

Local Southwest Utah Partnership Engages Youth to Mitigate Flood Damage, Control Invasive Species, and Restore Native Habitat

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American Conservation Experience, Hurricane, UT



Introduction

American Conservation Experience (ACE), a non-profit service organization, provides its young and diverse members with career-building opportunities in the field of restoration through education and hands-on experience. Since the fall of 2014, ACE crews, based in Hurricane, Utah, have worked in conjunction with the Washington County Flood Control Authority (WCFA)—an interlocal agency cooperative consortium made up of four southwestern Utah municipalities: Washington County, the City of St. George, Washington City, and Santa Clara City. WCFA's purpose is to facilitate efficient and effective management, administration, and cost responsibilities for regional storm water drainage and flood control concerns that cross these communities' common boundaries. Projects that were completed under WCFA guidance engaged youth crews in restoring riparian ecosystems around the Virgin and Santa Clara Rivers while protecting Washington County's residential and commercial infrastructure from potentially devastating future flooding events.

Monitoring

American Conservation Experience (ACE) crews monitored 22 miles of the Virgin River and its tributary, the Santa Clara River, in 2018 and 2019. This surveying effort was part of the condition assessment for the proposed restoration areas through the greater St. George metropolitan area. Work was conducted to provide the WCFA up to date information on the state of invasive plant dispersion, damage to erosion control features, and debris pile locations. The data collected by ACE helped the WCFA prioritize areas for invasive plant removal and assess failing erosion control features that could potentially lead to harm of residential or commercial infrastructure.

While monitoring for invasive plant species, ACE crews used Avenza Maps to draw polygons using the following protocols:

- Estimating the associated percent cover of each weed species in areas where invasive weeds and native plants were mixed
- Marking locations of monotypic stands separately, and marking them as ideal locations for drone photography
- Noting phenological stage and density

ACE crews placed waypoints on Avenza Maps to mark locations of damaged erosion control features and debris piles. Surveying for damaged erosion control features and debris piles entailed the following:

- Analyzing gabion baskets for cut wires
- Assessing the state of rip raps
 - Checking for displaced stones
 - Slumping
 - Erosion located downstream or downslope
- Prioritizing assessments of dangerous debris collection upstream of bridges through the metropolitan areas of St. George and Santa Clara, Utah. Debris piles are a major concern of the WCFA, as when floods occur, debris build up is a large indicator of the location and extent of flooding.

Data collected during these surveying efforts, helps the WCFA maintain a balance between restoring the banks of the Virgin and Santa Clara Rivers and addressing flood control concerns.

Willow Harvesting and Revegetation

The Santa Clara and Virgin Rivers experienced large flooding events during January 2005. As a result of these events, the City of Santa Clara and the City of St. George initiated a Master Plan. The plan documented what occurred during the floods, established guidelines to manage future development within the river corridors, developed a list of best practices in order to prevent future flood damage, and initiated protocols for reestablishing stream channel, floodplain, and terrace features. The plan's primary goal is to minimize the risk of flooding and bank erosion along the Santa Clara and Virgin Rivers. Plant harvesting, thinning, and revegetation work ACE completed along river corridors assisted Washington County in reaching its goals stated in the Master Plan.

ACE crews harvested coyote willow (*Salix exigua*) and Fremont cottonwood (*Populus fremontii*) using the following techniques and guidelines:

- Harvest healthy (free of insect/pathogen damage and green cross section), young (smooth bark, not furrowed), straight stems evenly through the stand (e.g., not from one side of the willow only), that are between ½" and 1 ¼" in diameter at the base using a diagonal cut
- Remove lateral branches and cut the terminal bud with a horizontal cut
- Dip the terminal end into latex paint, create bundles of 25 willows/ cottonwoods, and store finished bundles in slow moving pools of water

Planted coyote willows using the following techniques:

- Pole planting
- Brush layers
- Vertical bundles

Along City Creek, the Virgin River, and the Santa Clara Rivers, planting efforts were focused on cutbanks—the goal to stabilize the streambank with a dense matrix of roots. Fremont cottonwood (*Populus fremontii*) and black willow (*Salix nigra*) were planted using the pole planting technique. These species were planted farther back from the water's edge to help the river systems re-establish their natural roughness.

During the 2005 flood, overbank flows were able to exploit the low-roughness areas resulting in concentrated, higher velocity flows in the overbanks. The vegetation pattern along this section of the Santa Clara and Virgin Rivers was of either dense thickets of salt cedar or areas devoid of vegetation. By replacing these large stands of salt cedar and populating areas that lacked plantlife with native vegetation (coyote willows, Fremont cottonwoods, and black willows), ACE crews played a critical role in helping the river reestablish its natural morphology.



Invasive Species Removal

Since 2015, ACE crews have been systematically removing salt cedar (*Tamarix spp.*), giant reed (*Arundo donax*), and Russian olive (*Elaeagnus angustifolia*) from the banks of the Virgin and Santa Clara Rivers. Salt cedar has altered the morphology of the river—negatively impacting the habitat of the native flora and fauna—especially where stands have become monotypic. The Virgin River once had a shallow and wide meander, ideal habitat for native fish species such as the woundfin and the Virgin River chub. However, today, due to the establishment of these channel-altering invasive plants, the river runs narrow, fast, deep, and cold. This dramatic shift in river morphology increases the risk of flooding and bank erosion, and creates challenging conditions for native fish species.

ACE crews used the following methods for invasive species removal:

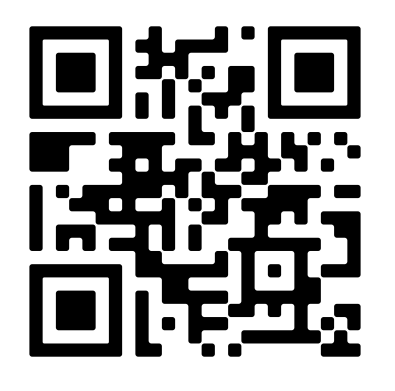
- Cut stump treatments
- Foliar spraying
- Mechanical removal

In the last 5 years, ACE has spent **16,023** person hours working in conjunction with the WCFA in the Virgin River Watershed, removing:

- 133 Russian olive (*Elaeagnus angustifolia*)
- 1,419 giant reed (*Arundo donax*) stands
- 16,726 salt cedar (*Tamarix spp.*)

The total treatment area amounts to **87.8 acres**.

The Virgin River *Arundo donax* Eradication Project (please use the QR code located below for a direct link to the 2015 VRADE Final Report), proved to be a successful endeavor that took place from April 2015 to December 2015. Monitoring and retreatment efforts continue to this day. Removing *Arundo donax* is critical to the health of the Southwestern Willow Flycatcher habitat as it directly competes with native vegetation used by the Fly Catcher for nesting.



Conclusion

Through monitoring, invasive plant control, and planting of native species, ACE's members played a critical role in the long term ecological restoration of Washington County's Virgin and Santa Clara River corridors. Completing this work, in partnership with local organizations, advanced members' restoration experience, knowledge, and skills through hands-on career-building opportunities.

