U.S. Department of the Interior
Bureau of Land Management

AQUATIC HABITAT MANAGEMENT PROGRAM

2020 UTAH ACCOMPLISHMENT REPORTING

Photo by: Meghan Krott, Color Country Aquatic Ecologist

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Aquatic Habitat Management Program
2020 Utah Accomplishment Reporting

The following report is a summary of projects (by District) that maintain and restore fisheries, riparian, water quality, surface and groundwater resources, as well as the physical, chemical, and biological processes of aquatic habitat. These projects would not be possible without the hard work of field staff, as well as the many partnerships that ensure success. Not every project is included, but a variety of projects that fit under the integrated Aquatic Habitat Management (AHM) Program.

Compiled by: Justin Jimenez, BLM Utah Aquatics Program Lead

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Canyon Country District

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Aquatic Habitats Web App and Other Geospatial Developments

A significant amount of aquatic and riparian related data exists within the BLM (e.g. AIM, PFC, MIM, water quality, species distribution, eDNA, stream temperature, etc.). However, these datasets are collected and stored in a variety of mediums and platforms. There is a need to see the spatial relationships and to summarize these data relative to different management units (e.g. watersheds, allotments, field offices, etc). This multi-year ongoing project focuses on creating an Aquatic Habitats Web Mapping Application that provides streamlined access to important datasets while automating calculation of basic summary statistics. The intent is to provide for quick data exploration to facilitate day-to-day operations of specialists within the Canyon Country district.

Compiling the datasets for inclusion in the Web App is an ongoing process. However, entering the legacy Properly Functioning Condition (PFC) data into the Geocortex per IM-2017-09 (*https://web.blm.gov/internal/wo-500/directives/dir-17/pim2017-009.html*) was a logical first step. Funds were acquired at the district level to bring on the district's Aquatic AIM seasonal crew lead to assist in this endeavor over the winter. Paper PFC forms from both the Monticello and Moab Field Offices dating back to the 1990s were brought to a central location and input into the Geocortex. After several months of work, the Canyon Country District is now current with PFC data entry and all data are now in digital format and are included in the web application.

Concurrent with this PFC effort, was a push to compile all of the legacy riparian treatment data for inclusion into the web app. In collaboration with the Southeast Utah Riparian Partnership (SURP), RiversEdge West, University of Utah's DigitLab, Forestry, Fire, and State Lands (FFSL), and Rim to Rim Restoration (RRR), we created a data schema that worked for our tracking, reporting, and analysis purposes. Legacy polygons were compiled and transcribed into the new data schema and incorporated into the web application. New treatment polygons, often associated with Watershed Restoration Initiative (WRI) funded projects, will be collected by contractors and youth corps using the Collector or Field Maps mobile applications and directly imported into this riparian vegetation treatments dataset. This streamlines the field data collection portion and provides an efficient workflow to keep the dataset current for analysis and reporting.

The SURP core team created a citizen science legacy riparian treatment assessment that is used to evaluate the condition of past treatments and help prioritize the need for follow up treatment. Our Aquatic AIM seasonal crew lead, still working with non-AIM district funding and with the input of Colorado Natural Heritage Program staff, translated the site assessment form into Survey123 so that the information can be incorporated into the web application. The current beta version was presented to the SURP and feedback will be incorporated in FY 21.

Finally, initial steps to provide automated summary statistics for both Aquatic and Terrestrial AIM data (Figure 1) have begun. The infographic widget was configured to return individual plot and reach data in graphical form. Data is returned based on what is in the current view or based upon specific plots queried by the user. Our Aquatic AIM crew lead began working on coding within AGOL that calculates means

of important variables using all plots and reach within a selected watershed, allotment, or field office. Programming is ongoing and refinements will continue in FY 21.

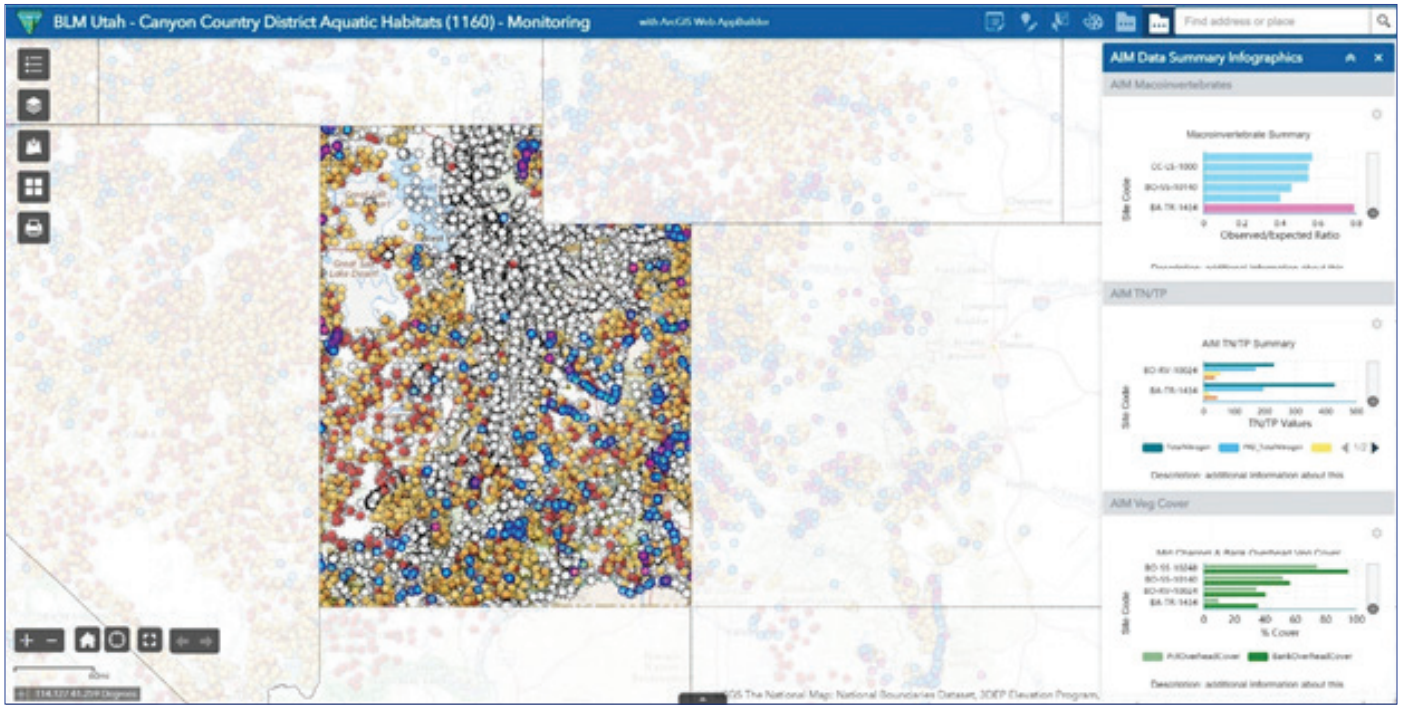

Figure 1. Current state of the Web Application.

Colorado River - Side Channel Restoration Above New Rapid Update

Initial removal of non-native tamarisk within side channel network at the site above New Rapid on the Colorado River was completed in FY18 and FY19 (See FY19 AHM Report for more details). In FY20, work focused on treating resprouts and removing biomass that had fallen in from the channel margins. The goal is to keep the channel free from woody invasive species and associated biomass to minimize channel roughness until flood waters can scour and reclaim the side channel. Recruitment of native species into the channel is now evident. Grasses, willows, multi-aged cottonwoods and upland plants (in some sections) are now evident where tamarisk previously dominated (Figures 4-5). In some cases, this corresponds with a release of existing plants form competition and in other cases we see new recruitment. With the top of the side channel now accessible, an assessment of side channel connectivity was completed using hi-resolution LIDAR data (flown by the State of Utah, Figure 3), in-situ geomorphic surface measurements, water surface feature measurements, and statistical relationships between discharge and gage height. In-situ measurements were taken to calibrate the LIDAR data and identify height difference between water surface and floodplain/side channel elevation. I performed a statistical regression using historic gage height and discharge data, excluding noise from ice in winter months. After relating the in-situ measurements of water surface and side channel/floodplain heights to the discharge and gage height for that day, it was easy to estimate the discharge necessary to inundate the side channel. The assessment shows that, in its current state, the side channel will inundate at flows around 25,000 cfs. These flows have been achieved 7 times since 2010 (Figure 2). However, discharges of 25,000 cfs were barely achieved in two of those years and 30,000 cfs in two others, likely resulting in minimal inundation and channel maintenance. Subsurface inundation occurs at lower discharges, creating a disconnected lentic system benefitting amphibians and birds.

Using the LIDAR, it's evident that 1.5 feet of material could be feasibly removed from approximately 100 meters at the top of the side channel using youth corps hand crews to cause inundation at around 20,000 cfs. A field trips is planned with the UDWR Southeast Region Native Aquatics Biologist to verify these results and discuss the benefits of removing this material to achieve inundation at lower discharges and for longer periods. This is particularly important in the context of diminished Colorado River flows.

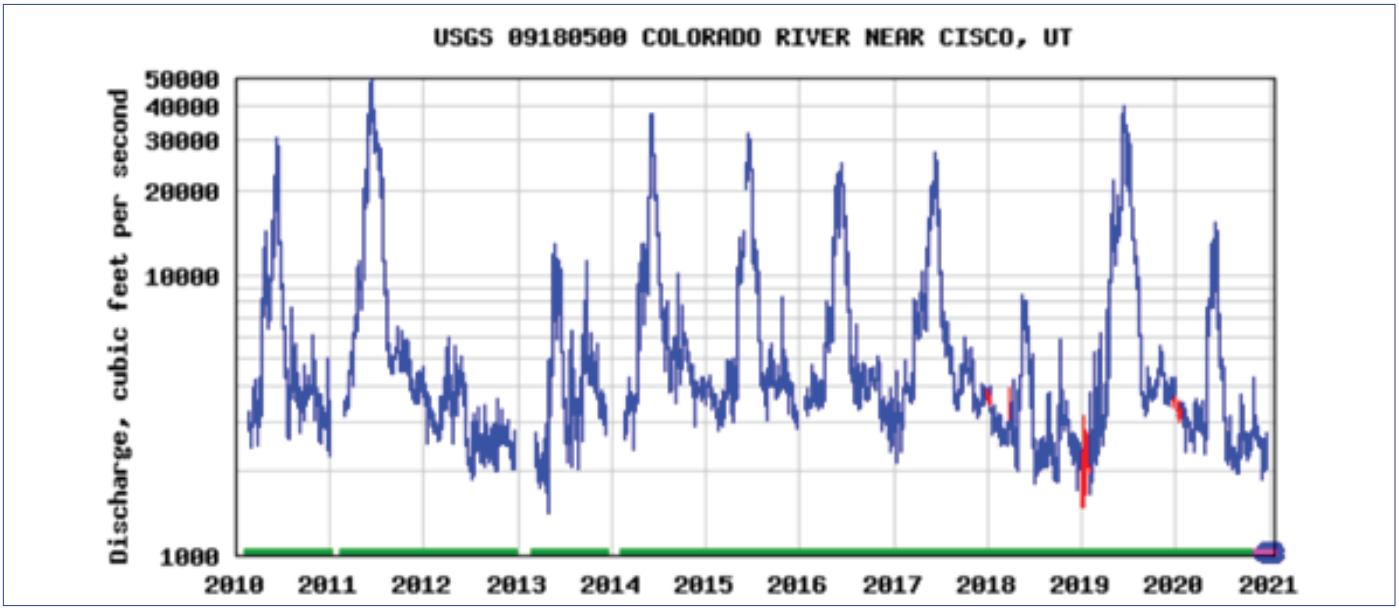

Figure 2. Colorado River Discharge near Cisco.

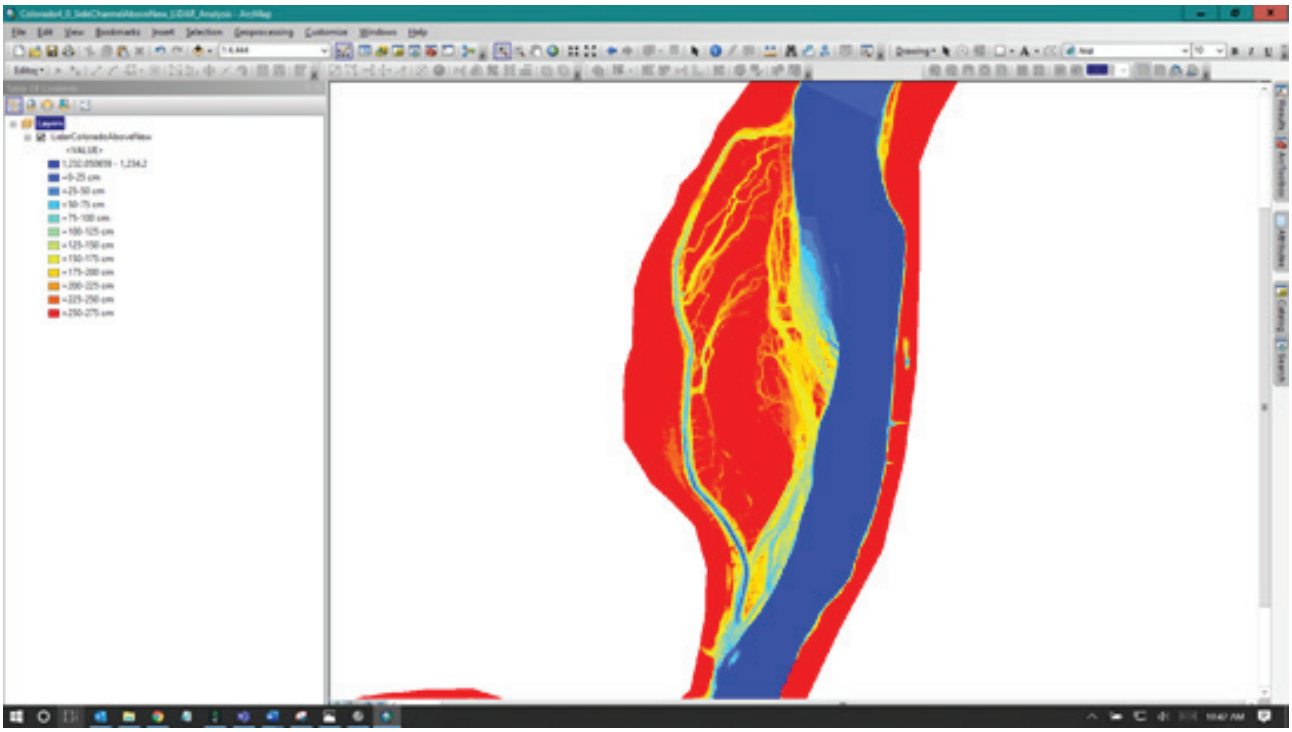

Figure 3. LIDAR data at side channel above new rapid.

Figure 4. Immediately post treatment.

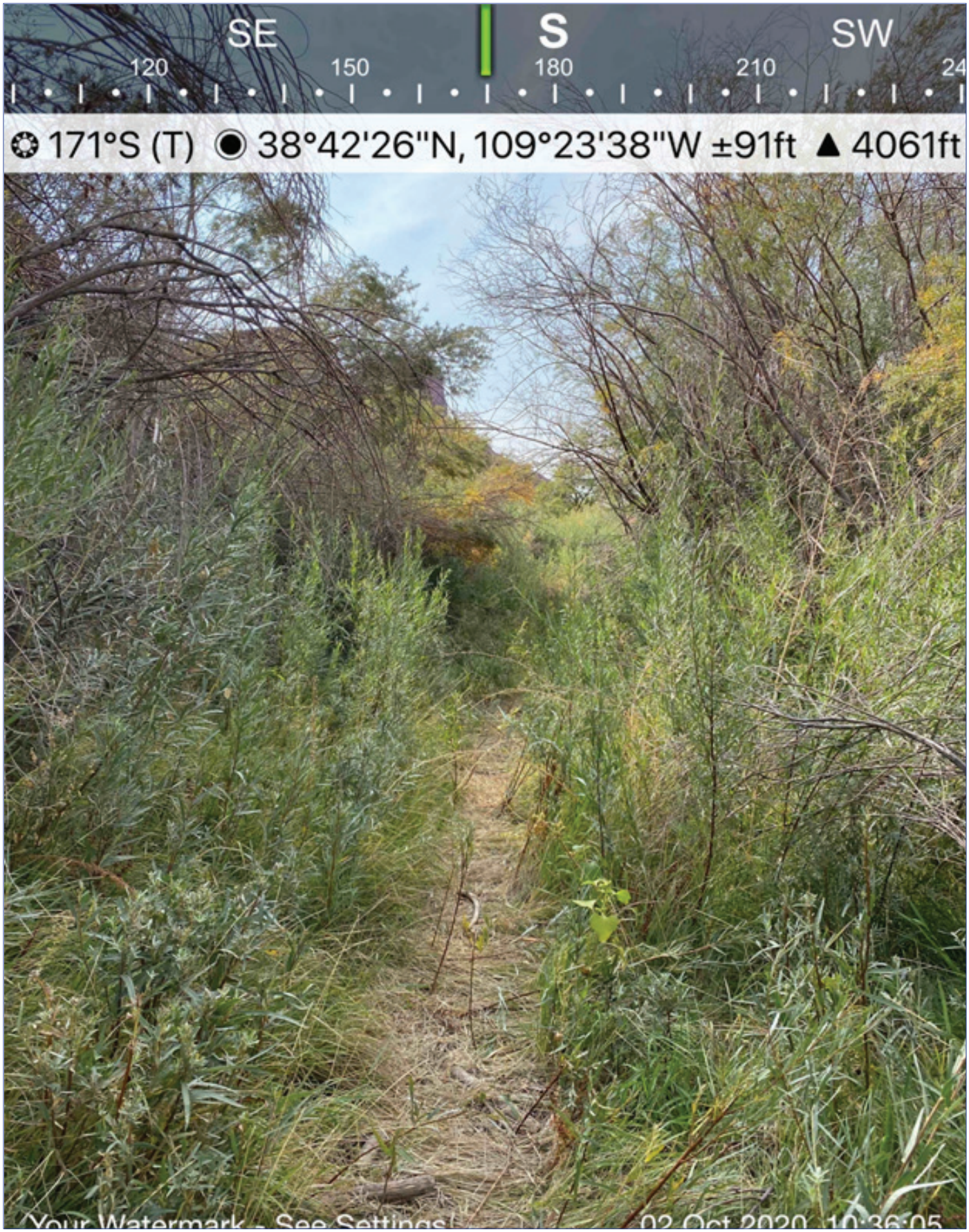

Figure 5. Recruitment in FY 20.

San Juan River WRI – Side Channel Restoration Updates

The Gold Mine Site is one piece of the overall San Juan River WRI project. Units 1-3 (Figure 6), containing the active side channels, have now been treated with a frill cut method by the Canyon Country Youth Corps and the Utah Conservation Corps. Resprout work has been completed in Units 1 and 2. This method provides for a very targeted application of herbicide while the tree is actively drawing resources from the canopy to the root system. Killing the root system is essential since they will resprout vigorously if only top-kill is achieved. Any living roots within the top 3-4 inches of soil can also resprout vigorously creating future treatments requiring less targeted herbicide applications. Once mortality of Russian olive is confirmed, and pending an Environmental Assessment (EA), a whole tree extraction methodology is desired to completely remove and pile the invasive trees in an area for future burning. Complete removal of Russian olive above and below ground biomass in and adjacent to side channels will allow these habitats to widen and reach equilibrium with the current flow regime. Additionally, Russian olive seedlings germinating from the seed bank were hand pulled in Unit 1 while still small (Figures 7-9). Mastication of frill cut Russian olives was completed on a small area to provide access for hand crews and to test results (Figure 10). Initial results show suppression of Russian olive and vigorous sprouting of willow. FY21 work will focus on the cottonwood gallery in the center of the project area. See the 2019 AHM Report for more information on the project.

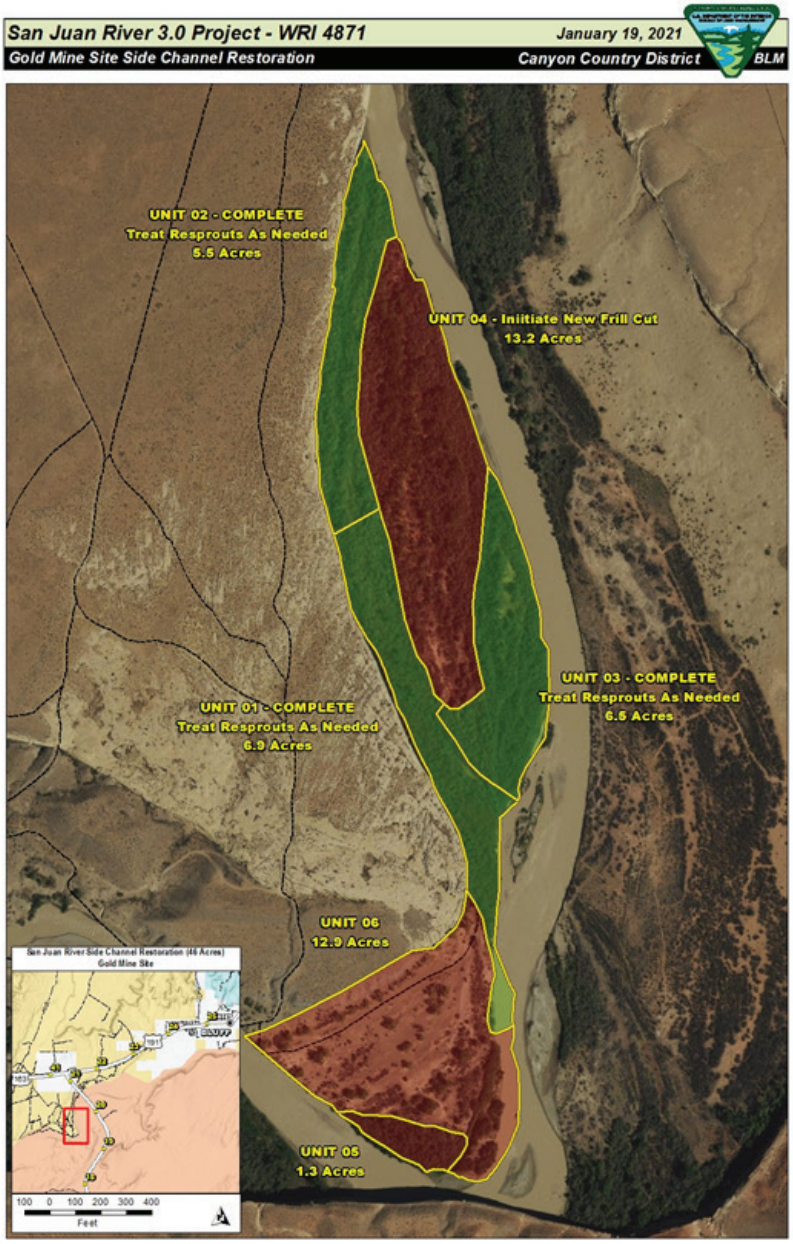

Figure 6. San Juan River WRI – Gold Mine Site

Figure 7. Russian olive seedlings from seed bank.

Figure 8. Hand pulling Russian olive seedlings.

Figure 9. After hand pulling.

Figure 10. Willow sprouting after mastication of frill cut trees.

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Erosion Control Structures

Multiple gully control structures were constructed near Moab to reduce erosion and associated sediment loading as part of an ongoing watershed improvement project. These gullies are active and drain directly into Mill Creek, a stream listed by the State of Utah as not meeting state water quality standards (Figure 11). Both Utah Division of Water Quality and Utah Watershed Restoaration Iniative contributed funding to this effort in order to improve water quality conditions and watershed health. Zeedyk structures are low profile, hand-built treatments made of rock or wood intended to restore hydrologic and ecological function of wet meadows and small streams impacted by head-cutting, gully erosion, and channel incision (Figure 12).

Water resources inventory and monitoring- Bears Ears National Monument

BLM submitted a detailed sampling analysis plan to UDWQ to conduct water quality sampling at 12 sites on a monthly basis, in coordination with the UDWQ cooperative program, to assess current water quality conditions within the recently established Bears Ears National Monument. BLM staff is also conducting intensive water resources inventory to develop a comprehensive dataset of springs and perennial stream segments in the National Monument (Figure 13). This effort will provide valuable information for managing these lands.

Figure 11. Gully pre-construction

Figure 12. Gully post-construction

Figure 13. Indian Creek

Wild and Scenic River planning effort- Green River

A planning effort for the recently designated Wild and Scenic River segments of the Green River was initiated in FY20. A Comprehensive River Management Plan (CRMP) will provide management direction to protect and enhance the river's Outstanding Remarkable Values (ORVs), free flowing condition and water quality, will maintain the classification and will address key issues. BLM staff is working with USGS and NPS staff to conduct extensive inventory and long- term monitoring activities along representative reaches as part of this planning effort.

Color Country and Paria River Districts

Primary Contact: Meghan Krott, Color Country and Paria River Districts Aquatic Ecologist, mkrott@blm.gov

Aquatic AIM

In FY2020, Color Country District began the second year of the Aquatic Assessment, Inventory and Monitoring (AIM) random sample design (Figure 14). Originally, the sample design was planned as a two-year effort, however, due to impacts from Covid-19 sampling was delayed and reduced resulting in only 30 of the planned 43 lotic AIM sites being sampled in 2020. The random sample design will now be finished in FY21. During FY20, 30 random sites and 6 targeted sites were sampled throughout the four field offices in the districts (including Kanab FO which is now a part of Paria River District). Sites were stratified by stream order and Field Office to produce a statistically valid sample design for the entire District.

Figure 14. Lotic AIM site on the Virgin River in St. George FO, flood-prone width measurement.

Color Country and Paria River Districts also participated in lentic AIM sampling in FY2020. A total of 5 lentic sites were sampled in the districts, 3 sites in Richfield Field Office and 2 sites within Grand Staircase Escalante National Monument.

Temperature Monitoring

In FY2020, stream temperature monitoring was conducted at 26 sites throughout both Color Country and Paria River Districts. Sites include: 8 probes on Otter Creek, 2 probes on Bear Creek, 8 probes on Birch Creek, Ranch Canyon Creek, Manning Creek, Parowan Creek (Figure 15), Calf Creek, North Creek, East Fork Virgin River, 3 Mile Creek and Summit Creek. This temperature monitoring supports restoration efforts on Otter Creek, Bear Creek and Birch Creek and provides critical mean August temperature data for use in statewide temperature modeling.

Figure 15. Temperature probe monitoring site on Parowan Creek.

Fish Surveys and Native Fish Transfers

In partnership with the Utah Division of Wildlife Resources (UDWR), Color Country and Paria River Districts conducted multiple fish surveys for species of conservation concern. These surveys are described below.

In support of the Virgin River Recovery Program, BLM UT assisted UDWR with their annual full pass survey of the Virgin River (Figure 16). This survey is conducted twice per year (spring and fall) and is used to assess population status of endangered Virgin River fish. Virgin River chub, woundfin, Virgin spinedace, desert sucker, specked dace, and flannelmouth sucker were all sampled during this survey.

BLM UT also assisted UDWR with annual Virgin spinedace monitoring on tributaries of the Virgin River managed by BLM. Population assessments of Virgin spinedace were conducted on the Santa Clara River and Beaver Dam Wash, as well as other areas not managed by BLM.

In support of Bonneville and Colorado River cutthroat trout recovery efforts, BLM UT assisted UDWR and the Fish Lake and Dixie National Forests with cutthroat trout surveys. Four Bonneville cutthroat trout population monitoring stations (3 on BLM, 1 on Fish Lake NF) were surveyed on Birch Creek in FY20. These stations also provide valuable restoration response monitoring for Birch Creek following the installation of beaver dam analogs and mechanical treatments that occurred in 2017-2018. One Colorado cutthroat population monitoring station was surveyed in partnership with UDWR and the Dixie National Forest on Pine Creek (Figure 17).

BLM UT also assisted UDWR and the Dixie National Forest with a project to restore native fish species to four streams that had previously been treated to remove non-native fish species. Collection of native fish occurred within a BLM managed section of the East Fork Sevier River. Mountain sucker, southern leatherside chub, mottled sculpin and speckled dace were collected over the course of four days and

Figure 16. Seine sampling during Virgin River full pass, September 2020.

Figure 17. Colorado River cutthroat trout sampling on Pine Creek.

Figure 18. Fish surveys on Otter Creek with BLM and UDWR.

transferred to four streams on the Dixie National Forest. Two of the transfer locations are upstream of BLM managed sections as well and could provided a source of native fish for downstream sections (Figure 19). In total, 1,456 southern leatherside chub, 475 speckled dace, 788 mountain sucker, and 372 mottled sculpin were collected and relocated to four different restoration streams.

As part of a pre-restoration monitoring program, fish surveys were also conducted on Otter Creek (Figure 18). Six trout population monitoring stations were established on Otter Creek (4 on BLM and 2 on private land upstream of BLM). Three of these stations had been previously monitored in 2015 and 3 new stations were added to provide population data prior to proposed stream restoration efforts. Brown trout, Utah chub and southern leatherside chub were captured during these surveys.

Figure 19. Meghan Krott, Color Country District Aquatic Ecologist releasing naive fish at Deer Creek.

Cedar City Field Office

The Cedar City Field Office (CCFO) accomplished two projects in support of aquatic habitat management in FY20.

In preparation for an Environmental Impact Statement and associated analysis, 20 springs within Cedar City Field Office were surveyed for springsnail populations. A random sample of springs with the proposed project area were surveyed. Of the 20 springs surveyed, live springsnails were found at one site and a springsnail shell was found at a second site (Figure 20). Site descriptions and photos were collected at each site as well.

Exclosures

Cedar City Field Office constructed four post and pole riparian exclosures around Chokecherry Spring, Mackelprang Spring West

Figure 20. Springsnail found during spring surveys within CCFO.

Fork, 8 Mile Spring and Meadow Spring (Figure 21 and 22). These lentic sites were being degraded by year-round wild horse and elk use.

Figure 21. New exclosure fencing around a spring in CCFO.

Figure 22. New exclosure fencing around a spring in CCFO.

Richfield Field Office

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Otter Creek Riparian and Water Quality Restoration Project

The goal of the Otter Creek Project is to improve water and riparian conditions in Otter Creek and help meet the Otter Creek TMDL defined targets/endpoints. Much of the riparian area of Otter Creek is currently in poor condition in association with decades of heavy cattle grazing pressure. Stream incision has lowered the water table and has further adversely affected riparian condition. Consequently, most of the willow and other woody riparian species have been greatly reduced in size and extent (Figure 23). However, it appears that local sources are still present. Moreover, recovery potential of these riparian areas is very good if grazing pressure is reduced and restoration actions can help raise the water table.

The project is a cooperative effort between federal, state and local partners and includes: Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), UDEQ-DWQ, Utah State University (USU), Utah Division of Wildlife Resources (UDWR), and Piute County Conservation District. We anticipate that the installation of instream structures along with the development of the Otter Creek Riparian and Water Quality Restoration Project Sampling and Analysis Plan (SAP) provides critical guidance for project design, data collection, data analyses and monitoring. The SAP includes a water quality, water chemistry, hydrologic, geomorphic, vegetation, grazing management and restoration effectiveness monitoring component for documenting and monitoring changes in water quality and quantity and riparian conditions that may occur once instream structures are installed. Improved grazing management within the riparian corridor will improve the condition of the riparian zone and help attain TMDL defined targets and endpoints for Otter Creek. Water quality will be improved by changing the timing of water delivery, reducing the amount of sediment moving directly through the current narrow channel, and increasing the amount of water and sediment retained in ponds, off-channel wetlands and floodplain soils.

Figure 23. Otter Creek

Several components of Phase 1 of the project were completed in FY2020 however some items were delayed due to Covid 19. Phase 1 includes stakeholder engagement, project design, and pre-implementation monitoring. During 2020 Utah State University (USU) installed continuous streamgage and groundwater level monitoring equipment. The Richfield Field Office hydrologist assists this effort by taking measurements so that a rating curve can be developed. USU also completed aerial photography using its reconnaissance drone.

Phase 2 (future proposal) includes installation of instream structures and evaluating changes in riparian conditions and water quality in Otter Creek. This phase cannot be completed without NEPA analysis which is currently under consideration in the Richfield Field Office.

Black Canyon Water Quality Monitoring

Black Canyon is located three miles south of Antimony Utah (Figure 24). The principle stream is the East Fork Sevier River and perennial tributaries include Pole Creek, Deep Creek, Deer Creek and Antimony Creek. The Bureau of Land Management (BLM) completing water quality monitoring in the East Fork Sevier River (EFSR) to fulfil its mission to protect resources on public lands. The BLM is interested in determining how land uses including livestock grazing, vegetation treatments, and wildland fire affect water quality in this area. Water quality data will help BLM determine what design features and/or mitigation might be necessary for future actions.

Water quality in the sampling area may be affected by a variety of natural conditions and land uses. Livestock grazing occurs throughout the sample area and BLM is involved with permitting grazing in areas adjacent to Pole Creek, Pine Creek, Deep Creek, and Deer Creek. Water quality is also affected by agriculture which occurs on private land along EFSR Center Creek, and Antimony Creek. The BLM has

Figure 24. East Fork of the Sevier River, Black Canyon

completed vegetation enhancements on about 10,000 acres of pinion-juniper woodlands within the sample area. The 2002 Sanford Fire burned across the headwaters of Deep Creek and other streams which originate on the higher elevations of Mount Dutton. It resulted in considerable sedimentation and ash flows which extirpated fish and altered habitat in several streams. Fish have since returned to Deep Creek and other nearby streams.

Streams in the Black Canyon area are an important part of the biodiversity of the region providing water for aquatic and terrestrial wildlife. The streams provide drinking water for big game and other wildlife along with vegetational variety which creates diverse habitats. Aquatic life in these streams is composed of a variety of cold water macroinvertebrates and East Fork of the Sevier River, Black Canyon fish including Bonneville Cutthroat Trout. The EFSR was included in the Otter Creek – East Fork Sevier River TMDL Study completed in 2006. Water Quality was found to be not supporting beneficial uses due to elevated levels of total phosphorus.

The BLM collected nine water quality samples at six sites for a total of 54 samples during FY2020. Samples include field parameters (flow, pH, dissolved oxygen, conductivity and turbidity); and laboratory samples (metals, nutrients and bacteria). BLM partnered with the Utah Division of Water Quality (DWQ) for this project and laboratory analysis (metals and nutrients) is conducted by Utah State Laboratories. The BLM completes bacteria sampling at the Richfield Field office using equipment borrowed from DWQ. As part of our cooperative effort the BLM also took six monthly bacteria samples at Otter Creek State Park to help ensure safe conditions at that recreation area.

Grand Staircase Escalante National Monument (GSENM)

Primary Contact: Meghan Krott, Color Country and Paria River Districts Aquatic Ecologist, mkrott@blm.gov, Raven Chavez, GSENM Soil Scientist, rdchavez@blm.gov, Justin Jimenez, BLM UT AHM Program Lead, jjimenez@blm.gov

Grand Staircase Escalante National Monument accomplished multiple projects in support of aquatic habitat management in FY20. These projects are detailed below.

BLM fire crews and interns from Southern Utah University completed maintenance and reconstruction of two riparian area spring exclosure fences during the summer of 2020. Crews spent a day each at Cole and Sand springs, located in the Nephi Pasture area of GSENM, maintaining and reconstructing the exclosure fences. Sand spring encloses about one acre, while Cole spring encloses about a half acre. Both springs are developed with a headbox that collects water and pipes it out to off-site tanks and troughs. The fence helps exclude cattle and keep the spring areas functioning properly.

Approximately 500 willows were planted at three locations within GSENM to improve riparian conditions. Planting occurred at Henrieville Creek, Birch Creek and Upper Valley Creek.

In partnership with UDWR, nonnative green sunfish and black bullhead were removed from a small spring fed tributary of the Escalante River. The tributary is unofficially named Slick Rock Saddle Bench Spring.

GSENM Water Quality Monitoring

GSENM completed year two of a five year water quality monitoring contract in FY 2020. Under an MOA with UT Division of Water Quality (UDWQ), data is being collected by RedFish Environmental with the help of the GSENM Soil Scientist. Water quality field parameters (i.e. discharge, water temperature, pH, specific conductivity, and dissolved oxygen) and water chemistry samples were collected at nine sites across GSENM (Figures 25, 26 and 27) once a month from May to October. Bacteriological E. coli samples were collected at three sites once a month from May to October. Water temperature sensors were also located at three sites along Calf Creek from May to October. Sample collection follows procedures found in the UDWQ Quality Assurance and Standard Operating Procedures Manual and is consistent with standard practices accepted by the EPA. Ongoing project data will be utilized in Proper Functioning Condition (PFC) and rangeland health determinations, as well as influence management decisions in both natural resources and recreation management.

Spring Stewardship Institute Springs Inventory

Under an agreement with GSENM, Spring Stewardship Institute collected data from 10 springs/seeps in FY2020 (Figure 28). The collected data and assessment of these springs was then input into the Springs Online database that was created by SSI. SSI specialists were accompanied by the GSENM Soil Scientist for two site visits where the SSI protocol was demonstrated. This is an ongoing project that will result in a baseline inventory of springs/seeps across GSENM, additional inventory of springs/seeps, input of data into the Springs Online database, and training for local specialists to continue inventory and monitoring

efforts into the future. Data from SSI inventory will be used alongside Lentic AIM data when conducting monitoring efforts and will influence future management decisions.

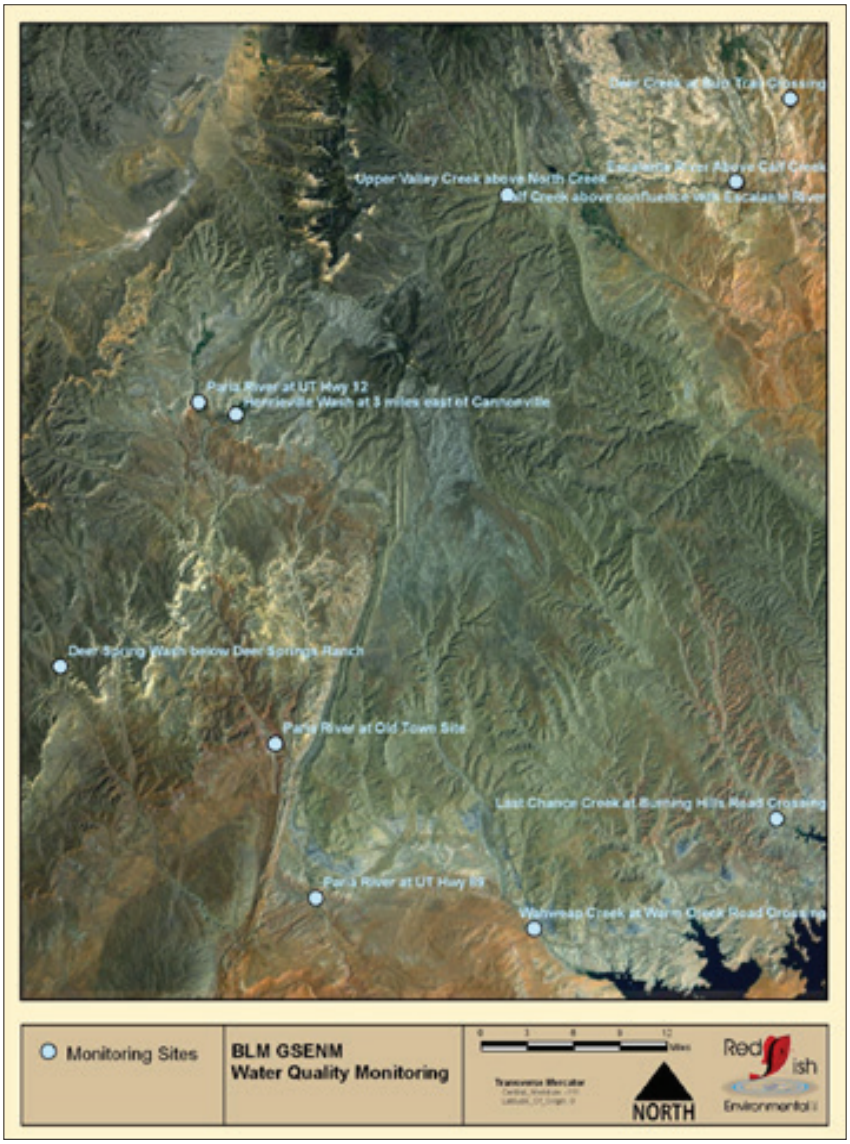

Figure 25. GSENM WQ monitoring site locations.

Figure 26. WQ monitoring site on Paria River.

Figure 27. WQ monitoring Site on the Escalante River

Figure 28. Potential spring during site visit.

Escalante River Youth Conservation Corps (YCC) Restoration Project

The main goal of the crews over four weeks was the removal of Russian Olive throughout Harris Wash in the Grand Staircase Escalante National Monument. There were two methods of removal that were being used during the project. The first was the low stump treatment, which involved cutting the Russian olive down as flush to the ground as possible and applying herbicide to the living tissue area of the remaining stump (Figure 30). The second was the frill cut method, which involves using a hatchet to cut a small pocket in the living tissue of the tree and applying a few milliliters of herbicide in the cut (Figure 31). At the end of each day the crews carefully measured and recorded the remaining amount of herbicide to keep track of the amount applied per acre (Figure 29). Acreage and miles of waterway were recorded by using Avenza on a tablet.

Russian Olive has had a detrimental impact on the ecology of the Escalante River and its tributaries, including Harris Wash. In the past, grazing of cattle along the river and its tributaries impacted the native vegetation, and created an opportunity for the quick growing and resilient Russian olive to establish on the river banks and the surrounded flood plains. Over time, as the Russian olive grew along the rivers, it began to act as a stabilizer of the riverbanks. The historic wide, shallow, and sinuous Escalante River became a narrow, deep, and ditch like river. This change in the structure and flow of the river has affected the entire river ecology. Native fish that had evolved to live and procreate in shallow warm waters were not equipped to handle the deep colder waters the river had become. The natural function of the shallow water and small riverbanks which allowed the seasonal floods to effectively flood and irrigate the surrounding flood plain and plant life was no longer functioning in the same way. Removing the Russian olive from the river and its tributaries is helping the entire ecosystem to return to a more natural state with native plants and animals returning and flourishing, and well as establishing the natural functions of the river and its flood plains.

The first two weeks of the project, when there was only one crew, they treated 5.82 acres and 0.4 miles of waterway. The last two weeks, when we had two crews, they treated 11.89 acres and 0.3 miles of waterway. In total for the project, we treated 17.71 acres and 0.7 miles of waterway. Herbicide was tracked and recorded by the ERWP partnership.

Figure 29. YCC crews preparing to treat Russian olive.

Figures 30 and 31. The end results of stump cut application (left) and frill cut application (right).

Green River District

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White River Restoration Project

The White River riparian corridor has become increasingly dominated by Russian olive (Elaeagnus angustifolia) and Tamarisk (Tamarix chinensis). This invasive vegetation displaces native plant communities by creating dense monocultures, preventing native plants from establishing or re-establishing along the riparian corridor. The impacts from these invasive species include the reduction and elimination of native plant communities, directly reducing plant community diversity, insect diversity, wildlife habitat diversity, aggressive fuels accumulation, and reduction of cottonwood galleries which are important sources of large woody debris for fish habitat in the river. Additionally, the infestations armor the stream bank preventing lateral dissipation of stream energy, effectively narrowing and deepening the channel resulting in a loss of instream habitat complexity. This disconnects the stream from the riparian zone reducing the amount of floodplain and backwater habitat available to juvenile fish; backwater zones are important habitats for many of the native endangered and conservation agreement fishes in the White River. Control and removal of both Russian olive and tamarisk infestations are critical to a healthy and functioning riparian system, which directly affects the overall health of the watershed.

Figure 32. Utah Youth Conservation Corps on the White River.

Since 2014, the Utah Conservation Corps (UCC) has partnered with the Bureau of Land Management (BLM)

and RiversEdge West (REW) to restore the White River ecosystem (Figure 32). The White River is one of the largest rivers in the west with without extensive storage reservoirs. This results in a nature flow cycle and multi-age native cottonwood stands found nowhere else in Utah. Fall 2020 field crews continued to remove woody invasive species using a variety of tools such as chainsaws, hand tools, and herbicide with special attention paid to establishing fuel breaks, addressing regrowth and quality control efforts within Bridge Polygon B (Figure 33), as well as began initial treatment efforts within Bridge Polygon C (Figure 33). Removal of these woody species (Russian olive, tamarisk) promote restoration of native cottonwood galleries while reducing presence of invasive species, improve native plant community resilience, improve water quality, reduce hazardous fuels, and improve native and endangered fish habitat (Figures 34 - 41).

Fall 2020 Restoration Metrics

Project	Crew Hours	Acres Treated	Miles of Waterway treated	Number of woody invasive stems removed
*Fuel Breaks (Polygon B)	1128	4.01	.07	**181+
***Polygon B retreatment and QC	327	11.66	.4	547
***Polygon C initial treatment	397.5	3.07	.5	337
Totals	1874.25	18.74 (gross)	.97	*1065+
****Adjusted Totals	n/a	12.7 (net)	n/a	n/a

*Altered Herbicide Prescription
**Stem counts incomplete.
***Correct Herbicide Prescription
****Net acreage treated (approximate). Gross acreage includes acreage that may have been treated multiple times over the fall season. Examples of this may be treating regrowth or quality control efforts aimed at removing missed stems.

Figure 33. White River treatment areas.

Figures 34 and 35. Before (left) and after (right) photos of the worksite along the north side of Polygon B, as seen from the cliffs above. The after photo shows a continuous fire break from the far end of the peninsula to the foreground, where we see native rabbitbrush and desert sagebrush growing above the floodplain

Figures 36 and 37. (Before (left) and after (right) photos of the worksite along the south side of Polygon B, taken from the cliffs at the west end of the worksite, facing east along the fire break. The before photo shows the dense, intertwined clustering of dead Russian Olive trees. The after photo reveals newly liberated young cottonwood trees with a hefty bubble of fire break extended at least 10 feet out from their dripline.

Figures 38 and 39. Before and after this olive was felled and scattered, Polygon C.

Figures 40 and 41. Before and after clearing ladder fuels from a cottonwood stand, Polygon C.

Upper Colorado River Basin Native Fish Monitoring

BLM staff working with UDWR biologist tagged 591 conservation agreement and 44 endangered fish from Flaming Gorge to Sand Wash boat ramp on the Green River. Data gathered during the trip will be used to assess fish health, population trends, age structure, basic water quality characteristics, and occupancy (Figure 42).

The data collected during this trip in combination with tracking tagged fish using the PIT tag antennae technologies will allow for computer based modeling analysis (i.e. survival analysis) which will help guide future conservation activities. The information gained from this project will also help inform current and future restoration activities that are taking place on the White, San Rafael, and Price Rivers.

Species Tagged:

Endangered

- Bonytail (Gila elegans)
- Colorado Pikeminnow (Ptychocheilus Lucius)
- Razorback Sucker (Xyrauchen texanus)

Conservation Agreement

- Bluehead Sucker (Catostomus discobolus)
- Flannelmouth Sucker (Catostomus latipinnis)

Figure 42. Jerrad Goodell, Green River District Aquatic Ecologist holding Colorado Pikeminnow.

West Desert District

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Gandy Warm Springs

Gandy Warm Springs is a remote warm springs in the west desert. The endemic sub-globose Snake pyrg is found at this site. In 2019-2020, this species was being evaluated for listing under the Endangered Species Act. Springsnail numbers had been relatively stable until 2019 when surveys documented a decline in springsnail abundance and distribution. Surveys later that summer documented a non-native armored catfish that was abundant throughout the spring system. BLM worked with Utah Division of Wildlife Resources (UDWR) and Fish and Wildlife Service to develop a Conservation Agreement and Strategy (CAS) that outlined how the agencies would work together to address this new threat to the species. The team determined that installing a barrier would be needed to allow for a future rotenone treatment and prevent additional upstream movement of non-native fish. BLM completed an Environmental Assessment for the barrier and UDWR led the effort to install the barrier in July 2020 (Figure 43). A rotenone treatment was attempted but halted due to complications with downstream landowners in September 2020. The BLM and UDWR are working to mechanically control (Figure 44) the non-native fish and enhance and protect the habitat where sub-globose snake pyrg remain in good numbers. In December 2020 FWS determined the sub-globose Snake pyrg was not warranted for listing under ESA in large part due to the efforts taken with the CAS.

Figure 43. Recently installed barrier to keep non native fish out of endemic sub-globose Snake pyrg habitat.

Figure 44. Mechanical control of non-native fish at Gandy Warm Springs.

Laketown Canyon Road Crossing

Laketown Canyon is a small tributary to Bear Lake, with a population of native Bonneville cutthroat trout, and the source of the water supply for the community of Laketown. This area is managed as an ACEC by the Salt Lake Field office in part to protect and maintain water quality. It is also an area that is gaining in popularity by recreational users. The community brought to our attention that there was erosion occurring at some of places that the UTV road crossed the stream and were concerned about losses of water quality and quantity. BLM partnered with the Utah Division of Wildlife Resources and Trout Unlimited to come up with a plan to improve these crossings and received funding from the Utah Watershed Restoration Initiative.

Phase I of the project was completed in November 2020 at four stream crossings. We used a combination of culverts, hardened fords, and realigning a ditched portion of the stream with the natural channel (Figures 45 and 46). This work will allow continued recreation access while improving water quality, riparian habitat, and instream habitat for Bonneville cutthroat trout.

Figure 45. Laketown Creek hardened ford example

Figure 46. Laketown Creek replaced culvert example.

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AQUATIC HABITAT MANAGEMENT PROGRAM

2020 UTAH ACCOMPLISHMENT REPORTING