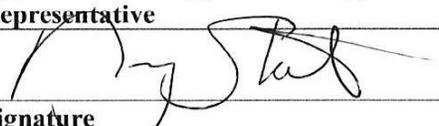


**Arizona Water Protection Fund  
Application Cover Page  
FY 2019**

<b>Title of Project:</b> Verde River-Oak Creek Confluence Habitat Improvement Project												
<b>Type of Project:</b> <input checked="" type="checkbox"/> Capital or Other <input type="checkbox"/> Water Conservation <input type="checkbox"/> Research	<b>Stream Type:</b> <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<b>Your level of commitment to maintenance of project benefits and capital improvements:</b> <input type="checkbox"/> < 5 years <input type="checkbox"/> 5-10 years <input type="checkbox"/> 11-15 years <input checked="" type="checkbox"/> 16-20 years										
<b>Applicant Information:</b> Name/Organization: Friends of the Verde River Address 1: P. O. Box 2535 Address 2: City: Cottonwood State: Arizona ZIP Code: 86326 Phone: (928) 641-6013 Fax: Tax ID No.: <span style="background-color: black; color: black;">XXXXXXXXXX</span>		<b>Inside an AMA:</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>  <b>If yes, which AMA:</b> <input type="checkbox"/> Phoenix <input type="checkbox"/> Tucson <input type="checkbox"/> Prescott <input type="checkbox"/> Pinal <input type="checkbox"/> Santa Cruz										
<b>Contact Person:</b> Name: Matt Wilson Title: Restoration Manager Phone: 330-719-5697 Fax: e-mail: mattw@verderiver.org		<b>Type of Application:</b> <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation  <b>Any Previous AWPB Grants:</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  <b>If yes, please provide Grant #(s):</b> 15-187; 17-191										
<b>Arizona Water Protection Fund Grant Amount Requested:</b>  \$292,451.00  If the application is funded, will the Grantee intend to request an advance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Matching Funds Obtained and Secured:</b> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Applicant/Agency/Organization:</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>Amount (\$):</u></th> </tr> </thead> <tbody> <tr> <td>1. Applicant</td> <td style="text-align: right;">13,128.98</td> </tr> <tr> <td>2. Coconino National Forest</td> <td style="text-align: right;">29,678.02</td> </tr> <tr> <td>3.</td> <td></td> </tr> <tr> <td style="text-align: right;"><b>Total:</b></td> <td style="text-align: right;"><b>\$42,807</b></td> </tr> </tbody> </table>		<u>Applicant/Agency/Organization:</u>	<u>Amount (\$):</u>	1. Applicant	13,128.98	2. Coconino National Forest	29,678.02	3.		<b>Total:</b>	<b>\$42,807</b>
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<b>Total:</b>	<b>\$42,807</b>											
Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A												
<b>Signature of the undersigned certifies understanding and compliance with all terms, conditions and specifications in the attached application. Additionally, signature certifies that all information provided by the applicant is true and accurate. The undersigned acknowledges that intentional presentation of any false or fraudulent information, or knowingly concealing a material fact regarding this application is subject to criminal penalties as provided in A.R.S. Title 13. The Arizona Water Protection Fund Commission may approve Grant Awards with modifications to scope items, methodology, schedule, final products and/or budget.</b>												
Nancy Steele	Executive Director, (928) 641-6013											
<b>Typed Name of Applicant or Applicant's Authorized Representative</b>	<b>Title and Telephone Number</b>											
	8/31/18											
<b>Signature</b>	<b>Date Signed</b>											

**Arizona Water Protection Fund  
FY2019 Funding Cycle**

**Proposal by  
Friends of the Verde River  
Verde River-Oak Creek Confluence Habitat Improvement Project**

**Executive Summary**

Friends of the Verde River (FVR) is pleased to submit this proposal for a Capital Project to the Arizona Water Protection Fund Commission for the FY 2019 Funding Cycle. Our proposal builds on three projects funded by WPF in 2007 (Grant # 07-149), in 2015 (Grant # 15-187), and in 2017 (Grant # 17-191). This proposal will also build on the extensive work accomplished since 2012 by the Verde Watershed Restoration Coalition (VWRC), which is a collaborative partnership coordinated by FVR to restore habitat throughout the Verde watershed.

In 2010, Verde Watershed stakeholders gathered to discuss and strategize how to cooperatively manage woody invasive plants on a watershed-scale in the Verde. These workshops resulted in the creation of the Verde River Cooperative Invasive Plant Management Plan (CIPMP) and a community-based public-private partnership, VWRC. The purpose of CIPMP is to implement restoration projects that use a strategic approach to controlling stakeholder-prioritized invasive plants in the riparian areas of the Verde Watershed while increasing collaboration among VWRC partners. The plan specifically prioritizes tamarisk, tree of heaven, Russian olive, and giant reed as the top four target species threatening the health of the Verde River ecosystem. VWRC is now in year seven of successfully implementing CIPMP with these target invasive species initially treated across more than 8,400 riparian acres in the watershed. FVR, other VWRC partners, and our grantors have already made an investment of over \$4 million to restore the riparian corridor and maintain a flowing Verde River. FVR and other VWRC partners are now targeting the remaining dense patches of invasive plants as well as transitioning to focusing more on monitoring and maintenance of previously treated sites to prevent recolonization. CIPMP also includes social, economic, and management goals - all directly related to the project tasks proposed here.

The overarching goals of this project are to:

1. improve riparian function and habitat on the Verde River,
2. provide local young adults and veterans with job skills and experience, and
3. bring communities together to emphasize the value of the Verde.

FVR will collaborate with five partner organizations: Arizona Conservation Corps (AZCC), Vets4Hire, EcoPlateau Research, Coconino National Forest (CNF), and RiversEdge West. The four main components of the project are:

1. monitoring previously treated areas of the Verde River and Oak Creek between Cottonwood and Camp Verde,
2. initial treatment of target invasive plants,
3. treating invasive regrowth along this stretch of the river, and
4. planning and implementing volunteer events in conjunction with CNF to engage the community in stewardship activities.

These actions will build upon the work completed and underway by FVR field crews and others, while accomplishing the common goal of cooperatively managing invasive plants.

## **Project Overview**

**Background:** One of the most significant natural resources in Arizona is the Verde River and its diverse Fremont cottonwood-Gooddings willow riparian forests. These rare riparian areas sustain a diversity of wildlife, providing habitat for migratory birds and serving as a centrally important economic and recreational resource to local communities. Invasive plant species – particularly tamarisk (*Tamarix spp.*), tree of heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), and Russian olive (*Elaeagnus angustifolia*) – threaten the health and sustainability of these communities on the Verde River.

In 2010, Verde Watershed stakeholders gathered to discuss and strategize how to cooperatively manage woody invasive plants on a watershed-scale in the Verde. These workshops resulted in the creation of the Verde River Cooperative Invasive Plant Management Plan (CIPMP) and a community-based public-private partnership called the Verde Watershed Restoration Coalition (VWRC). VWRC is a partnership of agencies and non-profits working collaboratively to improve riparian health on a watershed scale, representing 25 stakeholder organizations with both private and public land managers and stakeholders. It was born from the shared desire of diverse organizations, agencies, and private landowners to address the impact and spread of invasive plants in the watershed's riparian areas, an issue that requires a holistic, watershed-level approach with broad stakeholder participation. Friends of the Verde River (FVR) is the non-profit organization that convenes and organizes VWRC and carries out many of the goals and priority projects of the CIPMP. FVR works collaboratively to restore habitat, sustain river flows, and promote community stewardship to support a healthy Verde River system.

With this holistic perspective for engaging stakeholders throughout the watershed, the purpose of CIPMP is to implement restoration projects that use a strategic approach to controlling prioritized invasive plants in the riparian areas of the Verde Watershed while increasing stakeholder collaboration. In 2015 and 2017, the Arizona Water Protection Fund funded FVR to meet VWRC goals and priority projects, treating and monitoring invasive plants on a 47-mile reach along the Upper Verde and 2.8 miles between Clarkdale and Cottonwood. As a part of this work, FVR retreated and monitored some areas that had been previously treated by FVR and by EcoResults. This work emphasized the importance of monitoring and the need for multiple treatments in one area over time. Our proposal addresses this need on a project site directly downstream from the previously funded project sites where most of the initial treatment has been completed, paid for with prior funding from CNF and the Walton Family Foundation.

Since 2012, when FVR began implementing CIPMP, over 8,400 acres have been initially treated and over 2,800 acres have been retreated. Some of the first treatment sites from 2012-2014 are getting their second round of retreatment. FVR has been able to accomplish this through participation and financial support from our partners, including the U.S. Forest Service, National Park Service, U.S. Fish & Wildlife Service, Arizona Game and Fish Department, Arizona Department of Forestry and Fire Management, Arizona Department of Environmental Quality, Northern Arizona University Research Greenhouse, RiversEdge West, The Nature Conservancy, Oak Creek Watershed Council, Arizona Conservation Corps, Arizona State Parks, The Vetrplex, Yavapai County, Town of Camp Verde, City of Cottonwood, Town of Clarkdale, and over 235 private landowners.

**Goals:** The overarching goals of this proposed project are to continue to improve riparian habitat and function by managing invasive plants that threaten the biodiversity and long-term health of the Verde River through cooperative stakeholder participation. Three specific project goals are:

1. Improve the health of the Verde River system through monitoring and maintaining previous invasive woody plant treatments with careful data collection and integrated control methods within the riparian corridors of the Verde watershed.

2. Provide opportunities for success and job training through hiring, educating, and training local conservation corps members and military veterans to effectively perform restoration practices.
3. Create citizen scientists through volunteer involvement in the hands-on removal of invasive plants, monitoring of treatments in order to increase knowledge, and understanding of the impacts of invasive plants as well as the ecological, social, and economic importance of these riparian areas.

**Objectives:**

1. FVR will secure a contract with AZCC and with the Vetraplex to provide labor to treat, monitor, and retreat invasive plant regrowth from 275 acres along 4.1 miles of the Verde River and Oak Creek.
2. FVR and CNF will plan and implement two volunteer events (one annually) along this stretch of the river to engage our local community in stewardship activities and communicate directly with adjacent private landowners on the value of healthy native riparian habitat.

**Statement of problem:** Invasive plants can impact ecosystem function significantly by altering wildlife habitat, soils, flow and fire regimes, vegetation structure, river geomorphology, and biodiversity. The Verde River is one of the few remaining free flowing rivers in Arizona; an arid landscape where scarce surface water and riparian areas provide critically important resources for both humans and wildlife. While much of the initial removal of invasive plants has taken place, replacement by native plants is by no means certain. Those who work on riparian restoration have found that it is necessary to monitor and retreat sites to protect the health and sustainability of the native plant communities within this heavily-used river corridor. The general public is typically unaware of invasive plant issues and the many values of a healthy river system.

**Statement of solutions:** This proposed project will provide trained field crew labor to address the threat to our riparian areas from invasive plants by implementing the remaining initial treatment to the project area and the often overlooked maintenance and monitoring critical to a successful restoration project. FVR realizes the importance of the early detection and rapid response to controlling invasive plants before they can form large monocultures. The same attention, however, needs to be paid to the continued monitoring of treated project sites to ensure replacement by native vegetation once invasive species are removed. Detecting regrowth early and collecting data to analyze and determine the reasons for regrowth is key to continued success in adaptive management for long-term success in controlling invasive plants.

**Statement of Project Years of Benefit:** The activities described in this proposal will have many years of ecological, social, and economic benefits in the project area and in the greater Verde watershed. This project will ensure that invasive plant treatments continue to be successful. FVR's organizational capacity and field tested protocols will support the continued monitoring and project maintenance for many years following this project. The volunteer events and community engagement are intended to have a lasting effect on our community's support of watershed conservation and riparian restoration projects.

The benefits of the proposed activities include:

- Directly benefitting the Verde River and a perennial tributary (Oak Creek);
- Furthering the success and commitment of FVR and VWRC in riparian restoration;
- Protecting native riparian vegetation and aid natives in recolonizing invaded habitat;
- Improving river health through reducing channelization, restoring natural stream geomorphology, and increasing floodplain connections;
- Improving riparian habitat for wildlife;
- Creating local employment for youth and veterans; and
- Engaging communities to support and understand the economic value of the Verde River.

## Project Location & Environmental Contaminant Information FY 2019

<b>Project Location Information</b>			
1. County: <u>Yavapai</u>	2. Section(s): <u>Several</u>	3. Township: <u>15N</u>	4. Range: <u>4E</u>
<p>5. Watershed: <u>Verde</u></p> <p>6. 8 or 10 Digit Hydrologic Unit Code (HUC): <u>15060202</u></p> <p>7. Name of USGS Topographic Map where project area is located: <u>Cornville, AZ</u></p> <p>8. State Legislative District: <u>06</u> (Information available at: <a href="http://azredistricting.org/districtlocator/">http://azredistricting.org/districtlocator/</a>)</p> <p>9. Land ownership of project area: <u>Coconino National Forest</u></p> <p>10. Current land use of project area: <u>Public Lands</u></p> <p>11. Size of project area (in acres): <u>275 DIRECT</u></p> <p>12. Stream Name: <u>Verde River and Oak Creek</u></p> <p>13. Length of stream through project area: <u>4.1 miles</u></p> <p>14. Miles of stream benefited: <u>4.1 miles</u></p> <p>15. Acres of riparian habitat: <u>275 acres</u> will be:</p> <div style="margin-left: 200px;"> <input checked="" type="checkbox"/> Enhanced  <input checked="" type="checkbox"/> Maintained  <input checked="" type="checkbox"/> Restored  <input type="checkbox"/> Created         </div>			
<p>16. General description and/or delineation for the area of impact of the project within the watershed.  <u>Riparian area within 100 year FEMA floodplain on Coconino National Forest lands. Project-related work on adjacent private lands will be completed with funding from other sources.</u></p>			
<p>17. Provide directions to the project site from the nearest city or town. List any special access requirements:  <u>From Cornville travel west on E Cornville Road. Turn south on S Tissaw Rd and turn east on Thede Ln, traveling to the end of Thede Ln OR travel east on E Cornvill Road from Cornvill, turn south on Forest 119A Rd and bear right/north at Y intersection.</u></p>			
<b>Environmental Contaminant Location Information</b>			
<p>1. Does your project site contain known environmental contaminants? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants: _____</p> <p>2. Are there known environmental contaminants in the project vicinity? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants: _____</p> <p>3. Are you asking for Arizona Water Protection Fund monies to identify whether or not environmental contaminants are present? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p>			

## Scope of Work

In the Verde River watershed, we need to pay attention to upstream areas that can provide a constant stock of invasive species and high-density stable populations of invasive plants. High priority areas for monitoring and retreatment, therefore include sites in the upper reaches of the watershed and tributaries that are sources of seed and propagules that flow downstream, areas with high wildlife value, sites with tamarisk and tree of heaven greater than 10% of the total canopy cover, areas with the presence of Russian olive and giant reed (zero tolerance species), and areas that are at high risk for fire. The proposed project here builds on FVR's two previous projects with Water Protection Fund which focused on more upstream reaches of target invasive plants. The project proposed here focuses on the next downstream reach of these projects with high densities of target invasive species. At the confluence of the Verde River with a major tributary (Oak Creek), the riparian corridor contains large stands of invasive species (particularly giant reed). Within the 275-acre project area proposed here, 76.9 acres have been infested with target invasive plants or 27.9%. This is over twice the density of the project area for 17-191 (between Clarkdale and Cottonwood) and several times the density of invasive plants in the much larger area of the Upper Verde project (15-187). The proposed project site is also adjacent to areas that have all already been initially treated or will be treated this winter, and adjacent to many sites that have already been retreated as well. The four main components of the project are:

1. **Invasive Plant Monitoring:** Funding would support monitoring of previously treated sites within the project areas for two years to maintain the benefits of prior invasive plant removal. The project area spans a total of 275 riparian acres on both sides of the river within a 4.1-mile river reach located at the Verde River and Oak Creek confluence: a 1.4-mile reach of Oak Creek and a 2.7-mile reach of the Verde River, within CNF and adjacent private properties (see project map). The project areas comprise a continuous reach of the river starting 0.5 miles upstream of the confluence on the Verde River and 1.4 miles upstream on Oak Creek at the CNF property boundaries, extending 2.2 miles downstream of the confluence to adjacent private lands. All four target invasive species were identified in the project area from monitoring surveys between 2013 and 2018, and covered 28% of the project area. Over the past three years 60% of populations have been treated once by FVR's field crews. FVR has acquired funding to complete treatment on the private properties within the project area and Water Protection Fund monies would be focused exclusively toward project work on CNF lands.
2. **Invasive Plant Treatment:** Funding would support the remaining initial treatment of all target invasive species within the project area. FVR crews have initially treated 60% of target invasive plants within the project area and will continue to treat private properties during the 2018/19 winter season. However, this still leaves over 20% (16 acres of invasive plants) of the initial treatment in the project area to be completed, including several high-density stands of giant reed. Adjacent private lands to the CNF within this proposed project area will be treated for target invasive species during the 2018-19 winter treatment season with other funding sources and volunteers.
3. **Invasive Plant Retreatment:** Once regrowth has been monitored and detected, funding will support retreatment of regrowth of invasive plants to protect past investments in the initial treatment of nearby project sites. The proposed project area is downstream of the 47-mile stretch treated, monitored, and retreated with the 2015 WPF grant and the 2.8-mile stretch monitored and retreated with the 2017 WPF grant by FVR.
4. **Public outreach and volunteering:** FVR will work with CNF to plan and implement outreach events in this project area and communicate with adjacent private landowners on the value of invasive plant removal. FVR partnered with CNF in March 2018 for a very successful spring restoration event with over 30 volunteers and will follow that successful model in the proposed project area to combine education with restoration.

Crews will begin by monitoring the area following the monitoring protocol developed by FVR with VWRRC partners. This monitoring protocol includes the collection of spatial data to show location and size of invasive plant regrowth patches as well as newly established initial growth. The crew will use tablets and data collection software (Collector) to monitor recruitment of native species post-treatment by surveying established long term plots and establishing new plots. Portions of the proposed project area were initially treated during the past four field seasons. In addition to identifying regrowth to be treated the following season, monitoring data are used to measure treatment effectiveness. Our GIS Specialist will process and analyze all field data and provide information for reports.

Crews will use a variety of manual (hand pulling, loppers, and hand saws), mechanical (chainsaws), and chemical methods to treat tamarisk, Russian olive, giant reed, and tree of heaven. During treatment, crews will first clear any debris from the base of the tree to minimize hazards. Once the debris is cleared they will use chainsaws, loppers, or hand-saws (depending on the size of the tree) to cut it into manageable pieces. Crews will follow the protocol in deciding whether resulting biomass will be made into small “habitat piles” or it will be dragged out of the floodplain and scattered. The habitat piles will be smaller than four feet cubed and will create habitat for small mammals and birds. Both piling and scattering the biomass ensures pieces do not regrow. The piles and cut debris are left above the high water mark to dry out before eventually being flooded downstream. It is anticipated the piles will eventually flood, which is why the pieces are cut small in order to prevent any issues downstream.

During treatment, crews will be provided with a tablet that has a GPS locator and all previously mapped invasive species data. These data will allow crews to see where populations have been found to help them target those areas. Crews will also use a standard treatment form in Arc Collector to document invasive plant removal efforts daily. These data are collected for each species treated and georeferenced to polygons using Arc Collector. These data will inform the adaptive management process as well as document herbicide use.

Volunteers will receive training in restoration practices (such as hand-pull tree of heaven when the soil is moist) and as citizen scientists in the collection of monitoring data post-treatment. FVR has seen great success with these methods in nearby areas. This activity will engage local members of the community and will allow FVR to convey the benefits a healthy river provides to wildlife and people. This sort of community involvement and “buy-in” from individuals is what makes this program a success and ensures that the river will be taken care of and protected in the future.

### **Task 1: Permits, Authorizations, Clearances, Surveys, and Contracts**

**Task Description:** FVR will work with CNF to obtain and submit to the project manager all authorizations, clearances, and contracts and perform any consultations necessary to complete the tasks listed in this scope of work. This task will begin with a formal meeting with personnel from CNF to discuss project implementation and compliance. As initial treatments have been completed on portions of the project area over the past three treatment seasons, FVR does not anticipate any compliance issues and has requested confirmation from CNF.

FVR will secure contracts with AZCC and Vetraplex for on-the-ground restoration work. Both contracts will stipulate two members from each crew shall hold a current Commercial Applicator License through the AZ Department of Agriculture. All field crews will take an EPA Herbicide Handlers Course administered by the State. FVR will also contract EcoPlateau Research to model and identify presence/absence of critical habitat within the project area, ensuring invasive plant treatments will not negatively impact threatened or endangered species under the Endangered Species Act. As range shifts or expansions can occur for listed species from year to year (e.g. southwestern willow flycatcher), this process will be necessary annually to adaptively manage for treatment appropriately.

**Task Purpose:** To comply with all local, state, and federal permit requirements, environmental laws and regulations, and to obtain legal access to the project areas. Contracts with AZCC and the Vetraplex will ensure we have capacity to accomplish this project.

**Deliverable Descriptions:** Copies of AZCC contract, Vetraplex Contract, herbicide applicator licenses, SHPO clearance, existing archeological reports, CNF participating agreement, T&E species data and relevant FWS concurrence, ADEQ permit, relevant NEPA documentation.

**Responsible Personnel:** Restoration Manager (Matt Wilson), Field Coordinator (Ben Kowalewski), Program Administrator (Matt Gilbert), Executive Director (Nancy Steele), CNF Personnel (Debra Crisp and Emily Stoddard), EcoPlateau Research (Matt Johnson).

**Deliverable Due Date:** All project compliance will be completed prior to fieldwork activities.

**Reimbursable cost: \$16,400**

### **Task 2: Develop Project Plans**

**Task Description:** FVR will work with CNF to develop three separate plans for work associated with implementation of monitoring, initial treatment, and retreatment. All plans will include a detailed description of the work to be implemented during the grant cycle for each action area.

The project plans shall consist of the following:

1. Monitoring plan –a detailed plan that describes how the project areas will be monitored. The monitoring plan will include:
  - a. Maps to scale, of the project area clearly showing the proposed monitoring sites
  - b. Attributes to be measured, as well as frequency of monitoring
  - c. Rationale for the number and location of monitoring points
  - d. Procedures used to measure attributes and specific data analyses to be preformed
  - e. Materials and equipment list
  - f. Discussion of quality assurance/quality control
  - g. Sample monitoring data collection sheets including photo point record sheets
  - h. Personnel responsible for completion of the Task.
2. Treatment plan – FVR will develop and submit a detailed plan to include a description of the work to be implemented during the grant cycle to initially treat 16 acres of high density invasive plants in the 275-acre project area. The plan will list a combination of manual, mechanical, and chemical control methods and techniques currently being used by the Forest Service and conform to industry standards.
3. Re-treatment plan – FVR will develop and submit a detailed plan to include a description of the work to be implemented during the grant cycle to retreat post-monitoring along the 4.1-mile stretch of river, following the same control methods outlined in the treatment plan.

**Task Purpose:** The purpose of this task is to develop plans that provide a clear picture of when and how the work is to be accomplished, to ensure successful outcomes.

**Deliverable Description:** Develop project plans for monitoring, initial treatment, and retreatment.

**Responsible personnel:** Restoration Manager (Matt Wilson), Field Coordinator (Ben Kowalewski), GIS Specialist (Emily Garding).

**Deliverable Due Date: Year 1-August 1, 2019 Year 2-August 1, 2020**

**Reimbursable cost: \$6,706**

### **Task 3: Implement Monitoring Plan**

**Task Description:** FVR will implement the monitoring plan developed under Task 2 to help explain the environmental processes occurring due to project work. This plan will use protocol currently being used to monitor other FVR projects across the watershed. The FVR monitoring plan uses a tiered approach to monitoring, including both quantitative and qualitative elements. These approaches will provide data to evaluate whether actions are meeting management objectives, indicators of whether modifications need to be made (adaptive management) during the process, and plant community changes (native and invasive)

within the riparian corridor. Monitoring and native plant community surveys will occur during the growing season, prior to retreatment activities in Year 1, after initial and retreatment during Year 1, and after remaining retreatment in Year 2.

**Task Purpose:** monitoring is an important part of invasive plant management that is often overlooked. Monitoring information is used to adapt management techniques to ensure the long term success of the project, maximize effectiveness, document restoration benefits, and assess the health of the riparian ecosystem.

**Deliverable description:** An annual report will be developed and submitted to the WPF Project Manager after each field season. The report will include a summary of monitoring data and results, a visual map of monitored sites, and include all monitoring completed during either Year 1 or Year 2.

**Responsible personnel:** GIS Specialist (Emily Garding), Field Coordinator (Ben Kowalewski) contracted AZCC and Vetraplex crews, Restoration Manager (Matt Wilson), Field Technicians (Seasonal)

**Deliverable Due Date: Year 1-July 30, 2020; Year 2-July 30, 2021**

**Reimbursable cost: \$27,619**

#### **Task 4: Implement Initial Treatment Plan**

**Task Description:** FVR will implement the Initial Treatment Plan developed under Task 2. The plan will include a detailed description of the work to be implemented during the grant cycle. In total, FVR will treat the remaining 16 acres of high-density, well established invasive plant populations across the project area. Crews will use a combination of manual, mechanical, and chemical control methods and techniques, which are currently being used by the Forest Service and conform to industry standards. Initial Treatment will be completed during Year 1.

**Task Purpose:** To remove the remaining established populations of Russian olive and giant reed while reducing tamarisk and tree of heaven populations to less than 10% of the riparian zone within the project area.

**Deliverable description:** 16 acres will be initially treated during the grant cycle. Results will be provided to the WPF Program Manager as part of Task 3 and Task 7.

**Responsible Personnel:** AZCC and Vetraplex crews, GIS Specialist (Emily Garding), Field Coordinator (Ben Kowalewski), Restoration Manager (Matt Wilson), Field Technician (seasonal)

**Deliverable Due Date: Year 1: April 30, 2020**

**Reimbursable Cost: \$79,669**

#### **Task 5: Implement Retreatment Plan**

**Task Description:** FVR will implement the Retreatment Plan developed under task 2. The plan will include a detailed description of the work to be implemented during the grant cycle. In total, FVR will retreat the entire project area along 275 riparian acres and 4.1 river miles. Crews will use a combination of manual, mechanical, and chemical control methods and techniques, which are currently being used by the forest service and conform to industry standards. Retreatment will be split between Year 1 and Year 2, with initial treatment completed in Year 1 then retreated in Year 2.

**Task Purpose:** To retreat tamarisk, Russian olive, giant reed, and tree of heaven in order to reduce tamarisk and tree of heaven infestations to less than 10% of the riparian zone within the project area and to eliminate giant reed and Russian olive from the project area.

**Deliverable description:** 77 acres will be retreated during the grant cycle (46 acres in Year 1 and 31 acres in Year 2). Results will be provided to the WPF Program Manager as part of Task 3 and Task 7.

**Responsible Personnel:** AZCC and Vetraplex crews, GIS Specialist (Emily Garding), Field Coordinator (Ben Kowalewski), Restoration Manager (Matt Wilson)

**Deliverable Due Date: Year 1: April 30, 2020; Year 2: April 30, 2021**

**Reimbursable Cost: \$155,292**

#### **Task 6: Implement Volunteer Activities**

**Task Description:** FVR, in partnership with CNF, will hold two volunteer events (one in each year of the grant cycle) on the project site to educate and train citizen scientists. These events will engage local citizens in riparian restoration through invasive plant removal, monitoring, and related activities near public access points. These events will also include an educational component to better inform local community members of the importance of a healthy riparian area and the threat of invasive plants.

**Task purpose:** Use volunteer time to achieve project goals through invasive plant removal and educate the public about the threats of invasive plants on river systems, especially in the Verde Watershed, the importance of riparian health, and project information. The goal is to create excitement about the Verde watershed through education and hands-on activities.

**Deliverable Description:** A report that summarizes the events: total volunteer hours contributed, the number of participants, and restoration accomplishments at each event.

**Responsible Personnel:** Community Outreach Coordinator (Laura Jones), Field Coordinator (Ben Kowalewski), Restoration Manager (Matt Wilson), CNF Personnel

**Deliverable Due Date:** Jun 1 2020; June 1, 2021

**Reimbursable Cost:** \$2,678

### **Task 7: Final Report**

**Task Description:** FVR will submit a final report to include a summary of all methods used, outcomes of all tasks, analysis of all project data, suggestions for any changes or future actions, and an evaluation of the success in meeting project objectives. FVR will provide all data generated from this project and make an oral presentation in summary of the final report to the WPF Commission.

**Task Purpose:** To provide a comprehensive final report for public distribution that gives a detailed description of the project and highlights its benefits to the State of Arizona

**Deliverable Description:** Final Report

**Responsible Personnel:** Restoration Manager (Matt Wilson), Field Coordinator (Ben Kowalewski), GIS Specialist (Emily Garding), Program Administrator (Matt Gilbert), Executive Director (Nancy Steele)

**Deliverable Due Date:** August 30, 2021

**Reimbursable cost:** \$4,086

## Verde River/Oak Creek Habitat Improvement Project Detailed Budget Breakdown

Task 1: Permits, Authorizations, Clearances, Surveys, and Contracts					Notes
	Rate	Unit	Quantity	Total	
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	40	\$ 1,488	Coordination with CNF, consultations, contracts, authorizations
Field Coordinator	\$ 25	hrs	50	\$ 1,258	Support to EcoPlateau during T&E surveys
GIS Specialist	\$ 36	hrs	10	\$ 363	
Program Administrator	\$ 27	hrs	30	\$ 805	Contract negotiation
Executive Director	\$ 52	hrs	20	\$ 1,050	Contract review
<b>Subtotal</b>				<b>\$ 4,965</b>	
<b>Outside Service Costs</b>					
EcoPlateau Research	\$ 5,000	Survey	2	\$ 10,000	T&E critical habitat modeling and identification annually
<b>Subtotal</b>				<b>\$ 10,000</b>	
<b>Other Direct Costs</b>					
Travel	\$0.55	mile	100	\$ 55	Average 25 miles roudtrip to project site from FVR office; GSA rate
Applicators License/permits	\$ 300	fee	2	\$ 600	Proportional costs of total relative to project area
<b>Subtotal</b>				<b>\$ 655</b>	
<b>Task Subtotal</b>				<b>\$ 15,619</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 781</b>	
<b>Task 1 Total</b>				<b>\$ 16,400</b>	
Task 2: Develop Project Plans					Notes
	Rate	Unit	Quantity	Total	
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	65	\$ 2,417	Plan development, coordination with CNF
Field Coordinator	\$ 25	hrs	70	\$ 1,762	Field verification of project plans
GIS Specialist	\$ 36	hrs	60	\$ 2,181	Site maps
<b>Subtotal</b>				<b>\$ 6,360</b>	

<b>Other Direct Costs</b>					
Travel	\$0.55	mile	50	\$ 27	
<b>Subtotal</b>				<b>\$ 27</b>	
<b>Task Subtotal</b>				<b>\$ 6,387</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 319</b>	
<b>Task 2 Total</b>				<b>\$ 6,706</b>	
<b>Task 3: Implement Monitoring Plan</b>					
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>	<b>Notes</b>
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	120	\$ 4,463	Monitoring crew training; protocol updates; data verification
Field Coordinator	\$ 25	hrs	120	\$ 3,020	Field visits and monitoring; crew training
Field Technician	\$ 20	hrs	300	\$ 6,090	Botanists for quality assurance in identification/data collection
GIS Specialist	\$ 36	hrs	100	\$ 3,635	Collector App development, mapping, data quality control
<b>Subtotal</b>				<b>\$ 17,208</b>	
<b>Outside Service Costs</b>					
AZCC/VetraPlex	\$ 27	hour	280	\$ 7,560	Two VetraPlex crew members to monitor (local knowledge)
<b>Subtotal</b>				<b>\$ 7,560</b>	
<b>Other Direct Costs</b>					
Data Collection Hardware (Tablets)	\$ 350	each	2	\$ 700	One replacement per year
ESRI Software	\$ 100	each	2	\$ 200	One license per year
Field sampling supplies	\$ 250	year	2	\$ 500	Pin flags, plant press, field guides, etc
Travel	\$0.55	mile	250	\$ 136	Average 25 miles roudtrip to project site from FVR office
<b>Subtotal</b>				<b>\$ 1,536</b>	
<b>Task Subtotal</b>				<b>\$ 26,304</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 1,315</b>	
<b>Task 3 Total</b>				<b>\$ 27,619</b>	

<b>Task 4: Implement Initial Treatment Plan</b>					<b>Notes</b>
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>	
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	70	\$ 2,603	Site visits, crew training, technical guidance
Field Coordinator	\$ 25	hrs	100	\$ 2,516	Site visits and supervise crews; coordination with CNF
Field Technician	\$ 20	hrs	80	\$ 1,624	Site visits and field; organize and coordinate work with crews
GIS Specialist	\$ 36	hrs	70	\$ 2,544	Mapping, Collector app creation, data quality control
<b>Subtotal</b>				<b>\$ 9,288</b>	
<b>Outside Service Costs</b>					
AZCC/VetraPlex	\$ 7,250	week	9	\$ 65,250	Invasive species removal
Verde Valley Weed Control	\$ 45	acres	14	\$ 630	Herbicide mixing and supplies
<b>Subtotal</b>				<b>\$ 65,880</b>	
<b>Other Direct Costs</b>					
Chipper Time	\$ 25	hour	15	\$ 375	
Travel	\$ 0.55	mile	150	\$ 82	Average 25 miles roudtrip to project site from FVR office
Field supplies	\$ 250	year	1	\$ 250	Replacement sprayers, PPE, etc
<b>Subtotal</b>				<b>\$ 707</b>	
<b>Task Subtotal</b>				<b>\$ 75,875</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 3,794</b>	
<b>Task 4 Total</b>				<b>\$ 79,669</b>	
<b>Task 5: Implement Rreatment Plan</b>					<b>Notes</b>
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>	
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	140	\$ 5,207	Site visits, crew training, technical guidance
Field Coordinator	\$ 25	hrs	260	\$ 6,543	Site visits and supervise crews; coordination with CNF
Field Technician	\$ 20	hrs	220	\$ 4,466	Site visits and field; organize and coordinate work with crews
GIS Specialist	\$ 36	hrs	140	\$ 5,089	Mapping, Collector app creation, data quality control
<b>Subtotal</b>				<b>\$ 21,304</b>	
<b>Outside Service Costs</b>					

AZCC/VetraPlex	\$ 7,250	week	17	\$ 123,250	Invasive species removal
Verde Valley Weed Control	\$ 45	acres	50	\$ 2,250	Herbicide mixing and supplies
<b>Subtotal</b>				<b>\$ 125,500</b>	
<b>Other Direct Costs</b>					
Chipper Time	\$ 25	hour	15	\$ 375	
Travel	\$ 0.55	mile	400	\$ 218	Average 25 miles roudtrip to project site from FVR office
Field supplies	\$ 250	year	2	\$ 500	Replacement sprayers, PPE, etc
<b>Subtotal</b>				<b>\$ 1,093</b>	
<b>Task Subtotal</b>				<b>\$ 147,897</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 7,395</b>	
<b>Task 5 Total</b>				<b>\$ 155,292</b>	
<b>Task 6: Implement Volunteer Activities</b>					
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>	<b>Notes</b>
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	10	\$ 372	Train and supervise volunteers; teach riparian ecology
Field Coordinator	\$ 25	hrs	10	\$ 252	Train and supervise volunteers
Community Outreach Coordinator	\$ 35	hrs	40	\$ 1,400	Organize and coordinate events
<b>Subtotal</b>				<b>\$ 2,024</b>	
<b>Other Direct Costs</b>					
Volunteer Events	\$ 250	each	2	\$ 500	Volunteer supplies (gloves, snacks, etc) and promotion materials
Travel	\$ 0.55	mile	50	\$ 27	Average 25 miles roudtrip to project site from FVR office
<b>Subtotal</b>				<b>\$ 527</b>	
<b>Task Subtotal</b>				<b>\$ 2,551</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 128</b>	
<b>Task 6 Total</b>				<b>\$ 2,678</b>	
<b>Task 7: Final Report</b>					
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>	<b>Notes</b>

<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	40	\$ 1,488	Report writing and data analysis
Field Coordinator	\$ 25	hrs	10	\$ 252	Field data verification
GIS Specialist	\$ 36	hrs	30	\$ 1,090	Data analysis and maps
Finance Administrator	\$ 27	hrs	20	\$ 537	Proof and organize data; evaluate efficiency
Executive Director	\$ 52	hrs	10	\$ 525	Report writing and review
<b>Subtotal</b>				<b>\$ 3,892</b>	
<b>Task Subtotal</b>				<b>\$ 3,892</b>	
<b>Administrative Costs (5%)</b>				<b>\$ 195</b>	
<b>Task 7 Total</b>				<b>\$ 4,086</b>	
<b>Total Request from AWPF</b>				<b>\$ 292,451</b>	

## Verde River/Oak Creek Habitat Improvement Project Detailed Matching Budget Breakdown

Task 1: Permits, Authorizations, Clearances, Surveys, and Contracts					Notes
	Rate	Unit	Quantity	Total	
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	20	\$ 744	Coordination with CNF, consultations, contracts, authorizations
Field Coordinator	\$ 25	hrs	30	\$ 755	Support to EcoPlateau during T&E surveys
GIS Specialist	\$ 36	hrs	20	\$ 727	Mapping
CNF Forest Botanist	\$ 42	hrs	5	\$ 212	Technical expertise
CNF District Weeds Coordinator	\$ 42	hrs	5	\$ 212	District expertise
CNF District Biologist	\$ 55	hrs	10	\$ 546	T&E survey support
<b>Subtotal</b>				<b>\$ 3,195</b>	
<b>Other Direct Costs</b>					
Travel	\$ 0.55	mile	100	\$ 55	Average 25 miles roudtrip to project site from FVR office
<b>Subtotal</b>				<b>\$ 55</b>	
<b>Task Subtotal</b>				<b>\$ 3,250</b>	
<b>Deminimus (10%)</b>				<b>\$ 325</b>	
<b>Task 1 Total</b>				<b>\$ 3,575</b>	
Task 2: Develop Project Plans					Notes
	Rate	Unit	Quantity	Total	
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	10	\$ 372	Plan development, coordination with CNF
Field Coordinator	\$ 25	hrs	10	\$ 252	Field verification of project plans
GIS Specialist	\$ 36	hrs	10	\$ 363	Site maps
CNF Forest Botanist	\$ 42	hrs	5	\$ 212	Technical expertise
CNF District Weeds Coordinator	\$ 42	hrs	5	\$ 212	District expertise
CNF District Biologist	\$ 55	hrs	5	\$ 273	T&E survey support
<b>Subtotal</b>				<b>\$ 1,683</b>	

<b>Task Subtotal</b>				<b>\$ 1,683</b>
<b>Deminimus (10%)</b>				<b>\$ 168</b>
<b>Task 2 Total</b>				<b>\$ 1,852</b>
<b>Task 3: Implement Monitoring Plan</b>				
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>
<b>Direct Labor Costs</b>				
Restoration Manager	\$ 37	hrs	20	\$ 744
Field Coordinator	\$ 25	hrs	20	\$ 503
Field Technician	\$ 20	hrs	20	\$ 406
GIS Specialist	\$ 36	hrs	20	\$ 727
<b>Subtotal</b>				<b>\$ 2,380</b>
<b>Outside Service Costs</b>				
AZCC/VetraPlex	\$ 27	hour	40	\$ 1,080
<b>Subtotal</b>				<b>\$ 1,080</b>
<b>Other Direct Costs</b>				
ESRI Software	\$ 100	each	2	\$ 200
Field sampling supplies	\$ 250	year	1	\$ 250
Travel	\$ 0.55	mile	125	\$ 68
<b>Subtotal</b>				<b>\$ 518</b>
<b>Task Subtotal</b>				<b>\$ 3,978</b>
<b>Deminimus (10%)</b>				<b>\$ 398</b>
<b>Task 3 Total</b>				<b>\$ 4,376</b>
<b>Task 4: Implement Initial Treatment Plan</b>				
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>
<b>Direct Labor Costs</b>				
Restoration Manager	\$ 37	hrs	20	\$ 744

**Notes**

Monitoring crew training; protocol updates; data verification  
 Field visits and monitoring; crew training  
 Botanists for quality assurance in identification/data collection  
 Collector App development, mapping, data quality control

Two VetraPlex crew members to monitor (local knowledge)

One license per year  
 Pin flags, plant press, field guides, etc  
 Average 25 miles roudtrip to project site from FVR office

Site visits, crew training, technical guidance

Field Coordinator	\$ 25	hrs	20	\$ 503	Site visits and supervise crews; coordination with CNF
Field Technician	\$ 20	hrs	20	\$ 406	Site visits and field; organize and coordinate work with crews
GIS Specialist	\$ 36	hrs	10	\$ 363	Mapping, Collector app creation, data quality control
<b>Subtotal</b>				<b>\$ 2,017</b>	
<b>Outside Service Costs</b>					
AZCC/VetraPlex	\$ 7,250	week	1	\$ 7,250	Invasive species removal
Verde Valley Weed Control	\$ 45	acres	2	\$ 90	Herbicide mixing and supplies
<b>Subtotal</b>				<b>\$ 7,340</b>	
<b>Other Direct Costs</b>					
Chipper Time	\$ 25	hour	5	\$ 125	
Travel	\$ 0.55	mile	100	\$ 55	Average 25 miles roudtrip to project site from FVR office
Field supplies	\$ 250	year	1	\$ 250	Replacement sprayers, PPE, etc
<b>Subtotal</b>				<b>\$ 430</b>	
<b>Task Subtotal</b>				<b>\$ 9,786</b>	
<b>Deminimus (10%)</b>				<b>\$ 979</b>	
<b>Task 4 Total</b>				<b>\$ 10,765</b>	
<b>Task 5: Implement Rreatment Plan</b>					
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>	<b>Notes</b>
<b>Direct Labor Costs</b>					
Restoration Manager	\$ 37	hrs	30	\$ 1,116	Site visits, crew training, technical guidance
Field Coordinator	\$ 25	hrs	30	\$ 755	Site visits and supervise crews; coordination with CNF
Field Technician	\$ 20	hrs	30	\$ 609	Site visits and field; organize and coordinate work with crews
GIS Specialist	\$ 36	hrs	30	\$ 1,090	Mapping, Collector app creation, data quality control
<b>Subtotal</b>				<b>\$ 3,570</b>	
<b>Outside Service Costs</b>					
AZCC/VetraPlex	\$ 7,250	week	2	\$ 14,500	Invasive species removal
Verde Valley Weed Control	\$ 45	acres	10	\$ 450	Herbicide mixing and supplies
<b>Subtotal</b>				<b>\$ 14,950</b>	
<b>Other Direct Costs</b>					

Chipper Time	\$ 25	hour	5	\$ 125
Travel	\$ 0.55	mile	100	\$ 55
Field supplies	\$ 250	year	2	\$ 500
<b>Subtotal</b>				<b>\$ 680</b>
<b>Task Subtotal</b>				<b>\$ 19,200</b>
<b>Deminimus (10%)</b>				<b>\$ 1,920</b>
<b>Task 5 Total</b>				<b>\$ 21,120</b>
<b>Task 6: Implement Volunteer Activities</b>				
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>
<b>Direct Labor Costs</b>				
Restoration Manager	\$ 37	hrs	10	\$ 372
Field Coordinator	\$ 25	hrs	10	\$ 252
<b>Subtotal</b>				<b>\$ 624</b>
<b>Other Direct Costs</b>				
Travel	\$ 0.55	mile	50	\$ 27
<b>Subtotal</b>				<b>\$ 27</b>
<b>Task Subtotal</b>				<b>\$ 651</b>
<b>Deminimus (10%)</b>				<b>\$ 65</b>
<b>Task 6 Total</b>				<b>\$ 716</b>
<b>Task 7: Final Report</b>				
	<b>Rate</b>	<b>Unit</b>	<b>Quantity</b>	<b>Total</b>
<b>Direct Labor Costs</b>				
Restoration Manager	\$ 37	hrs	5	\$ 186
GIS Specialist	\$ 36	hrs	5	\$ 182
<b>Subtotal</b>				<b>\$ 368</b>
<b>Task Subtotal</b>				<b>\$ 368</b>

Average 25 miles roudtrip to project site from FVR office  
Replacement sprayers, PPE, etc

**Notes**

Train and supervise volunteers; teach riparian ecology  
Train and supervise volunteers

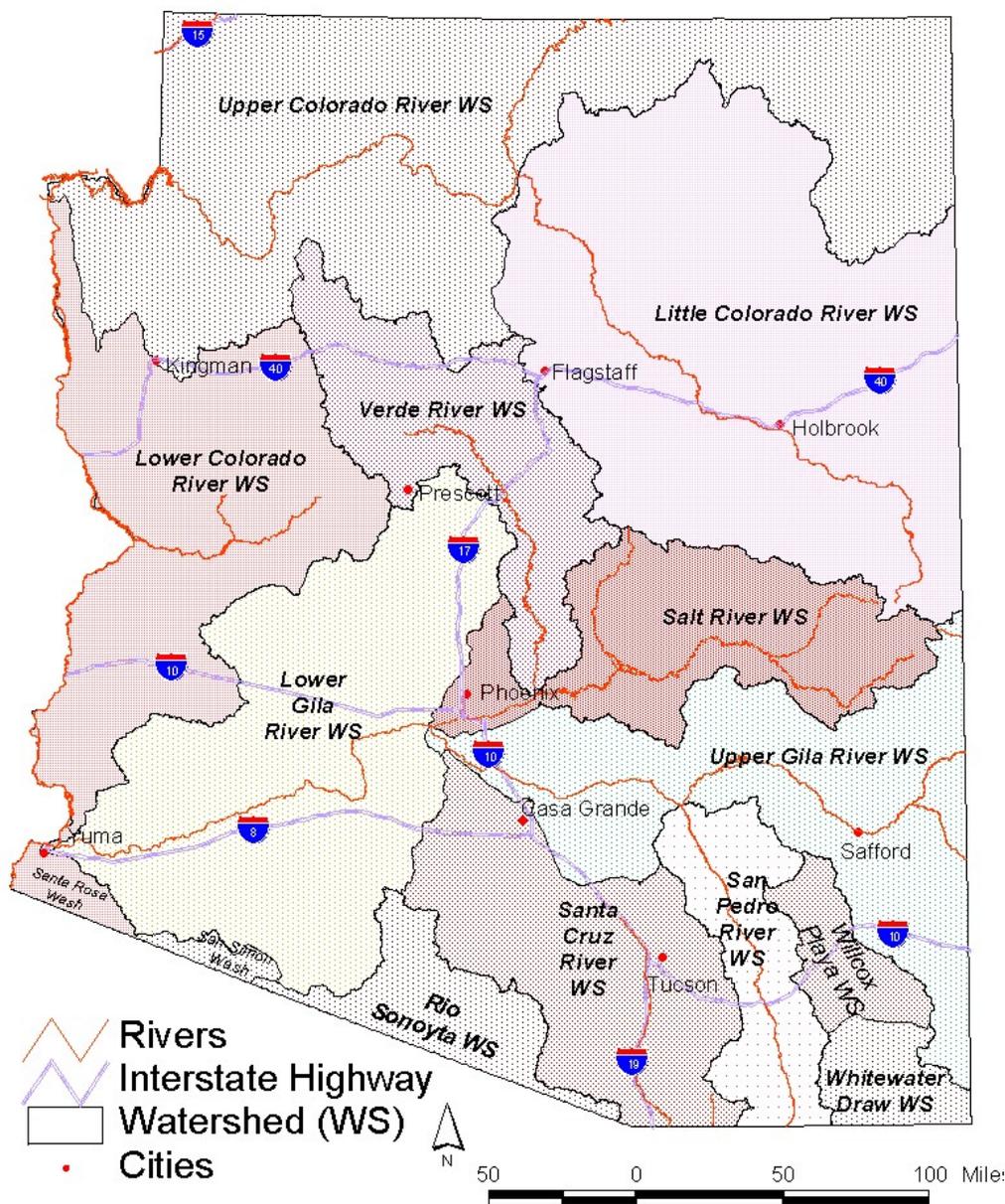
Average 25 miles roudtrip to project site from FVR office

**Notes**

Report writing and data analysis  
Data analysis and maps

<b>Deminimus (10%)</b>				<b>\$ 37</b>
<b>Task 7 Total</b>				<b>\$ 404</b>
<b>Total Matching Funds</b>				<b>\$ 42,807</b>

# Arizona Watershed Map FY 2019

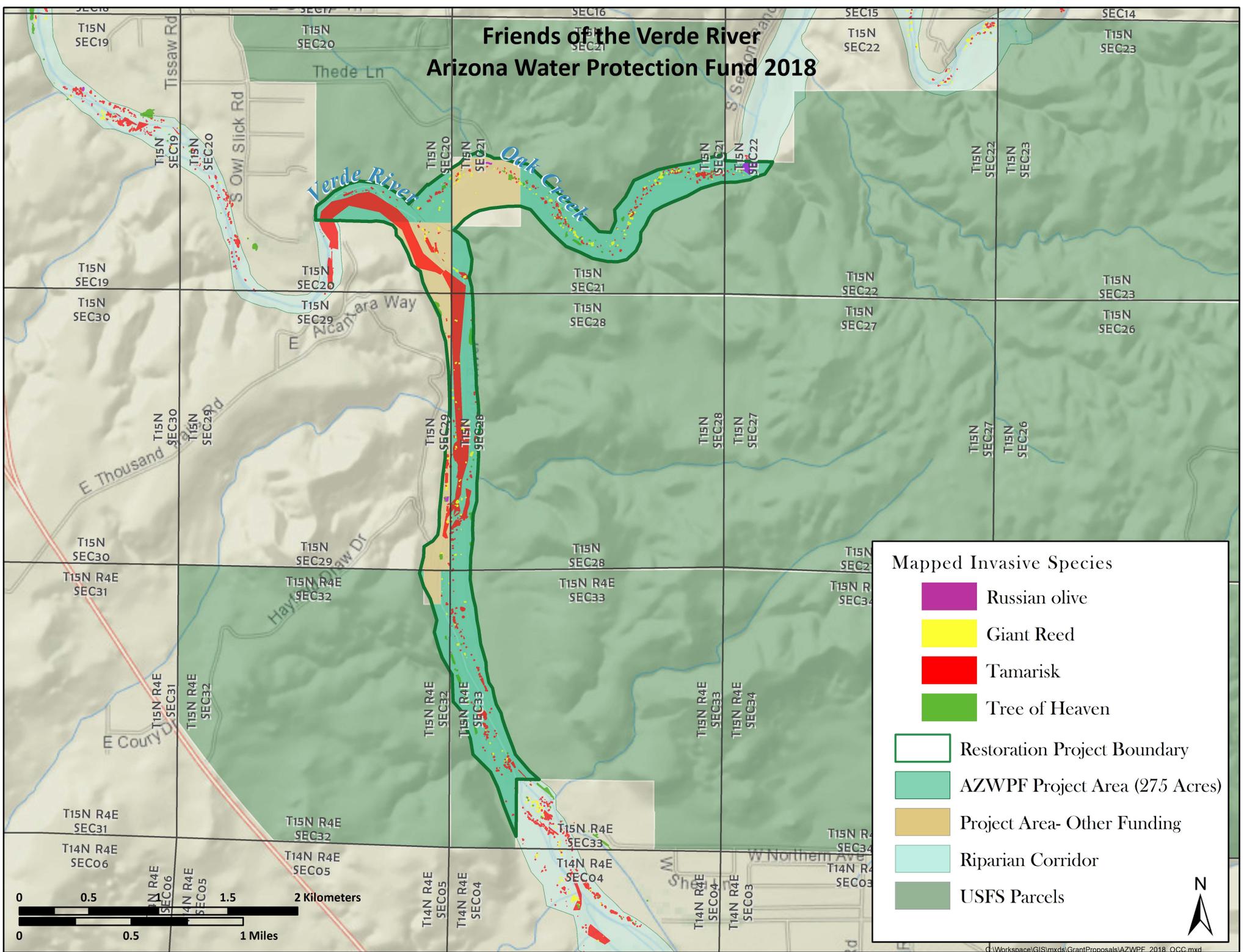


**Title of Project:** Verde River-Oak Creek Confluence Habitat Improvement Project

**Location** (include UTM's & Township/Range/Section): Verde River WS: T15N/SEC20; T15N/SEC21; T15N/SEC22; T15N/SEC29; T15N/SEC28; T15N/R4E/SEC32; T15N/R4E/SEC33

(Location must include at least one Section delineation for large scale projects)

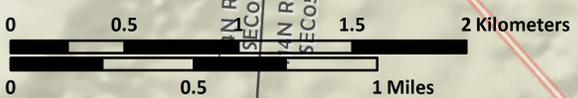
# Friends of the Verde River Arizona Water Protection Fund 2018



**Mapped Invasive Species**

- Russian olive
- Giant Reed
- Tamarisk
- Tree of Heaven

- Restoration Project Boundary
- AZWPF Project Area (275 Acres)
- Project Area- Other Funding
- Riparian Corridor
- USFS Parcels



## STATE HISTORIC PRESERVATION OFFICE Review Form

In accordance with the State Historic Preservation Act (SHPO), A.R.S. 41-861 *et seq.*, effective July 24, 1982, each State agency must consider the potential of activities or projects to impact significant cultural resources. Also, each State agency is required to consult with the State Historic Preservation Officer with regard to those activities or projects that may impact cultural resources. Therefore, it is understood that **recipients of state funds are required to comply with this law** throughout the project period. All projects that affect the ground-surface that are funded by AWPf require SHPO clearance, **including those on private and federal lands.**

The State Historic Preservation Office (SHPO) must review each grant application recommended for funding in order to determine the effect, if any, a proposed project may have on archaeological or cultural resources. To assist the SHPO in this review, the following information **MUST** be submitted with each application for funding assistance:

- A completed copy of this form, and
- A United States Geological Survey (USGS) 7.5 minute map
- A copy of the cultural resources survey report if a survey of the property has been conducted, and
- A copy of any comments of the land managing agency/landowner (i.e., state, federal, county, municipal) on potential impacts of the project on historic properties.  
NOTE: If a federal agency is involved, the agency must consult with SHPO pursuant to the National Historic Preservation Act (NHPA); a state agency must consult with SHPO pursuant to the State Historic Preservation Act (SHPA),  
**OR**
- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

### Please answer the following questions:

1. Grant Program: Arizona Water Protection Fund FY2019
  2. Project Title: Verde River-Oak Creek Confluence Habitat Improvement Project
  3. Applicant Name and Address: Friends of the Verde River, PO Box 2535, Cottonwood AZ, 86326
  4. Current Land Owner/Manager(s): Coconino National Forest
  5. Project Location, including Township, Range, Section: T15N/R4E/S20, 21, 22, 28, 29, 32, 33
  6. Total Project Area in Acres (or total miles if trail): 275
  7. Does the proposed project have the potential to disturb the surface and/or subsurface of the ground?  
 YES     NO
  8. Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected: The proposed project entails monitoring, treatment, and retreatment of invasive plants threatening riparian forest health along the Verde River and Oak Creek on Coconino National Forest lands. Workers will clear recent flood debris from around invasive plants, cut the stems, and treat with herbicide. Debris will be chipped or scattered on-site.
-

9. Describe the condition of the current ground surface within the entire project boundary area (for example, is the ground in a natural undisturbed condition, or has it been bladed, paved, graded, etc.). Estimate horizontal and vertical extent of existing disturbance. Also, attach photographs of project area to document condition: natural disturbance (floodplain)

10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?  YES  
 NO

11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?  YES  
 NO  UNKNOWN

**If YES, submit a copy of the survey report. Please attach any comments on the survey report made by the managing agency and/or SHPO**

12. Are there any buildings or structures (including mines, bridges, dams, canals, etc.), which are 50-years or older in or adjacent to the project area?  YES  NO

**If YES, complete an Arizona Historic Property Inventory Form for each building or structure, attach it to this form and submit it with your application.**

13. Is your project area within or near a historic district?  YES  NO

**If YES, name of the district:**

**Please sign on the line below certifying all information provided for this application is accurate to the best of your knowledge.**

 8/31/18  
Applicant Signature /Date

Nancy Steele  
Applicant Printed Name

**FOR SHPO USE ONLY**

SHPO Finding:

- Funding this project will not affect historic properties.
- Survey necessary – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*)
- Cultural resources present – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*)

SHPO Comments:

For State Historic Preservation Office:

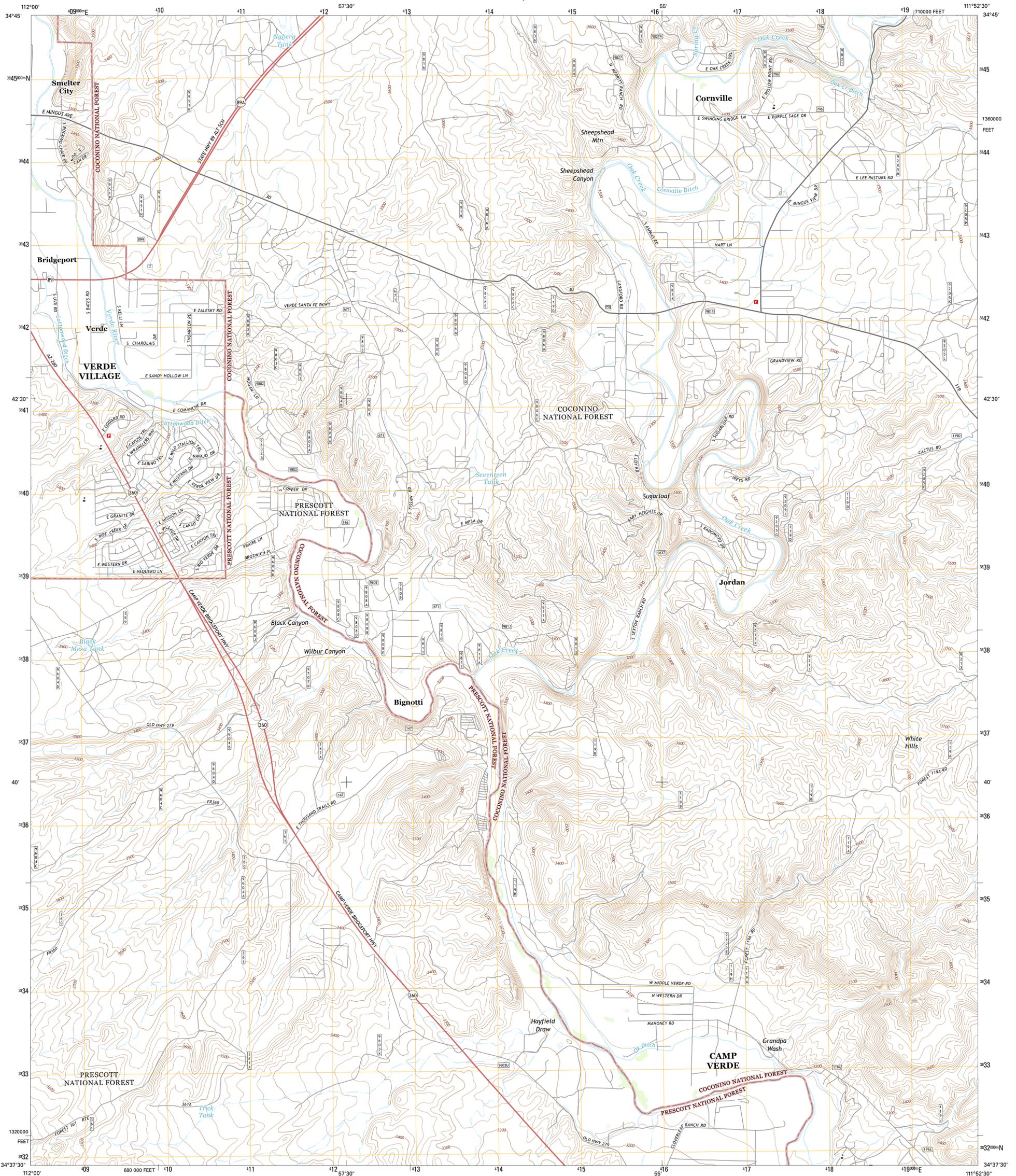
Date:



U.S. DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY



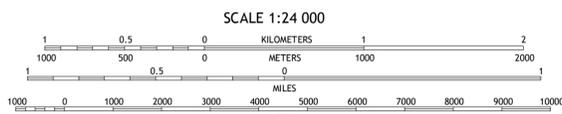
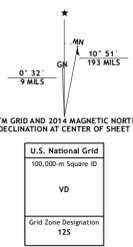
CORNVILLE QUADRANGLE  
ARIZONA-YAVAPAI CO.  
7.5-MINUTE SERIES



**Produced by the United States Geological Survey**  
North American Datum of 1983 (NAD83)  
World Geodetic System of 1984 (WGS84) Projection and  
1 000-meter grid: Universal Transverse Mercator, Zone 12S  
10 000-foot ticks: Arizona Coordinate System of 1983 (central zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, June 2013  
Roads.....HERE, ©2013  
Roads within US Forest Service Lands.....FS Topo Data with limited Forest Service updates, 2013  
Names.....GNIS, 2013  
Hydrography.....National Hydrography Dataset, 2013  
Contours.....National Elevation Dataset, 2001  
Boundaries.....Multiple sources; see metadata file 1972 - 2014  
Public Land Survey System.....BLM, 2011



CONTOUR INTERVAL 20 FEET  
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.16



**ROAD CLASSIFICATION**

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
FS Primary Route	FS Passenger Route
	FS High Clearance Route

Check with local Forest Service unit for current travel conditions and restrictions.

ADJOINING QUADRANGLES

1	2	3
4	5	6
7	8	

1 Clarkdale  
2 Page Springs  
3 Sedona  
4 Cottonwood  
5 Lake Montezuma  
6 Cherry  
7 Middle Verde  
8 Camp Verde

CORNVILLE, AZ  
2014



## **Friends of the Verde River – Key Personnel**

### **Nancy Steele – Executive Director**

Nancy is an executive manager with over twenty-five years of environmental management and research experience. Prior to joining Friends of the Verde River, Nancy was the Executive Director of the Council for Watershed Health in Los Angeles. She has served on several environmental, research, and community boards. Nancy earned her doctorate in Environmental Science and Engineering from University of California, Los Angeles, where her dissertation involved research on the environmental impacts of recycling electric vehicle batteries. She received her M.S. in zoology from Arizona State University; and her A.B. in biology from Occidental College.

### **Matt Wilson – Program Manager**

Matt is responsible for program direction, fundraising, and administrative support. He brings nine years of experience working in grant management, field ecology, stream restoration, and biomonitoring to the program. Matt holds a Bachelors in Biology and Masters in Biology with a concentration in community ecology and aquatic-terrestrial linkages.

### **Ben Kowalewski – Field Supervisor**

Ben has several years of experience with multiple conservation corps throughout the Southwest. He has worked with field crews all over central and northern Arizona and has been working in the Verde Valley since August 2016. Ben received a B.A. in Political Science with a concentration in Environmental Studies from Mercyhurst University (PA) in 2015.

### **Emily Grading – Field Data Coordinator**

Over the last decade, Emily has been involved in various conservation GIS projects across the western US. Her experience ranges from tracking wildlife and identifying potential wildlife corridors to assisting with recreation, land use, and conservation planning, in addition to mapping invasive plant infestations. Emily is putting her skills to use helping Friends of the Verde River manage data and map invasive plant treatments to help preserve and restore the Verde's unique riparian ecosystem.

### **Laura Jones – Community Outreach Coordinator**

Laura has 20 plus years' experience in non-profit, human resources and volunteer management. Laura has a Master's in Counseling from Long Island University and a Non-Profit Management Certificate from Columbia University's Graduate School of Business. In addition to her work with FVR, she is an active member of the Verde Valley community through volunteering with Big Brothers/Big Sisters and Made in Clarkdale.

### **Matt Gilbert – Finance Administrator**

Matt came to Friends with over a decade of experience in the private sector, where he supported administrative operations in a variety of capacities. With an educational background in political science and public administration, Matt has a strong interest in providing support to organizations working to mitigate the challenges associated with water scarcity in the southwest.

### **Arizona Conservation Corps (AZCC)**

AZCC has been training youth and young adults to address critical environmental and infrastructure needs on public lands since 1997. AZCC has partnered with several VWRC partners since their conception, providing a workforce for natural and cultural resource conservation needs in the Verde watershed. FVR and VWRC have created a unique partnership with AZCC to provide trained and certified corps members to treat invasive non-native plants throughout the watershed. AZCC is committed to recruiting local underserved youth for FVR and VWRC projects.

## Friends of the Verde River - Project Photos



Lower Oak Creek above the confluence with the Verde River on Coconino National Forest. There is a small patch of giant reed on the bank in the right of this photo (circled).

Confluence of the Verde River and Oak Creek.





Verde River below confluence with Oak Creek. Invasive species are circled on both banks.



Before (top) and after (bottom) photos of tamarisk removed by FVR's contracted crews during the 2017-18 winter treatment season on the Verde River at the Oak Creek confluence.





# Verde River



## Cooperative Invasive Plant Management Plan

Revised Plan

January 12, 2015



*Verde River  
Cooperative Invasive Plant  
Management Plan*

*Original Plan Prepared in 2011 by  
Fred Phillips Consulting  
401 South Leroux Street  
Flagstaff, AZ 86001*



*Plan Updated and Revised in 2014 by the  
Verde Watershed Restoration Coalition*



[www.verdwrc.org](http://www.verdwrc.org)

## **Acknowledgments**

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We would like to thank the following people for their contributions to this project:

- Chip Norton, for the incredible work and information that he has volunteered to initiate and sustain this important coordinated effort
- The Walton Family Foundation, for funding this program, and for supporting collaboration in the Verde watershed and beyond
- The VWRC Steering Committee, for their commitment to the process and for their continued support and cooperation
- All the participating stakeholders- Verde Watershed agencies, organizations, private landowners, businesses, and especially the Tamarisk Coalition for supporting this cooperative effort

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## Executive Summary

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### Project Background

The Verde River is treasured for its wildlife habitat, water supply, recreational opportunities, and natural beauty. It is one of the most substantial free-flowing rivers in Arizona. Although the river corridor primarily supports native riparian vegetation, invasive plant species — particularly saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), tree of heaven (*Ailanthus altissima*) and giant reed (*Arundo donax*) — threaten the health and sustainability of these communities.

This Cooperative Invasive Plant Management Plan (CIPMP) was developed to bring together federal and state agencies, local businesses, municipalities, non-profit organizations, and private landowners interested in a healthy Verde Watershed. In 2010, Friends of Verde River Greenway initiated the process and Fred Phillips Consulting was hired to develop this plan; stakeholders approved the final plan on April 27, 2011. The plan revision process was initiated in 2013 and the Verde Watershed Restoration Coalition (VWRC) updated the plan in 2014. The purpose of this management plan is threefold:

- To develop and implement a strategic approach for controlling invasive plants in the riparian corridors of the Verde River watershed — an approach that will enable stakeholders to prioritize, develop, and implement restoration actions
- To increase the level of trust, collaboration and communication among stakeholders, thereby enhancing information transfer, adaptive management, and basin-wide success
- To become one component of a more comprehensive restoration planning document that will address multiple system stressors affecting the diversity, sustainability and resilience of the Verde River and its tributaries within the Verde Watershed.

Implementation of the plan began in 2012, when Friends of Verde River Greenway (FVRG) took the lead role and hired staff to manage and coordinate the implementation of the plan and develop a restoration program of their own. Fieldwork began in 2011 with demonstration sites. Subsequent annual fieldwork seasons took place in fall 2012/winter 2013, fall 2013/winter 2014, and fall 2014/winter 2015. As of January 2015, nearly 10,000 riparian acres have been surveyed for prioritized invasive plant species and over 6,000 acres have been managed to control these infestations.

Throughout the plan, the status of action items are noted and can be referenced in the VWRC Accomplishment Table in Appendix F. Plan appendices were extensively updated and reorganized as a part of the 2014 revision process. Examples from the original plan for Inventory/Mapping, Monitoring and Treatment have been removed and replaced with actual plans developed by VWRC that represent actual protocols and current strategies. The Steering Committee understands that this plan is a living document; the plan will be updated annually to reflect changes in the status of goals and the completion of recommended actions. The partnership does not anticipate any major plan revisions during the final phases of implementation of this plan.

VWRC is starting the process of developing a restoration plan that addresses additional system stressors affecting the diversity, sustainability, and resilience of the Verde River and its tributaries.

### **Principal Vision and Guiding Principles**

CIPMP's principal vision is:

*The Verde River and its tributaries comprise a diverse, self-sustaining and resilient riparian ecosystem in which invasive plant species are controlled through cooperative stakeholder participation.*

The Guiding Principles for the execution of the Vision include: 1) approach this work collaboratively, 2) select techniques and management practices that will provide successful results, 3) provide education and outreach for the local community and public, and 4) implement a system-wide approach.

### **Five-Year Goals**

This plan establishes five-year ecological, social, economic, and management goals that address the management of invasive plants while promoting the social and economic values of a healthy riparian system to Verde Watershed community. VWRC understands there is more to consider than just invasive plants to maintain a healthy river system. This plan is a starting point and will become a part of the larger restoration plan in development. See Page 12 for the action items associated with each goal.

- **Ecological:** Manage invasive woody and herbaceous plant species through various control methods within the Coconino and Yavapai County FEMA floodplain. Eliminate seed sources to prevent further invasive plant species infestation, prevent new species from invading, allow native plant species

to thrive, and allow the riparian and wetland areas to become more naturally functioning, sustainable, and resilient to change.

- **Social:** Provide education and outreach to the local community and public. Teach them about the prevention and removal of invasive species, their detrimental effects, and the services and funding available for removing invasive species on their land. (See Appendix D for the Outreach, Education, and Engagement Strategic Plan.)
- **Economic:** Give the local community economic incentives and employment opportunities for managing invasive plant species in riparian areas on private and public lands.
- **Management:** Maintain a multi-stakeholder group to accomplish the ecological, social and economic goals and to monitor the project's long-term success.

Several ecological and anthropogenic stressors — water availability, ornamental plants, secondary weed invasion, absentee land ownership, biological control agents and bank erosion — may challenge the ability to remove invasive species. This plan outlines several actions to ensure that the 5-year goals can be met despite these stressors.

## **Recommendations**

In order to fulfill the goals outlined in this plan within the 5-year time frame the continued cooperation, support and guidance from VWRC Steering Committee members is critical. The partnership should continue to use the site and species approaches to prioritize areas for removing invasive plants. Efforts should first focus on eradicating Russian olive and giant reed infestations that remain to be treated and then reducing saltcedar and tree of heaven to less than 10 percent of the existing canopy cover, removing or remediating biomass and developing and implementing site specific restorations plans (where appropriate and necessary). The following are recommendations for next steps needed to accomplish the goals in this 5-year plan:

- Maintain VWRC Steering Committee and Sub-Committees to support and guide the implementation of this plan and future projects
- Complete Demonstration Projects Areas 1 and 2, include informational kiosk at both sites, (See Appendix I – Demonstration Projects)

- Remove and treat approximately 1,096 acres annually during the next three treatment seasons to accomplish ecological goals (2014-15, 2015-16, 2016-17) to eliminate and control invasive plants
- Finalize and fully implement VWRC's Monitoring Plan which includes long-term maintenance and monitoring based on adaptive management
- Continue to implement VWRC's outreach, education, and engagement strategy
- Develop a strategy for annual listed wildlife species surveys, and federal and state permitting/compliance where applicable
- Continue to recruit private landowner participation
- Develop Volunteer Program that will support VWRC projects, long-term maintenance and monitoring, and other VWRC partner needs
- Develop site specific restoration plans with VWRC Partners that address multiple stressors affecting the site

## Introduction

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The Verde River is treasured for its wildlife habitat, water supply, recreational opportunities, and natural beauty. It is one of the most substantial free-flowing rivers in Arizona. Although the river corridor primarily supports native riparian vegetation, invasive species — particularly saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), tree of heaven (*Ailanthus altissima*) and giant reed (*Arundo donax*) — threaten the health and sustainability of these communities. Other invasive plant species persist in the system with potential threat of expanding their range.

### Project Background

The Verde River Greenway extends from Clarkdale to Beasley Flat, below Camp Verde. Since 2008, Friends of Verde River Greenway (FVRG) has organized and managed river cleanup and invasive plant removal projects along this reach of river. During 2009–2010, FVRG focused on cooperative management projects that involved partnerships between various agencies, communities, and organizations. After realizing that improving riparian habitat within the Greenway would best be accomplished under a broad, watershed-scale cooperative effort, FVRG sought and secured funding to develop and implement this management plan and since has provided the capacity to manage, coordinate, develop and administer this watershed-scale project. In 2011 FVRG received its 501(c)(3) status and is serving as a fiduciary agent for the Verde Watershed Restoration Coalition (VWRC), which includes applying for and managing grants and contracts, and reporting. FVRG is also leading and participating in several other community driven restoration and recreation projects.

The first Verde River Habitat Improvement Workshop was held on July 20, 2010, in Camp Verde. Stakeholders included federal and state agencies, private companies, and nonprofits. The goals of this workshop were to:

- Initiate a cooperative effort for identifying priority invasive species
- Develop methods for site and species prioritization
- Discuss the best management practices (BMPs) necessary for successful management of invasive plant species within the Coconino and Yavapai County FEMA floodplain areas of the Verde River watershed

This Verde River Cooperative Invasive Plant Management Plan (CIPMP) originated from that workshop. The plan was finalized and published in the spring of 2011. FVRG formulated a strategy for working with private

landowners to remove invasive plant species and in 2011 and a Community Outreach Director was hired to recruit private landowners to participate in this watershed-scale restoration program. As of 2014, over 200 private landowners are participating in the program.

The Nature Conservancy's AmeriCorps member Selena Pao and FVRG volunteers immediately started mapping the Demonstration Areas for priority invasive plants in preparation for a planned spring demonstration project.

A 19-member Steering Committee was created with representatives from the US Forest Service, National Park Service, AZ State Parks, AZ Game and Fish Department, US Fish and Wildlife Service, The Nature Conservancy, Verde Natural Resource Conservation District, Friends of Verde River Greenway, Yavapai-Apache Nation, Salt River Project, and Tamarisk Coalition. The purpose of this diverse Steering Committee is to oversee the implementation of this watershed-scale invasive plant management plan and the development of future projects. Tahnee Robertson, a professional facilitator, was hired to facilitate meetings and the planning processes. The 19-member Steering Committee meets ten times annually and hosts an Annual Stakeholders Meeting. Four subcommittees were created to further facilitate the implementation process. They include "Planning and Implementation", "Monitoring and Research", "Outreach, Educational and Engagement", and "Sustainable Funding". These subcommittees are co-chaired with 5-7 committee members each. These subcommittees have developed strategic plans, developed and implemented monitoring protocols, developed outreach tools, and identify and apply for grants as a part of a fundraising strategy to achieve the goals and actions outlined in this plan. The subcommittees make recommendations to the Steering Committee for approval.

In January 2012 the VWRC Steering Committee selected Anna Schrenk as the Program Coordinator, and she started immediately. Chip Norton, President of FVRG stepped in as Program Manager in a volunteer role, Laura Jones was hired as the Community Outreach Director and FVRG hired a Program Administer, Laurie Parker. The team has been rounded out with a full-time AmeriCorps member who served as our Field Data Coordinator and a part-time Field Crew Supervisor.

During the first formal Steering Committee meeting on January 21, 2014, the partnership was formally named the **Verde Watershed Restoration Coalition** (VWRC, pronounced "V-Work"). The consensus was that the "work" in VWRC would identify this partnership with on-the-ground restoration work and local job creation.

In fall 2012, VWRC launched its first full treatment season, hiring young adults through the Coconino Rural Environment Corps (currently Arizona Conservation Corps) and local Veterans through The Vetraplex (a local Veterans organization). VWRC has completed two full fieldwork seasons; with the third season (fall 2014-winter 2015) underway at the time of the 2014 plan revision. Approximately 6,000 riparian acres have been managed for the target invasive plants outlined in this plan. Adaptive management has been an integral part of implementation, which includes monitoring and retreatment. See the VWRC Accomplishment Table, in Appendix F, for a complete list of actions being tracked.

A task force was formed from members of the VWRC Steering Committee and Friends of Verde River Greenway staff to lead the plan revision efforts. The task force included federal, state, private, and non-profit partners. Feedback and comments were organized from stakeholders and brought before the Steering Committee for discussion and approval. The vision, guiding principles and goals remain the same.

### **Purpose of This Plan**

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- To develop and implement a strategic approach for controlling invasive plants in the riparian corridors of the Verde River watershed — an approach that will enable stakeholders to prioritize, develop, and implement restoration actions
- To increase the level of trust, collaboration and communication among stakeholders, thereby enhancing information transfer, adaptive management<sup>1</sup>, and basin-wide success
- To become one component of a more comprehensive restoration planning document that will address multiple system stressors affecting the diversity, sustainability and resilience of the Verde River and its tributaries within the Verde Watershed.

### **Related Work**

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Although this Plan was developed primarily to control invasive plant species, VWRC partners recognize that a range of additional factors (system stressors) threaten the health and sustainability of the Verde River system. These factors include invasive invertebrate and vertebrate species, water diversion and over-allocation, water quality, secondary weed introduction, erosion, wildfire,

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<sup>1</sup> *Adaptive management is defined as a systematic process using monitoring and research to inform and adjust resource management, plans and approaches.*

biological control agents, and climate change. Without a holistic approach, overall ecosystem health cannot be sustained. VWRC is starting the process of developing a more comprehensive restoration plan that CIPMP will become a part of when complete. Other efforts and plans within the Verde River watershed focus on the issues discussed above. This Plan is designed to complement and augment these projects, which are summarized below.

**Table 1: Related Studies & Plans in the Verde Watershed**

Group	Study or Plan
U.S. Fish & Wildlife Service (FWS), Arizona Ecological Services Office	Verde River Focus Area Plan
Salt River Project	Horseshoe and Bartlett Reservoirs Habitat Conservation Plan
FWS	Arizona Partners for Fish and Wildlife Program (focus areas)
Coconino, Prescott, & Tonto National Forests	Land & Resource Management Plan
Arizona Game & Fish Department (AGFD)	Comprehensive Wildlife Conservation Strategy
Coconino and Tonto National Forests	Verde River Wild and Scenic River Comprehensive River Management Plan
Arizona State Parks	Greenway Management Strategy
The Nature Conservancy (TNC)	Conservation Action Plan for the Verde River
Various	Interagency Fossil Creek Native Fish Repatriation Plan
FWS and AGFD	Stillman Lake Renovation & Native Fish Sanctuary Plans
FWS	Functions and Values of the Verde River Riparian Ecosystem and an Assessment of Adverse Impacts to these Resources
Yavapai-Apache Indian Community	Special Report on Water Supply Sources
Verde Watershed Association, Big Sandy, Chino Winds, Coconino, East Maricopa, Tonto, Verde Natural Resource Conservation Districts	Verde Cooperative River Basin Study
Various	Conservation agreements, assessments, strategies, and recovery plans for individual candidate species

### About This Plan

This Plan was developed as a guiding document for VWRC, and a resource for Verde Valley land managers, including private landowners. It presents best management practices (BMPs) for invasive species management and native species recruitment, criteria for prioritizing sites, and strategies for adaptive management, outreach, education and engagement, and sustainable funding. In addition, this management plan has helped to promote partnerships between public land managers and private landowners where cooperative invasive species management efforts are being accomplished.

This Plan is a “living document” that will be updated annually to include results and status of ongoing efforts. The momentum of this partnership has continued for almost three years with active participation from a wide array of VWRC Partners. VWRC hosts annual stakeholder meetings to share techniques, successes and challenges, and results. The group publishes a quarterly e-newsletter called *The Otter*, which further informs Verde Valley residents and communities.

## Partners

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- Arizona Conservation Corps (Conservation Legacy)
- Arizona Department of Agriculture
- Arizona State Forestry
- Arizona State Parks
- Arizona Game & Fish, Regions II, III and VI
- Coconino National Forest
- Freeport McMoRan Copper and Gold
- Friends of Verde River Greenway
- Gila Watershed Partnership
- National Park Service
- Northern Arizona University
- Oak Creek Watershed Council
- Prescott College
- Prescott National Forest
- Private Landowners
- Salt River Project
- Tamarisk Coalition
- The Nature Conservancy
- Tonto National Forest
- U.S. Fish and Wildlife Service
- U.S.D.A. Forest Service Region 3,
- U.S.D.A. Natural Resource Conservation Service
- University of Arizona Cooperative Extension, Yavapai County
- USDA Animal Plant Health Inspection Services
- Verde Natural Resource Conservation District
- Verde River Basin Partnership
- Verde River Valley Nature Organization
- Verde Valley Land Preservation
- Walton Family Foundation
- Wildlife Habitat Council
- Yavapai County
- Yavapai-Apache Nation

## **Funding**

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Funding for VWRC has been provided by a diverse group of supporters. The Walton Family Foundation (WFF) has been the greatest supporter of this partnership, providing critical funding for the initial planning workshops, the development of this management plan, capacity building, and on-the-ground work. VWRC Partners, namely the USDA Forest Service (Coconino and Prescott National Forests), USFWS Partners for Fish and Wildlife Program, National Park Service and the Arizona Game and Fish Department have provided annual funding for on-the-ground work and equipment. FVRG has organized several fundraising campaigns, where donations from individual members of the public (private donor base) support VWRC and capacity within the organization. FVRG recently developed a fundraising plan that focuses on the development of sustainable funding sources to support its programs. In-kind contributions from VWRC Partners, including the Tamarisk Coalition (TC staff hours funded by WFF), Salt River Project, Arizona State Parks, Yavapai County, The Nature Conservancy, Community Counts (AmeriCorps), and private landowners have been critical to the on-going success of this partnership. Additional grant funding, awarded to FVRG, has allowed VWRC to accomplish the on-the-ground work completed to date, train crews and maintain capacity. Grantors include:

- Arizona Community Foundation-Yavapai Chapter
- Arizona Game and Fish Department
- Arizona State Forestry Division
- National Fish and Wildlife Foundation
- US Fish and Wildlife-Partners for Fish and Wildlife Program
- Yavapai County Rural Area Commission
- (As of January 2015, a grant from the Freeport McMoRan Foundation is pending.)

## **Funding Projections**

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The riparian areas in the Verde watershed have a variety of site conditions, such as steep canyons, limited road access, open floodplain, and minimal to dense invasive plant infestations, which require different logistics and methods for accessing and removing invasive plants. Because of these varying site conditions a single per acre cost for invasive plant removal in the Verde watershed is difficult to estimate. The table below breaks down costs based on density of invasive plant infestation and remoteness of the site. These estimated costs are an average of costs from current invasive plant removal efforts being conducting in the Verde watersheds by VWRC. Estimated costs include: accessing sites, equipment, transportation, a project supervisor, hiring

crews, and field crew time to conduct the removal efforts. Other costs that are required for project implementation, but are not included in the following estimates, include compliance and permitting; site-specific plan and design; grant writing; mapping and inventory; project management; long-term maintenance; and monitoring. For a further discussion on invasive plant removal costs see Appendix J.

**Table 2: Project Cost Estimates**

Invasive Plant Removal Type	Cost per acre for accessible sites (private land)	Cost per acre for accessible sites (Public land)	Cost per acre with follow-up treatment (private land)	Cost per acre with follow-up treatment (Public land)	Cost per acre with follow-up treatment in remote sites (Private land)	Cost per acre with follow-up treatment in remote sites (Public land)
Hand clear stands with low cover of invasive plants (10% and less invasives)	\$207	\$195	\$260	\$247	\$348	\$334
Hand clear stands with medium cover of invasive plants (10-50% invasive cover)	\$623	\$585	\$780	\$741	\$972	\$927
Hand clear monotypic stands of invasive plants (< 50% invasive cover) with revegetation	\$1141	\$1071	\$1427	\$1357	\$1750	\$1666
Mechanically clear monotypic stands of invasive plants	\$1000-\$2500	\$1000-\$2500	NA	NA	NA	NA

## Vision & Guiding Principles

### Vision

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*The Verde River and its tributaries comprise a diverse, self-sustaining and resilient riparian ecosystem in which invasive plant species are managed through cooperative stakeholder participation.*

### Guiding Principles

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The guiding principles for executing this vision describe a collaborative, system-wide approach for developing and implementing BMPs that will provide successful results for invasive plant management. They also address the need for education and outreach to the local community and public.

- **Approach this work collaboratively.** Incorporate the knowledge and priorities of landowners, managers, and stakeholders into actions chosen for managing invasive species. In addition, incorporate adaptive management practices to respond to monitoring results and “lessons learned.”
- **Select techniques and management practices that will provide successful results.** Where possible, use known techniques and management practices that have been successful in controlling invasive species within the floodplain of the Verde River and its tributaries. For invasive species within these floodplains that have not yet been subjected to successful controls, use methods and management practices that have worked in other riparian systems. For all other invasive species, experiment with techniques that have worked in non-riparian systems — agriculture settings or roadsides, for example.
- **Provide education and outreach for the local community and public.** Use education and outreach to help involve the local community and public. These programs should explain the need to remove invasive species, to restore ecological function, to limit invasive weed introductions (including ornamental plants), and to limit human disturbances to project areas.
- **Implement a system-wide approach.** Because seeds and vegetative materials disperse via water, wind, people and animals, they will affect invasive plant removal in project sites that lie upstream and downstream. Therefore, remove invasive species throughout the system to control them on a watershed scale and promote more sustainable results.

## **Five-Year Goals**

These goals incorporate a holistic approach to invasive plant management within the Verde River watershed and address ecological, social, economic, and management issues. They account for system stressors, use of site and species prioritization approach, and advance the Plan's vision.

- **Ecological** — Manage invasive woody and herbaceous plant species through various control methods within the Coconino and Yavapai County FEMA floodplain. Eliminate seed sources to prevent further invasive plant species infestation, prevent new species from invading, allow native plant species to thrive, and allow the riparian and wetland areas to become more naturally functioning, sustainable, and resilient to change.
- **Social** — Provide education and outreach to the local community and public. Teach them about the prevention and removal of invasive species, their detrimental effects, and the services and funding available for removing invasive species on their land. (See Appendix D for the Outreach, Education, and Engagement Strategic Plan)
- **Economic** — Give the community economic incentives and employment opportunities for managing invasive plant species in riparian areas on private and public lands.
- **Management** — Maintain a multi-stakeholder group to accomplish the ecological, social and economic goals and to monitor the project's success for the long term.

## **Ecological Actions**

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To accomplish the ecological goals of this Plan the following Action Steps are suggested. (See Appendix F, Accomplishment Spreadsheet, for complete list of Action Steps being tracked).

- Inventory and map invasive plant species infestation within the watershed.
- Conduct a workshop to establish an approach to inventorying and mapping. (Completed: August 3, 2011)
- Compile information on known existing invasive species infestations and create location maps. (Underway: May 2011-June 2014)

- Completely remove Russian olive and giant reed from the action area<sup>2</sup> using manual, biological, mechanical and/or herbicide control methods. See Appendix B for a discussion of the BMPs. (Underway: March 2012-Present)
- Reduce Tamarisk and Tree of Heaven to less than 10 percent of the action area. (Underway: March 2012-Present)
- Prioritize projects using these tools, “Criteria for Site Prioritization” and “Flow Chart for Species Prioritization” (See Appendix H, Species/Site Prioritization) to identify which species or sites to address first.
- Implement monitoring and maintenance plan to ensure long-term success. Monitoring will measure the natural recruitment, structure and composition of native plant species. (Draft Plan Complete: July 2014)
- In anticipation of the arrival of the Tamarisk Leaf Beetles (several species), develop site specific plans in areas with greater than 10% total cover of Tamarisk which include revegetation and bioengineering practices as necessary. (Underway: April 2014)

### **Social Actions**

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To accomplish the social goals of this Plan, the following actions are suggested.

- Implement VWRC’s Education, Outreach and Engagement Strategic Plan, see Appendix D for OEE Strategic Plan. (Plan Completed: June, 2013)
- Develop effective educational and outreach materials (website, social media, pamphlets, invasive species informational cards, etc.) to distribute to the local community and public. (Ongoing) The VWRC website ([www.verdewrc.org/](http://www.verdewrc.org/)) was completed in 2012, and is regularly updated and maintained.
- Engage school aged children by supporting school programs, field trips, SciTech and BioBlitz festivals. Continue to host workshops for watershed partners and landowners on restoration practices. (Ongoing)
- Contact local community leaders and private landowners to initiate management strategies for controlling invasive ornamental plants that are providing a seed source for areas downstream. (Ongoing)
- Include community members and stakeholders in educational events to promote the health of the Verde River system. (Ongoing)

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<sup>2</sup> *The action area is defined as the FEMA 100 year floodplain for Yavapai and Coconino Counties, with agriculture and developed areas removed.*

- Educate and train local conservation and veteran crews, agencies, and contractors in technical skills to promote their professional growth. (Ongoing)
- Improve aesthetic enjoyment and recreational opportunities for the public; promote their involvement and interaction with project sites by holding volunteer invasive species removal events on sites that are frequented by the public. (Ongoing)

### **Economic Actions**

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Consider the following when creating economic implementation plans:

- Employ and train local youth conservation corps and veterans crews to manage invasive species along the Verde River and its tributaries. (Ongoing)
- Provide economic opportunities to private landowners through grants and technical resources to remove invasive species on their land. (Ongoing)
- Increase employment opportunities for local young adults and veterans, agencies, contractors, and businesses in the Verde River watershed. (Ongoing)

### **Management Actions**

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To accomplish the management goals of this Plan, the following actions are suggested.

- Practice adaptive management by considering the lessons learned during restoration efforts and the rapid and long-term monitoring of treated areas to maintain invasive species cover at or below 10 percent. (Ongoing)
- Develop an approach for working with local communities to encourage them to value native plants, limit or eradicate invasive ornamental plants, and enhance the public's understanding of invasive plant removal and the value of a healthy river system. (Ongoing)
- Develop and implement a diverse sustainable fundraising strategy that includes private donors, agency support and other options. (Ongoing)

## Invasive Species in the Watershed

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### High-Priority Species

VWRC stakeholders identified the following four invasive species as high priorities for control within the riparian areas of the Verde River watershed.

- Saltcedar (*Tamarix spp.*)
- Tree of heaven (*Ailanthus altissima*)
- Russian olive (*Elaeagnus angustifolia*)
- Giant reed (*Arundo donax*)

All four high-priority species impact ecosystem function significantly, altering wildlife habitat, flow and fire regimes, geomorphology, vegetation structure, and biodiversity. (See Appendix A for a more detailed discussion.) Saltcedar and tree of heaven have invaded the riparian corridors of the Verde River and its tributaries; controlling them will require an extensive, coordinated effort. The ecological goal will be to keep these two species at an infestation level of less than 10 percent of the total canopy cover of the riparian zone, thus allowing the river system to sustain ecosystem function and integrity.

Giant reed occurs in large densities along numerous reaches of Oak Creek and the Verde River, manual treatment is costly. Inventory and Mapping efforts of public and private lands have shown that the giant reed infestations are much greater than previously expected, thus more treatment hours and funding is required. Russian olive also occurs along the riparian corridor in lower densities and control will not be as time and resource-intensive. These species are highly invasive and have the potential to rapidly expand in range and outcompete native vegetation given the appropriate conditions — disturbed areas, catastrophic fire, or flood events. Therefore, Russian olive and giant reed were identified as “zero-tolerance” species, and efforts will focus on the removal of all individuals within the riparian corridors of the Verde River watershed. To date, VWRC has surveyed 9,334 acres for the four target invasive plants. Projections have been made, using existing survey data, which include acres added to reflect additional private property participation. Lands managed by the Tonto National Forest with greater than 10% tamarisk have been excluded from the ultimate target area due to constraints placed on the Forest Service in critical habitat for the Southwest Willow Flycatcher. VWRC will continue to work with the Tonto National Forest to develop restoration plans for areas with saltcedar in critical habitat areas. Based on the goals outlined in this plan, the total area targeted for treatment is approximately 8,904 acres. Table 3 illustrates the extent of the

invasive plant infestations and a projected timeline for competition. More discussion can be found in Appendix J – Cost Estimate Explanation.

**Table 3 – VWRC Invasive Plant Management Projections**

Total Riparian Acres in Project Area	Total Riparian Access w/ access	Infested acres (Acres with invasive present)	Total Treatment acres (Acres to be treated under CIPMP)	Acres Completed (2010-2014)	Acres to be Completed (2014-2017)	Treatment season 2014/2015	Treatment season 2015/2016	Treatment season 2016/2017
31,065	26,032	16,603	8904	5617	3287	1096	1096	1095

### Lower-Priority Species

The role of VWRC in regards to secondary invasive species within the project area encompasses early detection, public education, and presence/absence data collection as a component of the Monitoring Protocol (Appendix C). Contract treatment crews receive plant identification training as a component of the annual crew training. Field crews, volunteers, and interns serve as the “eyes on the ground”, observing and reporting secondary invasive species as they are detected in the field. This information is available to private landowners and government land managers throughout the project area, each of which can address secondary invasive plant management according to their own distinct land management goals and mandates.

- Siberian Elm (*Ulmus pumila*)
- Uruguayan Pampas grass (*Cortaderia selloana*)
- Himalayan Blackberry (*Rubus armeniacus*)
- Yellow star thistle (*Centaurea solstitialis*)
- Malta star thistle (*Centaurea melitensis*)
- Dalmatian toadflax (*Linaria dalmatica*)
- Yellow sweet-clover (*Melilotus officinalis*)
- Mexican fireweed or Kochia (*Bassia scoparia*)
- Russian knapweed (*Acroptilon repens*)
- Spotted knapweed (*Centaurea stoebe*)
- Sahara mustard (*Brassica tournefortii*)
- Cheat grass (*Bromus tectorum*)
- Red brome (*Bromus rubens*)
- Creeping waterprimrose (*Ludwigia peploides*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Water lily (*Nymphaea* spp.)

## Project Area Features

This Plan covers the Verde River from its headwaters, near Paulden, to Sheep's Crossing above Horseshoe Dam, where flow decreases or ceases and all of the Verde's major perennial tributaries. The watershed spans 3,757,137 acres, three counties, two congressional districts, two National Monuments, tribal land, and four National Forests. The project area is delineated by the FEMA floodplain of the Verde River and its tributaries, all major agriculture and upland areas have been removed from the project area. In total, it includes 31,065 acres on 459.2 miles of stream (Figure 1) — 336.1 miles of federal land, 20.8 miles of state lands, 4.2 miles of Tribal land, and 98.1 miles of private land. The project area is further delineated into three major reaches:

- Reach 1: Headwaters near Paulden to Clarkdale (Figure 3)
- Reach 2: Clarkdale to Beasley Flats (Figure 4)
- Reach 3: Beasley Flats to Sheep's Crossing (Figure 5)

### Reach 1: Headwaters (near Paulden) to Clarkdale

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**Ownership.** Reach 1 contains lands that are primarily managed by TNC, AZGFD, Prescott National Forest, State Trust lands, and 15 private landowners. It lies primarily within Yavapai County, although a portion of Sycamore Creek is in Coconino County. Populated areas include Chino Valley, Paulden, Perkinsville, and Clarkdale. The Prescott National Forest manages most of the public land. Sycamore Creek, a tributary to the Verde River, include designated wilderness.

**Listed Species.** Because of its unique and irreplaceable nature, AGFD considers this reach a resource Category 1. It supports the following:

- Eight federally listed endangered species
- Two federally listed threatened species
- One federally proposed threatened species
- Three federal candidate species
- Four state endangered species
- Six state threatened species
- Eight state candidate fish and wildlife species



**Geology.** The geology of this Reach is characterized by mostly sedimentary rocks. They include Tertiary sedimentary rock overlain in places with volcanic rocks and alluvium in the Chino Valley, Redwall limestone and Martin Formation west of Perkinsville, Coconino Sandstone and Supai Formation between Perkinsville and Sycamore Canyon, and the Verde Formation downstream of Sycamore Canyon (Krieger 1965, Owen-Joyce and Bell 1983, Sullivan and Richardson 1993). The permeable nature of these sedimentary rocks facilitates groundwater flow to the river. The active channel through this reach is confined primarily by steep, narrow basalt and limestone canyons, with a narrow floodplain that widens around Perkinsville and at the confluence of Sycamore Creek (Sullivan and Richardson 1993).

**Hydrology.** The Verde River originates at the confluence of Big Chino Wash and Williamson Valley Wash. Sullivan Lake was created at the confluence of these washes for use as a stock-watering pond. Other inflow sources into the river include Sycamore Creek, various intermittent streams (Granite Creek, Hell Canyon, M.C. Canyon, Bear Canyon, and small ephemeral drainages), and springs (Sullivan and Richardson 1993). Riffles are short and shallow, except during flood events, and the stream gradient is low.

**Vegetation.** The dominant vegetation in the wider floodplain areas includes Fremont's cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), velvet mesquite (*Prosopis velutina*), desert willow (*Chilopsis linearis*), and saltcedar (*Tamarisk spp.*). The dominant vegetation in the narrow canyon includes velvet ash (*Fraxinus velutina*), Utah juniper (*Juniperus osteosperma*), box elder (*Acer negundo*), seep willow (*Baccharis salicifolia*), and desert willow (*Chilopsis linearis*). The prominent invasive species of concern in this reach include saltcedar, Russian olive, Tree of Heaven, Giant reed, Himalayan blackberry, and Siberian elm.

## **Reach 2: Clarkdale to Beasley Flats**

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**Ownership.** Reach 2 includes lands owned or managed by both private and public entities, they include the Yavapai-Apache Nation, Coconino and Prescott National Forests, National Park Service, State Trust, The Nature Conservancy, Arizona State Parks and an estimated 800 private landowners. It occurs within Yavapai and Coconino counties. Reach 2 has the highest density of private lands within the project area and includes the towns of Clarkdale, Jerome, Cottonwood, Cornville, Sedona and Camp Verde and several unincorporated communities. Beaver Creek and West Clear Creek, both tributaries to the Verde, include designated wilderness areas.

**Listed Species.** The Arizona Audubon Society has designated the area that includes Peck’s Lake, Tavasci Marsh, and the main stem Verde River adjacent to these areas as well as the Bubbling Springs on Oak Creek as “important bird areas”. This reach supports a diversity of neo-tropical and resident nesting birds, including the federally listed endangered southwestern willow flycatcher and yellow-billed cuckoo and the state-listed threatened species common Blackhawk, osprey, and yellow-billed cuckoo. Reach 2 supports the following:

- Six federally listed endangered species
- Three federally listed threatened species
- One federally proposed threatened species
- Three federal candidate species
- Four state endangered species
- Six state threatened species
- Eight state candidate fish and wildlife species



**Geology.** This reach is characterized by a broad floodplain with broad low terraces of coarse gravel. The close proximity of the active channel, make sand the primary substrate for riparian vegetation (Sullivan and Richardson 1993).

**Hydrology.** Reach 2 includes some of the major tributaries that contribute to the Verde River’s instream flow — Oak Creek, Dry and Wet Beaver Creeks, and West Clear Creek. The floodplain is broader than in Reaches 1 and 3. The river has low water velocities with shallow riffles that increase during flooding. The primary substrates in the active floodplain are primarily sand and small cobble. Peck’s Lake is the only natural oxbow lake along the Verde River. Surface water is diverted during the summer months, reducing flows in this reach.

**Vegetation.** The dominant vegetation along the floodplain includes Fremont’s cottonwood, Goodding’s willow, velvet ash, Arizona sycamore (*Platanus wrightii*), box elder, saltcedar, and tree of heaven. The primary invasive species of concern include saltcedar, tree of heaven, Russian olive, giant reed, Siberian elm. In the fallow agricultural fields or other disturbed areas, the invasive species of concern include kochia, yellow star thistle, malta star thistle, Uruguayan pampas grass, Russian knapweed, spotted knapweed, Sahara mustard, cheat grass, and red brome. Eurasian milfoil and water lily are priority aquatic invasive species for Peck’s Lake.

### Reach 3: Beasley Flats to Sheep's Bridge

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**Ownership & Designations.** Reach 3 is managed primarily by the Coconino, Prescott, and Tonto National Forests. Private lands include the small towns of Strawberry and Pine in the Fossil Creek watershed. The reach from Beasley Flats to Red Creek, including Fossil Creek, is designated as Wild and Scenic under the authority of the 1968 Wild and Scenic Rivers Act; the Scenic area extends from Beasley Flats to below Childs, and the Wild area extends from Childs to Red Creek. The Wild section flows through the Mazatzal Wilderness. Fossil Creek, one of the tributaries in this Reach, has a designated wilderness area.

**Listed Species.** Reach 3 provides nesting habitat for the bald eagle, a protected species under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, and for the common Blackhawk and osprey, which are state-listed threatened species. Five bald eagle breeding areas occur along the Verde River and are closed to vehicular and foot traffic.

- Eight federally listed endangered species
- Five federally listed threatened species
- One federal proposed threatened species
- Four federal candidate species
- Four state endangered species
- Six state threatened species
- Eight state candidate fish and wildlife species



**Geology.** The terrain in this reach becomes more rugged, and basalt cliffs and steep mesas are the primary geologic features (Sullivan and Richardson 1993). Cobble and sand are the dominant substrate type within the active floodplain, but large cobbles and boulders become more prevalent downstream. The floodplain is narrow, limiting the width of the riparian corridor.

**Hydrology.** Fossil Creek and the East Verde River contribute flow to this reach. Other intermittent creeks include Houston Creek, Gap Creek, Coldwater Canyon, Red Creek, Wet Bottom Creek, Tangle Creek, and Sycamore Creek. The gradient of the river increases in this reach and riffles become more frequent.

**Vegetation.** The dominant plant species occurring within the riparian corridor in this Reach include Fremont's cottonwood, velvet mesquite, Goodding's

willow, seep willow, burrobrush (*Hymenoclea monogyra*), broom baccharis (*Baccharis sarothroides*), desert willow, giant reed, and saltcedar. The primary invasive species of concern in this stretch include dense stands of saltcedar, and small populations of Russian olive, and giant reed.

## Plan Components

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### System Stressors & Proposed Actions

It is important for this Plan to consider existing and potential system stressors, which include ornamental plants, secondary weeds, river flow, grazing, wildfire, biological control agents, bank erosion, aquatic invasives and other unknown stressors. These stressors influence whether native or invasive plant species will dominate the Verde watershed. Nevertheless, restoration goals may still be achieved if appropriate steps are taken to address these system stressors. These stressors may also factor in to the process of site prioritization.

These and other system stressors are being addressed through other projects in the Verde watershed (see the “Related Work” section).

### Ornamental Plants

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Many of the invasives within the Verde watershed, particularly in Reach 2, have originated from ornamental plants on surrounding private and municipal lands. They will continue to persist unless measures are taken to control them.

### PROPOSED ACTIONS

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- Maintain VWRC Outreach, Education and Engagement Subcommittee and continue to implement strategic plan for education and outreach in the public and private sectors on alternative native landscaping materials. (Ongoing)
- Discuss removing invasive ornamental plants with local politicians, residents, and nurseries and provide alternative native plant options. (Ongoing)
- Provide information on funding programs and labor options for invasive plant removal. (Ongoing)

### Secondary Weed Invasions

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Many plants, particularly herbaceous and grass species, can invade a site after a natural or anthropogenic disturbance — a flood, the removal of other invasive species, recreational or development activities. Seeds may be brought

in through equipment, floods, animals, horticultural or agricultural plant and seed materials, and wind. Disturbed areas provide an opportunity for rapidly colonizing species to invade. Such species include yellow star thistle, Malta star thistle, Dalmatian toadflax, yellow sweet-clover, kochia, Russian knapweed, spotted knapweed, Sahara mustard, cheat grass, and red brome.

The role of VWRC in regards to secondary invasive species within the project area encompasses early detection, public education, and presence/absence data collection as a component of the Monitoring Plan (Appendix C). Contract treatment crews receive plant identification training as a component of the annual crew training. Field crews, volunteers, and interns serve as the “eyes on the ground”, observing and reporting secondary invasive species as they are detected in the field. This information is available to private landowners and government land managers throughout the project area, each of which can address secondary invasive plant management according to their own distinct land management goals and mandates.

## **PROPOSED ACTIONS**

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- Maintain Monitoring and Research Subcommittee to implement a strategy for secondary invasive species prevention and monitoring at restored or disturbed sites. (Ongoing)
- During site-specific restoration efforts, plant native plant materials where appropriate to outcompete secondary weeds and stabilize soils. (Ongoing)
- Share information on secondary weed species detected, and control techniques with project site landowners and/or land managers. (Ongoing)

## **Bank Erosion**

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Some invasive plant species, primarily saltcedar and giant reed, were introduced to the Verde watershed to prevent bank erosion where land was cleared for agriculture, pasture, development, or recreation. If these invasive species are targeted for removal, bank erosion may occur. In 2014, VWRC hosted a Streambank Stabilization workshop, where stakeholders learned techniques and methods to prevent erosion using native plant materials. This project site will be used as Demonstration Project to display erosion control techniques to private landowners, and to provide an ongoing source of data to inform adaptive management.

## PROPOSED ACTIONS

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- Collect pre-treatment site information about erosion potential and plan treatment accordingly if potential exists. See Appendix C for VWRC Monitoring Plan (Ongoing)
- Coordinate/implement bank stabilization with partners as needed on potential bank line erosion and prevention projects. (Ongoing)
- Provide information and technical services to landowners on prevention, treatment and long-term maintenance of invasive plants (Ongoing)
- Identify native plants that will quickly colonize and stabilize banks and establish these plants where appropriate, during low flows. (Ongoing)
- Compile information and host training workshop (4/16-17/2014) on streambank stabilization techniques, and where and how to procure native plant materials for revegetation of disturbed sites (Completed 4/18/2014)

## Adaptive Management

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VWRC is taking an adaptive management approach to the implementation of this plan by using monitoring and research data to inform and adjust resource management, plans, and approaches accordingly. As lessons are learned from treatment and project sites, methods can be adjusted to improve the effectiveness and efficiency of both re-treatment and future removal efforts.

Riparian restoration actions are fundamentally experimental endeavors governed by watershed- and site-specific processes and variables. As an experimental venture, restoration benefits from an organized “adaptive management” approach to developing and establishing a program of action. Adaptive management differs from “learning by doing” in that it is a science-based process through which a program plans, predicts, implements and evaluates interventions, and redirects efforts as necessary to achieve a desired outcome. Adaptive management involves taking action with acknowledged uncertainties, carefully monitoring outcomes, transparently assessing progress and redirecting efforts when necessary. Adaptive management involves the review of observed outcomes relative to predicted outcomes, establishing causal relationships, and determining corrections necessary to achieve desired outcomes. It applies to all aspects of a restoration project; i.e., the restoration actions themselves, management, funding, monitoring, stakeholder interaction, etc.

Adaptive management practice requires the prediction of outcomes and the definition of trigger and endpoint indicators to evaluate outcomes and inform ongoing management. Trigger indicators provide a mechanism for establishing

when corrective action is necessary to redirect a project if it is not performing as expected. Endpoint indicators provide a mechanism to establish when a predicted outcome has been achieved. Conceptual models are useful in identifying what processes and outcomes will best achieve desired outcomes and those that need to be monitored to inform adaptive management decisions.

Conceptual models are working hypotheses about the processes and variables influencing system form and function. They play a critical role in understanding the target system and in communicating restoration and monitoring procedures. Conceptual models (a) formalize current understanding of system processes and dynamics, (b) identify linkages of processes across disciplinary boundaries, and (c) identify the bounds and scope of the system of interest, including gaps in our knowledge. Conceptual models are a critical first step because without it, it is uncertain how well the system being restored is understood and thus a restoration action may be inadequate or fail. (Skidmore, Patten 2013).

By completing two to three demonstration projects with adequate monitoring and applying adaptive management, VWRC has been able to refine our techniques and processes to ensure effective, timely, and efficient treatment of targeted areas.

## **PROPOSED ACTIONS**

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- Collect monitoring data as outlined in VWRC Monitoring Plan (Ongoing)
- Analyze monitoring data to determine if management plans and approaches need to be adapted for better effectiveness. (Ongoing)

### **Approach for Prioritizing Actions & Sites**

A two-pronged approach was developed to prioritize actions for invasive species removal. This approach entails first prioritizing sites and then prioritizing the species within the site. (See Appendix H - VWRC Prioritization Methods for more discussion). The criteria for prioritizing sites and species are primarily driven by the ecological goal although the social, economic, and management goals will influence how this work is implemented and how the sites are managed.

Five criteria dictate whether a site can be successfully restored. For restoration to proceed these criteria must be met at any of the sites prioritized by the site or species approach.

- **Funding is available** to complete the project, includes pre and post treatment monitoring and maintenance.
- **The landowner/manager is willing.** Commitment, cooperation, communication, and common goals with the landowner/manager are required to implement actions, monitoring, and long-term maintenance.
- **Permits are obtained.** Permits are required on all public lands where invasive plant species will be removed to comply with the National Environmental Policy Act (NEPA), Section 404 of the Clean Water Act, Section 106 of the National Historic Preservation Act (NHPA), and Section 7 of the Endangered Species Act (ESA). Habitat Improvement agreements with individual private landowners are secured. Some activities on private lands may require permitting.
- **Capacity is available** to conduct the work. A trained work force and logistic plan is necessary to implement a successful, timely invasive species removal effort.
- **The site is accessible.** Site accessibility will affect the cost of restoration. The difficulty or ease of accessing the site to remove invasive species, conduct monitoring, and maintain it over the long term must be considered.

## **Implementation Strategy for 2012-2018**

### **Ecological Goals**

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The tasks outlined below represent steps for implementing a successful restoration effort. Many of these action items have been completed, and many are ongoing tasks.

- **Map and inventory invasive species.** A workshop should be conducted to establish an approach for how and where to initiate this work and to consolidate existing mapping efforts. (Completed: 8/2011)

As of December, 2014, VWRC has surveyed 9,334 acres. Additional private property will be mapped as Habitat Improvement agreements are secured.

- **Apply the site and species approaches.** Actions should be prioritized using the site and species approaches, along with data from the inventory and mapping effort. (Ongoing)
- **Define the total acreage of priority invasive plant control efforts.** The mapping information has identified 16,603 acres that harbor the four target

species outlined in this plan. A majority of these acres have less than 10% cover of tamarisk and tree of heaven. To accomplish the ecological goals to reduce woody invasive to less than 10% of the riparian area and illuminate Russian olive and giant reed, it has been estimated that 8,904 acres need to be treated. (Completed: 6/2014)

- **Remove sites that are not feasible for restoration.** Areas where restoration is infeasible (sites which not meet one or more of the 5 criteria which dictate whether or not a site can be successfully restored) have been removed from the estimated total acreage targeted for treatment (approximately 8,904 acres- see below). (Completed: 10/2014)
- **Determine how many acres per year must be treated to achieve the 5-year goals (2012-2018).** Approximately 8,904 acres. As of September 2014, VWRC partners have treated 5,617 of those acres. An estimated 3,287 acres remains to be treated based on mapping data. Approximately 1,096 acres will need to be treated annually during the next three field seasons (2014/15, 2015/16, 2016/17) to achieve these goals. Removal costs have been roughly estimated based on site accessibility, density of infestation, and methods. (See Appendix K for cost estimates.) (Completed: 6/2014)
- **Initiate implementation processes.** Work to acquire permits, secure Habitat Improvement agreements with landowners, secure funding, and build capacity to support annual implementation. (Ongoing)
- **Initiate three distinct demonstration projects in the Verde Valley.** These projects were selected by the stakeholders to provide public and landowner outreach and educational opportunities, obtain public support for the broader goals of the Plan, and employ, and train youth corps and veterans crews. Demonstration projects also yield information about the distribution of invasive species, efficacy of removal methods, project costs, and monitoring protocols. Of the three sites originally selected as demonstration sites, treatment has been underway at two since 2012. (Initiated 3/2012)

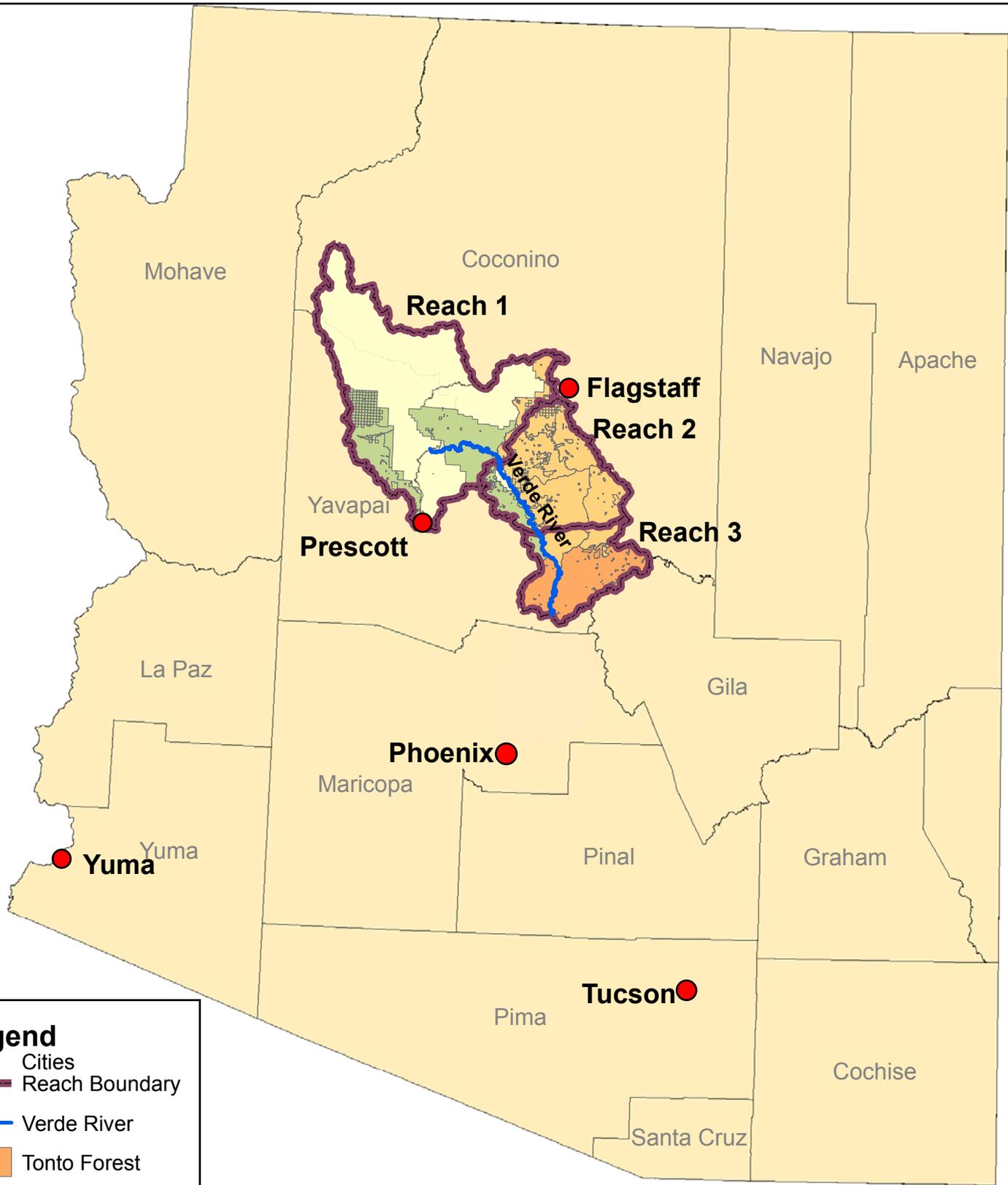
Despite the ongoing efforts of VWRC staff and leadership, the third proposed demonstration site failed to meet the second criterion under *Approach for Prioritizing Actions and Sites*: “the landowner/manager is willing”. In 2013, in response to evolving and expanding restoration challenges, the partnership selected an alternative location for the third demonstration site, which provided the opportunity to manage priority invasive plants and implement the first streambank bioengineering project to re-establish native vegetation and reduce erosion. Phase 1 of Demonstration Project 3 was completed in spring 2014. (See Appendix J for descriptions of Demonstration Projects 1-3)

## Plan Implementation Structure

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The following actions are also recommended.

- **Formalize the partnership.** Formalize the Verde River Watershed Restoration Coalition partnership with a Memorandum of Understanding (MOU), signed by all organizational partners involved in this restoration effort. Currently seventeen partners have signed the VWRC MOU (Appendix E). As new organizations become involved, VWRC requests that they formalize their commitment to the partnership by signing the MOU. (Ongoing)
- **Create a steering committee.** Create a multi-stakeholder steering committee to develop the structure for implementing future projects. (Completed: 12/2012) A 19-Member Steering committee was established and has been meeting ten times per year since January 2012. This diverse committee has representation from 15 different organizations, business and agencies, including a private landowner. They are committed to Plan vision and goals and play a critical role in the success of this watershed-scale project.
- **Maintain Capacity- secure funds to maintain staff, facilitation, overhead.** Grant funding is currently supporting the majority of FVRG's overhead. (See Appendix G, Sustainable Funding Background and Approach)
- **Develop an education and outreach strategy.** The steering committee developed a strategy for public education and outreach that targets the Verde watershed community. (Completed: 6/2013)
- **Develop a site monitoring and maintenance strategy.** VWRC's Research and Monitoring Subcommittee developed strategies for monitoring treated sites and for long-term maintenance. These strategies address:
- **Collect short and long-term monitoring** to provide information that will inform adaptive management. (Draft Plan Completed: 2/2014)
- **Continue long-term maintenance** to ensure that goals are being met. (Initiated: 3/2012)



**Legend**

-  Cities
-  Reach Boundary
-  Verde River
-  Tonto Forest
-  Prescott Forest
-  Coconino Forest
-  Counties



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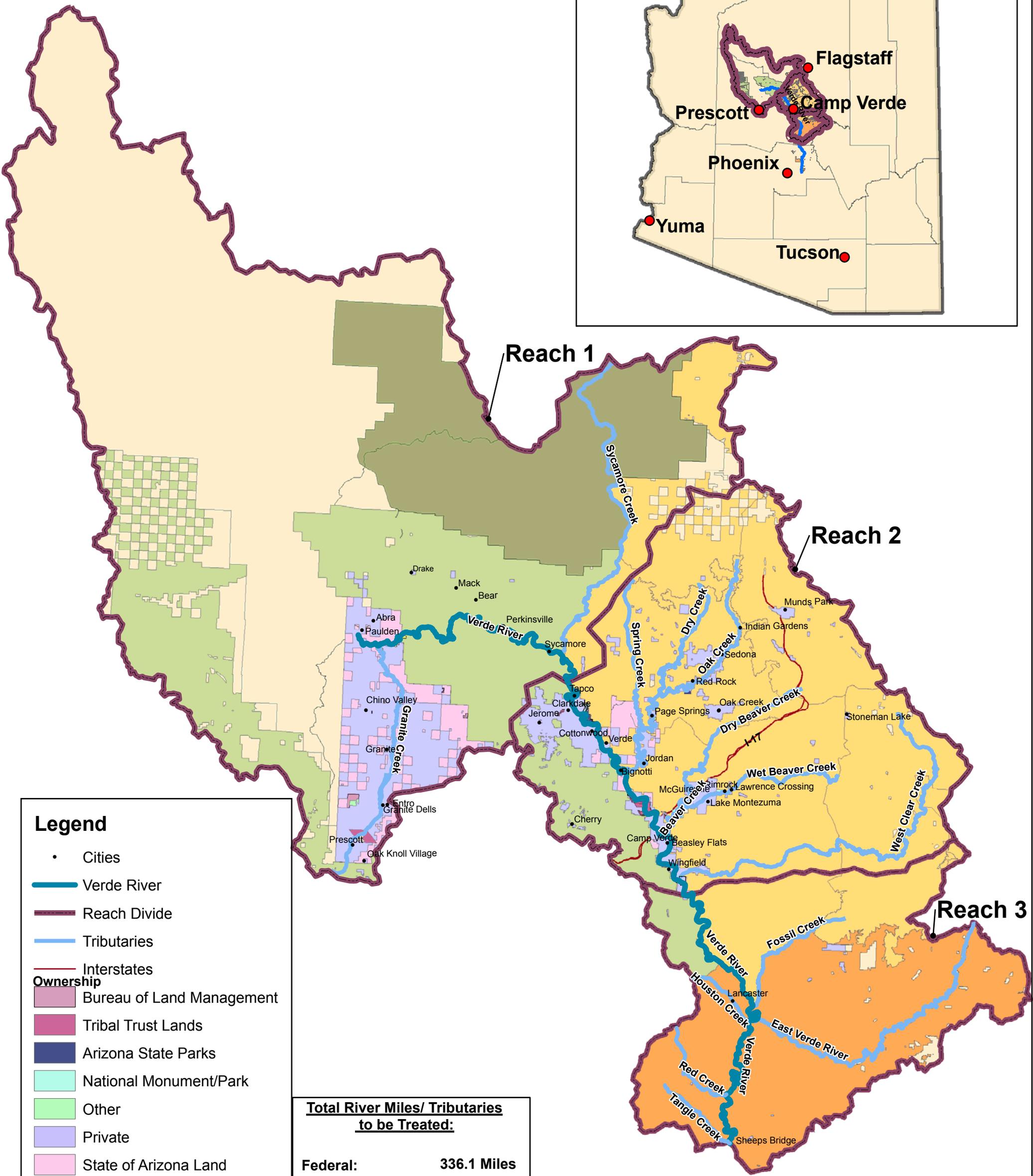
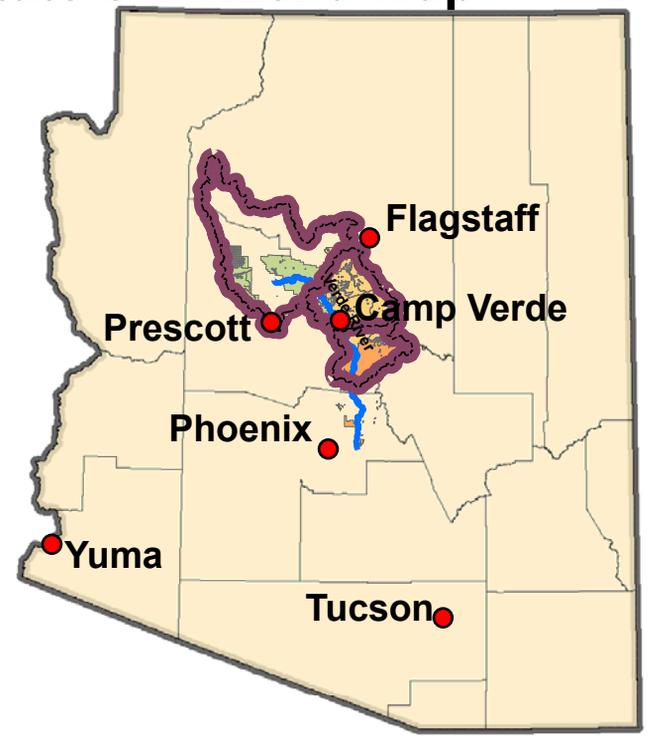
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 PO Box 2535  
 Cottonwood, AZ  
 86326

# VERDE RIVER RESTORATION PLAN LOCATION MAP



APRIL 2011  
**CONCEPT PLAN LOCATION MAP**  
**FIGURE 1**

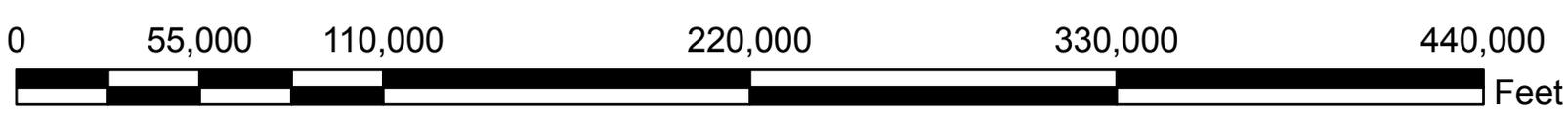
# State of Arizona Map

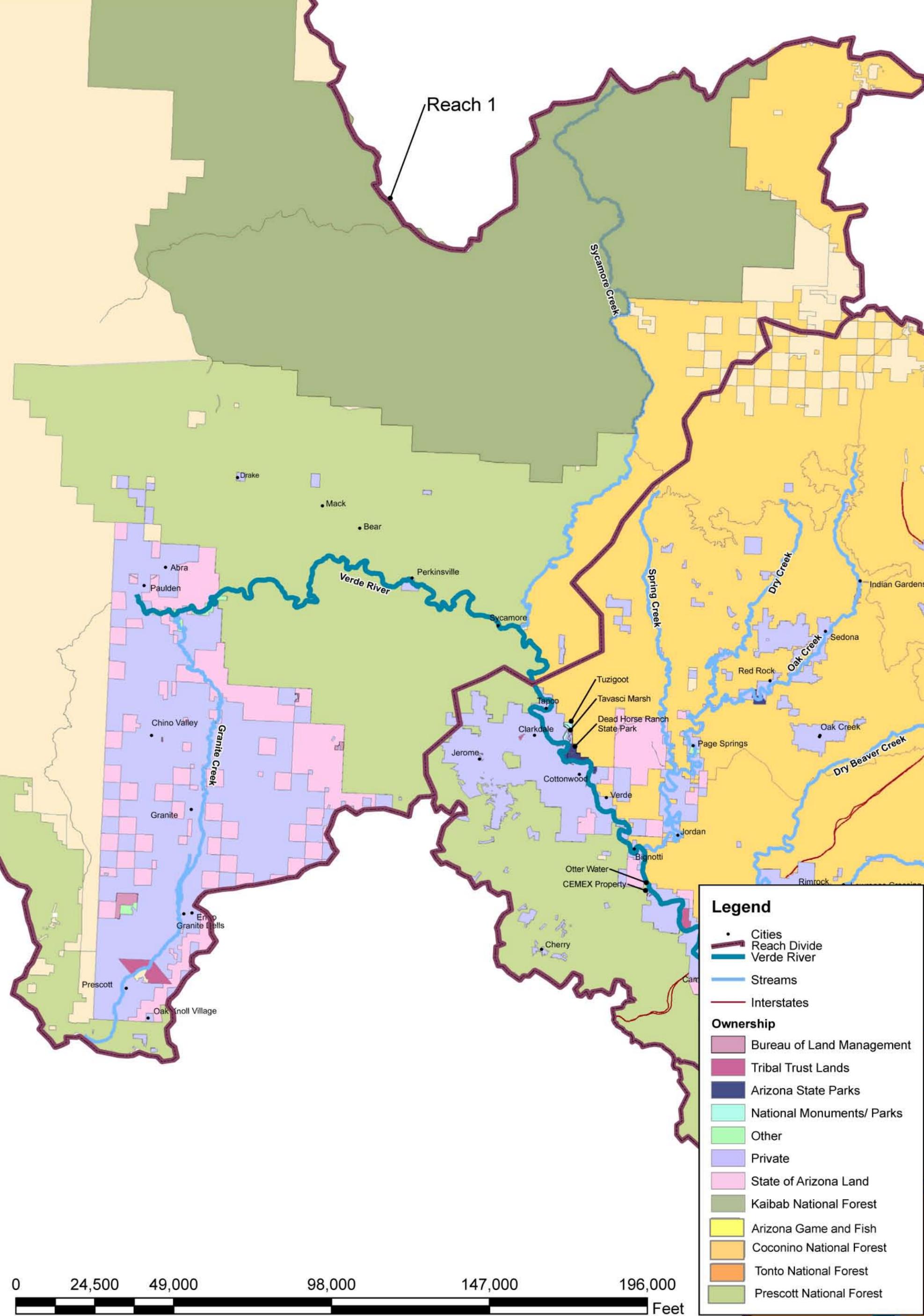


## Legend

- Cities
- Verde River
- Reach Divide
- Tributaries
- Interstates
- Ownership**
- Bureau of Land Management
- Tribal Trust Lands
- Arizona State Parks
- National Monument/Park
- Other
- Private
- State of Arizona Land
- Kaibab National Forest
- Coconino National Forest
- Tonto National Forest
- Prescott National Forest
- Arizona Game and Fish

<u>Total River Miles/ Tributaries to be Treated:</u>	
<b>Federal:</b>	<b>336.1 Miles</b>
<b>State:</b>	<b>20.8 Miles</b>
<b>Tribal:</b>	<b>4.2 Miles</b>
<b>Private:</b>	<b>98.1 Miles</b>
<b>Total River Miles:</b>	<b>459.2 Miles</b>





0 24,500 49,000 98,000 147,000 196,000 Feet

**Legend**

- Cities
- Reach Divide
- Verde River
- Streams
- Interstates

**Ownership**

- Bureau of Land Management
- Tribal Trust Lands
- Arizona State Parks
- National Monuments/ Parks
- Other
- Private
- State of Arizona Land
- Kaibab National Forest
- Arizona Game and Fish
- Coconino National Forest
- Tonto National Forest
- Prescott National Forest



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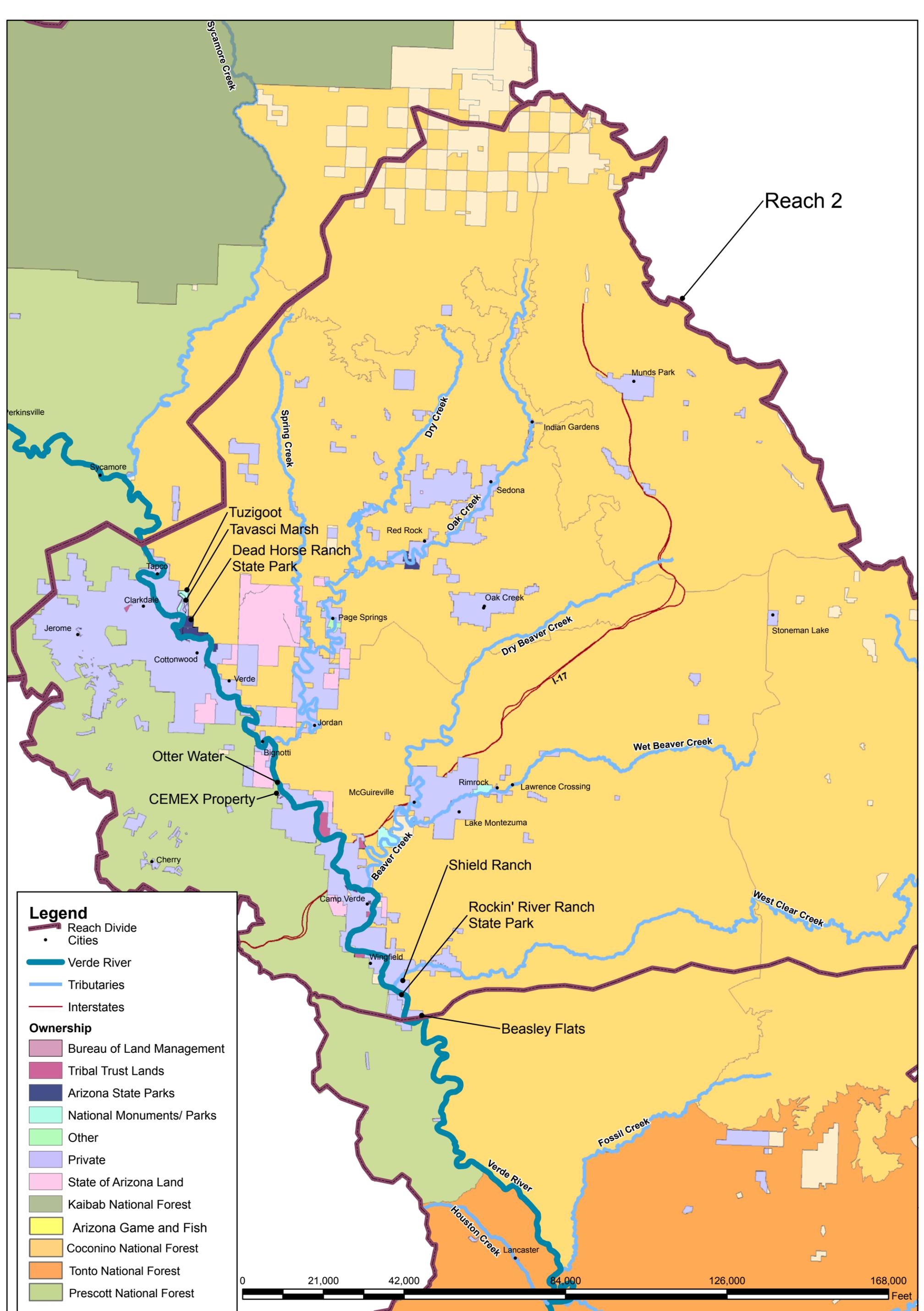


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**VERDE RIVER RESTORATION PLAN REACH 1**



**APRIL 2011**  
**CONCEPT PLAN**  
**FIGURE 3**



**Legend**

- Reach Divide
- Cities
- Verde River
- Tributaries
- Interstates

**Ownership**

- Bureau of Land Management
- Tribal Trust Lands
- Arizona State Parks
- National Monuments/ Parks
- Other
- Private
- State of Arizona Land
- Kaibab National Forest
- Arizona Game and Fish
- Coconino National Forest
- Tonto National Forest
- Prescott National Forest



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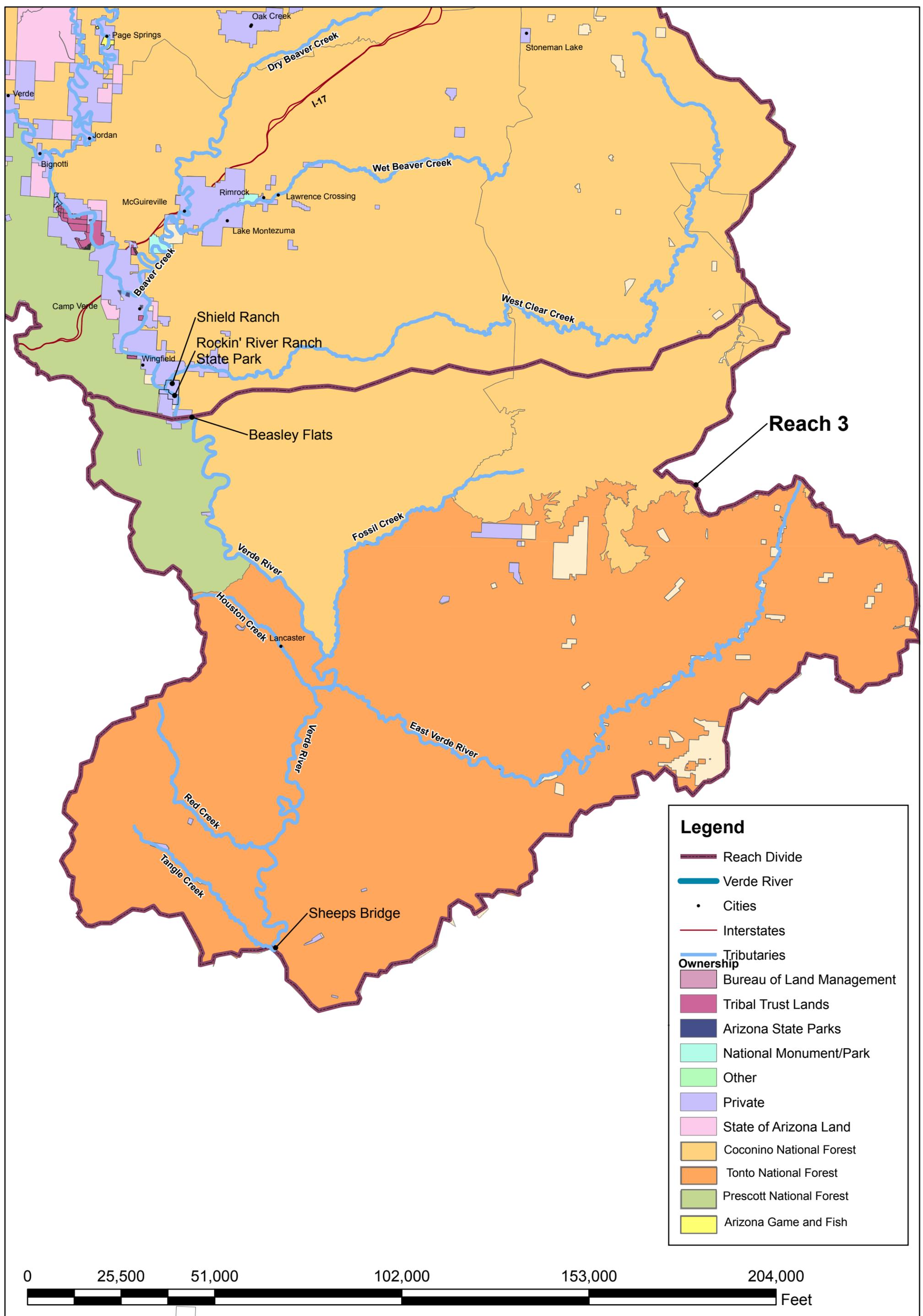


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# VERDE RIVER RESTORATION PLAN REACH 2



APRIL 2011  
 CONCEPT PLAN  
 FIGURE 4

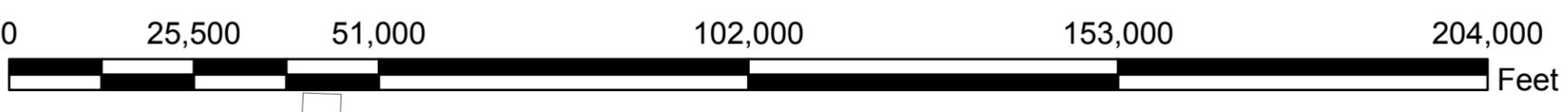


**Legend**

- Reach Divide
- Verde River
- Cities
- Interstates
- Tributaries

**Ownership**

- Bureau of Land Management
- Tribal Trust Lands
- Arizona State Parks
- National Monument/Park
- Other
- Private
- State of Arizona Land
- Coconino National Forest
- Tonto National Forest
- Prescott National Forest
- Arizona Game and Fish



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**VERDE RIVER  
 RESTORATION PLAN  
 REACH 3**



APRIL 2011  
 CONCEPT PLAN  
 FIGURE 5



United States  
Department of  
Agriculture

Forest  
Service

Red Rock  
Ranger District

P. O. Box 20429  
Sedona, AZ 86341  
Phone: (928) 282-4119  
Fax: (928) 203-7539

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Date: August 30, 2018

Arizona Water Protection Fund Commission  
3550 N Central Ave, Suite 200

Dear AWPFC Commissioners:

Friends of the Verde River (FVR), as part of the Verde Watershed Restoration Coalition (VWRC) is proposing a habitat restoration project on the Verde River and Oak Creek confluence. This project is located on the Coconino National Forest (CNF) along the Verde River and Oak Creek starting at upstream boundaries with private properties above the confluence and continuing downstream to the boundary with private property upstream of Camp Verde, AZ. As a partner of VWRC, the Coconino National Forest supports this project which will treat identified and mapped tamarisk and tree of heaven populations on 175 acres along 4.1 miles of river. We are committed to monitoring and maintenance of these sites to ensure long-term success. CNF has successfully partnered with FVR for eight years and is in full support of this essential project to remove invasive plants from this area.

FVR, VWRC, and the Forest Service share a common interest in accomplishing the ecological and social goals outlined in the Verde River Cooperative Invasive Plant Management Plan, while providing economic opportunity for our local communities. The Forest is committed to supporting VWRC in its endeavors to apply for additional funding to continue restoration work within the Verde Watershed. The Forest is also committed to working collaboratively with VWRC partners on programs to promote restoration, outreach, education, and opportunities for young adults and veteran employment. Thank you for your consideration.

Sincerely,

/s/ Nicole Branton

Nicole Branton

Red Rock Ranger District Ranger





Arizona Water Protection Fund Commission  
3550 N Central Ave, Suite 200  
Phoenix, AZ 85012

August 27, 2018

RE: Friends of Verde River AWPf FY19 Proposal

Dear Grant Review Committee,

RiversEdge West, formerly Tamarisk Coalition, is a nonprofit organization working with riparian and watershed restoration practitioners across the western US. Our mission is to advance the restoration of riparian land through collaboration, education, and technical assistance.

Please accept this letter of support for Friends of Verde River's (FVR) application to the Arizona Water Protection Fund, FY 2019 funding cycle. RiversEdge West staff have worked closely with FVR and the Verde Watershed Restoration Coalition (VWRC) for eight years now, through seven riparian restoration fieldwork seasons that consistently exceeded management goals. Over 230 private landowners participate in the VWRC riparian invasive plant management and habitat improvement program. FVR's capacity and commitment to long-term maintenance is excellent, with protocols in place for inventory, mapping, treatment, monitoring and maintenance, and a GIS database where data is stored in perpetuity. Data informs adaptive management, and is shared with other watershed partnerships across Arizona and regionally.

With AWPf support, FVR will be able to treat and re-treat priority woody invasive plants on a contiguous portion of the Verde River and Oak Creek. This reach is currently a source of invasive plant seeds and propagules for further downstream. The Verde River provides drinking water to over 3 million Arizonans. The proposed project is critically important for restoring and maintaining healthy, functioning riparian lands in the Verde Watershed - for both wildlife and people.

If you have any questions, please feel free to contact me at any time by phone at (970) 256-7400 or by email at [rlloyd@riversedgewest.org](mailto:rlloyd@riversedgewest.org).

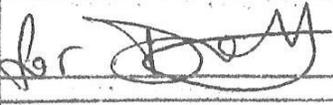
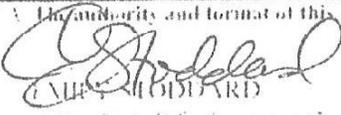
Sincerely,

Rusty Lloyd  
Executive Director



MODIFICATION OF GRANT OR AGREEMENT		PAGE	OF PAGES
		1	9
1. U.S. FOREST SERVICE GRANT AGREEMENT NUMBER: 17-PA-11030416-025		2. RECIPIENT/COOPERATOR GRANT or AGREEMENT NUMBER, IF ANY:	
4. NAME, ADDRESS OF U.S. FOREST SERVICE UNIT ADMINISTERING GRANT/AGREEMENT (unit name, street, city, state, and zip + 4): Coconino National Forest, Supervisor's Office 1824 S. Thompson St. Flagstaff, AZ 86001		5. NAME, ADDRESS OF U.S. FOREST SERVICE UNIT ADMINISTERING PROJECT/ACTIVITY (unit name, street, city, state, and zip + 4): Coconino National Forest, Supervisor's Office 1824 S. Thompson St. Flagstaff, AZ 86001	
6. NAME, ADDRESS OF RECIPIENT/COOPERATOR (street, city, state, and zip + 4, county): Friends of the Verde River Greenway, Inc. (FVRG) 115 S. Main St., Suite A / P.O. Box 2535 Cottonwood, AZ 86326-4012		7. RECIPIENT/COOPERATOR'S HHS SUB ACCOUNT NUMBER (For HHS payment use only):	
<b>8. PURPOSE OF MODIFICATION</b>			
CHECK ALL THAT APPLY:	This modification is issued pursuant to the modification provision in the grant/agreement referenced in item no. 1, above.		
<input type="checkbox"/>	CHANGE IN PERFORMANCE PERIOD:		
<input checked="" type="checkbox"/>	CHANGE IN FUNDING: Add funding in the amount of \$125,500.00 for additional work. See attached Revised Scope of Work (Attachment A) and Financial Plan (Attachment B) for details on how funding will be spent.		
<input checked="" type="checkbox"/>	ADMINISTRATIVE CHANGES: Change FVRG Project Contact and U.S. Forest Service Program Manager Contact. See Box #9 below (#1-2).		
<input checked="" type="checkbox"/>	OTHER (Specify type of modification): Apply AVAILABILITY OF FUNDS clause, see Box #9 below (#3).		
<b>Except as provided herein, all terms and conditions of the Grant/Agreement referenced in 1, above, remain unchanged and in full force and effect.</b>			
9. ADDITIONAL SPACE FOR DESCRIPTION OF MODIFICATION (add additional pages as needed):			
<p>1. Replace U.S. Forest Service Program Manager Contact Amina Sena with: Debbie Crisp, Forest Botanist Coconino National Forest, Supervisor's Office 1824 S. Thompson St., Flagstaff, AZ 86001 Phone: 928-527-3424 FAX: 928-527-3620 Email: dcrisp@fs.fed.us</p> <p>2. Replace FVRG Cooperator Project Contact Anna Schrenk with: Matthew Wilson, Program Manager, Habitat Restoration Friends of the Verde River Greenway, Inc. Physical Address: 115 S. Main St., Ste A, Cottonwood, AZ 86326 Mailing Address: P.O. Box 2535, Cottonwood, AZ 86326-4012 Phone: 330-719-5697 Email: mattw@verderiver.org</p> <p>3. LIMITATION OF FUNDS. U.S. Forest Service funds in the amount of \$125,500.00 are currently available for performance of this modification through December 31, 2020. The U.S. Forest Service's obligation for performance of this agreement beyond this date is contingent upon the availability of appropriated funds from which payment can be made. There is no legal liability on the part of the U.S. Forest Service for any payment may arise for performance under this agreement beyond this amount until FVRG receives notice of availability to be confirmed in a written modification by the U.S. Forest Service.</p>			
<b>10. ATTACHED DOCUMENTATION (Check all that apply):</b>			
<input checked="" type="checkbox"/>	Revised Scope of Work		
<input checked="" type="checkbox"/>	Revised Financial Plan		
<input type="checkbox"/>	Other:		



11. SIGNATURES			
<p>A. Signature of the person who prepared this modification (Name, Title, and Date)</p>			
 NANCY SHUTT Executive Director	7/19/18	 TAMARA COWLES Test Supervisor	7/19/18
12. G & A REVIEW			
<p>The authority and format of this modification have been reviewed and approved for signature by:</p>  AMY HUBBARD			7/19/2018



#17-PA-11030416-025

Modification 001

### **Attachment A: Revised Scope of Work**

Note that for the work completed under Modification 001, no U.S. Forest Service rigs will be provided for use by FVRG. FVRG will provide all necessary transportation for its personnel, volunteers, and contract crews.

Modification 001 provides funding for a total of 11 weeks of crew time:

- 8 weeks will be spent treating riparian corridors and uplands for a total target accomplishment of about 160 acres of weeds treatment (with 50 of initial treatments and 110 acres of retreatment).
- 3 weeks will be spent on activities related to forest priorities, as described in the agreement: erosion control in washes, grassland restoration, and for monitoring. These activities would have a target accomplishment of 20 acres soil and water acres improved.

This modification also includes general education and outreach in the Verde Watershed, specific to the provision of responsible recreation educational information and outreach opportunities.

#### Burden Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0217. The time required to complete this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.