, small-mouthed bass, and large-mouth bass, is known to be a problem for native fish species in general, although the extent of the problems contributing to the decline of chinook salmon and steelhead is unknown (NMFS 2016a, 2016b, 2016c). These nonnative fish species have been found to consume longfin smelt (California Department of Fish and Game 2009). Additionally, nonnative ray-finned fishes in the silverside order (Atheriniformes) are known to have a direct negative correlation with Delta smelt in areas where these nonnative fish occur in the historic range of Delta smelt (FWS 2004).

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 downstream loss of habitat. Stable geomorphology is 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). Vernal pool and seasonal wetland hydrology may be altered by changes to surface and subsurface flow, depending on topography, precipitation, and soil types (FWS 2005b).

These stressors affect Chinook salmon, steelhead, longfin smelt, Delta smelt, and green sturgeon by reducing survival rates for juveniles and reproductive rates for adults. Flow reductions through water use also increase the likelihood for fish stranding and contaminant concentration and can cause tissue damage to chinook salmon and steelhead. One of the most widespread stressors for all fish species of mitigation need is increased water temperature, which regulates feeding, spawning, growth, and migration (California Department of Fish and Game 2009; FWS 2016; NMFS 2014, 2018). Agricultural runoff and sedimentation can shift dissolved oxygen, pH, and ammonia to levels that are dangerous for Chinook salmon, steelhead, Delta smelt, and longfin smelt (California Department of Fish and Game 2009; FWS 2016; NMFS 2014, 2018).

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 Chinook salmon, 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 (NMFS 2014, 2018). The risks of entrainment to Delta smelt and longfin smelt by state and federal water export facilities in the Delta have also been well-documented (California Department of Fish and Game 2009, FWS 2016).

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

Section 2.4 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 the volatility of precipitation events coupled with increased risk of flash flood events; sea-level rise and storm surge, primarily focused on Stockton; and an increased risk of wildfire, which is coupled with increased flooding and erosion risk (Caltrans 2019b).

The Central Valley will likely experience more flooding in the winter, greater erosion of riparian habitats, and increased river and creek sedimentation as a result of climate change (California Emergency Management Agency 2012). Cold winter storms that currently create a deep Sierra snowpack and, as they melt, provide flows to Central Valley streams throughout the summer are expected to become warmer and more unpredictable, resulting in less snow and more rain. The expected result of these warmer winter conditions is higher average winter flows and a shorter runoff period that will lead

to increased flooding and less flow in Central Valley streams during the summer (CDFW 2015a).

Climate change is listed as a major threat to Delta smelt and longfin smelt and is expected to result in a curtailment of the suitable spawning season for both species on account of increased temperatures and more erratic freshwater inputs (California Department of Fish and Game 2009; FWS 2016). Green sturgeon are considered to be under high threat from climate change due to elevated temperatures and shifting prey base, although the specific mechanisms by which they may be affected need further research (NMFS 2018).

Steelhead and Chinook 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 longfin smelt, Chinook salmon, and steelhead and would most likely affect summer-rearing juveniles (California Department of Fish and Game 2009; NMFS 2014, 2016a, 2016c). Drought may cause local extirpations of steelhead in the Central Valley, and degraded habitat conditions may make reestablishment of populations difficult (NMFS 2016a). 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 (Ice et al. 2004). The exacerbation of these stressors by fire may affect all of the fish species of mitigation need. Central Valley spring-run Chinook salmon in particular are vulnerable to wildfire because the headwaters of their known natal creeks are geographically clustered and could all be simultaneously severely disturbed in the event of a catastrophic wildfire (NMFS 2014).

8.6 Multi-resource Benefits

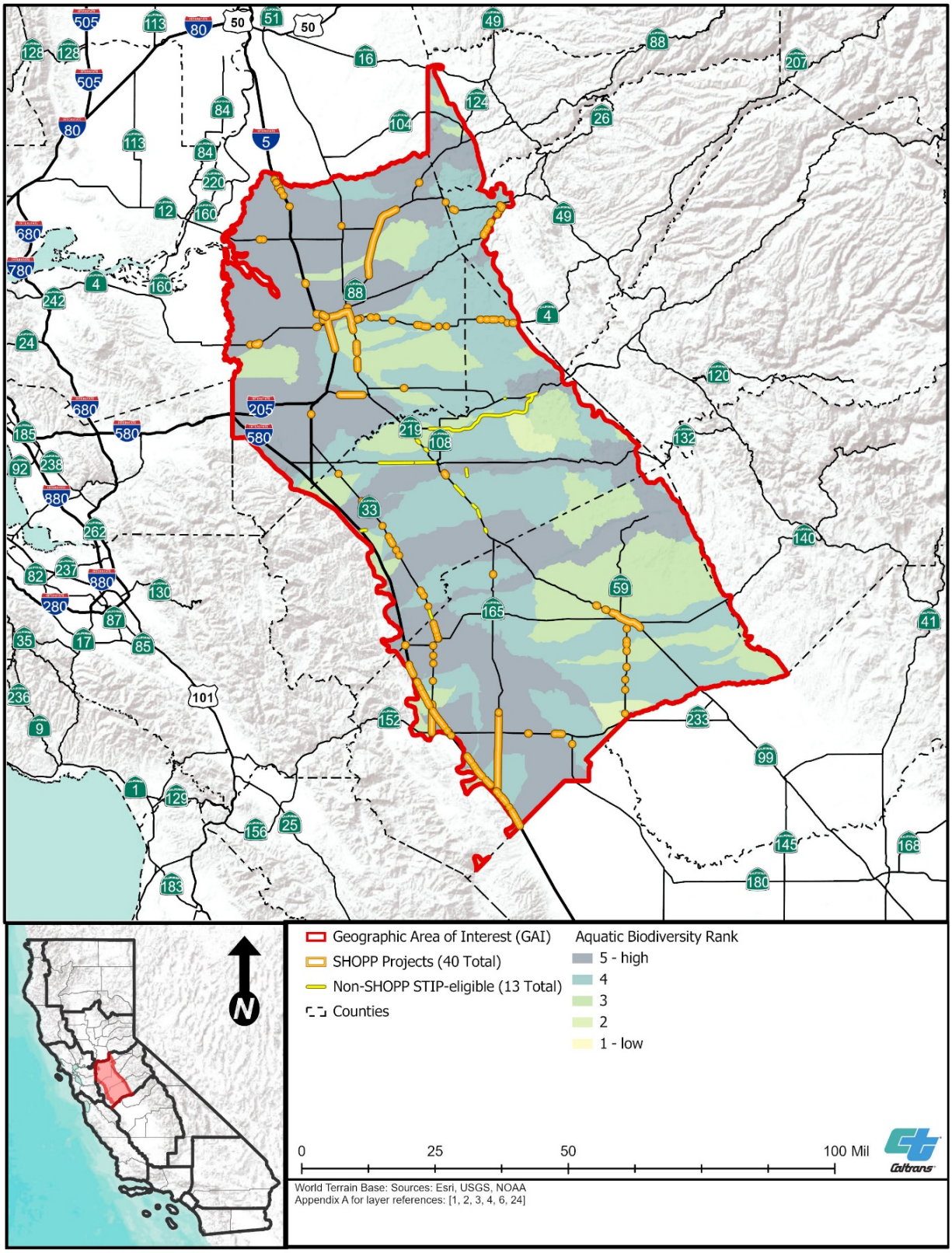
Advance mitigation planning provides Caltrans an opportunity to integrate the enhancement and/or restoration of multiple aquatic resource related values into its advance mitigation scoping to benefit California native aquatic biodiversity, aquatic and terrestrial connectivity, special-status species, 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 pockets of moderate aquatic biodiversity in the central and eastern portions of the GAI. 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 fish species such as Pacific lamprey (*Entosphenus tridentatus*) and white sturgeon (*Acipenser transmontanus*) as well as other species that use aquatic habitat, such as vernal pool fairy shrimp, conservancy fairy shrimp, and San Joaquin Orcutt grass.
- 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 TMDL.

Caltrans will consider aquatic resources' biodiversity values, special-status species with the potential to co-occur in aquatic habitats, 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, 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, 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 2019). Additionally, chinook salmon, green sturgeon, Delta smelt, 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 large-mouth bass (California Department of Fish and Game 1996; CDFW 2016; FWS 1996; NMFS 2014, 2018).

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

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-1: No net loss of area, functions, values, and condition of wetland and non-wetland water resources	See below	See below
Objective AR-1.1: Improve quality and function of wetland and non-wetland water resources.	**Sub-Objective AR-1.1.1:** Enhance and/or rehabilitate wetland and non-wetland water resources such that the greatest functional lift to the aquatic resource is provided, including by consolidating compensatory mitigation consistent with Executive Order W59-93. **Sub-Objective AR-1.1.2:** Enhance and/or rehabilitate key wetland and non-wetland water habitats that are identified in the SWAP, FWS recovery plans, and other land management plans identified in Table 8-3. **Sub-Objective AR-1.1.3:** Enhance and/or rehabilitate riparian vegetation in the GAI, particularly in the Merced, San Joaquin, Stanislaus, and Tuolumne Rivers; as well as Cottonwood Creek, Fahrens Creek, Mokelumne River, and Salado Creek; and other named and unnamed tributaries into the San Joaquin River, many of which are listed in Table 8-2. **Sub-Objective AR-1.1.4:** Enhance and/or restore wetland and non-wetland water resource functions, such as connectivity, abundance of native plants, and water quality, that define habitat value for aquatic organisms and increase basin-wide value of resources.	▪ *2008 Final Compensatory Mitigation Rule* (73 *Federal Register* 19593) ▪ *2019 Westside-San Joaquin Integrated Region Water Management Plan* (San Luis & Delta-Mendota Water Authority 2019) ▪ *California Wetlands Conservation Policy* (Executive Order W-59-93) ▪ *Lodi General Plan* (City of Lodi 2010) ▪ *Merced Vision 2030 General Plan* (City of Merced 2017) ▪ *National Wetlands Mitigation Action Plan* (EPA and Corps 2002) ▪ *Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division* (Corps 2015*)* ▪ *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (FWS 2005b) ▪ *San Joaquin County MSHCP and Open Space Plan* (San Joaquin County 2000) ▪ *San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan* (FWS 2006a) ▪ *San Luis Reservoir State Recreation Area Final Resource Management Plan/General Plan* (U.S. Bureau of Reclamation and California Department of Parks and Recreation 2013) ▪ *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material in Waters of the State* (SWRCB 2019) ▪ *SWAP* (CDFW 2015a)
Objective AR-1.2: Avoid a no net loss of aquatic resource acreage by establishing aquatic resources.	**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, and other land management plans identified in Table 8-3. **Sub-Objective AR-1.2.2:** Establish and/or reestablish riparian vegetation in the HUC-8s included in Table 8-2, particularly the Merced, San Joaquin, Stanislaus, and Tuolumne Rivers; as well as the Cottonwood Creek, Fahrens Creek, Mokelumne River, and Salado Creek; and other named and unnamed tributaries into the San Joaquin River, many of which are listed in Table 8-2.	Same references as listed with Objective AR-1.1.

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.	**Sub-Objective AR-2.1.1:** In coordination with the RWQCB, restore and/or enhance wetland and non-wetland waters with RWQCB biology-related beneficial use designations such as cold freshwater habitat, freshwater replenishment, migration of aquatic organisms, spawning, reproduction, and/or early development, warm freshwater habitat, and wildlife habitat. **Sub-Objective AR-2.1.2:** In coordination with natural resource regulatory agencies, address aggradation, erosion, nutrients, contaminants, sedimentation, and temperatures in the Lower San Joaquin River, Middle San Joaquin-Lower Chowchilla, San Joaquin Delta, and Upper Mokelumne River HUC-8s. **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 Los Banos Creek, Little Salado Creek, Merced River, and Salado Creek as well as riparian marshes. **Sub-Objective AR-2.1.4**: Restore or create adjacent wetlands and non-wetland aquatic features to enhance water quality in tributaries and floodplain habitats. **Sub-Objective AR-2.1.5:** Rehabilitate and/or enhance small streams and sections of larger streams to remove nonnative plant species that degrade stream water quality, such as Mediterranean barley, annual beard grass, perennial pepperweed, gum, black locust, Himalayan blackberry, tree-of-heaven, giant reed, water hyacinth, and pampas grass. **Sub-Objective AR-2.1.6:** Improve stream temperatures by increasing shaded riverine aquatic habitat in the Merced, San Joaquin, Stanislaus, and Tuolumne Rivers as well as the Cottonwood Creek, Fahrens Creek, Mokelumne River, and Salado Creek for fish and other aquatic life.	▪ *303(d) List of Impaired Water Bodies* (SWRCB 2018) ▪ *2018 Merced Integrated Regional Water Management Plan Update* (Merced Integrated Regional Water Management Authority 2019) ▪ *2019 Westside-San Joaquin Integrated Region Water Management Plan* (San Luis & Delta-Mendota Water Authority 2019) ▪ *Central Valley Flood Protection Plan 2017 Update* (California Department of Water Resources 2017) ▪ *East Stanislaus Integrated Region Water Management Plan* (East Stanislaus Regional Water Management Partnership 2018) ▪ *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (FWS 2005b) ▪ *San Joaquin County MSHCP and Open Space Plan* (San Joaquin County 2000) ▪ *SWAP* (CDFW 2015a) ▪ *Water Quality Control Plan for the Central Valley Region* (Central Valley RWQCB 2018)
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. **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 Merced, San Joaquin, Stanislaus, and Tuolumne Rivers. **Sub-Objective AR-2.2.3:** Reestablish hydrologic regimes or drainage patterns for better function of delta wetlands, depressional wetlands, freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater ponds, lakes, and riverine systems.	Same references as listed with Objective AR-2.1.
Objective AR-2.3: Improve water storage and groundwater recharge	**Sub-Objective AR-2.3.1:** Promote restoration of stream and riparian areas' natural functions to provide water storage and release. **Sub-Objective AR-2.3.2:** Reduce excessive and invasive vegetation along stream/riparian corridors to lower vegetative transpiration rates to sustainable levels and increase water storage in soils and streams. **Sub-Objective AR-2.3.3:** Create or restore wetlands to streams to enhance groundwater-surface water dynamics in tributaries.	Same references as listed with Objective AR-2.1.

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Goal AR-3: Restore or enhance and expand habitat for fish species of mitigation need	See below	See below
Objective AR-3.1: Restore and/or enhance habitat.	**Sub-Objective AR-3.1.1:** Consult with FishPAC to select and implement habitat restoration and enhancement actions that support key populations and important habitat and contribute to the recovery of threatened and endangered salmon and steelhead. Enhancement or restoration may include placement of large pieces of wood in alcoves and pools and stream channel restoration. **Sub-Objective AR-3.1.2:** Consult with FishPAC to select and implement FishPAC and legislative priorities in the GAI to restore access to habitats that support key populations for recovery of threatened and endangered salmon and steelhead. The highest value for fish passage remediation and habitat restoration should be given to the current high priority locations on the SHS (listed in each years' Fish Passage Annual Report to 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.	▪ *Caltrans Fish Passage Annual Legislative Reports* (Caltrans 2020) ▪ *Delta Smelt Resiliency Strategy* (CDFW 2016) ▪ *Department of Fish and Game Report to the Fish and Game Commission: A Status Review of the Longfin Smelt (Spirinchus thaleichthys) in California* (California Department of Fish and Game 2009) ▪ *Pacific Coast Salmon Fishery Management Plan* (NOAA 2021) ▪ *Recovery Plan for The Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the DPS of California Central Valley Steelhead* (NFMS 2014) ▪ *Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes* (FWS 1996) ▪ *Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (*Acipenser medirostris*)* (NMFS 2018) ▪ *Steelhead Restoration and Management Plan for California* (California Department of Fish and Game 1996) ▪ *SWAP* (CDFW 2015a)
Goal AR-4: Support resiliency of aquatic resources to climate change and sea-level rise	See below	See below
Objective AR-4.1: Reduce impacts from climate change and sea-level rise.	**Sub-Objective AR-4.1.1:** Enhance and/or restore aquatic resource function and value in areas of lower climate resilience, such as the central portion of the GAI, and at delta wetlands, depressional wetlands, and freshwater wetlands to reduce climate change and sea-level rise effects on aquatic resources. **Sub-Objective AR-4.1.2:** Prioritize enhancement and/or restoration that will increase resilience to climate change such as aquatic features with hydrologic connection to the American and Sacramento Rivers, as well as the Butte Sink area, Colusa Basin, and Morrison Creek, such that the potential for aquatic resource migration increases by the enhancement and/or restoration of ecotones that transition from aquatic to upland habitats. **Sub-Objective AR-4.1.3:** Prioritize riparian areas of the Lower San Joaquin River, Middle San Joaquin-Lower Chowchilla, San Joaquin Delta, and Upper Mokelumne River HUC-8s for enhancement and/or restoration to improve freshwater quantity and quality, floodplain connectivity, and in-stream cover continuity. **Sub-Objective AR-4.1.4:** Enhance, rehabilitate, establish and/or reestablish aquatic habitats by using native species such as box elder (*Acer negundo*), Fremont's cottonwood (*Populus fremontii*), willows (*Salix* sp.), cattails (*Typha* spp.), rushes (*Juncus* sp.), and bulrushes (*Schoenoplectus* sp.), to reduce the effects of climate change. **Sub-Objective AR-4.1.5:** Reduce adverse instream flooding effects by restoring affected headwater and tributary hydrological functions for the Los Banos Creek, Little Salado Creek, Merced River, and Salado Creek. **Sub-Objective AR-4.1.6:** Prioritize habitat establishment and reestablishment in areas that can also reduce risk in flood-prone systems, particularly in areas Los Banos Creek, Little Salado Creek, Merced River, and Salado Creek.	▪ *2018 Merced Integrated Regional Water Management Plan Update* (Merced Integrated Regional Water Management Authority 2019) ▪ *2019 Westside-San Joaquin Integrated Region Water Management Plan* (San Luis & Delta-Mendota Water Authority 2019) ▪ *Central Valley Flood Protection Plan 2017 Update* (California Department of Water Resources 2017) ▪ *East Stanislaus Integrated Region Water Management Plan* (East Stanislaus Regional Water Management Partnership 2018) ▪ *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (FWS 2005b) ▪ *San Joaquin County MSHCP and Open Space Plan* (San Joaquin County 2000) ▪ *San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan* (FWS 2006a) ▪ *SWAP* (CDFW 2015a)

Objective	Sub-Objective	Alignment with Documents Identified in Table 8-3
Objective AR-4.2: Improve aquatic habitat resiliency.	**Sub-Objective AR-4.2.1:** Promote native plant species that can stabilize banks, improve filtering of nutrient loads from water, and maintain the flood conveyance properties of streams and estuaries, such as rushes, bulrushes, cattail, and willows. **Sub-Objective AR-4.2.2:** Prioritize management of invasive species that occur in large contiguous areas in aquatic habitats, such as annual beard grass, perennial pepperweed, gum, black locust, giant reed, nutria, bullfrog, western mosquito fish, and striped bass that may be exacerbated by climate change such that the greatest functional lift is provided. **Sub-Objective AR-4.2.3:** Enhance, rehabilitate, establish and/or reestablish small (that is, low order) tributaries/streams that discharge into larger rivers such as the Merced, San Joaquin, Stanislaus, and Tuolumne Rivers.	Same references as listed with Objective AR-4.1.
Goal AR-5: Provide multi-resource benefits	See below	See below
Objective AR-5.1: Maximize mitigation opportunities for multiple environmental benefits.	**Sub-Objective AR-5.1.1:** Enhance, rehabilitate, establish, and/or reestablish aquatic resource areas currently occupied by, or that provide habitat for, one or more special-status species, or areas that contribute to the protection of ecologically, geographically, and/or genetically distinct populations or sub-populations of obligate aquatic special-status species. **Sub-Objective AR-5.1.2:** Enhance and/or restore habitats for other aquatic species such as vernal pool crustaceans and plants, fish species included in Section 2.15.2, as well as species included in Appendix C that could benefit from aquatic habitat enhancement and/or restoration. **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.	▪ *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (FWS 2005b) ▪ *San Joaquin County MSHCP and Open Space Plan* (San Joaquin County 2000) ▪ *San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan* (FWS 2006a) ▪ *SWAP* (CDFW 2015a) ▪ *Water Quality Control Plan for the Central Valley Region* (Central Valley RWQCB 2018)

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 2020). 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, RWQCB, NMFS, 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 natural water storage and groundwater recharge functions. 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-objective of Goal AR-4 describes what additional benefits exist for other resources in the GAI, including benefits to upland terrestrial habitat. Goal AR-4 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 10 will nominate advance mitigation projects to the Caltrans Director and request funding approval (see Step 4 on Figure 1-1; Figure 6-1; Caltrans 2019a). Each advance mitigation project nominated to the Director will consist of a scope, schedule, and cost for an SHC § 800.6(a)-authorized activity. With respect to scope, in this chapter, Caltrans analyzes the information presented previously to identify advance mitigation project scope options that have a high probability of successfully meeting the AMP's transportation project and environmental objectives. Understanding the regulatory framework, environmental setting, available opportunities to purchase credits, impact forecasts, transportation project schedule needs, and natural resource regulatory agency goals and objectives will assist Caltrans District 10 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 on 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, Caltrans District 10 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 (July of fiscal year 2022/23) mitigation that can be purchased or established by 2023/24 (within the next 2 years) could potentially address approximately:

- 0.7 acre of wetland, 6.6 acres of non-wetland waters, 2.4 acres of threatened and endangered fish habitat impacts, 10.6 acres of vernal pool habitat impacts, and 50.3 acres of riparian habitat, potentially contributing to the acceleration of 8, 19, 4, 9, and 6 transportation projects, respectively
- 9.2 acre of California red-legged frog habitat impacts, potentially contributing to the acceleration of 11 transportation projects
- 23.0 acres of California tiger salamander habitat impacts, potentially contributing to the acceleration of 19 transportation projects
- 23.7 acres of giant garter snake habitat impacts, potentially contributing to the acceleration of 20 transportation projects

- 0.4 acre of valley elderberry longhorn beetle habitat impacts, potentially contributing to the acceleration of one transportation project

All or some of these needs could form the basis for Caltrans District 10 to develop an advance mitigation project scope. How to potentially address these needs and the feasibility of addressing them through the AMP's authorized activities is discussed further below.

9.3 Authorized Activity Summary

Advance mitigation project scope options that have a high probability of successfully meeting the AMP's objectives are feasible. Below, a brief description of each of the 11 SHC § 800.6(a)-authorized advance mitigation project types is provided, followed by a discussion of its feasibility. Listed in Table 9-3, some advance mitigation project types are not currently feasible because they are not available in the GAI. Others are not currently feasible because a regulatory and administrative pathway is not available. Still others have potential but may 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 SHC § 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

Advance Mitigation Project Type	Authorization	Section
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
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 does 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 one NCCP/HCP with a plan area that overlaps the GAI and that includes transportation-related projects (Table 4-2, Figure 4-1). Caltrans is a permittee to this document (Table 4-2).

Feasibility. HCPs are not authorized to accept bulk financial contributions; however, this authorized activity may be feasible for NCCPs and NCCPs/HCPs. 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,[1] at which point the credits or values would be available to transportation projects.

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 10 active conservation banks, including 3 (with FWS) that provide California red-legged frog credits, 5 (with FWS) that provide California tiger salamander credits, and one (with FWS and NMFS) that provides Chinook salmon, Central Valley steelhead, Delta smelt, and longfin smelt credits (Table 4-3). FWS is a signatory to 25 active conservation banks. In addition to those mentioned above, three of these offer California red-legged frog credits, seven offer California tiger salamander credits, and two offer valley elderberry longhorn beetle credits (Table 4-3). CDFW and FWS are cosignatories to 10 active conservation banks. In addition, several mitigation banks in the GAI offer credits for species of mitigation need. These are described in Section 9.3.3.

Conservation bank service areas are shown in Appendix G, and the anticipated transportation project impact forecast on species of mitigation need is presented by year on Figure 6-2. 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 10 may be able to address some of its California red-legged frog, California tiger salamander, valley elderberry longhorn beetle, Chinook salmon, Central Valley steelhead, Delta smelt, and longfin smelt mitigation need through pre-transfer 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 the California tiger salamander is a dually listed species, it is probable that compensatory mitigation will be incorporated into future consultations under Section 7 or permits under Section 10 of the ESA in coordination with the FWS. Pre-transfer purchases must be authorized in the bank's BEI for this authorized activity to be feasible. For existing banks, a BEI amendment would be required to formalize a process for bulk pre-transfer credit purchases, which must be completed before undertaking this authorized activity. In 2021, the Interagency Project Delivery Team

[1] Caltrans contracting processes and agency interactions are incorporated into this time estimate.

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 other waters-focused, and each bank's alignment with natural resource protection is documented through its BEI. Seven mitigation banks in the GAI provide wetland and/or non-wetland water credits, and several of these provide mitigation credits for species of mitigation need. The Corps is a signatory, or is anticipated to be a signatory, on all mitigation banks in the GAI (Table 4-3). In addition to wetlands and other waters credits, two of these banks (with CDFW and FWS as cosignatories) provide California tiger salamander credits, one (with CDFW and FWS as cosignatories) provides giant garter snake credits, and one (with CDFW, FWS, and NMFS as cosignatories) provides Central Valley steelhead and Chinook salmon credits.

Feasibility. This authorized activity may be feasible. Caltrans District 10 may be able to address some of its wetlands and other waters credits, as well as California tiger salamander, giant garter snake, Central Valley steelhead, and Chinook salmon mitigation need through pre-transfer credits purchased from mitigation 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. Pre-transfer purchases must be authorized in the bank's BEI for this authorized activity to be feasible. For existing banks, a BEI amendment would be required to formalize a process for bulk pre-transfer credit purchases, which must be completed before undertaking this authorized activity. 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 were discussed in Section 4.4.[2] 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

[2] Up-to-date information on approved in-lieu fee programs, including available credits, can be found at: https://ribits.ops.usace.army.mil/ords/f?p=107:47:13453394859366::NO

defined area.[3] 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 is one active in-lieu fee program with a service area that overlaps the GAI.

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. Bulk credits purchased from an in-lieu fee program through an advance mitigation project might, with natural resource agency approval, be incorporated into future conditions on transportation projects.

9.3.5. MCA Credit Purchase

As discussed in Section 4.5, MCAs are an advance mitigation tool that can be developed when and where an RCIS is approved by CDFW. At this time (July of fiscal year 2022/23), instructions and guidance for establishing MCAs are currently under development by CDFW.[4] In addition, no foundational RCISs required to issue MCAs are underway in the GAI.

Feasibility. At this time (July of fiscal year 2022/23), this authorized activity is not feasible because no MCA credits are available for purchase in the GAI.

9.3.6. Conservation Bank Establishment

Instructions and guidance for establishing conservation banks are available from CDFW[5] and FWS.[6] Conservation banks are species-focused, and each bank's alignment with natural resource protection will be documented through its BEI. CDFW, FWS, and NMFS are potential signatories, and there also may be circumstances where the Corps and/or 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 C, *Complete SAMNA Species Results*
- Appendix G, *Conservation and Mitigation Bank Service Areas*

[3] https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/banking_faq.pdf
[4] https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation
[5] https://wildlife.ca.gov/Conservation/Planning/Banking/Templates
[6] 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 habitat for species of mitigation need within the GAI to support ecosystem functions that are essential to recovery of the species (WILD-1).
- Preserve, enhance, and increase connectivity between blocks of habitat supporting species of mitigation need to allow for dispersal that will maintain resilience and variability of populations (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 Corps[7] and CDFW.[8] 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*

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

- Chapter 8, *Aquatic Resources Conservation Goals and Objectives*
- Appendix D, *Hydrologic Units*
- Appendix F, *Aquatic Resource Locations*
- Appendix G, *Conservation and Mitigation Bank Service Areas*

To support future transportation project permits, Caltrans would seek wetland, non-wetland water, and other important aquatic feature credit establishment under the Corps' jurisdiction (wetlands and WOTUS) and RWQCB jurisdiction (waters of the state), as well as waters of the state and riparian credit establishment under CDFW's Lake and Streambed Alteration Program.

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 could 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 of 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-59-93[9] (AR-1).
- Restore and/or enhance the chemical, physical, and biological integrity of wetlands and non-wetland waters (AR-2).
- Support resiliency of aquatic resources to climate change and sea-level rise (AR-3).
- Provide multi-resource benefits (AR-4).

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

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

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.

9.3.8. In-lieu Fee Program Establishment

Each in-lieu fee program's alignment with natural resource protection is documented in its enabling instrument. Instructions and guidance for establishing in-lieu fee programs are available from the federal agencies.[10] 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 D, *Hydrologic Units*
- 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*

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

Conservation Investment Strategies Program Guidelines, MCAs focus on species and species habitat, and can include credits for waters of the state and riparian habitat to meet mitigation needs under a Lake and Streambed Alteration Agreement. An MCAs' alignment with natural resource protection will be documented through the foundational RCIS and the MCA itself (CDFW 2019b). 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 credits[11] and CDFW would be the signatory. Caltrans may also request other natural resource regulatory agencies to be signatories to the MCA, such as the SWRCB, 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 (July of fiscal year 2022/23), instructions and guidance for establishing MCAs are under development by CDFW[12] 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

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

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.

Nevertheless, in the future, Caltrans anticipates that when a CDFW-approved RCIS is in place[13] 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 action[14] 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[15] with the other agencies into the scope and schedule.

Wildlife Crossing and Aquatic Corridor Enhancements

As described in Section 4.5 and pointed out above, the RCIS and MCA framework provides CDFW with a compensatory mitigation mechanism to approve credits for wildlife crossing and aquatic corridor enhancements. In other words, through an MCA developed under an RCIS, CDFW would be authorized to recognize credits established through wildlife crossing and aquatic corridor enhancement made separate from and distinct from specific transportation projects. An MCA for connectivity would be consistent with Caltrans' understanding of natural resource regulatory agency goals and objectives to preserve, enhance, and increase connectivity between blocks of habitat supporting species of mitigation need to allow for dispersal that will maintain resilience and variability of populations (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 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

[13] 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.
[14] https://wildlife.ca.gov/Conservation/Planning/Regional-Conservation
[15] Parallel evaluations are undertaken when, for the same environmental enhancement/action, two or more agencies must employ different mechanisms to approve the credits.

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[16] 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.*

Feasibility. At this time (July of fiscal year 2022/23), 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 (July of fiscal year 2022/23), a number of the authorized activities listed in Table 9-3 appear to be feasible (Tables 9-4 and 9-5). This suggests that

[16] SWRCB does not typically approve establishment of or accept preservation credits.

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). 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 (Section 9.3.6 through 9.3.11).

Based on its evaluation, Caltrans found that, at this time (July of fiscal year 2022/23), 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, California tiger salamander and WOTUS could be addressed within the same credit purchase or through establishing a single credit establishment project.

Further, credits purchased by the end of 2023/24 (within the next 2 years) have the potential to address the following within the Caltrans District 10 GAI:

- **Lower San Joaquin River Sub-basin forecast wetland and non-wetland waters impacts**. Specifically, mitigation credits purchased for an anticipated <0.1 acre of non-wetland waters impact have the potential to accelerate 1 transportation project.
- **Middle San Joaquin-Lower Chowchilla Sub-basin forecast wetland and non-wetland waters impacts**. Specifically, mitigation credits purchased for an anticipated 0.7 acre of wetland impact and 3.8 acres of non-wetland waters impact have the potential to accelerate 6 and 9 transportation projects, respectively.
- **Rock Creek-French Camp Slough sub-basin forecast wetland and non-wetland waters impacts**. Specifically, mitigation credits purchased for an anticipated <0.1 acre of wetland impact and 0.3 acre of non-wetland waters impact have the potential to accelerate 1 and 3 transportation projects, respectively.
- **San Joaquin Delta Sub-basin forecast wetland and non-wetland waters impacts**. Specifically, mitigation credits purchased for an anticipated <0.1 acre of wetland impact and 2.4 acres of non-wetland waters impact have the potential to accelerate 1 and 5 transportation projects, respectively.
- **Upper Calaveras California Sub-basin forecast wetland and non-wetland waters impacts**. Specifically, mitigation credits purchased for an anticipated 0.1 acre of non-wetland waters impact have the potential to accelerate 1 transportation project.
- **Upper Mokelumne Sub-basin forecast wetland and non-wetland waters impacts**. Specifically, mitigation credits purchased for an anticipated <0.1 acre of

non-wetland waters impact have the potential to accelerate 1 transportation project.

- **San Joaquin Delta Sub-basin forecast threatened and endangered fish impacts**. Specifically, mitigation credits purchased for an anticipated 1.8 acres of threatened and endangered fish impacts have the potential to accelerate 5 transportation projects.
- **Upper Calaveras California Sub-basin forecast threatened and endangered fish impacts**. Specifically, mitigation credits purchased for an anticipated <0.1 acre of threatened and endangered fish impacts have the potential to accelerate 1 transportation project.
- **Upper Mokelumne Sub-basin forecast threatened and endangered fish impacts**. Specifically, mitigation credits purchased for an anticipated <0.1 acre of threatened and endangered fish impacts have the potential to accelerate 1 transportation project.
- **Middle San Joaquin-Lower Chowchilla Sub-basin forecast vernal pool habitat impacts**. Specifically, mitigation credits purchased for an anticipated 5.2 acres of vernal pool habitat impact have the potential to accelerate 5 transportation projects.
- **Rock Creek-French Camp Slough Sub-basin forecast vernal pool habitat impacts**. Specifically, mitigation credits purchased for an anticipated 4.5 acres of vernal pool habitat impact have the potential to accelerate 2 transportation projects.
- **San Joaquin Delta Sub-basin forecast vernal pool habitat impacts**. Specifically, mitigation credits purchased for an anticipated 0.2 acre of vernal pool habitat impact have the potential to accelerate 1 transportation project.
- **Upper Calaveras California Sub-basin forecast vernal pool habitat impacts**. Specifically, mitigation credits purchased for an anticipated 0.7 acre of vernal pool habitat impact have the potential to accelerate 2 transportation projects.
- **Middle San Joaquin-Lower Chowchilla Sub-basin forecast riparian habitat impacts.** Specifically, mitigation credits purchased for an anticipated 7.6 acres of riparian habitat impacts have the potential to accelerate 1 transportation project.
- **San Joaquin Delta Sub-basin forecast riparian habitat impacts.** Specifically, mitigation credits purchased for an anticipated 29.1 acres of riparian habitat impacts have the potential to accelerate 2 transportation projects.
- **Upper Calaveras California Sub-basin forecast riparian habitat impacts.** Specifically, mitigation credits purchased for an anticipated 13.6 acre of riparian habitat impacts have the potential to accelerate 1 transportation project.
- **Great Valley Ecoregion mitigation credits purchased for forecast California red-legged frog habitat impacts**. Specifically, mitigation credits purchased for an anticipated 9.3 acres of California red-legged frog impacts have the potential to accelerate 8 transportation projects.

- **Great Valley Ecoregion mitigation credits purchased for forecast California tiger salamander habitat impacts**. Specifically, mitigation credits purchased for an anticipated 23.0 acres of California tiger salamander impacts have the potential to accelerate 19 transportation projects.
- **Great Valley Ecoregion mitigation credits purchased for forecast giant garter snake habitat impacts**. Specifically, mitigation credits purchased for an anticipated 23.8 acres of giant garter snake impacts have the potential to accelerate 20 transportation projects.

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

Table 9-4. Wildlife Resources Credit Options and Feasibility, July 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	Yes	Yes, one HCP/NCCP	Yes, CDFW and FWS	1 to 3 years
Purchase conservation bank credits	Yes, with instrument amendment	Yes, 6 FWS- or CDFW and FWS-approved banks in GAI with California red-legged frog credits, 12 banks have California tiger salamander credits, 4 banks have valley elderberry longhorn beetle credits, and 1 NMFS-approved bank with Central Valley steelhead, Chinook salmon, Delta smelt, and longfin smelt credits	Yes, with CDFW, FWS, and NMFS	1 to 3 years
Purchase in-lieu fee credits	Yes	Yes, one in-lieu fee program in the GAI	Yes, with SWRCB and NMFS	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, and NMFS	2 to 6 years
Establish in-lieu fee program	Yes	Yes, with FWS and NMFS	Yes, with FWS and NMFS Potential to align with Corps in-lieu fee program	2 to 6 years
Establish MCA credits or values[b]	Yes, in part; two RCISs in progress; MCA guidelines in progress	Maybe—MCA guidelines in progress	Maybe, CDFW, FWS, NMFS, and SWRCB 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, FWS, NMFS, and SWRCB 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.

Table 9-5. Aquatic Resources Credit Options and Feasibility, July 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, seven established and four pending Corps banks, including two CDFW and FWS-approved banks with tiger salamander credits, one bank with giant garter snake credits, and one bank with Central Valley steelhead and Chinook salmon credits	Yes, RWQCB, Corps, EPA, CDFW, FWS, and NMFS	1 to 3 years
Purchase in-lieu fee credits	Yes, with instrument amendment	Yes, one in-lieu fee program in the GAI	Yes, Corps, RWQCB, and EPA	1 to 3 years
Purchase MCA credits	No	Not available	Not available	Not available
Establish mitigation bank	Yes	Yes, Corps, CDFW, EPA, FWS, and NMFS	Yes, Corps, CDFW, EPA, FWS, NMFS, and RWQCB	2 to 6 years
Establish in-lieu fee program	Yes	Yes, for Corps, EPA, FWS, NMFS, and CCC	Maybe, Corps, EPA, FWS, NMFS, and RWQCB	2 to 6 years

Authorized Activity	Regulatory and Administrative Pathway Available	Available/Opportunity Exists in the GAI	Potential to Address Overlapping Jurisdictions	Time to Complete[a]
Establish MCA credits or values[b]	Yes, in part; two RCISs in progress; MCA guidelines in progress	Maybe—MCA guidelines in progress	Maybe NMFS and RWQCB 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 NMFS and RWQCB Potential for parallel evaluations	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.

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 10 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 10 will also consider based on its localized knowledge of delivering mitigation in its region. As just one example, Caltrans may prioritize advance mitigation projects that reduce risk in implementation and long-term management by eliciting others to be bank or in-lieu fee sponsors.

As described in the introduction to this chapter, as well as Section 9.1, to inform the advance mitigation project scope, Caltrans District 10 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 10 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 10 will commit to delivering the advance mitigation project within the scope, schedule, and budget communicated with nomination materials. At that point, Caltrans District 10 will initiate project delivery (see Steps 6 through 10 on Figure 1-2; Caltrans 2021b). Advance mitigation project delivery includes stakeholder engagement, project alternative analysis, coordination with natural resource regulatory agencies with the authority to approve compensatory mitigation, contracting with third parties and/or credit sponsors, and developing an agency-approved instrument and/or one or more advance mitigation project-specific interagency agreement. In addition:

- Stakeholder engagement will be conducted in accordance with each advance mitigation project's communication plan and be consistent with the applicable and appropriate requirements of existing applicable state and federal standards and instruments.

- When required by the advance mitigation project type, site selection may be performed by Caltrans or under contract to Caltrans through a competitive bid process, and may include existing mitigation providers, 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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