

Appendix D
Community and Land Cover Mapping Methods

The *Salinas River Long-Term Management Plan* (LTMP) uses the terms *community* and *land cover type* to classify and describe the biological setting of the study area. The term *community* means land cover types that are grouped together because of similarity in vegetation type, vegetation structure, ecological function, and current land use. The LTMP recognizes three types of communities: natural communities, semi-natural communities, and non-natural communities. Natural communities are an assemblage of species (plant and animal) that co-occur in the same habitat or area and interact through trophic and spatial relationships. Communities are typically characterized by reference to one or more dominant species. Communities are composed of land cover types.

A *land cover type* is defined as the dominant character of the land surface discernible from aerial photographs and, in some cases, from local knowledge, as determined by the dominant vegetation type, water type, or human use. Land cover types are the most widely used units in analyzing ecosystem function and the diversity of habitats for native species. Land cover data are crucial for developing species distribution models, a key component of regional habitat conservation plans. While many other factors influence whether a species will occupy an area, land cover is often one of the most important.

Land cover data are an essential component of conservation planning. Across the LTMP study area, several land cover datasets have been developed recently at various scales and levels of resolution. This appendix outlines the process used to identify the best available land cover data for the LTMP study area and describes how these data were merged to create a single land cover dataset for the LTMP.

Dataset Inventory

Thoroughly inventorying available land cover data is the first step toward identifying a suitable land cover dataset. We conducted the inventory at several scales, as follows.

- National land cover datasets. The U.S. Geological Survey and U.S. Forest Service are the primary agencies conducting land cover mapping at the national level where the mapping is made publicly available.
- Statewide land cover datasets. In California, the California Department of Forestry and Fire Protection is the primary agency gathering statewide land cover data. The California Department of Fish and Wildlife also gathers land cover data but mostly at a regional scale.
- Regional and local datasets. Regional datasets may cover portions of multiple counties, while local datasets will largely fall within one or two counties. These datasets are often developed by federal and state agencies but are also developed by local agencies such as regional habitat conservation plan implementing entities, counties, open space agencies, or large water agencies. Nonprofit conservation organizations also develop regional and local datasets of land cover for some parts of California.

Table D-1 lists the land cover datasets identified as overlapping the study area partially or completely, along with the relevant characteristics of each dataset.

Table D-1. Inventory of Land Cover Data within the Study Area

Name	Source	Aerial Photography	Published	Extent	Resolution
Salinas River Vegetation	TNC and AIS	2005 NAIP	2008	0.25-mile buffer of Salinas River plus tributaries	Common and widespread vegetation units were delineated to an MMU of approximately 0.25 acre (0.1 hectare). Small wetlands and forest openings were delineated in several instances below 0.25 acre (0.1 hectare).
Salinas Generalized Land Use/Land Cover Mapping	TNC, AIS, and Stanford University	2005 and 2012 NAIP	2014	1-mile buffer of Salinas River where it surrounds the agricultural area of the valley	0.5-acre (0.2-hectare) MMU for riparian and agriculture types and 1-acre (0.4-hectare) MMU for all upland, urban, or other land cover types
Salinas River Arundo	California Invasive Plant Council and others	Unknown	2014	Unknown	Unknown
Pinnacles National Monument	National Park Service, NatureServe, California Native Plant Society, AIS, and California Department of Fish and Wildlife	2003 and 2005 photography and 2002 NAIP	2012	Pinnacles National Park	1.25-acre (0.5-hectare) MMU
CALVEG	U.S. Forest Service	1997–2013	1997–2013	Large portions of California	2.5-acre (1-hectare) MMU for contrasting vegetation conditions based on cover type. No minimum mapping unit for lakes and conifer plantations.
Fire Resource and Assessment Program Vegetation	California Department of Forestry and Fire Protection	Various	2015	Statewide	323-square-foot (30-square-meter) MMU
National Land Cover Database	U.S. Geological Survey	2009	2013	Nationwide	30-square-foot (3-square-meter) MMU
Farmland Mapping and Monitoring Program	California Department of Conservation	2014	2016	Statewide	10 acres (4 hectares)

Abbreviations: AIS = Aerial Information Systems; MMU = minimum mapping unit; NAIP = National Agriculture Imagery Program; TNC = The Nature Conservancy

Selecting Datasets

Datasets based on the most recent field mapping or imagery and with the smallest minimum mapping unit are most desirable because they represent current conditions most accurately and precisely; the dataset's mapped features and the geographic extent are also important (Table D-1). Table D-2 lists the datasets selected based on the factors listed in Table D-1, including recent data, geographic extent, and resolution. Datasets in Table D-2 are listed in the order they were combined. For example, the Salinas River Arundo dataset (California Invasive Plant Council 2014) was applied first, then the Salinas Generalized Land Use/Land Cover Mapping (The Nature Conservancy et al. 2014) was applied, but only in the study area locations that were not mapped by the Salinas River Arundo dataset. That is, the Salinas River Arundo dataset takes priority over the Salinas Generalized Land Use/Land Cover Mapping. The remaining datasets are applied, in this manner, until the entire study area is covered by an existing vegetation dataset. Figure 1 shows the distribution of datasets used within the study area and which dataset has priority in which portion of the study area.

Table D-2. Land Cover Datasets Used, Priority, and Rationale

Priority	Dataset	Rationale
1	Salinas River Arundo (California Invasive Plant Council 2014)	Most detailed and current representation of <i>Arundo donax</i> , an invasive species targeted for removal as part of the LTMP
2	Salinas Generalized Land Use/Land Cover Mapping (The Nature Conservancy et al. 2014)	Relatively small minimum mapping unit that focuses on Salinas River area; more recent than the other Salinas River dataset
3	Vegetation—Salinas River (The Nature Conservancy and Aerial Information Systems 2008)	Most recent and detailed data outside of priority dataset 2.
4	Existing Vegetation Mid Region 5 Central Coast—CALVEG (U.S. Department of Agriculture, Forest Service 2017)	Provides coverage for most of the study area but less detail than priority datasets 1–3
5	Fire Resource and Assessment Program Vegetation (California Department of Forestry and Fire Protection 2015)	Used to fill in remaining gaps in study area; for a statewide dataset, it is relatively current and detailed.

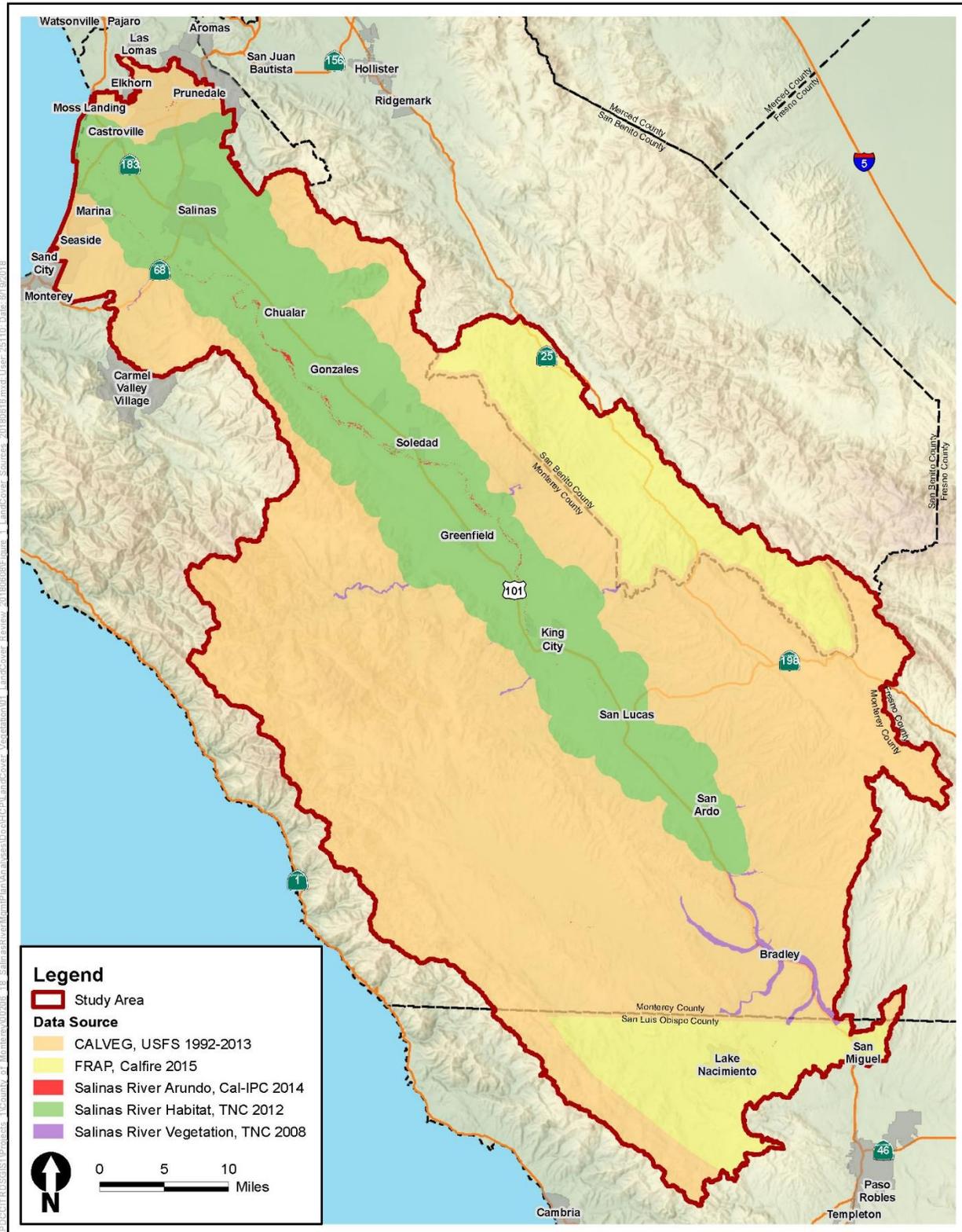


Figure D-1. Land Cover Data Sources

Methodology

The datasets selected were merged in order of the prioritization shown in Table D-2. Because the datasets use different land cover type naming conventions, the land cover classifications were compared and aligned prior to merging in order to create a standard land cover classification system that accurately portrays the existing communities in the LTMP study area. The U.S. National Vegetation Classification System (NVCS) (2017) was selected as the land cover classification system on which to base the LTMP land cover type names because it is used by the California State Wildlife Action Plan (SWAP). By using this classification system, management objectives consistent with the SWAP can be tracked over time. In addition, the NVCS is a well-recognized classification system, and several of the other datasets used herein have comparable classification systems.

Each land cover type within each dataset was assigned to a NVCS “macrogroup” type by comparing the original dataset land cover type, the geographic distribution, and other provided classification types (e.g., California Wildlife Habitat Relationships, CALVEG, etc.) with the description of the NVCS macrogroup land cover type. The selected macrogroup was then checked against Appendix D of the SWAP that lists those NVCS macrogroups that occur on the Central Coast. This process was complicated by the fact that the NVCS was modified in 2017, and this update combined some macrogroups and broke apart others.

The NVCS includes anthropogenic land cover types that were used to characterize agricultural land cover types where applicable. The NVCS does not include aquatic features (e.g., rivers, lakes), because these features are not vegetated. To characterize aquatic features within the study area, the National Wetlands Inventory (NWI) naming convention at the system level was used (e.g., riverine, estuarine) (U.S. Fish and Wildlife Service 2018). Finally, there were several mapped land cover types that did not fit within the NVCS or NWI classifications, including urban and developed land cover types as well as several water feature types; these land cover types were assigned a land cover category unique to this dataset.

The final step to standardizing the land cover classification system is to assign each land cover type to a community. Land cover types were grouped or “rolled up” into communities based on similarities in vegetation type and structure, ecological function, and current land use. Table D-3 shows the names of NVCS, NWI, and LTMP-specific land cover types; their associated datasets; and the final “roll up” community names used in the LTMP.

Table D-3. Land Cover Classifications and “Roll Up” Communities for the LTMP Dataset

Land Cover Classification System and Land Cover Type	"Roll Up" Community	CALVEG	TNC 2008	TNC 2014	FRAP	Cal-IPC
U.S. National Vegetation Classification System—Macrogroup						
Californian Forest & Woodland	Forest and Woodland	x	x	x	x	
Southern Vancouverian Montane-Foothill Forest	Forest and Woodland	x				
Intermountain Singleleaf Pinyon-Juniper Woodland	Forest and Woodland	x			x	
Vancouverian Flooded & Swamp Forest	Riparian	x	x			
Interior Warm & Cool Desert Riparian Forest	Riparian	x	x	x	x	
Californian Chaparral	Shrublands	x	x	x	x	
Californian Coastal Scrub	Shrublands	x	x		x	
Californian Annual & Perennial Grassland	Grassland	x	x	x	x	
Pacific Coastal Beach & Dune	Coastal Strand and Dune	x				
Vancouverian Lowland Marsh, Wet Meadow & Shrubland	Wetland		x	x		
Western North American Montane-Subalpine-Boreal Marsh, Wet Meadow & Shrubland	Wetland	x				
Warm Desert Lowland Freshwater Marsh, Wet Meadow & Shrubland	Wetland	x	x	x	x	
North American Pacific Coastal Salt Marsh	Wetland	x			x	
Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland	Shrublands	x				
North American Warm-Desert Xeric-Riparian Scrub	Riparian	x				
Cool Interior Chaparral	Shrublands	x				
Interior West Ruderal Flooded & Swamp Forest & Woodland	Riparian	x				
Western North American Ruderal Marsh, Wet Meadow & Shrubland	Wetland		x			
Western North American Ruderal Grassland & Shrubland	Shrublands	x				
North Pacific Coastal Ruderal Grassland & Shrubland	Coastal Strand and Dune	x				
Californian Ruderal Forest	Forest and Woodland	x	x	x	x	
Western North American Cliff, Scree & Rock Vegetation	Barren		x			

Land Cover Classification System and Land Cover Type	"Roll Up" Community	CALVEG	TNC 2008	TNC 2014	FRAP	Cal-IPC
National Vegetation Classification System—Agricultural and Developed Vegetation Cultural Type						
Woody Horticultural Crop	Agriculture	x	x	x	x	
Forest Plantation & Agroforestry	Agriculture	x				
Row & Close Grain Crop	Agriculture	x	x		x	
Pasture & Hay Field Crop	Agriculture					x
Fallow Field & Weed Vegetation	Agriculture			x		
National Wetlands Inventory Systems						
Riverine	Riverine	x	x		x	
Lacustrine	Aquatic	x			x	
Estuarine	Estuarine	x			x	
Marine	Marine	x		x	x	
Other						
Barren	Barren	x		x	x	
Urban	Developed	x			x	
Artificial Lake or Pond	Aquatic	x				
<i>Arundo donax</i>	Riparian		x			x
Wash or floodplain	Riverine			x		
Urban/Developed	Developed			x	x	
Dairy and Other Bovine Confined Feeding Operations	Agriculture			x		
Water Feature	Aquatic		x	x		
Abbreviations: LTMP = Salinas River Long-Term Management Plan; Cal-IPC = California Invasive Plant Council; FRAP = Fire Resource and Assessment Program Vegetation; TNC = The Nature Conservancy						

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