



**ADVANCE MITIGATION PROGRAM
Great Valley Ecoregion Section Within
Caltrans District 10 Regional Advance
Mitigation Needs Assessment**

Appendices

Version 1.0

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

California Department of Transportation – District 10

July 2022

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APPENDICES

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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APPENDIX A: GIS SOURCES

This RAMNA relies on maps to convey information. At the bottom of each map figure is a citation that lists the GIS source identification numbers. These source identification numbers refer to Table A-1, where the metadata documentation is provided. When available, the source date and/or website address to access the data layer online are also provided.

Table A-1. District 10 RAMNA GIS Sources

ID	GIS Layer	Source Agency	Source Date	Download Date	Website
1	State Highway Network	Caltrans	8/1/2018	10/11/2018	http://www.dot.ca.gov/hq/tsip/gis/data/library/Metadata/NHS.html
2	SHOPP	Caltrans	2019/2020 Q2	3/17/2021	Caltrans System Planning
3	STIP	California Transportation Commission	2019/2020 Q2	3/17/2021	Caltrans System Planning
4	Ecoregion Section (GAI)	USFS	1/26/2021	1/26/2021	https://data.fs.usda.gov/geodata/edw/datasets.php?xmlKeyword=Ecomap
5	Watershed Boundary Dataset	USGS	9/26/2014	10/19/2018	https://www.usgs.gov/core-science-systems/ngp/national-hydrography
6	County Boundaries	U.S. Census Bureau	7/8/2016	10/11/2018	https://data.ca.gov/dataset/ca-geographic-boundaries
7	California Conservation Easements	California Protected Areas Database	12/1/2020	2/2/2021	http://www.calands.org/cced
8	California Protected Areas Holdings	California Protected Areas Database	2/10/2021	2/10/2021	http://www.calands.org/data
9	Tribal Land Boundaries	Bureau of Indian Affairs	5/16/2017	10/11/2018	https://hub.arcgis.com/items/2e915ef3df48422283e5b2c7d89dfcba
10	U.S. Military Installations	U.S. Census Bureau	12/1/2017	10/11/2018	https://www2.census.gov/geo/tiger/TIGER2020/MIL/
11	Farmland Mapping & Monitoring Program	California Department of Conservation	6/7/2016	4/27/2021	https://gis.conservation.ca.gov/portal/home/item.html?id=16689151f4d240d2a16232ea650a6c62
12	ACE Climate Resilience – ACE [ds2738]	CDFW	2/22/2018	10/17/2018	https://map.dfg.ca.gov/metadata/ds2738.html?5.66.18

ID	GIS Layer	Source Agency	Source Date	Download Date	Website
13	Vegetation D10 in Caltrans District 10 Geospatial Data for the Advance Mitigation Needs Assessment for the Second Quarter of FY 2019/2020	SAMNA	1/1/2017	3/24/2021	http://www.dot.ca.gov/env/advancemitigation/
14	Waters and Wetlands D10 in Caltrans District 10 Geospatial Data for the Advance Mitigation Needs Assessment for the Second Quarter of FY 2019/2020	SAMNA	1/1/2017	3/24/2021	http://www.dot.ca.gov/env/advancemitigation/
15	USFWS Critical Habitat	FWS	10/1/2018	3/24/2021	https://ecos.fws.gov/ecp/report/table/critical-habitat.html
16	Essential Connectivity Areas – CEHC	CDFW	1/1/2014	10/17/2018	https://map.dfg.ca.gov/metadata/ds0620.html?5.66.18
17	Natural Landscape Blocks – CEHC	CDFW	10/1/2017	10/17/2018	https://map.dfg.ca.gov/metadata/ds0621.html?5.66.18
18	Potential Riparian Connections – CEHC	CDFW	3/1/2010	10/17/2018	https://map.dfg.ca.gov/metadata/ds0622.html?5.66.18
19	National Flood Hazard Layer	Federal Emergency Management Agency	6/29/2018	9/25/2019	https://www.fema.gov/national-flood-hazard-layer-nfhl
20	CalWater Hydrologic Areas	California Department of Forestry and Fire Protection	11/1/2016	10/19/2018	https://frap.fire.ca.gov/mapping/gis-data/
21	Vernal Pools – ACE [ds2732]	CDFW	2/13/2020	1/29/2021	https://map.dfg.ca.gov/metadata/ds2732.html?5.94.01
22	Terrestrial Connectivity – ACE [ds2734]	CDFW	8/28/2019	9/25/2019	https://map.dfg.ca.gov/metadata/ds2734.html?5.80.28
23	SWAP Terrestrial Targets – 2015	CDFW	2/1/2018	10/29/2018	https://map.dfg.ca.gov/metadata/ds1966.html?5.66.18
24	Aquatic Biodiversity Summary – ACE [ds2768]	CDFW	2/22/2018	7/3/2019	https://map.dfg.ca.gov/metadata/ds2768.html?5.80.28

ID	GIS Layer	Source Agency	Source Date	Download Date	Website
25	Calfish Passage Assessment Database ("PAD")	Calfish	10/3/2019	12/15/2019	https://map.dfg.ca.gov/metadata/ds0069.html?5.84.18vo
26	Terrestrial Biodiversity Summary – ACE [ds2739]	CDFW	2/24/2020	7/3/2019	https://map.dfg.ca.gov/metadata/ds2739.html?5.80.28l
27	Corps Regulatory In-lieu Fee & Bank Information Tracking System	Mitigation Service Banks	Not available	1/28/2019	https://ribits.usace.army.mil/ribits_ape_x/f?p=107:2
28	CDFW Approved Mitigation Service Areas	Mitigation Service Banks	7/23/2018	1/28/2019	https://map.dfg.ca.gov/metadata/ds2782.html?5.76.22
29	National Hydrology Dataset Plus ("NHDPlus")	EPA	3/13/2019	4/29/2021	https://www.epa.gov/waterdata/get-nhdplus-national-hydrography-dataset-plus-data
30	303(d) List of Impaired Waterbodies	SWRCB	2014–2016	4/7/2020	https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml
31	ZIP Codes	U.S. Postal Service	2/11/2020	3/11/2020	https://www.arcgis.com/home/item.html?id=8d2012a2016e484dafaac0451f9aea24

APPENDIX B: LAND COVER TYPES

Land cover types in the GAI were excerpted from the SAMNA Reporting Tool's vegetation layer, which was developed by merging CDFW's 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 2021a, 2021b). Land cover types that occur in the GAI based on the SAMNA Reporting Tool are listed below (CDFW 2019), and complete descriptions can be found in Mayer and Laudenslayer (1988). Table 2-2 in the main text indicates the acreages of each habitat type that are mapped in the Great Valley Section.

A key map, provided after the list of habitat types, references mapbook pages, including zoomed-in views of locations in the GAI and mapped land cover types (page B-3). These 19 maps correspond with the aquatic resources maps in Appendix F.

Tree-dominated Habitats: Tree-dominated habitats have at least 10 percent total tree canopy crown closure. In the GAI, tree-dominated habitats include blue oak-foothill pine, blue oak woodland, eucalyptus, montane hardwood, montane riparian, ponderosa pine, valley foothill riparian, and valley oak woodland.

Shrub-dominated Habitats: Shrub-dominated habitats have at least 10 percent total cover by shrub species and less than 10 percent cover by tree species. In the GAI, shrub-dominated habitats include alkali desert scrub, chamise-redshank chaparral, coastal scrub, and mixed chaparral.

Herbaceous-dominated Habitats: Herbaceous-dominated habitats have at least 2 percent total cover by herbaceous species and less than 10 percent total cover by tree or shrub species. In the GAI, herbaceous-dominated habitats include annual grassland, fresh emergent wetland, pasture, perennial grassland, saline emergent wetland, and wet meadow.

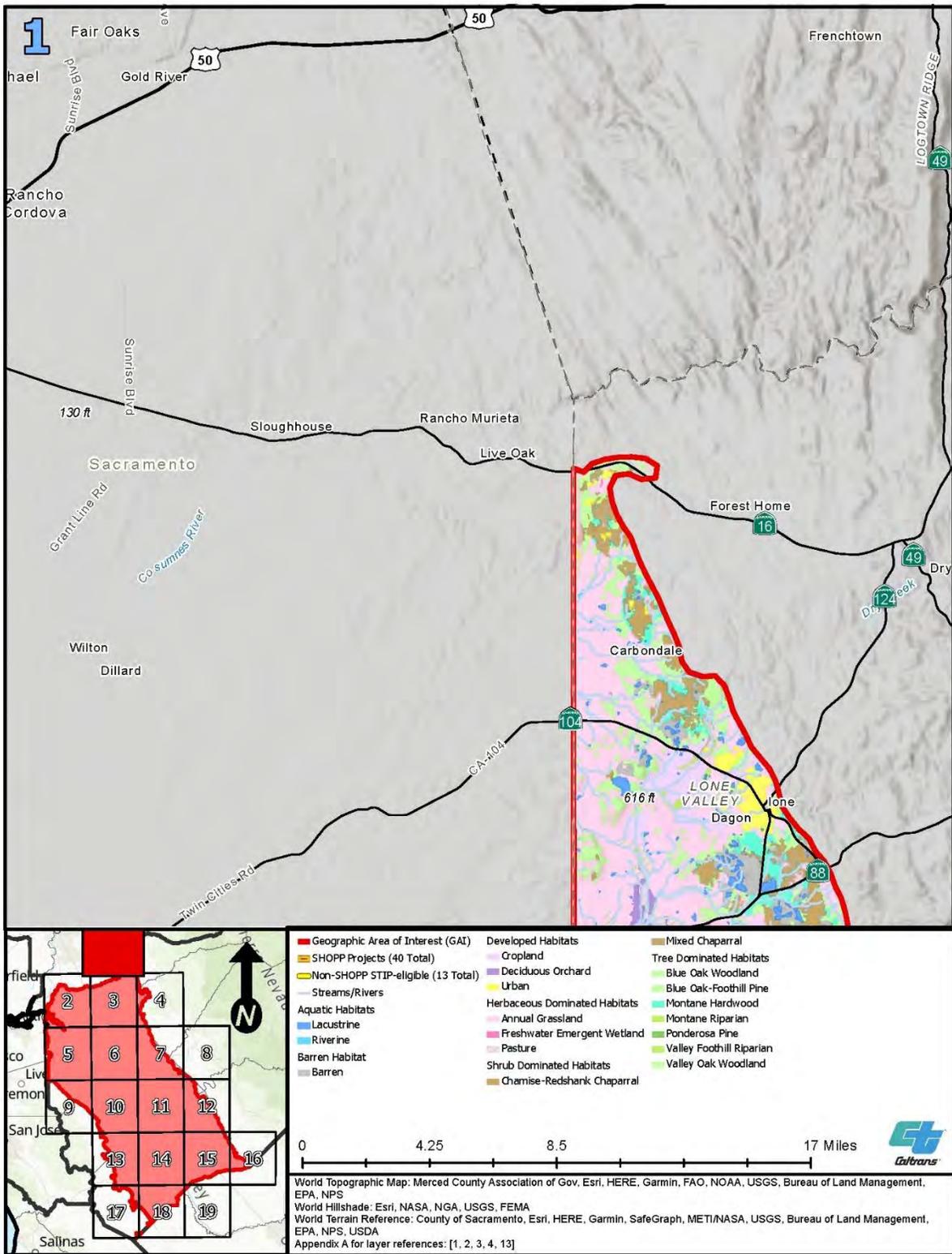
Aquatic Habitats: Aquatic habitats have at least 98 percent total cover by open water and no more than 2 percent total cover by vegetation in the continually exposed shore zone. In the GAI, aquatic habitats include lacustrine and riverine.

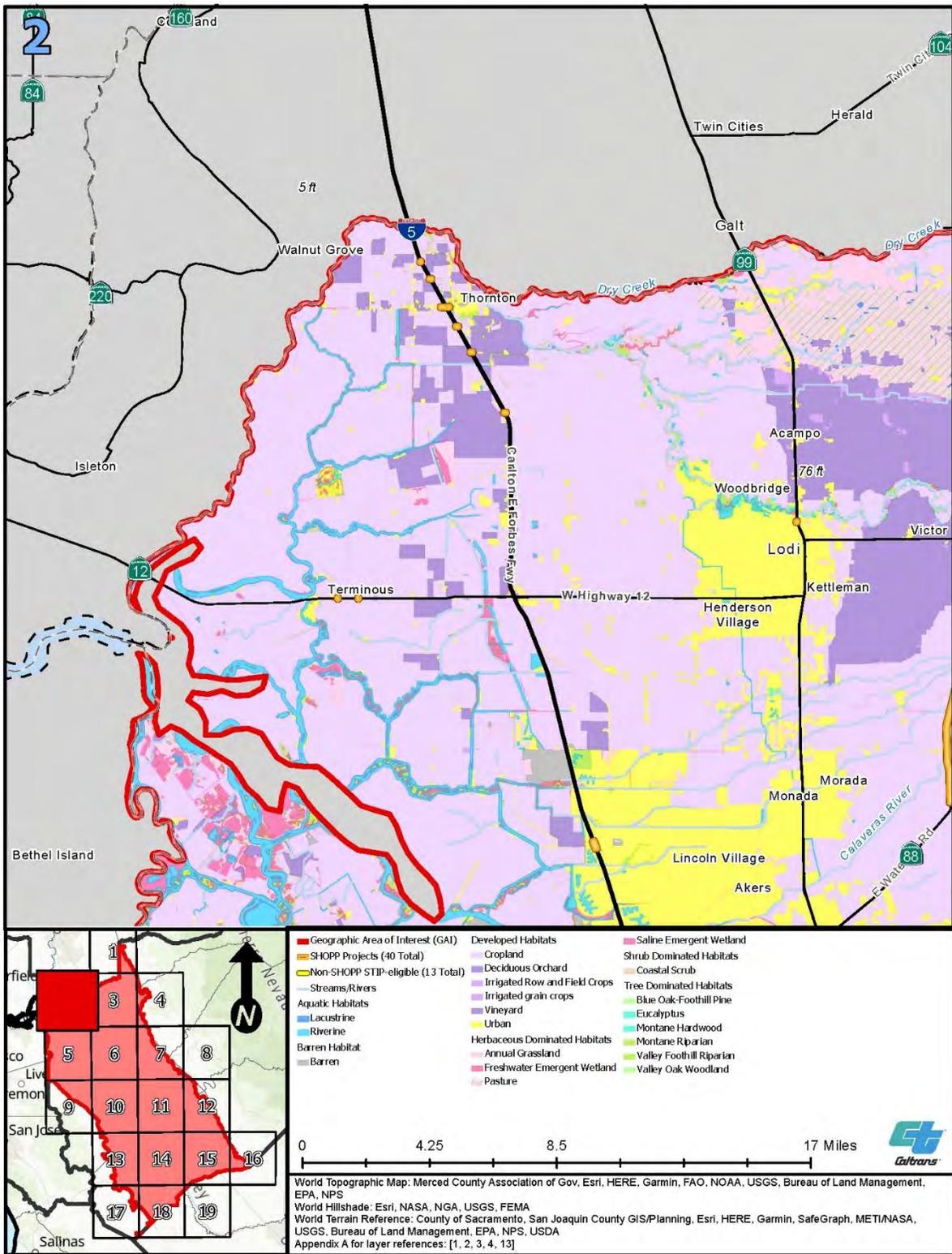
Developed Habitats: Developed habitats have at least 2 percent total cover by non-wildland vegetation grown for food, fiber, or landscaping, and do not meet criteria for any wildland habitat. In the GAI, developed habitats include cropland, deciduous orchard, evergreen orchard, irrigated grain crops, irrigated row and field crops, rice, urban, and vineyard.

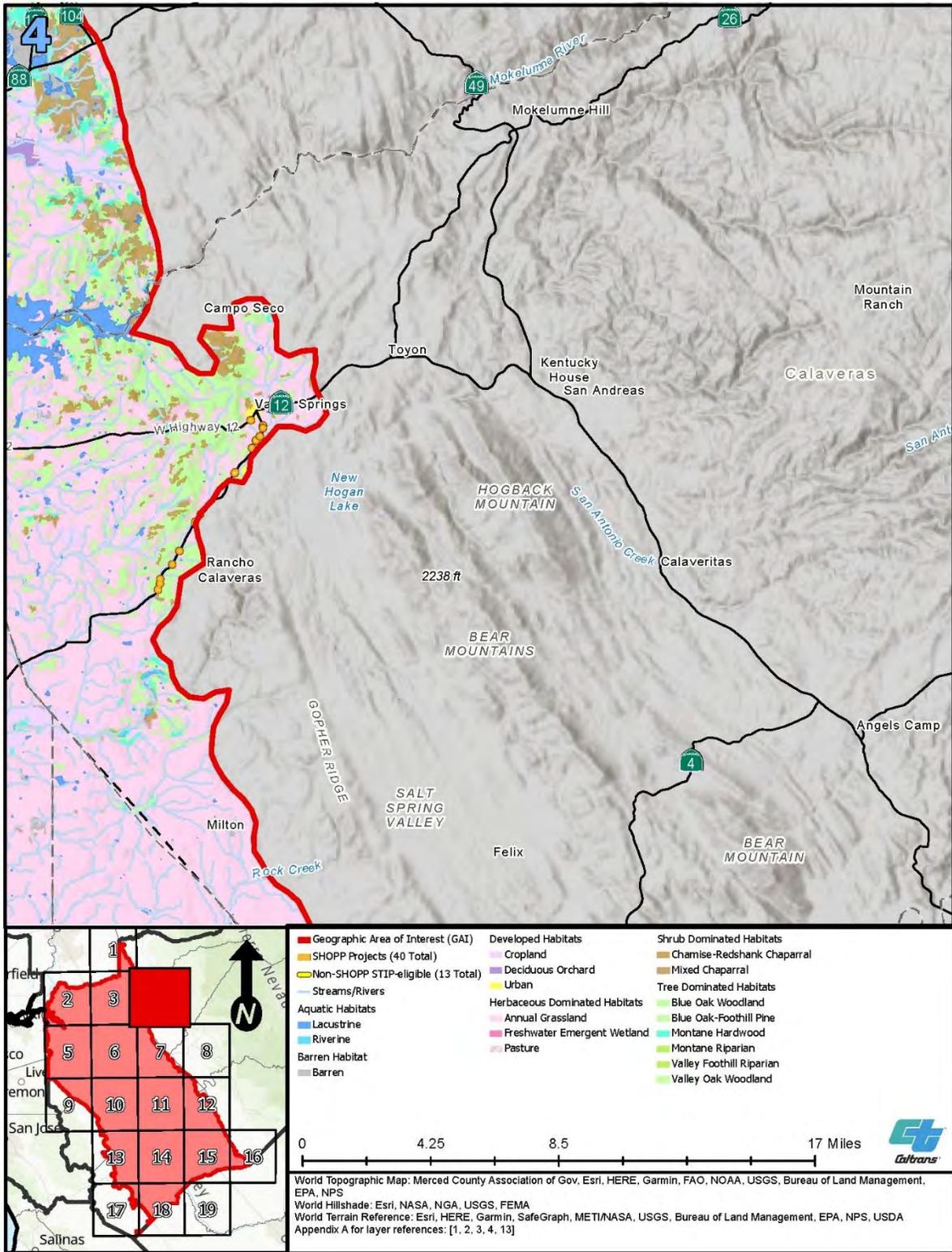
Non-vegetated Habitats: Non-vegetated habitats include barren areas, characterized by less than 2 percent cover by herbaceous species. In the GAI, non-vegetated habitats consist of barren areas.

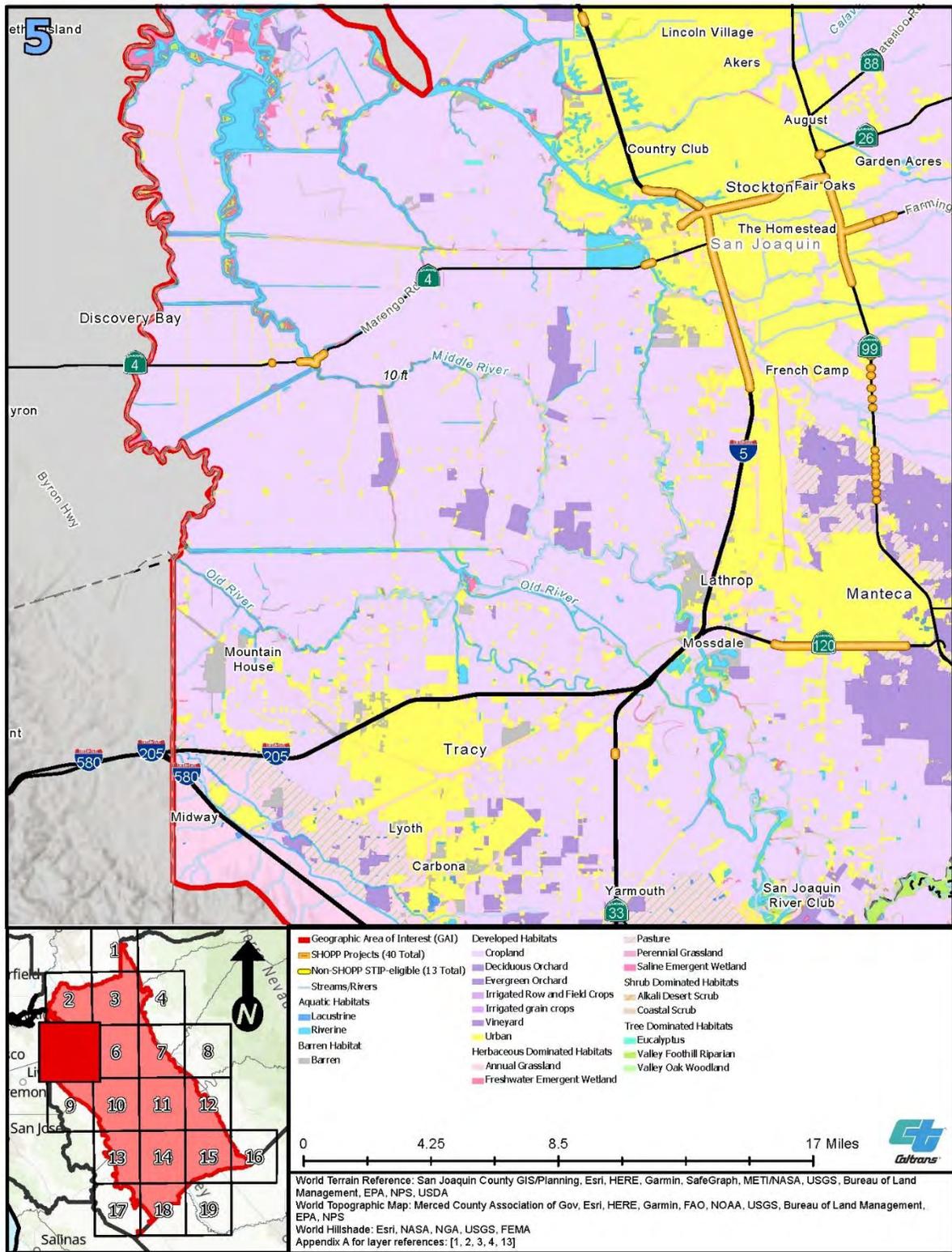
References

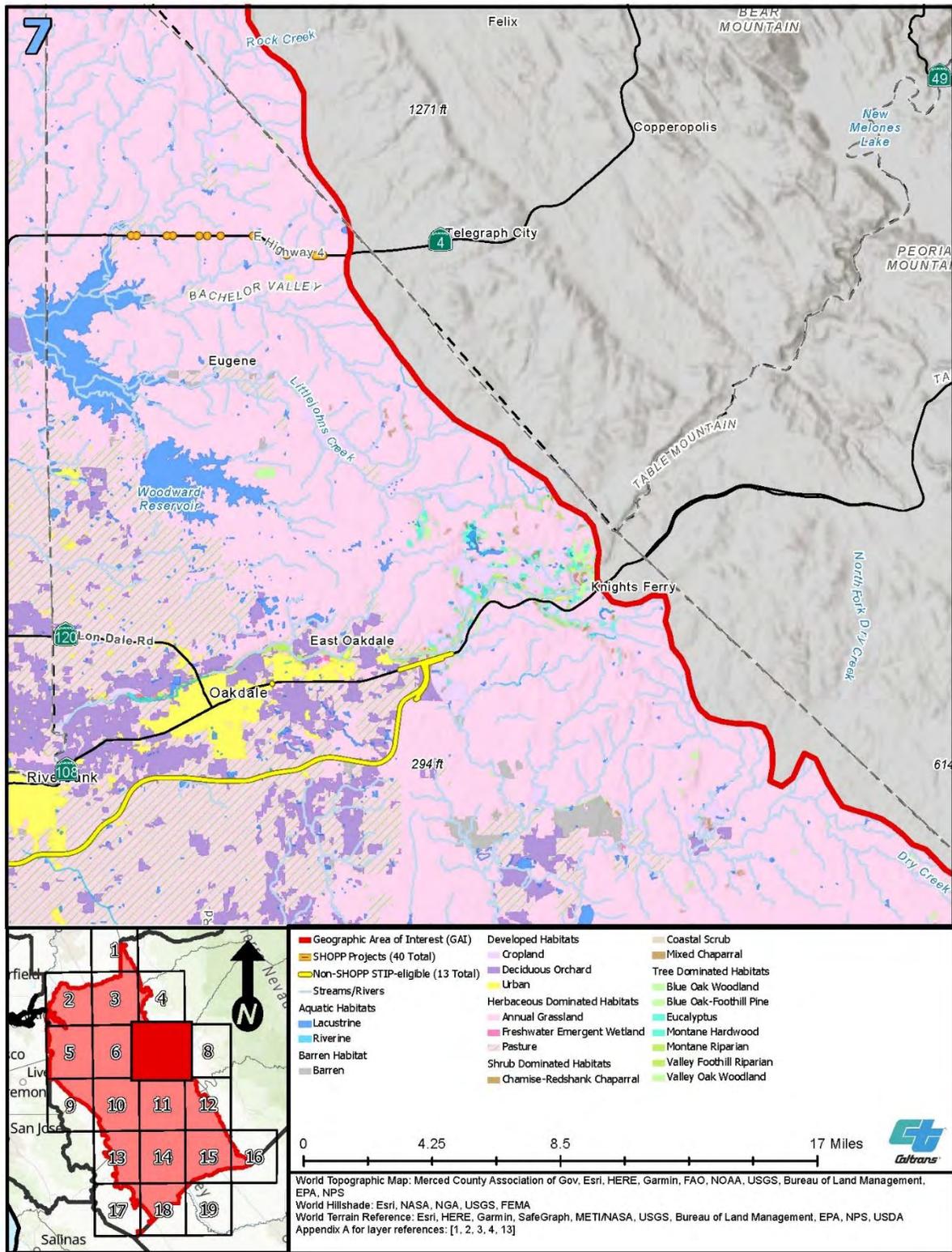
- Caltrans (California Department of Transportation). 2021a. "Vegetation_D10 in Caltrans District 10 Geospatial Data for the Advance Mitigation Needs Assessment for the Second Quarter of FY 2019/2020" (data file). Accessed March 24, 2021. <http://www.dot.ca.gov/env/advancemitigation/>.
- . 2021b. *Statewide Advance Mitigation Needs Assessment Report*. State Highway Operation and Protection Program Ten-Year Project Book Second Quarter 2019/2020 Fiscal Year. May. Sacramento, California.
- CDFW (California Department of Fish and Wildlife). 2019. *California Wildlife Habitat Relationships (CWHR) System*. Supported by the California Interagency Wildlife Task Group and maintained by the CDFW. Database Version 9.0.
- Mayer, Kenneth E. and William F. Laudenslayer, Jr., eds. 1988. "A Guide to Wildlife Habitats of California." State of California, Resources Agency, Department of Fish and Game. Sacramento, California. Including Revisions and Updates. Accessed August 2, 2021. <https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>.

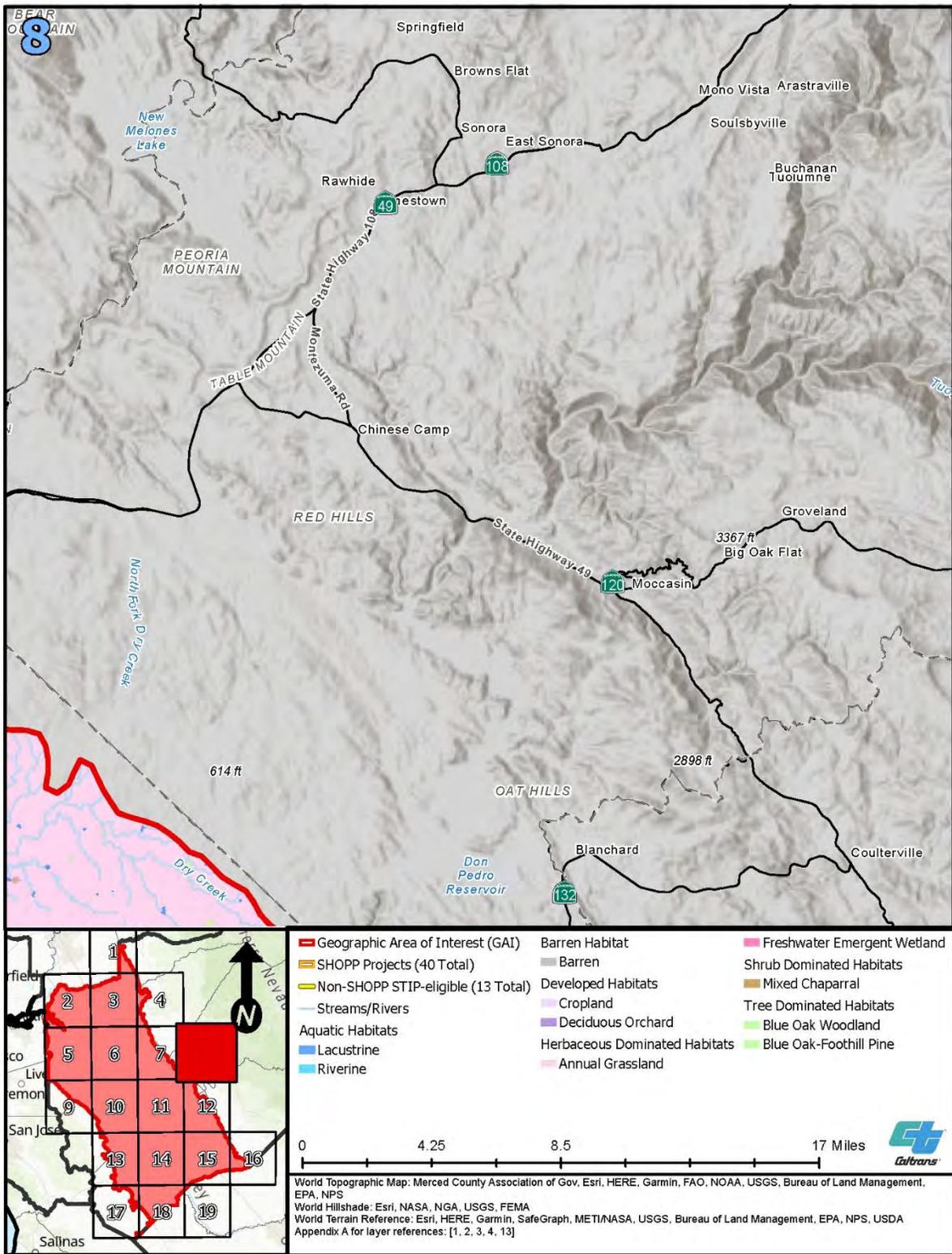


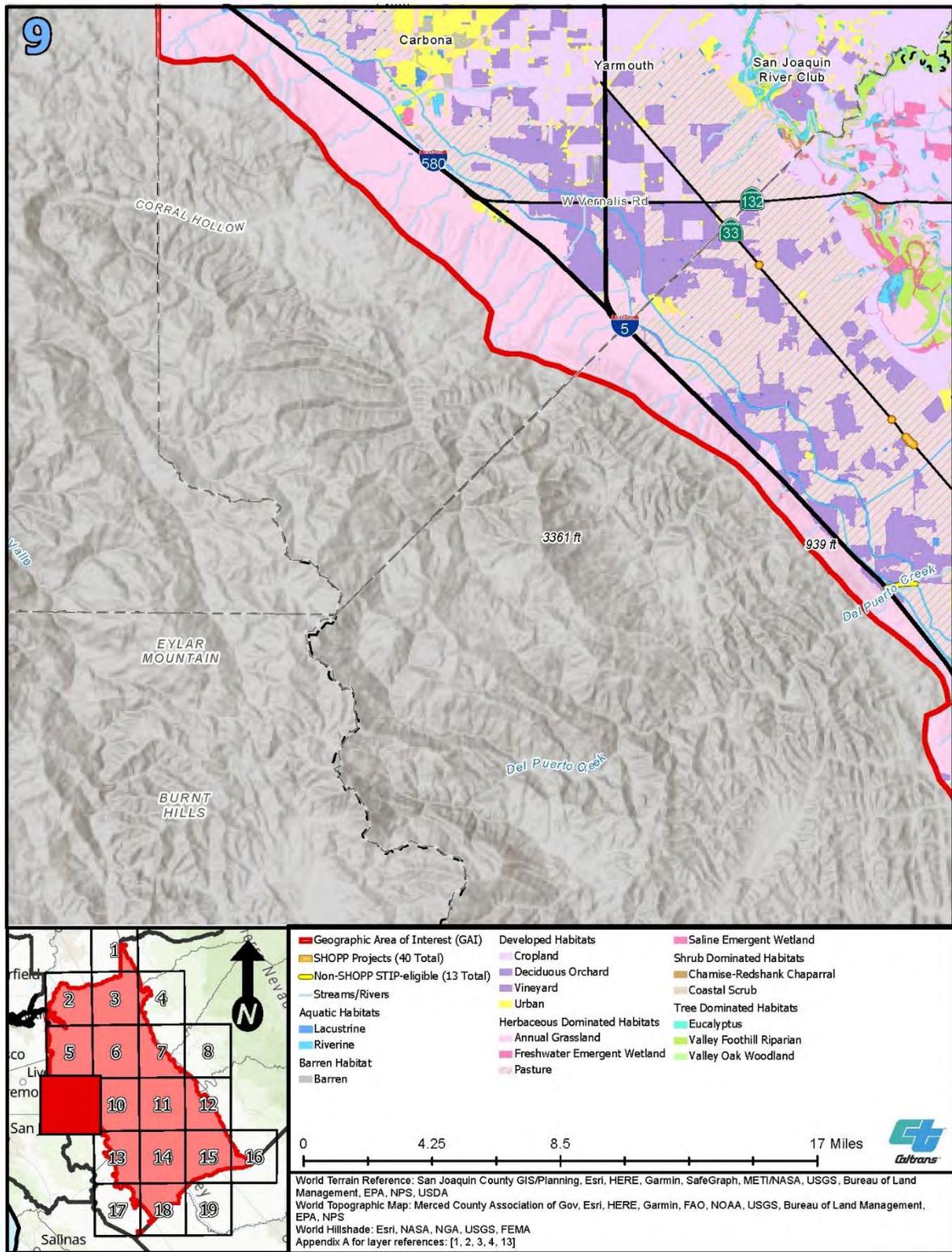


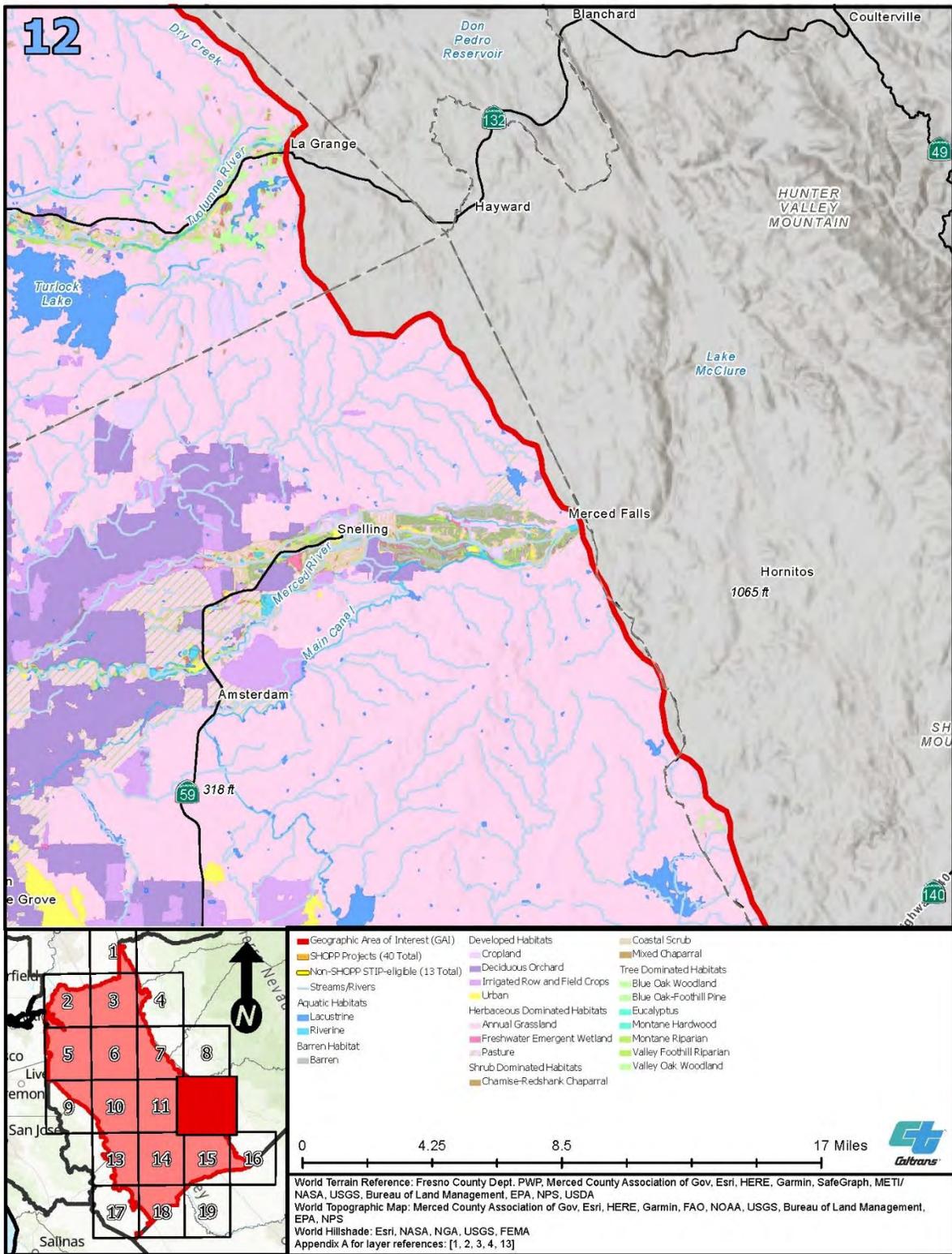


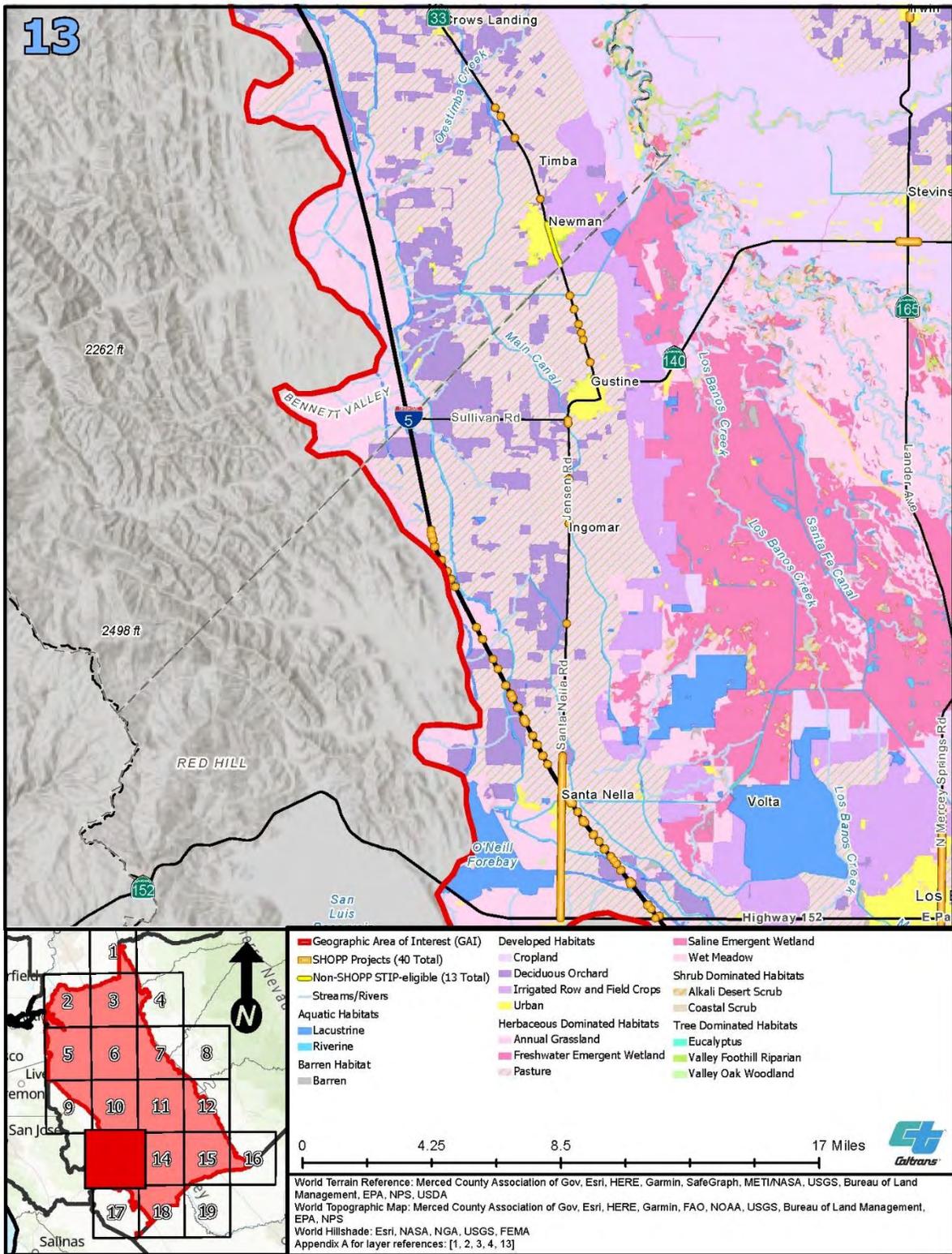


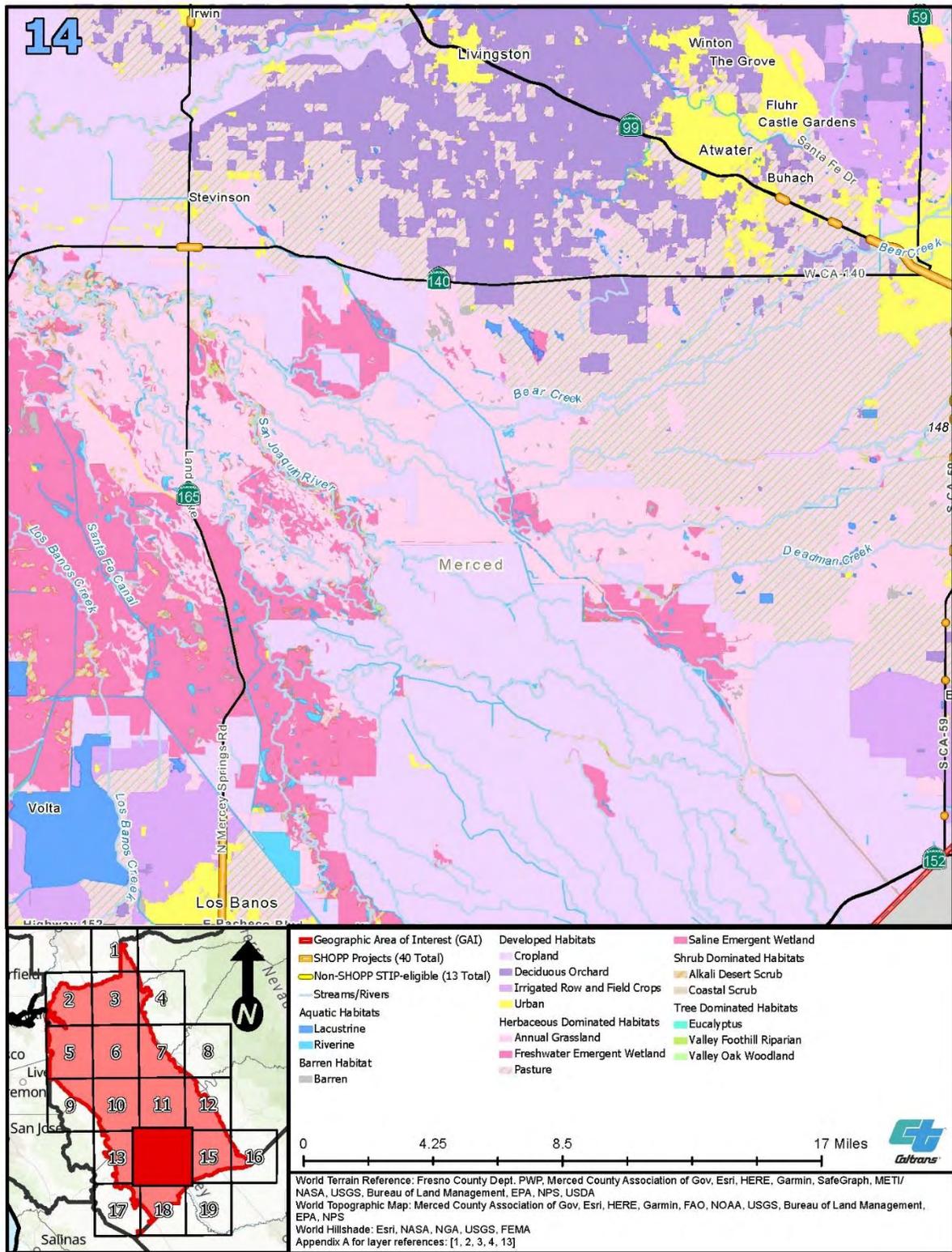


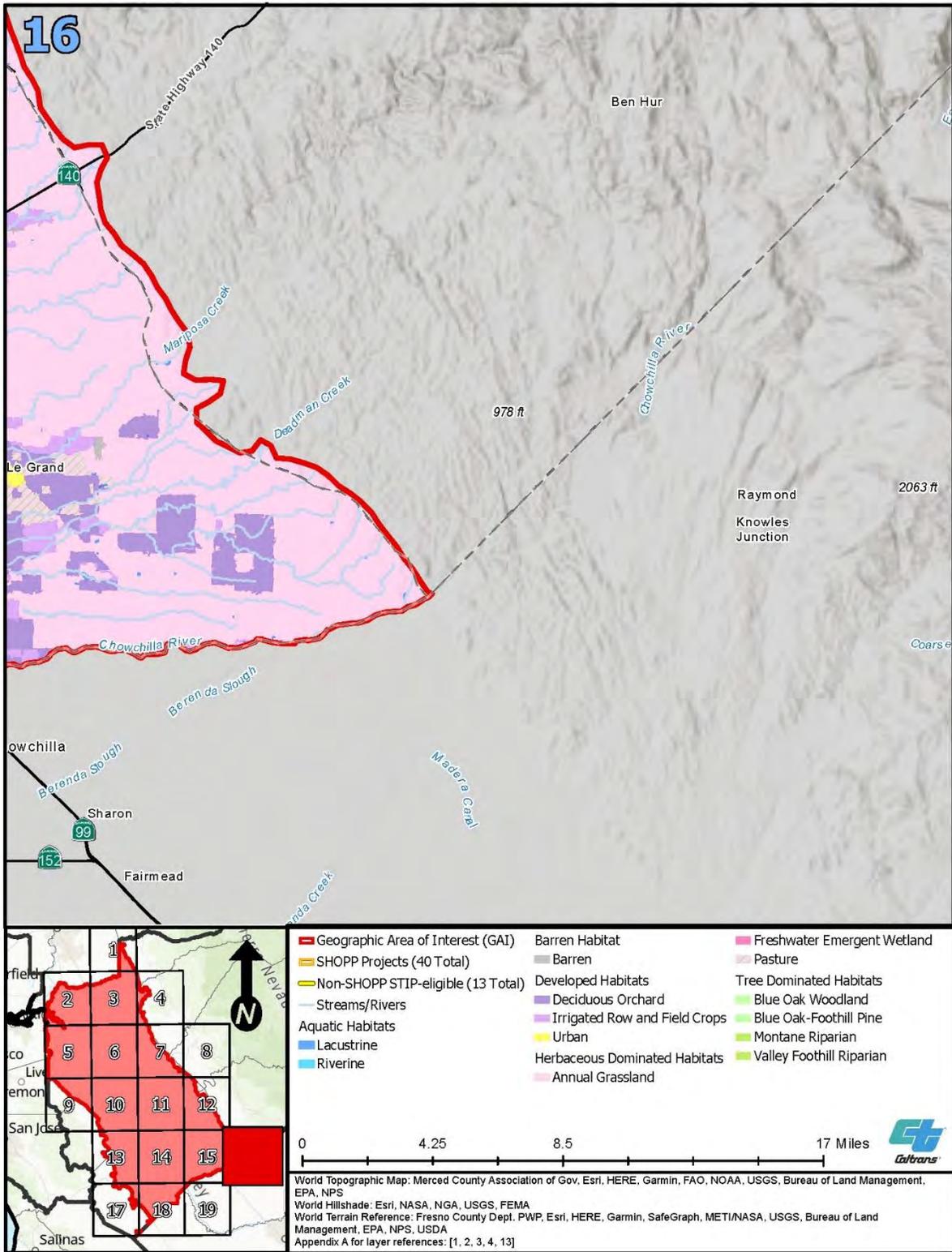


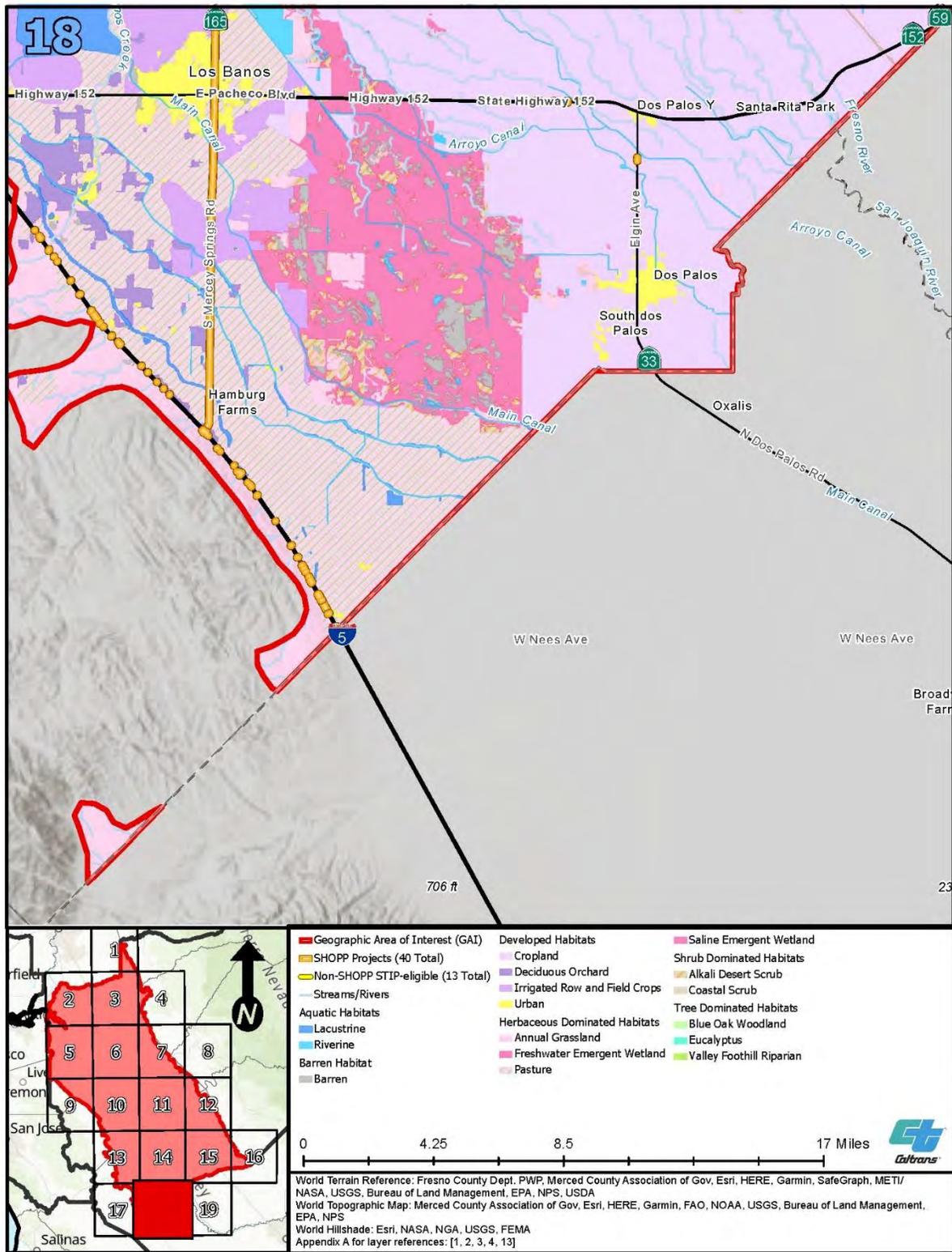


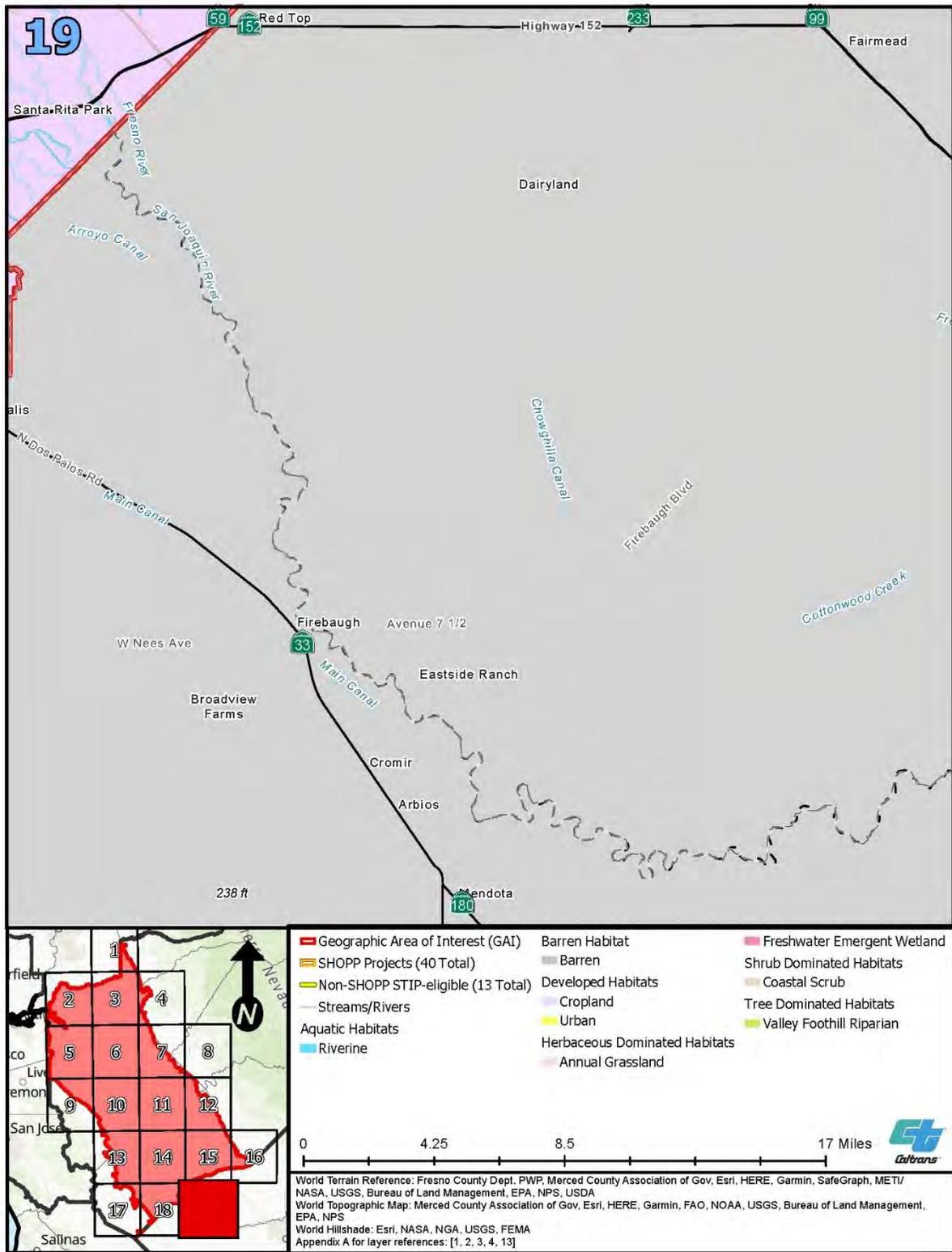












APPENDIX C: COMPLETE SAMNA SPECIES RESULTS

Complete terrestrial species SAMNA results for the GAI are provided in Table C-1, which include SAMNA results for the portion of the Great Valley Section within the GAI (starts on page C-3). The table lists the species for which the SAMNA has enough and the right kind of information to forecast potential impacts from transportation projects conceptualized in long-range transportation plans (Caltrans 2021). SAMNA results are only as accurate as their foundational data and have not been ground-truthed. Regarding these results:

- Species without CWHR system-supplied home ranges but identified by the California Natural Diversity Database as potentially present will be incorporated into the analysis of specific advance mitigation projects and future transportation projects.
- Subspecies may or may not have CWHR-supplied or other documented sources showing their home ranges. When a subspecies did not have home range information suitable for input into the SAMNA model, SAMNA results are provided at the species level, which may include both special-status and non-special-status species. Hence, the number of species that have the potential to be affected may be overestimated.
- If impacts were estimated, additional information sources were consulted to determine whether special-status subspecies are located in the GAI, and the SAMNA results are usable for this analysis. Footnotes have been added to the table where data input limitations and modeling assumptions resulted in identification of potential impacts on species or subspecies that are not present in the GAI.
- When no impacts are estimated for a specific habitat, for any species, the habitat was excluded from this appendix.
- When no impacts for a species are estimated for any habitat, the species is included. Based on available information, it is potentially present in the GAI, but not in the habitats forecast to be affected by transportation projects.

Total habitat impacts for each special-status species are indicated in the far-right column of the table. Total habitat impacts in the bottom row of the table indicate the total anticipated impacts for each habitat type. 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.

Habitats referenced in Table C-1 are mapped in Appendix B. While California red-legged frog, the Central California DPS of California tiger salamander, giant garter snake, and valley elderberry longhorn beetle are the species of mitigation need identified for this GAI, several other special-status species share habitat with these species of mitigation need and may be affected by Caltrans' future transportation projects. Advance mitigation planning will consider the special-status species that co-occur in habitats that may also

benefit from advance mitigation project planning and scoping to improve the conservation benefits of compensatory mitigation in the GAI. For example, advance mitigation established for California red-legged frog impacts may also provide mitigation to compensate for impacts on other species. The acreage of habitats for the species of mitigation need with the potential to be affected in the GAI, and the other special-status species that may share these habitats, were excerpted from Table C-1 and are provided in Tables 5-5 and 5-6 in Chapter 5 of the main text.

References

Caltrans (California Department of Transportation). 2021. *Statewide Advance Mitigation Needs Assessment Report*. State Highway Operation and Protection Program. Ten-Year Project Book. Second Quarter 2019/2020 Fiscal Year. May. Sacramento, California.

Table C-1. Complete SAMNA Results for the Great Valley Section in the GAI, by Land Cover (acres)

Common Name	Scientific Name	Status	Annual Grassland	Barren	Blue Oak Woodland	Deciduous Orchard	Eucalyptus	Fresh Emergent Wetland	Irrigated Row and Field Crops	Lacustrine	Mixed Chaparral	Pasture	Riverine	Urban	Valley Foothill Riparian	Total
Plants	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
lone manzanita	<i>Arctostaphylos myrtifolia</i>	FT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
Chinese Camp brodiaea	<i>Brodiaea pallida</i>	FT, SE	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69
Stebbins' morning-glory	<i>Calystegia stebbinsii</i>	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
Succulent owl's-clover	<i>Castilleja campestris</i> var. <i>succulenta</i>	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
California jewelflower ^a	<i>Caulanthus californicus</i>	FE, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Pine Hill ceanothus ^a	<i>Ceanothus roderickii</i>	FE, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
Palmate-bracted bird's-beak	<i>Chloropyron palmatum</i>	FE, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Kern mallow ^a	<i>Eremalche parryi</i> ssp. <i>kernensis</i>	FE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
lone buckwheat	<i>Eriogonum apricum</i> var. <i>apricum</i>	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
Irish Hill buckwheat	<i>Eriogonum apricum</i> var. <i>prostratum</i>	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
Hoover's spurge	<i>Euphorbia hooveri</i>	FT	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Pine Hill flannelbush	<i>Fremontodendron decumbens</i>	FE, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
El Dorado bedstraw	<i>Galium californicum</i> ssp. <i>sierrae</i>	FE, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	FS, SE	32.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.28
San Joaquin woollythreads ^a	<i>Monolopia congdonii</i>	FE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Colusa grass	<i>Neostapfia colusana</i>	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Bakersfield cactus ^a	<i>Opuntia basilaris</i> var. <i>treleasei</i>	FE, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
San Joaquin Valley Orcutt grass	<i>Orcuttia inaequalis</i>	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Hairy Orcutt grass	<i>Orcuttia pilosa</i>	FE, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Layne's ragwort	<i>Packera layneae</i>	FT, SR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
San Joaquin adobe sunburst ^a	<i>Pseudobahia peirsonii</i>	FT, SE	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86

Common Name	Scientific Name	Status	Annual Grassland	Barren	Blue Oak Woodland	Deciduous Orchard	Eucalyptus	Fresh Emergent Wetland	Irrigated Row and Field Crops	Lacustrine	Mixed Chaparral	Pasture	Riverine	Urban	Valley Foothill Riparian	Total
Greene's tuctoria	<i>Tuctoria greenei</i>	FE, SR	31.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.86
Invertebrates	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	FE	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95
Longhorn fairy shrimp	<i>Branchinecta longiantenna</i>	FE	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	FT	5.22	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	FE	5.41	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.63
Amphibians	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
California tiger salamander	<i>Ambystoma californiense</i>	FT, ST	32.28	0.00	0.19	0.00	0.05	1.50	0.00	0.77	0.00	0.00	0.00	0.00	1.59	36.38
California newt ^b	<i>Taricha torosa</i>	SSC	4.31	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	4.51
Ensatina ^c	<i>Ensatina eschscholtzii</i>	FS	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Western spadefoot	<i>Spea hammondi</i>	FS, SSC	32.28	0.00	0.19	13.35	0.05	1.50	11.99	0.77	0.04	0.00	2.69	0.00	0.00	62.86
Foothill yellow-legged frog	<i>Rana boylei</i>	FS, SE, SSC	9.89	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.09	0.00	0.00	10.13
California red-legged frog	<i>Rana draytonii</i>	FT, SSC	9.02	0.00	0.09	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	9.30
Reptiles	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
Blunt-nosed leopard lizard	<i>Gambelia sila</i>	FE, SE, SFP	8.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.09
Blainville's horned lizard	<i>Phrynosoma blainvillii</i>	FS, SSC	32.28	0.00	0.19	0.00	0.05	0.00	11.99	0.00	0.04	0.00	0.00	0.00	1.59	46.14
Western skink ^d	<i>Plestiodon skiltonianus</i>	FS	6.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.00	0.00	0.00	7.64
California legless lizard ^e	<i>Anniella pulchra</i>	FS, SSC	0.00	0.00	0.19	0.00	0.05	0.00	0.00	0.00	0.04	0.00	0.00	0.00	1.59	1.86
Ring-necked snake ^f	<i>Diadophis punctatus</i>	SSC	9.05	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.04	0.51	0.00	0.00	0.00	9.78
Coachwhip	<i>Masticophis flagellum</i>	SSC	8.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.79	0.00	0.00	0.00	43.73
Striped racer ^g	<i>Masticophis lateralis</i>	FT, ST	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Gophersnake	<i>Pituophis catenifer</i>	None	32.28	0.00	0.19	13.35	0.05	1.50	11.99	0.00	0.04	45.92	0.00	223.06	1.59	329.97

Common Name	Scientific Name	Status	Annual Grassland	Barren	Blue Oak Woodland	Deciduous Orchard	Eucalyptus	Fresh Emergent Wetland	Irrigated Row and Field Crops	Lacustrine	Mixed Chaparral	Pasture	Riverine	Urban	Valley Foothill Riparian	Total
California mountain kingsnake	<i>Lampropeltis zonata</i>	None	2.67	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.80
Common gartersnake ^h	<i>Thamnophis sirtalis</i>	FE, SE, SFP	32.28	0.00	0.19	13.35	0.05	1.50	11.99	0.77	0.04	45.92	0.00	0.00	1.59	107.67
Giant gartersnake	<i>Thamnophis gigas</i>	FT, ST	32.28	0.00	0.00	0.00	0.00	1.50	0.00	0.77	0.00	0.00	2.69	0.00	1.59	38.84
Birds	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
American white pelican ⁱ	<i>Pelecanus erythrorhynchos</i>	SSC	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.00	2.69	0.00	0.00	3.72
Great blue heron	<i>Ardea herodias</i>	SFS	32.28	0.00	0.19	0.00	0.05	1.50	11.99	0.77	0.00	0.00	2.69	223.06	1.59	274.13
Great egret	<i>Ardea alba</i>	SFS	32.28	0.00	0.19	0.00	0.05	1.50	11.99	0.77	0.00	0.00	2.69	223.06	1.59	274.13
Greater white-fronted goose ^j	<i>Anser albifrons</i>	SSC	32.28	0.00	0.00	0.00	0.00	1.50	11.99	0.77	0.00	0.00	2.69	0.00	0.00	49.24
Redhead	<i>Aythya americana</i>	SSC	0.00	0.00	0.00	0.00	0.00	1.44	0.00	0.34	0.00	0.00	2.49	0.00	0.00	4.27
Barrow's goldeneye ^k	<i>Bucephala islandica</i>	SSC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.09
Osprey	<i>Pandion haliaetus</i>	SFS	9.65	0.06	0.19	0.00	0.00	1.17	0.00	0.00	0.04	0.00	1.59	0.00	0.05	12.74
White-tailed kite	<i>Elanus leucurus</i>	FS, SFP	32.28	0.26	0.19	13.35	0.05	1.50	11.99	0.00	0.04	0.00	0.00	223.06	1.59	284.31
Bald eagle	<i>Haliaeetus leucocephalus</i>	FS, SE, SFP, SFS	32.28	0.26	0.19	0.00	0.05	1.50	0.00	0.77	0.04	0.00	2.69	0.00	1.59	39.37
Northern harrier	<i>Circus hudsonius^e</i>	SSC	32.28	0.26	0.19	13.35	0.05	1.50	0.00	0.77	0.04	0.00	2.69	223.06	1.59	275.78
Swainson's hawk	<i>Buteo swainsoni</i>	FS, ST	32.28	0.26	0.19	0.00	0.05	0.00	0.00	0.00	0.04	45.92	0.00	223.06	1.59	303.39
Golden eagle	<i>Aquila chrysaetos</i>	FS, SFP, SFS	32.28	0.26	0.19	0.00	0.05	1.50	0.00	0.00	0.04	45.92	0.00	223.06	1.59	304.89
Peregrine falcon	<i>Falco peregrinus</i>	SFP, SFS	32.28	0.26	0.19	0.00	0.05	1.50	0.00	0.77	0.04	0.00	2.69	223.06	1.59	262.43
California quail ^l	<i>Callipepla californica</i>	SSC	32.28	0.00	0.19	13.35	0.05	0.00	0.00	0.00	0.04	0.00	0.00	223.06	1.59	270.56
Black rail	<i>Laterallus jamaicensis</i>	FS, ST, SFP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	1.59
Sandhill crane	<i>Antigone canadensis^e</i>	FS, ST, SFP	32.28	0.00	0.00	0.00	0.00	1.50	11.99	0.77	0.00	0.00	0.00	0.00	1.59	48.14
Lesser sandhill crane	<i>Antigone canadensis canadensis^e</i>	SSC	18.13	0.00	0.00	0.00	0.00	1.13	10.42	0.32	0.00	0.00	0.00	0.00	0.92	30.92
Snowy plover	<i>Charadrius nivosus^e</i>	FT, SSC	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Mountain plover	<i>Charadrius montanus</i>	FS, SSC	17.08	0.26	0.00	0.00	0.00	0.00	10.42	0.00	0.00	0.00	0.00	0.00	0.00	27.75

Common Name	Scientific Name	Status	Annual Grassland	Barren	Blue Oak Woodland	Deciduous Orchard	Eucalyptus	Fresh Emergent Wetland	Irrigated Row and Field Crops	Lacustrine	Mixed Chaparral	Pasture	Riverine	Urban	Valley Foothill Riparian	Total
Black tern	<i>Chlidonias niger</i>	SSC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.32
Burrowing owl	<i>Athene cunicularia</i>	FS, SSC	32.28	0.26	0.19	0.00	0.05	0.00	0.00	0.00	0.04	45.92	0.00	223.06	1.59	303.39
Long-eared owl	<i>Asio otus</i>	SSC	14.09	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	2.40	0.00	0.00	0.04	16.66
Short-eared owl	<i>Asio flammeus</i>	SSC	32.28	0.00	0.19	0.00	0.05	1.50	11.99	0.00	0.04	0.00	0.00	223.06	1.59	270.70
Bewick's wren ^m	<i>Thryomanes bewickii</i>	SSC	0.00	0.00	0.19	13.35	0.05	0.00	0.00	0.00	0.04	0.00	0.00	223.06	1.59	238.28
Marsh wren ⁿ	<i>Cistothorus palustris</i>	SSC	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.59	3.10
Loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	32.28	0.26	0.19	13.35	0.05	0.00	0.00	0.00	0.04	0.00	0.00	223.06	1.59	270.82
Hutton's vireo ^o	<i>Vireo huttoni</i>	SSC	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.23
Yellow warbler	<i>Setophaga petechia</i>	SSC	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Common yellowthroat ^p	<i>Geothlypis trichas</i>	SSC	32.28	0.00	0.00	0.00	0.05	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.59	35.42
Spotted towhee ^q	<i>Pipilo maculatus</i>	SSC	0.00	0.00	0.19	13.35	0.05	0.00	0.00	0.00	0.04	0.00	0.00	223.06	1.59	238.28
California towhee ^f	<i>Melospiza crissalis</i> ^e	FT, SE	0.00	0.00	0.19	9.01	0.05	0.00	0.00	0.00	0.04	0.00	0.00	153.47	0.67	163.41
Rufous-crowned sparrow ^s	<i>Aimophila ruficeps</i>	SSC	2.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67
Vesper sparrow	<i>Poocetes gramineus</i>	None	12.48	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	12.71
Oregon vesper sparrow	<i>Poocetes gramineus affinis</i>	SSC	12.48	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	12.71
Savannah sparrow ^t	<i>Passerculus sandwichensis</i>	SE	32.28	0.00	0.19	13.35	0.05	0.00	0.00	0.00	0.04	45.92	0.00	0.00	1.59	93.41
Grasshopper sparrow	<i>Ammodramus savannarum</i>	SSC	32.28	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.33
Song sparrow	<i>Melospiza melodia</i>	None	32.28	0.00	0.19	13.35	0.05	1.50	0.00	0.77	0.04	0.00	2.69	223.06	1.59	275.52
Modesto song sparrow	<i>Melospiza melodia mailliardi</i>	SSC	21.66	0.00	0.19	9.01	0.05	1.29	0.00	0.00	0.04	0.00	1.83	159.17	1.39	194.62
Red-winged blackbird ^u	<i>Agelaius phoeniceus</i>	SSC	32.28	0.00	0.00	13.35	0.05	1.50	11.99	0.00	0.00	0.00	0.00	223.06	1.59	283.83
Tricolored blackbird	<i>Agelaius tricolor</i>	FS, ST, SSC	32.28	0.00	0.00	13.35	0.05	1.50	11.99	0.00	0.00	0.00	0.00	223.06	1.59	283.83
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	SSC	32.28	0.00	0.00	0.00	0.00	1.50	0.00	0.77	0.00	45.92	0.00	0.00	0.00	80.47
Mammals	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
Ornate shrew ^v	<i>Sorex ornatus</i>	FE, SSC	13.86	0.00	0.00	0.00	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.25	15.43

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Broad-footed mole ^w	<i>Scapanus latimanus</i>	SSC	13.28	0.00	0.14	7.86	0.00	0.00	1.58	0.00	0.00	6.24	0.00	0.00	0.12	29.20
Yuma myotis	<i>Myotis yumanensis</i>	FS	32.28	0.00	0.19	13.35	0.05	1.50	11.99	0.77	0.04	45.92	2.69	223.06	1.59	333.43
Western red bat	<i>Lasiurus blossevillii</i>	SSC	32.28	0.00	0.19	0.00	0.05	1.50	0.00	0.77	0.04	45.92	2.69	223.06	1.59	308.09
Spotted bat	<i>Euderma maculatum</i>	FS, SSC	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	FS, SSC	32.28	0.26	0.19	13.35	0.05	0.00	11.99	0.00	0.04	45.92	2.69	223.06	1.59	331.42
Pallid bat	<i>Antrozous pallidus</i>	FS, SSC	32.28	0.26	0.19	13.35	0.05	0.00	11.99	0.00	0.04	45.92	2.69	223.06	1.59	331.42
Western mastiff bat	<i>Eumops perotis</i>	FS, SSC	13.55	0.16	0.19	9.65	0.00	0.28	5.19	0.00	0.04	35.29	0.00	52.89	0.20	117.43
Brush rabbit	<i>Sylvilagus bachmani</i>	None	9.30	0.00	0.14	1.08	0.00	0.00	0.00	0.00	0.00	1.28	0.00	87.06	0.00	98.86
Riparian brush rabbit	<i>Sylvilagus bachmani riparius</i>	FE, SE	0.28	0.00	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	87.06	0.00	88.43
Black-tailed jackrabbit ^x	<i>Lepus californicus</i>	SSC	32.28	0.00	0.19	13.35	0.05	0.00	11.99	0.00	0.04	45.92	0.00	223.06	1.59	328.47
Nelson's antelope ground squirrel	<i>Ammospermophilus nelsoni</i>	FS, ST	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.53	0.00	0.00	0.00	19.36
San Joaquin pocket mouse	<i>Perognathus inornatus</i>	FS	31.86	0.26	0.05	0.00	0.00	0.00	0.00	0.00	0.00	45.92	0.00	0.00	0.00	78.08
California pocket mouse ^y	<i>Chaetodipus californicus</i>	SSC	9.02	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.16
Heermann's kangaroo rat ^z	<i>Dipodomys heermanni</i>	FE, SE, SFP	14.50	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.04	40.62	0.00	0.00	0.00	55.35
Giant kangaroo rat	<i>Dipodomys ingens</i>	FE, SE	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83
Fresno kangaroo rat	<i>Dipodomys nitratoides</i>	FE, SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.94
Deer mouse ^{aa}	<i>Peromyscus maniculatus</i>	SSC	32.28	0.26	0.19	13.35	0.05	1.50	11.99	0.00	0.04	45.92	0.00	223.06	1.59	330.23
Dusky-footed woodrat	<i>Neotoma fuscipes</i>	FE, SSC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.20
California vole ^{bb}	<i>Microtus californicus</i>	SSC	32.28	0.00	0.19	13.35	0.05	1.50	11.99	0.00	0.04	45.92	0.00	223.06	1.59	329.97
Red fox ^{cc}	<i>Vulpes vulpes</i>	FPE, FS, ST	4.09	0.05	0.00	2.67	0.00	0.00	6.97	0.00	0.00	27.01	0.00	0.00	0.00	40.78
Sacramento Valley red fox	<i>Vulpes vulpes patwin</i>	None	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Kit fox	<i>Vulpes macrotis</i>	None	10.80	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.93	0.00	0.00	0.00	47.88
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	FE, ST	10.80	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.93	0.00	0.00	0.00	47.88
Ringtail	<i>Bassariscus astutus</i>	SFP	26.20	0.26	0.19	0.00	0.05	0.00	0.03	0.00	0.04	11.14	0.00	0.00	1.04	38.94

Common Name	Scientific Name	Status	Annual Grassland	Barren	Blue Oak Woodland	Deciduous Orchard	Eucalyptus	Fresh Emergent Wetland	Irrigated Row and Field Crops	Lacustrine	Mixed Chaparral	Pasture	Riverine	Urban	Valley Foothill Riparian	Total
American badger	<i>Taxidea taxus</i>	SSC	32.28	0.26	0.19	13.35	0.05	0.00	11.99	0.00	0.04	45.92	0.00	0.00	1.59	105.66
Western spotted skunk ^{dd}	<i>Spilogale gracilis</i>	SSC	32.28	0.00	0.19	13.35	0.05	0.00	11.99	0.00	0.04	45.92	0.00	223.06	1.59	328.47
Northern river otter ^{ee}	<i>Lontra canadensis</i>	SSC	0.00	0.00	0.00	0.00	0.00	1.10	0.00	0.00	0.00	0.00	1.59	0.00	0.85	3.54
Mountain lion	<i>Puma concolor</i>	SCT	11.62	0.00	0.14	3.98	0.00	0.00	0.00	0.00	0.00	34.79	0.00	0.00	0.00	50.52
Total	Not applicable	Not applicable	32.28	0.26	0.19	13.35	0.05	1.50	11.99	0.77	0.04	45.92	2.69	223.06	1.59	333.69

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 Plant species does not occur in the GAI.

^b California newt: Only the Coast Range population is special status, and it does not occur in the GAI (only occurs from Monterey County south).

^c Ensatina: Only the yellow-blotched (*Ensatina eschscholtzii croceater*) and large-blotched (*E. e. klauberi*) subspecies are special status, and they do not occur in the GAI (neither occurs further north than Kern County).

^d Western skink: Only the Coronado (*Plestiodon skiltonianus interparietalis*) subspecies is special status, and it does not occur in the GAI (does not occur further north than San Diego County).

^e Common name, scientific name, or regulatory status has changed since the SAMNA model was run (Caltrans 2021).

^f Ring-necked snake: Only the San Bernardino (*Diadophis punctatus modestus*), regal (*D. p. regalis*), and San Diego (*D. p. similis*) subspecies are special status, and they do not occur in the GAI (regal only occurs in the Great Basin, the other two do not occur north of Kern County).

^g Striped racer: Only the Alameda (*Masticophis lateralis euryxanthus*) subspecies is special status, and it does not occur in the GAI (occurs only in Alameda and Contra Costa Counties).

^h Common gartersnake: Only the San Francisco (*Thamnophis sirtalis tetrataenia*) subspecies and south coast population (*T. s. pop. 1*) are special status, and they do not occur in the GAI (San Francisco occurs only in San Mateo and Santa Cruz Counties, the south coast population does not range north of Ventura County).

ⁱ American white pelican: This species is only considered special status in the portion of its range where it nests, and it does not nest in the GAI (in California, only nests in the Klamath Basin).

^j Greater white-fronted goose: Only the tule (*Anser albifrons elgasi*) subspecies is special status, and it does not occur in the GAI (does not occur east of Antioch).

^k Barrow's goldeneye: This species is only considered special status in the portion of its range where it nests, and it does not nest in the GAI (formerly nested in the high Sierra Nevada Mountains but may no longer nest in California).

^l California quail: Only the Catalina (*Callipepla californica catalinensis*) subspecies is special status, and it does not occur in the GAI (endemic to Channel Islands).

^m Bewick's wren: Only the San Clemente (*Thryomanes bewickii leucophrys*) subspecies is special status, and it does not occur in the GAI (was endemic to San Clemente Island and is now extinct).

ⁿ Marsh wren: Only the Clark's (*Cistothorus palustris clarkae*) subspecies is special status, and it does not occur in the GAI (does not occur north of Los Angeles County).

^o Hutton's vireo: Only the Catalina (*Vireo huttoni unitti*) subspecies is special status, and it does not occur in the GAI (endemic to Channel Islands).

^p Common yellowthroat: Only the San Francisco/saltmarsh (*Geothlypis trichas sinuosa*) subspecies is special status, and it does not occur in the GAI (only occurs in counties which border San Francisco Bay).

^q Spotted towhee: Only the San Clemente (*Pipilo maculatus clementae*) subspecies is special status, and it does not occur in the GAI (endemic to Channel Islands).

^r California towhee: Only the Inyo (*Melospiza crissalis eremophilus*) subspecies is special status, and it does not occur in the GAI (only occurs in Inyo County).

^s Rufous-crowned sparrow: Only the Santa Cruz Island (*Aimophila ruficeps obscura*) subspecies is special status, and it does not occur in the GAI (endemic to Channel Islands).

^t Savannah sparrow: There are three special-status subspecies of savannah sparrow, none of which occur in the GAI. Only the Belding's (*Passerculus sandwichensis beldingi*) subspecies is state endangered, and it does not occur north of Santa Barbara County.

^u Red-winged blackbird: Only the Kern (*Agelaius phoeniceus aciculatus*) subspecies is special status, and it does not occur in the GAI (restricted to Lake Isabella and Walker Basin).

^v Ornate shrew: There are five special-status subspecies of ornate shrew, none of which occur in the GAI. Only the Buena Vista Lake (*Sorex ornatus relictus*) subspecies is federally endangered, and it does not occur north of Kings County.

^w Broad-footed mole: Only the Alameda Island (*Scapanus latimanus parvus*) subspecies is special status, and it does not occur in the GAI (endemic to Alameda Island).

^x Black-tailed jackrabbit: Only the San Diego (*Lepus californicus benettii*) subspecies is special status, and it does not occur in the GAI (does not occur north of Santa Barbara County).

^y California pocket mouse: Only the Dulzura (*Chaetodipus californicus femoralis*) subspecies is special status, and it does not occur in the GAI (only occurs in southern California).

^z Heermann's kangaroo rat: Only the Morro Bay (*Dipodomys heermanni morroensis*) subspecies is special status, and it does not occur in the GAI (endemic to San Luis Obispo County).

^{aa} Deer mouse: Only the Anacapa (*Peromyscus maniculatus anacapa*) and San Clemente Island (*P. m. clementis*) subspecies are special status, and they do not occur in the GAI (endemic to Channel Islands).

^{bb} California vole: There are six special-status subspecies of California vole, none of which occur in the GAI.

^{cc} Red fox: Only the Sierra Nevada (*Vulpes vulpes necator*) subspecies is special status, and it does not occur in the GAI (does not occur below 4,500 feet elevation).

^{dd} Western spotted skunk: Only the Channel Islands (*Spilogale gracilis amphiala*) subspecies is special status, and it does not occur in the GAI (endemic to Channel Islands).

^{ee} Northern river otter: Only the southwestern (*Lontra canadensis sonora*) subspecies is special status, and it does not occur in the GAI (only occurs in the Lower Colorado River Valley).

APPENDIX D: HYDROLOGIC UNITS

Sub-basin Descriptions

Eleven sub-basins overlap the GAI. A description of each sub-basin is provided in the following sections. A crosswalk between the HUC-8 sub-basins and HUs is provided in Table D-1 at the end of this appendix.

Fresno River Sub-basin

The Fresno River sub-basin drains an area of 414,638 acres (648 square miles) and includes four rivers and streams that traverse 2 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Fresno River sub-basin includes a part of the San Joaquin Valley Floor HU, which includes portions of the El Nido-Stevinson and Gravelly Fork hydrologic areas.

Lower San Joaquin River Sub-basin

The Lower San Joaquin River sub-basin drains an area of 587,246 acres (918 square miles) and includes 241 rivers and streams that traverse 227 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Lower San Joaquin River sub-basin includes portions of the Delta-Mendota Canal, Middle West Side, San Joaquin Delta, and San Joaquin Valley Floor HUs.

The Delta-Mendota Canal HU is mainly associated with the 117-mile-long Delta-Mendota Canal, delivering water from the Sacramento-San Joaquin Delta to the San Joaquin Valley. The canal begins at the C. W. Bill Jones Pumping Plant near Tracy and follows the Coast Ranges south, ultimately terminating at Mendota Pool at the confluence of the San Joaquin River and the north fork of the Kings River (Water Education Foundation 2021) The Delta-Mendota Canal HU includes portions of the Patterson and Los Banos hydrologic areas.

The part of the Middle West Side HU that lies within the Lower San Joaquin River sub-basin includes portions of the Del Puerto Creek and Orestimba Creek hydrologic areas.

The San Joaquin Delta HU includes the San Joaquin, Middle, and Old Rivers. The San Joaquin River originates in the high Sierra Nevada and flows west for approximately 100 miles before turning north for approximately 260 miles where it joins the Sacramento River. The waters confluence with the Sacramento River and form the San Joaquin Delta before flowing out to the Pacific Ocean (EPA 2020).

The part of the San Joaquin Valley Floor HU that lies within the Lower San Joaquin River sub-basin includes portions of the El Nido-Stevinson, Montpelier, Riverbank, and Turlock hydrologic areas.

Middle San Joaquin-Lower Chowchilla Sub-basin

The Middle San Joaquin-Lower Chowchilla sub-basin drains an area of 2,256,113 acres (3,525 square miles) and includes 566 rivers and streams that traverse 972 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Middle San

Joaquin-Lower Chowchilla sub-basin includes portions of the Ahwahnee, Delta-Mendota Canal, Mariposa, Merced River, Middle West Side, and San Joaquin Valley Floor HUs.

The part of the Ahwahnee HU that lies within the Middle San Joaquin-Lower Chowchilla sub-basin includes a portion of the Daulton hydrologic area.

The part of the Delta-Mendota Canal HU that lies within the Middle San Joaquin-Lower Chowchilla sub-basin includes portions of the Los Banos and Patterson hydrologic areas.

The Mariposa HU consists of a cluster of streams of the east valley known as the Lower Mariposa group of streams, which includes the Mariposa Creek watershed, the largest of the group. This watershed includes Agua Fria Creek at the headwaters, draining the Mount Bullion area before flowing into Mariposa Creek and Mariposa Creek Dam. Ultimately, Mariposa Creek discharges into the San Joaquin River (Mariposa County 2006).

The Merced River HU is associated with the Merced River watershed. The Merced River has headwaters in Yosemite National Park, flowing to Lake McClure and Lake McSwain. Ultimately, the Merced River discharges into the San Joaquin River. The part of the Merced River HU that lies within the Middle San Joaquin-Lower Chowchilla sub-basin includes a portion of the Kassenbaum Flats hydrologic area.

The part of the Middle West Side HU that lies within the Middle San Joaquin-Lower Chowchilla sub-basin includes portions of the Orestimba Creek, Pacheco Pass, and Panoche Creek hydrologic areas.

The part of the San Joaquin Valley Floor HU that lies within the Middle San Joaquin-Lower Chowchilla sub-basin includes portions of the Berenda Creek, El Nido-Stevinson, Fahr Creek, Gravelly Fork, Madera, Merced, and Turlock hydrologic areas.

Rock Creek-French Camp Slough Sub-basin

The Rock Creek-French Camp Slough sub-basin drains an area of 302,576 acres (473 square miles) and includes 334 rivers and streams that traverse 409 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Rock Creek-French Camp Slough sub-basin includes portions of the Gopher Ridge, North Valley Floor, San Joaquin Delta, San Joaquin Valley Floor, and Stanislaus River HUs. A description of the San Joaquin Delta HU was provided in the Lower San Joaquin River sub-basin section.

The part of the Gopher Ridge HU that lies within the Rock Creek-French Camp Slough sub-basin includes a portion of the Estanislao hydrologic area.

The part of the North Valley Floor HU that lies within the Rock Creek-French Camp Slough sub-basin includes portions of the Duck-Littlejohns and Lower Calaveras hydrologic areas.

The part of the San Joaquin Valley Floor HU that lies within the Rock Creek-French Camp Slough sub-basin includes portions of the Manteca, Riverbank, Valley Home, and Warnersville hydrologic areas.

The Stanislaus River HU is associated with the 113-mile-long Stanislaus River. Headwaters are located within the Sierra Nevada Foothills. The Stanislaus River ultimately drains into the San Joaquin River. Several dams are found throughout the length of the river, including Donnell Dam, forming Donell Lake; Beardsley Dam, forming Beardley Lake; New Melones Dam, forming New Melones Lake; and Tulloch Dam, forming Tulloch Reservoir (NMFS 2014). The part of the Stanislaus River HU that lies within the Rock Creek-French Camp Slough sub-basin includes a portion of the Table Mountain hydrologic area.

San Joaquin Delta Sub-basin

The San Joaquin Delta sub-basin drains an area of 788,795 acres (1,232 square miles) and includes 528 rivers and streams that traverse 468 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the San Joaquin Delta sub-basin includes portions of the Carbona, Delta-Mendota Canal, Middle West Side, North Diablo Range, North Valley Floor, San Joaquin Delta, and San Joaquin Valley Floor HUs. A description of the San Joaquin Delta HU was provided in the Lower San Joaquin River sub-basin section.

No information was found on the Carbona or North Diablo Range HUs.

The part of the Delta-Mendota Canal HU that lies within the San Joaquin Delta sub-basin includes a portion of the Patterson hydrologic area.

The part of the Middle West Side HU that lies within the San Joaquin Delta sub-basin includes a portion of the Del Puerto Creek hydrologic area.

The part of the North Valley Floor HU that lies within the San Joaquin Delta sub-basin includes portions of the Duck-Littlejohns, Lower Calaveras, and Lower Mokelumne hydrologic areas.

The part of the San Joaquin Valley Floor HU that lies within the San Joaquin Delta sub-basin includes portions of the Manteca and Riverbank hydrologic areas.

Upper Calaveras California Sub-basin

The Upper Calaveras California sub-basin drains an area of 338,364 acres (529 square miles) and includes 300 rivers and streams that traverse 226 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Upper Calaveras California sub-basin includes portions of the Lower Calaveras, Middle Sierra, North Valley Floor, San Joaquin Delta, and Upper Calaveras HUs. A description of the San Joaquin Delta HU is provided in the Lower San Joaquin River sub-basin section.

The Lower Calaveras HU is associated with the Calaveras River Basin. The Lower Calaveras River watershed occurs below New Hogan Reservoir and splits into the Old Calaveras Channel and Mormon Slough/Stockton Diverting Canal before draining into the San Joaquin River (Calaveras County Water District 2016).

The part of the Middle Sierra HU that lies within the Upper Calaveras California sub-basin includes a portion of the Campo Seco hydrologic area.

The part of the North Valley Floor HU that lies within the Upper Calaveras California sub-basin includes portions of the Duck-Littlejohns, Lower Calaveras, and Lower Mokelumne hydrologic areas.

The Upper Calaveras HU is also associated with the Calaveras River Basin. The Upper Calaveras River watershed occurs within the mountainous region above New Hogan Reservoir. Several creeks converge into the Calaveras River North and South Forks before draining into New Hogan Dam (Calaveras County Water District 2016). The part of the Upper Calaveras HU that lies within the Upper Calaveras California sub-basin includes a portion of the Jenny Lind hydrologic area.

Upper Cosumnes Sub-basin

The Upper Cosumnes sub-basin drains an area of 607,874 acres (950 square miles) and includes 63 rivers and streams that traverse 38 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Upper Cosumnes sub-basin includes portions of the Middle Sierra and North Valley Floor HUs.

The part of the Middle Sierra HU that lies within the Upper Cosumnes sub-basin includes portions of the Cosumnes and Sutter Creek hydrologic areas.

The part of the North Valley Floor HU that lies within the Upper Cosumnes sub-basin includes a portion of the Lower Cosumnes-Dry hydrologic area.

Upper Merced Sub-basin

The Upper Merced sub-basin drains an area of 812,443 acres (1,269 square miles) and includes 225 rivers and streams that traverse 253 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Upper Merced sub-basin includes portions of the Merced River and San Joaquin Valley Floor HUs.

The part of the Merced River HU that lies within the Upper Merced sub-basin includes a portion of the Kassenbaum Flats hydrologic area.

The part of the San Joaquin Valley Floor HU that lies within the Upper Merced sub-basin includes portions of the El Nido-Stevinson, Fahr Creek, Merced, Montpelier, and Turlock hydrologic areas.

Upper Mokelumne River Sub-basin

The Upper Mokelumne River sub-basin drains an area of 810,442 acres (1,266 square miles) and includes 398 rivers and streams that traverse 341 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Upper Mokelumne River sub-basin includes portions of the Middle Sierra, North Valley Floor, Sacramento Delta, and San Joaquin Delta HUs. A description of the San Joaquin Delta HU is provided in the Lower San Joaquin River sub-basin section.

The part of the Middle Sierra HU that lies within the Upper Mokelumne River sub-basin includes portions of the Campo Seco, Cosumnes, Sutter Creek, and Upper Mokelumne hydrologic areas.

The part of the North Valley Floor HU that lies within the Upper Mokelumne River sub-basin includes portions of the Lower Calaveras, Lower Cosumnes-Dry, and Lower Mokelumne hydrologic areas.

The Sacramento Delta HU includes the Sacramento River, Steamboat Slough, and Prospect Slough. The Sacramento River originates within the eastern slopes of the Coast Range, Mount Shasta, the western slopes of the southernmost region of the Cascades, and the northern portion of the Sierra Nevada (Rivers for Change 2014). The river then meets the San Joaquin River to form the Sacramento Delta before flowing out to the Pacific Ocean.

Upper Stanislaus Sub-basin

The Upper Stanislaus sub-basin drains an area of 766,025 acres (1,197 square miles) and includes 67 rivers and streams that traverse 89 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Upper Stanislaus sub-basin includes portions of the North Valley Floor, San Joaquin Delta, San Joaquin Valley Floor, Stanislaus River, and Tuolumne River HUs. A description of the San Joaquin Delta HU is provided in the Lower San Joaquin River sub-basin section.

The part of the North Valley Floor HU that lies within the Upper Stanislaus sub-basin includes a portion of the Duck-Littlejohns hydrologic area.

The part of the San Joaquin Valley Floor HU that lies within the Upper Stanislaus sub-basin includes portions of the Manteca, Riverbank, Turlock, Valley Home, and Warnersville hydrologic areas.

The part of the Stanislaus River HU that lies within the Upper Stanislaus sub-basin includes a portion of the Table Mountain hydrologic area.

The Tuolumne River HU is mainly associated with the Tuolumne River watershed. The Tuolumne River originates in Yosemite National Park, flowing southwest through Yosemite, Stanislaus National Forest, and private lands before draining into the San Joaquin River (NMFS 2014). The part of the Tuolumne River HU that lies within the Upper Stanislaus sub-basin includes a portion of the Vizard Creek watershed.

Upper Tuolumne Sub-basin

The Upper Tuolumne sub-basin drains an area of 1,198,607 acres (1,873 square miles) and includes 273 rivers and streams that traverse 289 miles (Table 2-4 in Chapter 2, *Environmental Setting*). As noted in Table D-1, the Upper Tuolumne sub-basin includes portions of the San Joaquin Valley Floor and Tuolumne River HUs.

The part of the San Joaquin Valley Floor HU that lies within the Upper Tuolumne sub-basin includes portions of the Montpelier, Riverbank, Turlock, and Warnersville hydrologic areas.

The part of the Tuolumne River HU that lies within the Upper Tuolumne sub-basin includes a portion of the Vizard Creek watershed.

Crosswalk: HUC-8s to HUs

The SAMNA Reporting Tool expresses the landscape in terms of USGS HUC-8 sub-basins (Caltrans 2021; USGS 2014). However, SWRCB considers beneficial uses in terms of HUs (California Department of Water Resources 2016). Table D-1 provides a crosswalk between the HUC-8 and HU classification systems for the GAI.

Table D-1. Crosswalk Table of HUC-8 Sub-basins with HUs in the GAI

HUC-8 #	HUC-8 Name	HUC-8 Acreage ^a	HU #	HU Name	HU Acreage ^a
18040007	Fresno River	414,638	536	San Joaquin Valley Floor	1,350,598
18040007	Fresno River	414,638	545	San Joaquin Valley Floor	534,473
18040002	Lower San Joaquin River	587,246	535	San Joaquin Valley Floor	421,187
18040002	Lower San Joaquin River	587,246	536	San Joaquin Valley Floor	1,350,598
18040002	Lower San Joaquin River	587,246	541	Delta-Mendota Canal	986,464
18040002	Lower San Joaquin River	587,246	542	Middle West Side	579,418
18040002	Lower San Joaquin River	587,246	544	San Joaquin Delta	433,311
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	536	San Joaquin Valley Floor	1,350,598
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	537	Merced River	998,668
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	538	Mariposa	477,393
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	539	Ahwahnee	412,119
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	541	Delta-Mendota Canal	986,464
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	542	Middle West Side	579,418
18040001	Middle San Joaquin-Lower Chowchilla	2,256,113	545	San Joaquin Valley Floor	534,473
18040051	Rock Creek-French Camp Slough	302,576	531	North Valley Floor	759,546
18040051	Rock Creek-French Camp Slough	302,576	534	Stanislaus River	594,377
18040051	Rock Creek-French Camp Slough	302,576	535	San Joaquin Valley Floor	421,187

HUC-8 #	HUC-8 Name	HUC-8 Acreage ^a	HU #	HU Name	HU Acreage ^a
18040051	Rock Creek-French Camp Slough	302,576	544	San Joaquin Delta	433,311
18040051	Rock Creek-French Camp Slough	302,576	570	Gopher Ridge	73,607
18040003	San Joaquin Delta	788,795	531	North Valley Floor	759,546
18040003	San Joaquin Delta	788,795	535	San Joaquin Valley Floor	421,187
18040003	San Joaquin Delta	788,795	541	Delta-Mendota Canal	986,464
18040003	San Joaquin Delta	788,795	542	Middle West Side	579,418
18040003	San Joaquin Delta	788,795	543	North Diablo Range	165,776
18040003	San Joaquin Delta	788,795	544	San Joaquin Delta	433,311
18040003	San Joaquin Delta	788,795	575	Carbona	27,113
18040011	Upper Calaveras California	338,364	531	North Valley Floor	759,546
18040011	Upper Calaveras California	338,364	532	Middle Sierra	561,688
18040011	Upper Calaveras California	338,364	533	Upper Calaveras	614,915
18040011	Upper Calaveras California	338,364	544	San Joaquin Delta	433,311
18040011	Upper Calaveras California	338,364	571	Lower Calaveras	8,477
18040013	Upper Cosumnes	607,874	531	North Valley Floor	759,546
18040013	Upper Cosumnes	607,874	532	Middle Sierra	561,688
18040008	Upper Merced	812,443	536	San Joaquin Valley Floor	1,350,598
18040008	Upper Merced	812,443	537	Merced River	998,668
18040012	Upper Mokelumne	810,442	510	Sacramento Delta	488,596
18040012	Upper Mokelumne	810,442	531	North Valley Floor	759,546
18040012	Upper Mokelumne	810,442	532	Middle Sierra	561,688
18040012	Upper Mokelumne	810,442	533	Middle Sierra	614,915
18040012	Upper Mokelumne	810,442	544	San Joaquin Delta	433,311
18040010	Upper Stanislaus	766,025	531	North Valley Floor	759,546
18040010	Upper Stanislaus	766,025	534	Stanislaus River	594,377

HUC-8 #	HUC-8 Name	HUC-8 Acreage ^a	HU #	HU Name	HU Acreage ^a
18040010	Upper Stanislaus	766,025	535	San Joaquin Valley Floor	421,187
18040010	Upper Stanislaus	766,025	536	San Joaquin Valley Floor	1,350,598
18040010	Upper Stanislaus	766,025	536	Tuolumne River	1,350,598
18040010	Upper Stanislaus	766,025	544	San Joaquin Delta	433,311
18040009	Upper Tuolumne	1,198,607	535	San Joaquin Valley Floor	421,187
18040009	Upper Tuolumne	1,198,607	536	San Joaquin Valley Floor	1,350,598
18040009	Upper Tuolumne	1,198,607	536	Tuolumne River	1,350,598

Source: Caltrans 2021

^a Numbers were rounded to the nearest whole number.

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APPENDIX E: LIST OF 303(d) IMPAIRED WATERS

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 meet water quality standards. Waterbodies in the GAI that are included on the Section 303(d) list of impaired waters, their impairments, and whether TMDLs have been established are provided in Table E-1 (SWRCB 2021).

Table E-1. Impaired Waters in the GAI

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA? ^a
Lower San Joaquin River	Grayson Drain (at outfall)	Indicator bacteria	Required, not established yet	No
Lower San Joaquin River	Harding Drain	Pesticides (chlorpyrifos)	Being addressed by action other than a TMDL	Yes
Lower San Joaquin River	Highline Canal (from Mustang Creek to Lateral No. 8, Merced and Stanislaus Counties)	Toxicity	Required, not established yet	Yes
Lower San Joaquin River	Hospital Creek (San Joaquin and Stanislaus Counties)	Arsenic (metals)	Required, not established yet	Yes
Lower San Joaquin River	Ingram Creek (from confluence with Hospital Creek to Hwy. 33 crossing)	Indicator bacteria, metals/metalloids, nutrients, pesticides, salinity, toxicity	Required, not established yet	Yes
Lower San Joaquin River	Ingram Creek (from confluence with Hospital Creek to Hwy. 33 crossing)	Pesticides	Being addressed by action other than a TMDL	Yes
Lower San Joaquin River	Ingram Creek (from confluence with San Joaquin River to confluence with Hospital Creek)	Salinity	Required, not established yet	Yes
Lower San Joaquin River	Mustang Creek (Merced County)	Nutrients	Required, not established yet	Yes
Lower San Joaquin River	Orestimba Creek (above Kilburn Road)	Pesticides	Required, not established yet	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA?^a
Lower San Joaquin River	Ramona Lake	Toxicity	Being addressed by action other than a TMDL	Yes
Lower San Joaquin River	Salado Creek (Stanislaus County)	Indicator bacteria	Required, not established yet	No
Lower San Joaquin River	San Joaquin River (Merced River to Tuolumne River)	Metals (mercury)	Required, not established yet	Yes
Lower San Joaquin River	San Joaquin River (Tuolumne River to Stanislaus River)	Pesticides	Required, not established yet	Yes
Lower San Joaquin River	Tuolumne River, Lower (Don Pedro Reservoir to San Joaquin River)	Pesticides	Required, not established yet	Yes
Lower San Joaquin River	Turlock Lake	Metals (mercury)	Required, not established yet	Yes
Lower San Joaquin River	Westley Wasteway (Stanislaus County)	Indicator bacteria	Required, not established yet	No
Middle San Joaquin-Lower Chowchilla	Agatha Canal (Merced County)	pH	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Bear Creek (from Bear Valley to San Joaquin River, Mariposa and Merced Counties)	Indicator bacteria	Required, not established yet	No
Middle San Joaquin-Lower Chowchilla	Black Rascal Creek (Merced County)	Toxicity	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Deadman Creek (Merced County)	Indicator bacteria	Required, not established yet	No
Middle San Joaquin-Lower Chowchilla	Deep Slough (Merced County)	pH	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Duck Slough (Merced County)	Toxicity	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Grasslands Marshes	Metals (selenium)	Being addressed with EPA-approved TMDL	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA?^a
Middle San Joaquin-Lower Chowchilla	Los Banos Creek (below Los Banos Reservoir, Merced County)	Indicator bacteria	Required, not established yet	No
Middle San Joaquin-Lower Chowchilla	Los Banos Reservoir	Metals (mercury)	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Miles Creek (Merced County)	Indicator bacteria	Required, not established yet	No
Middle San Joaquin-Lower Chowchilla	Mud Slough, North (downstream of San Luis Drain)	Pesticides	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Mud Slough, North (upstream of San Luis Drain)	Salinity	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Newman Wasteway	Salinity	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	O'Neill Forebay	Metals (mercury)	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Poso Slough	Toxicity	Being addressed by action other than a TMDL	Yes
Middle San Joaquin-Lower Chowchilla	Salt Slough (Mud Slough to Sand Dam, Merced County)	Toxicity	Being addressed by action other than a TMDL	Yes
Middle San Joaquin-Lower Chowchilla	Salt Slough (upstream from confluence with San Joaquin River)	Salinity, toxicity	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	San Joaquin River (Mendota Pool to Bear Creek)	Metals (boron)	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	San Joaquin River (Bear Creek to Mud Slough)	Pesticides	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	San Joaquin River (Mud Slough to Merced River)	Pesticides	Required, not established yet	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA?^a
Middle San Joaquin-Lower Chowchilla	Turner Slough (drains into San Joaquin River [Bear Creek to Mud Slough], Merced County)	Toxicity	Required, not established yet	Yes
Middle San Joaquin-Lower Chowchilla	Turner Slough (Merced County)	Indicator bacteria	Required, not established yet	No
Rock Creek-French Camp Slough	Avena Drain	Nutrients (ammonia)	Required, not established yet	Yes
Rock Creek-French Camp Slough	Duck Creek (San Joaquin County)	Metals (mercury)	Required, not established yet	Yes
Rock Creek-French Camp Slough	Littlejohns Creek	Indicator bacteria	Required, not established yet	No
Rock Creek-French Camp Slough	Lone Tree Creek	Nutrients (ammonia)	Required, not established yet	Yes
Rock Creek-French Camp Slough	Temple Creek	Nutrients (ammonia)	Required, not established yet	Yes
Rock Creek-French Camp Slough	Walker Slough (partly in Delta Waterways, eastern portion)	Indicator bacteria	Being addressed with EPA-approved TMDL	No
Rock Creek-French Camp Slough	Woodward Reservoir	Metals (mercury)	Required, not established yet	Yes
San Joaquin Delta	Bear Creek (San Joaquin and Calaveras Counties; partly in Delta Waterways, eastern portion)	Metals (copper)	Required, not established yet	Yes
San Joaquin Delta	Calaveras River, Lower (from Bellota Weir to Stockton Diverting Canal)	Toxicity	Required, not established yet	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA? ^a
San Joaquin Delta	Calaveras River, Lower (from Stockton Diverting Canal to the San Joaquin River; partly in Delta Waterways, eastern portion)	Metals (mercury)	Being addressed with EPA-approved TMDL	Yes
San Joaquin Delta	Delta Waterways (central portion)	Pesticides	Required, not established yet	Yes
San Joaquin Delta	Delta Waterways (eastern portion)	Pesticides	Required, not established yet	Yes
San Joaquin Delta	Delta Waterways (export area)	Toxicity	Required, not established yet	Yes
San Joaquin Delta	Delta Waterways (southern portion)	Pesticides	Required, not established yet	Yes
San Joaquin Delta	Delta Waterways (Stockton Ship Channel)	Toxic organics	Required, not established yet	Yes
San Joaquin Delta	Five Mile Slough (Alexandria Place to Fourteen Mile Slough; in Delta Waterways, eastern portion)	Indicator bacteria	Being addressed with EPA-approved TMDL	No
San Joaquin Delta	French Camp Slough (confluence of Littlejohns and Lone Tree Creeks to San Joaquin River, San Joaquin County; partly in Delta Waterways, eastern portion)	Toxicity	Required, not established yet	Yes
San Joaquin Delta	Grant Line Canal subwatershed at Clifton Court Rd. (San Joaquin County)	Salinity	Required, not established yet	Yes
San Joaquin Delta	Grant Line Canal subwatershed near Calpack Rd. (San Joaquin County)	Salinity	Required, not established yet	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA? ^a
San Joaquin Delta	Middle River (in Delta Waterways, southern portion)	Nutrients	Required, not established yet	Yes
San Joaquin Delta	Mormon Slough (Commerce Street to Stockton Deep Water Channel; partly in Delta Waterways, eastern portion)	Nutrients	Required, not established yet	Yes
San Joaquin Delta	Mormon Slough (from Stockton Diverting Canal to Bellota Weir– Calaveras River)	Toxicity	Required, not established yet	Yes
San Joaquin Delta	Mormon Slough (Stockton Diverting Canal to Commerce Street)	Indicator bacteria	Required, not established yet	No
San Joaquin Delta	Mosher Slough (downstream of I-5; in Delta Waterways, eastern portion)	Nutrients	Required, not established yet	Yes
San Joaquin Delta	Mosher Slough (upstream of I-5; partly in Delta Waterways, eastern portion)	Indicator bacteria	Being addressed with EPA-approved TMDL	No
San Joaquin Delta	Mountain House Creek (from Altamont Pass to Old River, Alameda and San Joaquin Counties; partly in Delta Waterways, southern portion)	Salinity	Required, not established yet	Yes
San Joaquin Delta	Old River (San Joaquin River to Delta-Mendota Canal; in Delta Waterways, southern portion)	Nutrients	Required, not established yet	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA?^a
San Joaquin Delta	Pixley Slough (San Joaquin County; partly in Delta Waterways, eastern portion)	Nutrients	Required, not established yet	Yes
San Joaquin Delta	Potato Slough, Little (San Joaquin County)	Toxicity	Required, not established yet	Yes
San Joaquin Delta	San Joaquin River (Stanislaus River to Delta Boundary)	Pesticides	Required, not established yet	Yes
San Joaquin Delta	Smith Canal (in Delta Waterways, eastern portion)	Pesticides	Required, not established yet	Yes
San Joaquin Delta	Stanislaus River, Lower	Metals (mercury)	Required, not established yet	Yes
San Joaquin Delta	Tom Paine Slough (in Delta Waterways, southern portion)	Salinity	Required, not established yet	Yes
Upper Calaveras California	Davis No. 2, unnamed spillway (near N. Podesta Lane)	Metals (mercury)	Required, not established yet	Yes
Upper Merced	Ingalsbe Slough (tributary to Merced River, Merced County)	Toxicity	Required, not established yet	Yes
Upper Merced	Merced River, Lower (McSwain Reservoir to San Joaquin River)	Metals (mercury)	Required, not established yet	Yes
Upper Mokelumne	Brack Tract Drain, at Woodbridge Rd. (San Joaquin County)	Metals (arsenic)	Required, not established yet	Yes
Upper Mokelumne	Camanche Reservoir	Metals (zinc)	Required, not established yet	Yes
Upper Mokelumne	Mokelumne River, Lower (in Delta Waterways, eastern portion)	Metals (zinc)	Required, not established yet	Yes
Upper Stanislaus	Langworth Pipeline (Stanislaus County)	Nutrients	Required, not established yet	Yes

Sub-basin	Impaired Water	Impairment	TMDL Status	Relevant to RAMNA? ^a
Upper Tuolumne	Dry Creek (tributary to Tuolumne River at Modesto, E. Stanislaus County)	Indicator bacteria	Required, not established yet	No
Upper Tuolumne	Modesto Reservoir	Metals (mercury)	Required, not established yet	Yes

Source: SWRCB (2021)

^a TMDLs relevant to the RAMNA reflect impaired aquatic resource-related beneficial uses.

^b Refers to toxicity to aquatic organisms

References

SWRCB (State Water Resources Control Board). 2021. "2018 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report)." Accessed May 13, 2022.

https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2018_integrated_report.html.

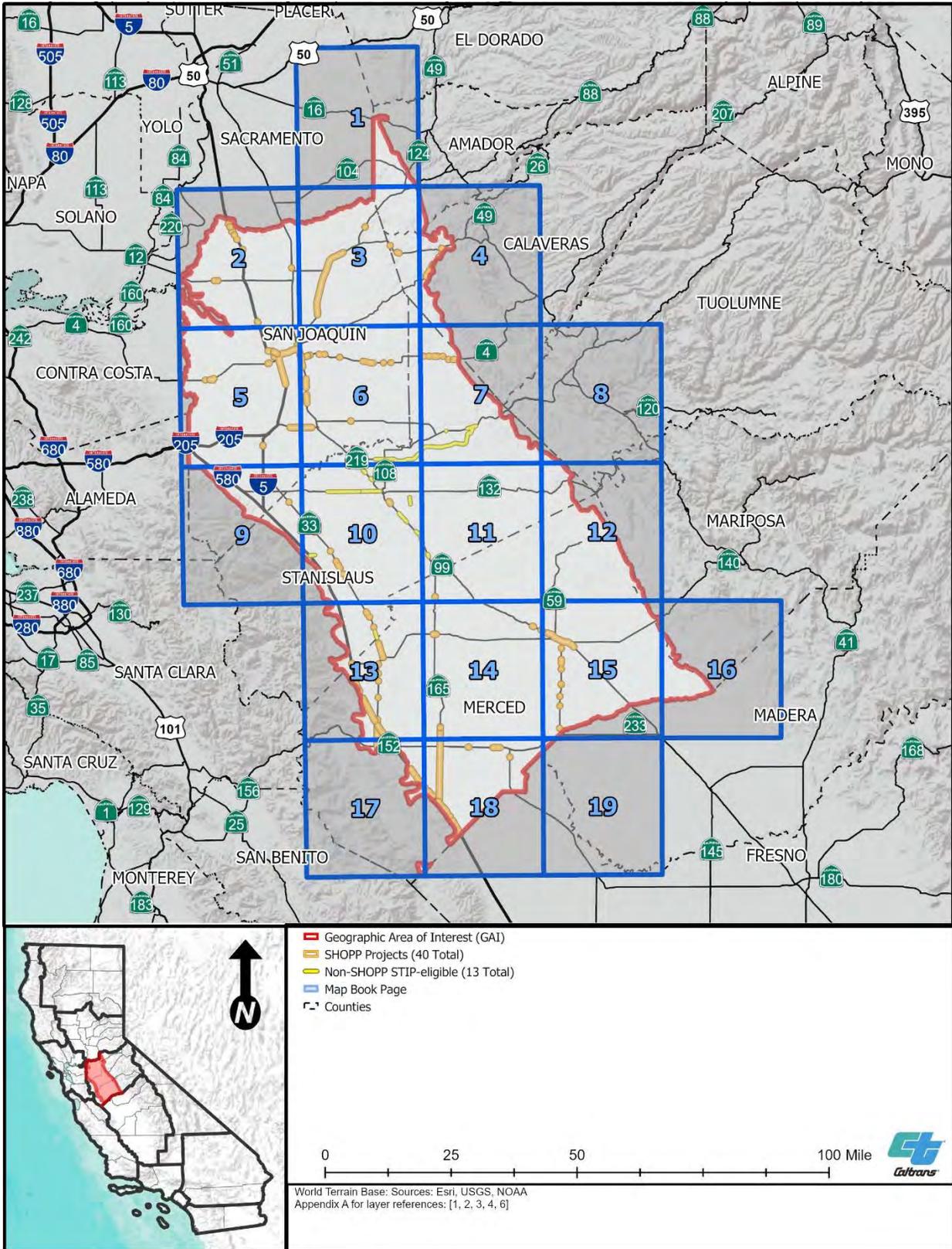
APPENDIX F: AQUATIC RESOURCE LOCATIONS

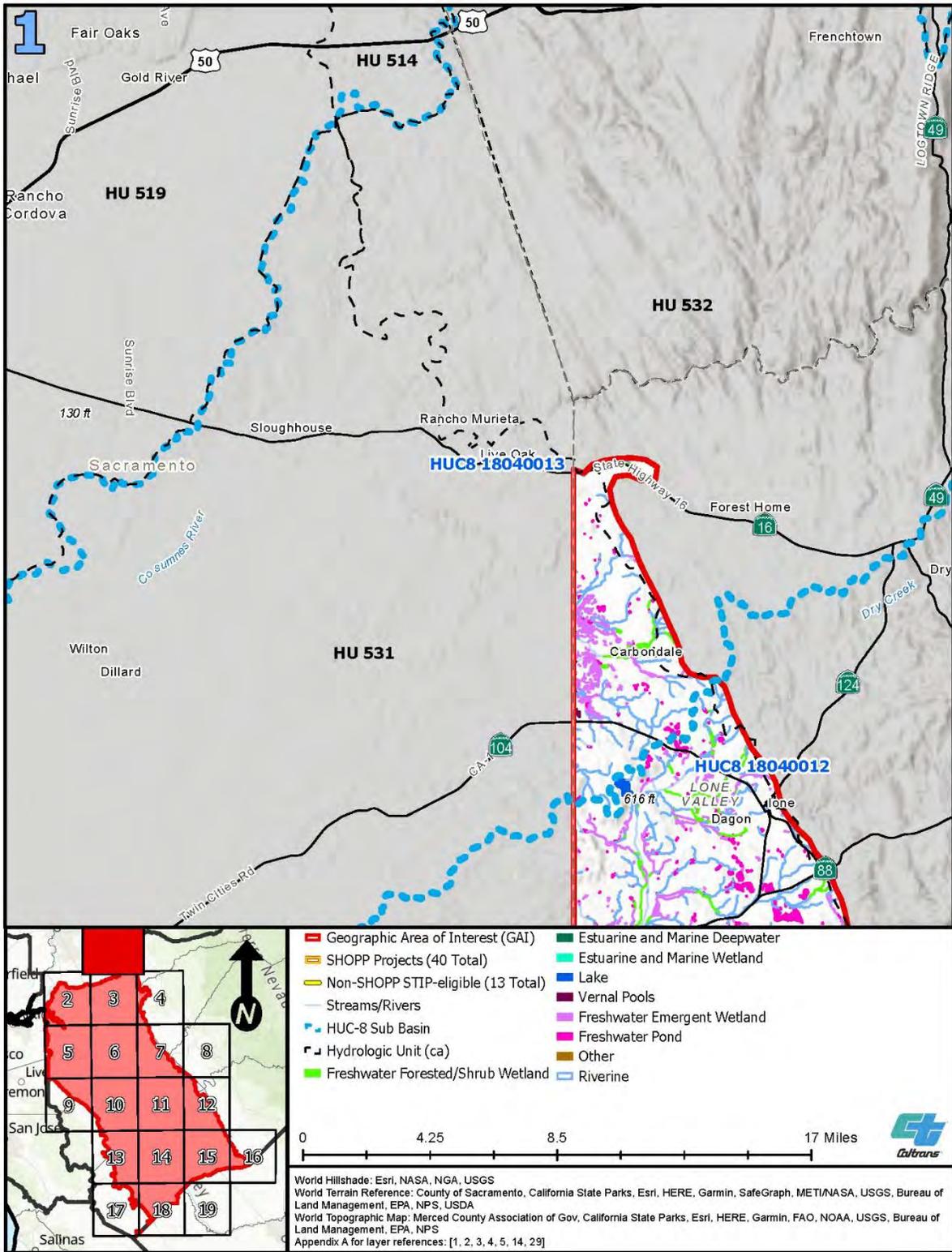
Aquatic resource locations are shown by HUC-8 sub-basin and HU in the following maps, which also include major landmarks for perspective. These locations were excerpted from the SAMNA Reporting Tool's water and wetland layers (Caltrans 2021a, 2021b). Hydrologic units are described in Appendix D, which includes a crosswalk table of HUC-8 subbasins and HUs. These 19 maps correspond with the land cover maps in Appendix B.

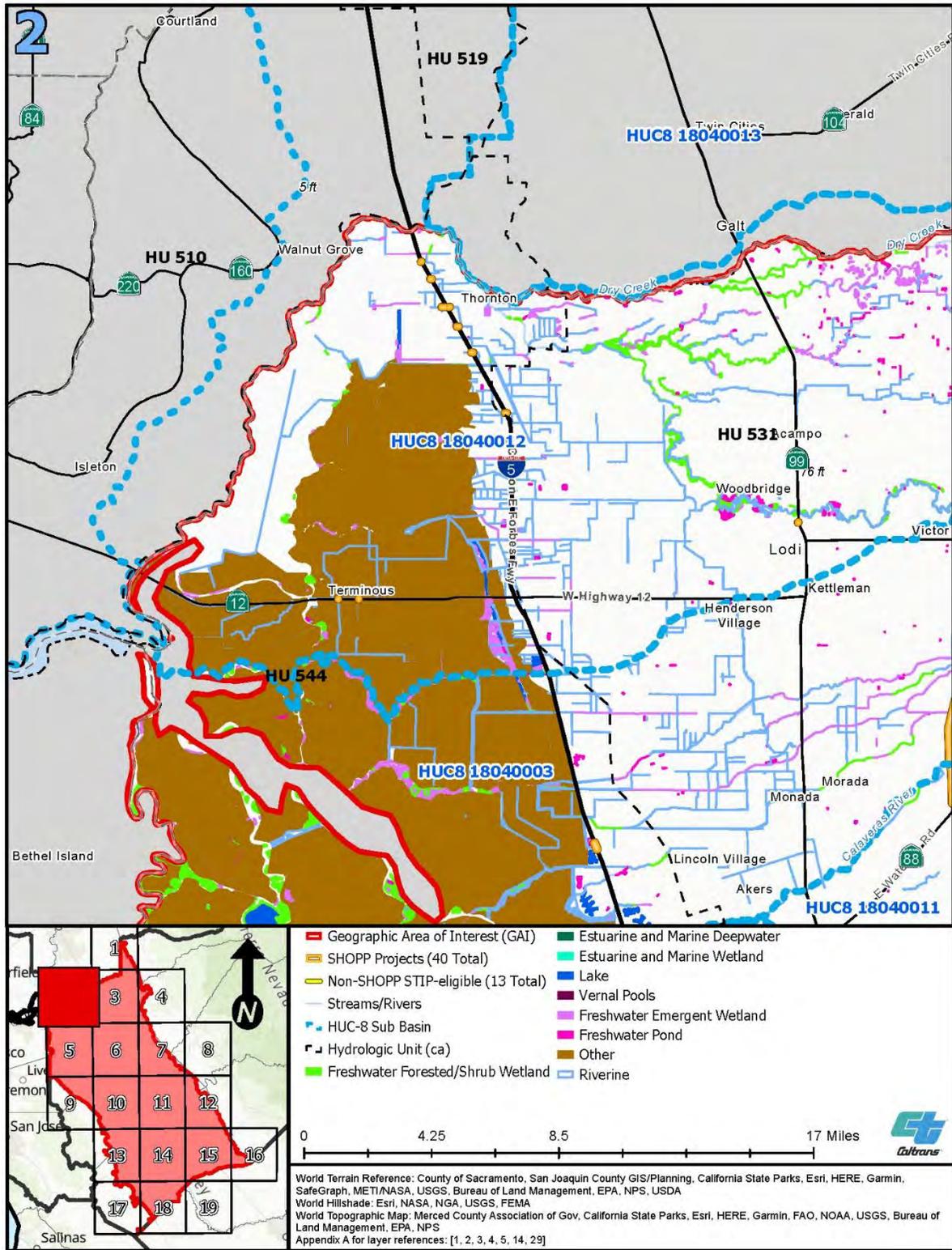
Few sources of information are known to be available that can be used to describe existing and relevant wetland, riparian, and littoral resources. The FWS National Wetlands Inventory (2017) and the San Francisco Estuary Institute California Aquatic Resource Inventory (2018) are the only known datasets that include the distribution, extent, and types of aquatic resources in the GAI, and the SAMNA Reporting Tool relies on them (Caltrans 2021a, 2021b).

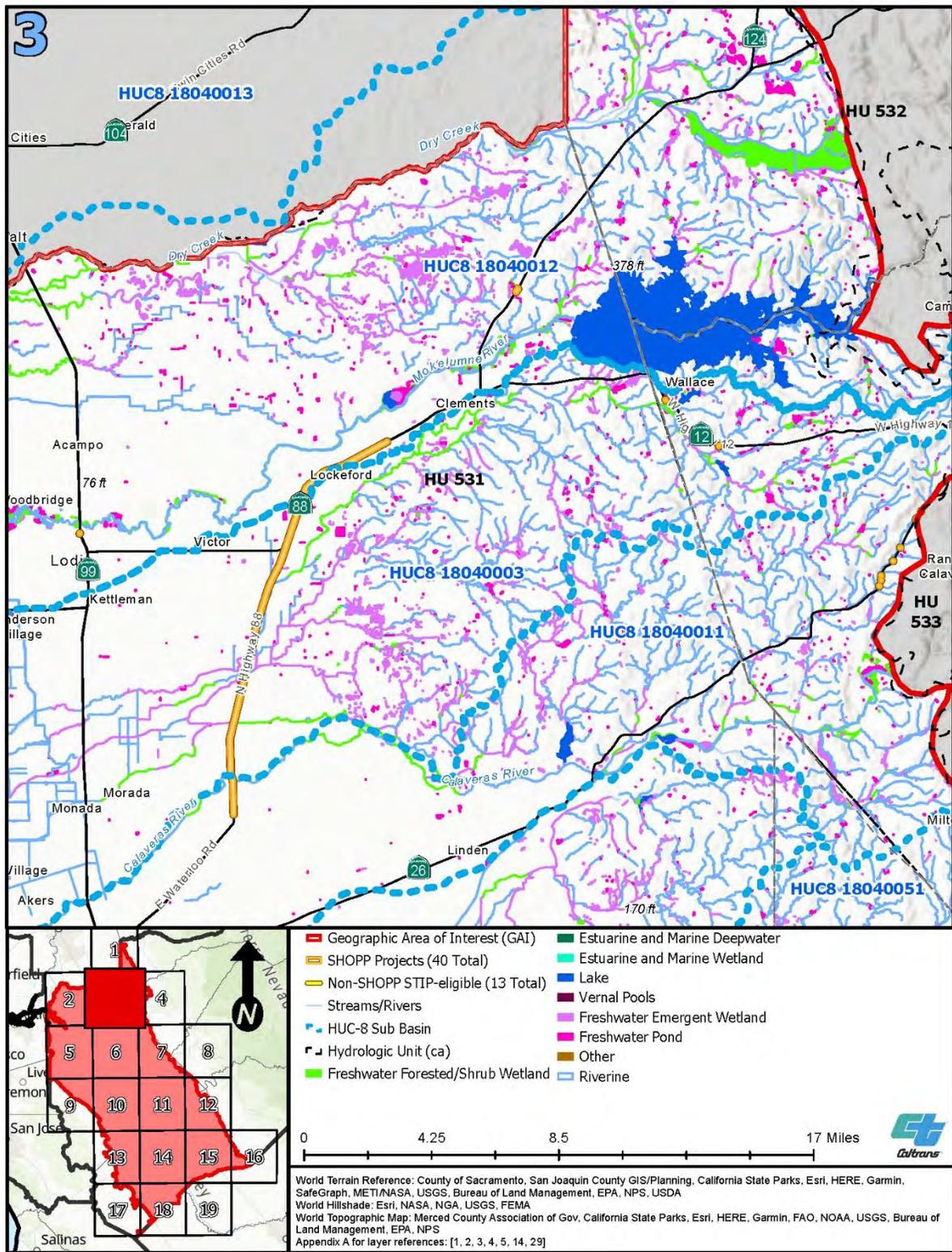
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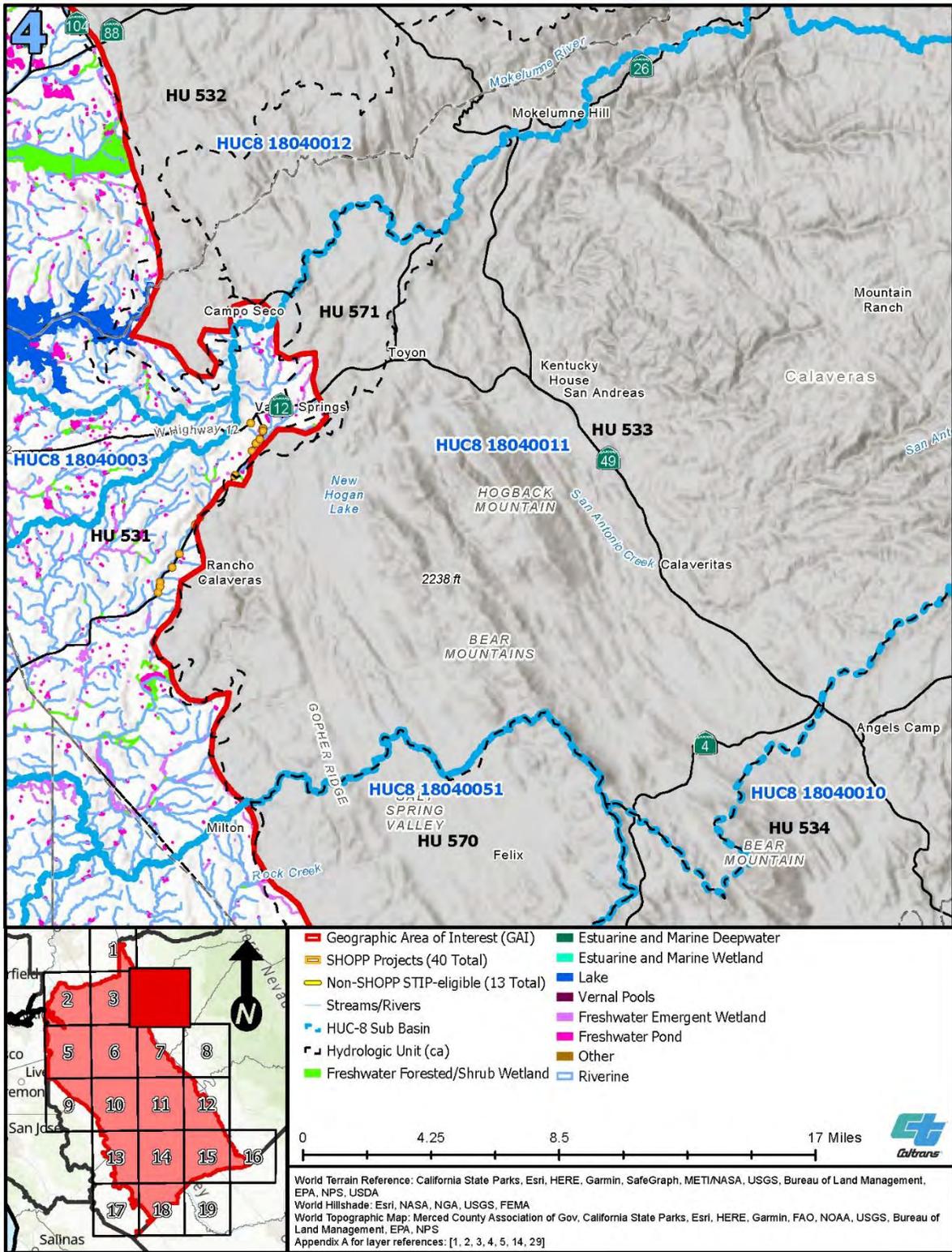
- Caltrans (California Department of Transportation). 2021a. "Waters_D10 in Caltrans District 10 Geospatial Data for the Advance Mitigation Needs Assessment for the Second Quarter of FY 2019/2020" (data file). Accessed March 24, 2021. <http://www.dot.ca.gov/env/advancemitigation/>.
- . 2021b. "Wetlands_D10 in Caltrans District 10 Geospatial Data for the Advance Mitigation Needs Assessment for the Second Quarter of FY 2019/2020" (data file). Accessed March 24, 2021. <http://www.dot.ca.gov/env/advancemitigation/>.
- FWS (U.S. Fish and Wildlife Service). 2017. "National Wetlands Inventory. Wetlands Mapper." Accessed April 1, 2021. <https://www.fws.gov/wetlands/data/mapper.html>.
- San Francisco Estuary Institute. 2018. "California Aquatic Resource Inventory (CARI)." Accessed February 28, 2019. <https://www.sfei.org/cari#sthash.SnPvzyAU.dpbs>.

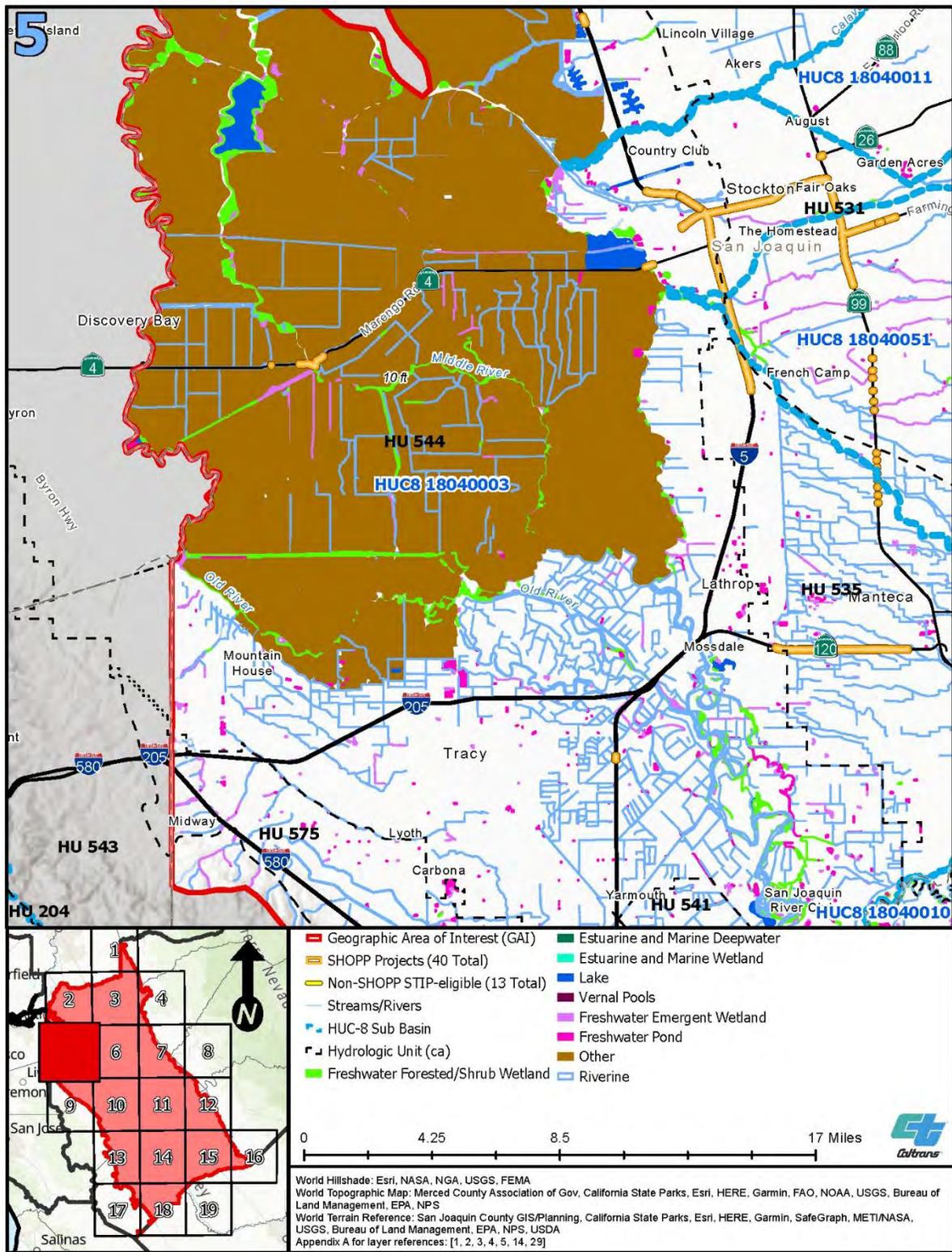


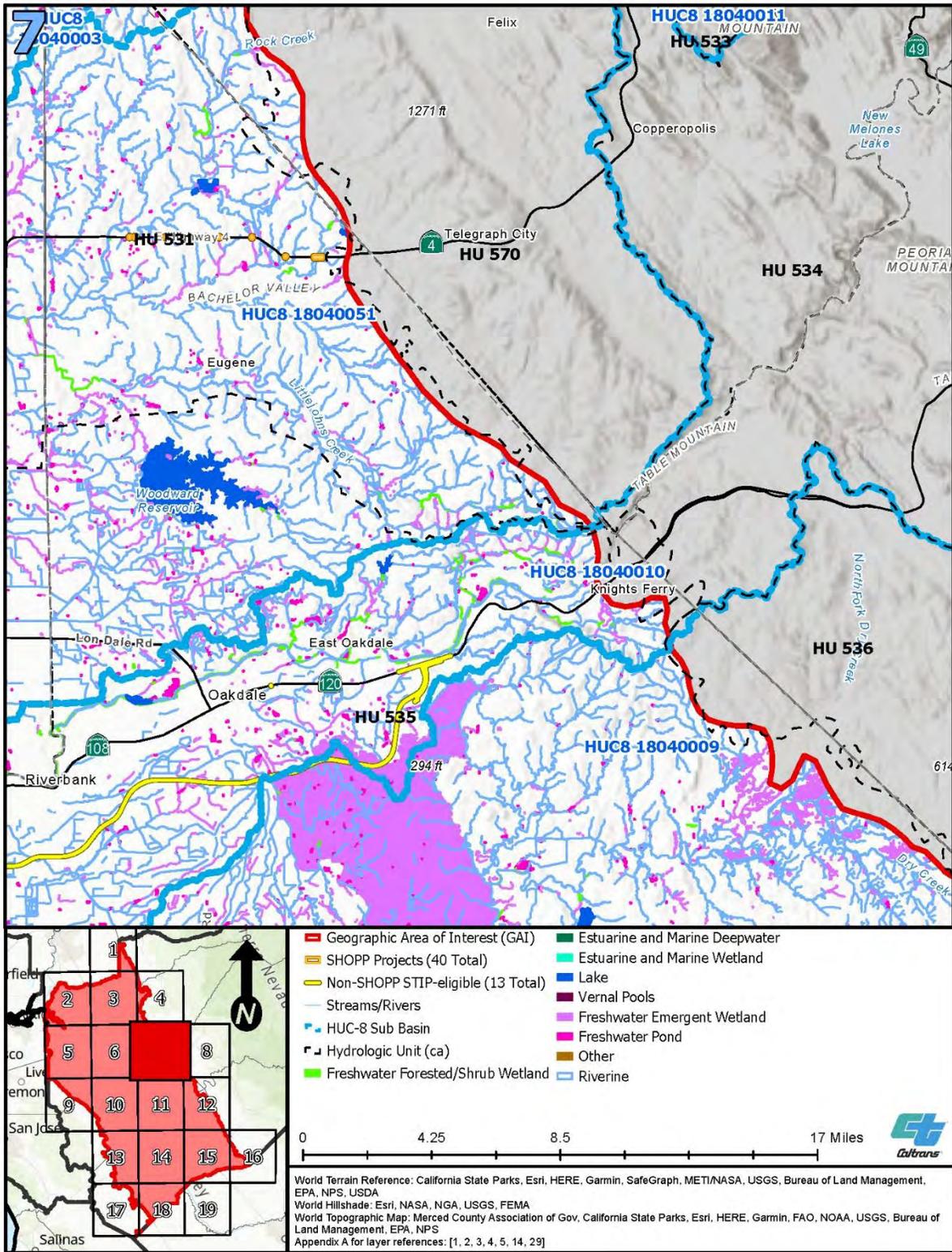


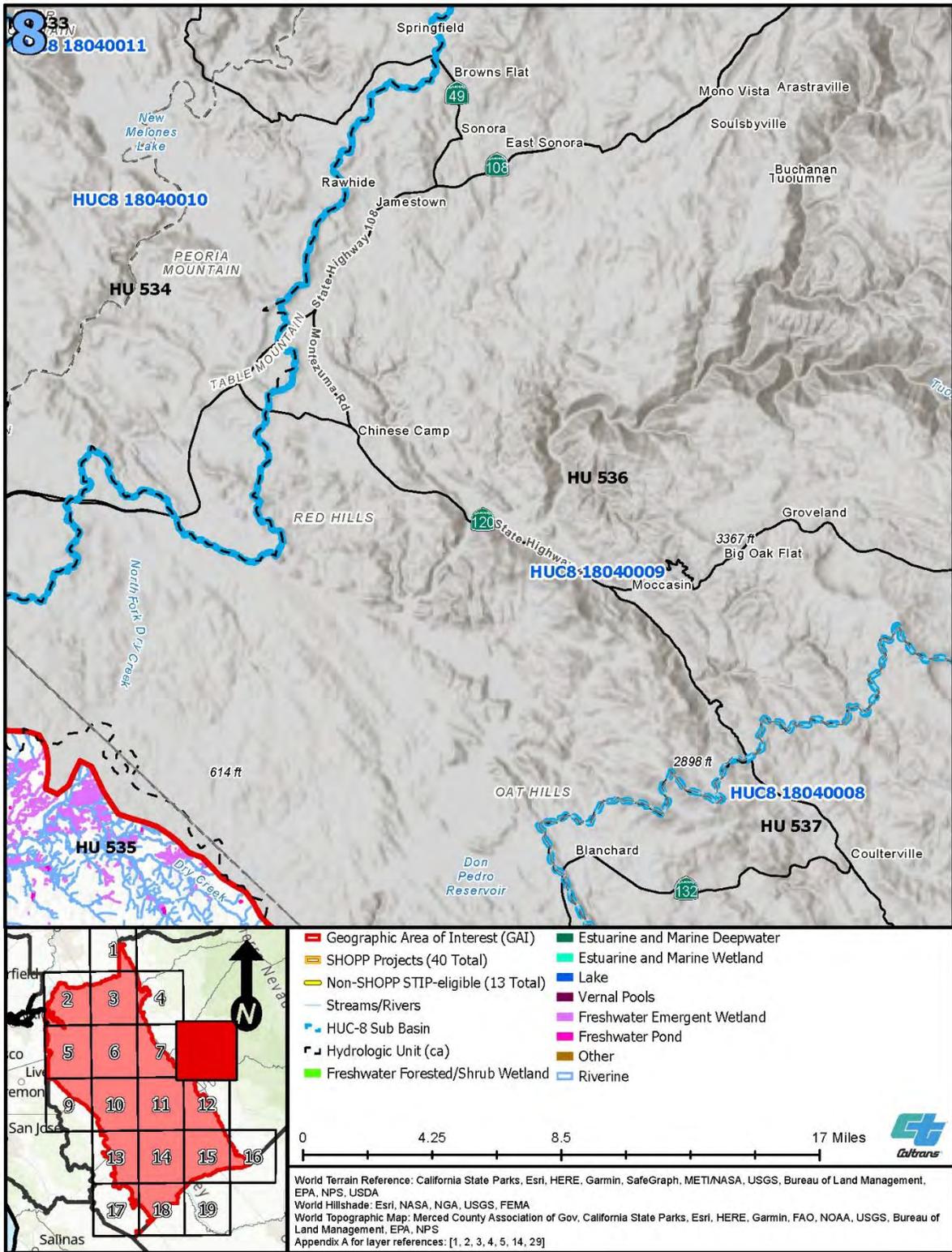


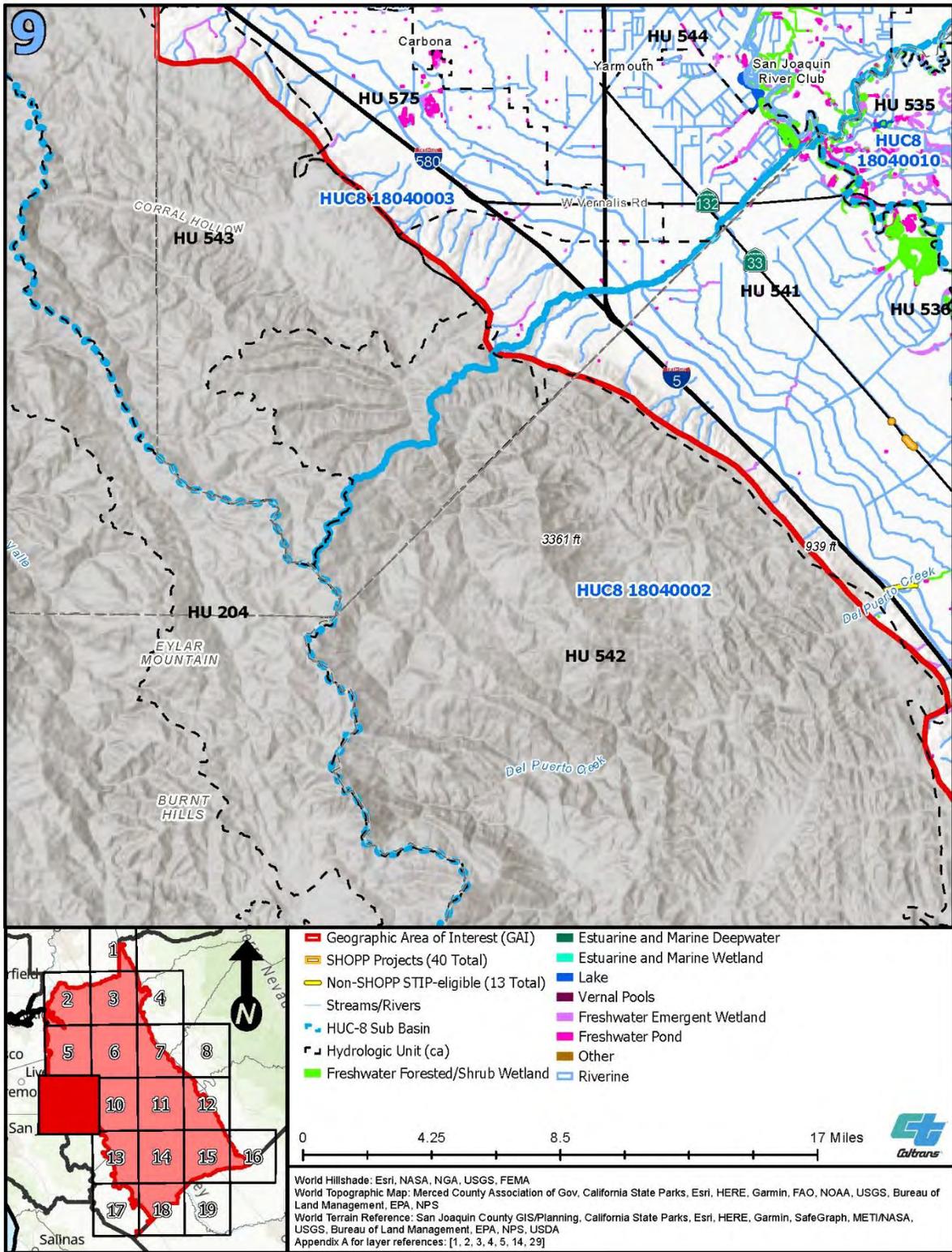


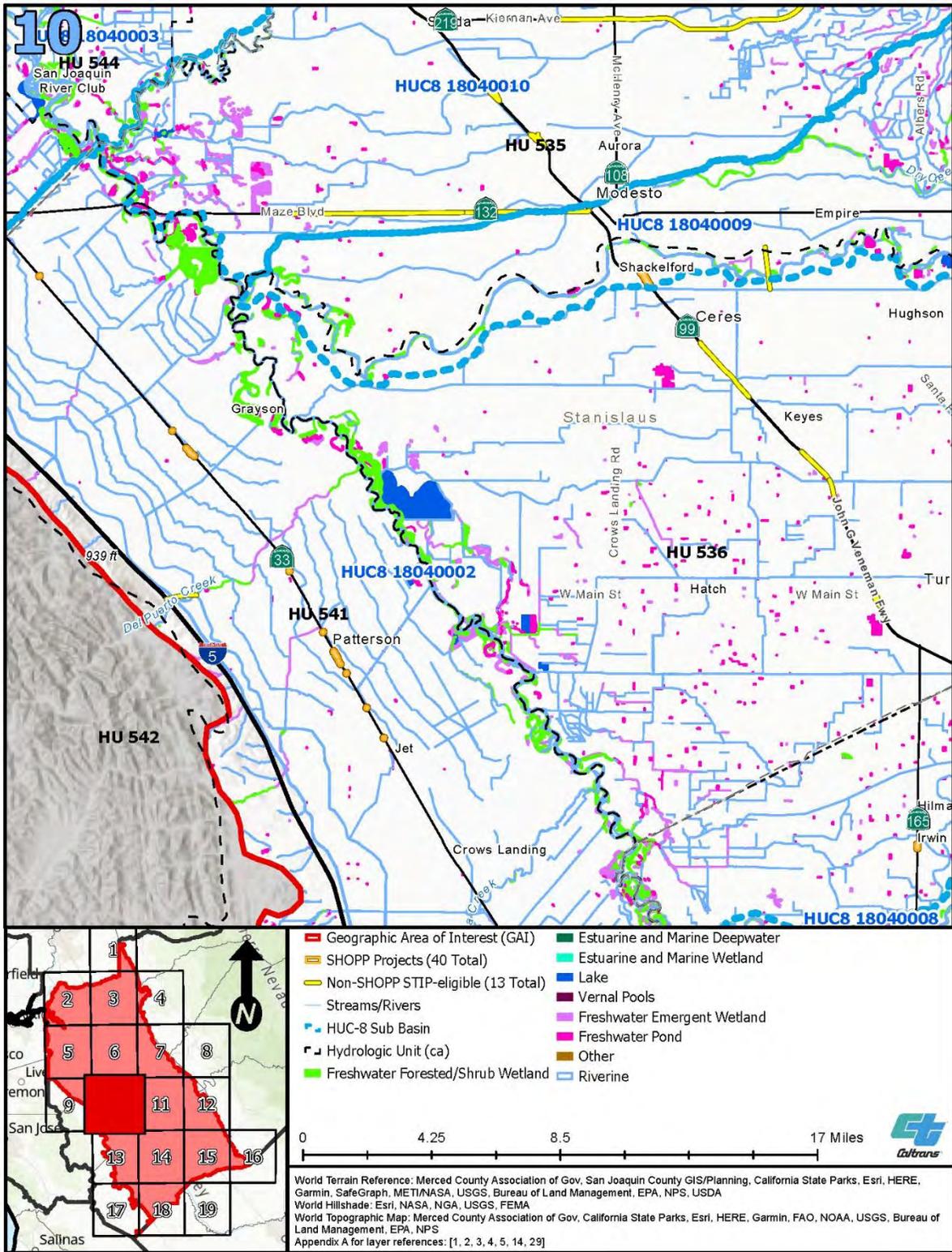


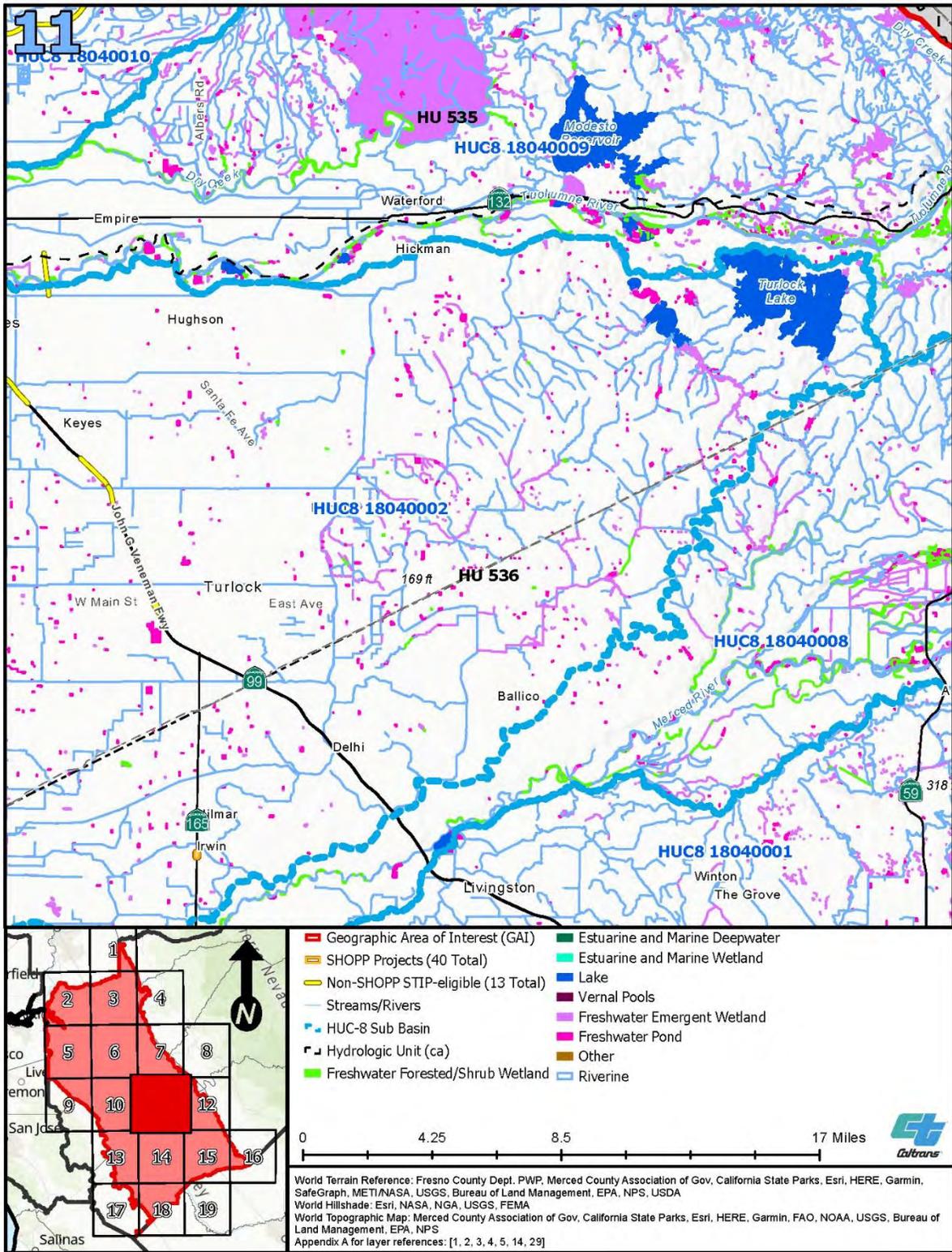


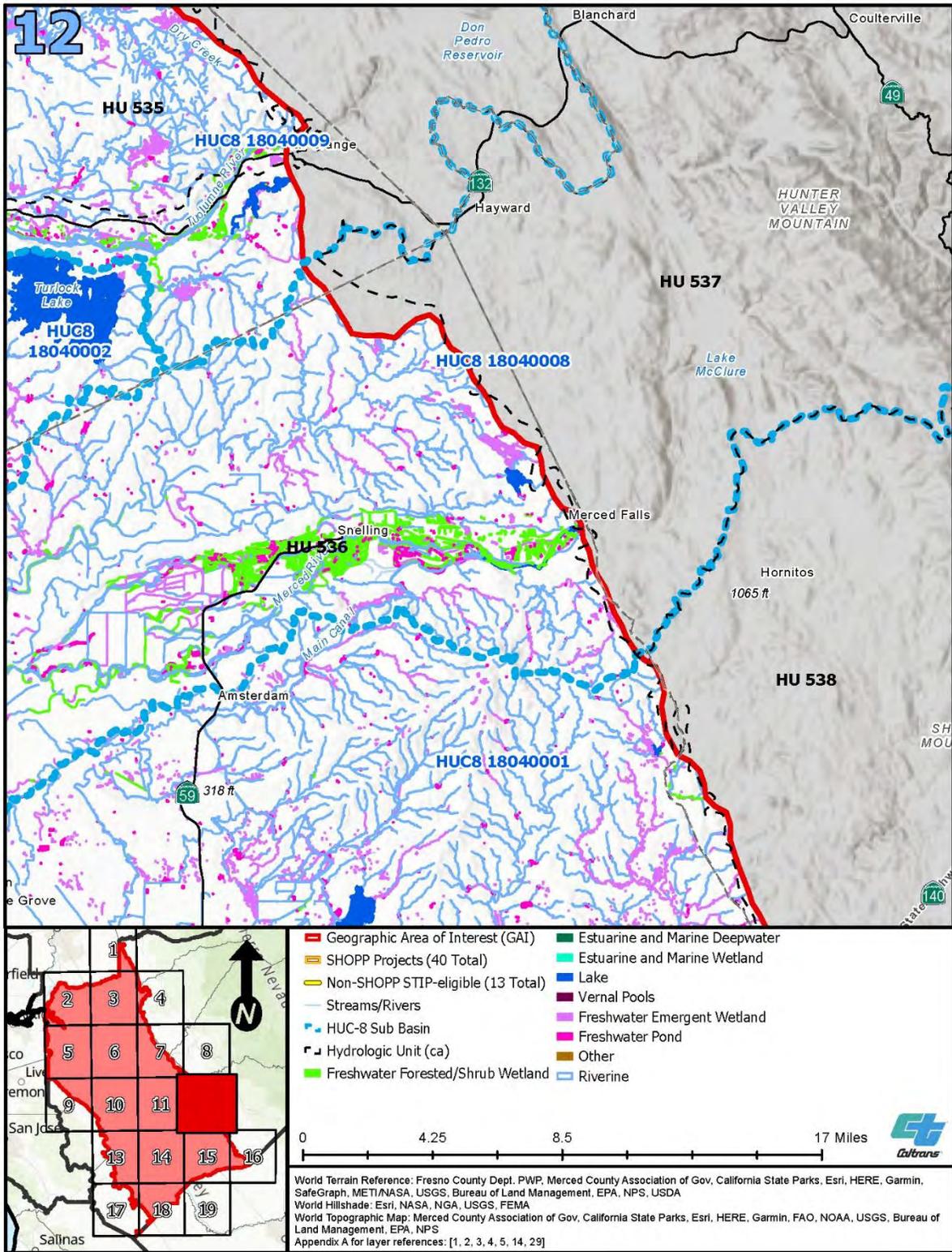


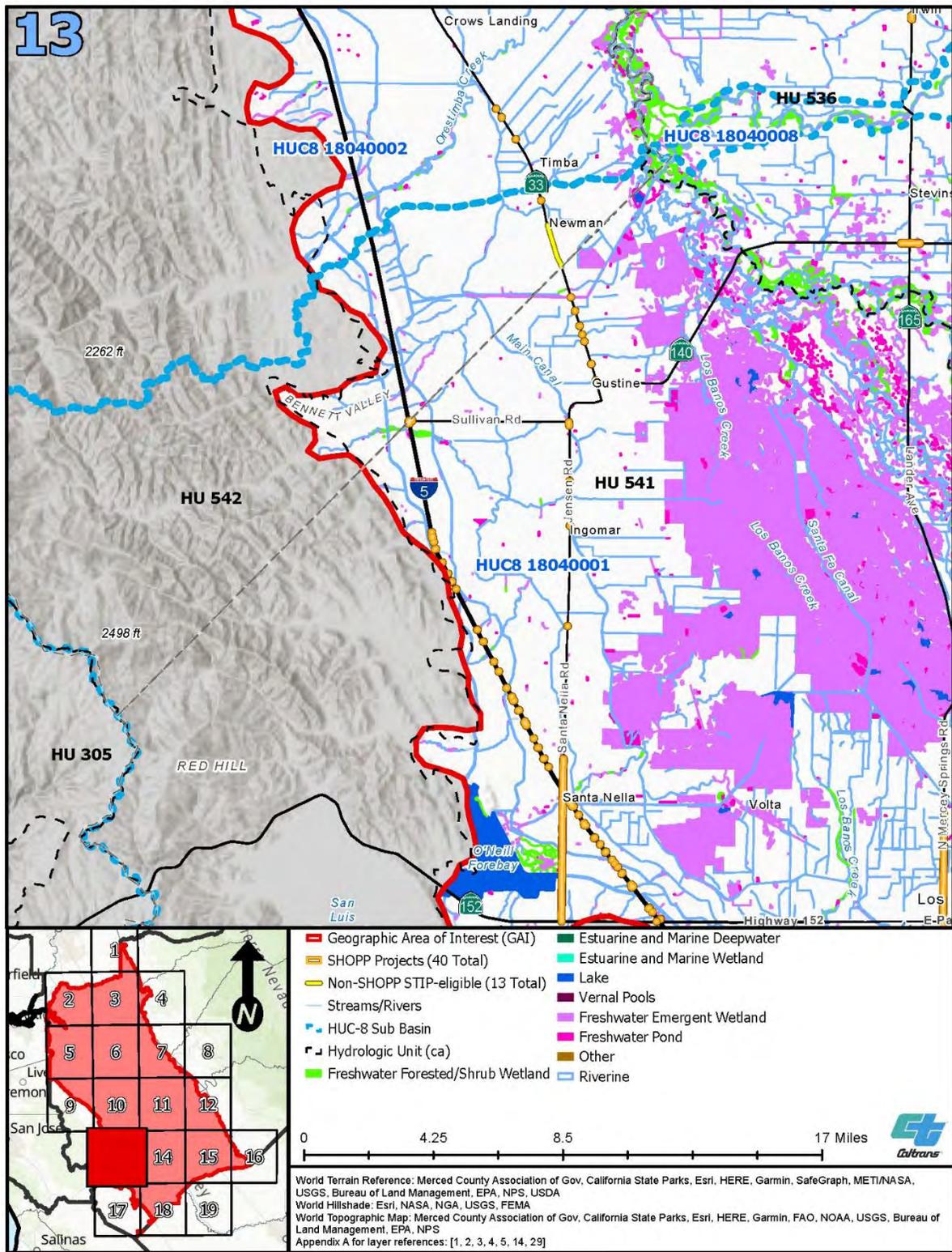


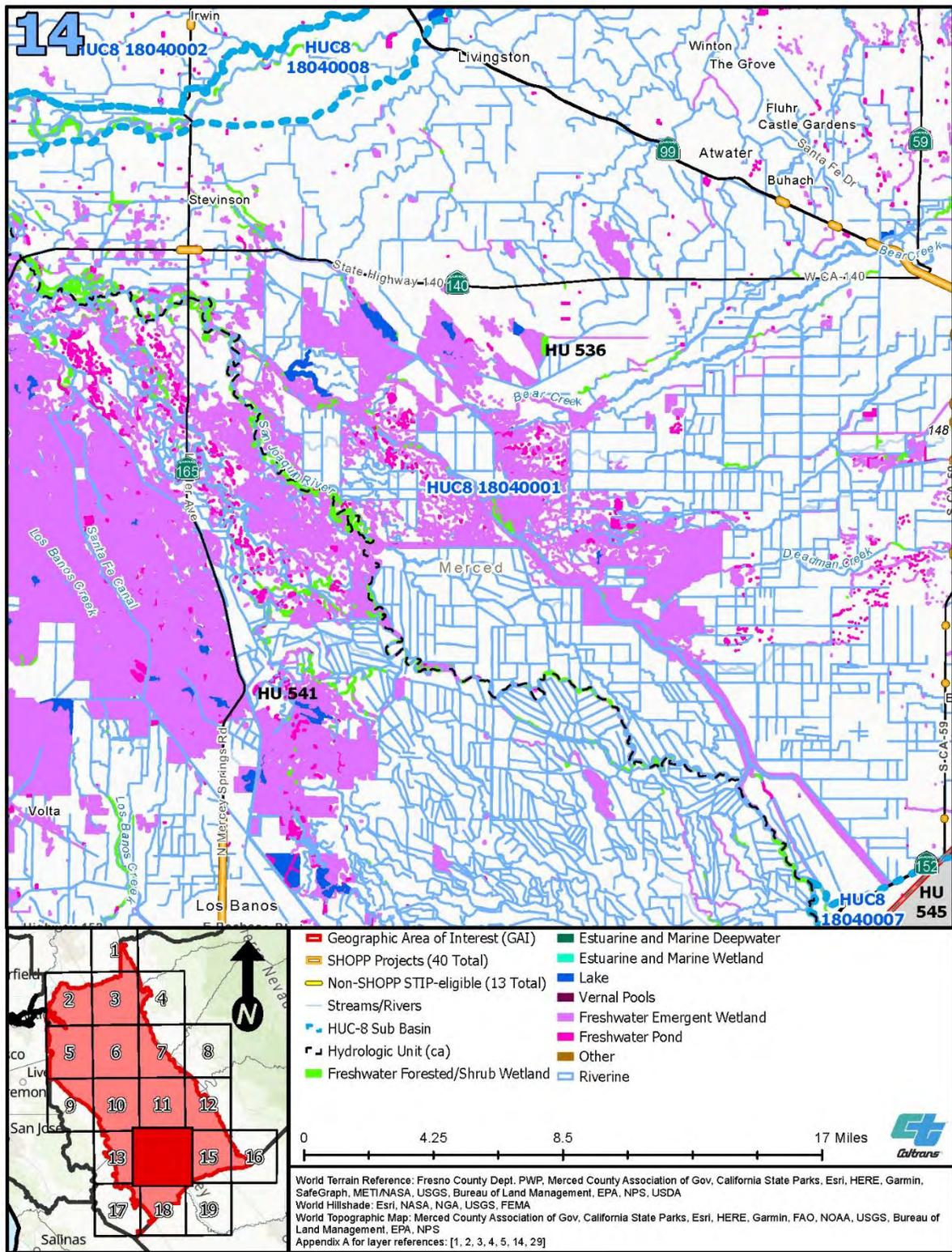


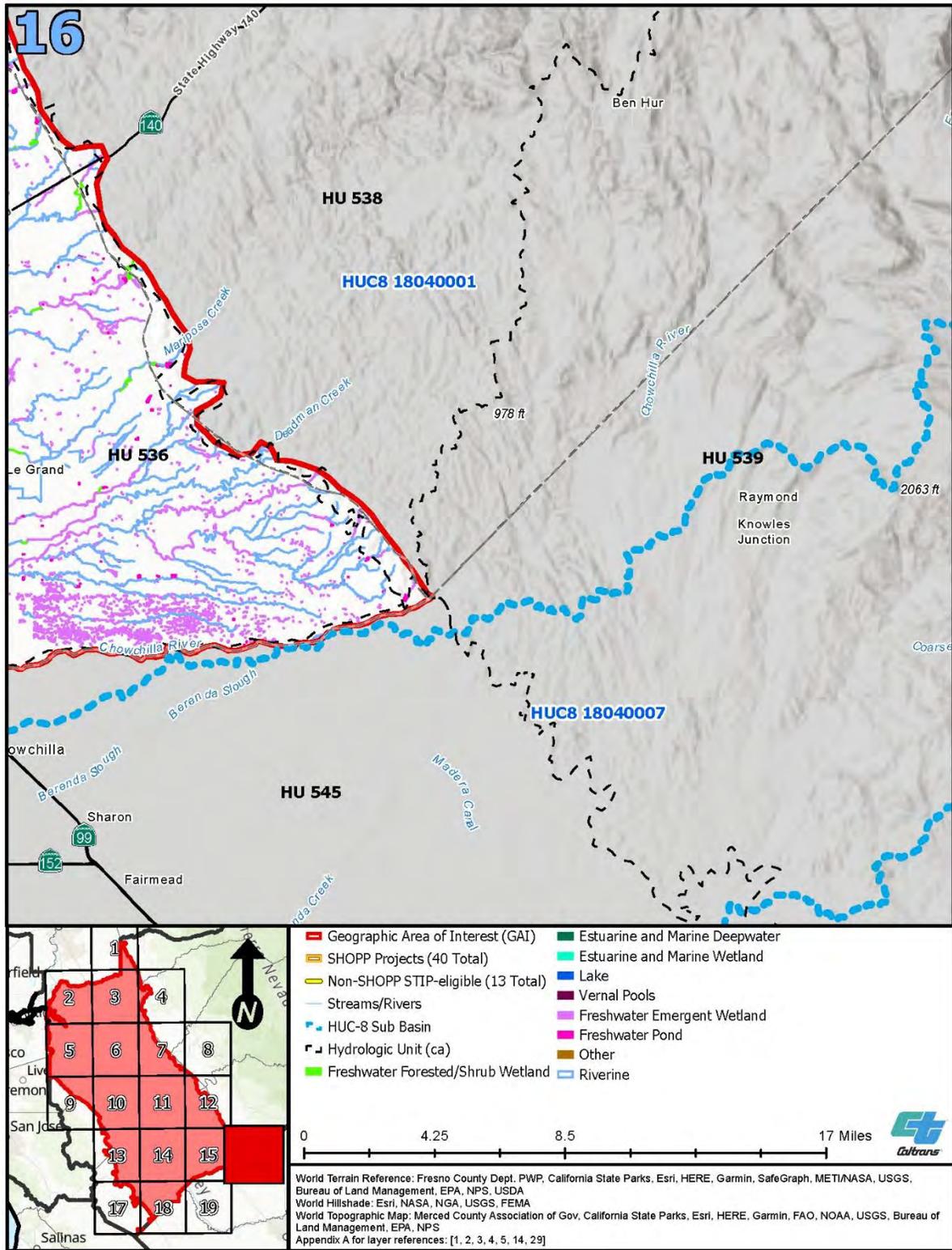


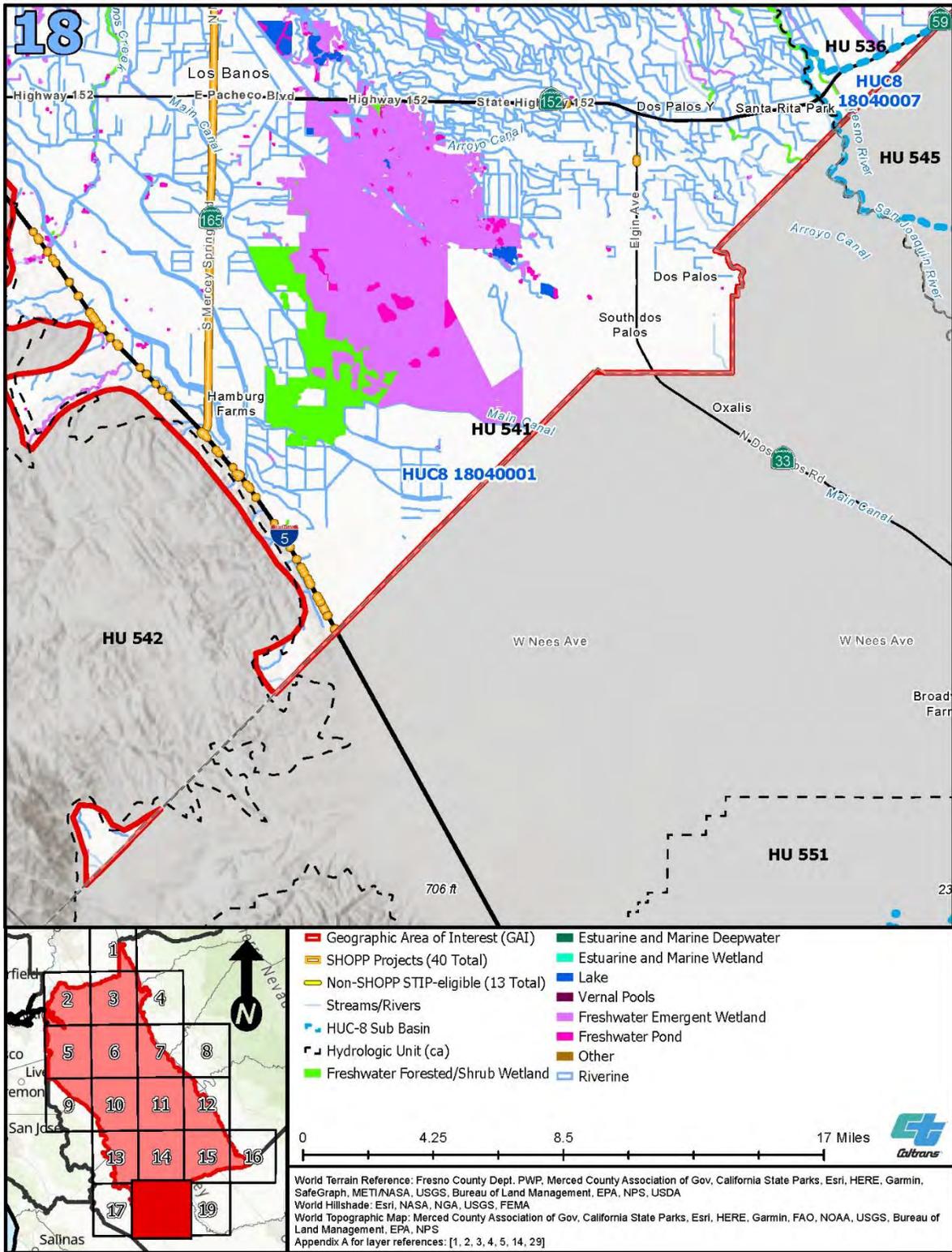


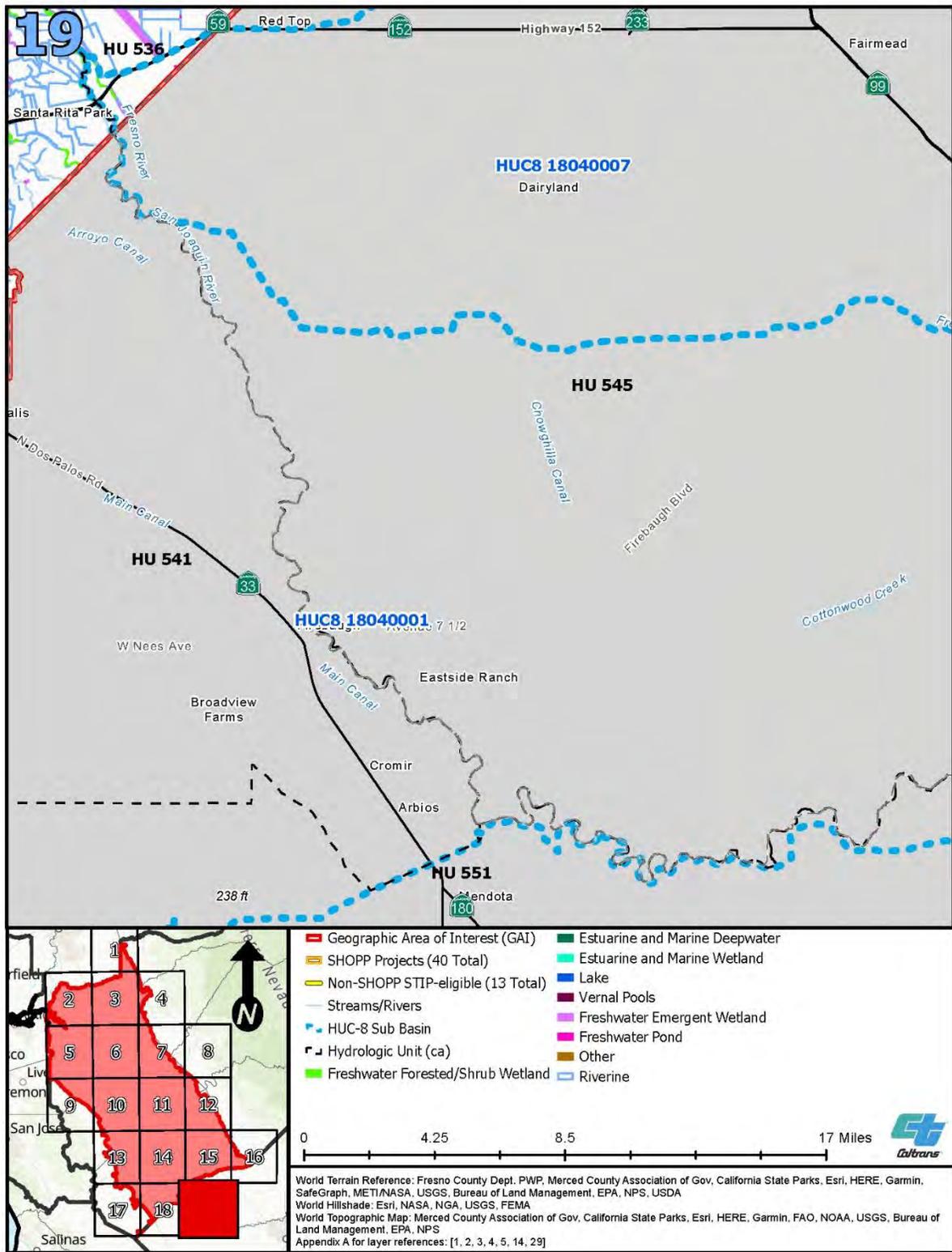












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APPENDIX G: CONSERVATION AND MITIGATION BANK SERVICE AREAS

In the following pages, conservation and mitigation bank service areas that overlap the GAI are provided for aquatic resources and the species of mitigation need. These figures are organized by the resource for which credits are available and are presented in the following order:

- Figure G-1. California Red-legged Frog Bank Service Areas (Map 1)
- Figure G-2. California Red-legged Frog Bank Service Areas (Map 2)
- Figure G-3. California Tiger Salamander Bank Service Areas (Map 1)
- Figure G-4. California Tiger Salamander Bank Service Areas (Map 2)
- Figure G-5. California Tiger Salamander Bank Service Areas (Map 3)
- Figure G-6. Giant Garter Snake Bank Service Areas
- Figure G-7. Valley Elderberry Longhorn Beetle Bank Service Areas (Map 1)
- Figure G-8. Valley Elderberry Longhorn Beetle Bank Service Areas (Map 2)
- Figure G-9. Aquatic Resources and Vernal Pool Bank Service Areas (Map 1)
- Figure G-10. Aquatic Resources and Vernal Pool Bank Service Areas (Map 2)
- Figure G-11. Aquatic Resources and Vernal Pool Bank Service Areas (Map 3)
- Figure G-12. Aquatic Resources and Vernal Pool Bank Service Areas (Map 4)
- Figure G-13. Aquatic Resources and Vernal Pool Bank Service Areas (Map 5)
- Figure G-14. Aquatic Resources and Vernal Pool Bank Service Areas (Map 6)
- Figure G-15. Aquatic Resources and Vernal Pool Bank Service Areas (Map 7)

Because individual conservation and mitigation banks often offer credits for more than one species or resource, which may have separate service areas, the same bank may be found on multiple maps.

Refer to Table 4-3 in Chapter 4 for a full list of conservation and mitigation banks within the GAI, including others not shown in these figures, that offer credits for resources other than aquatic features or the species of mitigation need.

Figure G-1. California Red-legged Frog Bank Service Areas (Map 1)

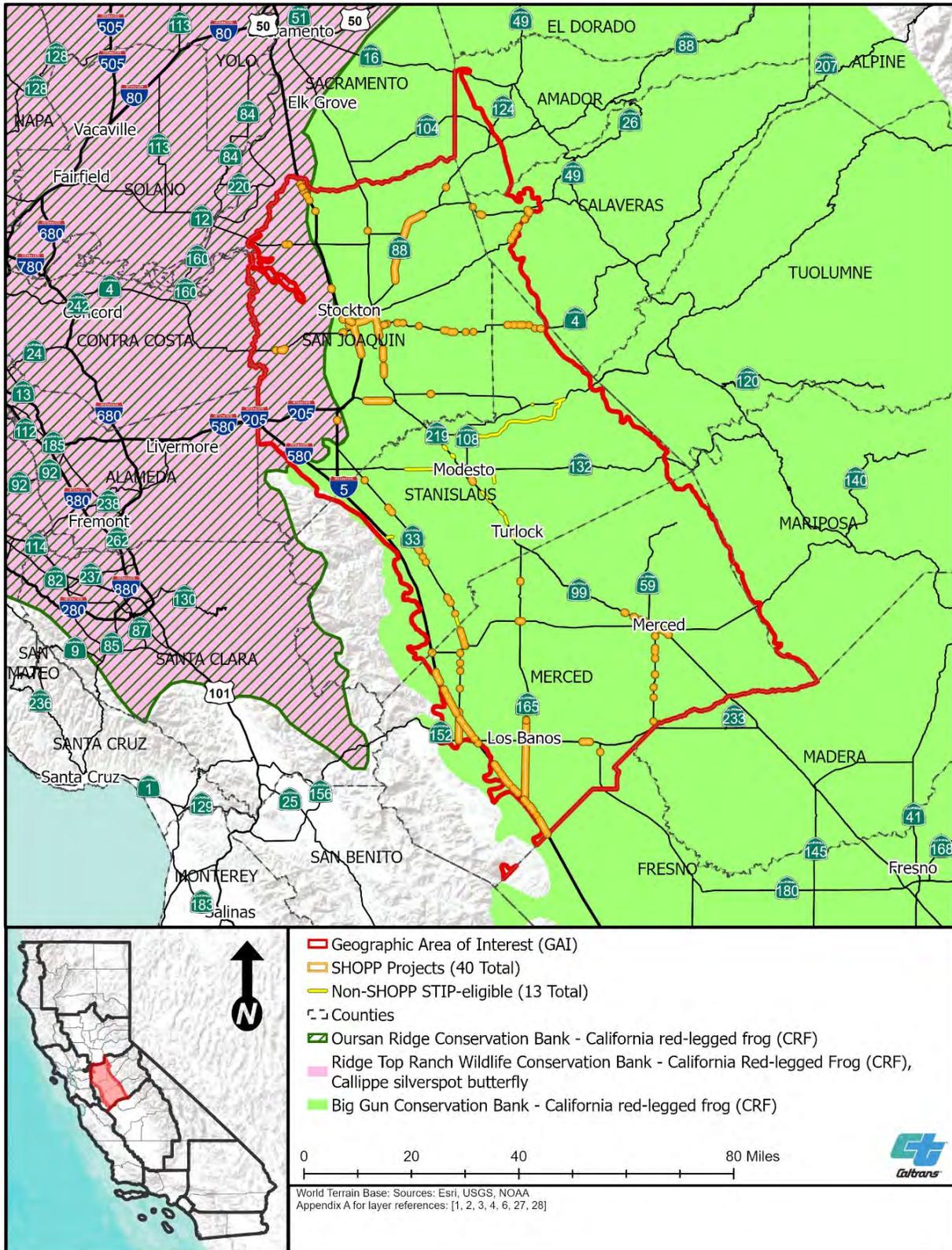


Figure G-2. California Red-legged Frog Bank Service Areas (Map 2)

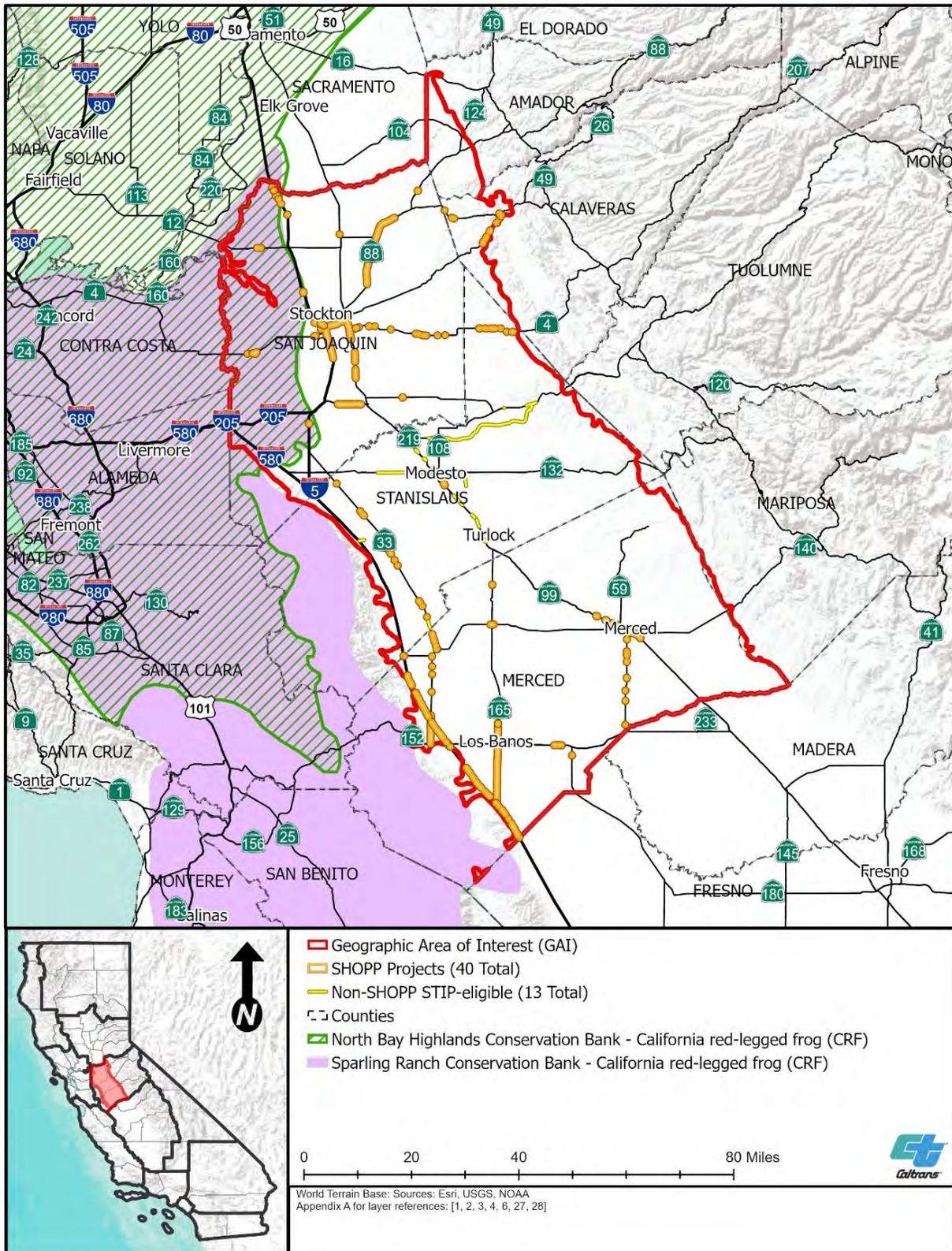


Figure G-3. California Tiger Salamander Bank Service Areas (Map 1)

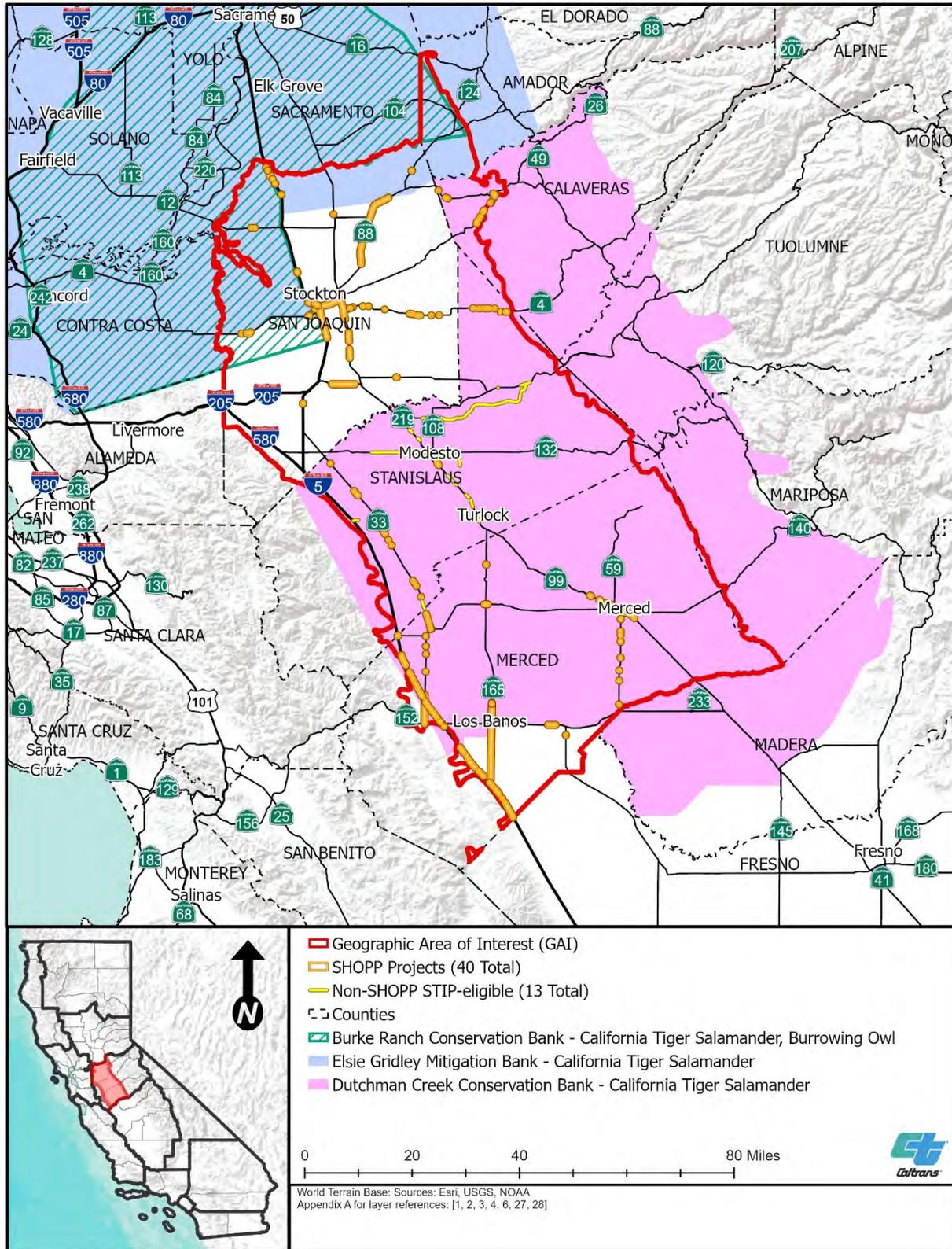


Figure G-4. California Tiger Salamander Bank Service Areas (Map 2)

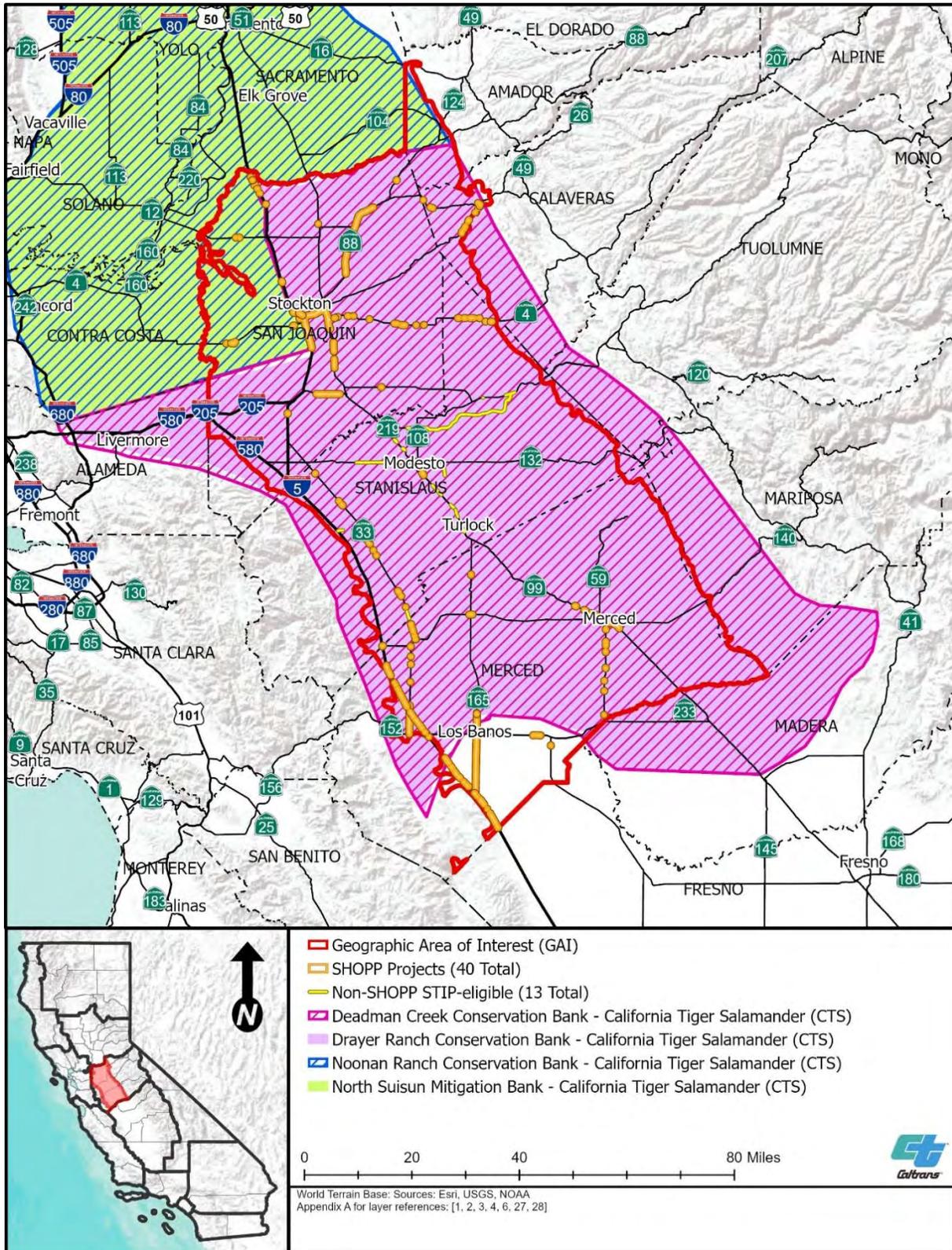


Figure G-5. California Tiger Salamander Bank Service Areas (Map 3)

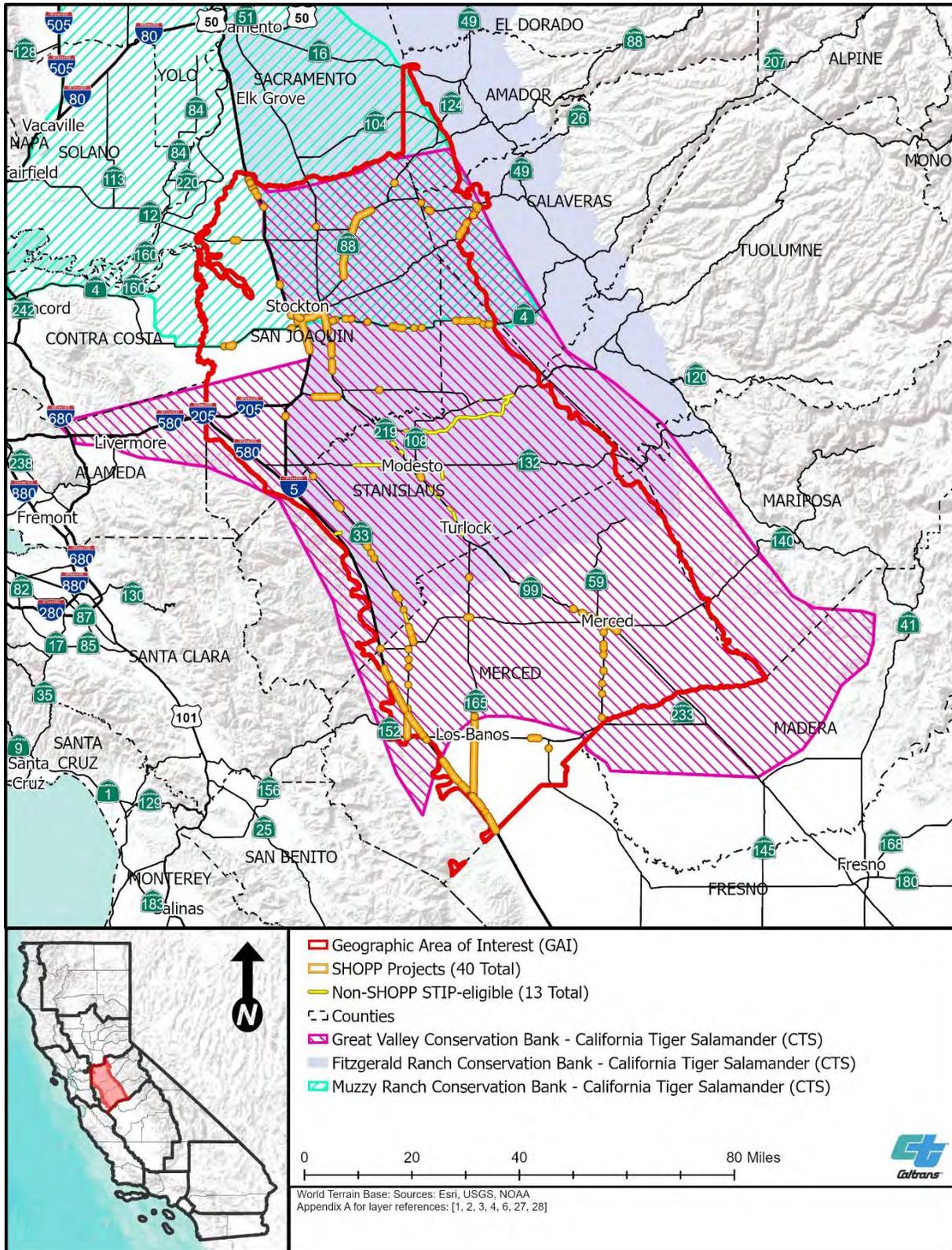


Figure G-6. Giant Garter Snake Bank Service Areas

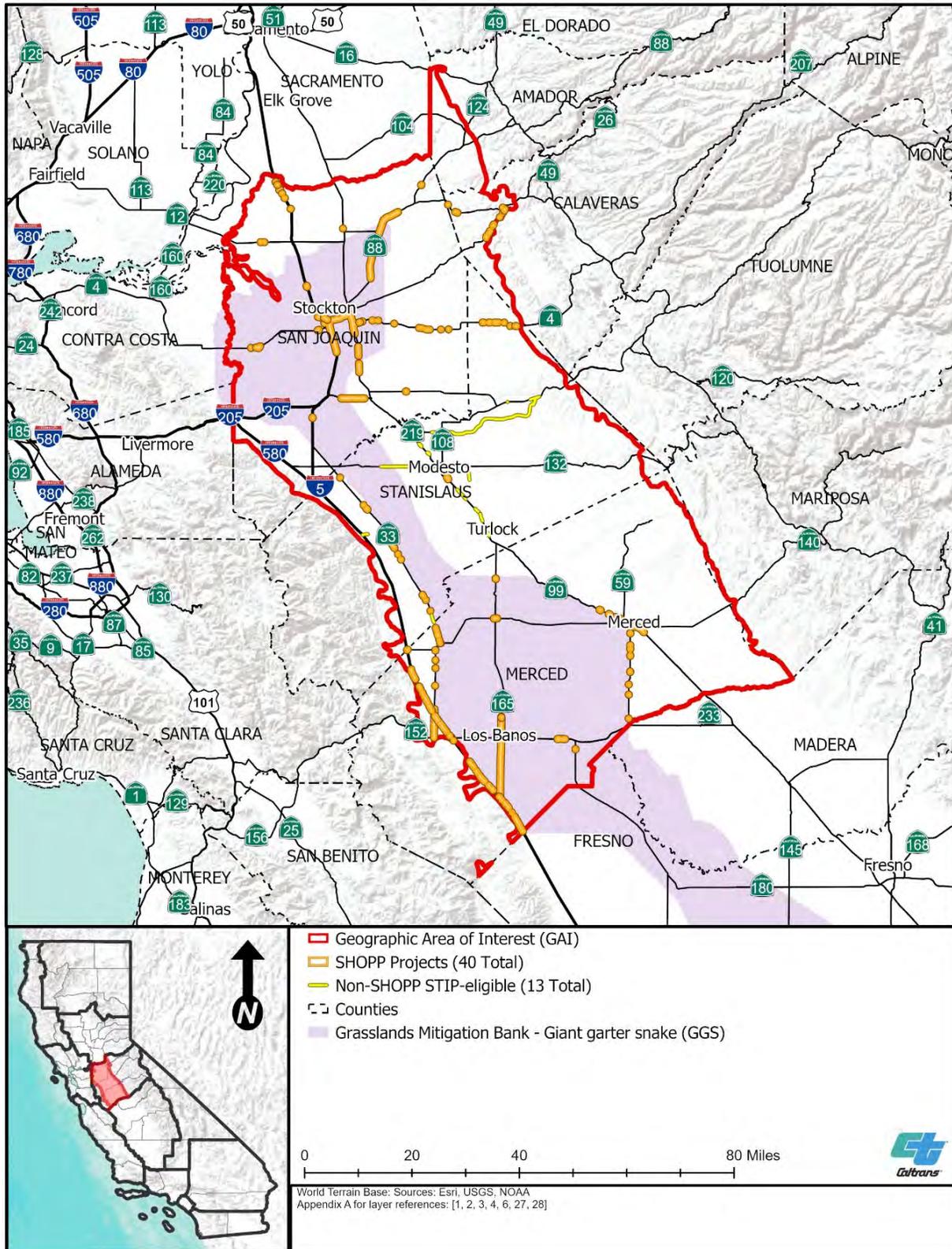


Figure G-7. Valley Elderberry Longhorn Beetle Bank Service Areas (Map 1)

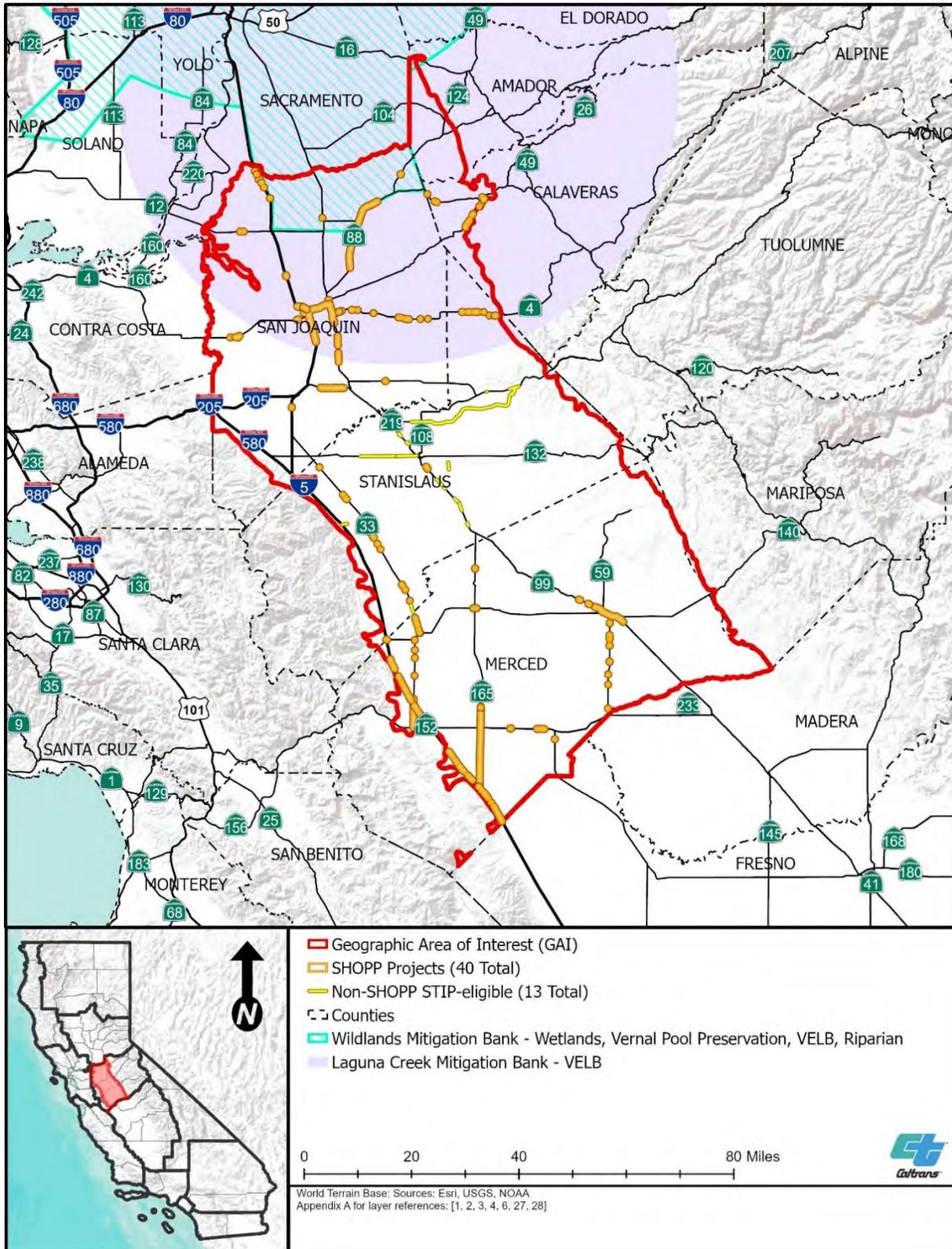


Figure G-8. Valley Elderberry Longhorn Beetle Bank Service Areas (Map 2)

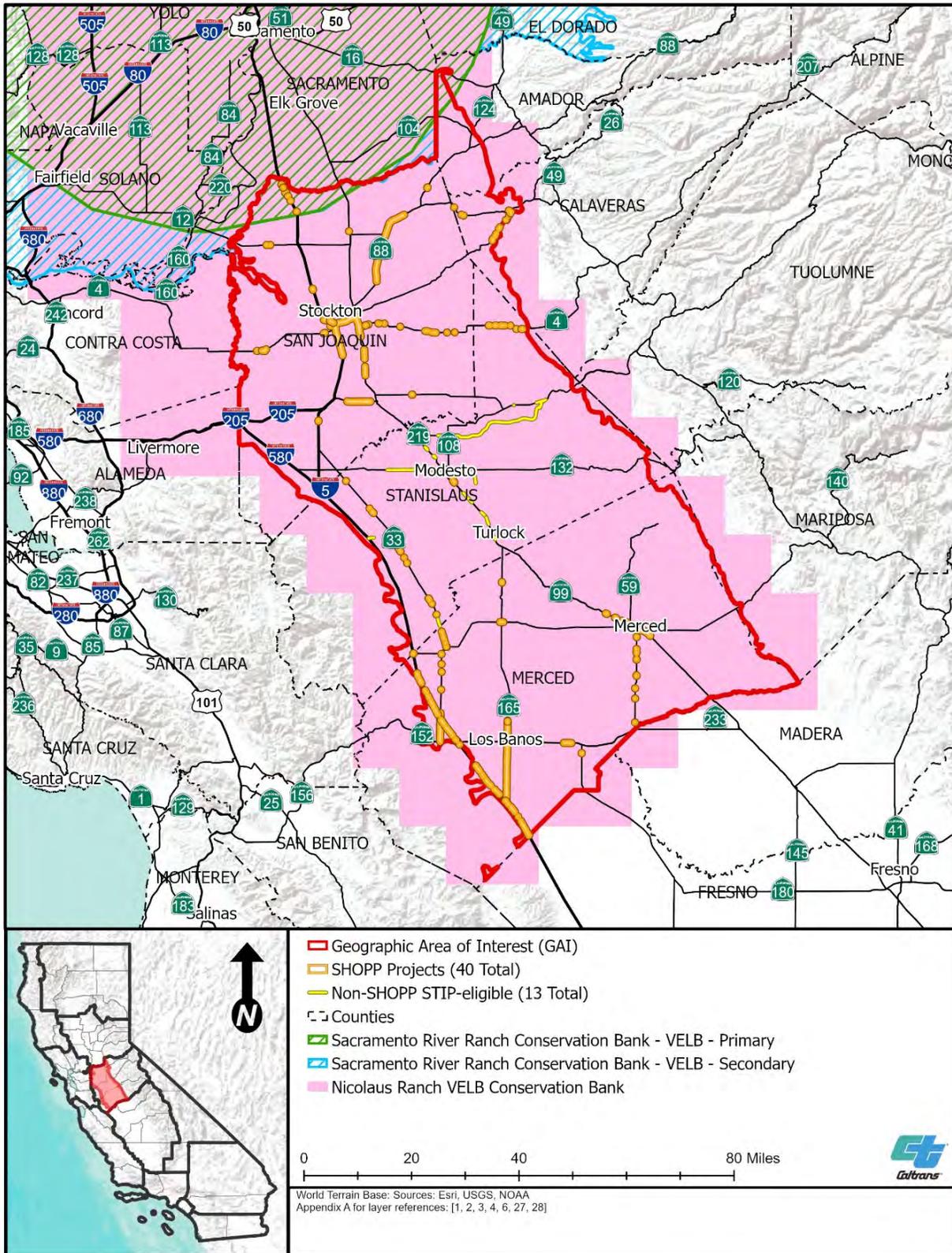


Figure G-9. Aquatic Resources and Vernal Pool Bank Service Areas (Map 1)

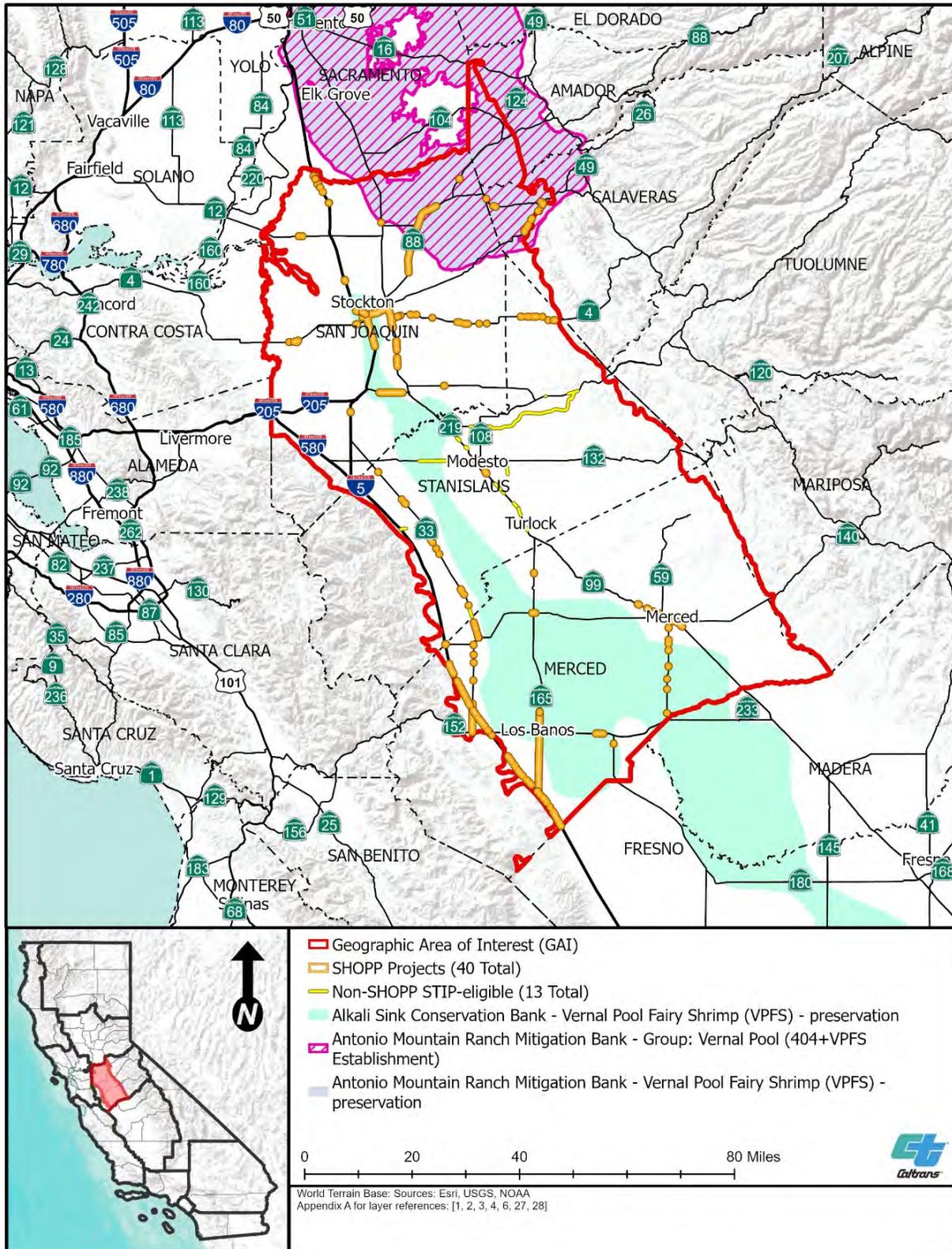


Figure G-10. Aquatic Resources and Vernal Pool Bank Service Areas (Map 2)

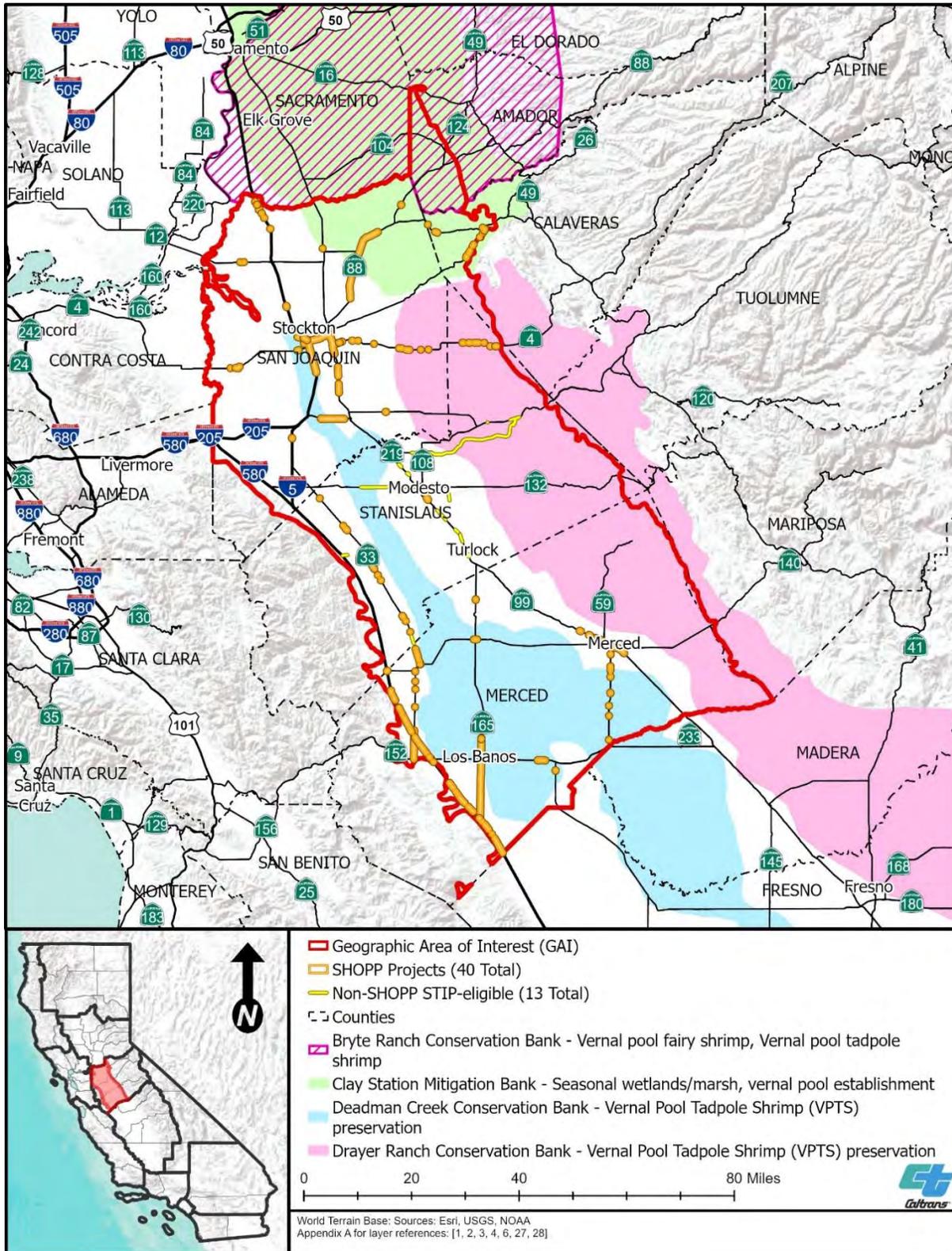


Figure G-11. Aquatic Resources and Vernal Pool Bank Service Areas (Map 3)

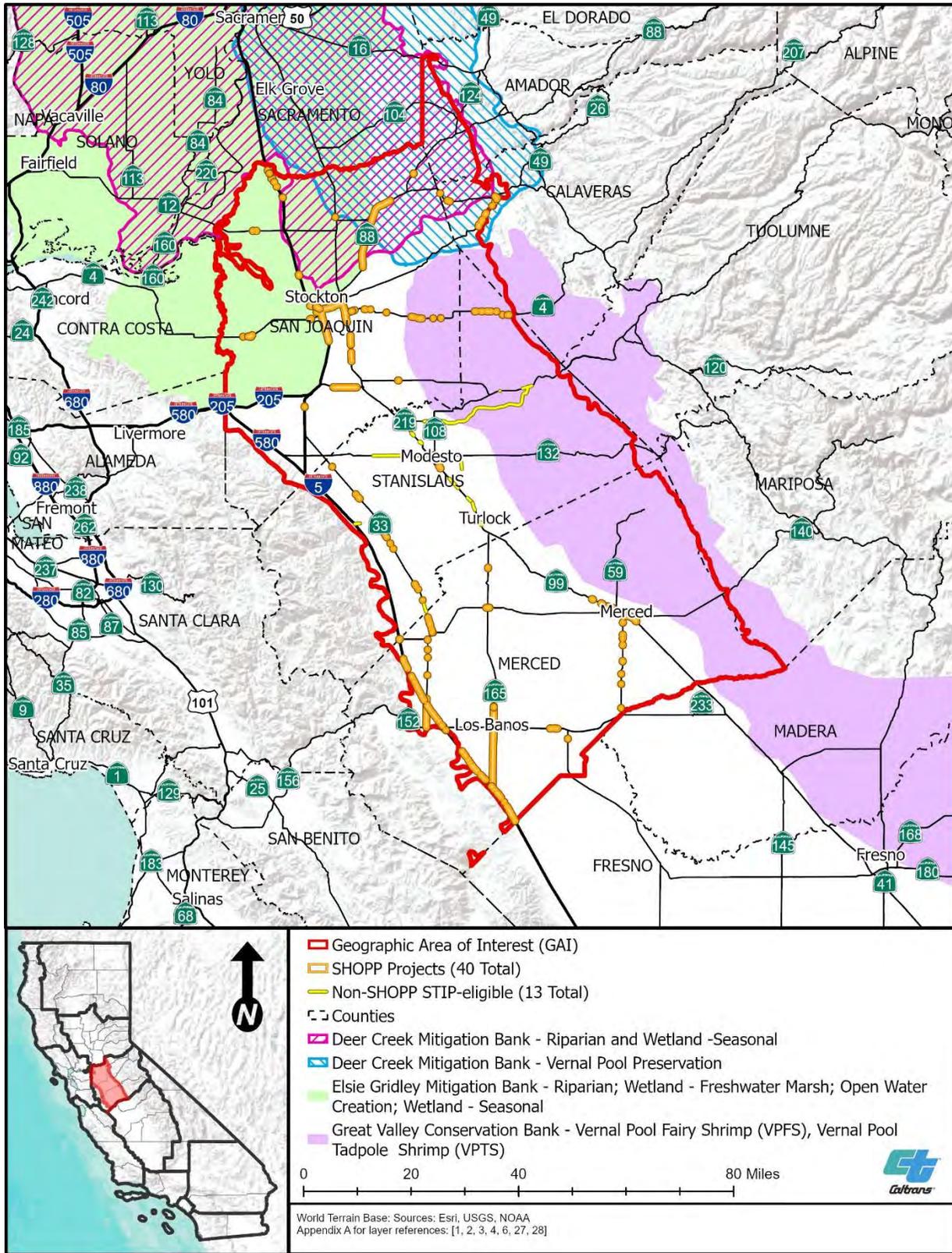


Figure G-12. Aquatic Resources and Vernal Pool Bank Service Areas (Map 4)

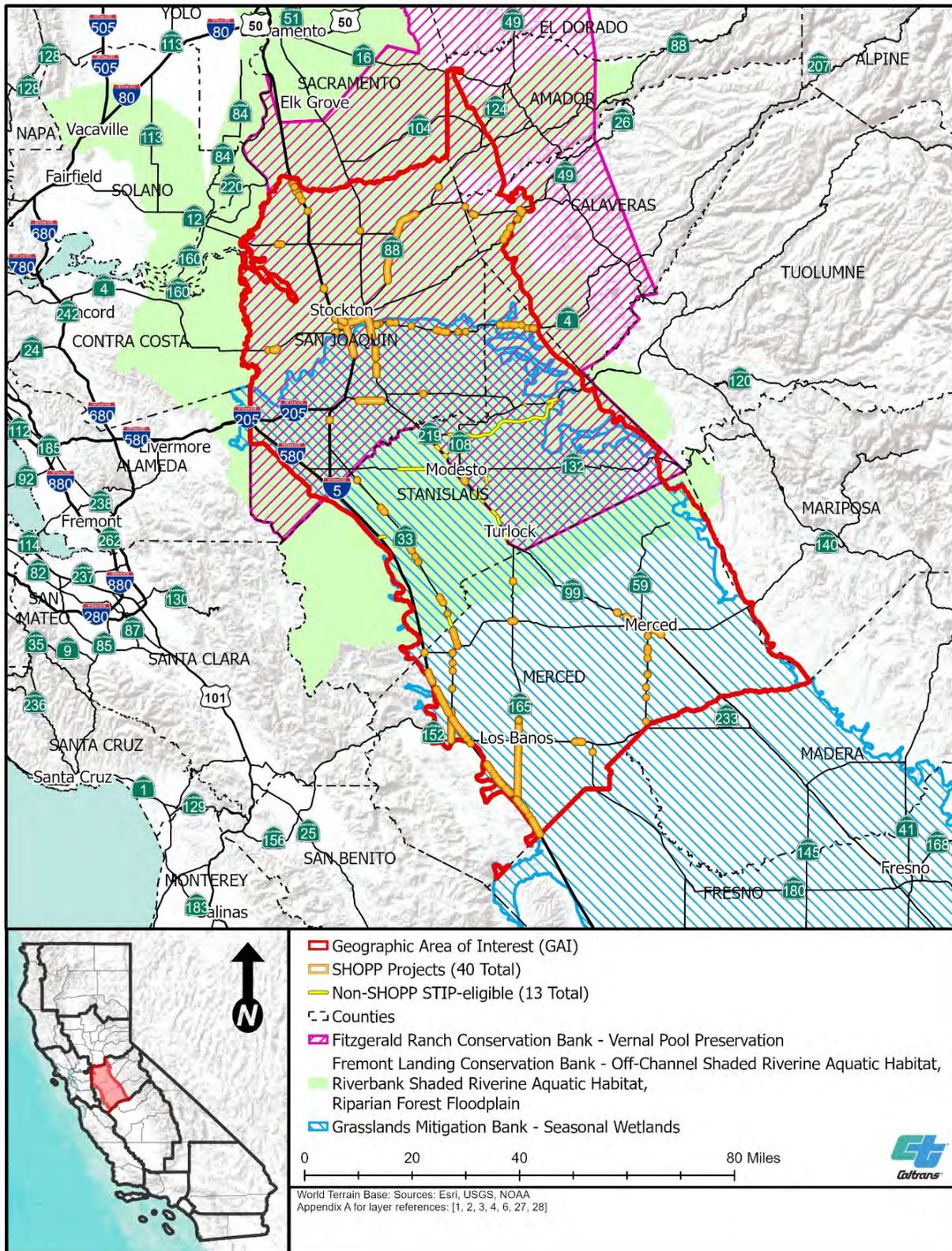


Figure G-13. Aquatic Resources and Vernal Pool Bank Service Areas (Map 5)

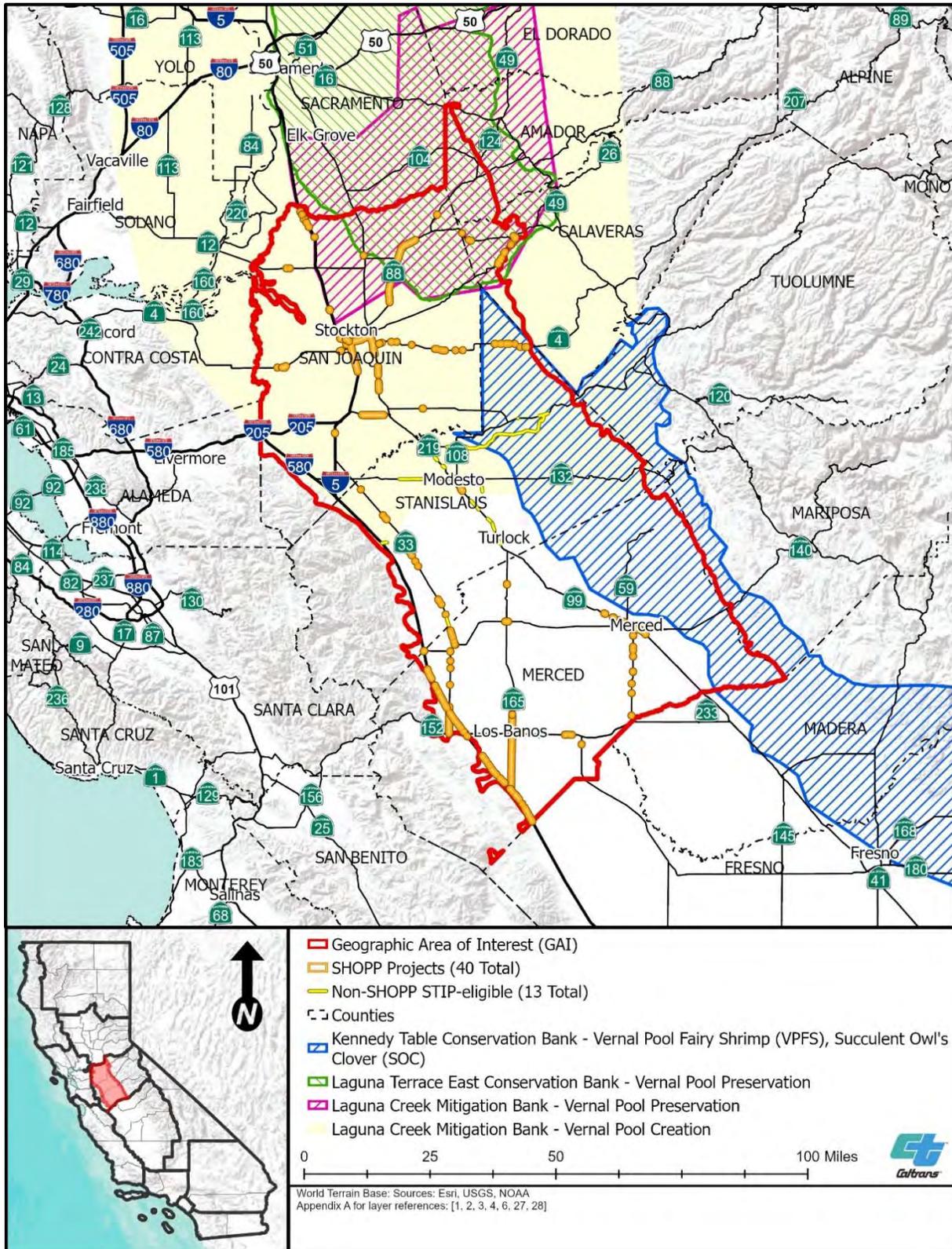


Figure G-14. Aquatic Resources and Vernal Pool Bank Service Areas (Map 6)

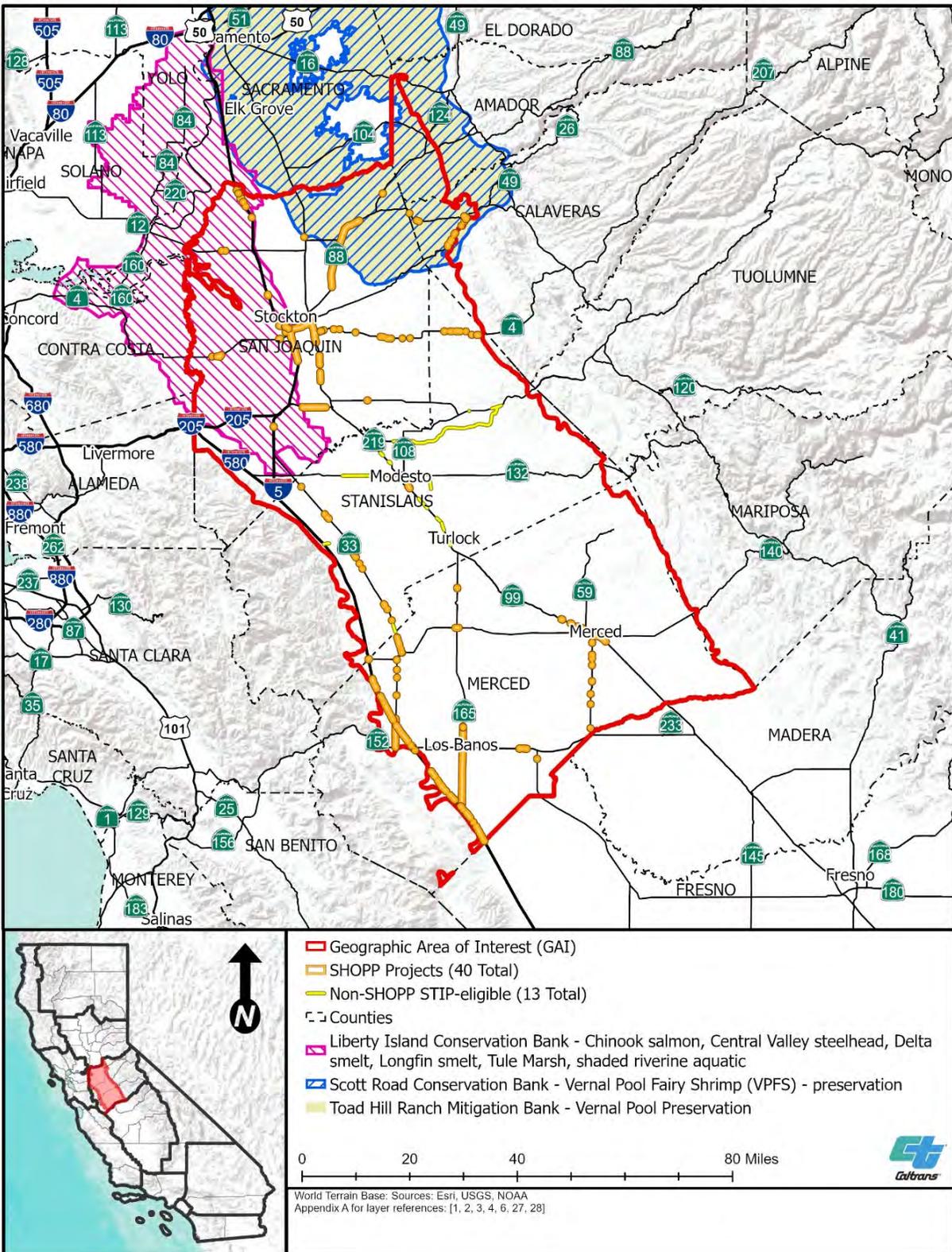


Figure G-15. Aquatic Resources and Vernal Pool Bank Service Areas (Map 7)

