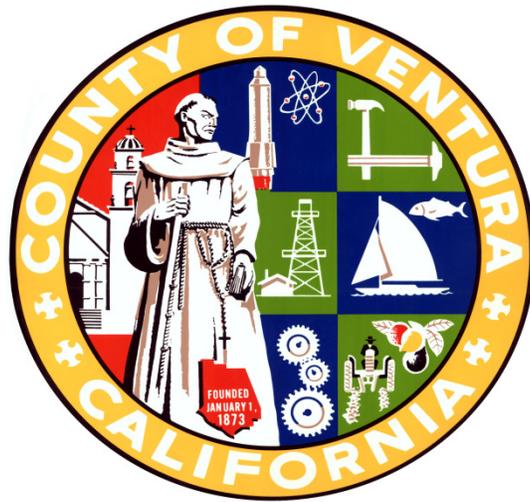


Ventura County Grand Jury 2015 - 2016



Riverbed Hazardous Invasive Vegetation

May 3, 2016

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Riverbed Hazardous Invasive Vegetation

Summary

The 2015-2016 Ventura County Grand Jury (Grand Jury) noted an increasing level of vegetation growing in the Ventura and Santa Clara riverbeds. Investigation also revealed that smaller tributaries are similarly overgrown. The Grand Jury expressed concern that overgrowth could cause damage to bridges, as well as riverbank erosion, and flood plain inundation should it become uprooted and wash downstream to form a dam during heavy storms.

The Grand Jury learned that the presence of an invasive species of giant reed, *Arundo donax* (Arundo), is the major part of the problem. The Grand Jury conducted an investigation to determine the impact of this hazardous vegetation, the potential for infrastructure damage due to uprooted vegetation, and the actions being taken to control its growth in the Ventura County (County) watershed areas. (Figure 01)

The Grand Jury looked to County agencies to determine their awareness of hazardous invasive vegetation and how it affects the watershed, as well as their plans to address the issue. The Grand Jury took a two-pronged approach:

- It investigated the County's ability to remove hazardous plants and debris upstream of vital infrastructure in order to protect it from flood damage.
- It investigated the County's access to environmentally protected areas for the purpose of installing and servicing rain and water runoff measuring (hydrology) instruments.

The Grand Jury also looked at neighboring counties to see if they are facing a similar problem in their watersheds and, if so, what actions they are taking.

The Ventura County Watershed Protection District is responsible for clearing the watershed of hazardous vegetation. In carrying out its responsibility, the District must comply with Federal and State environmental protection regulations. Many of these regulations are focused on protecting the native flora and fauna. There is a conflict of public interests between the need to clear hazardous vegetation to protect infrastructure and the need to preserve the natural habitat from human activities that endanger it.

Because a significant portion of the populated area of the County lies in the flood plain that borders the Santa Clara and Ventura Rivers, the Grand Jury found that it is imperative that these critical waterways stay clear of hazardous vegetation and debris that could form dams at bridge abutments and culverts. When high water does wash vegetation and debris downstream, it must be cleared quickly so that flooding does not result.

The Grand Jury recommends that the Ventura County Board of Supervisors take action to ensure continued, responsible access to the mountainous areas of the County where hydrology equipment is installed. In addition, the Board needs to develop plans and identify funds to limit the growth of Arundo and eventually rid the watershed of it and any other types of hazardous invasive vegetation.

Background

The Ventura and Santa Clara Rivers form a major portion of the Ventura County watershed system. Major highway and rail transportation arteries cross these two rivers at several locations. (Att-01) If this vital watershed system becomes clogged with debris and vegetation, a large storm could destroy these vital crossings and cause widespread inundation of the flood plains that border the two rivers.

Uprooted vegetation and debris can and has caused major damage to infrastructure and private property. Therefore, this investigation focused on the ability of the County to manage/eradicate *Arundo* in the riverbeds.



Figure 01, *Arundo* growth. By permission of County of Ventura, Watershed Protection District

Methodology

The Grand Jury conducted a review of Federal, State, and County agency websites focused on:

- watershed management
- disaster planning and response
- hazardous invasive watershed vegetation

Face-to-face interviews, telephone interviews, and electronic communications were conducted with officials at the Federal, State, and County levels. Newspaper articles and scholarly publications available on the web were also reviewed.

[Note: Additional dangers of Arundo, such as fire and other ecological impacts, are not the subject of this report.]

Facts

- FA-01.** The most recently available national data show 53% of bridge failures occur as a result of floods. Raging waters undermine bridge footings or batter the structures with debris and render them structurally weakened or destroyed. (Ref-01), (Figure 02)
- FA-02.** In southern California, the most hazardous watershed vegetation is an invasive species known as Arundo. This non-native plant can grow as fast as 4 inches per day and can reach 30 feet in height. Arundo is a major problem in riverbeds, estuaries, and beaches. It is often ripped out of the river bottoms by rushing storm water and washed downstream into flood control channels. It can form debris dams against bridges and culverts. Because the rhizomes (root mass) of this giant reed grow close to the surface, they often break off during rushing waters thus destabilizing the riverbanks, the leading cause of flooding in southern California. (Ref-02, Ref-03)



Figure 2, Bridge damage from Arundo dam (Photo from Ref-02)

- FA-03.** In Ventura County, Arundo provides no known environmental benefit and has virtually no commercial use. In addition to being a threat to the watershed, it is also a fire hazard, depletes groundwater far in excess of native species, and is an air pollutant when burned. (Ref-03)

FA-04. In 2004 a demonstration project was conducted by the Ventura County Watershed Protection District (VCWPD), the County Resource Conservation District, and the Natural Resources Conservation Service (an entity of the United States Department of Agriculture) to determine the cost of Arundo removal. Four methods were evaluated with costs ranging from about \$7,000 to over \$19,000 per acre, depending on density of growth, location, and terrain.

Arundo growth in just the upper Santa Clara River Watershed (including part of Los Angeles County) is estimated to exceed 16,000 acres – resulting in a total projected removal cost of \$112 million to \$304 million. However, the VCWPD 2015-2016 adopted budget includes \$3.2 million for Arundo removal in Ventura County. (Ref-04, Ref-05)

FA-05. The Environmental Protection Agency (EPA) regulates access and activities that may impact the flora and fauna on public lands. Regulations do not restrict activity that is in response to emergency conditions that threaten life and/or property. (Ref-06)

FA-06. Ventura County is unique in its topography. The gradient (slope) between mountains that exceed 8,000 feet in elevation and the coastline that is about 15 miles away is one of the steepest in the nation. The gradient causes flood waters to accelerate rapidly as they make their way down the watershed to the ocean. (Ref-07)

FA-07. The VCWPD maintains storm warning hydrology gauges throughout the County, including in the Los Padres National Forest. (Ref-08) (Att-02)

FA-08. Data from the hydrology monitoring stations is collected and evaluated in the Emergency Operating Center. The center is jointly operated by the VCWPD and the Sheriff’s Office of Emergency Services (OES). This data is used to plan the response to a flood. Responses are laid out in the Multi-Hazard Mitigation Plan (MHMP) and the Flood Warning Program and Response Annex. (Ref-09, Ref-10)

FA-09. The U.S. Forest Service, an agency of the U.S. Department of Agriculture (USDA), states in its own website:

- “The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation’s forests and grasslands to *meet the needs of present and future generations*. [Emphasis added]”
- The U.S. Forest Service’s motto, “Caring for the Land and Serving People” includes: “*Listening to people and responding to their diverse needs in making decisions*. [Emphasis added]”
- The U.S. Forest Service has established 13 guiding principles, one of which states: “We strive for quality and excellence ... and are *sensitive to the effects of our decisions on people and resources*. [Emphasis added]”

(Ref-11)

- FA-10.** Most of the watershed area of Ventura County is within federally controlled land in the Los Padres National Forest, and most of the hydrology equipment is on these federal lands. The Grand Jury learned that it has been very difficult for the VCWPD to gain access to the Los Padres National Forest for hydrology equipment installation and service.
- FA-11.** The Santa Ana Water Protection Agency (SAWPA) has a Memorandum of Understanding with the U.S. Forest Service for gaining access to environmentally sensitive areas to install and conduct maintenance on hydrology equipment used to predict flooding. SAWPA also has a plan for Arundo eradication throughout its area of responsibility. (Ref-12)
- During fiscal year 2015, SAWPA had a budget of \$2.9 million for Arundo removal. To date, SAWPA has spent approximately \$30 million to eradicate Arundo from 4,300 acres. It is managing Arundo removal from more than 10,000 acres. (Ref-13, Ref-14, Ref-15)
- FA-12.** As of March 3, 2016, the VCWPD is negotiating with the U.S. Forest Service for responsible access to the Los Padres National Forest for the purpose of installing and maintaining hydrology equipment.

Findings

- FI-01.** Ventura County is severely limited in its ability to control the growth of Arundo. If left unchecked, Arundo will likely cause riverbank erosion, floodplain inundation, and major damage to infrastructure. (FA-01, FA-02)
- FI-02.** Since there is virtually no commercial value to Arundo, there is no way to recover the cost of removing it. (FA-03, FA-04)
- FI-03.** In the event of imminent flooding that endangers infrastructure and/or private property, the VCWPD can mitigate the danger by clearing only the dams that form from uprooted plants and other debris. However, this *reaction* to the problem is not as safe and effective as the *proactive* approach of removing the Arundo before it can be uprooted by flood waters. (FA-05)
- FI-04.** The VCWPD faces four challenges in carrying out its responsibilities in flood prediction and control:
- There is a critical need for routine County access to the hydrology equipment in the Los Padres National Forest.
 - The very steep gradient from the mountains to the coastal plain makes early detection of developing flood conditions of paramount importance to public safety.
 - The current level of cooperation between the federal government (U.S. Forest Service) and the VCWPD is inadequate for protecting the downstream infrastructure and private property.
 - Arundo removal efforts are hampered by coexistence with native vegetation that must be preserved. Arundo removal also presents

difficulties in disposal. Both of these issues result in the high cost of control.

(FA-05, FA-06, FA-07, FA-08, FA-09)

FI-05. The needs of the County, the EPA, and the U.S. Forest Service can be met through working agreements. (FA-09, FA-10, FA-11, FA-12)

Recommendations

R-01. The Grand Jury recommends that the Ventura County Board of Supervisors, in conjunction with the VCWPD, develop a long-term plan and corresponding budget line item that leads to the eventual eradication of Arundo. (FI-04)

R-02. The Grand Jury recommends that the Ventura County Board of Supervisors direct the VCWPD to work with the Environmental Protection Agency for the responsible removal of Arundo in the County watershed, rivers, and tributaries. (FI-05)

R-03. The Grand Jury recommends that the Ventura County Board of Supervisors direct the VCWPD to negotiate a formal agreement with the U.S. Forest Service for continued responsible access to the Los Padres National Forest for the purpose of installing and maintaining hydrology equipment. (FI-04, FI-05)

Responses

Responses Required From:

Ventura County Board of Supervisors (FI-01, FI-03, FI-04), (R-01, R-02, R-03)

References

Ref-01. Lee, Sternberg, "Perspective: A New System for Preventing Bridge Collapses", Table 1, *Issues in Science and Technology*, University of Texas, 2008, <http://issues.org/?s=bridge+failure> (accessed March 3, 2016).

Ref-02. County of Santa Barbara, Agricultural Commissioner, Weights & Measure Department, "Santa Ynez River Tamarisk and Arundo Project", <http://cosb.countyofsb.org/agcomm/wma.aspx?id=40861> (accessed March 3, 2016).

Ref-03. McWilliams, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, "Arundo donax", <http://www.fs.fed.us/database/feis/plants/graminoid/arudon/all.html> (accessed March 3, 2016).

- Ref-04.** Ventura County Watershed Protection District; Ventura County Resources Conservation District; Natural Resources Conservation Service, *Ventura River Arundo Removal Demonstration Project*, October 13, 2004, <http://www.cal-ipc.org/symposia/archive/pdf/2006/PosterKanthack06.pdf> (accessed March 3, 2016).
- Ref-05.** Ventura County Resource Conservation District, *Final Report for the Arundo and Tamarisk Removal Plan in the Upper Santa Clara River Watershed*, March 31, 2006, http://webcache.googleusercontent.com/search?q=cache:qrbVeKejT98J:www.waterboards.ca.gov/losangeles/water_issues/programs/grants_loans/fundings/arundotamarisk%2520%2520removal%2520project.pdf+&cd=8&hl=en&ct=clnk&gl=us (accessed March 3, 2016).
- Ref-06.** Protection of Wetlands, Executive Order 11990, *Federal Register* 2696, Section 404 of the Clean Water Act, May 24, 1977, <http://www.epa.gov/cwa-404/protection-wetlands> (accessed March 3, 2016).
- Ref-07.** California State Water Sources Control Board, Ventura River Watershed, http://www.waterboards.ca.gov/losangeles/water_issues/programs/regional_program/Water_Quality_and_Watersheds/ventura_river_watershed/summary.shtml (accessed March 3, 2016).
- Ref-08.** Ventura County Watershed Protection District, Rainfall Stations, <http://www.vcwatershed.net/hydrodata/gmap.php?param=rain> (accessed March 3, 2016).
- Ref-09.** "Ventura County Multi-Hazard Mitigation Plan", http://www.vcfloodinfo.com/images/multi_hazard_plans/Ventura%20HMP%20DRAFT_Main%20Body_July%202015_v3.pdf (accessed March 3, 2016).
- Ref-10.** County of Ventura, Watershed Protection District, "Flood Warning Program and Response Annex", <http://www.vcfloodinfo.com/documents/Flood-Warning-Response-Annex.pdf> (accessed March 3, 2016).
- Ref-11.** United States Department of Agriculture, Forestry Service, "What We Believe" (Mission Statement), www.fs.fed.us/about-agency/what-we-believe (accessed March 3, 2016).
- Ref-12.** Santa Ana Watershed Protection Authority; USDA Forest Service San Bernardino National Forest; USDA Cleveland National Forest, "Memorandum of Understanding", July 19, 2011. <http://www.sawpa.org/wp-content/uploads/2012/07/Forest-First-MOU.pdf> (accessed March 3, 2016).
- Ref-13.** Santa Ana Watershed Authority, "Comprehensive Financial Report Fiscal Year Ended June 30, 2015", page 69, <http://www.sawpa.org> (accessed March 25, 2016).

- Ref-14.** Santa Ana Watershed Protection Authority, "Think Native in Southern California and Stop Growing Arundo", 2002, <http://www.sawpa.org/wp-content/uploads/2012/07/Arundo-brochure.pdf> (accessed March 3, 2016).
- Ref-15.** Santa Ana Watershed Protection Authority, SAWPA Projects, "Arundo Habitat Management", (Background tab), 2012, <http://www.sawpa.org/collaboration/projects/arundohabitatmanagement/> (accessed March 25, 2016).

Attachments

- Att-01.** Ventura County Map Showing Santa Clara and Ventura River Major Bridge Crossings
- Att-02.** Ventura County Map Showing Hydrology Monitoring Stations

Glossary

<u>TERM</u>	<u>DEFINITION</u>
Arundo	Arundo donax, aka giant reed; a non-native plant to Ventura County that is similar in appearance to bamboo
County	Ventura County, California
EPA	Environmental Protection Agency, an entity of the United States government
Fauna	Animal life
Flora	Plant life
Grand Jury	2015-2016 Ventura County Grand Jury
Hydrology	The study of the earth’s water and its movements
Inundation	The process of covering with water, especially flood waters
MHMP	Multi-Hazard Mitigation Plan
OES	Ventura County Sheriff’s Office of Emergency Services
Rhizome	Shallow, horizontal root mass
VCPWA	Ventura County Public Works Agency
VCWPD	Ventura County Watershed Protection District

Attachment 01

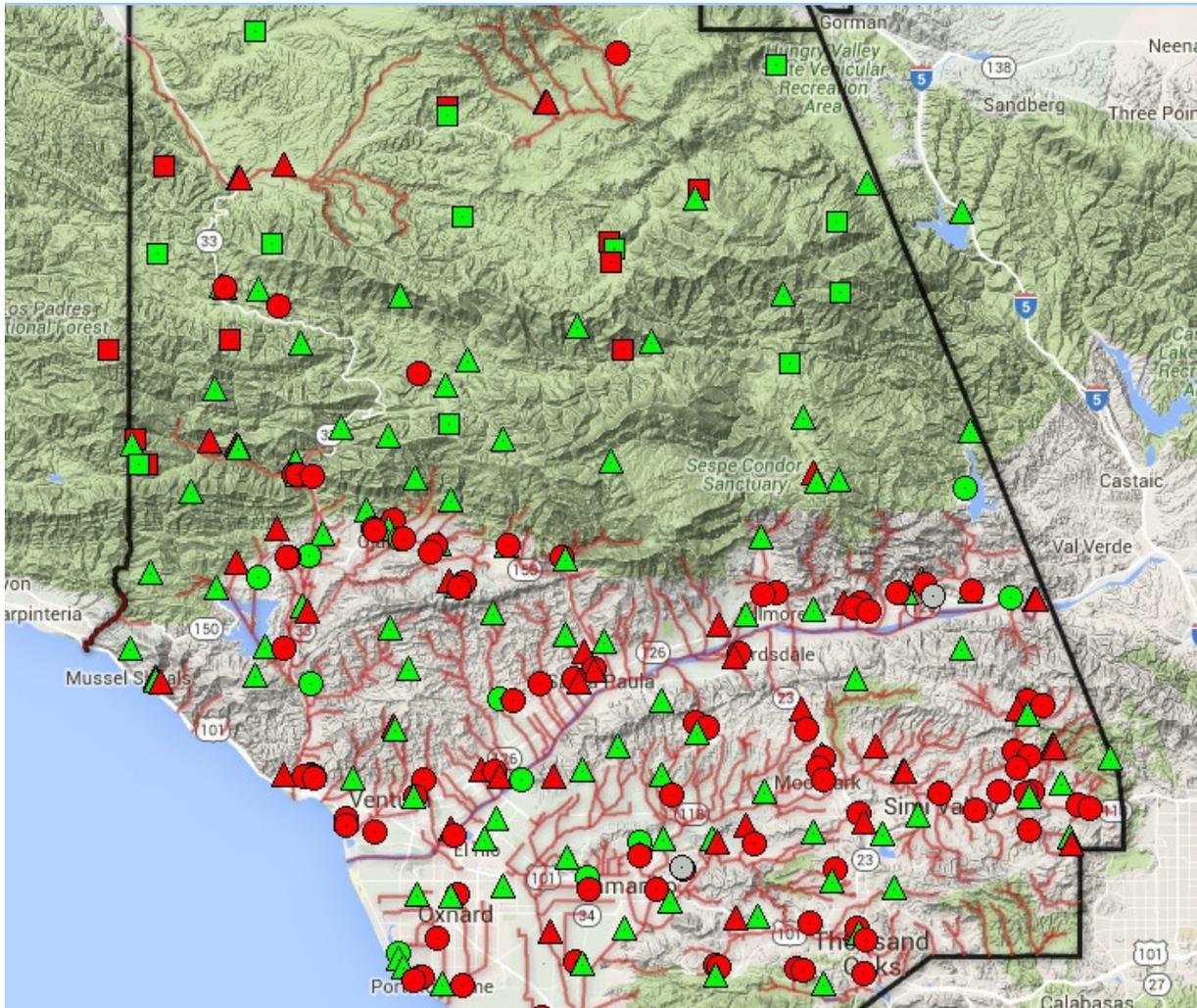
**Ventura County Map Showing Santa Clara and Ventura
River Major Bridge Crossings**



Ventura Co. Bridges Hazardous Vegetation Printed: Jan 19, 2016

WARNING: The information contained hereon was created by the Ventura County Geographic Information System (GIS), which is designed and operated solely for the convenience of the County and related contract entities. The County does not warrant the accuracy of this information, and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.

**Attachment 02
Ventura County Map Showing Hydrology Monitoring
Stations**



Ventura County Hydrology Monitoring Stations
Accessed 4 February 2016

Legend:

- = Daily and Peak Stations
- Δ = Peak only (Event) Stations
- O = ALERT Peak Stations
- Red Symbols = Active Stations
- Green Symbols = Inactive Stations