
Section 319 Non Point Source Pollution Control Program

Watershed Project Final Report

Virgin River

By

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EXECUTIVE SUMMARY

Project Title:	Virgin River		
Start Date:	10/1/2006	Completion Date:	11/13/2008
Funding:	EPA funds		
FY-06	\$100,000		FY 06 \$100,000
FY-07	\$33,730		FY 07 \$33,730
Total	\$133,730	Total Budget:	\$133,730
		Total EPA 319 Grants:	\$133,730
		Total expenditures of EPA funds: (\$90,086 from 2006, \$28,520 from 2007. The remaining \$15,124 was transferred to another PIP elsewhere in Utah)	\$118,605
		Total 319 Match accrued:	\$161,251
		Total project expenditures:	\$279,856

Summary Accomplishments

Two grants were awarded to the Washington County Water Conservancy District (WCWCD) for work in the Virgin River watershed. The first, in 2006, was for \$100,000. It was intended to be the first of several years of incremental funding for a variety of projects aimed at improving water quality and increasing public awareness of local water quality issues. However, instead of continuing to request incremental money in 2007 to support such a broad range of projects, the local watershed coordinator opted to select three very specific projects that could be completed in a timely manner. That 2007 grant was for \$33,730.

The WCWCD was able to purchase a multi terrain loader with the 2006 grant money. The loader has been a critical piece of machinery for clearing tamarisk from riparian areas. Approximately 100 acres of tamarisk were cleared by this equipment as part of this grant. Since the loader was acquired there have been hundreds of additional acres of tamarisk which have been cleared and revegetated by the WCWCD and its partners. This piece of equipment was used, as well as equipment owned and contracted by project partners. In addition to the tamarisk removal, local partners including municipalities, federal and state agencies and other partners were brought together to address tamarisk removal and a tamarisk removal plan was developed and approved by local partners. The plan describes acceptable methods for tamarisk removal which are consistent with river and stream bank stability and also habitat improvement needs. The

plan addressed the needs of seasonal nesting of the endangered Southwestern Willow Flycatcher in the riparian corridor.

The 2007 grant was used for conducting a streambank stability and revegetation workshop in December 2007. Devastating floods in 2005 resulted in a federal disaster declaration and many millions of dollars in damage to private property and public infrastructure. Many miles of the Virgin River and Santa Clara River were scoured and eroded leaving unstable banks and conditions of excessive sediment transport in the river system. It was identified that there was a need to provide instruction and practical information to local decision makers, regulators, and private property owners.

The workshop was intended to provide municipalities, local property owners, state and federal agencies, regulatory authorities, and others training and hands on practical application of stream bank stabilization principles. The workshop lasted three days and included classroom instruction and hands on implementation of the concepts taught.

The workshop was taught by Chris Hoag from the NRCS plant research station in Idaho and Tom Moody of Natural Channel Design in Flagstaff, AZ. Fred Phillips, a tamarisk removal expert also provided instruction.

The 2007 grant also supported establishment of a willow nursery in St. George near the Virgin River. The nursery is located on private property provided by a cooperative landowner. Willows were planted and are now maintained by volunteer efforts. Willows are large enough to provide planting stock. Willows were used from the nursery to improve stream bank stability on the Virgin and Santa Clara Rivers. Most of the cuttings available from the nursery, including many willow clumps, were used on a local project to stabilize a streambank on the Virgin River and to create habitat for the endangered Southwestern Willow Flycatcher. The nursery provides a great demonstration for how willows can be economically grown and harvested for use in stream bank stabilization and habitat improvement projects. There is generally an ample supply of willows available in the river system for harvesting; however periodic flooding with its devastating scour and lateral erosion can remove much of the available supply. The project was also used for water quality public education and river system awareness efforts including a number of Eagle Scout projects.

Additionally, the 2007 grant supported Southern Utah University in their efforts to monitor Salt Cedar beetles released in July 2006 to document the reproduction, health, and spread of the beetle, as well as the impact on tamarisk in the watershed.

1.0 INTRODUCTION

The Virgin River is part of the Lower Colorado River system. It flows westerly through the southwestern corner of Utah. The river continues through Arizona and Nevada and flows directly to Lake Meade. The river has its headwaters in the East Fork of the Virgin River in Kane County on the Markagunt Plateau. Most of Zion National Park lies within the watershed. The watershed encompasses almost all of Washington and small portions of Iron County to the north and Kane County to the east. The watershed also includes a portion of Mohave County in Arizona to the south. The Virgin River Watershed includes approximately 2,800 square miles.

The climate of the Virgin River Watershed is influenced by the large variations in topography and elevation. Elevations in the watershed range from 2,100 feet above sea level where the Virgin River crosses into Arizona to elevations over 10,500 feet in the mountains to the north and east. The climate is typical of the arid Southwest. The average annual precipitation ranges from 6-8 inches in the St. George area to 35 inches in the higher mountains. The area is typified with ephemeral streams that only flow during extreme snow melt or rain events. The precipitation in the watershed occurs during two periods, as snow in the mountains during winter or as monsoon thunderstorms in the late summer. The area is referred to as 'Utah's Dixie' or 'Dixie' because the climate allows for growing cotton, figs, grapes, olives, almonds and other crops that would be more typical of the southeastern United States.

Current uses of the river and its tributaries include drinking water, wildlife, recreation, and irrigation. During low discharge stream conditions much of the water in the Virgin and its tributaries is diverted for irrigation and secondary water use. Fishing and recreation are important in the upper reaches. The river floodplain is used for agricultural purposes, as pasture and irrigated and non-irrigated cropland.

Natural conditions in the watershed lead to high TDS concentrations and loadings. Much of the watershed consists of rock layers or formations that contain soluble minerals. These rock formations include the Kaibab, Moenkopi, Chinle, and Moenave Formations, and the Cretaceous marine rock sequence. The watershed also includes a number of geothermal hot springs, the most notable is the Pah Tempe Hot Springs located adjacent to the river in LaVerkin. The springs consistently flow at 11cfs and have a dramatic effect on the river's temperature and water quality, especially during low flow conditions.

Flood irrigation has been a predominant agricultural practice in the Hurricane Valley and Washington Fields areas since the area was settled in the 1850s by Mormon Pioneers. In recent years many areas have converted to sprinkler systems resulting in water savings and water quality improvement.

Historically the Virgin River had a multichannel braided or anasmotized wide and flat channel. The riparian vegetation consisted largely of Fremont cottonwood and Coyote willow. In past decades tamarisk or salt cedar has invaded the watershed and displaced the native vegetation. The tamarisk dominance has resulted in many negative changes in the river system. The tamarisk is highly tolerant of saline water and concentrates salts in the soil around each plant causing impacts to the soils, impacting water quality and limiting competition by native vegetation. The tamarisk

restricts overbank floodplain flows during floods resulting in build up of floodplains and downcutting of the main channel. Tamarisk tends to spread flood flows not allowing the floodplain to function naturally and worsening the effects of floods. Tamarisk has no natural enemies, does not provide forage to wild or domestic animals and provides limited habitat for animals. It has also been suggested that tamarisk consumes more water than native vegetation, especially during summer months when the water table drops and only the extensive roots of the tamarisk can reach the water.

Washington County has become a very attractive place to live because of the warm climate and mild winters, the comfortable lifestyle, beautiful scenery and close proximity to the interstate and recreational attractions. The county is one of the fastest growing areas in the nation. Its population has been almost doubling every decade. Currently the population is approximately 120,000. This trend is expected to continue. Much of the growth is centered in the cities of St. George, Washington and Hurricane. Residential growth is taking place as areas of agriculture are developed to residential uses. A continued shift from agricultural land uses to residential uses will result in an increased need to plan for and manage stormwater and urban runoff in addition to agricultural impacts.

Water Quality Concerns

The main beneficial use of the Virgin River is for agriculture including irrigation and livestock watering. Any water diverted from the Virgin River for drinking water purposes is diverted above the impacts of the Pah Tempe Hot Springs. Irrigation water use is impaired when high concentrations of TDS impair the ability of plants to absorb water from soils. As noted above, there are several causes and sources of salinity loading to Virgin River. The Virgin River TMDL has identified the main sources of TDS in the lower Virgin River as a combination of streambank/land erosion (54%), upstream sources (23%), Fort Pearce Wash (7%), St. George WWTP (6%), Santa Clara River (5%), urban dry weather/stormwater flows (2%), and irrigation return flows (2%). The TMDL concludes that it is not possible to achieve a TDS concentration of 1,200 mg/l and recommends site specific TDS criteria of 2,360 mg/l to represent background conditions resulting from highly saline soils and geology and the Pah Tempe Hot Springs. A TDS load reduction of 5% or 835,530 kg/year is prescribed for the river. The proposed projects combined with other existing efforts addressed the load reduction necessary for the Virgin River to meet the TMDL loadings.

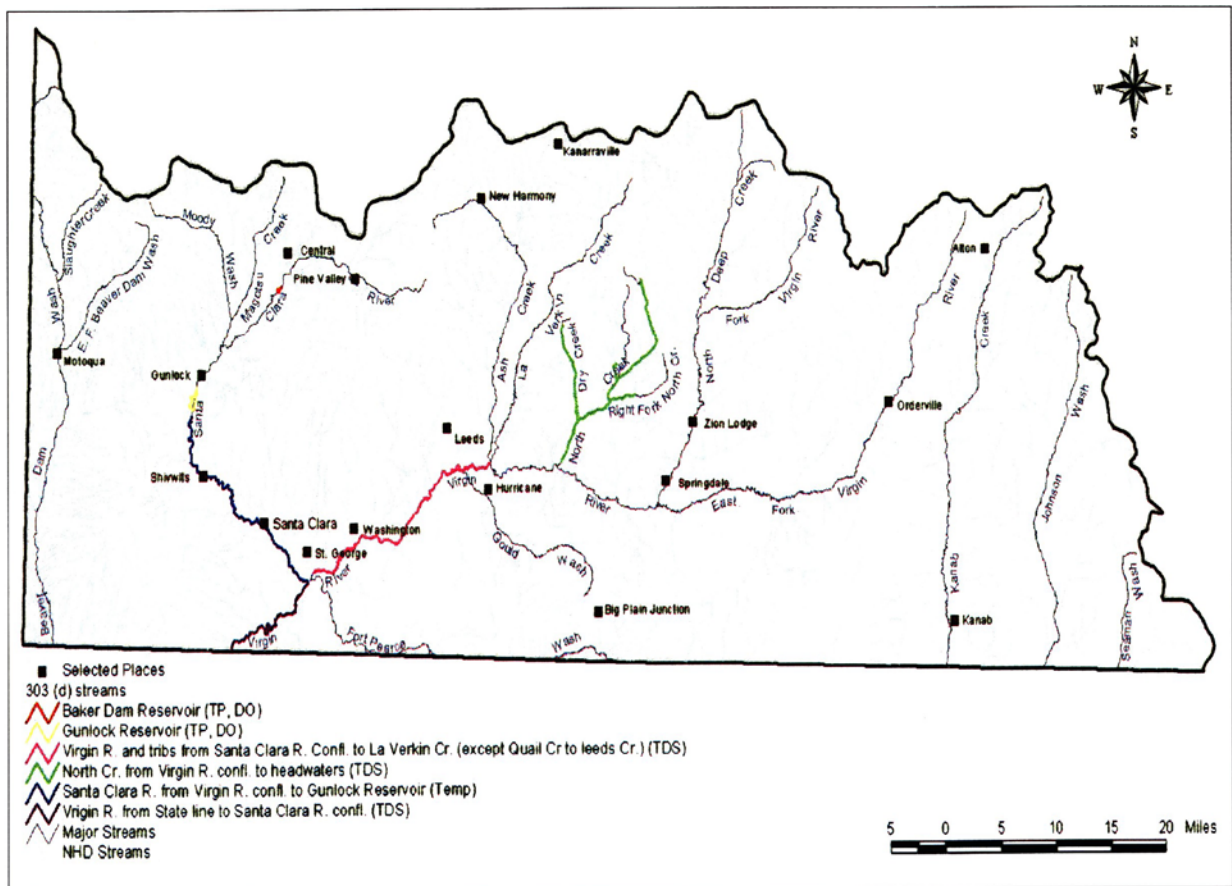
The Santa Clara River from its confluence with the Virgin River to Gunlock Reservoir is listed as impaired due to elevated TDS and expected to be impaired due to elevated Selenium concentrations. The TMDL addresses both of these impairments. The TMDL identifies the main sources of TDS and Selenium impairment in the Santa Clara as streambank/land erosion (68% TDS-65% Selenium), upstream sources (15% TDS), stormwater/dry weather flows (9% TDS-2% Selenium), and irrigation return flows (9% TDS-33% Selenium). The bulk of both the TDS and Selenium impairment is attributed to streambank/land erosion, at 68% and 65% respectively. The TMDL proposes a set of BMPs for TDS and a set for Selenium that would address the pollution load necessary to meet the TMDL requirements. The set of BMPs to address TDS include: water conservation, streambank fencing to reduce erosion, streambank revegetation, stormwater detention basins, tamarisk removal,

construction of irrigation pipelines and seeding of poorly vegetated areas to reduce erosion. The set of BMPs to address Selenium include: streambank fencing to reduce erosion, tamarisk removal, and construction of irrigation pipelines to replace open canals and ditches. Erosion control, tamarisk removal and the construction of irrigation pipelines are common to both lists of recommended BMPs to address the two sources of impairment.

The 2006 implementation plan was an initial attempt to address sources of non-point source pollution within a five year period. The work proposed would provide measurable improvements and lead to landowners and others taking steps of their own to address water quality issues and watershed problems.

1.1 Map

The following map shows the location of the Virgin River Watershed in the southwest corner of Utah. 303(d) listed waterbodies are highlighted.



2.0 PROJECT GOALS, OBJECTIVES, AND TASKS

The project goals, objectives and tasks outlined in the **2006 PIP** included the following:

Goal No. 1: Provide funding to assist with implementing the master plans for the Santa Clara and Virgin Rivers to address instability, revegetation, and management issues. Provide education and information to the public, local municipalities and stakeholders. Conduct training and hands-on workshops to train municipalities, local landowners and project partners in streambank stabilization and revegetation.

Objective 1: Develop the necessary technical documents that will provide guidance and direction to address streambank erosion, revegetation, and management issues in the Santa Clara and Virgin Rivers. Identify critical or problem areas and develop specific recommendations for improvement and implementation. Provide that information to city and county governments, landowners, and stakeholders in a useable format. Meet with landowners on-site to discuss site-specific conditions, make recommendations for improvement and coordinate resources for implementation.

Task 1 –Provide annual streambank restoration workshops for four years. Meet with local government and property owners.

Output: Santa Clara Master Plan (to be completed prior to 319 grant approval)

Virgin River Master Plan (likely to be completed prior to 319 grant approval)

Four classroom and hands-on streambank restoration and revegetation workshops

Stream restoration accomplished through workshops and by property owners and stakeholders

Goal No. 2: Maintain a riparian vegetation nursery to provide free willow cuttings and other plants for property owners and others as part of streambank restoration projects.

Objective 1: Provide free native riparian vegetation to make landowner streambank restoration and revegetation practical and manageable when combined with education and training.

Task 2 – Maintain nursery stock. Maintain nursery and provide stock for projects.

Output: Local nursery greater than 2 acres in size providing willow cuttings and other plants for stream restoration and revegetation projects.

Goal No. 3: Implement a streambank stabilization and revegetation project on the lower Santa Clara River from Riverwood to Tonaquint Park. Reduce TDS in the Santa Clara River by 750,000 kg/year and Selenium by 0.5 kg/year.

Objective 1: Address TDS and Selenium issues in the lower Santa Clara River through streambank stabilization and revegetation. Provide a

demonstration project through implementation of proper BMPs in a high visibility area. Demonstrate BMPs in urban, rural, and agricultural settings.

Task 3 – Address specific problem areas in the stream reach from Riverwood downstream to Tonaquint Park. Locations could include:

- Urban areas behind Riverwood Development
- Revegetate left bank near Mathis Park
- Reshape and revegetate right bank across from Riverwood

Conduct site-visits and tours of project areas. Obtain equipment for tamarisk removal to take place as part of this project (lower Santa Clara River demonstration) and the following project (Virgin River Tamarisk Removal Project).

Output: Streambank stability and revegetation in the lower Santa Clara River. High visibility demonstration project providing example and incentive for property owners and stakeholders to implement projects.

Goal No. 4: Implement a tamarisk removal and revegetation project on the Virgin River near Quail Creek. Reduce TDS by 500,000 kg/year.

Objective 1: Reduce salinity and TDS in the Virgin through tamarisk removal and revegetation of native plants. Provide a demonstration and involve the Boy Scouts of the Snow Canyon, Virgin, and St. George Districts. Determine the most effective method of tamarisk removal and management for the Virgin River area and conditions. Provide site visits and tours for others in the watershed interested or engaged in non-point source pollution reduction, habitat improvement, streambank revegetation and tamarisk removal.

Task 4 – Sequential removal of tamarisk and revegetation with native vegetation. Monitoring of work to insure successful results and improvements to water quality, stream function and morphology and habitat.

Output: At least 100 acres of tamarisk removal and revegetation. High visibility work done leading to increased tamarisk removal efforts by property owners. Involvement of hundreds of boy scouts from all over the county.

Goal No. 5: Create a natural erosion control marsh for development in Washington Fields. Reduce TDS in the Virgin River by 100,000 kg/year.

Objective 1: Create a natural erosion control marsh to treat current and future runoff from urban development in the Washington Fields.

Task 5 – Purchase property or acquire easements for the Seegmiller Marsh area. Develop and implement detailed plan including protection from the river.

Output: Erosion control for Washington Fields. Protected riparian habitat. Development of educational facilities at the site.

The project goals, objectives and tasks outlined in the **2007 PIP** included the following:

Goal No. 1: Conduct a streambank stability and revegetation workshop in November 2007. The workshop will be three days in length and include classroom discussion and hands on training applicable to conditions in the Virgin River watershed. Course instructors will include regionally recognized experts from the NRCS Plant Materials Research Center and other private consultants that very familiar with the local conditions.

Objective 1: Provide needed streambank restoration training to property owners, floodplain managers, volunteer groups, municipalities, and others. Empower local groups with the necessary information and training to complete streambank stability and restoration projects with little additional technical oversight. Increase the amount of river corridor stewardship and sound management.

Task 1 –Provide annual streambank restoration workshops for four years. Meet with local government and property owners.

Output: At least thirty additional people trained in approved streambank restoration and revegetation methods and prepared to apply that knowledge and training to local conditions that need attention.

Goal No. 2: Maintain a willow nursery that will be established under the previous year's 319 grant. Willows will be grown and then made available for streambank restoration projects. The riparian plant nursery will likely be located near Sand Hollow where the project sponsor has land and water readily available (it is anticipated that the nursery will be constructed with 319 funds applied for in August 2005). An innovative farmer is actively farming ground nearby who will likely be participating.

Objective 1: Provide free native riparian vegetation to make landowner and volunteer group streambank restoration and revegetation practical and manageable when combined with education and training.

Task 2 – Maintain nursery stock. Maintain nursery and provide stock for projects.

Output: Local nursery greater than 2 acres in size providing willow cuttings and other plants for stream restoration and revegetation projects.

Goal No. 3: Monitoring of Salt Cedar beetles released in July 2006 to document the reproduction, health, and spread of the beetle as well as the impact on tamarisk in the watershed. Southern Utah University experts in entomology and biology have expressed interest in participating with their expertise and student resources.

Objective 1: Determine suitability of Salt Cedar beetle to Virgin River climate and day length. Quantify and correlate feeding damage by beetle to tamarisk and response of native vegetation. Monitor the rate of spread of extent of spread of beetles. Evaluate the use of the tamarisk biological control method as it relates to conditions in the Virgin River and existing efforts to control tamarisk.

Task 3-Monitor beetle reproduction, life stages, behavior, migration, overwintering, survival and resulting defoliation. Collect information on results experienced elsewhere. Compile results into a summary report.

Output: Monitoring data on the status and potential success of biological control to aid in tamarisk control and improvement of riparian stream conditions in the Virgin River.

2.1 Planned and Actual Milestones, Products, and Completion Dates

The following is the milestone table that was submitted for the 2006 grant. The plan was to request 4 years of incremental funding to support the objectives. Ultimately, there was a shift away from the 319 incremental funding plan due to the fact that several of the objectives were already being accomplished prior to the 319 grant approval and funding. Due to that timing, it worked best to use the funding for the purchase of the multi terrain loader, which supports objectives 3 and 4.

Task	Responsible Organization	Output	Qty.	FY '07					FY '07					FY '08					FY '09						
				July '06-June'07					July '07-June'08					July '08-June'09					July '09-June'10						
				July	Sept	Nov	Jan	Mar	May	July	Sept	Nov	Jan	Mar	May	July	Sept	Nov	Jan	Mar	May	July	Sept	Nov	Jan
Objective 1-Streambank Information and Education Develop Santa Clara River Master Plan Develop Virgin River Master Plan Conduct training workshops Conduct on-site meetings with property owners	1, 2 1	Trained landowners Education	3																						
Objective 2-Establish Riparian Vegetation Nursery Select location Obtain professional oversight Grading and earthwork Install irrigation system Plant and maintain nursery	1, 2 1, 2, 3 1, 2 1, 2 1, 2, 3	Nursery location Expertise Prepared land Irrigation Functioning nursery	1																						
Objective 3-Santa Clara River Demonstration Project Obtain tamarisk removal and revegetation equipment Address site specific areas in stream reach Stream and revegetation monitoring Conduct tours of project area	1 1, 4 1, 2, 3, 4 1, 2, 4, 5	Equipment Streambanks stabilized, revegetated, etc. Evaluation Education	5 areas																						
Objective 4-Tamarisk Demonstration Project Removal of tamarisk Conduct tours of project area Revegetation Monitoring	1, 2, 3 1, 2, 3, 6 1, 2, 3, 6 1, 2, 3	TDS reduction Improvement of stream function and habitat	100 ac. 90 ac.																						
Objective 5-Stormwater treatment marsh for Washington Fields Area Acquire property Develop conceptual plan Develop detailed plan Implement plan Monitoring	1, 2, 4 1, 2, 3, 4, 7, 8 1, 2, 3, 4, 7, 8 1, 2, 3, 4, 8	Plan Stormwater treatment	100 ac. 1																						
Group 1-WCWD Group 2-Virgin River Program Group 3-UDWR	Group 4-St. George City Group 5-Private land owners Group 6-Boy Scouts	Group 7-NRCS Group 8-Audubon and others																							

The following is the milestone table that was submitted for the 2007 grant.

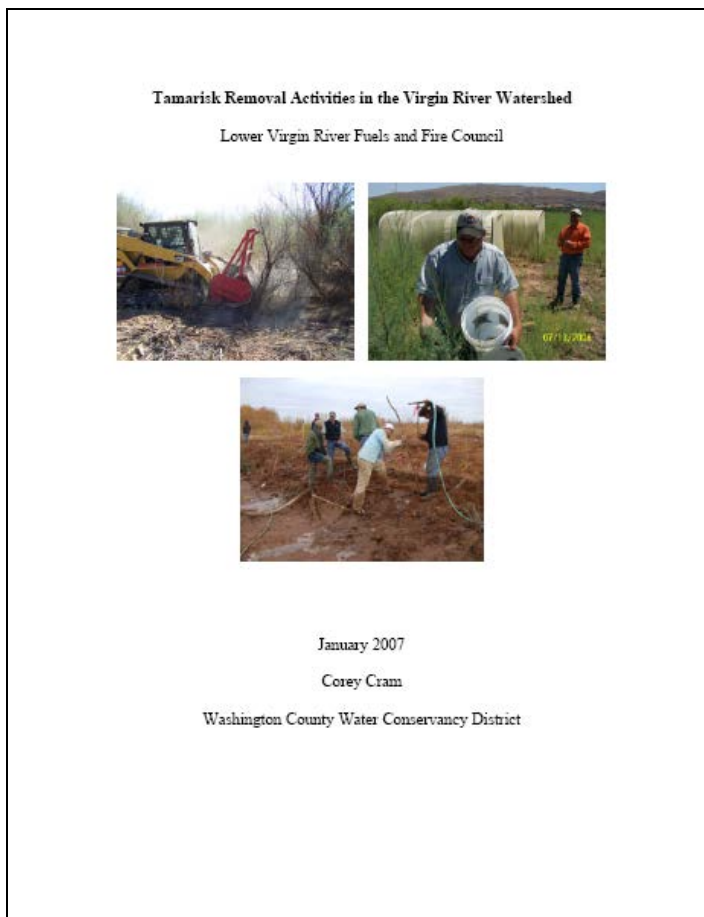
Task	Oct. '07	Nov. '07	Dec. '07	Jan. '08	Feb. '08	Mar. '08	Apr. '08	May '08	June '08	July '08	Aug. '08	Sept. '08
Task 1, Workshop												
Task 2, Maintain Nursery												
Task 3, Monitor Biocontrol												

2.2 Supplemental Information

Outside the scope of this grant additional river master plans were completed for the Virgin River, Santa Clara River and Fort Pearce Wash. These plans provide an analysis of current river conditions and a template for appropriate river morphology. The studies include information on river function and provide a basis for decision making both for municipalities and also private property owners. The Plan has been shared by the cities, county, land owners and resource agencies. Washington County, Santa Clara, Washington, and St. George Cities have all enacted floodplain and erosion hazard ordinances to manage activities and development in the floodplain and river corridor based on the information and recommendations contained in the studies. The studies and the ordinances have been very effective tools to manage activities and protect river function and water quality. Recent flooding in December 2010 was of similar magnitude and duration compared to the devastating flooding which took place in January 2005, but recent damages and channel change was a fraction of what was experienced in 2005. This has been attributed to three factors 1) NRCS stream bank stabilization efforts, 2) municipal ordinances and decision making, and 3) active management of non-native vegetation to improve river function. The piece of equipment purchased with the 2006 319 grant was instrumental in completing this work.



Photographs of the tracked skidsteer with hydraulic powered tamarisk chipper attachment removing tamarisk along the Virgin River near Quail Creek



Willow Nursery



Photographs of two boy scouts involved in planting willows at the willow nursery and in riparian restoration education efforts



Photographs of the willow nursery in the summer of 2007



Photographs of the Willow Nursery from November 2007 (left) and July 2008 (right)

River restoration from Riverwood to Tonaquint

The Santa Clara River reach from Riverwood to Tonaquint was identified as a reach which was unstable and having an altered and unnatural morphology. The reach of the Santa Clara River from Riverwood to Tonaquint has been addressed. The stream reach was addressed using principles established in the Santa Clara River Master Plan. The Water District worked cooperatively with the City of St. George, the NRCS and other partners to remove non-native/invasive vegetation and restore the vegetation with native vegetation. Tamarisk has been removed by physical removal with a chipper attached to a tracked skidsteer followed by herbicide treatment of cut stumps and any resprouts. Stream reconstruction and stabilization was conducted by the NRCS and revegetation with native willows and trees followed.



Photographs of the lower Santa Clara River near Tonaquint.

Streambank Stability Workshop





Photographs from the hands-on training associated with the December 2007 Streambank Stabilization Workshop.

3.0 BEST MANAGEMENT PRACTICES DEVELOPED AND/OR REVISED

Projects in the Virgin River Watershed were designed to reduce TDS loading into the watershed and increase public education about local water quality issues. The development of master plans helped guide activities that best support a healthy river system and a functional floodplain. The removal of tamarisk from riparian areas has helped reduce flooding impacts that could have been much more catastrophic than they were. Revegetation efforts with native species have improved conditions for wildlife, including the endangered Southwest Willow Flycatcher. The establishment of a willow nursery provides for a continuous stock of plants to be used to streambank projects, as well as providing an educational opportunity for locals. Monitoring the Salt Cedar beetle provided very useful information that hasn't been collected in many other parts of the state where the beetles had been released.

4.0 MONITORING RESULTS

The projects completed with 319 dollars were primarily information and education in nature, with a study component. There was no QAPP required for this project work as per Utah Division of Water Quality correspondence with EPA on 8/29/2007 between Mike Reichert and Gary Kleeman. The only monitoring to report on was that conducted by researchers at Southern Utah University pertaining to the Salt Cedar beetles.

Salt Cedar Beetle Monitoring

Salt Cedar Beetles were released at three locations in July 2006 to aid in tamarisk removal along the Virgin River. Little beetle reproduction was seen from 2006 to 2007 and populations were very low. As part of this grant, researchers and students from Southern Utah University established transects at each of the three release sites and at two control sites in 2007. About half the beetles were observed to have survived the

winter from 2007 to 2008. Beetle populations were observed to explode in 2008. The beetles defoliated much of the tamarisk along the Virgin River during the summer and were observed from the Arizona state line upstream to Washington City. In the early Fall the beetles continued to spread and were found on the lower Santa Clara River, the lower portion of Fort Pearce Wash and upstream on the Virgin River to the Leeds area. Observations confirmed the research on the species and the beetles only forage on the Salt Cedar. There has been no observed foraging on other native plants or on any cultivated plant species. Defoliation of tamarisk has revealed a greater presence of native trees present in the flood plain of the river system. These plants include cottonwood, narrow leaf cotton wood, black willow, velvet ash, and coyote willow. Foraging pressure on the invasive tamarisk or Salt Cedar has allowed native plants to thrive.

In early July the beetles that emerged from winter hibernation reproduced and laid eggs, which have hatched. The offspring went through three instars of larvae growth and matured into beetles. The beetles were observed to complete three reproductive cycles during the cycle. The longer growing season has allowed for greater increases in beetle populations. Monitoring will continue to evaluate the effectiveness of the beetles on tamarisk, changes in vegetation and any changes to the animal assemblage present. To date it is believed that the Salt Cedar Beetles are a valuable addition to local tamarisk removal and re-vegetation efforts. The beetles target re-sprouts where mechanical removal is implemented. They also are holding the tamarisk in check, which is allowing the native vegetation to increase. Efforts continue to improve local stream conditions to decrease pollutant loadings and create a more natural functioning stream and better habitat for both fish and birds.

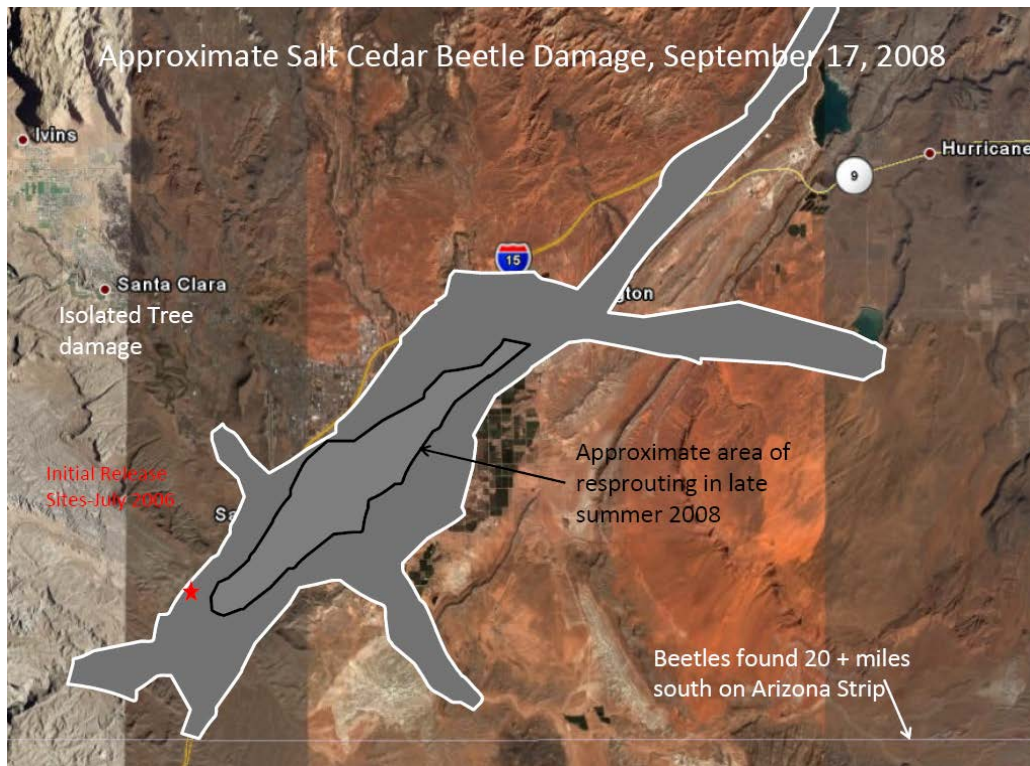


Release of beetles in July 2006



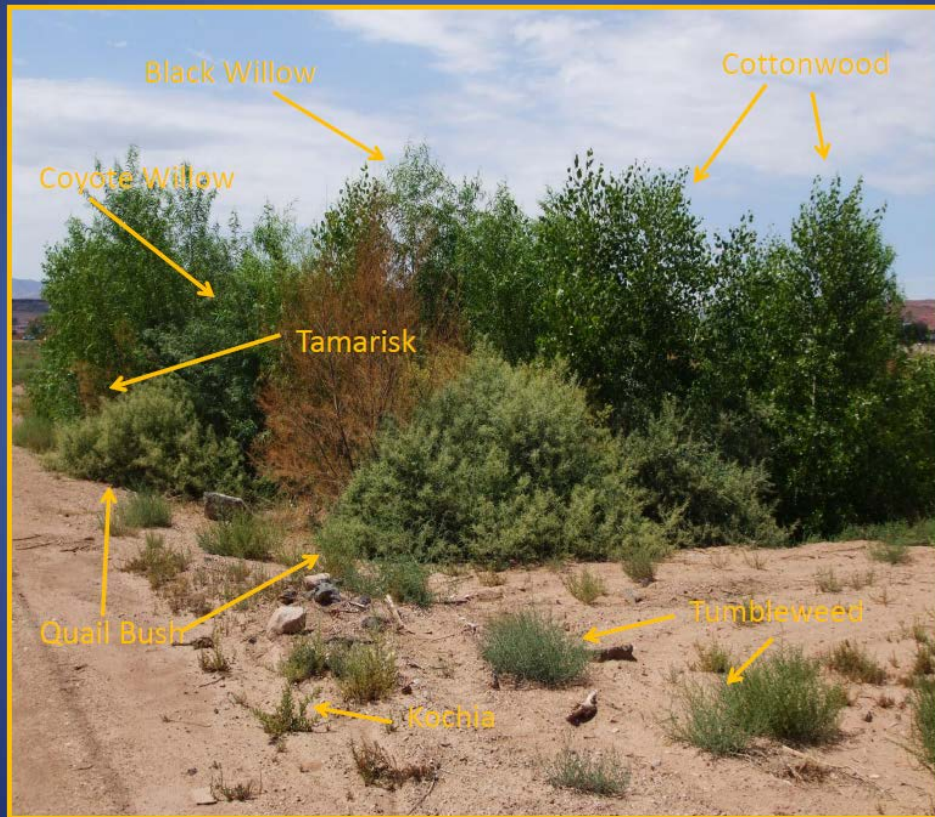
Salt Cedar Beetles successfully overwintering and reproducing in Washington County, Utah





Defoliation observed on June 17, 2008

Selective Foraging by the Salt Cedar Beetle, August 7, 2008



5.0 COORDINATION EFFORTS

The WCWCD coordinated efforts between local, state and federal agencies in support of these projects. Local municipalities including Washington County and St. George, Santa Clara and Washington Cities assisted in monitoring of the beetles and vegetation response. The Bureau of Reclamation coordinated with the local effort and conducted research and monitoring. Researchers from the University of California Santa Barbara and University of Nevada Reno conducted research on comparing beetle subspecies, animal utilization of tamarisk and native vegetation, water consumption of tamarisk, stressed tamarisk and other topics. Information was shared at the biannual Virgin River Watershed Conference. The U.S. Fish and Wildlife Service and the local Virgin River Resource Management and Recovery Plan were kept notified of activities.

5.1 Coordination with State and Local Agencies

The state and local agencies listed below helped carry out the project by providing support in the following areas:

- Southern Utah University: Information and Education (I&E), Tamarisk beetle research
- Washington County: Collaboration on Master Plans

- Cities of Santa Clara, Washington and St. George: Collaboration on Master Plans
- Virgin River Program: Advisory

5.2 Coordination with State Environmental Programs

The following State Environmental Programs supported the project in the following areas:

- Utah Division of Water Quality: Standard program monitoring, technical assistance, 319 Grant Management
- Utah Division of Wildlife Resources: Advisory

5.3 Coordination with Federal Agencies

The following federal agencies made key contributions to the project:

- EPA: Financial assistance, Clean Water Act Section 319
- USDA: Coordination with NRCS
- NRCS: Technical planning, design, and construction of streambank restoration work
- USFWS: Advisory due to presence of endangered species in and near the Virgin River

6.0 SUMMARY OF PUBLIC PARTICIPATION

There has been considerable public involvement in these projects. They were encouraged to provide feedback on the master planning efforts, were invited to participate in the riparian restoration workshop and they have volunteered many hours to assist in non native plant removal and re-vegetation with native species. Information on tamarisk removal, the tamarisk beetle, streambank stability and the river master plans was shared with the public through watershed meetings, newspaper inserts, city council meetings and other venues. The cities were very grateful to have master plans to use as a decision making tool. The objective information allowed the cities to implement ordinances which protect public and private property and infrastructure. The public have appreciated the tamarisk removal, as it has lessened the fire risk, increased safety on walking and biking trails, improved water quality, improved stream function, and decreased flood damage. Some individuals have found the beetles to be a nuisance, so having monitoring data for the beetles and their impacts has proven invaluable to address concerns and questions from the public.

7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

The watershed coordinator was encouraged to begin with a broad, multi objective PIP in 2006. This proved challenging, as several of the projects were already moving forward prior to the 319 grant approval and funding being made available. Long term, it seemed more efficient to develop very specific PIPs with defined participants and timelines, as was done in 2007. It was difficult to plan so far in advance and then have a significant delay in funding being available.

8.0 FUTURE ACTIVITY RECOMMENDATIONS

Cities and counties will be encouraged to follow the Master Plans now in place for the Virgin River, the Santa Clara River and Fort Pearce Wash. St. George, Washington and Santa Clara have all implemented floodplain and erosion hazard ordinances which were based on the river master plans. These ordinances not only manage activities within the floodplain of local rivers and streams, but manage activities within the broader erosion hazard zone of the rivers. It is believed that these ordinances have prevented extensive damage to private property, homes and public infrastructure by subsequent floods. Maintenance of the willow nursery will continue and streambank projects will be prioritized and implemented on an as needed basis.
