ESCALANTE RIVER
WATERSHED
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Escalante River

WATERSHED PARTNERSHIP

SPRING/SUMMER NEWSLETTER 2018

IN THIS ISSUE

Dear partners and supporters,

Spring is right around the corner which means time to gear up for another season of work and play in the stunning beauty of the Escalante watershed.

For the Escalante River Watershed Partnership (ERWP), it also means time for work crews, volunteers, and other partners to head out into the backcountry and communities of Escalante and Boulder, Utah to continue our monumental efforts to restore and protect this watershed. ERWP has been working on restoration efforts in the Escalante watershed since 2009 with a mission to restore and maintain the natural ecological conditions of the Escalante River and its watershed and involve local communities in promoting and implementing sustainable land and water use practices. ERWP is a coalition of federal and state agencies, nonprofit organizations, private landowners, businesses, and community members. In this newsletter we are pleased to present a series of articles from ERWP partners covering a wide range of topics related to these restoration efforts including recent work to restore native fish habitat, an update on Russian olive treatments, and a closer look at some of the field crews who are doing the heavy lifting. We hope you will find these stories compelling and that they will help you to better understand the important work taking place to protect this wild landscape.

Happy reading,

Stephanie Minnaert Linda Whitham

ERWP Field Staff

We'd like to take some time to highlight the people who conduct boots-on-the-ground work for ERWP projects. ERWP Field Staff work directly with volunteers, conduct retreatment efforts during the summer months, and oversee the conservation corps crews in the fall. Without their dedication and continued-support, we wouldn't be where we are today.

Kristen Buck

Education and Field Coordinator, Grand Staircase Escalante Partners

Kristen Buck started her outdoor adventures in her backyard. The Verde River and red rocks of Sedona in Arizona captured her expeditious heart and she continued her exploration through Peace Corps after graduating from Arizona State University. Living and existing with nature came naturally and promoted a career in outreach and education. She established a Student Conservation Association position in the Canyonlands National Park as an interpretive backcountry ranger expanding her understanding of public lands and restoration projects. This invaluable experience brought her to the Escalante River Watershed Partnership. Kristen is excited to develop an intimate relationship with the Escalante canyons as well as the community that enjoys the beauty of this unique landscape.

Alex Engel

Logistics and Field Coordinator, Grand Staircase Escalante Partners

Alex received a civil engineering degree from UW-Milwaukee in 2011, but couldn't handle the thought of being stuck behind a desk for the rest of his life. Instead, he joined a conservation corps so that he could work outdoors. Alex first came to Escalante in 2013 with Arizona Conservation Corps to treat Russian olive with ERWP. He is very happy to be working in such beautiful country.

Brad Jorgensen

Field Coordinator, Grand Staircase Escalante Partners and Biological Science Technician, Glen Canyon National Recreation Area

Raised on a small family farm/ranch in Nebraska, Brad fell in love with the Colorado Plateau in 2011. He has developed a passion for learning and working with Native Plants and Wildlife at various positions he's held within the National Park Service. Brad has been both a Biological Science Technician for Glen Canyon National Recreation Area and a Field Coordinator with the Escalante River Watershed Partnership since 2014. Together with hankerin' to get out and explore the backcountry and his enthusiasm in sharing his ecological knowledge with others, Brad remains dedicated to protect wilderness for the benefit of future generations.

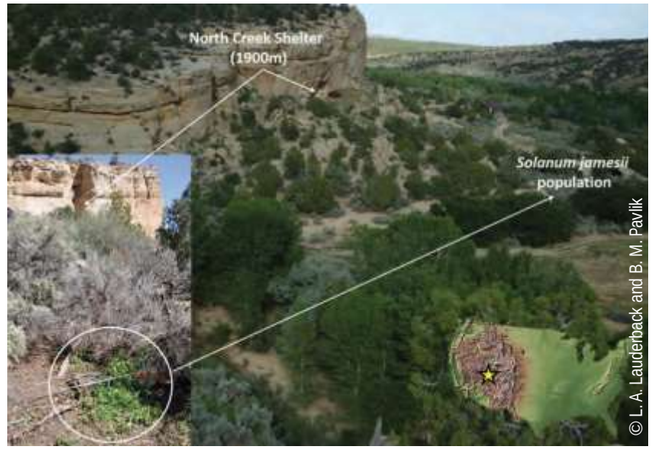

Figure 1. Location of the North Creek Shelter archeological site and a nearby population of the Four Corners Potato (inset, left). (from Louderback and Pavlik, 2017)

Dr. Lisbeth Louderback holds the tiny tubers of *Solanum Jamesii*, the Four Corners potato.

ERWP Sponsored "Potato Talk"

By: Dennis Bramble, Professor (Emeritus), University of Utah, Dept. of Biology

On August 2, 2017, ERWP sponsored a public presentation of research on the native Escalante Potato to a capacity crowd at the Escalante Showhouse. Drs. Lisbeth Louderback and Bruce Pavlik, both from the University of Utah, took turns describing their current studies of the small local potato that inspired the original name, "Potato Valley", for the Escalante area. Louderback is assistant professor of anthropology and Curator of Archaeology at the Natural History Museum of Utah; Pavlik is Director of Conservation at Red Butte Gardens. Their work, as everyone soon learned, represents a superb example of cutting edge science at the intersection of archeology, botany and conservation biology.

Louderback explained that their current project was triggered by an unexpected discovery made while she was engaged in her doctoral studies at one of the oldest archeological sites on the Colorado Plateau. The site, known as the North Creek Shelter, is located at the base of a sandstone cliff behind the Slot Canyons Inn and near the confluence of North Creek and the Escalante River, just west of town (Figure 1). It preserves the remains of successive living areas occupied by indigenous peoples extending back nearly 11,000 years. To better understand the food resources utilized by these ancient hunter-gatherers, Louderback collected minute granules of starch that had lodged in tiny cracks in the grinding stones that were used to prepare plant materials before eating. Much to her surprise, and after painstaking microscopic analysis, some of these starch particles were confirmed to belong to the native potato, *Solanum jamesii*. There seems little doubt that the people occupying the North Creek Shelter were utilizing the potato as a food at least 10,000 years ago. The discovery represents the earliest North American record of native peoples consuming potato tubers. It is not currently possible to determine with certainty whether the potatoes were simply collected from wild plants or were cultivated as a food crop. If it is eventually shown that the plants were cultivated, Louderback's discovery at North Creek Shelter will suddenly rise to a new level of scientific importance. It would become the oldest known record of indigenous people cultivating a food crop in all North America.

One possible avenue for testing the idea that the potato was cultivated and not simply collected from a wild population is to better understand the potato's natural distribution (biogeography) as well as the evolutionary relationships among the various populations of the plant. Dr. Pavlik showed that this approach to the problem requires field studies aimed at locating as many natural populations of the potato as possible together with lab studies that compare the genetic fingerprints of these widely scattered potatoes. The genetics analyses are being done in collaboration with scientists at the USDA Potato Genebank in

Wisconsin. *Solanum jamesii* is best known to botanists as the "Four Corners Potato", a name that reflects its scattered distribution in the states of Utah, Arizona, New Mexico and Colorado.

While the genetic studies are still ongoing, other evidence is already beginning to strengthen the idea that the potato may have had special value for the early inhabitants of the American Southwest. For example, Louderback and Pavlik's field studies have shown that more often than not small isolated populations of the potato occur in close proximity to ancient archeological sites that were once occupied for extended periods of time. In addition, most of the present day Native American tribes of the Southwest are known to have used the potato as a food source during pre-settlement times, conceivably an unbroken tradition going back as far as North Creek Shelter. The epicenter of potato distribution and evolution (including the ancestors of modern commercial varieties) is in South and Central America, not North America. *Solanum jamesii* is therefore a geographic outlier within its family, raising the possibility that it was dispersed northward by humans through early trading networks. In possible support of this idea, Pavlik pointed to archeological evidence at famous sites like Chaco Canyon where the presence of parrot feathers and other items proves that long-distance trading of valuable products occurred between peoples of the Four Corners area and those occupying tropical regions far to the south. Preliminary data also suggest that the potato population at Chaco Canyon has significantly greater genetic diversity than other populations around the Southwest. Increased genetic variation might be expected in a location that was once at the center of major trading routes along which the plants were dispersed. Although still an open question, the chances appear increasingly good that the presence of a native potato near North Creek Shelter and many other archeological sites in the Southwest is a relic of the activities of early human occupants of the region.

> The ERWP is proud to have been able to bring such interesting and locally connected science to the community of Escalante.

Another dimension of the work is to promote the conservation of the Four Corner's Potato. The plant is currently represented in its native range by widely scattered, reproductively isolated populations of just a few dozen (or fewer) individuals each. Thus, the prospect of local extinction and further reduction of its range and genetic diversity is very real. The Escalante population of potato, once abundant enough to give the area its first name and to provide food for its early settlers, is now reduced to just a handful of plants distributed over a half-dozen dozen localities. Local harvesting (historical) and habitat loss are likely the major causes of its reduction. Louderback and Pavlik are now in the process of implementing a conservation program that will initially raise large numbers of the potato in greenhouse facilities at the University of Utah from tubers collected from the Escalante area. Once sufficient tubers are available, they will be provided free to interested Escalante residents for propagation in local gardens. It is hoped that when the genetic structure and ecological habitat requirements of the Escalante potato are better understood, cultivated plants might be used to reintroduce the potato into places where it formerly occurred. There is also the exciting prospect that the potato could be "branded" and marketed in Escalante eating establishments, several of which have already expressed interest. Although the tubers are tiny by conventional potato standards, they could easily be served as an hors d'oeuvre or appetizer with a compelling story behind it.

The ERWP is proud to have been able to bring such interesting and locally connected science to the community of Escalante. Because of this exposure, residents quickly identified two previously unknown populations of the potato. One of these is by far the largest population ever discovered in the Escalante area and possibly the state of Utah. And its context might help strengthen the case that the potato was cultivated rather than just collected. We are grateful to Drs. Louderback and Pavlik for sharing this fascinating research with the citizens of Escalante just weeks after it was first made available to scientists world-wide (Louderback and Pavlik, 2017). The presentation and indeed the whole North Creek Shelter project would not have been possible without the enthusiastic support of Joette-Marie Rex and her family on whose property the site is located. ERWP provided funds for the meal associated with the talk and the Rex family and the Escalante Relief Society kindly supplied the desert. The event was a great success all the way around.

Additional information:

L. A. Louderback and B. M. Pavlik. Starch granule evidence for the earliest potato use in North America. Proc. Nat. Acad. Sci. (PNAS) 2017 July, 114 (29) 7606-7610.

(https://unews.utah.edu/utah-home-to-earliest-use-of-wild-potato-in-north-america/)

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Russian olive treatments within the Escalante Watershed – 17 years of landscape-scale commitment

By Stephanie Minnaert, Public Lands Program Coordinator, Grand Staircase Escalante Partners

Woody invasive species have been a focus for over 17 years within the Escalante Watershed in southcentral Utah. The Escalante River is a relatively intact riverine ecosystem with over 90 miles of lush riparian corridor at its most upper portion beginning in the Aquarius Plateau at elevations over 11,000 feet flowing through spectacular redrock canyons to Lake Powell and onto the Colorado River in a rugged, pristine landscape called the Grand Staircase-Escalante. From private lands in the towns of Boulder and Escalante, to three different federal agencies – Dixie National Forest (US Forest Service), Grand Staircase Escalante National Monument (Bureau of Land Management), and Glen Canyon National Recreation Area (National Park Service) – many different organizations make up the Escalante River Watershed Partnership (ERWP) contributing to the success of this nearly multi-decade project. In the project's first year, a Glen Canyon National Recreation seasonal and volunteer groups conducted the first woody invasive treatments in the lower part of the watershed to kick off the start. Today, the Russian olive project within the Escalante Watershed is a huge undertaking with a nearly $1.4 million annual budget and contributions from federal and state agencies, nonprofit partners, local businesses, and community members.

Last year, 2017, was a milestone year for the project. Boots-on-the-ground work was coordinated by Grand Staircase Escalante Partners in conjunction with federal and state partners and private land owners. Nearly 740 acres of woody invasive initial treatments on both private and public lands were performed, and 1,192 acres of retreatment on both private and public lands were completed within the watershed. Two program coordinators, five seasonal field staff, and a part-time administrative assistant were employed by Grand Staircase Escalante Partners as solely dedicated to this restoration project. Much of the work was also performed by conservation corps crews, volunteers, local contractors for private lands work and horsepacking operations, and other ERWP partners.

Thousands of volunteer hours were committed to this project in 2017 alone by the most dedicated, loyal, and hard-working individuals. They travel many hours to spend up to a week in the remote, backcountry of the Grand Staircase-Escalante to treat Russian olive, all in the spirit of a healthy Escalante River. Wilderness Volunteers have consistently been involved with Russian olive work within the Escalante Watershed since before ERWP formed in 2009. Their work dates back to the early 2000's when treatments were being conducted only in Glen Canyon National Recreation Area. Currently, Wilderness Volunteers conduct


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two trips per year (one in fall and one in spring) and help ERWP staff by clearing debris and treating some of the smaller invasive trees. Great Old Broads for Wilderness spent nearly one week at the end of September assisting ERWP staff with Russian olive treatments just below the Highway 12 Bridge. Vanderbilt Alternative Spring Break program provided nearly twelve students in March from Vanderbilt University in Nashville, Tennessee for a week-long service project where we provided a unique backcountry experience with camping, working, and hiking in Harris Wash.

ERWP has met nearly 90% of initial treatment goals within the Escalante Watershed.

Conservation Corps crews worked diligently during the fall of 2017, like many years before this, to complete one of the best Russian olive treatment seasons yet due to full-scale implementation of frill cutting and successful fundraising efforts. Nearly 75 crew members from Utah Conservation Corps, Arizona Conservation Corps, Canyon Country Youth Corps, and Southwest Conservation Corps – Ancestral Lands lived and worked within the Escalante Watershed from August through November to help ERWP close in on accomplishing woody invasive treatment goals on public lands. Before the fall season began, a 10-day training with all four conservation corps programs was conducted in the town of Escalante to prepare the crew members for living and working in the backcountry for over two months. Training topics included: saw training, Wilderness First Aid, emergency preparedness, backcountry logistics, woody invasive treatment techniques, and much more. Logistics on this project present some of the most challenging with five different backcountry basecamps, horsepacking support necessary for all of the camps, working from beginning of September through mid-November with crews alternating between 8-days on, 6-days off during this time period, and ensuring the health and safety of each individual on the project in such a remote setting.

Our next phase of the project is nearing with Russian olive treatments on public lands transitioning into a monitoring and maintenance phase, meaning going back to those areas that have been initially treated and retreating new sprouts or regrowth, while also monitoring treated areas for native recruitment of woody species and herbaceous plants allowing us to ensure the continued success of our work and providing insight into how the landscape is changing post-woody invasive treatments. ERWP has met nearly 90% of initial treatment goals within the Escalante Watershed with over 89 river miles treated of invasive Russian olive on public lands. We're treading into new territory by accomplishing goals that are unprecedented in many ways for a restoration project of this scale in the west. Private lands restoration work will continue, mainly within the community of Escalante, into the near future. ERWP is currently working hard on strategic planning for future work within the Escalante.

I'd like to take the time to thank our 2017 funders: Walton Family Foundation, Utah Partners for Conservation & Development Watershed Restoration Initiative, National Park Service, Bureau of Land Management, Utah Department of Agriculture & Food Invasive Species Management Grant Program, The Nature Conservancy, Tamarisk Coalition, Patagonia, Utah Parks for Kids campaign and private individual donations. Without financial support from many, work to protect the health of the Escalante Watershed would not be feasible.


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Private Lands Restoration Work

By: Sue Fearon, Private Lands Program Coordinator, Grand Staircase Escalante Partners

This past winter has been a busy one for private lands restoration work. In December 2017, we started removal of 88 acres of Russian olive and tamarisk on property southeast of Escalante in partnership with US Fish & Wildlife Service Partners for Fish & Wildlife Program (USFWS PFW) and Natural Resources Conservation Service.

This project, our largest to date, was long in planning. We, ERWP's Private Lands Program Coordinator and wildlife biologists from partner agencies, had many conversations with the landowner and the property leasee to talk about the site's potential, how we could improve wildlife habitat and what we could each contribute to the project. With each conversation, details were fleshed out and the project grew, eventually encompassing 221 acres of both riparian and uplands. These conversations are key to the success of the private lands work in the Escalante. Investing in the planning process, teasing out landowners' objectives, future use and management and blending these elements with ERWP's mission to improve ecological function and productivity take time and are well worth the effort.

This work, southeast of town, really began in November with some upland brush removal followed an aerial seeding of a wide variety of grasses, forbs and shrubs including Indian Ricegrass, Sand Dropseed, Alkali Sacaton, Gooseberryleaf Globemallow, Firecracker Penstemon, Fourwing Saltbush and many other varieties. This was followed by the invasive removal. Still to come are a riparian fence to help manage future grazing, planting willows and cottonwoods that were collected on private land on the Escalante River and, finally, years of retreatment and monitoring to ensure that the restoration is durable.

This project area encompasses 221 acres of both riparian and uplands and is a multiyear project.

As this work continues we are in the planning stages for restoration of adjacent private property. While slightly smaller in scale, the restoration efforts will involve both riparian and upland components and will also support the NRCS Southwest Willow Flycatcher Initiative Program, a program designed to enhance habitat for this endangered bird. To date, ERWP has partnered with 100s of landowners. Restoration efforts in the Escalante Watershed are not intended for any one species but rather are designed to support the communities of Boulder and Escalante and the natural communities the watershed supports.

Climate Change in the Escalante Watershed: What does the Future Hold?

By: John Spence, PhD, Chief Scientist and Terrestrial Natural Resources Branch Chief, Science & Resource Management, Glen Canyon National Recreation Area

The world climate has varied greatly over long periods of time, from extreme hothouse conditions in the Jurassic, when dinosaurs grew to gigantic sizes, to the "Snowball" Earth of the Cambrian when most of the planet was covered with ice. There have been significant scientific advances in understanding these swings in climate, and it has become increasingly clear that greenhouse gases such as carbon dioxide and methane are major factors in climate change. These gases have also been implicated as one of the major factors in the great mass extinctions of the past, including the end-Permian event, where more than 90% of all life on the planet died out. The physical properties of greenhouse gases cause cooling or warming trends in the atmosphere, which then translate to the world's oceans. About 50% of the sun's energy reaches the earth's surface, and is then radiated back into the atmosphere as warming infrared radiation. Carbon dioxide and other greenhouse gases trap much of this heat before it escapes into space, re-radiating it back to earth, therefore warming the lower atmosphere. This is similar to the heat-trapping ability of glass, and we have all experienced what happens during a hot day in summer when we get into our cars! The principal sources of greenhouse gases include forest fires, the burning of coal, oil and natural gas, and releases from volcanic eruptions. As these gases increase in the atmosphere, physical laws dictate that warming is inevitable.

Climate is extremely complicated, and future changes can only be predicted through computer modeling. These models work well at large scales, such as continents, but become somewhat less reliable as they are "downscaled" to local regions such as the Escalante River watershed. About 30 such computer models are currently being used to predict future changes based on varying amounts of greenhouse gases in the atmosphere. Rather than trying to determine which are most accurate, non-climate scientists such as ecologists and biologists tend to look at a mean "ensemble" that includes elements of the many individual models.

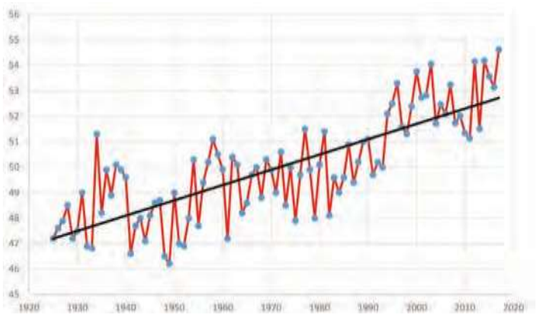

Figure 1. Mean annual temperature in degrees F for Escalante between 1925 and 2017

Average temperatures throughout Utah have increased about 1.8° F since 1895. I have been able to reconstruct the mean annual temperature for Escalante back to 1925 (Figure 1). This chart shows that mean annual temperatures in the 1920's were around 48° F, and in the last decade or so were around 52° F, an increase of 4° F! The National Park Service has analyzed the available climate data for Glen Canyon National Recreation Area. The results indicate that the park and surrounding region has exceeded its historical maximum and mean annual temperatures. Future increases depend on whether we continue to burn oil and coal or switch to cleaner carbon-neutral energies such as solar or wind. In the "business-as-usual" scenario, projections are for an additional 4-6° F of increase in minimum temperatures and 6-8° F increase in maximum temperatures by 2070. Currently the world's countries are trying to limit the increase by 2070 to about 3-4° F through the Paris Climate Accord. Precipitation is more difficult to model, and current projections are only approximate, but suggest only a slight decline in precipitation in the watershed. However, only a few years ago the science was predicting 30% declines in precipitation! So these estimates could change again. Mean snowpack is predicted to decline by as much as 50% in winter, and snowmelt and annual runoff may peak 2-3 months earlier, in March instead of May-June! These predicted effects on annual base flow in the Escalante River remain unknown, but base flow is likely to be slightly to significantly lower by summer. This will have impacts on recruitment and survival of important riparian plants

Currently the world's countries are trying to limit the increase by 2070 to about 3-4° F through the Paris Climate Accord.

such as Fremont cottonwood. This species generally releases its seeds in May, when runoff is beginning. The seeds only live a few weeks. If runoff happens in March, a majority of the seeds will not germinate and a gradual decline in cottonwoods along the river could occur. Other effects are likely, including to aquatic communities and native fish species. For upland vegetation and soils, another prediction is a decline in available moisture in the soil, and increasing drought between late February and June, before the summer monsoon rains arrive.

I have done some initial scenario planning for the effects on the riparian ecosystem of the Escalante River from declining snowpack, potential reductions in water availability in the watershed, and changes in flooding. I have come up with four scenarios (Figure 2). The two most important future uncertainties in the Escalante River watershed are how much base flows and runoff change, and whether a period of major flooding like the floods of the 1900-1930 period will occur again in the future. These two uncertainties create four basic scenarios, which I have called the Invasion, Hopeful, Blowout and Steady Decline scenarios. Briefly, the four scenarios result in the following changes. In the Invasion scenario, significant declines in base flow occur, but flooding does not increase, favoring invasion of tamarisk and other non-native species with likely declines in native species. In the Hopeful scenario, conditions would be similar to today, with only minor changes to base flow and current flooding. In the Blowout scenario, major flooding scours out the riparian vegetation, while signifi decreases in base fl reduce native species recruitment on the floodplain. In the Steady Decline scenario, major flooding scours vegetation, but base flows remain high enough for at least some recruitment of native species to occur. Other scenarios are possible, and it remains to be seen how climate changes in the future will affect the Escalante River and its remarkable and diverse riparian and aquatic ecosystems.

Some online resources interested readers might want to explore include:

The National Climate Change Viewer (NCCV) at: https://www2.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp. This website allows users to model potential future changes at the state, county or local watershed level, including the Escalante watershed.

Another interesting website is NASA's sea level change site, with interactive maps of sea level rise and other changes. It can be found at: https://sealevel.nasa.gov/.

Detailed information on the most recent climate predictions for the US can be found in the 2017 Climate Science Special Report at: https://science2017.globalchange.gov/.

The International Panel on Climate Change website is: http://www.ipcc.ch/.

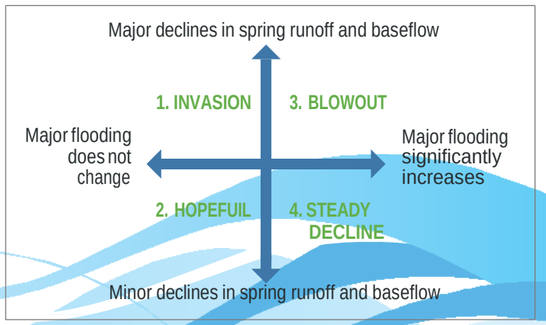

Figure 2. Four potential scenarios for ecological changes on the Escalanted River with future predicted climate change.

Frill Cutting Treatment Method within the Escalante Watershed

By: Alex Ehrle, Logistics & Field Coordinator, Grand Staircase Escalante Partners

While working with Escalante River Watershed Partnership (ERWP) in 2013, the frill cut technique for treating Russian olive was first introduced by the Lake Mead Exotic Plant Management Team with National Park Service. Frill cutting is a unique method of treating Russian olive trees where small "hacks" or "frills" are insert into the cambium layer of the tree, live tissue through which nutrients are passed, and herbicide is applied to the frill. Trees are also left to die in place meaning biomass – trucks, limbs, and branches – are left as is. This method allows for more efficient work, for example through the use of hatchets as opposed to chainsaws, in such remote settings that are experienced within the Escalante Watershed. During the 2013 introduction of the method, our team noticed the Lake Mead Exotic Plant Management Team could cover about twice as much ground using the frill cut method as our team could using the cut stump method, another treatment method where the entire top of the tree is cut at the stump (usually within a few inches of the ground), herbicide is applied to the cambium layer, and the biomass is cut up by chainsaw into small pieces and piled. The ERWP field team realized then how much more effective our work could be utilizing the frill cut technique.


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For the next couple years, ERWP field team worked out the details of the frill cut method, refined the herbicide mix, determined how many frill cuts needed to be applied to a tree and other technical matters. The field team started slow and performed different experiments and adaptive management to perfect the method for the Escalante Watershed. If a large tree was missed during primary treatment, for example, the frill cut technique was used instead of hauling in a chainsaw to cut it down. Our first large scale implementation was at the confluence of Harris Wash and Escalante River while working with Wilderness Volunteers.

Then early in 2016, the ERWP field team retreated the Escalante River from 25 Mile Wash to Fools Canyon, a 25-mile stretch that had not been maintained in 7 years. The trees were large, too big to easily cut down with a hand saw, but with the frill cut method, our team flew through some the most difficult to access stretches of Escalante River. A testament to the effectiveness of the frill cut method.

> The ERWP field team realized then how much more effective our work could be utilizing the frill cut technique.


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The next step was to teach the conservation crews how to apply the method while working out the details with our federal agency partners. We started slow, teaching a couple crews, one at a time. It was good practice for teaching the 10 crews we had at our annual fall training in 2017. The success of the frill cut method has been proven in our efficiency as our team was able to increase acreage treated in a season by over 60% from previous years.

The frill cut method is a treatment technique that has allowed our team to move farther and faster using less resources, which is hugely important in such remote, hard to reach places.


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Figure 2. Location of all three species monitoring stations (n=47) sampled in the Escalante River basin in 2017.

Three species monitoring in rarely sampled reaches of the Escalante River and tributaries 2017

By: Erik Woodhouse, Native Aquatics Biologist, Utah Division of Wildlife, Washington County Field Office

Population declines of Roundtail Chub (*Gila robusta*), Bluehead Sucker (*Catostomus discobolus*), and Flannelmouth Sucker (*Catostomus latipinnis*), hereafter referred to as the three species, have prompted the implementation of a range-wide conservation agreement and strategy to reduce threats that would warrant their listing under the Endangered Species Act. Established by the Utah Division of Wildlife Resources (UDWR) in 2006, the goal of this agreement is to ensure the long-term persistence of these three species within their historical range and support the development of statewide conservation actions. Since 2009, The UDWR, Washington County Field Office (WCFO) has conducted monitoring efforts biennially within 13 stratified random monitoring stations from above Sand Creek to downstream of Boulder Creek. The goal of monitoring efforts is to track changes in three species occupancy, relative abundance, reproduction, and recruitment as well as monitor native fish response to basin wide Russian Olive and Tamarisk removal efforts by the Escalante River Watershed Partnership.

In 2017, the UDWR WCFO received a generous grant from the Richard K. & Shirley S. Hemingway Foundation in cooperation with The Nature Conservancy to fund in part, a basin wide monitoring effort that included rarely sampled portions of the lower Escalante River mainstem and tributaries. With only five prior monitoring efforts to date a current status assessment of the three species population basin wide is warranted.

During five trips from June to October, 2017, a total of 29 stations (580 sites) were sampled on the Escalante River mainstem in three regions: 1) upstream of Sand Wash to downstream of Boulder Creek 2) upstream of Fence Canyon to downstream of 25 Mile Wash, and 3) upstream of Coyote Gulch to downstream where the river is inundated by Lake Powell (Figure 2). A total of 18 stations (333 sites) were sampled in the tributaries including Pine Creek (n=1), Mamie Creek (n=3), Sand Creek (n=3), Calf Creek (n=7), Deer Creek (n=3), and Boulder Creek (n=1) (Figure 2). Stations were sampled from upstream to downstream, using a 1.2 x 4.6 m knotless nylon seine (3.2 mm mesh). Sampling in mainstem stations was conducted using three-pass depletion seining while in tributary stations two-pass depletion seining was used. All fish captured were identified to species and measured to the nearest 1.0 mm (total length); natives were returned to the river and non-natives were removed. At each site, field crews recorded habitat type (run, riffle, pool, and backwater) and dominant substrate (silt, sand, gravel, cobble, boulder, bedrock).

Mainstem Species Composition 2017 (n=5,744)

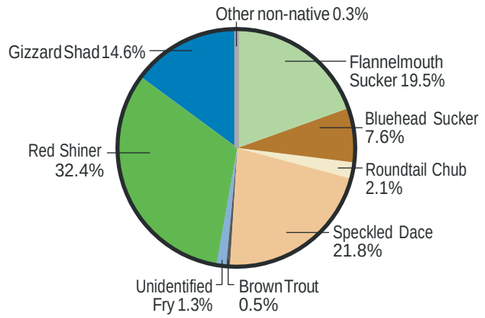

Figure 3. Summary of species composition of all fish captured at three species monitoring stations on the mainstem of the Escalante River, 2017.

Tributaries Species Composition 2017 (n=383)

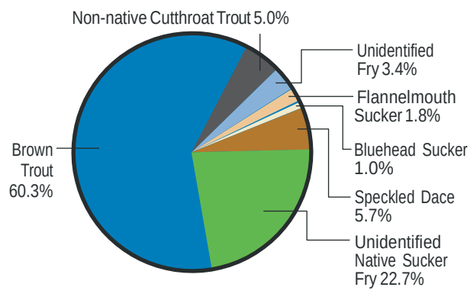

Figure 4. Summary of species composition of all fish captured at three species monitoring stations on Pine Creek (n=1), Mamie Creek (n=3), Sand Creek (n=3), Calf Creek (n=7), Deer Creek (n=3), and Boulder Creek (n=1), 2017.


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Mainstem Results

Overall at mainstem sites, three species (n=1,677) accounted for 29.2% of total captures (n=5,744) during sampling (Figure 3). Flannelmouth Sucker was the most abundant of the three species captured accounting for 19.5% of the total catch followed by Bluehead Sucker (n=7.6%), and Roundtail Chub (n=2.1%). Speckled Dace (n=1,252) was the most abundant native species captured and accounted for 21.8% of total captures. Red Shiner was the most abundant non-native and overall species captured accounting for 32.4% of total captures followed by Gizzard Shad (n=14.6%), Brown Trout (n=0.5%), and other non-native species (n=0.3%) which included Common Carp (*Cyprinus carpio*), Channel Catfish (*Ictalurus punctatus*), Fathead Minnow (*Pimephales promelas*), Green Sunfish (*Lepomis cyanellus*), and Black Crappie (*Pomoxis nigromaculatus*). Additionally, there were 73 unidentified fry captured which accounted for 1.3% of the total catch.

Tributaries Results

Brown Trout (*Salmo trutta*) (n=231) was the most abundant species captured in all tributaries sampled and accounted for 60.3% of the total catch (n=383) followed by unidentified native sucker fry (22.7%), Speckled Dace (5.7%), non-native Cutthroat Trout (5.0%), unidentified fry (3.4%), Flannelmouth Sucker (1.8%), and Bluehead Sucker (1.0%) (Figure 4).

Results of basin wide monitoring efforts in 2017 suggests that three species populations in the middle (Sand Creek to Boulder Creek) and upper portion of the lower mainstem (Fence Canyon to Twentyfive Mile Wash) are stable with three species reproduction, recruitment, and distribution throughout. The lowest reach of the mainstem below Coyote Gulch is dominated by non-native fish species which accounted for 90.7% of the total catch in those stations. Results of monitoring in the upper tributaries suggests that non-native trout are the most abundant species in all drainages sampled and their persistence has had negative impacts on native fish distribution and abundance within. Historically, there has been very little native fish inventory, monitoring, and conservation work relative to other river systems, with previous efforts being limited both spatially and temporally in scale. Sampling by the UDWR in 2017 was the most extensive distribution effort conducted to date, with several sections of the lower Escalante River being sampled for the first time. Three species population data collected in 2017 will aid the UDWR in making sound conservation decisions towards population recovery efforts in the future.


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The UDWR WCFO would like to thank the Richard K. & Shirley S. Hemingway Foundation for their generous grant which funded much of our sampling efforts in 2017 as well as Linda Whitham from The Nature Conservancy for her assistance in the grant transfer process. We would also like to thank Mark Fuller and Lance Ostrom from the U.S. Fish and Wildlife Service as well as Kelly Cambridge and Matt Yazzi from the Ute Indian Tribe of the Uintah and Ouray Reservation for their assistance with sampling in the Lower Escalante River and with planning this logistically challenging sampling effort.


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Connecting native trout populations in the Escalante River drainage

By: Michael Golden, Fish biologist, US Forest Service, Dixie National Forest

Colorado River cutthroat trout (*Onconrhynchus clarki pleurictius*; CRCT) is the native trout to the Escalante River drainage. The current distribution and abundance of CRCT is greatly reduced over its historic distribution. Some of the major factors that have resulted in the declines in CRCT distribution and abundance are: the introduction of nonnative trout (e.g. brook trout, brown trout and rainbow trout) which compete with, hybridize with and prey upon native CRCT, habitat fragmentation (dams, diversions, culverts, grade control structures) which prevents intermixing of populations and inhibits recolonization of habitats following disturbance and habitat degradation (e.g. dewatering, loss of riparian vegetation, sedimentation). Working cooperatively with the Forest Service and other partners UDWR has expanded CRCT populations in the Escalante and Fremont River drainages from 5 population in 8.2 miles in the 1990s to 10 populations in 62 miles of stream at present.

Since 2009 the Dixie National Forest and the Escalante River Watershed Partnership (ERWP) have been working to identify and remove barriers to movement within CRCT occupied habitat in the Escalante River drainage. To date seven impediments to Aquatic Organism Passage (AOP) have been removed or replaced on CRCT streams within the watershed. Replacement structures are designed to accommodate annual flows and sediment regimes while maintaining stream channel morphology and passage for trout less than 6 inches long. AOP projects in CRCT streams of the Escalante River drainage have provided CRCT and other aquatic organisms with improved access to 17.0 miles of stream habitat upstream from the original impediments, as well as providing connectivity between 21.2 miles of CRCT habitat.

In late summer/early autumn 2018 the Dixie National Forest will replace a perched, 24 inch culvert with a bottomless timber crib bridge on FSR 30150 where it crosses Hall Creek in the headwaters of the Birch Creek drainage. This Hall Creek AOP project will reopen access to 2.6 miles of fish habitat upstream from the culvert and complete a series of AOP projects in the Birch Creek watershed that provide connectivity in 10.3 miles of stream between the Water Canyon and Hall Creek populations of the species. This type of connectivity allows for genetic exchange between populations and facilitates natural recolonization following a disturbance.

The project is being funded and supported by multiple partners including The Nature Conservancy – Richard K. & Shirley S. Hemingway Foundation, the USDI Bureau of Land Management (BLM) and The National Fish and Wildlife Foundation (NFWF). Chartered by Congress in 1984, the National Fish and Wildlife Foundation (NFWF) protects and restores the nation's fish, wildlife, plants and habitats. Working with federal, corporate and individual partners, NFWF has funded more than 4,500 organizations and committed more than $3.8 billion to conservation projects. Learn more at www.nfwf.org. The NFWF and BLM are supporting the project through the Bring Back the Natives Program. Trout Unlimited and the Forest Service are supporting the project through a cooperative effort to replace culverts for AOP throughout the United States.

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Riparian Cooperation: Working Together to Achieve Goals in 2018

By Brad Jorgensen, Field Coordinator, Grand Staircase Escalante Partners and Biological Science Technician, Glen Canyon National Recreation Area

In 2017, Escalante River Watershed Partnership (ERWP) collaborated with Arizona Conservation Corps (AZCC) for another productive and rewarding season of Russian Olive removal, continuing the progress initially established by Coconino Rural Environmental Corps (CREC) within Glen Canyon National Recreation Area in 2009. One of the most significant highlights of this past season was watching the daily progress of Arizona Conservation Corps as they steadily approached the boundary between the lands managed by the National Park Service, and the Bureau of Land Management. The development of this widespread conservation effort originated in Glen Canyon National Recreation Area, and the border is a symbolic milestone that represents countless hours of unwavering perseverance in the face of seemingly insurmountable odds.

As we move forward toward completing initial treatment of Russian Olive on the Escalante River this year, let us not forget the steadfast support from a vast commonwealth of partnerships that have been inexorably involved in the continued success of this project. Without the collaboration of over 25 non-profits, state and government agencies, and the immeasurable individual component, this colossal undertaking that has been taking place for nearly two decades would be nothing short of unimaginable. Continuing to grow and foster these relationships is imperative to the prospective ecological well-being of the watershed due to the cooperation of large-scale removal efforts of this particular invasive species on private and public lands. These alliances pave the way for native plant recruitment and sustainability that benefit not only the balance of natural riparian systems, but are also crucial for favorable long-term geomorphological processes. It is important to acknowledge that the legacy of this work weighs on our collective shoulders, and we must strive to sturdily carry it onward with symmetry and grace into an unpredictable future.

How can I help?

To make a tax deductible donation via mail, please fill out and send to: Escalante River Watershed Partnership—c/o Grand Staircase Escalante Partners

P.O. Box 724 • 520 West Main Street, STE C
Escalante, Utah 84726
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