Winter 14

swimming upstream

San Juan River Basin Recovery Implementation Program
Upper Colorado River Endangered Fish Recovery Program

Nonnative fish control—an uphill battle

By Tom Chart, USFWS

From their inception, the San Juan and the Upper Colorado programs have recognized that competition and predation from nonnative fish threaten recovery of the endangered fishes. On the San Juan River, biologists have targeted nonnative channel catfish and common carp for removal. Researchers report remarkable success controlling common carp, which are now outnumbered by the endangered Colorado pikeminnow and razorback sucker. Channel catfish in the San Juan River have proven more persistent. Researchers are now considering refining the removal effort during June and July to target spawning catfish in the mid-reaches of the river. Channel catfish and carp are plentiful in the Green and Colorado sub-basins too, but they are no longer targeted for removal. Since the late 1990's, nonnative smallmouth bass and northern pike have garnered much more attention, due to their greater predatory potential. And, as if those two nonnative predators were not enough, in recent years walleye have invaded the lower portions of the Green and Colorado rivers. These three species, along with burbot (current distribution is largely limited to the Green River upstream of Flaming Gorge Dam), have been dubbed the 'worst of the worst' nonnatives. Successful control of these nonnative predators is widely recognized as the biggest obstacle to endangered fish recovery in the Upper Colorado Program—an uphill battle if there ever was one.

PHOTO COURTESY UDWR

THIS NONNATIVE NORTHERN PIKE WAS CAPTURED ELECTROFISHING ON THE MIDDLE GREEN RIVER. THIS PREDATORY FISH HAS A NATIVE BLUEHEAD SUCKER IN ITS MOUTH.

The 2014 sampling season has ended and researchers are compiling data in preparation for the next Upper Colorado Program nonnative fish workshop in December. Since the first workshop in 2002, researchers process new information and recommend necessary adjustments to our nonnative control program. The first workshops resulted in significant increases in the geographic scope (the number of river miles targeted for removal) and intensity (number of removal passes) of nonnative fish removal. The primary method of removal, boat- or raft-based electrofishing, is time consuming and expensive. Recent workshops led to more subtle changes, like fine-tuning the multi-agency electrofishing effort to make it more efficient, and targeting spawning aggregations of the 'worst of the worst' nonnative predators. The researchers are the first to admit that they still don't have all the answers, but they have learned a lot.

Based on lessons learned, the 2014 results will likely tell us that we gained ground on the smallmouth bass threat, lost ground on northern pike, and the jury is out on walleye. These predictions are based on accumulated experience and extensive data that point to a clear linkage between hydrology (wet vs dry years) and the reproductive potential of these nonnative predators. As a general rule, smallmouth bass spawn more successfully in drought conditions, while northern pike do better in wet years. Researchers, such as Dr. Kevin Bestgen with Colorado State University's Larval Fish Lab, have studied these environmental correlations for years and now have considerable analytical support for those rules of thumb. For example, biologists are still trying to suppress a strong cohort of northern pike produced during the extremely wet year of 2011, and equally strong cohorts of smallmouth bass produced during the low flows of 2012 and 2013.

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River	Presence of Invasive Species	
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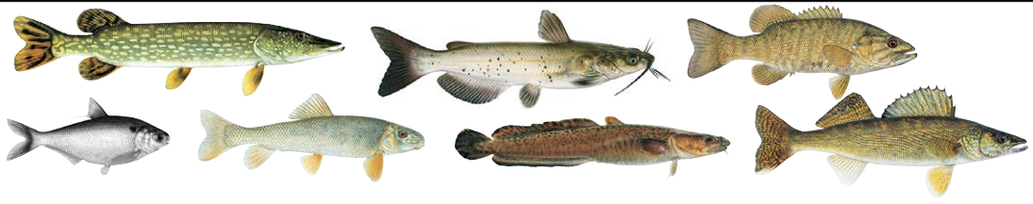
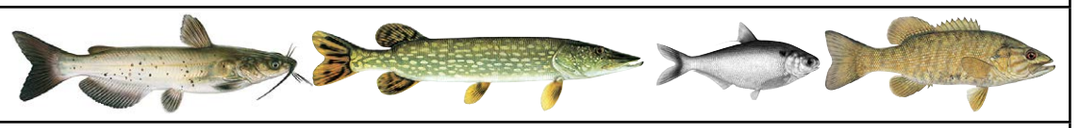
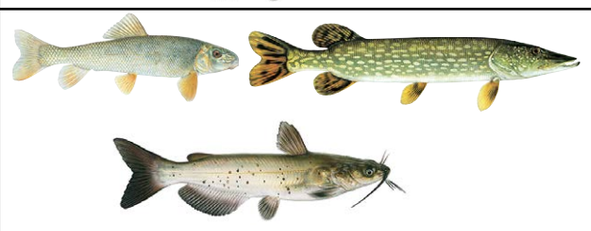
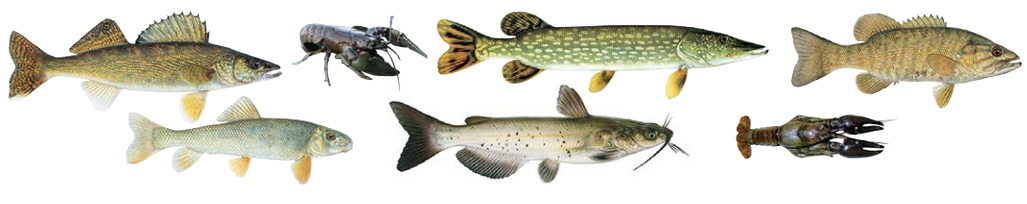
Green		
White		
Yampa		

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RUSTY CRAYFISH PHOTO COURTESY OF THE UNITED STATES GEOLOGICAL SURVEY
VIRILE CRAYFISH PHOTO COURTESY D. GORDON E. ROBERTSON

PHOTO COURTESY MELANIE FISCHER, USFWS

NONNATIVE NORTHERN PIKE CAPTURED IN THE YAMPA RIVER, 2014.

PHOTO COURTESY MELANIE FISCHER, USFWS

NONNATIVE WALLYEYE CAPTURED IN THE YAMPA RIVER, 2014.

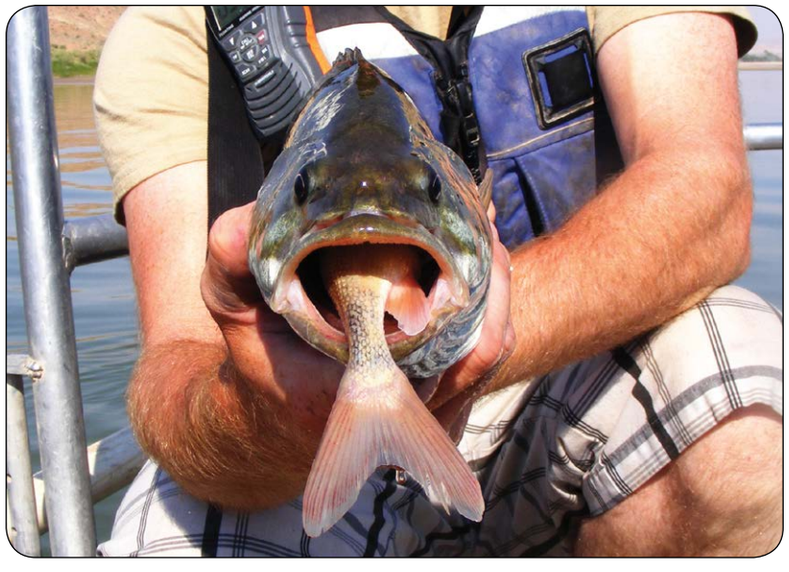


PHOTO COURTESY UDWR

VORACIOUS NONNATIVE SMALLMOUTH BASS WITH A NATIVE SUCKER IN ITS MOUTH.

Keeping with the theme of an uphill battle, it is difficult to not conjure images of Sisyphus and his boulder. Biologists reduce the number of smallmouth bass or northern pike in the rivers only to have the boulder roll back downhill as the remaining nonnative adults pull off a successful spawn when flow conditions and temperatures are favorable. The Program would be living a true tragedy if, like Sisyphus, we were doomed to the same pointless task in perpetuity. However, the researchers have never been, and are not now, complacent with the current approach, but are constantly striving for a more effective control program. And everyone now realizes that an effective control program will require more than mechanical removal of fish from the rivers.

Developing a more diverse, programmatic solution would require a greater level of awareness of the problem and a commitment to find a solution. Unfortunately it took some bad news to ratchet up awareness. In 2012, the U.S. Fish and Wildlife Service (Service) was compelled to delay downlisting Colorado pikeminnow from endangered to threatened because of a clear linkage between reduced numbers of adults in the Yampa River and persistently high densities of nonnative predators there. Population estimates showed that nonnative northern pike were outnumbering endangered Colorado pikeminnow, 3:1. The Service's decision came as a major setback to Upper Colorado Program partners. In Washington D.C., Congressional representatives were starting to question the success of this 26-year old Recovery Program. As a result, discussions of an effective solution to the nonnative predator problem quickly went beyond the nonnative fish workshops to include state natural resource managers.

In February 2014, the Program, working closely with Upper Basin state chiefs of fisheries, approved a 'Basinwide Nonnative Fish Strategy' (see related story on this page). This strategy promotes a consistent position that all states will manage against the 'worst of the worst' nonnative predators throughout the basin (with a few exceptions), control off-channel sources of these nonnative species, develop sport fisheries with species (or sterile hybrids) that are compatible with endangered fish recovery (to help fend off future illegal introductions), and develop a strong public outreach message that all of these actions are needed to achieve recovery.

In accordance with the new strategy, several important nonnative control actions began in 2014. Researchers expanded northern pike control into the upper reaches of the Yampa River and incorporated specific walleye control in the lower Green River. Program partners are meeting with local officials and sport fishing interests to discuss options to eliminate escapement of northern pike and smallmouth bass from Elkhead Reservoir in the Yampa River drainage. Partners in Utah are honing in on a solution to stop escapement of nonnative walleye and smallmouth bass from Starvation Reservoir in the Green River sub-basin. Utah recently implemented must-kill regulations for the 'worst of the worst' nonnative species throughout critical habitat and in some upstream

Nonnative fish control—continued

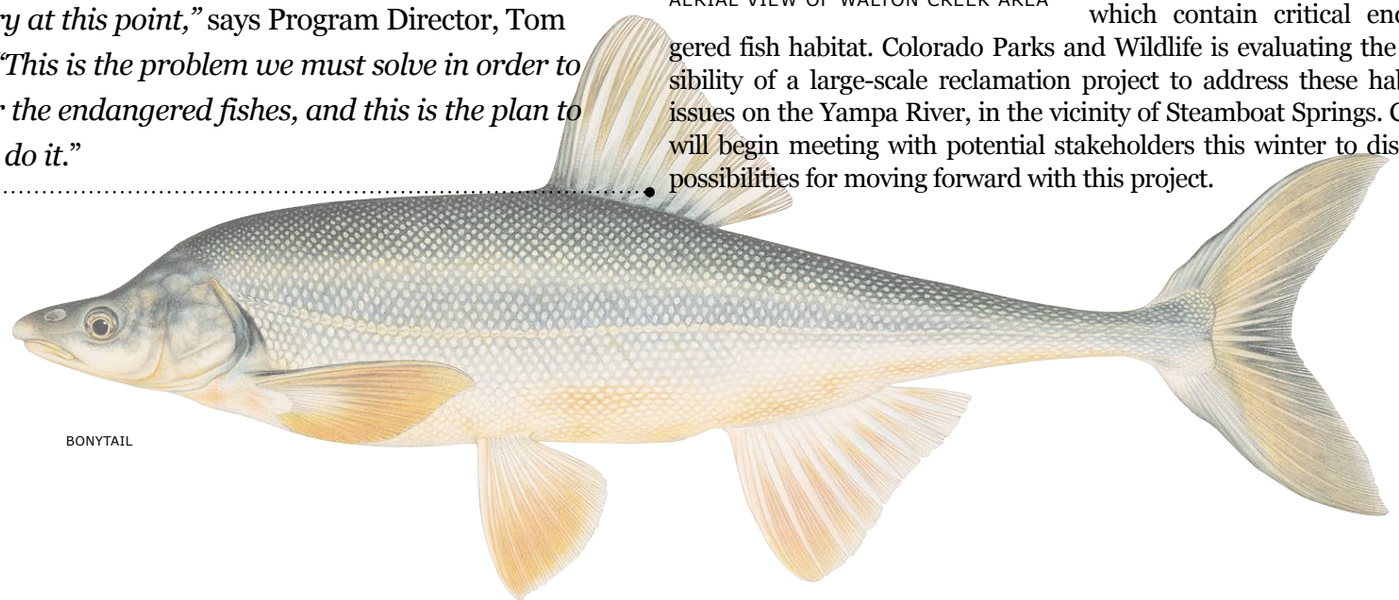
locations. Wyoming passed similar regulations for northern pike and burbot upstream in the Green River drainage. Colorado is exploring other strategies to communicate a similar zero-tolerance policy for these species in their portion of critical habitat. Colorado is also discussing management alternatives with Tri-County Water Conservancy District to contain smallmouth bass in Ridgway Reservoir in the Gunnison River drainage. All of these new activities build upon the Program's intensive, ongoing mechanical removal efforts conducted each year throughout 400+ miles of critical habitat.

There is no question that the Upper Colorado Program is faced with an uphill battle to reduce the threats of nonnative predation and competition. The endangered fish populations and the success of the Program are at risk until these threats are significantly reduced. The next three to five years represent a critical juncture for the Program—the outcome may depend on how many components of the new strategy are implemented. The good news is that the problems have now been elevated to the appropriate levels, and this increased awareness should help us get the "boulder" rolling in the right direction.

PHOTO COURTESY DAREK ELVERUD

WALLEYE THAT ATE A BONYTAIL. WALLEYE CAPTURED AT TAKE-OUT BEACH, UT, 2014

"Nonnative fishes are our biggest challenge to recovery at this point," says Program Director, Tom Chart. *"This is the problem we must solve in order to recover the endangered fishes, and this is the plan to help us do it."*



BONYTAIL

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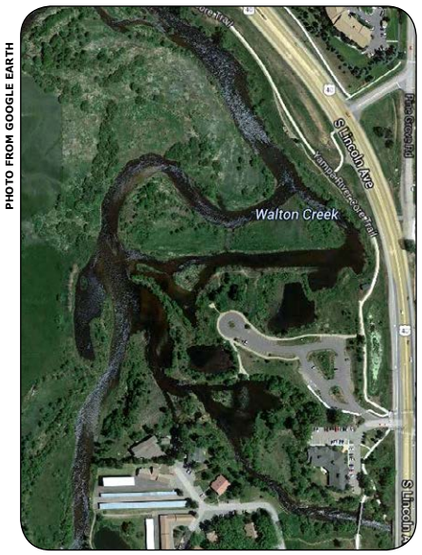
Basinwide nonnative fish strategy

By Angela Kantola, USFWS

In response to expanding populations of nonnative aquatic species within critical habitat of the upper Colorado River basin, in February 2014, the Upper Basin Program's Management Committee approved the Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy. Now-retired Pat Martinez spearheaded the Basinwide Strategy, developed in cooperation with the Program's State partners who bear responsibility for sportfish management. The goal of the Basinwide Strategy is to reduce the negative ecological impact that problematic nonnative aquatic species currently pose or may pose for the native aquatic community in critical habitat so that they no longer impede or threaten the recovery of endangered fishes in the Upper Basin. The Strategy has five sections: Prevention; Eradication, Control and Management; Research and Monitoring; Policy and Enforcement; and Information and Education. Program partners are working hard to implement the strategies outlined in this plan.

PHOTO FROM GOOGLE EARTH



AERIAL VIEW OF WALTON CREEK AREA

Yampa Habitat Reclamation

Floodplain areas of the Yampa River upstream of Steamboat Springs have been mined for gravel for decades. Some of these areas, like the Walton Creek confluence provide preferred habitat for nonnative northern pike in the form of large non-natural backwaters and sloughs that remain connected to the main channel at most flow levels. Habitat reclamation would reduce the numbers of all life stages of northern pike entering downstream reaches of the Yampa River which contain critical endangered fish habitat. Colorado Parks and Wildlife is evaluating the feasibility of a large-scale reclamation project to address these habitat issues on the Yampa River, in the vicinity of Steamboat Springs. CPW will begin meeting with potential stakeholders this winter to discuss possibilities for moving forward with this project.

Melissa Trammell named researcher of the year

The Upper Colorado River Endangered Fish Recovery Program hosted the Annual Researcher's Meeting in Grand Junction, Colorado, in January 2014. During the meeting, the Program had the honor of presenting Melissa Trammell, with the Researcher of the Year award.

PHOTO COURTESY MELANIE FISCHER, USFWS

STEVE PLATANIA, AMERICAN SOUTHWEST ICHTHYOLOGICAL RESEARCHERS, L.L.C., PRESENTS THE RESEARCHER OF THE YEAR AWARD TO MELISSA TRAMMELL.

Melissa Trammell, an avid outdoors person throughout her life, began her professional relationship with the Colorado River fish in the late 1980's as a CSU graduate student experimenting with a Colorado pikeminnow sport fishery in northwest Colorado. The next decade or so found Melissa working for the Utah Division of Wildlife Resources in Moab.

In the early 2000's Melissa did a relatively short stint with a private consultant (SWCA) where she developed a nonnative fish control strategy for the June Sucker Recovery Program and where she became exposed to the Grand Canyon ecosystem.

Melissa started working for the National Park Service (NPS) in 2003. This provided the Upper Colorado Program the opportunity to officially pull Melissa back into our day to day business as a powerhouse member and occasional chairperson of the Biology Committee. During the past two years Melissa has served double duty as NPS' representative on the Management Committee as well.

PHOTO COURTESY MELISSA TRAMMELL, NPS

MELISSA TRAMMEL HOLDS A NONNATIVE NORTHERN PIKE.

Melissa was instrumental in helping Grand Canyon National Park initiate the first of a series of translocations of humpback chub to tributaries in 2009. She has continued to be a critical part of Grand Canyon National Park's fisheries program.

Melissa has taken on the role of NPS Subject Matter Expert for the development of the Long Term Experimental and Management Plan for the operation of Glen Canyon Dam.

The analytical skills Melissa developed as a graduate student and honed as a principal investigator coupled with her programmatic experiences as a participant in a variety of conservation efforts make her uniquely qualified for her current role in ecosystem recovery.

Melissa Trammell has probably seen and seined more reaches of the Colorado River and its tributaries than anyone. It is for that breadth of experience and for her keen scientific contributions to the recovery of the endangered fishes that the Upper Colorado Program was pleased to present Melissa Trammell with the 2014 Researcher of the Year award. Congratulations Melissa!

Program director's message

By Sharon Whitmore, Assistant Director
San Juan River Basin Recovery Implementation Program

As the days get shorter and there's a nip in the air, I am reminded of the annual cycle of the San Juan River Program. In the fall, crews are wrapping up the field season and will soon start compiling the year's data and analyzing results. The Coordination Committee (CC) recently approved the Annual Work Plan that lays out priority recovery activities for 2015. It's also time to start putting together this newsletter. Although it's like pulling teeth sometimes to get biologists to write general interest articles about their work, Swimming Upstream is an important part of the yearly cycle of the San Juan and Upper Colorado Programs. The newsletter educates basin residents about how the recovery programs are benefiting the endangered Colorado River fish and basin water users and it is a valuable tool for promoting the programs to basin residents and the legislators who approve program funding.

Winters are mostly for data crunching, writing reports, planning, and watching the skies in hopes of a good snow pack. The principal investigators (PIs) of the various recovery projects compile and deliver their data to the SJR Program Office for incorporation into the Program's central database. The Biology Committee (BC) meets to review results of data integration analyses, review information, identify important questions, discuss priorities, and make adjustments to the Program's Long Range Plan.

I always look forward to the annual Researchers Meeting in January when the two recovery programs come together to hear about successes and challenges, get a basin-wide recovery perspective, and collaborate. In February, the BC and PIs meet to take the first close look at the results of the 2014 field season. It's an exciting time, albeit a little nerve wracking, to see how the fish community responded to our management actions. Each year brings ups and downs but long-term results show populations of both Colorado pikeminnow and razorback suckers are sustaining in the San Juan River and reproducing.

Soon enough spring will be here again! We get better run-off forecasts, predictions of hydrologic conditions, and we start formulating plans for environmental flow releases. In May, the San Juan Program caps the year with its Annual Meeting. Committees and other interested parties come together to see what progress has been made toward recovery, share information, ask questions, and collaborate.

As we cycle back around to summer and the days get longer and temperatures rise, 2014 annual reports will be completed, 2015 field work will again be underway, and planning for 2016 (yikes!) will commence. Each annual cycle brings us closer to recovering the endangered fish. With the continued recovery actions of the San Juan and Upper Colorado Programs and the commitment and dedication of Program partners, water development in the basin can continue and the endangered Colorado River fish have a great future. For me, this epitomizes the beauty of collaborative recovery programs - diverse and often times disparate interests successfully working together to recover species in need. I feel very fortunate that this is the kind of work I have gotten to do for most of my career. Thanks to all the San Juan and Upper Colorado Program partners and participants!

Sharon Whitmore

Congratulations to John Shields, U. S. Fish and Wildlife Service 2013 Recovery Champion!

Recovery Champions are Service staff and their partners whose work is advancing the recovery of endangered and threatened species of plants and animals. John Shields, former chair of the Upper Colorado River Endangered Fish Recovery Program's Management Committee received one of the Service's 2013 Recovery Champion awards.

As Chair of the Management Committee, John Shields, formerly with the Wyoming State Engineer's Office, led conservation of the endangered Colorado River fishes for 14 years. Through collaboration and cooperation, John played an integral role in the delivery of more than a million acre-feet of water to meet the flow needs of the endangered fish, in the construction of fish passage structures at four diversion dams on the Colorado and Gunnison Rivers, in screening three major irrigation canals, and in retrofitting a 100-year-old irrigation system to conserve water. Known for his outreach and advocacy, John led partners in letting the House and Senate know that the Endangered Species Act is working in the Upper Colorado River. Further, his testimony was a key factor in the passage of Public Law 112-270, maintaining critical base funding for the Upper Colorado and San Juan Programs.

MELANIE FISCHER, USFWS

FROM LEFT TO RIGHT: ANGELA KANTOLA, JOHN SHIELDS, MIKE THABAULT AND TOM CHART. CLICK ON TRIANGLE ABOVE TO WATCH VIDEO OF AWARD PRESENTATION.

A comment by The Nature Conservancy's Robert Wigington reflects the esteem John gained through the years: *"John is a leader and a problem-solver who truly understands the nuances of this highly variable ecosystem."*

San Juan researchers look for ways to improve survival of stocked razorback sucker

By Jason Davis, USFWS

Razorback sucker have been stocked, at various levels, into the San Juan River since 1994. Beginning in 2011, biologists began working to increase survival of stocked fish by using a 'soft' release, when possible. In a 'soft' release, biologists stock fish in off-channel or low velocity habitats that have been netted off from the river proper. Fish acclimatize to riverine conditions in these enclosures for up to 24 hours.

PHOTO COURTESY USFWS

RELEASE OF RAZORBACK SUCKERS INTO THE SAN JUAN RIVER IN SHIPROCK, NM

In October 2014, the San Juan Program implemented an experimental stocking design to compare survival of razorback sucker stocked with 'soft' verses 'hard' releases ('hard' release consists of tempering fish to ± 2° C and releasing them in the mainstem of the river). Razorback sucker collected by the Navajo Nation Department of Fish and Wildlife at the Navajo Agricultural Products Industry (NAPI) ponds were randomly assigned into 'soft' and 'hard' release treatments. They then stocked fish in both treatments at the same locality on the same day, but first acclimatized the 'soft' released fish for 18-24 hours prior to release. This experimental design coupled with subsequent recaptures will allow for a direct test of short and long term effectiveness of these two stocking strategies.

Additionally, to test the effect of stocking location and source of fish (i.e. NAPI ponds verses Horsethief Canyon) on survival, U.S. Fish and Wildlife Service and Navajo Nation biologists will use a balanced experimental stocking design to help remove confounding effects. Razorback sucker harvested from each of these sources will be stocked within one day of each other, at the same locations, and using the same release protocol. Knowledge gained from these experiments will help increase the survival of stocked razorback sucker in the San Juan River.

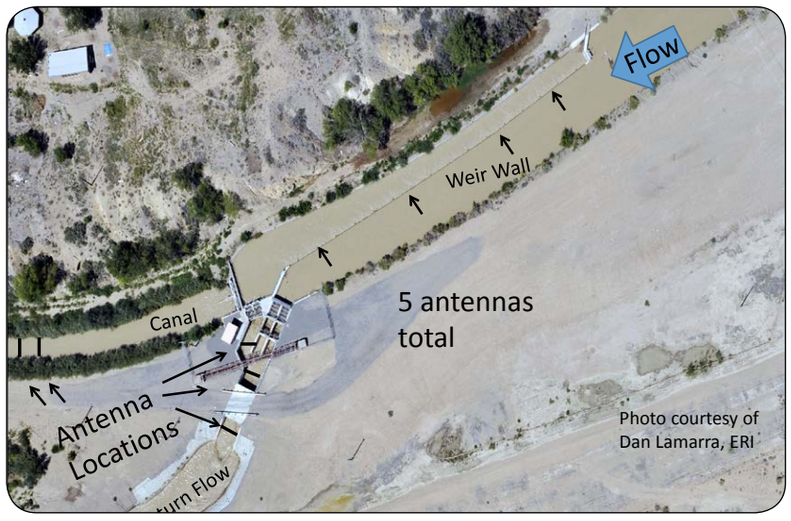
PHOTO COURTESY USFWS

RAZORBACK SUCKERS HARVESTED OUT OF A NAPI POND.

PIT tag antenna systems provide new data for the San Juan Recovery Program

Mark McKinstry, Bureau of Reclamation, Salt Lake City, UT
Peter MacKinnon, Biomark, Inc., Boise, ID

A PIT tag is a small microchip in a glass capsule (about the size of a large grain of rice), like those placed in a dog or cat at a veterinary clinic for individual identification. PIT-tag antenna systems operate year-round and use radio frequencies to capture the movement of any fish implanted with a tag as they pass within 20-30 inches of the antenna's surface. In 2014, three new PIT tag antenna systems were installed at various locations on the San Juan River and now add to the existing system that was installed on McElmo Creek in 2012. The first system was installed at Hogback Weir, a new fish weir that was constructed to reduce entrainment of endangered fish in the Hogback Canal located between Farmington and Shiprock, NM. Previous studies had



AERIAL VIEW OF HOGBACK CANAL AND FISH WEIR ALONG WITH PIT-TAG ANTENNA LOCATIONS.

demonstrated considerable entrainment of fish by this diversion. The weir is a new design that may have application throughout the western United States where silt and debris loads can overwhelm more traditional fish screens. To test the effectiveness of the new weir, a series of five PIT-tag antennas were installed in March of 2014 at the facility to track movements of the fish as they enter the canal. A full test of the system using stocked PIT-tagged fish was conducted in November and will provide information on how well the weir prevents entrainment. Shortly after the antenna was installed in March, fish were detected moving upstream through the facility, a direction of movement that was not anticipated by the researchers, but which has provided additional recapture and movement data for those fish. Information from this PIT-tag antenna system will hopefully provide information to the Upper Colorado River Endangered Fish Recovery Program on its planned activities to reduce entrainment by the Green River Canal near Green River, UT.

Another PIT-tag antenna was installed in February 2014 at the Public Service Company of New Mexico's (PNM) fish pas-

PHOTO COURTESY OF MARK MCKINSTRY, USBOR

PIT TAG ANTENNA LOCATED IN PNM FISH PASSAGE NEAR FARMINGTON, NM.

sage facility near Farmington, NM. The objective of this project is to provide real-time information to biologists working at the fish passage to determine seasonal timing of fish movement into the passage. The ultimate goal is to ensure that the passage is operated during periods of the year when fish are moving upstream and to determine the effectiveness of the fish passage. Initial results are limited to only a few months, but biologists have already learned that the fish passage should probably be operated earlier in the year and that upstream passage rates of PIT-tagged fish entering the bottom of the fish passage are less than 10%. An additional antenna will be installed further upstream in the passage this winter to try and refine the question of passage rates.

The third PIT tag antenna system was installed October 2014 in a restored secondary channel of the San Juan River approximately 15 miles downstream of Shiprock, NM. The channels are being restored as part of a habitat restoration project being conducted by The Nature Conservancy. The PIT-tag antennas are going to be used to provide monitoring data on the use of the channels. Previous research conducted by New Mexico Department of Game Fish biologists demonstrated that constructed secondary channels are used by native fish in the same proportion as more natural channels. Simplification of the San Juan River channel through armoring of the stream banks by non-native vegetation and the lack of large magnitude floods has led to a > 75% reduction in secondary channels in the river. The restoration project is designed to test the concept of restoring secondary channels and backwaters to provide better habitats for fish, especially the larval and juvenile life-stages.

An additional project using floating and submersed PIT tag antennas was conducted during the summer of 2014. By floating PIT tag antennas down an 85-mile length of the San Juan River from Shiprock NM to Bluff, UT researchers detected over 550 unique PIT tags and also located a suspected Colorado pikeminnow spawning bar in the Four Corners area. Additional research is planned to differentiate between a detected tag and a live fish. The goal of the project is to provide recapture data from PIT-tagged fish to improve population models and provide more information on movements of the endangered fish.

PHOTO COURTESY OF MARK MCKINSTRY, USBOR

FLOATING PIT-TAG ANTENNA SYSTEM BEING USED IN THE SAN JUAN RIVER NEAR FOUR CORNERS.

The U. S. Fish and Wildlife Service (Service) through the San Juan Program will operate and maintain the antenna systems, including data retrieval and analysis. Detections of endangered fishes will provide the San Juan Program a better picture of San Juan River endangered fish populations. The antenna installations were done in cooperation with The Navajo Nation, Bureau of Reclamation, the Service, Biomark Inc., Public Service Company of New Mexico, The Nature Conservancy, Keller-Bliesner Engineering Inc., and Utah State University.

For more information, contact
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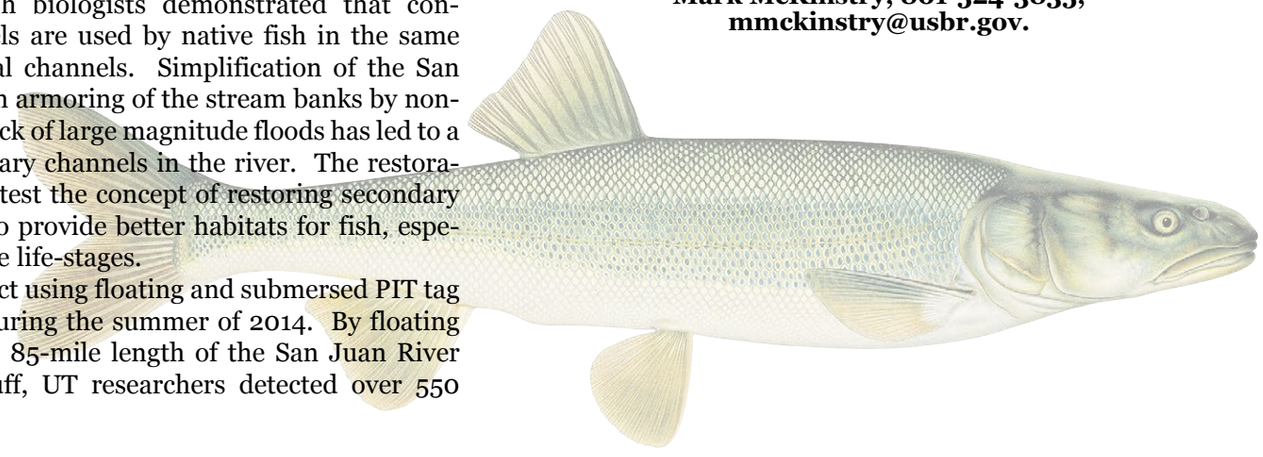


Investigating Passage Efficiency of the PNM Fish Passage

Christopher Cheek, Navajo Nation Department of Fish and Wildlife

Reducing barriers to fish movement in the San Juan River is a major management tool for the recovery of the razorback sucker and the Colorado pikeminnow. In 2001, the San Juan River Basin Recovery Implementation Program (San Juan Program) in cooperation with the Public Service Company of New Mexico (PNM) constructed the PNM Fish Passage. The purpose of the facility is to allow native fish species to access habitats upstream of the PNM weir while also assisting in the removal of nonnative species.

PHOTOGRAPH COURTESY CPW

ERNIE TELLER (USFWS) HOLDING AN ADULT PIKEMINNOW CAPTURED AT THE PNM FISH PASSAGE IN JULY OF 2014.

The PNM weir consists of a 3.5' diversion dam that transects the entire river near Fruitland, NM and is used to deliver water to the PNM San Juan Generating Station. Evaluations have shown that the PNM weir is a significant barrier to upstream fish movement at flows less than 7000 CFS which are relatively rare in the current day San Juan River. Construction of the fish passage allows native fishes to access upstream habitats specifically during critical periods of reproduction.

The fish passage consists of an inflow structure upstream of the PNM weir, a concrete basin that acts as a fish trap, and a 400 foot passage channel that connects to the river downstream of the weir. Fish moving upstream enter the passage canal and make their way upstream to enter the capture basin through an upstream angled gate. Once fish enter the capture basin, they are trapped between the angled gate and a one inch mesh screen on the upstream side of the capture basin. Fish are removed from the capture basin daily by Navajo Nation Department of Fish and Wildlife (NNDFW) employees between April and October. Native fish are enumerated and indentified then released upstream of the PNM weir. All endangered species captured are weighed, measured, and scanned for Passive Integrated Transponder (PIT) tags prior to being released upstream. All nonnative species captured at the facility are also weighed, measured, identified, and removed from the river.

The PNM fish passage allows passage for between 10,000 and 25,000 native fish annually. The overwhelming majority of the fish captured are native suckers, with the two most abundant species being flannelmouth and bluehead suckers. The number of razorback sucker captured annually is usually between 30 and 40. Colorado pikeminnow captures fluctuate annually between 80 and 100 fish per year with a record number of 707 captures in 2012. Nonnative captures are usually low with between 100 and 200 annually. The most abundant nonnative species are black bullheads, channel catfish, and common carp.

In the last two seasons of operation (2013 and 2014) it has become apparent that two issues are impeding proper operation of the fish passage: Screens clogging with debris and sedimentation at the fish passage inflow. During periods of high river flows the San Juan River carries large amounts of both sediment and debris. When debris enters the fish passage, it can obstruct the screens in the capture basin reducing the amount of water that can flow through the facility and into the passage canal. For correct operation, a large amount of water is needed to flow through the canal to provide an adequate "cue" for fish to locate and move up the passage canal. As the screens clog and water level drops, the canal can become impassable.

Sedimentation has been an issue at the PNM fish passage since its construction. The main current of the river is located on the opposite bank meaning that the water velocity is slowest near the fish passage intake. Sediment accumulates upstream of the intake and can reduce the amount of water that can be taken into the passage facility. In the past, the facility has used heavy equipment annually or biannually to clear sediment to allow maximum flow into the passage channel. It is likely that the sedimentation issues are at least partially linked to the obstruction of the passage screens. When these screens become clogged, the water velocity at the intake is drastically reduced. This reduction in velocity increases sedimentation at the inflow.

In an effort to evaluate the efficiency of the fish passage, a PIT tag antenna was placed at the entrance of the passage canal approximately 50 feet upstream of the river. The PIT tag antenna is a stationary device that allows remote detection of fish that have a PIT tag. When a tagged fish passes through the antenna it is recorded with an individual tag number, date, and time. All tag information is stored in a database for the San Juan River with pertinent information such as species, capture locations, size, number of days in the river, etc. The antenna was installed with three objectives: 1.) Determine how the passage efficiency for Colorado pikeminnow and razorback sucker (How many fish are detected by the PIT antenna vs. how many successfully passed through the facility). 2.) Assess timing of fish movements to better target passage for endangered species, and 3.) Record detections to aid in studies of movement and survival of the endangered fishes.

The PIT antenna detected 256 individual razorback sucker entering the canal between March 21st and September 30th, 2014, but only 9 tagged razorback sucker were captured in the passage during that time period. Twenty-two Colorado pikeminnow were detected on the antenna during that same time period and 10 pikeminnow were recaptured in the fish passage. This

PIT TAG ANTENNA INSTALLED NEAR THE MOUTH OF THE PASSAGE CANAL.

information indicates that a large number of endangered fish enter the passage canal, but do not successfully pass through the facility. The low proportion of successful passage may be a product of reduced flow caused by sedimentation and debris obstruction mentioned earlier.

Movement of razorback sucker was detected by the antenna beginning as soon as the antenna was installed in March prior to the beginning of passage operation at the first of April. These detections indicate that razorback sucker are likely attempting to move upstream earlier than previously thought. With this preliminary information it was decided by the San Juan Program Biology Committee to begin operating the facility beginning in early March of 2015 to provide passage to as many razorback sucker as possible.

In an attempt to increase the proportion of fish that are able to successfully pass through the facility, NNDFW working with Bureau of Reclamation (BOR) and the San Juan Program is currently investigating solutions to the sedimentation and debris issues. Through consultation with BOR, it was decided that the best solution is to install trash rakes that will automatically clean screens to alleviate the debris obstruction and maintain flow through the facility. An automatic trash rake system would likely also solve sedimentation by maintaining water velocity that will sluice sediment downstream. The Bureau of Indian Affairs awarded NNDFW with $54,000 to assist the San Juan Program with the cost of purchasing and installing the trash rake system. The installation should be complete prior to the 2015 operating season.

In 2015, a second PIT tag antenna will be installed in the passage canal on the upstream side closest to the fish capture basin. The second antenna will allow for further investigation of passage efficiency. The existing PIT tag antenna can only document that fish entered the mouth of the passage canal, but there is no way to know if fish were attempting to move upstream or simply using the backwater type habitat created at the mouth of the canal. Using the two antenna system we will be able to determine if fish moved upstream to the top of the passage canal. Also, with the installation of the trash rake system, we will be able to investigate any change in the efficiency of the passage .

In the coming years we will continue to investigate and attempt to improve the ability of the PNM fish passage to function correctly. We expect the coming improvements will increase the number of fish captured and passed through the facility. If the improvements do result in a significant improvement in captures and passage efficiency, this information could be useful to other fish passage facilities.

Cha..cha...changes!

Jim Brooks, the U.S. Fish and Wildlife Service's New Mexico Fish and Wildlife Conservation Office's Project Leader retired on January 11, 2014, after more than 25 years of federal service. Jim's involvement on the San Juan began in 1986 when he and others insisted on a systematic inventory of the river from Navajo Dam to Lake Powell prior to proposed stocking of razorback sucker. The inventory documented reproducing Colorado pikeminnow and the presence of razorback sucker, prompting re-consultation under the Endangered Species Act on the proposed Animas-La Plata (ALP) project. Jim and others recommended reoperating Navajo Dam to mimic a natural hydrograph. Jim was a key player in drafting San Juan Program documents, and identifying and conducting needed research.

JIM BROOKS WITH CHANNEL CATFISH

Jim served as Chair of the Biology Committee on multiple occasions and more recently as Chair of the Coordination Committee. He was instrumental in developing augmentation strategies for the two endangered fishes, in conceptualizing the design of an innovative fish weir wall at Hogback Diversion to prevent entrainment of native fishes, and led efforts to control and manage nonnative fishes.

The Upper Colorado Program bid adieu to two of its longest serving participants this past year. Dan Luecke, long-time representative of the environmental groups on the Implementation Committee retired at the end of 2013. In March, John Shields retired from the Wyoming State

DAN LUECKE HOLDS A JOSEPH R. TOMELLERI PRINT. PROGRAM DIRECTOR TOM CHART PRESENTED THE POSTER IN APPRECIATION OF DAN'S WORK.

Engineer's Office and stepped down as chair of the Management Committee. Both gentlemen had been involved in the Upper Colorado Program from its inception and played key roles in its many successes. "I've really enjoyed working with all of you," said Dan Luecke. "The program has come to be seen as a model of competing interests working things through and I think it deserves to be held up as a good example of a commitment to a common goal by groups that don't necessarily see eye to eye." Tom Pitts, Upper Basin Water Users Representative lauded Dan's contributions, noting that his "pragmatic, thoughtful approach helped develop the spirit of cooperation that characterizes the Recovery Program."

John Shields began working with the Upper Colorado Program in 1987, and served on the Water Acquisition Committee, Biology Committee, Information and Education

TOM CHART PRESENTS JOHN SHIELDS A JOSEPH R. TOMELLERI PRINT IN HONOR OF HIS ACCOMPLISHMENTS

Committee, and the Management Committee. As a member and then chair of the Management Committee, John labored tirelessly on Public Law 106-392 and subsequent amendments that authorized federal funding of the Program. "John's significant contribution to developing and implementing the spirit of collaboration and cooperation in dealing with many difficult issues since the inception of the Program has been fundamental to its success," said Upper Basin Water Users Representative, Tom Pitts. John has embarked on a second career with the U.S. Bureau of Reclamation in Boulder City, Nevada.

PHOTOGRAPH COURTESY, HENRY MADDUX

MANAGEMENT COMMITTEE CHAIR, HENRY MADDUX

John Shields left seemingly impossibly big shoes to fill as Management Committee Chair, but who better to step in than former Program Director, Henry Maddux! Henry served as Program Director from 1996-2000 and is now Utah's Species Recovery Program Director. Henry assumed the role of Management Committee chair in February 2013 and was heartily welcomed back by all.

Patty Gelatt, Western Colorado Supervisor for the U.S. Fish and Wildlife Service in Grand Junction, retired at the end of March with 32 years of service. Patty was a key player in developing the Endangered Species Act (ESA) consultations that brought the Upper Basin Program where it is today. "This has been a watershed (literally and figuratively) in our approach to large-scale watershed level administration of the ESA," said Michael Thabault, the Service's Assistant Regional Director for Ecological Services. Patty

PICTURED LEFT TO RIGHT: ANGELA KANTOLA, PATTY GELATT AND TOM CHART

always brought a thoughtful, wise, and reasoned approach to implementation of the ESA, while strongly advocating for healthy river ecosystems. Upper Colorado Program Deputy Director, Angela Kantola said "Patty has been our water depletion consultation 'answer woman' for years. Now that she's retired, whenever we have a question, we ask ourselves 'What would Patty do?'".

BIOLOGIST DAREK ELVERUD

ALL OTHER PHOTOGRAPHS COURTESY, USFWS

The Recovery Program welcomed back biologist Darek Elverud to the U.S. Fish and Wildlife Service's Colorado River Fishes Project in Grand Junction, Colorado. Darek formerly worked for the Utah Division of Wildlife Resources. Among other projects, Darek assumes the lead for Colorado River Colorado pikeminnow population estimate work following Doug Osmundson's retirement.

San Juan River Recovery Program continues PIT tag investigations in tributary systems

By Nathan Cathcart, Kansas State University

Since 2012, a passive integrated transponder (PIT) antenna array installed at the mouth of McElmo Creek, a tributary to the San Juan River near Aneth, UT, detected 2,465 unique fish including 204 razorback sucker and 114 Colorado Pikeminnow. Collaborators on this and related projects represent the US Bureau of Reclamation, Kansas State University, Utah State University, the Navajo Nation, the US Fish and Wildlife Service (Service), San Juan Program, and Biomark, Inc. PIT antenna investigations also include deployment of portable systems in Chaco Wash, another small tributary near Shiprock, NM and at the confluence of McElmo and Yellow Jacket creeks near the CO/UT border.

The goals for these investigations are to determine frequency, timing, extent of movements, behaviors and their ecological correlates (e.g., flow, discharge, etc.) of the fish community as they relate to small tributaries of the San Juan River. As part of these studies more than 5,000 flannelmouth sucker, bluehead sucker, roundtail chub, and channel catfish have been PIT tagged

PHOTO COURTESY NATHAN CATHCART

A PORTABLE PIT ANTENNA INSTALLED UPSTREAM IN MCELMO CREEK. THIS ANTENNA HAS BEEN DEPLOYED SINCE MAY 2014.

in tributary or mainstem San Juan River habitats, augmenting the thousands of razorback sucker and Colorado pikeminnow previously tagged by the Service.

In addition to the endangered species contacted at the McElmo Creek array, the following species have been detected: 1,745 flannelmouth sucker and 371 channel catfish. Razorback sucker and channel catfish displayed similar movement behaviors—occupying McElmo Creek mostly between May-July and during periods of high discharge in the San Juan River. Flannelmouth sucker detections were dominated by San Juan River resident fish that run up McElmo Creek in March. Colorado pikeminnow appeared to use the creek more in late fall and winter. At Chaco Wash, 135 unique fishes were detected between June 6th and July 17th, 2013. Endangered species accounted for 89% of all fish detected with razorback sucker being most common (84 individuals). Thirty-four Colorado pikeminnow were also detected during the 40-day span in the backwater habitat. At the confluence of McElmo and Yellow Jacket creeks during the summers of 2013 and 2014, more than 400 individual fishes were detected. Colorado pikeminnow were detected in small numbers in this upper reach of McElmo Creek. Flannelmouth sucker, roundtail chub, bluehead sucker, and channel catfish accounted for 96% of the contacts there.

PHOTO COURTESY NATHAN CATHCART

NATE CATHCART, KANSAS STATE UNIVERSITY, HOLDS A COLORADO PIKEMINNOW RECAPTURED AT THE MOUTH OF CHACO WASH. THIS INDIVIDUAL WAS TAGGED IN 2010 ABOUT 9 MILES UPSTREAM.

Franssen heads up publications integrating San Juan Program monitoring efforts

By Scott Durst, USFWS

Nathan Franssen, has co-authored four articles published in scientific journals that integrate data across multiple San Juan River Basin Recovery Implementation Program (San Juan Program) projects. In addition to contributing to the scientific literature related to the fish community of the San Juan River, these efforts have informed the Recovery Program's efforts to adaptively manage for the recovery of the Colorado pikeminnow and razorback sucker in the San Juan River. The four articles were collaborative efforts between Franssen and other San Juan Program researchers.

*"Prey and nonnative fish predict the distribution of Colorado pikeminnow (*Ptychocheilus lucius*) in a south-western river in North American"* by Franssen and Durst (2014) in Ecology of Freshwater Fish investigated the factors that may be limiting Colorado pikeminnow recruitment in the San Juan River and assessed relationships between Colorado pikeminnow and their potential prey, competitors, and predators. Colorado pikeminnow ≤ 200 mm total length (TL) were frequently found in reaches of the river with high densities of native small-bodied fishes. For larger Colorado pikeminnow (>200 mm TL), there was a positive relationship with densities of all small-bodied fishes and non-native competitors (i.e., channel catfish). These relationships indicate potential negative interactions between Colorado pikeminnow >200 mm TL and channel catfish along with inappropriate small-bodied prey fish for Colorado pikeminnow ≤ 200 mm TL could contribute to limited recruitment of Colorado pikeminnow into sub-adult and adult size classes in the San Juan River.

"Movement and growth of juvenile Colorado Pikeminnows in the San Juan River, Colorado, New Mexico and Utah" by Durst and Franssen (2014) in Transactions of the American Fisheries Society examined seasonal movement and growth to inform recovery efforts throughout the Colorado River Basin. Juvenile Colorado pikeminnow demonstrated surprising seasonal long-distance movements where fish moved upstream from spring to summer and back downstream over winter possibly in response to growth maximizing temperature differences. While juvenile pikeminnow in the San Juan River were larger than Colorado pikeminnow of the same age in the upper Colorado River Basin, hatchery-reared fish stocked into the San Juan at age-0 are probably larger than their wild-spawned counterparts, but annual growth rates appear similar between the San Juan River and fish in the Upper Colorado River Basin. Surprisingly, smaller Colorado pikeminnow (< 200 mm TL) had slower growth rates than larger fish in the San Juan River, suggesting a possible resource limitation for smaller Colorado pikeminnow.

"Fish community responses to mechanical removal of nonnative fishes in a large southwestern river" by Franssen, Davis, Ryden, and Gido (2014) in Fisheries explored the effectiveness of mechanical nonnative fish removal and the responses of native fishes. While common carp densities declined riverwide, channel catfish densities only declined in the most upstream reaches. In most cases native fish response to nonnative fish removal were not apparent. The complexity of large river systems like the San Juan River, sources of juvenile channel catfish, and barriers to nonnative fish movement likely reduced the effectiveness of removal and the ability to detect a positive response in the native fishes.

"Effect of longitudinal and lateral stream channel complexity on native and non-native fishes in an invaded desert stream" by Franssen, Gilbert, and Propst (2014) in Freshwater Biology assessed how stream channel complexity across different reaches correlated with species richness, evenness, and abundance of small-bodied native and nonnative fishes. Fish species richness was highest in the most complex braided reach but unexpectedly; native fish densities were highest in the most upstream channelized reach. Nonnative fish densities were greatest in the complex braided reach and all fish were scarce in the canyon reach located most downstream on the San Juan River. When comparing fish assemblages between main and secondary channel habitats, they found higher fish densities in secondary channels compared to the primary channel. Interestingly, while native fish densities were similar between channel types, nonnative fish densities where higher in smaller secondary channels compared to the primary channel and fish assemblages from restored secondary channels appeared similar to natural ones. These results suggest stream channel complexity may alter fish assemblages in the San Juan River and reduced channel complexity could lower a river's ability to support a diverse fish community.

Currently a manuscript examining the long-term dynamics of large-bodied fishes in the San Juan River is being finalized and efforts to understand the ecology of stocked razorback sucker are on-going. These integration efforts have helped the San Juan Program navigate its management decisions while producing scientifically sound products accessible to the wider community of biologists, managers, and researchers.

the fisheye:

Krissy Wilson, Program Coordinator for the Desert Tortoise Adoption Program

Krissy Wilson is the native aquatics species program coordinator for Utah Division of Wildlife Resources (UDWR) and is involved in the Upper Colorado, June sucker, and Virgin River recovery programs. Krissy also oversees all native fish (except cutthroat), amphibians, reptiles, and mollusk species in the state of Utah. One of the programs Krissy administers is the Desert Tortoise Adoption Program. The desert tortoise (Gopherus agassizii) found in Washington County, Utah (Mojave population) was listed threatened under ESA in 1990. UDWR has administered the Desert Tortoise adoption program since 1991 with more than 150 desert tortoises adopted to willing and qualified applicants. During the past several years Krissy has made a concerted effort to improve the adoption program. Actions include: development and publication of Utah's Desert Tortoise Adoption Booklet; mandatory home inspections before approval of adoption; cooperation and collaboration with local veterinarians; development of standardized protocol when a "lost" tortoise is reported or surrendered to UDWR; and increased exposure of adoption program in television, newspaper, and radio.

As Program Coordinator over the adoption program, "lost" tortoises are usually held at Krissy's home until the rightful owner is located or the tortoise is adopted. More than 40 tortoises have resided at Krissy's home for varying periods of time. A few of the tortoises have exhibited clinical signs of Upper Respiratory Tract Disease (URTD), an infectious disease that affects desert tortoises. If URTD is suspected, Krissy takes them to the vet and administers

KRISSY WITH "GIOVANNI" AGE 74 AND "LENNY" AGE 4

the prescribed antibiotics. Tortoises typically recover following treatment.

A wild tortoise that has tested positive for URTD cannot be returned to the wild and are held at a facility in Hurricane, Utah. Krissy reports 30-40 URTD positive tortoises are held at the facility with some having been there for more than ten years.

Krissy proposed that the Desert Tortoise Recovery Team allow these tortoises be placed through the adoption program. Krissy believed that most of the public would not want to adopt a "sick" animal, and thus proposed to offer an assurance to adopters: If, in the first year of adoption, the tortoise exhibits clinical signs of URTD, UDWR would pay for a vet visit and treatment. The Team agreed and provided funds to cover URTD treatment. It was crucial that the media campaign was approached in a way that demonstrated that URTD (in captivity) can be managed and the tortoises can live a long and healthy life. Thus in February 2014 UDWR began a "media blitz campaign" to inform the public of the availability of these tortoises for adoption. Media coverage included television, radio, newspaper interviews and UDWR facebook page. The public response was overwhelming! UDWR had over 500 phone calls and contacts asking to adopt these tortoises. UDWR successfully placed all the tortoises that had been held in captivity for over ten years and still has 80 successful applicants ready and waiting to adopt. In an effort to provide tortoises to the applicants, Krissy is working with the state of Nevada that has over 1,000 tortoises in captivity and need a home. Best Friends Sanctuary in Kanab will be the first recipients of 12 tortoises from Nevada. Next spring, UDWR will begin the transfer of tortoises from Nevada for adoption in Utah. Krissy acknowledges that this effort would not have been possible without the assistance of a lot of folks especially her staff, Cory Noble and Pam Martin. Krissy said "Desert tortoises are such amazing animals. If feels so good that these tortoises are no longer in captivity and are in homes where they can be loved and appreciated".

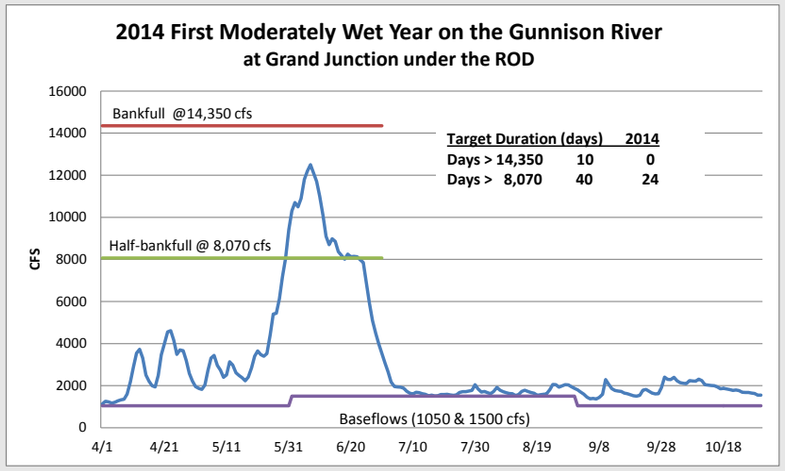
Water, water everywhere

By Jana Mohrman, USFWS

A First for the Gunnison River

Thanks to a good snowpack this year, the U.S. Bureau of Reclamation (Reclamation) was able to operate the three dams on the Gunnison River known as the Aspinall Unit to provide high spring flows to benefit endangered fishes. This was the first time reservoir inflow was sufficient for Reclamation to release 9000 cubic feet per second (cfs) of water under the 2012 Record of Decision for Aspinall Unit operations.

Typically, Reclamation times their Aspinall releases to coincide with the peak flow of the North Fork of the Gunnison River to get the 'biggest bang for their buck' in the lower Gunnison River. However, spring runoff in 2014 presented a complicated set of conditions. Snowpack in the Gunnison and Colorado River basins was above average. Reclamation needed to delay releases from the Aspinall Unit (until slightly after the North Fork peak) to avoid flooding in the Grand Valley. Although a bit late, the Aspinall releases provided "scouring flows" to clean sediment from the Gunnison River cobbles and gravel to benefit endangered fishes. The Colorado River hit its high-water mark of 26,100 cfs above its confluence with the Gunnison River on June 2. The Gunnison River peaked at Whitewater on June 7 with flows of 12,850 cfs. "If those peaks occurred simultaneously, we could have had flooding problems particularly at an Interstate 70 bridge west of Fruita" Eric Knight of Reclamation said.



Reclamation used spillways on all three dams of the Aspinall Unit to achieve these high peak flows. More large releases from the Aspinall Unit can be expected in future years to regularly scour fine sediment from the Gunnison River and improve habitat for endangered fish and other species. Click on triangle below to watch video of water release.

Helping fish negotiate changed rivers

By Angela Kantola, USFWS

The recovery programs have built a number of fish passages and screens to help fish navigate dams and diversion canals in the Colorado River system.

Fish Screens

When water is diverted from the river for irrigation and other purposes, fish often are drawn into the diversion canal. The Upper Colorado River Endangered Fish Recovery Program installed screens to prevent fish from becoming trapped (entrained) up in irrigation canals on the Grand Valley Irrigation Canal (2002) and Grand Valley Project Canal (2007) on the Colorado River, and Redlands Water and Power Canal (2005) on the Gunnison River. On the San Juan River, Navajo Engineering Construction Authority constructed a weir wall at the Hogback Diversion Dam near Shiprock, New Mexico, in 2013 to prevent endangered fish from becoming entrained in the irrigation canal. Fish screens are operated throughout most of the irrigation season, although sometimes water conditions (algae, debris, etc.) prevent screen operations for

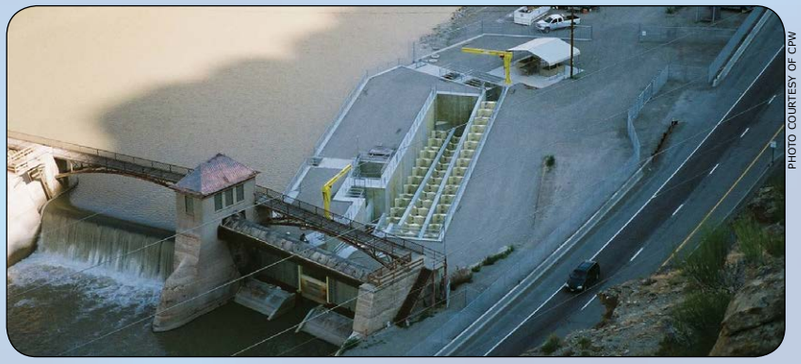


PHOTO COURTESY OF CPW

GRAND VALLEY PASSAGE

short periods. At the end of the irrigation season the U.S. Fish and Wildlife Service (Service) conducts "salvage" operations to capture endangered and other native fishes that have become trapped in irrigation canals. Fish salvage is conducted by driving along major portions of the canals looking for pools of water that contain fish after the irrigation water is turned off for the year (usually in early November). The pools are sampled with truck-mounted electrofishing units and seines. All native fish collected are identified and loaded into a hatchery truck, transported, and returned to the Colorado River.

The Upper Colorado Program has one more canal to screen—the Green River Canal at the Tusher Wash Diversion near Green River, UT. The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) will rehabilitate the dam starting in 2015. The Upper Colorado Program will work with NRCS to install a barrier to prevent endangered fishes from entering and becoming trapped in the canal. To better understand fish movement in and around this canal, the Upper Colorado Program installed antennas to detect fish with PIT tags. Since installed in 2013, antennas detected high levels of entrainment of razorback sucker and Colorado pikeminnow in the canal. The Upper Colorado Program is working to determine the best type of screen for Tusher, which could take the form of a weir wall like the one at the Hogback Diversion on the San Juan River. In the meantime, Utah and the Service will salvage fish from the canal in the fall and return them to the river.

Fish Passages or "Ladders"

The recovery programs also have built fish passages at several dams that block fish movement in the Colorado River. Passages are "passive," where all fish pass through on their own or "selective," with equipment that allows biologists to sort and selectively pass only native fishes.

Fish access has been restored to 36 miles of critical habitat on the San Juan River with construction of passages at the Public Service Company of New Mexico (PNM) Weir and the Hogback Diversion Dam, and removal of the Cudei Diversion Dam. The need for additional fish passages at Arizona Public Service Company and Fruitland irrigation diversion structures is being evaluated.

About 15 miles east of Shiprock, New Mexico, a passive, in-river "rock ramp" fish passage was built on the San Juan River at the Hogback Diversion in 2001. In 2003, a selective fish passage was installed at the PNM Weir, on the San Juan River about 12 miles downstream of Farmington, New Mexico near the town of Fruitland. The Navajo Nation operates this passage from April

PHOTO COURTESY OF USFWS

FISH PASSAGE AT HOGBACK DIVERSION DAM

through October. Fish move up a 400-foot passage into a concrete capture basin. A large crane-mounted net is lowered into the capture basin and fish are dip-netted and placed into it. The fish are hoisted and placed in a holding table with 8" of water for processing. Biologists measure and weigh endangered fishes (Colorado pikeminnow and razorback sucker), scan them for a PIT tag, and implant a tag if no code is read. All other native and nonnative fishes are counted, and the native and endangered fish are then passed upstream. In 2013, 14,418 fish were captured at PNM. 14,287 were native fishes, including 80 Colorado pikeminnow (57 which had no PIT tag, indicating they had not been previously captured) and 39 razorback sucker (1 had no PIT tag). In 2014, a remote PIT-tag antenna was installed in the passage canal to help evaluate the efficiency and timing of the passage operation.

PHOTO COURTESY OF USFWS

REDLANDS FISH SCREEN

Fish passages on the Colorado and Gunnison rivers in western Colorado have restored access to more than 100 miles of designated critical habitat. Selective fish passage facilities were built at the Redlands Diversion Dam on the Gunnison River (1996) just upstream of its confluence with the Colorado River and the Grand Valley Project on the Colorado River (2004) in DeBeque Canyon about 8 miles upstream of Palisade. Fish swim up through baffled, gentle-grade concrete channels (like a wheelchair ramp or set of switchbacks for fish) until they reach a holding pool. Native fish are passed upstream and nonnative fish are removed from the river. Two passive fish passage structures also were built on the Colorado River (below the Grand Valley Project selective fish passage): the Price-Stubb Diversion fish passage and the Grand Valley Irrigation Company fish passage. The Price-Stubb Diversion has remote PIT-tag antennas to detect movement of tagged fish.

A total of 17 (third highest annual catch since 1996) Colorado pikeminnow used the Redlands fish passage on the Gunnison River in 2014, mostly young (16-24") fish without PIT tags (meaning they had never been captured before). To study whether these fish might establish home ranges further upstream in the Gunnison River, biologists tagged and moved them nearly 40 miles upstream.

Also in 2014, a record number of razorback sucker passed through the Grand Valley Project fish passage on the Colorado River. Most notable this year was the first use of this ladder by Colorado pikeminnow.

PHOTO COURTESY OF USFWS

GRAND VALLEY IRRIGATION COMPANY PASSAGE

Electrofishing workshop confirms effective procedures

Grand Junction, CO August 18 – 21, 2014

By Jan Dean, USFWS

Dr. Jim Reynolds, Professor Emeritus, University of Alaska, and Natchitoches National Fish Hatchery Assistant Manager, Jan Dean. recently led a workshop to evaluate the electrofishing Standard Operating Procedure (SOP) and train biologists.

Pat Martinez (USFWS and CPW retired) and Larry Kolz (USFWS retired) began developing the SOP eight years ago.. The SOP manual has been used in the field for 2 years. The manual includes electrical current and power goals for capturing fish.

Electrofishing is used to capture, study, and protect endangered species, native to the Colorado River and its electrofishing power levels are set to collect the target species without causing fish injury

PHOTO COURTESY OF JAN DEAN, USFWS

ELECTROFISHING BOATS IN THE COLORADO RIVER DURING THE WORKSHOP FIELD TRIP.

or stress. It is also used to remove invasive nonnative fish such as smallmouth bass, northern pike and walleye.

The plan was for one full day of instruction in a classroom setting, two field trips, and a last day summary. The first trip was to Highline Lake, near Grand Junction. Electrical measurements were made on four rafts and five boats, so that resistance, power distribution to the positive electrode (anode) and intensity of the electrical field at selected distances from the anodes could be determined. Crews were assigned a part of the lake to sample fish at various power settings to assess threshold power, the minimum required for good fishing and for rapid fish recovery. Each crew measured and recorded water conductivity and temperature. Later, electrical field intensity measures were used to estimate threshold

BACK ROW (LEFT TO RIGHT) -- CHRIS SMITH (USFWS), JOHN HAWKINS (CSU), TILDON JONES (USFWS), DAVE SPEAS (BOR), BOB SCHELLY (UDWR), DAREK ELVERUD (USFWS), TRAVIS FRANCIS (USFWS), BEN SCHLEICHER (USFWS), ED KLUENDER (CSU), CHRIS MICHAUD (UDWR), ZACH AHRENS (UDWR), ERIC GARDUNIO (CPW) MIDDLE ROW (LEFT TO RIGHT) - SHAWN WEIMER (UDWR), DAVE BEERS (USFWS), JIM WHITE (CPW), JULIE HOWARD (UDWR), KATIE CREIGHTON (UDWR), ADAM BOEHM (UDWR), PAUL JONES (CPW), KEVIN THOMPSON (CPW), BRENDAN CROWLEY (USFWS), DALE RYDEN (USFWS) KNEELING IN FRONT (LEFT TO RIGHT) - JIM REYNOLDS (INSTRUCTOR), JAN DEAN (INSTRUCTOR) NOT PICTURED, BUT ATTENDED THE COURSE - CAMERON WALFORD (CSU)

power settings, and then compared to each crew ‘s fishing success at Highline Lake.

The instructors independently reviewed data in preparation for a brief report to the class. Neither knew the full results from the first field trip until they shared each part during the morning presentation. The independent methods for estimating threshold power settings agreed remarkably well, especially for the electric current used by each boat. This gave them confidence in the methods used and the results obtained during that one field trip.

The second field trip was on the Colorado River, to extensively evaluate thresholds necessary for successful electrofishing. Each raft and boat was assigned three, half-mile segments of the river for quickly determining threshold settings and capturing fish so that the catch per unit of time could be calculated for each species and each river segment. Again, each crew measured water conductivity and temperature in each river segment for use in the final analysis. Water conductivity is a critical factor in electrofishing and is used to determine initial power settings in the SOP.

Although data are still being analyzed, the course instructors are reasonably confident that the power guidelines in the existing SOP are close to, and slightly lower than, what they found in the quick assessment under actual river conditions. New equipment and techniques were employed to estimate threshold power levels and the results were found to be good predictors of power

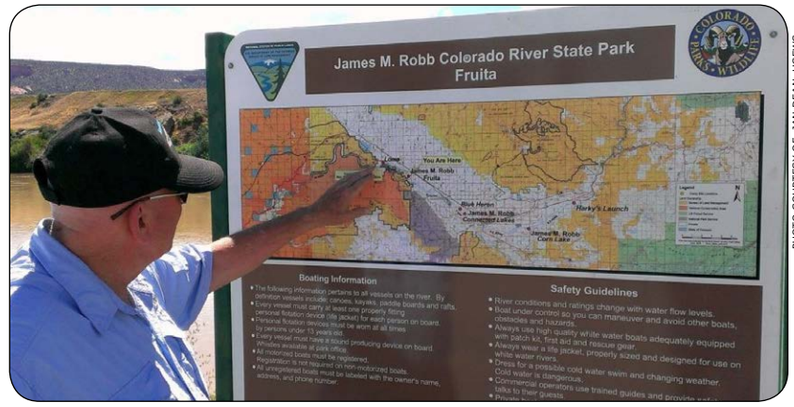


PHOTO COURTESY OF JAN DEAN, USFWS

DR. JIM REYNOLDS PLANNING THE COLORADO RIVER FIELD TRIP FOR THE ELECTROFISHING WORKSHOP.

levels for fishing success via more conventional methods. More was learned about electrical field intensity at distances from the spherical anodes.

The course provided a great opportunity for biologists from multiple organizations to come together to learn from each other how to better sample fish in the upper Colorado River. It was a unique experience to test a standardized raft/boat fleet with a standardized sampling protocol, all under actual river sampling conditions with the experts in that environment.

PHOTO COURTESY OF JAN DEAN, USFWS

LAUNCHING RAFTS IN THE COLORADO RIVER FOR THE WORKSHOP FIELD TRIP.

Species updates

PHOTO COURTESY OF CHRIS CHEEK, NNDFW

ERNIE TELLER, USFWS HOLDING AN ADULT COLORADO PIKEMINNOW CAPTURED AT THE PNM FISH PASSAGE IN JULY OF 2014.

Colorado pikeminnow

Prey and nonnative fish predict the distribution of Colorado pikeminnow in the San Juan River according to Nate Franssen, a UNM post-doctoral researcher, and Scott Durst, San Juan River Program Biologist, investigating factors that may be limiting pikeminnow recruitment in the San Juan River. They found smaller pikeminnow (≤ 200 mm) were frequently found in river reaches with high densities of native small-bodied fishes. For larger pikeminnow (>200 mm), there was a positive relationship with densities of all small-bodied fishes and nonnative channel catfish. These relationships indicate potential negative interactions between larger pikeminnow and channel catfish along with inappropriate small-bodied prey fish for smaller pikeminnow.

THE FULL RESULTS OF THIS STUDY ARE PUBLISHED IN ECOLOGY OF FRESHWATER FISH, *"PREY AND NON-NATIVE FISH PREDICT THE DISTRIBUTION OF COLORADO PIKEMINNOW (PTYCHOCHEILUS LUCIUS) IN A SOUTH-WESTERN RIVER IN NORTH AMERICAN,"* BY FRANSSEN AND DURST (2013).

PHOTO COURTESY OF UDWR

UDWR TECHNICIANS CHELSEA GIBSON (LEFT) AND KRISTA KOEHN (RIGHT) WORK UP A HUMPBACK IN DESOLATION CANYON.

Humpback chub

The Moab UDWR office has completed three humpback chub surveys in Desolation and Gray Canyons on the Green River. Humpback chub were sampled using trammel nets, hoop nets and electrofishing at four long term trend sites and two random historical sites. Out of the 106 humpback that were captured, 70% were new fish and were implanted with PIT tags: 80% were captured via trammel nets, 14% were captured via hoop nets and 6% were captured via electrofishing. A population estimate will be included in the 2014 annual report.

PHOTO COURTESY OF UDWR

A HUMPBACK CHUB CAUGHT IN A TRAMMEL NET IN DESOLATION CANYON.

AMY S. MARTIN, UDWR

ADULT BONYTAIL CAPTURED ON THE WHITE RIVER SUMMER, 2014

Bonytail

Exciting observations were made regarding the status of bonytail during nonnative fish removal on the White River. During both passes, numerous bonytail were captured (~100 fish/trip), presumably from a stocking last fall near the Bonanza bridge. "Bonytail were so abundant that we actually had to start ignoring these fish in order to stay on task with our project." said Matt Breen, UDWR. All bonytail were in excellent condition and captured in a variety of habitats throughout the entire study reach. Overall, it looks like bonytail are taking to the White River very well!

AMY S. MARTIN, UDWR

SUNRISE ON THE WHITE RIVER

PHOTO COURTESY BOB SCHELLY, UDWR

SEINING IN STEWART LAKE

Razorback sucker

The Bureau of Reclamation's coordinated Flaming Gorge spring flow releases may play a vital role in razorback sucker recovery. In September, Utah biologists drained the Stewart Lake floodplain and reported captures of >700 wild juvenile razorback sucker (many had grown to 5 inches or longer).Shortly after their release to the Green River, several razorback suckers were seined from nearby backwaters, providing circumstantial evidence of successful transition from the floodplain to the river. With such large numbers and impressive growth rates, this year's Stewart Lake razorback sucker class demonstrates the importance of adaptive floodplain management.

PHOTO COURTESY BOB SCHELLY, UDWR

A JUVENILE RAZORBACK SUCKER SEINED SHORTLY AFTER THE DRAINING OF STEWART LAKE.

swimming upstream

Swimming Upstream is a publication of the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. These programs are national models of cost-effective, public and private partnerships. The programs are working to recover endangered fishes while water development continues in accordance with federal and state laws and interstate compacts, including fulfillment of federal trust responsibilities to American Indian tribes.

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