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# Decision Support Tool for Prioritizing Arundo Treatment in the Santa Clara River Watershed

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Cover photos: Photos of the Santa Clara River, California.

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# 1 INTRODUCTION

This *Decision Support Tool for Prioritizing Arundo Treatment in the Santa Clara River Watershed* (Report) was developed to support the prioritization of *Arundo donax* (Arundo) removal and management to reduce threats within the Santa Clara River watershed (watershed). The Report provides a framework to guide Arundo removal in areas that will result in the greatest benefit to the watershed and is intended to serve as a 'living' guidance document that can be updated, as needed, in the future. The Report is one component within the overall Decision Support Tool. The structure of the Decision Support Tool includes the following components:

- Report – includes a descriptive summary of vegetation survey and analysis results and acts as a guiding document suggesting recommendations for management based on assigned priority levels,
- Prioritization Table (Appendix A) – includes tabular results of prioritization using criteria (discussed further in Section 3 of this Report),
- Arundo Mapping Summary (Appendix B) – includes tabular results of Arundo cover classes mapped, and
- KMZ Map – delineates the river mile segments used to prioritize Arundo removal (discussed further in Sections 3 and 4 of this Report), symbolized by assigned priority.

The Report acts as the prioritization guide to be used in conjunction with the Prioritization Table and KMZ Map. As described in Section 4.2, these components will be adaptively managed to remain useful as new data is released in the future. These components fulfill the requirements for Task 7 (Design) of the Upper Santa Clara River Proposition 1 Integrated Regional Water Management (IRWM) Round 1 Grant Project Work Plan (DWR Grant Agreement No. 4600013902). The Report and Decision Support Tool build on and expand prior work conducted in the watershed over the past twenty years, particularly the *Santa Clara River Parkway Strategic Plan for Arundo Treatment and Post-treatment Revegetation* (Strategic Plan) that was prepared by Stillwater Sciences for the California State Coastal Conservancy (Stillwater Sciences 2011a).

## 1.1 Watershed Overview

The Santa Clara River watershed is approximately 1,630 square miles and contains the upper and lower reaches of the Santa Clara River, in Los Angeles (L.A.) and Ventura Counties, respectively, originating in the San Gabriel Mountains near the western edge of the Mojave Desert and flowing westward to the Pacific Ocean (Figure 1). This is the largest river system in Southern California that remains in a relatively natural state with little urbanization in the watershed. Roughly 10,000 acres of the Santa Clara mainstem and lower tributaries are within the 100-year floodplain in L.A. County, with another 15,000 acres in Ventura County. The population of the Santa Clara watershed is increasing rapidly, especially in the upper watershed, increasing the strain on water and natural resources, including over 60 state or federally protected species. Although the main stem of the Santa Clara River does not have any water storage reservoirs, there are reservoirs on several tributaries that store local runoff and imported water from the State Water Project (Lake Piru, Pyramid Lake, Castaic Lake, and Bouquet Reservoir as shown in Figure 1).

The Santa Clara River watershed is tectonically active, has steep erodible terrain, is subject to periodic wildfire, and has a semi-arid climate driven by ENSO climate fluctuations (El Niño events): water availability is characterized by drier La Niña years and periodic droughts, such as

that experienced in 2012–2018, alternating with episodes of wetter El Niño years, which have historically occurred at roughly 5- to 8-year intervals on average (Stillwater Sciences 2007, 2011b). The river corridor, including riparian vegetation, is periodically reset by large flood events that occur every 10–20 years on average (Stillwater Sciences 2008, 2011b). Implementing best practices management of watershed resources is critical for ensuring water availability for a growing population, for maintaining sustainable groundwater basins and resilient groundwater-dependent ecosystems to benefit natural systems and agriculture, and to minimize the impacts of flooding, erosion, and sedimentation that occurs during El Niño storms or following wildfire and earthquakes and enhance ecosystem and water supply resilience to climate change.

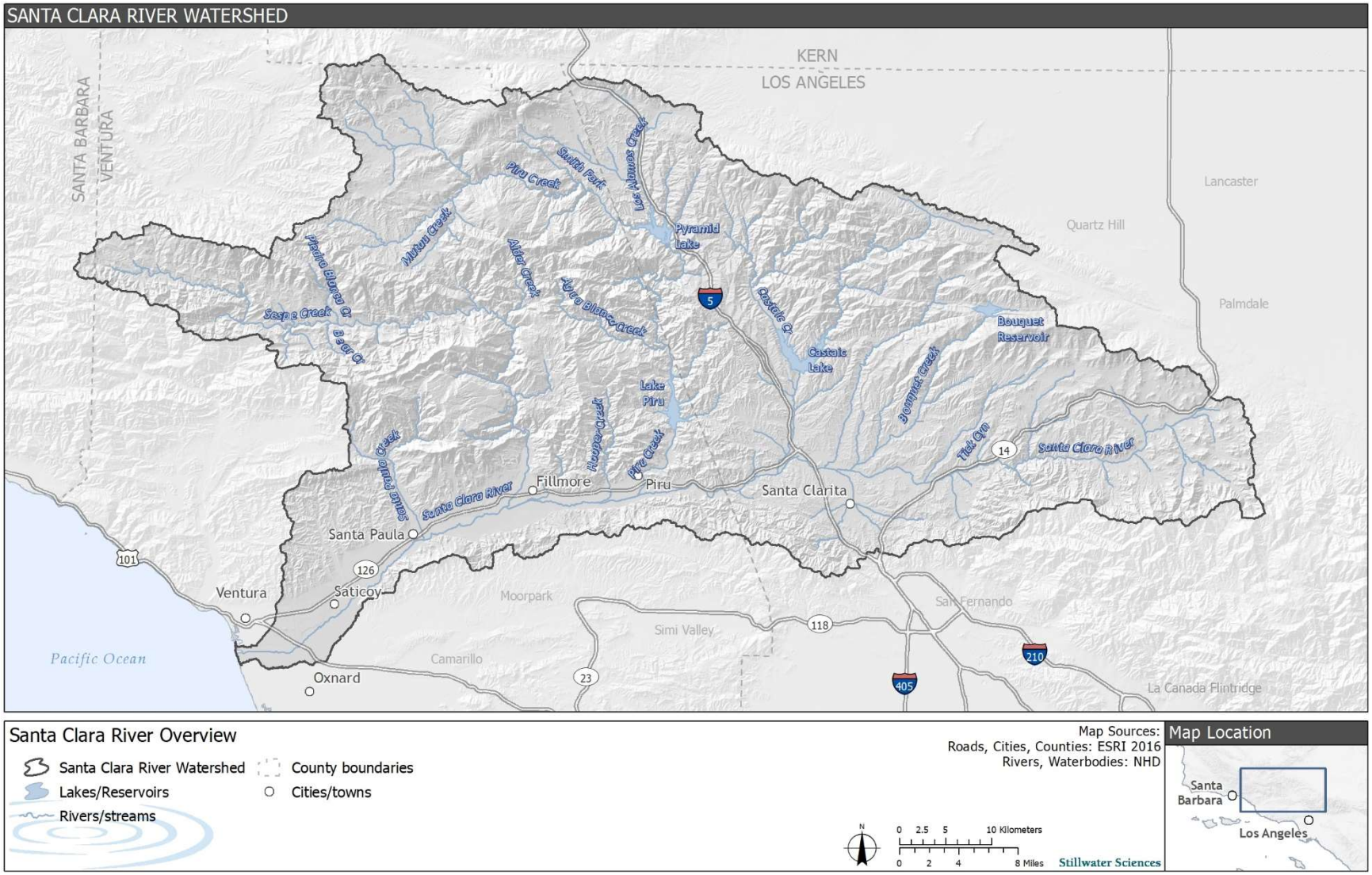


**Figure 1.** Santa Clara River watershed overview.

## 1.2 Arundo in the Watershed

Based on updated vegetation mapping conducted as part of this effort (Section 3.2), there are approximately 11,830 acres of natural or semi-natural riparian and floodplain vegetation within the Study Area (Figure 2). Of this mapped floodplain area, over half (7,490 acres; 63%) contains notable amounts of Arundo, ranging from stands with 1–5% cover of Arundo in the understory of native riparian forests and shrublands to dense monospecific stands with 96–100% Arundo cover. The Santa Clara River Watershed ranks among the top three watersheds (along with the Santa Ana River and Salinas River), in terms of documented levels of Arundo infestation, out of 38 total watersheds surveyed in central and southern California (California Invasive Plant Council 2011).

Arundo is a perennial bamboo-like grass that can reach 30 feet in height and uses approximately 3 to 4 times the amount of water for evapotranspiration compared with native plants. Annual water loss via evapotranspiration can be up to 10 feet per infested acre (Dudley et al. 2018), and in some cases much more as differences in transpiration rates related to temperature, wind, soil moisture, competition among plants for water, local desiccation, as well as other variables may impact the annual water utilization rate. Arundo grows fast (2–4 inches per day, 40–75 metric tons per hectare per year), is tolerant of both drought and flooding and can survive high salinity conditions. It burns readily but grows back following wildfires that kill native vegetation and carries fire into adjacent management areas and infrastructure. Arundo reproduces from rhizomes (massive root systems). Once established, Arundo can spread rapidly and outcompete native riparian vegetation. In addition, Arundo is commonly used by unhoused populations living in the river to make structures, increasing fire risk.

Arundo has invaded many parts of the watershed, including the lower portions of major tributaries. However, the greatest extent of the Arundo infestation occurs in the floodplain of the mainstem Santa Clara River., with the heaviest infestations found in river reaches with shallow groundwater that support Groundwater Dependent Ecosystems (GDEs).The extensive Arundo invasion in riparian and floodplain habitats throughout much of the watershed poses an ongoing impact and a threat to native biodiversity, including habitat for over 60 species that have federal or state protected status, and to water resources, local communities, high-value agriculture and infrastructure, and recreational uses. The need for control of Arundo in the watershed has been widely recognized for over 20 years, and various opportunistic efforts have been undertaken to remove Arundo and restore native vegetation at disparate locations along the river. However, the goal of implementing successful long-term control of Arundo throughout this large watershed has been constrained by limited and sporadic funding and the lack of a comprehensive watershed-wide process and program (including monitoring and maintenance) for Arundo removal and native habitat enhancement and restoration in the floodplains of the Santa Clara River and its tributaries. The complex network of management objectives in the watershed may also contribute to Arundo invasion. For example, the Valencia Water Treatment Plant discharges between 20 and 30 million gallons per day, sustaining Arundo populations downstream of Interstate 5; however, this discharge can't be completely eliminated as it supports fish habitat.

Successful implementation of a watershed-wide program has numerous significant and long-lasting benefits, both environmentally and economically (for example, see https://restorethescr.com/). The California Invasive Plant Council (Cal-IPC) rates Arundo in the 'high' threat category and California Department of Food and Agriculture classifies it as a B-rated noxious weed, which is a "pest of known economic or environmental detriment". The general benefits of Arundo removal have been highlighted by various sources. General sources

(Cal-IPC 2011) and work specifically focused on the Santa Clara River watershed (e.g., Bell et al. 2016; Coffman et al. 2010; Orr et al. 2011; Stillwater Sciences 2008, 2011b; Stover et al. 2018) were reviewed to evaluate the likely benefits of Arundo control and native revegetation, as listed below.

Benefits of Arundo removal in the Santa Clara River watershed:

- Reduction in water consumption: a variety of studies in the arid west have demonstrated that, based on its evapotranspiration rate, Arundo uses anywhere from three to 110 times more water than native riparian plant species (Coffman and Ambrose 2011 and references cited therein), depending on local area conditions. Under typical conditions, it is estimated that stands of Arundo may use approximately 3 to 10 times as much water per acre as native riparian vegetation (Cal-IPC 2011, Coffman and Ambrose 2011). Because of this, Arundo infestation and the potential water savings benefits of removing Arundo and replacing it with native vegetation have been specifically called out by local Groundwater Sustainability Agencies.
- Reduction in floodplain fire risk (native riparian vegetation is more fire resistant, while Arundo is highly flammable), reducing the threat of fires to infrastructure, agriculture, and communities, including homeless encampments where many fires start.
- Reduction in local flood damage to high-value agriculture and infrastructure (such as bridges and recreational areas) via erosion and debris accumulation.
- Significant benefits to Threatened, Endangered, and other special-status species through habitat enhancement and reduced fire risk.
- Active and passive recreational benefits for human users (i.e., increased access to the river for swimming/wading and the enjoyment of nature, respectively), including various Disadvantaged Communities along the river, provided by restored native habitat.
- A reduction of dense Arundo stands increases visibility for property managers and law enforcement to improve safety for all. Fewer unhoused encampments start or persist, and violent crimes against unhoused are more easily stopped.
- Enhanced cultural resources valued by the Chumash and Fernandeño Tataviam.
- Enhanced water quality.

# 2 NEED FOR A DECISION SUPPORT TOOL

Active intervention is required for effective removal of Arundo from the Santa Clara River watershed. Arundo removal and replacement with native vegetation (via natural recruitment or active planting) will increase the amount of water within the Santa Clara River and its tributaries available for environmental uses, and on a large-scale, provide positive impacts to groundwater levels, groundwater dependent ecosystems, and aquatic and riparian habitats. Stakeholders within the watershed require accurate and up-to-date geospatial data to guide the effective control of Arundo, prioritize areas for its removal, and secure funding for long-term management of this invasive weed. While the accepted best management practice for watershed-wide Arundo eradication is to begin high in the watershed working methodically downstream to the ocean to avoid reinfestation from upstream sources, the absence of funding, political capital, and organizational structure require stakeholders to work opportunistically (see Stillwater Sciences 2011a and Coffman and Ambrose 2011 for additional discussion and guidance on this topic). The Decision Support Tool provides stakeholders with a guiding document (Report), Prioritization Table, and KMZ Map that prioritizes opportunistic, efficient and effective Arundo removal and

management. Using the Decision Support Tool will guide targeted Arundo removal to maximize use of available funds in areas that will result in the greatest benefit.

# 3 METHODS

The Decision Support Tool was developed through assessment of existing information, desktop-based vegetation mapping supported by field-based vegetation surveys, and Geographic Information Systems (GIS) analyses to inform Arundo removal prioritization, as described in Section 4. Together, these components will be managed adaptively to ensure they remain useful as new data become available in the future.

## 3.1 Study Area

The Decision Support Tool Study Area is the active floodplain of the Santa Clara River from the Santa Clara River Estuary in Ventura County to Soledad Canyon in Los Angeles County (57 river miles) and the following tributary extents: Castaic Creek to Castaic Lagoon (5 river miles), San Francisquito Canyon Creek to the USFS boundary (5 river miles), Bouquet Canyon Creek to the USFS boundary (7 river miles), South Fork Santa Clara River to the confluence of Pico and Lyon Canyon creeks (2 river miles), and Mint Canyon Creek to the USFS boundary (6 river miles; Figure 2). The Study Area is split into two segments (i.e., the extent mapped in 2018 and the additional mapping extent) based on vegetation mapping data availability and classification methodology, as described in Section 3.2.

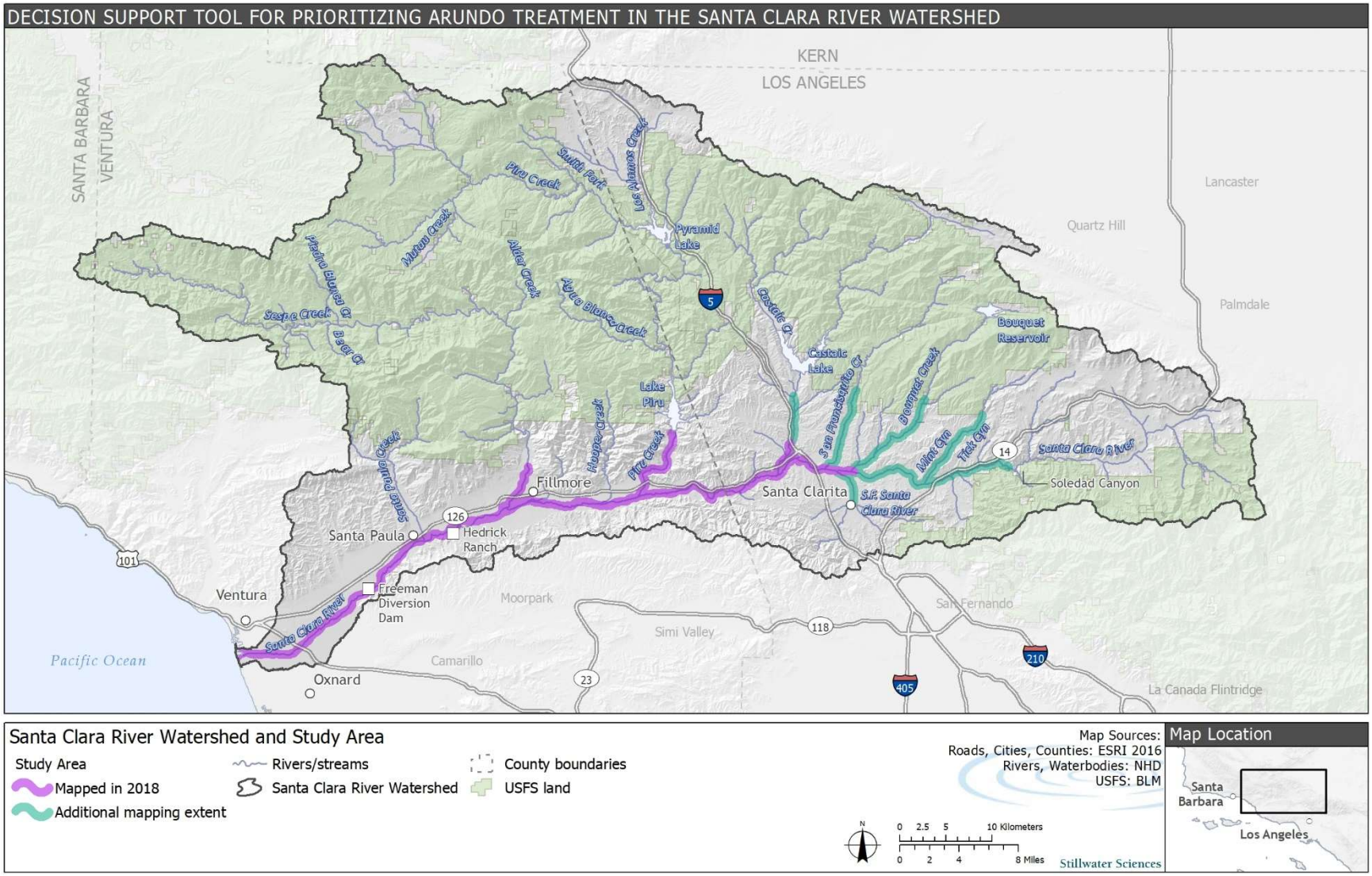


**Figure 2.** Study Area within the Santa Clara River floodplain.

## 3.2 Vegetation Mapping

Existing information relevant to vegetation classification and mapping in the region was gathered and reviewed. The primary vegetation data source was a 2018 vegetation map, as shown in Figure 2, including the mainstem Santa Clara River from the estuary to the confluence with Bouquet Creek, lower Sespe Creek, lower Piru Creek, and lower Castaic Creek (Stillwater Sciences 2019). This mapping utilized the State of California standard vegetation classification system described in *A Manual of California Vegetation* (MCV; CNPS 2022).

Existing vegetation mapping in the additional mapping extent of the Study Area (Figure 2)—including the mainstem Santa Clara River from the confluence with Bouquet Creek to Soledad Canyon, lower Castaic Creek, lower San Francisquito Creek, lower South Fork Santa Clara River, lower Bouquet Canyon Creek, and lower Mint Canyon—was limited to the coarser Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG; USFS 2022) with no available datasets mapped to the State of California standard, MCV. The CALVEG dataset utilizes broader vegetation dominance types (USFS 1981).

The Study Area was divided into two segments—the extent previously mapped in 2018 and the additional mapping extent upstream—based on existing vegetation data availability, such that the majority of the lower watershed (mapped in 2018) is classified using the MCV and the additional mapping extent (in the upper watershed) is classified using CALVEG vegetation dominance types. For each segment and classification system, an initial list of vegetation types that were likely to occur in the Study Area was generated.

### 3.2.1 Desktop-based analysis

A preliminary vegetation map was prepared in GIS using available imagery and existing vegetation map datasets (i.e., Stillwater 2018 mapping and CALVEG). In addition to the 2020 NAIP (USDA-FSA 2020), 2016 NAIP and Google Earth imagery were used during photointerpretation of vegetation types as a reference for less severe drought conditions, and to correct vegetation classification and Arundo cover estimates for areas where Arundo had been removed by fire, scour or control treatments since the 2018 mapping. Other data sources, including a hillshade generated from the National Center for Airborne Laser Mapping 2015 LiDAR (NCALM 2015) data, and base features such as roads and levees, were used to aid the photo interpretation and classification process. Delineation of vegetation boundaries was conducted at on-screen scales between 1:1,200 and 1:5,000.

### 3.2.2 Field-based mapping

The field mapping effort took place during spring, summer, and fall of 2022 and provided a detailed characterization of the vegetation. Surveys focused on the additional mapping extent of the Study Area where limited existing vegetation classification information was available, with additional surveys in the extent previously mapped in 2018 to detect changes to vegetation classification and mapping since prior mapping was completed in 2018. Information collected during this field effort was used to refine vegetation mapping to ensure the photo interpretation process could proceed more accurately (Section 3.2.3). At each field verified location, the site

was either assessed via the comprehensive CNPS vegetation rapid assessment form[1], or using reconnaissance data collection methods where surveyors confirmed or corrected the mapped vegetation type and collected information on the dominant vegetation and invasive species cover.

Field verification surveys validated desktop estimates of non-native cover and, where applicable, informed changes to vegetation classification and polygon boundaries (Figure 3). Field-based data collection focused on Arundo and selected non-native species (i.e., *Tamarisk* spp., *Ricinus communis* [castor bean]) cover estimates. Surveys focused on areas within the Study Area where ambiguous vegetation signatures required ground-truthing and where additional characterization on invasive vegetation was deemed necessary, particularly in areas where the cottonwood and willow overstory was most likely to impair our ability to accurately estimate and map percent cover of Arundo in the understory.

Field crews used the ArcGIS Field Maps application on handheld tablets (Samsung Galaxy Tablet or iPad) to review the preliminary vegetation map and assess the accuracy of the preliminary polygon boundaries and classification. Crews collected GPS data on the tablet to record changes to preliminary mapped polygons. For locations where a CNPS rapid assessment form was collected, a modified version uploaded into ESRI's Survey123 was used; the CNPS reconnaissance field data collection occurred in attribute fields within the ArcGIS Field Maps application.

### 3.2.3 Final map development

Species composition data collected in the field were compiled and reviewed to assign the appropriate vegetation classification to each sampled location in the Study Area. Final vegetation type classifications were appended to the spatial data collected in the field and used in combination with the 2020 NAIP base map imagery to refine the preliminary vegetation map using GIS. This field-based data aided in photointerpretation and extrapolation in areas that that were inaccessible to field crews during the field mapping effort. As described above, the Study Area extent previously mapped in 2018 was classified using the MCV, and additional mapping extent areas were classified using CALVEG vegetation dominance types. Some areas were classified into broader land cover types (e.g., agriculture, developed, riverwash).

After the extent of mapped stands were finalized, percent cover of Arundo within each stand was assigned using a combination of field-based observations and visual photointerpretation of NAIP 2020 aerial imagery. Previous Arundo mapping efforts were also utilized (i.e., Rancho Santa Ana Botanic Garden [RSABG 2015] and the University of California, Santa Barbara [UCSB 2020]) to support estimates where recent on-the-ground data was not available. Cover estimates were assigned using modified Daubenmire classes (<1, 1–5, 5–10, 10–25, 25–50, 50–75, 75–95, and >95% cover). A detailed summary of Arundo cover by river mile is provided in Appendix B.

Plant species nomenclature followed *The Jepson eFlora* (Jepson Flora Project 2022), except where MCV vegetation alliance names referenced older nomenclature. In such instances, the nomenclature used in MCV was retained for the name of the vegetation alliance only, species associates listed within the alliance description followed *Jepson eFlora* nomenclature.

[1] A modified CNPS vegetation rapid assessment field data form (CNPS 2018) was used to document the occurrence, percent cover and strata of dominant and characteristic plant species present, as well as the vegetative cover across six height strata (<0.5 meters [m], 0.5–1 m, 1–2 m, 2–5 m, 5–10 m, and > 5 m).

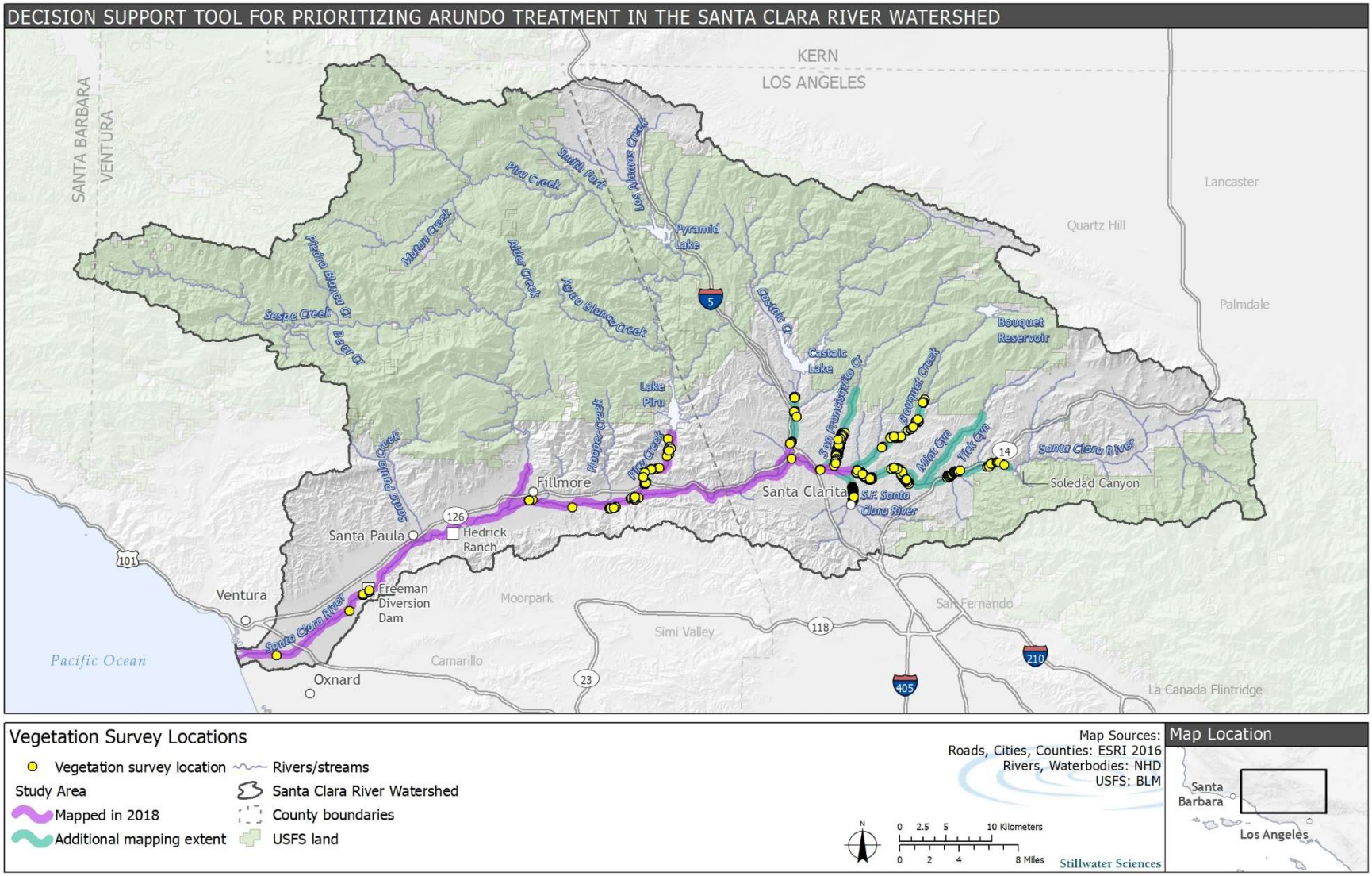


**Figure 3.** Santa Clara River vegetation survey locations.

## 3.3 Arundo Removal Prioritization

Vegetation mapping was combined with existing datasets to create a KMZ Map of the Study Area, as described further below. The KMZ Map was utilized to guide Arundo removal prioritization determinations within the Study Area.

### 3.3.1 Prioritization Analysis

Vegetation mapping was combined with additional spatial data representing fire threat, habitat value, land ownership, and floodplain extent to inform the impact and feasibility of Arundo removal by river mile within the Study Area. Prioritization also considered the likelihood of flood scour or fire wherein mature stands of Arundo would be eradicated by nature and then more easily controlled. Spatial data from existing datasets that covered some or all of the Study Area were incorporated into the prioritization rank and included:

- **Fire threat** (CAL FIRE 2014): represents modeled fire threat based on fire probability and fire hazard; ranks were assigned using 2014 data based on expected fire behavior for unique combinations of topography and vegetative fuels under a given sever weather condition. Ranks of 1 and 2 (low and moderate) have been combined into a "low to moderate" risk category, while ranks of 3, 4, and 5 (high, very high, and extreme) have been combined into a "high" risk category in Appendix A. This fire threat dataset was selected for this analysis because it is modeled continuously throughout the Study Area, where other fire hazard layers (e.g., CAL FIRE's Fire Hazard Severity Zones) are limited to State and Local Responsibility Areas and do not provide hazard values within the floodplain.
- **Southwestern willow flycatcher (SWFL) and yellow-billed cuckoo (YBCU) habitat** (Hall et al. 2020): modeling to predict SWFL and YBCU habitat using Landsat-8 data and mapping techniques to identify riparian and floodplain characteristics suitable for breeding habitat. Used to inform habitat value.
- **Critical Habitat** (USFWS 2022, NMFS 2022): critical habitat designations for species listed under the Endangered Species Act. Used to inform habitat value.
- **California Natural Diversity Database** (CNDDB; CDFW 2022): includes observations for sensitive or special-status plants, wildlife and aquatic and terrestrial communities. Used to inform habitat value.
- **Relative Elevation**: floodplain elevation relative to the channel thalweg; derived from 2015 NCALM LiDAR.
- **Canopy Height**: canopy height model representing height of vegetation above ground surface; derived from 2015 NCALM LiDAR.
- **Land ownership** (BLM 2022, Newhall): data represents public land management agencies and Newhall Land and Farming Company land ownership.
- **Flood reset zone** (Stillwater Sciences 2011a,b): represents the combined flood scour extent from 1994/1995 and 2005 as a proxy for vegetated areas likely to be reset by the next large flood scour event. Limited to the mainstem Santa Clara River.

The KMZ map component of the Decision Support Tool visualizes the prioritization ranking for Arundo removal within the Study Area by river mile, as defined in the Prioritization Table (Section 3.3.2, Appendix A). The KMZ map was developed to be distributed and utilized broadly by stakeholders within the watershed and can be updated as new datasets become available (described in Section 4.1.2 below). The Decision Support Tool is designed to be a living resource

to incorporate additional data and added utility (i.e., an interactive web-based mapping tool), based on additional funding availability.

### 3.3.2 Prioritization Table

The layers listed in Section 3.3.1 were utilized to prioritize Arundo removal within the Study Area. A Prioritization Table (Appendix A) was developed using these layers, in addition to other considerations (e.g., proximity to water inputs such as a tributary or barranca, accessibility, treatment types, etc.) to develop an Arundo removal priority classification for each unit within the Study Area. Columns utilized in the Prioritization Table are discussed further below. The Decision Support Tool does not include cost estimates at this time; Arundo treatment costs by type can be found in the Strategic Plan (Table 2-1, Stillwater Sciences 2011a).

Columns included in the Prioritization Table (Appendix A) are described below.

Location
Classifies whether the unit is along the mainstem Santa Clara River or along a tributary to the Santa Clara River.

River Mile
The unit of distance from the mouth of the Santa Clara River or selected tributaries upstream to the nearest mile.

Arundo Removal Priority
Based on the factors described above and presented in Appendix A, an Arundo removal priority rating was assigned to each river mile using the following scale:

1 = very high priority
2 = high priority
3 = medium priority
4 = low-medium priority
5 = low priority

Areas with substantial amounts of Arundo, high levels of habitat and concerns for protected species, and high fire risk received the highest priority ratings. In contrast, areas with little to no Arundo and limited concerns for protected species and fire hazard received lower priority ratings.

Current conditions & Considerations
Lists general conditions and considerations for the unit. Examples may include proximity to high value habitat, relative elevation, land cover types, land use, and groundwater dependent ecosystem (GDE) information.

Property Ownership
Property ownership of the unit using various publicly available datasets. Where available, detail on the management agency or easement holder was included to support prioritization of units where Arundo removal would be most easily facilitated.

Arundo Inside Primary Flood Reset Zone
The primary flood reset zone is an estimation of the area that is likely to be reset via scour and/or deposition in the next large flood event (i.e., floods with magnitude greater than a 10-year recurrence interval). If prompt action can be taken following larger flood events, Arundo

treatment in this zone will generally require only limited herbicide application to treat new growth from those rhizomes that do remain after a high-flow event. The primary flood reset zone is also the area that is most likely to be successfully revegetated with native species through natural recruitment, rather than expensive active planting, which could be scoured away by a subsequent high-flow event. However, there may be cases where more active removal activities are warranted within the primary flood reset zone (FRZ). For example, if a dense or extensive patch of Arundo in the FRZ is considered to pose a substantial risk of invading or carrying wildfire into adjacent stands of high value natural habitat more immediate action may be prudent to protect existing natural resources and the ecosystem services they provide.

Most Abundant Arundo Cover Class

A percent cover of Arundo presence within the unit. Cover classes were assigned using modified Daubenmire classes (<1, 1–5, 5–10, 10–25, 25–50, 50–75, 75–95, and >95% cover).

Fire Threat

Arundo is highly flammable, and given its shade tolerance, frequently establishes under native riparian vegetation increase fire risk (Stillwater Sciences 2011a). The following provides an explanation of the analysis used to generate the CAL FIRE 2014 fire threat dataset used in the prioritization analysis. It is important to note that while this model accounts for fire spread and severity, it may not accurately capture the risk of fire ignition, a growing concern in the watershed with increased unhoused encampments and the flammability of Arundo frequently adjacent or within encampments.

> *Fire Threat is a combination of two factors: 1) fire probability, or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined to create 5 threat classes ranging from low to extreme. Fire Threat was first developed and introduced for the FRAP California Forest and Range 2003 Assessment. See the on-line technical report Trends in Wildland Fire…for more detailed information on the methodology.*
>
> *Annual probability of fire was classified as either low (return interval >350 yrs), moderate (return interval 250–350 yrs), high (return interval of 150–250 yrs), very high (return interval of 50–150 yrs), or extreme (return interval <50 yrs) to give a measure of the likelihood of fire occurrence (note that these classes differ from earlier versions of Fire Threat).*
>
> *Fuel Rank and Fire Probability were combined into the single measure of Fire Threat, in which areas of very high or extreme Fire Threat are more likely to experience damaging wildfire.*

Protected Species Concerns

Special-status species and habitat (federally and/or state protected species and habitat[2]) concerns within the unit are identified here, using the California Natura Diversity Database (CNDDB; CDFW 2022) and critical habitat layers (USFWS 2022).

[2] Species that are "threatened, rare, or endangered" and have some level of protection from federal and state laws such as species listed as threatened, endangered, proposed threatened, proposed endangered, or a candidate under the Federal Endangered Species Act; listed threatened, endangered, rare, or a candidate species under the California Endangered Species Act; protected under the Native Plant Protection Act for Rare species; classified as a California Department of Fish and Wildlife (CDFW) Species of Special

# 4 RESULTS AND DISCUSSION

## 4.1 Prioritizing Arundo Removal

The results of the prioritization process are provided in Appendix A and the KMZ file (for viewing map layers using Google Earth) that accompanies this report. The results are summarized by river mile segments for the Santa Clara River and lower reaches of the primary tributaries (Sespe, Piru, Castaic, San Francisquito, Bouquet, and Mint Canyon creeks plus the South Fork Santa Clara River). In all, some 60 miles of the mainstem Santa Clara River and 40 miles of tributary reaches were mapped in the Study Area (see Figure 1) and are included in the prioritization tool.

Most of the segments with the highest priority rating for Arundo removal are on the mainstem Santa Clara River, while the lowest priority segments tend to be in the drier reaches of tributaries in the upper watershed. In all, 29 river mile segments (27 on the Santa Clara River mainstem and 2 on Sespe Creek) were classified as very high priority (rating = 1), 18 segments (12 on the mainstem and 6 on tributaries) were classified as high priority (rating = 2), 16 (12 on mainstem, 4 on tributaries) as medium priority (rating = 3), 23 (9 on mainstem, 14 on tributaries) as medium to low (rating = 4), and 14 (1 on mainstem, 13 on tributaries) as low priority (rating = 5).

The results of the mapping of Arundo percent cover throughout the Study Area are presented in Appendix B. In all, 14,519 acres of vegetation were mapped in the Study Area. Approximately 59.8% (8687 acres) of the Study Area was mapped with more than a trace level of Arundo (from 1-100% cover), while 40.2% (5,832 acres) was mapped as having essential no Arundo (0-1% cover of Arundo).Thus, nearly 60% of the Study Area has sufficient Arundo cover (>1%) to require some level treatment to remove or eradicate Arundo. Of this area, 1.4% (2535 acres) was mapped in the 1-5% cover class, 13.2% (1920 acres) in the 5-10% cover class, 11.1% (1606 acres) in the 10-25% cover class, 12.2% (1777 acres) in the 25-50% cover class., and 7.1% of the Study Area (1,030 acres) was mapped at greater than 50% cover of Arundo (493 acres with 50-75% cover, 489 acres with 75-95% cover, and 48 acres with >95% cover).

Given the constraints of available funding and willing landowners, this Decision Support Tool should be used to identify the highest priority areas for near-term removal of Arundo to protect sensitive species, conserve natural biodiversity, reduce wildfire risk, and help maintain local water supplies for environmental needs and human use. The information in the tool can also be used to estimate costs and develop strategies for longer term, watershed-wide program for control and, ideally, eradication of Arundo in the Santa Clara River Watershed.

## 4.2 Future Vision

Because of the size and complexity of the watershed, the large number of sensitive species and habitats within the watershed, and the cultural importance of this watershed, new data are consistently being collected and released that may be important in the context of the Decision

Concern; classified as a CDFW Fully Protected species; listed by the California Native Plant Society (CNPS) ranking as rare or endangered on List 1A, 1B, or 2; listed by the CNPS on List 3 or 4; state of federally protected species habitat such as critical habitat; riparian habitats regulated under California Fish and Game Code; and CDFW Natural Communities of Special Concern.

Support Tool. For example, some smaller patches of Arundo are known to occur in various tributaries and the mainstem upstream of the current Study Area. Data on these areas should be added in the future. Any relevant updates to data should be incorporated into the Decision Support Tool to keep it a timely and useful resource. The Report, Prioritization Table, and KMZ Map will be a publicly available, 'living' resource that can be updated with any relevant information that is released in the future. The frequency of future updates and addition of extra features, such as a user-friendly public web dashboard, will depend on availability of future funding.

The total cost for watershed-wide removal of Arundo is in the tens of millions of dollars. The cost per acre for Arundo removed varies substantially depending on site conditions, control methods, and whether native vegetation is likely to recover on its own or if active revegetation is required to restore desired riparian habitat (for further information on cost factors, see discussions in the Strategic Plan, as well as Cal-IPC 2011 and online at www.restorethescr.com).

Application of the Decision Support Tool will involve outreach to landowners to identify which of the high priority reaches might be most suitable for near-term implementation (Arundo removal, repeated monitoring and retreatment, and, if needed, revegetation with natives) as funding becomes available, and which might need to wait for later phases. As a practical matter, some lower priority areas might be bundled with high priority areas to create a single, larger project to promote more efficient and cost-effective removal of Arundo and enhancement of native riparian vegetation. For example, expanding a project treatment zone to include areas upstream of high priority reaches will help prevent future reinfestation and protect the investment made to rehabilitate high priority sites.

We also strongly recommend the further development of a rapid response framework (strategy, funding, regulatory compliance, and permitting), as discussed in the Strategic Plan, to promote an effective approach to Arundo treatment following floods and wildfires. Higher resolution remote sensing data that is now available can facilitate more rapid assessment of flood and wildfire impact, improving our ability to plan and implement rapid response actions. The combination of the current state program to facilitate regulatory approval for restoration projects (Cutting the Green Tape, see https://wildlife.ca.gov/Conservation/Watersheds/Cutting-Green-Tape) with the recent high flows in January through March of 2023, which have reset the river to an extent not seen since the 2005 flood events, provides a unique window of opportunity to develop and implement such a framework that allows a rapid response to conduct very cost-effective Arundo removal following a major disturbance.

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# Appendices

# Appendix A

# Santa Clara River Arundo Removal Prioritization Table

| Location | River Mile (downstream to upstream) | Arundo Removal Priority Level (1: high, 5: low) | Current Conditions & Considerations (i.e., invasive adjacency to high value habitat, relative elevation, Arundo cover, land use, groundwater dependent ecosystems [GDEs]) | Property Ownership[1, 2] | Arundo Inside Primary Flood Reset Zone (yes/no) | Most Abundant Arundo Cover Class | Fire Threat[3] | Protected Species Concerns[4] (SS: sensitive species; SNC: sensitive natural community; CH: critical habitat) |
|---|---|---|---|---|---|---|---|---|
| Mainstem | Estuary/beach | 1 | estuary and seasonal sand bar; wetland complex with some Arundo; riparian forest (arroyo willow and black cottonwood) with some Arundo; state park developed area (campground, parking) with some nonnative species (e.g., ice plant, *Myoporum* spp.); low-moderate fire hazard; GDE | Private, CA Dept. of Parks and Rec, City and County of Ventura | Y | 6% of unit has 1-5% Arundo cover | low to moderate | 16 SS; 3 SNC; 4 CH |
| | 0 | 1 | wetland complex with some Arundo; riparian forest (arroyo willow and black cottonwood) with some Arundo; low-moderate fire hazard; GDE | Private, CA Dept. of Parks and Rec, City of Ventura | Y | 13% of unit has 1-5% Arundo cover | low to moderate | 10SS; 2 SNC; 3 CH |
| | 1 | 1 | Riparian forest and scrub along both banks; with various levels of Arundo; GDE | Private, BLM, The Nature Conservancy (TNC) | Y | 40% of unit has 25-50% Arundo cover | low to moderate | 5 SS; 1 SNC; 2 CH |
| | 2 | 2 | Riparian forest and scrub along both banks; with various levels of Arundo; low-moderate fire hazard; GDE | Private, City of Ventura, TNC | Y | 31% of unit has 25-50% Arundo cover | low to moderate | 6 SS; 1 SNC; 1 CH |
| | 3 | 2 | Riparian forest and scrub along both banks; with various levels of Arundo including some dense patches; low-moderate fire hazard; GDE | Private, City of Ventura | Y | 24% of unit has 10-25% Arundo cover | low to moderate | 6 SS; 1 SNC; 1 CH |
| | 4 | 3 | Riparian woodland mainly along north bank, mixed with riparian shrubland; with various levels of Arundo including some dense patches; low-moderate fire hazard; GDE | Private, City of Ventura, TNC | Y | 29% of unit has 25-50% Arundo cover | low to moderate | 8 SS; 1 SNC; 1 CH |
| | 5 | 3 | Riparian woodland mainly along north bank, mixed with riparian shrubland; with various levels of Arundo; low-moderate fire hazard; GDE | Private, TNC | Y | 49% of unit has 5-10% Arundo cover | low to moderate | 3 SS; 1 SNC; 1 CH |
| | 6 | 3 | Riparian forest and scrub in narrow stringers along both banks; with various levels of Arundo including some dense patches; low-moderate fire hazard; GDE | Private, City of Ventura, TNC | Y | 42% of unit has 5-10% Arundo cover | low to moderate | 3 SS; 1 SNC; 1 CH |
| | 7 | 3 | Limited willow woodland, mainly riparian shrublands and riverwash; Scattered patches of Arundo; low-moderate fire hazard; | Private | Y | 20% of unit has 1-5% Arundo cover | low to moderate | 4 SS; 1 SNC; 1 CH |
| | 8 | 2 | Stringer of willow woodland and Arundo along N bank (surface water input from barranca), shrublands and riverwash; variable Arundo; variable fire hazard; | Private, TNC | Y | 48% of unit has 5-10% Arundo cover | low to moderate & high | 4 SS; 1 SNC; 1 CH |
| | 9 | 1 | Well-developed willow woodlands in wetter areas, mixed with shrublands and riverwash; variable fire hazard; GDE | Private, TNC | Y | 28% of unit has 25-50% Arundo cover | low to moderate & high | 3 SS; 1 SNC; 1 CH |
| | 10 | 1 | Well-developed willow woodlands in wetter areas, mixed with shrublands and riverwash; Arundo scattered throughout and in smaller dense patches; variable fire hazard; TNC has already conducted Arundo removal in some areas; GDE | Private, TNC | Y | 31% of unit has 25-50% Arundo cover | low to moderate & high | 4 SS; 1 SNC; 1 CH |
| | 11 | 2 | Well-developed willow woodlands in wetter areas, mixed with shrublands and riverwash; Arundo scattered throughout and in smaller dense patches; variable fire hazard; TNC has already conducted Arundo removal in some areas; GDE | Private, TNC | Y | 34% of unit has 5-10% Arundo cover | low to moderate & high | 7 SS; 1 SNC; 1 CH |
| | 12 | 2 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; | Private, TNC | Y | 40% of unit has 25-50 % Arundo cover | low to moderate & high | 7 SS; 1 SNC; 1 CH |
| | 13 | 2 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; | Private, TNC | Y | 22% of unit has 1-5% Arundo cover | low to moderate & high | 7 SS; 1 SNC; 1 CH |
| | 14 | 2 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; | Private, TNC | Y | 31% of unit has 1-5% Arundo cover | low to moderate & high | 8 SS; 1 SNC; 1 CH |
| | 15 | 2 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; | Private, TNC | Y | 23% of unit has 50-75% Arundo cover | low to moderate & high | 11 SS; 1 SNC; 1 CH |
| | 16 | 1 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; downstream end of East Grove GDE -with some high value habitat | Private, TNC | Y | 30% of unit has 25-50% Arundo cover | low to moderate & high | 5 SS; 1 SNC; 1 CH |
| | 17 | 1 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; core of East Grove GDE -with some very high value habitat; proposed mitigation bank; edge of Hedrick Ranch Natural Area (HRNA) | Private, Friends of the SCR | Y | 35% of unit has 5-10% Arundo cover | low to moderate & high | 5 SS; 1 SNC; 1 CH |
| | 18 | 1 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in patches; variable fire hazard; core of East Grove GDE -with some very high value habitat; some Arundo removal has already occurred in this area; HRNA | Private, Friends of the SCR, TNC | Y | 41% of unit has 5-10% Arundo cover | low to moderate & high | 6 SS; 1 SNC; 1 CH |
| | 19 | 1 | Mixture of riparian woodlands and shrublands; variable Arundo - scattered and in some large patches; variable fire hazard; upstream edge of East Grove GDE; adjacent to very high value habitat | Private, Friends of the SCR, TNC | Y | 46% of unit has 5-10% Arundo cover | low to moderate & high | 3 SS; 1 SNC; 1 CH |

| Location | River Mile (downstream to upstream) | Arundo Removal Priority Level (1: high, 5: low) | Current Conditions & Considerations (i.e., invasive adjacency to high value habitat, relative elevation, Arundo cover, land use, groundwater dependent ecosystems [GDEs]) | Property Ownership[1, 2] | Arundo Inside Primary Flood Reset Zone (yes/no) | Most Abundant Arundo Cover Class | Fire Threat[3] | Protected Species Concerns[4] (SS: sensitive species; SNC: sensitive natural community; CH: critical habitat) |
|---|---|---|---|---|---|---|---|---|
| Mainstem (cont.) | 20 | 3 | Mixture of riparian shrublands (mulefat, scalebroom, and California sagebrush) and riverwash; Arundo scattered and in mod-dense patches; variable fire hazard | Private, TNC | Y | 41% of unit has 5-10% Arundo cover | low to moderate & high | 3 SS; 1 SNC; 1 CH |
| | 21 | 3 | Mixture of riparian shrublands (mulefat, scalebroom, and California sagebrush) and riverwash; Arundo scattered and in mod-dense patches; variable fire hazard | Private, TNC | Y | 33% of unit has 25-50% Arundo cover | low to moderate & high | 8 SS; 1 SNC; 1 CH |
| | 22 | 2 | Mixture of riparian shrublands (mulefat, scalebroom, and California sagebrush) and riverwash; Arundo scattered and in mod-dense patches; variable fire hazard | Private, TNC, City of Fillmore | Y | 39% of unit has 25-50% Arundo cover | high | 7 SS; 1 SNC; 1 CH |
| | 23 | 1 | Mixed natural habitat; high Arundo; high fire hazard; proximity to housing development | Private, City of Fillmore | Y | 62% of unit has 25-50% Arundo cover | low to moderate & high | 9 SS; 1 SNC; 1 CH |
| | 24 | 1 | Mixed natural habitat; high Arundo; high fire hazard; proximity to Sespe Cienega Ecological Reserve (CSER) restoration site | Private, CDFW, City of Fillmore | Y | 76% of unit has 25-50% Arundo cover | high | 8 SS; 1 SNC; 1 CH |
| | 25 | 1 | Mixed natural habitat; high Arundo; high fire hazard; proximity to Sespe Cienega Ecological Reserve (CSER) restoration site | Private, CDFW, TNC | Y | 37% of unit has 75-95% Arundo cover | high | 4 SS; 2 SNC; 1 CH |
| | 26 | 1 | Mixed natural habitat; high Arundo; high fire hazard; proximity to CSER restoration site | Private, TNC | Y | 43% of unit has 10-25% Arundo cover | high | 4 SS; 2 SNC; 1 CH |
| | 27 | 3 | Alluvial scrub; moderate Arundo; low-moderate fire hazard | Private | Y | 50% of unit has 1-5% Arundo cover | low to moderate & high | 2 SS; 1 SNC; 1 CH |
| | 28 | 3 | Alluvial scrub; moderate Arundo; low-moderate fire hazard | Private, TNC | Y | 40% of unit has 5-10% Arundo cover | low to moderate & high | 2 SS; 1 SNC; 1 CH |
| | 29 | 3 | Alluvial scrub; moderate Arundo; low-moderate fire hazard | Private, TNC | Y | 46% of unit has 5-10% Arundo cover | low to moderate & high | 3 SS; 1 SNC; 1 CH |
| | 30 | 3 | Alluvial scrub; moderate Arundo; low-moderate fire hazard | Private (Newhall), TNC | Y | 52% of unit has 1-5% Arundo cover | majority no threat, some high | 5 SS; 1 SNC; 1 CH |
| | 31 | 3 | Alluvial scrub; moderate Arundo; low-moderate fire hazard | Private (Newhall), TNC | Y | 63% of unit has 1-5% Arundo cover | low to moderate | 3 SS; 1 SNC; 1 CH |
| | 32 | 3 | Alluvial scrub; moderate Arundo; low-moderate fire hazard | Private (Newhall), TNC | Y | 60% of unit has 1-5% Arundo cover | low to moderate & high | 4 SS; 1 SNC; 2 CH |
| | 33 | 2 | Mid riparian - Alluvial scrub in Del Valle GDE transition zone; moderate high Arundo; low-moderate fire hazard | Private (Newhall), TNC | Y | 32% of unit has 1-5 % Arundo cover | low to moderate & high | 9 SS; 1 SNC; 2 CH |
| | 34 | 1 | Mixed natural habitat very high value; Del Valle GDE; moderate high Arundo; low-moderate to some high fire hazard | Private (Newhall) | Y | 38% of unit has 50-75% Arundo cover | low to moderate & high | 10 SS; 2 CH |
| | 35 | 1 | Mixed natural habitat very high value; Del Valle GDE moderate high Arundo; high fire hazard | Private (Newhall) | Y | 38% of unit has 50-75% Arundo cover | high | 11 SS; 2 CH |
| | 36 | 1 | Mixed natural habitat very high value; Del Valle GDE; moderate high Arundo; high fire hazard | Private (Newhall) | Y | 37% of unit has 1-5% Arundo cover | high | 11 SS; 2 CH |
| | 37 | 1 | Mixed natural habitat high value; Del Valle GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 30% of unit has 5-10% Arundo cover | high | 7 SS; 2 CH |
| | 38 | 1 | Mixed natural habitat high value; GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 24% of unit has 1-5% Arundo cover | high | 6 SS; 2 CH |
| | 39 | 1 | Mixed natural habitat high value; GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 59% of unit has 10-25% Arundo cover | high | 7 SS; 2 CH |
| | 40 | 1 | Mixed natural habitat high value; GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 52% of unit has 50-75% Arundo cover | high | 6 SS; 3 CH |
| | 41 | 1 | Mixed natural habitat very high value; GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 35% of unit has 25-50% Arundo cover | high | 12 SS; 1 SNC; 3 CH |
| | 42 | 1 | Mixed natural habitat very high value; GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 28% of unit has 10-25% Arundo cover | high | 14 SS; 1 SNC; 3 CH |
| | 43 | 1 | Mixed natural habitat very high value; GDE; high Arundo; high fire hazard | Private (Newhall) | Y | 38% of unit has 25-50% Arundo cover | high | 13 SS; 1 SNC; 3 CH |
| Mainstem (cont.) | 44 | 1 | Mixed natural habitat very high value; GDE; high Arundo; high fire hazard | Private (Newhall), CDFW | Y | 66% of unit has 25-50% Arundo cover | high | 12 SS; 1 SNC; 3 CH |

| Location | River Mile (downstream to upstream) | Arundo Removal Priority Level (1: high, 5: low) | Current Conditions & Considerations (i.e., invasive adjacency to high value habitat, relative elevation, Arundo cover, land use, groundwater dependent ecosystems [GDEs]) | Property Ownership[1, 2] | Arundo Inside Primary Flood Reset Zone (yes/no) | Most Abundant Arundo Cover Class | Fire Threat[3] | Protected Species Concerns[4] (SS: sensitive species; SNC: sensitive natural community; CH: critical habitat) |
|---|---|---|---|---|---|---|---|---|
| | 45 | 1 | Mixed natural habitat very high value; GDE; moderate-high Arundo; high fire hazard; adjacent to high value habitat downstream | Private (Newhall), CDFW, City of Santa Clarita | Y | 27% of unit has 25-50% Arundo cover | low to moderate & high | 11 SS; 1 SNC; 2 CH |
| | 46 | 1 | Mixed natural habitat high value; GDE; moderate-high Arundo; low-high fire hazard; adjacent to high value habitat downstream | Private, CDFW, City of Santa Clarita | Y | 22% of unit has 25-50% Arundo cover | low to moderate & high | 7 SS; 1 SNC; 1 CH |
| | 47 | 2 | Mixed natural habitat high value; GDE; moderate Arundo; low-high fire hazard; adjacent to high value habitat downstream | Private, CDFW, City of Santa Clarita | Y | 24% of unit has 1-5% Arundo cover | low to moderate & high | 7 SS; 1 SNC; |
| | 48 | 5 | Alluvial and riparian scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, CDFW, City of Santa Clarita | N | 100% of unit has <1% Arundo cover | low to moderate | 6 SS; 1 SNC; |
| | 49 | 4 | Alluvial and riparian scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, CDFW, City of Santa Clarita | Y | 8% of unit has 1-5% Arundo cover | low to moderate & high | 7 SS; 1 SNC; |
| | 50 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, CDFW, City of Santa Clarita | Y | 2% of unit has 1-5% Arundo cover | low to moderate | 4 SS; 2 SNC; |
| | 51 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, City of Santa Clarita | Y | 2% of unit has 1-5% Arundo cover | low to moderate | 2 SS; 1 SNC |
| | 52 | 5 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, Mountain Recreation and Conservation Authority (MRCA) | N | 100% of unit has <1% Arundo cover | majority no threat, some high | 3 SS; 1 SNC |
| | 53 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, City of Santa Clarita | Y | 19% of unit has 1-5% Arundo cover | low to moderate | 3 SS; 1 SNC |
| | 54 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, MRCA, City of Santa Clarita | Y | 27% of unit has 1-5% Arundo cover | low to moderate | 7 SS; 1 SNC; |
| | 55 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, City of Santa Clarita | Y | 52% of unit has 1-5% Arundo cover | low to moderate | 7 SS; 1 SNC; |
| | 56 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private, City of Santa Clarita | Y | 27% of unit has 1-5% Arundo cover | low to moderate & high | 1 SNC |
| | 57 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private | Y | 21% of unit has 1-5% Arundo cover | low to moderate & high | 1 SNC |
| | 58 | 4 | Alluvial scrub habitat values; little to no Arundo; low-moderate fire hazard | Private | Y | 35% of unit has 1-5% Arundo cover | low to moderate & high | 1 SS; 1 SNC; 1 CH |
| | 59 | 2 | Transition from mixed rip woodland to alluvial scrub; likely GDE; low-moderate Arundo; low-high fire hazard | Private, MRCA, City of Santa Clarita | Y | 25% of unit has 10-25% Arundo cover | low to moderate & high | 5 SS; 2 SNC; 1 CH |
| | 60 | 1 | Mixed riparian woodland high value; likely GDE; low-moderate Arundo; high fire hazard | Private, MRCA | Y | 100% of unit has 10-25% Arundo cover | high | 6 SS; 2 SNC; 1 CH |
| Sespe Creek | 0 | 1 | Valuable alluvial scrub habitat; significant amounts of Arundo; high fire hazard | Private | N/A | 70% of unit has 25-50% Arundo cover | high | 8 SS; 1 SNC; 1 CH |
| | 1 | 1 | Valuable alluvial scrub habitat; significant Arundo; high fire hazard | Private | N/A | 32% of unit has 5-10 % Arundo cover | low to moderate & high | 8 SS; 1 SNC; 1 CH |
| | 2 | 2 | Mixed shrubland with patches of riparian woodland; low-moderate Arundo; variable fire hazard | Private | N/A | 23% of unit has 5-10% Arundo cover | low to moderate & high | 8 SS; 1 SNC |
| | 3 | 5 | Mixed shrubland with patches of riparian woodland; little or no Arundo; variable fire hazard | Private | N/A | 8% of unit has 1-5% Arundo cover | low to moderate & high | 4 SS; 1 SNC |

| Location | River Mile (downstream to upstream) | Arundo Removal Priority Level (1: high, 5: low) | Current Conditions & Considerations (i.e., invasive adjacency to high value habitat, relative elevation, Arundo cover, land use, groundwater dependent ecosystems [GDEs]) | Property Ownership[1, 2] | Arundo Inside Primary Flood Reset Zone (yes/no) | Most Abundant Arundo Cover Class | Fire Threat[3] | Protected Species Concerns[4] (SS: sensitive species; SNC: sensitive natural community; CH: critical habitat) |
|---|---|---|---|---|---|---|---|---|
| Piru Creek | 0 | 4 | Riparian (mainly scalebroom) shrubland; sparse Arundo; low-high fire hazard | Private, TNC | N/A | 25% of unit has 1-5% Arundo cover | low to moderate & high | 3 SS; 1 SNC; 1 CH |
| | 1 | 4 | Mixed riparian woodland and shrubland; sparse Arundo; low-high fire hazard | Private, County of Ventura | N/A | 23% of unit has 1-5% Arundo cover | low to moderate & high | 3 SS; 1 SNC; 1 CH |
| | 2 | 4 | Mixed riparian woodland and shrubland; sparse Arundo; high fire hazard | Private | N/A | 20% of unit has 1-5% Arundo cover | high | 1 SS; 1 SNC; 1 CH |
| | 3 | 5 | Cottonwood-willow woodland, riparian shrubland; very little Arundo; high fire hazard | Private | N/A | 1% of unit has 1-5% Arundo cover | high | 1 SS; 1 SNC; 1 CH |
| | 4 | 4 | Cottonwood-willow woodland, riparian shrubland; low Arundo; high fire hazard | Private | N/A | 16% of unit has 1-5% Arundo cover | high | 1 SS; 2 SNC; 1 CH |
| | 5 | 5 | Cottonwood-willow woodland, riparian shrubland; no Arundo; high fire hazard | Private | N/A | 100% of unit has <1% Arundo cover | high | 3 SS; 3 SNC; 1 CH |
| Castaic Creek | 0 | 2 | Various riparian shrubland alliances with patches of cottonwood; likely GDE; low-moderate Arundo; high fire risk | Private (Newhall) | N/A | 39% of unit has 5-10% Arundo cover | high | 5 SS; 1 SNC; 3 CH |
| | 1 | 2 | Fremont cottonwood woodland, riparian shrubland; likely GDE; some Arundo and tamarisk patches; high fire hazard | Private (Newhall) | N/A | 34% of unit has 5-10% Arundo cover | high | 6 SS; 1 SNC; 2 CH |
| | 2 | 2 | Upstream riparian shrubland transitions to Fremont cottonwood woodland; likely GDE; patches of Arundo and tamarisk; high fire hazard | Private (Newhall) | N/A | 53% of unit has 10-25% Arundo cover | high | 4 SS; 1 SNC; 2 CH |
| | 3 | 5 | Alluvial scrub and riparian shrub; low-moderate Arundo; variable fire hazard | Private | N/A | 2% of unit has 5-10% Arundo cover | majority no threat, some high | 2 SS; 2 SNC |
| | 4 | 4 | Alluvial scrub and riparian shrub; low-moderate Arundo; some tamarisk; high fire hazard | Private, County of Los Angeles | N/A | 17% of unit has 5-10% Arundo cover | high | 6 SS; 2 SNC |
| | 5 | 4 | Alluvial scrub and riparian shrub; low-moderate Arundo; some tamarisk; high fire hazard | Private, County of Los Angeles, DWR | N/A | 16% of unit has 5-10% Arundo cover | high | 7 SS; 1 SNC |
| San Francisquito Creek | 0 | 2 | high native habitat value, proximity to very high value habitat in mainstem; likely GDE; scattered Arundo; variable fire hazard | Private, CDFW, City of Santa Clarita | N/A | 29% of unit has 1-5% Arundo cover | low to moderate & high | 8 SS |
| | 1 | 2 | proximity to very high value habitat in mainstem; likely GDE; moderate scattered Arundo; some tamarisk; high fire hazard | Private, CDFW, City of Santa Clarita | N/A | 38% of unit has 1-5% Arundo cover | high | 4 SS; 1 SNC |
| | 2 | 3 | Transition from mixed rip woodland to alluvial scrub; potential GDE; low-moderate Arundo; high fire hazard | Private, CDFW, MRCA, County of Los Angeles | N/A | 40% of unit has 1-5% Arundo cover | high | 4 SS |
| | 3 | 3 | Alluvial scrub and riparian shrub; low-moderate Arundo; high fire hazard | Private, City of Santa Clarita, MRCA | N/A | 26% of unit has 1-5% Arundo cover | high | 4 SS |
| | 4 | 4 | Alluvial scrub and riparian shrub; low-moderate Arundo; high fire hazard | Private, City of Santa Clarita | N/A | 6% of unit has 1-5% Arundo cover | high | 2 SS |
| | 5 | 4 | Alluvial scrub and riparian shrub; low-moderate Arundo; high fire hazard | Private | N/A | 15% of unit has 1-5% Arundo cover | high | 3 SS |
| South Fork Santa Clara River | 0 | 4 | Alluvial and riparian scrub/shrub (scalebroom, big sagebrush, coastal sage scrub) mixed with Fremont cottonwood and willows; very little Arundo; little fire hazard; potential GDE | Private, CDFW | N/A | 12% of unit has 1-5% Arundo cover | low to moderate | 6 SS |
| | 1 | 4 | Alluvial scrub, scattered patches of black cottonwoods and willows and mixed rip shrubland; little or no Arundo; limited fire hazard; potential GDE | Private, CDFW | N/A | 21% of unit has 1-5% Arundo cover | low to moderate | 5 SS |
| | 2 | 5 | Alluvial scrub, scattered patches of black cottonwoods and willows and mixed rip shrubland; little or no Arundo; limited fire hazard | Private, CDFW | N/A | 100% of unit has <1% Arundo cover | low to moderate | 6 SS |

| Location | River Mile (downstream to upstream) | Arundo Removal Priority Level (1: high, 5: low) | Current Conditions & Considerations (i.e., invasive adjacency to high value habitat, relative elevation, Arundo cover, land use, groundwater dependent ecosystems [GDEs]) | Property Ownership[1, 2] | Arundo Inside Primary Flood Reset Zone (yes/no) | Most Abundant Arundo Cover Class | Fire Threat[3] | Protected Species Concerns[4] (SS: sensitive species; SNC: sensitive natural community; CH: critical habitat) |
|---|---|---|---|---|---|---|---|---|
| Bouquet Canyon | 0 | 3 | near SCR confluence native habitat value; proximity to high value habitat in mainstem; high fire risk; potential GDE | Private, CDFW, City of Santa Clarita | N/A | 45% of unit has 5-10% Arundo cover | high | 4 SS; 1 SNC |
| | 1 | 5 | channelized; very little vegetation | Private, Castaic Lake Water Agency | N/A | 100% of unit has <1% Arundo cover | low to moderate | 3 SS |
| | 2 | 5 | channelized; limited vegetation | Private | N/A | 7% of unit has 5-10% Arundo cover | n/a | 3 SS |
| | 3 | 5 | channelized; limited vegetation | Private | N/A | 36% of unit has 1-5% Arundo cover | high | 3 SS |
| | 4 | 3 | narrow channel with sparse woody vegetation and grassland, with broader floodplain and mixed riparian woodland and shrubland at downstream end; scattered Arundo patches; high fire hazard | Private | N/A | 13% of unit has 25-50% Arundo cover | high | 2 SS; 1 SNC |
| | 5 | 5 | Narrow channel with some areas of broader floodplain; mixed riparian shrub and scalebroom/alluvial scrub; | Private | N/A | 100% of unit has <1% Arundo cover | high | 5 SS; 1 SNC |
| | 6 | 4 | Scattered patches of riparian woodland, grasses and forbs, and riparian and scalebroom alluvial scrub; Arundo in scattered patches; high fire hazard | Private | N/A | 1% of unit has 25-50% Arundo cover | high | 4 SS; 1 SNC |
| | 7 | 4 | Scattered patches of riparian woodland, grasses and forbs, and riparian and scalebroom alluvial scrub; limited Arundo; high fire hazard | Private, USFS | N/A | 2% of unit has 1-5% Arundo cover | high | 3 SS; 1 SNC |
| Mint Canyon | 0 | 5 | channelized; no vegetation | Private | N/A | 100% of unit has <1% Arundo cover | no threat | 6 SS |
| | 1 | 5 | channelized; very limited vegetation no; fire hazard | Private, BLM | N/A | 100% of unit has <1% Arundo cover | no threat | 6 SS; 1 SNC |
| | 2 | 4 | Narrow channel and riparian zone; mixed riparian woodland and shrubland; low-moderate Arundo; low to moderate fire hazard | Private | N/A | 22% of unit has 5-10% Arundo | low to moderate | 5 SS; 1 SNC |
| | 3 | 5 | Narrow channel and riparian zone; alluvial and riparian scrub; limited little to no Arundo; high fire hazard | Private | N/A | 5% of unit has 5-10% Arundo | high | 4 SS |
| | 4 | 5 | Narrow channel and riparian zone; alluvial and riparian scrub; limited Arundo; high fire hazard | Private | N/A | 5% of unit has 1-5% Arundo cover | high | 4 SS |
| | 5 | 4 | Narrow channel and riparian zone; alluvial and riparian scrub; limited Arundo; high fire hazard | Private | N/A | 63% of unit has 1-5% Arundo cover | high | 4 SS |
| | 6 | 5 | Narrow channel and riparian zone; alluvial and riparian scrub; little to no Arundo; high fire hazard | Private | N/A | 100% of unit has <1% Arundo cover | high | 4 SS |

[1] BLM 2022
[2] GreenInfo Network 2022a, b
[3] CAL FIRE 2014
[4] Special-status species and sensitive natural communities (CNDDB, CDFW 2022); critical habitat (USFWS 2022)

# Appendix B

# Santa Clara River Arundo Mapping Summary

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Santa Clara River | Estuary/ beach | Within FRZ | 98.4 | 7.1 | 9.1 | 3.5 | 0.2 | | <0.1 | | 11% | 1117.31 |
| | | Outside FRZ | 820.9 | 57.1 | 61.5 | 26.9 | 21.5 | 1.8 | 5.7 | 3.6 | 89% | |
| | 0 | Within FRZ | 48.0 | 2.3 | 7.6 | 39.1 | 24.1 | | 0.6 | | 27% | 454.56 |
| | | Outside FRZ | 223.3 | 58.8 | 24.7 | 0.1 | 5.3 | 19.9 | 0.9 | | 73% | |
| | 1 | Within FRZ | 24.5 | 28.8 | 1.9 | | 38.5 | | 5.7 | | 56% | 177.55 |
| | | Outside FRZ | 17.3 | 3.1 | 13.0 | | 34.1 | | 9.5 | 1.1 | 44% | |
| | 2 | Within FRZ | 9.3 | 9.6 | 4.4 | 24.0 | 29.2 | 3.8 | | | 30% | 268.11 |
| | | Outside FRZ | 103.5 | 9.2 | 5.3 | | 49.2 | 10.8 | 9.9 | | 70% | |
| | 3 | Within FRZ | 11.1 | 5.0 | 12.2 | 52.3 | 2.2 | 0.1 | 0.0 | | 38% | 221.12 |
| | | Outside FRZ | 76.5 | 10.5 | 9.1 | 2.6 | 27.9 | 8.4 | 3.2 | | 62% | |
| | 4 | Within FRZ | 59.1 | 17.6 | 21.8 | 9.3 | 42.6 | 0.7 | 10.9 | | 86% | 189.24 |
| | | Outside FRZ | 11.8 | 2.7 | 0.8 | 4.1 | 6.9 | 0.9 | | | 14% | |
| | 5 | Within FRZ | 33.3 | 3.3 | 73.9 | | 12.5 | 1.0 | 6.0 | | 91% | 142.21 |
| | | Outside FRZ | 5.5 | 0.8 | 1.0 | | 3.4 | | 1.6 | | 9% | |
| | 6 | Within FRZ | 50.5 | 16.8 | 84.6 | 2.1 | 0.1 | | 0.5 | | 70% | 220.96 |
| | | Outside FRZ | 28.5 | 12.7 | 12.6 | 6.5 | 3.8 | | 2.3 | | 30% | |
| | 7 | Within FRZ | 47.0 | 19.3 | 16.5 | 1.2 | 5.1 | | 1.4 | | 54% | 167.41 |
| | | Outside FRZ | 25.4 | 14.4 | 4.0 | 21.5 | 3.4 | | 8.3 | | 46% | |
| | 8 | Within FRZ | 58.3 | 3.7 | 90.0 | 7.3 | 3.6 | | 0.5 | | 63% | 258.95 |
| | | Outside FRZ | 17.3 | 1.2 | 33.3 | 11.7 | 4.2 | | 27.8 | | 37% | |
| | 9 | Within FRZ | 26.0 | 9.3 | 35.8 | | 44.2 | 9.1 | 7.2 | | 77% | 170.83 |
| | | Outside FRZ | 16.6 | 2.5 | 2.8 | | 3.7 | 2.3 | 11.4 | | 23% | |
| | 10 | Within FRZ | 22.6 | 5.1 | 9.8 | 1.3 | 39.6 | 16.4 | | | 53% | 179.87 |
| | | Outside FRZ | 15.6 | 24.1 | 9.8 | 15.0 | 15.3 | 3.8 | 1.5 | | 47% | |
| | 11 | Within FRZ | 19.5 | 8.1 | 48.8 | | 4.2 | | | | 39% | 207.88 |
| | | Outside FRZ | 53.4 | 34.9 | 21.9 | 1.3 | 14.6 | | 1.1 | | 61% | |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Santa Clara River (cont.) | 12 | Within FRZ | 18.4 | 9.5 | 16.9 | 0.8 | 34.8 | | 2.2 | | 76% | 108.08 |
| | | Outside FRZ | 8.3 | 1.9 | 4.3 | | 8.3 | | 2.6 | | 24% | |
| | 13 | Within FRZ | 20.9 | 13.7 | 0.0 | 43.1 | 5.7 | 4.4 | 17.0 | | 51% | 207.02 |
| | | Outside FRZ | 32.3 | 32.3 | | 0.1 | 5.1 | 28.2 | 4.1 | | 49% | |
| | 14 | Within FRZ | 27.0 | 5.4 | 31.3 | 21.9 | 2.1 | 4.6 | 1.5 | | 53% | 176.66 |
| | | Outside FRZ | 15.1 | 49.3 | 2.0 | 1.1 | 0.1 | | 15.1 | | 47% | |
| | 15 | Within FRZ | 23.7 | 10.2 | 0.8 | 21.9 | 36.8 | 36.2 | 10.4 | | 71% | 198.11 |
| | | Outside FRZ | 8.9 | 3.6 | | 10.0 | 4.9 | 10.1 | 20.5 | | 29% | |
| | 16 | Within FRZ | 25.5 | 22.1 | | 51.8 | 52.9 | 16.0 | 10.3 | | 71% | 250.38 |
| | | Outside FRZ | 5.3 | 16.8 | | 19.7 | 22.6 | 3.9 | 3.4 | | 29% | |
| | 17 | Within FRZ | 18.2 | 27.0 | 109.0 | 56.0 | 50.2 | 1.0 | 0.2 | | 59% | 442.73 |
| | | Outside FRZ | 34.8 | 44.9 | 44.2 | 47.6 | 2.0 | 6.4 | | 1.1 | 41% | |
| | 18 | Within FRZ | 33.2 | 10.2 | 165.9 | 5.3 | 44.4 | 3.8 | 2.4 | 0.4 | 66% | 403.91 |
| | | Outside FRZ | 106.7 | 5.6 | 1.7 | 3.8 | 8.3 | 11.9 | | 0.4 | 34% | |
| | 19 | Within FRZ | 28.2 | 8.0 | 152.9 | 5.4 | 2.5 | 11.9 | 24.3 | 1.6 | 67% | 351.47 |
| | | Outside FRZ | 15.2 | 5.1 | 8.3 | 28.2 | | 17.2 | 13.4 | 29.2 | 33% | |
| | 20 | Within FRZ | 35.4 | 2.8 | 37.7 | 9.4 | 10.1 | 5.4 | 1.6 | | 46% | 222.03 |
| | | Outside FRZ | 6.0 | 27.0 | 53.0 | 17.1 | 3.3 | 8.9 | 4.2 | | 54% | |
| | 21 | Within FRZ | 51.1 | 12.5 | 6.0 | 27.0 | 65.2 | 6.7 | 7.1 | | 87% | 200.66 |
| | | Outside FRZ | 0.1 | 3.2 | 10.1 | 3.3 | 1.5 | 3.7 | 3.2 | | 13% | |
| | 22 | Within FRZ | <0.1 | 22.7 | 5.2 | 13.3 | 55.1 | | 2.8 | | 65% | 151.66 |
| | | Outside FRZ | <0.1 | 2.8 | 0.7 | 40.6 | 3.6 | 1.4 | 3.4 | | 35% | |
| | 23 | Within FRZ | 4.9 | 21.4 | 0.2 | 0.5 | 116.8 | 0.6 | 15.5 | | 76% | 211.49 |
| | | Outside FRZ | 26.1 | 1.1 | 1.6 | 6.8 | 15.3 | 0.4 | 0.3 | | 24% | |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Santa Clara River (cont.) | 24 | Within FRZ | | 8.1 | 0.3 | 0.1 | 145.1 | | 9.0 | 4.2 | 71% | 233.25 |
| | | Outside FRZ | | 12.8 | 2.5 | 12.0 | 31.3 | | 7.9 | | 29% | |
| | 25 | Within FRZ | | 22.0 | 68.5 | 1.6 | 0.3 | 3.1 | 32.0 | | 60% | 213.15 |
| | | Outside FRZ | | 3.7 | 3.2 | 17.2 | 15.7 | 3.2 | 42.6 | | 40% | |
| | 26 | Within FRZ | | 13.2 | 42.9 | 100.9 | | | 15.9 | | 70% | 247.53 |
| | | Outside FRZ | | 22.4 | 1.3 | 5.3 | 0.6 | | 45.1 | | 30% | |
| | 27 | Within FRZ | 12.2 | 77.4 | | 64.9 | | | 0.2 | | 93% | 166.74 |
| | | Outside FRZ | 1.8 | 6.7 | | 2.3 | | | 1.2 | | 7% | |
| | 28 | Within FRZ | 16.0 | 98.2 | 7.1 | 62.6 | 0.8 | | | | 73% | 253.80 |
| | | Outside FRZ | 56.7 | 3.9 | 1.3 | 4.8 | 1.3 | | 1.1 | | 27% | |
| | 29 | Within FRZ | 37.3 | 102.7 | 1.4 | 72.2 | 2.6 | | | | 87% | 249.06 |
| | | Outside FRZ | 16.0 | 11.0 | 5.3 | 0.1 | 0.5 | | | | 13% | |
| | 30 | Within FRZ | 9.5 | 83.8 | | 45.4 | 11.3 | 1.6 | 2.8 | | 83% | 186.15 |
| | | Outside FRZ | 2.3 | 13.7 | | 13.0 | 1.4 | 1.3 | | | 17% | |
| | 31 | Within FRZ | 2.8 | 169.5 | | 46.3 | 38.5 | | | | 94% | 274.73 |
| | | Outside FRZ | 11.1 | 4.8 | | 0.7 | 1.1 | | | | 6% | |
| | 32 | Within FRZ | 2.5 | 130.9 | | 73.5 | 5.5 | 5.5 | | | 99% | 219.51 |
| | | Outside FRZ | | | | 1.5 | <0.1 | | | | 1% | |
| | 33 | Within FRZ | 0.0 | 33.1 | 0.4 | 8.8 | 21.8 | 16.3 | 11.9 | | 87% | 105.66 |
| | | Outside FRZ | 8.0 | 0.4 | 1.3 | 0.1 | 2.9 | 0.4 | 0.4 | | 13% | |
| | 34 | Within FRZ | 0.2 | 0.4 | 7.3 | 27.0 | 15.9 | 25.1 | 0.0 | | 78% | 97.03 |
| | | Outside FRZ | 1.5 | 0.2 | 1.0 | 2.7 | 2.4 | 11.4 | 1.8 | | 22% | |
| | 35 | Within FRZ | 7.2 | 7.0 | 0.0 | 3.6 | 0.4 | 17.0 | 1.2 | | 42% | 86.98 |
| | | Outside FRZ | 5.6 | 6.9 | 0.2 | 2.1 | 11.3 | 15.7 | 8.7 | | 58% | |
| | 36 | Within FRZ | 1.2 | 26.6 | 18.6 | | <0.1 | 6.4 | 0.0 | | 47% | 113.08 |
| | | Outside FRZ | 12.4 | 13.6 | 16.4 | | 2.8 | 4.6 | 10.5 | | 53% | |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Santa Clara River (cont.) | 37 | Within FRZ | 18.5 | 5.3 | 44.9 | 15.6 | 39.8 | | | | 70% | 177.34 |
| | | Outside FRZ | 19.2 | 15.8 | 7.8 | 0.8 | 9.5 | | | | 30% | |
| | 38 | Within FRZ | 4.7 | 5.4 | 33.6 | 35.8 | 24.9 | | | | 45% | 233.61 |
| | | Outside FRZ | 74.0 | 51.0 | 2.3 | 1.2 | 0.8 | | | | 55% | |
| | 39 | Within FRZ | 3.1 | 11.7 | | 100.3 | | | | | 57% | 201.28 |
| | | Outside FRZ | 43.1 | 21.5 | 1.7 | 18.5 | 1.4 | | | | 43% | |
| | 40 | Within FRZ | 1.8 | 3.8 | | 13.6 | | 55.3 | | | 70% | 106.80 |
| | | Outside FRZ | 8.5 | 5.7 | | 17.4 | | 0.6 | | | 30% | |
| | 41 | Within FRZ | 32.9 | 21.1 | 6.6 | 3.9 | 47.1 | 13.5 | | 0.4 | 87% | 144.56 |
| | | Outside FRZ | 7.8 | 1.2 | 6.4 | 0.1 | 3.2 | 0.4 | | | 13% | |
| | 42 | Within FRZ | 15.7 | 6.0 | 21.5 | 41.4 | 34.5 | 1.5 | | 3.1 | 80% | 154.81 |
| | | Outside FRZ | 16.2 | 0.0 | 4.2 | 5.0 | 4.9 | | | 0.9 | 20% | |
| | 43 | Within FRZ | 3.1 | 4.1 | | 21.5 | 39.1 | 21.5 | | | 75% | 119.55 |
| | | Outside FRZ | 20.6 | <0.1 | | 1.0 | 6.4 | 2.3 | | | 25% | |
| | 44 | Within FRZ | 2.3 | 4.2 | | 3.9 | 51.9 | 4.0 | | | 72% | 92.09 |
| | | Outside FRZ | 7.6 | 9.6 | | | 8.6 | 0.1 | | | 28% | |
| | 45 | Within FRZ | 18.3 | 3.2 | 4.9 | 3.8 | 25.7 | 3.8 | | | 49% | 122.30 |
| | | Outside FRZ | 36.8 | 13.4 | 4.8 | 0.5 | 7.1 | 0.2 | | | 51% | |
| | 46 | Within FRZ | 50.4 | 17.6 | 10.5 | 2.3 | 25.9 | | | | 80% | 134.24 |
| | | Outside FRZ | 21.7 | 0.5 | 1.9 | | 3.3 | | | | 20% | |
| | 47 | Within FRZ | 47.3 | 24.2 | 22.0 | | | | | | 91% | 102.49 |
| | | Outside FRZ | 6.1 | 0.7 | 2.2 | | | | | | 9% | |
| | 48 | Within FRZ | 131.5 | | | | | | | | 95% | 139.04 |
| | | Outside FRZ | 7.6 | | | | | | | | 5% | |
| | 49 | Within FRZ | 121.7 | 5.4 | | | | | | | 84% | 150.70 |
| | | Outside FRZ | 17.2 | 6.4 | | | | | | | 16% | |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Santa Clara River (cont.) | 50 | Within FRZ | 64.9 | 2.0 | 0.4 | | | | | | 77% | 87.75 |
| | | Outside FRZ | 20.3 | 0.1 | | | | | | | 23% | |
| | 51 | Within FRZ | 66.0 | 1.2 | | | | | | | 86% | 78.14 |
| | | Outside FRZ | 10.7 | 0.2 | | | | | | | 14% | |
| | 52 | Within FRZ | 82.6 | | | | | | | | 94% | 87.62 |
| | | Outside FRZ | 5.0 | | | | | | | | 6% | |
| | 53 | Within FRZ | 43.7 | 12.1 | 4.6 | | | | | | 97% | 62.56 |
| | | Outside FRZ | 2.2 | | <0.1 | | | | | | 3% | |
| | 54 | Within FRZ | 58.3 | 21.1 | | | | | | | 98% | 81.12 |
| | | Outside FRZ | 1.0 | 0.7 | | | | | | | 2% | |
| | 55 | Within FRZ | 30.5 | 35.8 | 1.3 | | 0.3 | | | | 94% | 72.42 |
| | | Outside FRZ | 2.6 | 1.7 | 0.3 | | <0.1 | | | | 6% | |
| | 56 | Within FRZ | 66.9 | 25.1 | | | | | | | 99% | 93.25 |
| | | Outside FRZ | 1.0 | 0.2 | | | | | | | 1% | |
| | 57 | Within FRZ | 44.7 | 16.4 | | 3.0 | | | | | 82% | 78.08 |
| | | Outside FRZ | 13.6 | | | 0.4 | | | | | 18% | |
| | 58 | Within FRZ | 23.9 | 20.5 | | 5.1 | | | | | 84% | 59.09 |
| | | Outside FRZ | 6.7 | 0.1 | | 2.8 | | | | | 16% | |
| | 59 | Within FRZ | 22.8 | 7.8 | | 13.0 | | | | | 79% | 54.89 |
| | | Outside FRZ | 9.3 | 1.5 | | 0.6 | | | | | 21% | |
| | 60 | Within FRZ | | | | 1.4 | | | | | 95% | 1.43 |
| | | Outside FRZ | | | | 0.1 | | | | | 5% | |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Sespe Creek | 0 | Within FRZ | 1.0 | 0.3 | 0.0 | 1.9 | 24.7 | 2.3 | | | 26% | 118.16 |
| | | Outside FRZ | 7.7 | 0.5 | 15.5 | 0.8 | 57.7 | 3.8 | 1.8 | | 74% | |
| | 1 | n/a | 94.5 | 30.5 | 83.6 | 3.7 | 39.9 | 7.0 | 1.6 | | 100% | 260.90 |
| | 2 | n/a | 160.1 | 1.5 | 50.4 | | 2.6 | | | | 100% | 214.67 |
| | 3 | n/a | 84.7 | 7.8 | | | | | | | 100% | 92.48 |
| Piru Creek | 0 | Within FRZ | 11.3 | 18.6 | | | | | | | 100% | 29.90 |
| | | Outside FRZ | 72.2 | 8.9 | | | | | | | 100% | 81.09 |
| | 1 | n/a | 46.3 | 14.0 | | | | | | | 100% | 60.29 |
| | 2 | n/a | 54.5 | 13.5 | | | | | | | 100% | 68.01 |
| | 3 | n/a | 47.3 | 0.7 | | | | | | | 100% | 47.96 |
| | 4 | n/a | 124.6 | 24.2 | | | | | | | 100% | 148.86 |
| | 5 | n/a | 140.5 | | | | | | | | 100% | 140.54 |
| Castaic Creek | 0 | Within FRZ | | 1.1 | 2.0 | | | | | | 100% | 3.04 |
| | | Outside FRZ | 26.7 | 11.5 | 23.4 | | | | | | 100% | 61.59 |
| | 1 | n/a | 40.5 | 40.7 | 26.5 | 9.6 | | | 0.8 | | 100% | 118.02 |
| | 2 | n/a | 11.3 | 1.3 | 10.7 | 32.9 | | | 5.6 | | 100% | 61.82 |
| | 3 | n/a | 63.1 | 0.6 | 1.4 | | | | | | 100% | 65.01 |
| | 4 | n/a | 54.9 | 0.6 | 11.0 | | | | | | 100% | 66.50 |
| | 5 | n/a | 72.9 | | 13.5 | | | | | | 100% | 86.38 |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| San Francisquito | 0 | Within FRZ | 0.2 | | | | 0.2 | | | | 100% | 0.40 |
| | | Outside FRZ | 35.2 | 17.7 | | | 6.8 | | | 0.7 | 100% | 60.32 |
| | 1 | n/a | 46.7 | 39.6 | 13.7 | 0.8 | 0.3 | | 4.0 | 0.1 | 100% | 105.19 |
| | 2 | n/a | 63.5 | 49.3 | 11.9 | | | | | | 100% | 124.65 |
| | 3 | n/a | 116.2 | 47.0 | 13.8 | 1.8 | | | | | 100% | 178.82 |
| | 4 | n/a | 73.9 | 5.2 | 1.7 | 2.7 | | 1.2 | | 1.6 | 100% | 86.25 |
| | 5 | n/a | 38.7 | 7.1 | | 3.2 | | | | | 100% | 48.96 |
| SF Santa Clara | 0 | n/a | 30.5 | 4.1 | | | | | | | 100% | 34.64 |
| | 1 | n/a | 33.2 | 9.3 | 0.5 | 2.1 | | | | | 100% | 45.11 |
| | 2 | n/a | 30.6 | | 0.1 | | | | | | 100% | 30.66 |
| Bouquet Canyon | 0 | Within FRZ | 0.5 | | 1.4 | | | | | | 100% | 1.86 |
| | | Outside FRZ | 10.2 | | 7.4 | | | | | | 100% | 17.56 |
| | 1 | n/a | 12.6 | | | | | | | | 100% | 12.58 |
| | 2 | n/a | 10.3 | | 0.8 | | | | | | 100% | 11.16 |
| | 3 | n/a | 6.5 | 3.9 | 0.4 | | | | | | 100% | 10.83 |
| | 4 | n/a | 31.2 | 1.6 | | 0.4 | 5.1 | 1.8 | 0.7 | | 100% | 40.64 |
| | 5 | n/a | 22.2 | | | | | | | | 100% | 22.17 |
| | 6 | n/a | 95.0 | 0.4 | | | 1.1 | | | | 100% | 96.46 |
| | 7 | n/a | 34.8 | 0.6 | | | | | | | 100% | 35.49 |

| Location | River Mile (RM) | Location Relative to Flood Resent Zone (FRZ)[1] | Acreage of Arundo Cover Classes by River Mile Segment | | | | | | | | Percent of RM Segment Within/ Outside FRZ | Total Acreage of RM Segment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <1% | 1–5% | 5–10% | 10–25% | 25–50% | 50–75% | 75–95% | >95% | | |
| Mint Canyon | 0 | n/a | 5.0 | | | | | | | | 100% | 4.97 |
| | 1 | n/a | 4.2 | | | | | | | | 100% | 4.18 |
| | 2 | n/a | 3.2 | 0.1 | 1.0 | | | | | 0.1 | 100% | 4.41 |
| | 3 | n/a | 10.5 | 0.5 | | | | | | | 100% | 10.98 |
| | 4 | n/a | 3.8 | 1.3 | | | | | | | 100% | 5.04 |
| | 5 | n/a | 3.8 | 6.5 | | | | | | | 100% | 10.36 |
| | 6 | n/a | 8.4 | | | | | | | | 100% | 8.45 |
| **Grand Total Acreage of Arundo class within FRZ** | | | 1,851.51 | 1,348.41 | 1,242.47 | 1,169.84 | 1,279.06 | 298.49 | 201.31 | 9.66 | **51%** | **7,400.07** |
| **Grand Total Acreage Arundo outside FRZ/mapping** | | | 3,980.50 | 1,006.55 | 677.24 | 436.01 | 498.00 | 194.22 | 287.34 | 38.79 | **49%** | **7,118.6** |
| **Grand Total Acreage of RM Segment** | | | **5,832.02** | **2,354.96** | **1,919.71** | **1,605.85** | **1,777.06** | **492.70** | **488.65** | **48.45** | | **14,519.4** |

[1] Stillwater Sciences 2011a,b; n/a indicates where flood reset zone mapping is not available.