



FINAL SUMMARY
BIOLOGY COMMITTEE MEETING
28-29 November 2017
Public Lands Center
Durango, CO

Attendees

Biology Committee Members

Bill Miller – Southern Ute Indian Tribe
Jacob Mazzone – Jicarilla Apache Nation
Brian Westfall – Bureau of Indian Affairs
Jason Davis – U.S. Fish and Wildlife Service (Region 2)
Mark McKinstry – U.S. Bureau of Reclamation
Benjamin Schleicher – U.S. Fish and Wildlife Service (Region 6)
Vincent Lamarra – Navajo Nation
Harry Crockett – State of Colorado
Matthew Zeigler – State of New Mexico
Tom Wesche – Water Development Interests
Dave Gori – Conservation Interests
Craig Townsend – Bureau of Land Management

Coordination Committee Members

Tom Sinclair – U.S. Fish and Wildlife Service Region 2
Dale Ryden – U.S. Fish and Wildlife Service Region 6

Peer Reviewers

Steve Ross – University of New Mexico

Program Management

Sharon Whitmore, U.S. Fish and Wildlife Service (Region 2)
Melissa Mata, U.S. Fish and Wildlife Service (Region 2)
Scott Durst, U.S. Fish and Wildlife Service (Region 2)
Nate Franssen, U.S. Fish and Wildlife Service (Region 2)
Eliza Gilbert, U.S. Fish and Wildlife Service (Region 2)

Other Interested Parties

Steve Platania – American Southwest Ichthyological Researchers, L.L.C.
Stephanie Clark Barkalow – American Southwest Ichthyological Researchers, L.L.C.
Mike Farrington – American Southwest Ichthyological Researchers, L.L.C.
Henry Day – Arizona Public Service (APS)
Richard Grimes – Arizona Public Service (APS)
Carrie Padgett – Southwestern Water Conservation District
Ben Zimmerman – Southern Ute Tribe
Jamie Shockey – City of Farmington
Brian Hines – Utah Department of Wildlife Resources
Katie Creighton – Utah Department of Wildlife Resources
Matt Owens – PNM Resources
Alex Birchfield – Office of Surface Mining Reclamation and Enforcement (OSMRE)
Susan Behery – U.S. Bureau of Reclamation

Tracy Diver – U.S. Fish and Wildlife Service Region 2
Weston Furr – U.S. Fish and Wildlife Service Region 2
Bobby Duran – U.S. Fish and Wildlife Service Region 2
Jerrod Bowman – Navajo Nation Department of Fish and Wildlife
Kim Yazzie – Navajo Nation Department of Fish and Wildlife
Scott Clark – University of New Mexico

Tuesday 28 November 2017

Introductions and changes to agenda – Miller

- Changes to the agenda items included switching the agenda items per day to focus on the brainstorming session after relevant Program updates have been provided
- Added items included an update on PNM passage, Hydrology Update and Navajo Water Operation Update

Approve draft summary from 13 July 2017 Biology Committee (BC) meeting – Miller

- There were no additional comments. Wesche motioned to approve the July Meeting; Davis seconded; summary was unanimously approved.

Update on 2018 Annual Work Plan – Whitmore

- **Coordination Committee (CC) Action Items** – The CC asked that the University of New Mexico Post-Doc present information on the status of the data integration work to the BC and CC at the next Annual Meeting. They asked to see a concept paper describing the proposed Phase III Habitat Restoration Project, its purpose, and budget estimates.
- **Revisions to the Program Document** – The BC requested clarification from the CC on conflict of interest and the BC chair position at an earlier BC meetings in 2017. Clarifying conflict of interest in the narrative required modifying how the Annual Work Plan (AWP) development process was described in the flow chart in the Program Document. This in turn prompted the need to modify the Long Range Plan (LRP) development process to incorporate the new direction for the LRP which will become a long range planning document that is not modified every year. The CC also asked that the Program Office prepare a 10,000-foot-level, two-page briefing that puts the AWP in context with the LRP and prioritized projects for the CC prior to the Fall Biology Committee Meeting. Revising those sections of the Program Document now is difficult until these new processes are fully developed. Although not yet officially approved by the CC, the CC revised the **BC Chair** as follows: “The Biology Committee will elect a new chair from the committee’s membership at the late fall meeting, 2017, with the new chair term commencing January 1, 2018. Thereafter, during the late fall meeting of every odd year, the Biology Committee shall elect a new chair whose term shall commence on January 1 of every even year. It is the intent of the Coordination Committee to have the Biology Committee chairperson rotate between the Program participants but rotation is not mandatory.”
- The draft AWP was provided to CC along with the BC’s compiled comments and 2018 AWP Program Office (PO) recommendations. In addition to the PO’s recommendations, a section on Future Direction was included. This was an attempt to start thinking about longer term recovery planning to proactively determine what activities/studies the Program might want to discontinue and/or initiate in the upcoming years. This might provide a useful framework for the next agenda item - brainstorming management activities, capital projects, data integration, and new studies to move Program toward recovery.
- Wesche asked if the peer reviewer assessment of the Program was sent out to the Coordination Committee, since the Program Office mentioned they would provide the assessment to the CC with the AWP. The Program Office intended to send the peer reviewer assessment to the CC but apparently did not send a copy. The PO will correct the oversight and send the peer reviewer assessment to the CC following the meeting.

Review CC decisions and action items on 2018 AWP – PO

- **CC Decisions** – During their Aug. 1, 2017 conf. call, the CC approved the 2018 AWP with the caveat that a final decision on Nonnative Species Monitoring and Control (Scope of Work 17) will be made after the Nov. 30, 2017 Nonnative Removal Workshop. As part of the AWP, they also approved the remote biologist position proposed by the U.S. Fish and Wildlife Service’s New Mexico Fish and Wildlife Conservation Office.

Update on 2017 and 2018 budgets, contracting, and CPI – McKinstry

- CPI 2.2% for FY2019
- McKinstry reiterated that U.S. Bureau of Reclamation (BOR) does not get all of the money in one payment, so they have to be selective on how to distribute funds to the Program. Additionally, BOR follows the rules of the Continuing Resolutions, of which there have been several this year, so it is even more difficult to obligate funds across multiple projects when you don’t have all of your funds up-front.

Phase III Habitat Restoration Project V (Phase III Project): update, objectives, and how to measure success – Gori

- Gori provided an update to the Phase III Restoration Project. The presentation focused on results from Bliesner’s draft wetland conceptual design report. Bliesner requested BC comments on the report and how to move forward. Gori made a point that the Phase III Project is a Proof-of-Concept project that (1) builds on the success and lessons-learned in the Upper Colorado Basin and (2) allows management experiments that will improve outcomes in an adaptive management context. Many BC members voiced their concerns regarding the concept report, questioning whether lessons learned from the Upper Colorado Program have been incorporated or thought out for the Phase III Project. For example, when developing the design, did The Nature Conservancy (TNC) consider Stewart Lake as an example to follow? Katie Creighton noted that the Stewart Lake project found that bringing larval fish into a created habitat from the top was not necessarily successful, but that larval fish were being retained coming from the bottom ends of their created habitats, such as Matheson habitat design. It was recommended that given the parallels to what Phase III Project is trying to accomplish, it would be beneficial to conduct a site visit of Stewart Lake. Filling the wetland habitat with water, should be thought out properly based on previous habitat projects, and should consider filling the wetland at high flows, cutting flow off entirely and use water pumps.
- It was mentioned that projects in other Basins can be used for ideas in evaluating the concept design for the Phase III Project, but need to recognize that the San Juan River is a different landscape and may not be comparable to those other projects. This project is much smaller in scale (2 acres) and the gradient of the San Juan River system may not have similar outcomes as seen in Stewart Lake. Bliesner’s original criteria eliminated sites that had <3.5’ gradient. Phase III Project has an elevation drop of 3 feet from top to bottom to help alleviate nonnative issues and to drain the created wetland.
- Steve Ross mentioned that this report is more about engineering and less on the biology. He emphasized the need to think of the biological purposes of the Phase III Project. If we provide low velocity habitat, will Razorback Sucker survive and recruit and how will it be measured? The Minckley et al. (2003) *A Conservation Plan for Native Fishes of the Lower Colorado River* and Marsh et al. (2015) *Conservation to Stem Imminent Extinction: The Fight to Save Razorback Sucker (*Xyrachen texanus*) in Lake Mohave and its implication for Species Recovery*, papers looked at habitat approaches in developing habitat sites, and cases that may or may not work. In parallel, Lake Mohave restoration sites are off the lake, but along the margins. There needs to be more thought behind the biology and not just the engineering of the Phase III Project. Again, the group was reminded that the Mohave wetlands and backwaters are an entirely different system and may not be directly comparable.
- It is certainly true that these papers in one case are more general (Minckley et al.) or in a different habitat (shoreline ponds on Lake Mohave that are stocked with larval Razorback Suckers), but the general thesis of attempting to rear listed native fishes in off-channel (or off lake) habitats is the same.

It is generally helpful to see what other folks tried or suggested, and take what information from those efforts that is useful.

- The group discussed biological questions that should be addressed in the plan. What would be the best design for this project in creating larval habitat from the top or bottom? The bottom would be ideal because the site selected for the Phase III Project has resulted in good numbers of larvae within the area. The design concept does allow for a low-flow backwater/forbay area for larval. What numbers of larval fish would be anticipated to be captured within the Phase III Project? Are there other opportunities on the river that could accomplish the same numbers at a much lower cost than constructing this Phase III Project?
- The Phase III Project at River Mile 135 could also be a good site to stock larval razorback and grow out individuals along the river because it is high in the river. The Phase III Project has the potential to explore ideas and conduct experiments on what are the bottlenecks to recruitment.
- Some BC members expressed interest in seeing the maintenance cost for the Phase III Project, especially if there would be a need to excavate the pond on a regular basis. There are concerns that the pond would be inundated with sediment and vegetation if not continually maintained.
- Gori said this project does have potential to explore other questions including the ability to grow-out Razorback Sucker to recruitable sizes? This could give us some indication if habitat is a limiting factor to larval fish growing out in the San Juan River Basin.
- There has been a long held belief that there are no wetlands in the San Juan River Basin, but Lamarra identified a wetland that could be restored while looking for sites for the Phase III Project. The Phase III project is, however, a more engineered project. Are there other options that do not need a lot of leg work? We need something on the landscape that allows us to identify whether the species will recruit in the San Juan River.
- Miller suggested a test of larval production and recruitment using elevated baseflows. How would we measure the response to changing summer baseflows? Do we need more backwater habitats? A long term shift in higher baseflows to create the habitat we think larval fish will need to recruit to juveniles could be done. The PO iterated that the new environment flow (eflow) operating procedures focus on increasing high flows during the spring release.
- The Phase I and II projects provide backwater types of habitat and could help us identify whether recruitment is occurring at those sites; however, increased recruitment has not been observed over the last five years. Comparatively, the Phase III Project would be relatively cheap.
- How should we proceed forward with the Phase III project? If Stewart Lake is the pilot study, TNC and the PO should visit Stewart Lake to understand what has been learned from that project and how success is measured. If done, the Phase III Project will create a wetland that will need to be managed. Many of the restored wetlands in the Green River have become inundated with nonnative fish. The wetland would need to be managed in way that maintains its function as a wetland and management experiments can be conducted.
- The discussion on Phase III Project raised many good points and ideas about what the objectives of the project could or should be. There was general agreement that we need to try something considering only one juvenile Razorback sucker has been captured in the last 15 years during a small-bodied monitoring, which is a standardized sampling effort. There was also general support to further explore the Phase III Project but there needs to be clarification of the biological objectives of the project in the next draft of the concept plan.
- It was stressed that this project was a proof of concept and would be attempting to address a potential recruitment bottleneck in a controlled system with limiting confounding factors. If the provision of a stable, low-velocity habitat accomplishes this then future options on how to provide similar habitats will need to be discussed.

Disposition of razorback sucker too small to stock – Davis

- The decision was made to not stock Razorback Sucker under 300 mm, so we can distinguish between wild and hatchery raised fish. We need to determine what will happen to those fish that are too small

to stock out. One option is to euthanize those smaller fish. New Mexico Fish and Wildlife Conservation Office are still checking Endangered Species Act regulation to determine if euthanization can be an option.

- Currently, Hidden Pond has 65 Razorback Sucker that were less than 300 mm and were not stocked out during active harvest at the NAPI ponds. Other than euthanizing Razorback Sucker due to lack of size at stocking or holding them and stocking at a later date, we should look into other options on how to deal with excess Razorback Sucker.
- Southwest Native Aquatic Resources and Recovery Center (SNARRC) are trying to establish a minimum length of 225 mm before transporting Razorback Sucker.

Update on Colorado Pikeminnow calcein marking – Durst and Franssen

- The calcein marking experiment is to determine the efficacy of using calcein marking to field identify age-1 hatchery-reared Colorado Pikeminnow. There have been complications to the experiment such as a light/shade treatment and two different types of calcein readers (tools). Given these complications, Program biologist have developed a prototype reader to assist in reading marks in the field and this prototype will be tested at some point in the future.
- Overall, it appears the mark is still detectable at above 90% after 196 days, but the detectability is decreasing over time as fish grow. There have been some lessons learned and discrepancies identified with the calcein mark, for example, fish cannot be preserved in formalin or the calcein mark will disappear. Every fish at SNARRC that is age-0 is now calcein marked and should be detectable for at least one year.
- The final reading for this experiment is scheduled for the first week of December 2017.

Consider PIT tagging Colorado Pikeminnow < 150 mm Total Length – Durst and Franssen

- Current protocol is to tag Colorado Pikeminnow that have a total length of at least 150mm, however, fish have been tagged as small as 130mm. Tagging smaller fish would allow the Program to monitor more fish and potentially tag many more fish in the wild. Tagging smaller fish could be accomplished by using smaller PIT tags, such as 8 mm tags.
- Tagging protocols could be established to tag in the dorsal muscle. Based on previous experiments, tag loss is similar between dorsal muscle and abdomen PIT tagging. It may be worth conducting an experiment in the field with one field crew tagging into the dorsal muscle and another crew field tagging in the abdomen for one year. This experiment would tag Colorado Pikeminnow between 100 and 150 mm and observe those tagged individuals survival rates. One year of tagging in this format could indicate the optimal size limit for tagging individual Colorado Pikeminnow.
- Using existing data, given that we have an array of sizes of individual marked fish, we could analyze the data and potentially tease out the optimal size to PIT tag Colorado Pikeminnow. Many more individuals could be tagged if the protocol allows for tagging fish less than 150 mm. For example, small-bodied monitoring identified that 50% of the Colorado Pikeminnow they capture are less than 150 mm. The goal is to tag as many wild fish as possible.
- It was also noted that tag retention is increased when using preloaded syringes for PIT tagging fish. However, not all of the Program biologists are using preloaded PIT tag syringes. This may not be cost effective, but is an option to look into for increasing PIT tag retention in wild fishes.
- Recommendations will be made at the February meeting after additional information is collected (e.g., tag at size and recapture, smaller tags, readability and interference of detecting tags)

Temperature effects experiment – Gilbert

- The PO provided an update on a temperature effects experiment on Razorback Sucker that will be funded, as a required conservation measure, through the Four Corners BiOP. It is unknown how water temperature may affect Razorback Sucker larval development therefore; the PO plans to conduct a laboratory experiment to examine these effects. This will be accomplished by looking at the effects of various water temperatures on: length at ontogenetic stage and percent population transition between

ontogenetic phases. Based on the data, Razorback Sucker at the mesolarval phase is observed and captured more often in the river than any other ontogenetic phases. This suggests that a recruitment bottleneck for Razorback Sucker may be occurring between certain larval ontogenetic phase transitions.

- General comments received from the BC on the experiment included establishing a control to determine natural mortality, replicating river condition, temperature treatment selection, and multispecies comparison. Pre-dam temperatures were colder than today. San Juan River temperatures at Bluff between 2002-2016 exceeded optimal conditions for Razorback Sucker in June.
- Is there a way to replicate river conditions in the lab to reflect temperature depressions? We do know that temperature depression occurs in the main channel of the river, but do we know if these depressions are being observed in the backwaters, where we expect to see larval fish grow? There may be some data that could reference temperature effects in backwaters. Three years of data from at least three different secondary channels have seen lower temperatures than those observed in the main channel.
- How were the temperature treatment ranges selected? The temperature treatments were selected based on the possible temperature outputs from Navajo Dam. The temperature treatment levels appear to have a sound design for an experiment, but we may want to consider widening the temperature range. It may be worth looking at weekly temperature averages that could help identify temperature ranges over monthly averages. The ability to maintain temperatures at the current narrow temperature ranges may be difficult or impossible due to laboratory and costly set up. It was recommended that the experiment be developed in a flow through system to have the flexibility to regulate temperatures. Currently, this experiment is a conceptual design and actual implementation is being developed. The experimental design currently has three temperature treatments at 16°C, 17°C, and 18°C. It was suggested to have two degree intervals (e.g. 16°C, 18°C, and 20°C) to address difficulties in maintaining constant temperatures in a laboratory setting. Including additional temperatures may be worthwhile to mimic different temperatures that Razorback Sucker may experience in the river.
- The effective size of the experimental design is small so it may be difficult to detect a difference.
- Including other native species in the experimental design could help determine if temperature effects on other native species such as Flannelmouth Sucker were comparable to Razorback Sucker.

BC review of Complex Reach study and habitat monitoring input – Miller

- The complex reach study and habitat monitoring is an overall holistic approach looking at habitat projects. Complex reaches are very similar to recently restored channels. There may be additional hydraulic modeling that can be conducted to make the river self-maintaining. Maybe some mechanical work or peak flows could be used.
- Ross provided a summary of the complex reach study, stating that it provides good evidence that habitat selection is nonrandom for Colorado Pikeminnow and that there is site selection with size of fish, flow rates and temperature. Sites were chosen because they were complex. The study georeferenced capture points to identify areas that attract more fish and looked to see if adjoining habitat was preferred. The main hypothesis that was tested was to determine if Colorado Pikeminnow had random preference for site selection. There were questions on whether there was a control established for the complex reach study and how this was measured. Proportional sampling for certain types of habitat was conducted then complex reaches were identified. A seine haul was identified as a sampling unit.
- The complex reach study should be considered when thinking about future habitat restoration projects.

Update on Fruitland Weir – Mata and Gilbert

- An update was provided on the Fruitland Irrigation Project consultation. The biological opinion on the project is planned to go out to the action agencies in the following week. This consultation encompasses various components of the project including the Fruitland Weir that is being funded by the Program and the Salinity Project that converts earthen canals to pressurized pipelines.

- The purpose of this consultation is to evaluate the effects of entrainment, impingement, and fish passage on both Colorado Pikeminnow and Razorback Sucker.

Fish passage at APS – Franssen

- Four Corner Power Plant BiOp provided \$642,000 to install fish passage at APS. The BiOp does not fully fund the fish passage and the PO will need to work with BOR to include APS as a future capital project.
- Miller motioned that the BC approve the PO to request that the CC prioritize the APS Fish Passage on the list of capital projects for funding. Mazzone seconded and it was approved

Additional monitoring downstream of waterfall – McKinstry

- McKinstry suggested that the Program should consider larval and small-bodied monitoring downstream of the waterfall. This sampling may help determine if the waterfall is a recruitment bottleneck
- One option would be to reduce the amount of larval sampling upstream in the main channel, since we have been conducting sampling for 15+ years; we know that fish are reproducing in the San Juan River upstream.
- The objective of sampling below the waterfall would be to get an idea of many larvae are going over the waterfall. Is it even possible to quantify how many larvae are being lost over the waterfall? Maybe a bead study to quantify transport rate or a pilot study to see loss of larvae and identify what is retention for larvae above the waterfall can be conducted.
- Another idea is to use Reach 1 as a reference in larval numbers for a given year, then sample below the waterfall to make comparison between larval counts above and below. If we see greater numbers below we know we are losing larvae over the waterfall. There are some problems with this idea. The differences will be confounded by fish spawned below the waterfall. How do we differentiate between larvae from below the waterfall and those that came from above the waterfall? Oxytetracycline (OTC) marking may be an option, however, that is only possible on a short term basis.
- The overarching question is what does the Program plan to do about the waterfall? Remove it, construct a ladder, or actively translocate fish upstream of the waterfall? The BC needs to start talking about connecting the river to the lake with passage of some sort. Or do we actively manage by moving fish and finding ways to acclimate them to reduce their chances of going back over the waterfall. We want to see larger fish in the wild; the waterfall could be that limiting factor where we don't see these larger fish. Or do we not see larger fish in the wild because of the San Juan's water quality. What is the limiting factor the lake or the river.
- If we do additional sampling below the waterfall, we will need to articulate why it is important and how it could lead towards a management decision to help recover the species.

Waterfall project and PIT tag antenna at waterfall – McKinstry

- McKinstry provided an update for Casey Pennock on his project at the waterfall. Ninety-one Razorback Suckers were tagged with dual sonic tags in 2017, 31 individuals were translocated above the waterfall, 30 were released below the waterfall, and another 30 individuals were tagged and released in Lake Powell. Sixteen of those fish have not been subsequently re-contacted. Twenty-nine out of 31 fish captured at the waterfall and moved two miles upstream have been subsequently recaptured below the waterfall. The furthest upstream detection of a sonic tagged fish was at Bluff.
- Researchers sampled downstream of the waterfall and collected more than 200 juvenile Colorado Pikeminnow from a single backwater in March. In addition, 15 young-of-year Razorback Sucker were collected at three sites downstream of the waterfall.
- A semi-permanent PIT tag antenna was installed below the waterfall in August, where it detected 140 individuals within a short period in August. This indicates that fish are not just present in the spring but also in late summer. This may be driven by pulses in flows that trigger fish to move upstream.

- This semi-permanent PIT tag antenna may answer important questions about Colorado Pikeminnow migration. We could possibly identify fish that want to return to the river.
- It was requested that all the PIT tag information be sent to Pennock, so he can start evaluating the data with fish movement from the river to below the waterfall.
- The sonic tags are not working 100%; the SURs in the river did not detect any sonic tags, but SURs in the lake detect many tags; turbidity and turbulence may be a factor as well as technology issues. The plan is to switch from sonic tags to radio tags in the future.

Conditions at Phase II restoration site – McKinstry

- Current conditions at Phase II restoration sites have changed over the past few years. The secondary channels were almost completely closed off at low flows during the 2017 monsoon season. There has been quite a bit of vegetation regrowth on high terraces along the restored channels and sediment deposition within channels during the 2017 monsoon season. The pressure sensors located in the restored channels will provide a record of flow conditions in the restored channels in 2017 and the cross-sections will provide information on sedimentation/erosion at different locations between sampling periods.
- Observing the restoration sites over the years and considering all the effort put in place to removing nonnative and planting native vegetation, it is questionable whether that effort is worth repeating. Nonnative Russian olives have re-sprouted from root stocks that remained after site restoration and are growing rather quickly in the last three years.
- Water flow is minimal at low flows (500 cfs) due to deposition within the channels, which is also causing a loss in carrying capacity within the Phase II restoration sites. There was a discussion of how the channel responds to flow at 500 cfs versus 800 cfs. It had minimal flow at 500 cfs but was almost fulling flowing at 800 cfs based on ground observations.
- Native cottonwoods that were planted as poles are not growing and that may be because the cottonwoods were not planted down to the water table. Natural recruitment of young cottonwoods is occurring on low terraces close to the water table that were cleared during the restoration effort; it is not clear whether these young cottonwoods will survive to maturity.

Condition of Phase I restoration site – McKinstry

- The created channel on river left downstream of Red Wash is performing fairly well, with little deposition after three years. There is minimal Russian olive growth; this may be due to the presence of gravel within the restoration site. The mouth at this site is partially blocked with debris so the channel function may start to change.
- Given that we have invested time and money in creating and connecting these secondary channels. We need to decide on whether we should let nature takes its course or should we dedicate money to keep secondary channels open?

Lake Powell natal origin update – Clark-Barkalow

- ASIR conducted a microchemical analysis to determine fish natal origin and determine the water sources an individual came from. Razorback sucker fin ray samples were taken from fish captured at the waterfall to determine the natal origin of untagged Razorback Suckers. Based on the output from the microchemical analysis the data was analyzed using a canonical correlation multivariate statistic. Five fish were identified as not originating from a hatchery and were predicted as fish originating from San Juan River, but it was not complete overlap and some people questioned the strength of the prediction. The purpose of this talk was to provide clarification and discuss the 2016 results.
- We have 100 % classification of fish from hatcheries; however, fish originating from either the Colorado or Green Rivers are unclear. Maybe there is a source of water that we have not identified that may be causing this grouping, such as tributaries.

- Another option is that we may need to look at other elements in the water to identify a unique marker that we have not tried before to identify the natal origin of these fish. McKinstry commented that we should not be surprised if these fish are from Lake Powell.
- The next step in teasing out these discrepancies is to identify new sources that could link them to their natal origin.

What does NMGFD data discrepancy report mean to Program – PO

- The PO does not think the New Mexico Department of Game and Fish (NMDGF) data discrepancy report will impact data analyses. NMDGF efforts in identifying data entry discrepancies led to a clean database but the discrepancies did not affect trends or our understanding of the small-bodied fish community.

•

Update on NAPI stocking – Bowman

- Biologists at NAPI started feeding fish and collecting water quality from the boat versus the bank. A number of dead fish appeared, and were collected, and then sent to SNARRC for evaluation. SNARRC determined that the cause of death was probably due to poor water quality in the ponds. It is hard to determine what is going on because the water quality in the river and at NAPI ponds is nearly identical. There were a total of 30 fish mortalities. They began doing water exchanges every two weeks and set up more aerators in an attempt to improve water quality. There were some issues with the pumps overheating in their boxes that they could not entirely figure out. Over 90 fish, 300 mm or larger were stocked out at the end of July. About 65 individuals less than 300 mm were kept to grow out.
- Davis commended Navajo Nation efforts in communicating with the NMFWCO and SNARRC in dealing with their concerns of fish mortality in the NAPI ponds.

Update on PNM passage – Yazzie

- More fish used the fish ladder compared to last year with 201 Colorado Pikeminnow captured. PNM's selective fish passage is capturing significantly more native fish than nonnative fish. Upgrades were conducted at the PNM fish passage structure to include safety rails and catwalks for both safety and ease of maintenance and operation of the facility. In addition, electrical repairs were completed on the hoist.
- There is a need to analyze the data from PNM passage in association with the operation of the passage to evaluate whether fish want to pass. There is no flow data at the fish passage. It was suggested that this may be a good place for a gaging station with a transducer.

Lake Powell – Schleicher

- Sampling conducted at Neskahi Canyon of Lake Powell captured 148 Razorback Sucker. No native fish were captured in Cha Bay, the bay below Piute Canyon. Wagon wheel sampling was conducted in both the San Juan Arm and Colorado Arm of the lake on known spawning bars. In 2011 and 2012, 33% of the fish captured were untagged on the San Juan Arm, however, last year that was only 13%. Three Razorback Suckers were tagged and came from the Green River and another was identified from the Gunnison River, which is about 400 miles traveled by one individual fish.

Hydrology Update – Miller

- An updated IHA (Indicators of Hydrologic Alteration) analysis was performed on post dam (1965-1990) and post-1992 data sets to compare differences in operation with the flow recommendations to the post dam period.
- Miller indicated that during the flow recommendation period summer base flows have been lower than flows observed from 1965-1992 resulting in fewer flowing secondary channels during the flow recommendation period. The flow recommendations recommended a baseflow range of 500-1,000 cfs; however, the dam has been operated to only meet the 500 cfs target. During July –August, we

would need to have baseflows at 1,500 cfs to have secondary channels available for fish when they need those habitats most in the summers.

- We are getting high flows at the same frequency as the post dam period. What is important to recognize here is that during post-dam flow conditions, the San Juan River had remnant Colorado Pikeminnow (albeit low in numbers), but no Razorback Suckers were present. It may have been that fish were spawning much higher in the system prior to the dam, as indicated from survey notes from BOR back in the 1940s.
- What flows are needed to inundate side channels during rearing season without compromising spring peak releases? Maybe an additional 500 cfs for 60 days would help, this may create more “sticky” habitat that will retain fish in the San Juan River.
- The operating procedures do not allow for elevated base flows when we have years with 21 days of high flows in the spring. If we decide to elevate base flows in the summer to provide more inundated habitat, we may need to revisit the operating procedures. This could be accomplished by having a review to see if there is any available water to elevate base flow.
- There are some concerns that creating more secondary channels will promote more habitats for nonnative fish like Red Shiners. It was suggested take we look at Angela Hill’s 2016 peak flow paper. Bestgen and Hill (2016) *Reproduction, abundance, and recruitment dynamics of young Colorado Pikeminnow in the Green and Yampa Rivers, Utah and Colorado, 1979-2012?*
- The PO and Lamarra reanalyzed habitat data and found that the high flows of 2016 reset several secondary channels to now flow at lower flows.

Hydrology Update – Behery

- We may need to revisit water volume after peak flow releases to see if there is any water that can be released. If we have a high spring peak release, we cannot have elevated baseflows based on the current decision tree. Current operation is to keep base flows between 500-1000 cfs, but the flow recommendations say to keep it as close to 500 cfs as possible.
- Behery provided clarification on staying at 4800 cfs during the peak release. The National Weather Service flood stage warning system required BOR to hold the release below 4,800 cfs so a flood warning would not be issued.
- Whether we will have a spring peak release in 2018 is yet to be determined. We currently have little snow on the ground. A determination will need to be made in May.

Swimming upstream – Melissa Mata

- Issuance of the Swimming Upstream newsletter will be moved to the spring so anticipate article requests by March and April. Swimming Upstream for FY18 will be slim, since articles were just requested in the fall. McKinstry nominated Schleicher to write an article on the Lake Powell work that is currently being conducted.

Effective Breeding Size – Diver

- Genotype work should be completed in December. Colorado Pikeminnow genotype has four years’ worth of data and will include 2016 genetic samples. In 2011, seven individuals were identified as contributing to reproduction in the population. In 2016, 41 individuals were identified. Broodstock and wild fish from the Upper Colorado have a much higher mean, where on average the genetic samples identify 87 individuals contributing to their genetic gene pool.
- Southwestern Native ARRC has begun documenting the history of both Colorado Pikeminnow and Razorback Sucker broodstock including origin and number of individuals that started their broodstock. Southwestern Native ARRC does have concerns regarding the current broodstock given how old these fish are.
- May need to collect more fish from the wild to improve broodstock from the Upper Colorado Program to increase genetic diversity.

Shortening Annual Reports – PO

- The PO asked the BC for a decision on shortening annual reports. In general, BC members supported the idea of shorter reports and would appreciate not having to read 150 pages to understand the work. If a way can be found to shorten the reports and get straight to the point, it would be helpful in reviewing reports.
- The PO would like the PI's to decide how to condense their annual reports but there would need to be some minimum requirements to include results, any changes in methods or recommended changes in the methods of the protocol and environmental changes. There are some concerns of data being lost if not presented in annual reports.
- The BC voted and approved shortening annual reports to include results, new information or methods and recommendations.

Long Range Plan – Mata

- A draft of the Long Range Plan will be provided to the BC within two weeks of the February meeting.

Nominations and vote on new BC chair – PO

- Mike Ruhl, NMDGF and Jason Davis, FWS-Region 2 were nominated for the BC Chair. Ruhl received 5 votes and Davis received 6 votes. Davis is the new BC Chair.

Upcoming meetings – PO

- CRABs meeting 10-11 January 2018, Laughlin, NV
- Researchers Meeting 23-24 January 2018, Vernal, Utah
- BC Meeting – Noon start on February 20th through 22nd The last day will include half day recruitment bottleneck workshop
- 2018 SJRRIP Annual Meetings – two weeks were selected, May 15-17 (preferred) and May 22-24. The CC will be queried as to their preference.

Wednesday November 29, 2017

Brainstorming Ideas for Recovery Elements – The PO described the Future Direction sections for each recovery element that was included in the PO's 2018 AWP recommendations to the CC. These were used to set the stage for the BC discussion on future Program needs and to inspire new ideas.

Element 1 - Management and Augmentation of Populations and Protection of Genetic Integrity

Future Direction:

- 1) Continue stocking hatchery-reared fish until wild-recruitment is occurring to attain self-sustaining populations of Colorado Pikeminnow and Razorback Sucker in the San Juan River.
- 2) Encourage future SOWs and efforts within existing SOWs to improve the efficiency of the augmentation program.
- 3) Investigate methods to document and identify wild-spawned Colorado Pikeminnow and Razorback Sucker in order to distinguish them from hatchery-reared fish.
 - a. Continue with the calcein marking study initiated by the Program Office in 2017 to investigate the use of this technique to mark all stocked Colorado Pikeminnow so they can be distinguished from wild spawned fish. All hatchery-reared age-0 Colorado Pikeminnow will be marked (calcein) prior to stocking. To accommodate this experimental marking, 200,000 marked fish will be stocked in 2017 instead of 400,000 (also see SOW 28).
 - b. No Razorback Sucker < 300 mm TL will be stocked in the San Juan River to accommodate identification of wild spawned fish.
- 4) Continue to mark all stocked Razorback Sucker and captured fish with PIT tags to identify stocked and wild fish which will help track progress towards recovery.

- 5) Develop hypotheses/objectives, database management, and analytical approaches for continued PIT tagging work in the San Juan River-Lake Powell system (experimental design).

BC Discussion

- Southwestern Native ARRC is in the process of writing a Colorado Pikeminnow genetic management plan. The Program recognizes that we have many options in rearing Razorback Sucker with regards to hatcheries. However, Colorado Pikeminnow is an entirely different story. Colorado Pikeminnow is only stocked in the San Juan River Basin, whereas the Upper Basin Program tried for a year and cancelled all stocking for Colorado Pikeminnow. There may be a need to establish new broodstock for improved genetic integrity even though the Upper Colorado Program is not currently considering stocking.
- Is it possible to improve the quality of fish being reared at the hatchery, such as prey training, exercise or stocking fewer but larger fish into the San Juan River?
- There are some issues with stocking larger Colorado Pikeminnow. Rearing cost becomes expensive to rear larger Colorado Pikeminnow. Larger Colorado Pikeminnow will start eating each other. Questions arise on what to do with individuals who may not make the size criteria.
- Some larger Colorado Pikeminnow have been stocked in Bonytail Chub ponds to prey on newly spawned Bonytail Chub at Southwestern Native ARRC and have been stocked into the San Juan River, however, the data has not been analyzed to evaluate their success.
- The Program should consider stocking Roundtail Chub into the San Juan River. There is evidence from isotopic analysis that this could be a missing component to Colorado Pikeminnow diet. Roundtail chub are present in the San Juan River, but in low numbers.
- The idea of stocking Roundtail Chub into the San Juan River has been previously discussed probably in the late 1990s, but was dismissed, most likely due to the feasibility of developing a hatchery program for Roundtail Chub; however, that was before Mumma Native Aquatic Species Restoration Facility (Mumma) was established where they have successfully reared Roundtail Chub.
- Mazzone indicated that Jicarilla Apache Game and Fish Jicarilla have been stocking Roundtail Chub into a San Juan tributary with success. Broodstock was developed from wild captured Roundtail Chub. Progeny from the brood is released throughout the upper San Juan River basin, by bucket hauls into suitable habitat. Telemetry investigations indicate movement into and out of Navajo Lake. Mazzone has information that could aid in potential stocking of Roundtail Chub into the mainstem or tributaries of the San Juan River. Mazzone would encourage the Program to consider stocking in the Animas, McElmo and Chaco systems. Crockett will look into the process and cost of raising Roundtail Chub.
- As wild fish numbers increased the Program may need to reduce the number of fish stocked or consider stocking on alternate years.
- The Program needs to establish a systematic way to analyze all of the available PIT tag data. This should include PIT tag monitoring, comprehensive inventory of current PIT antennae locations, and information on how the data are retrieved and stored. This type of information is needed for identifying future needs and planning. Are there any ideas on how to develop an experiment design with the data that we have on hand now? Not yet but Clark will be covering some of these things in his Post-doc work.
- What other PIT tag antennae technology can the Program use? The efficacy of using floating PIT tag antennae is in the process of being reviewed.

- Should the Program consider implementing river-wide PIT tag antennae? If so, what would it take? Capital funds could potentially be used to establish a system. River-wide PIT tag antennae coverage could provide information on behavioral patterns. Zeigler looked at the PIT tag antennae data from the Phase II Restoration site that showed a lot of fish were moving through that site. Antennas located in specific locations could provide some insight into specific recovery questions.

Element 2 - Protection, Management, and Augmentation of Habitat

Future Direction:

- 1) Continue to support O&M of the SJRB hydrology model. The model is a required ESA compliance measure for use by the FWS for section 7 consultations on water-related project in the SJR Basin. The model is also available for run requests to provide hydrological analysis of water development scenarios or other scenarios in relation to the flow recommendations.
- 2) Continue to fund additional flow measurements at USGS gages throughout the duration of the Program to insure accurate flow and Navajo Dam release data.
- 3) Continue to operate the PNM fish passage throughout the duration of the Program to provide access to additional river habitat, track fish movement into the passage and upstream, and remove undesirable nonnative fishes from the system.
- 4) Continue to work with the Navajo Nation and the Biology Committee to assess and improve operations and facilities to increase effectiveness of the passage.
- 5) Continue to maintain temperature probes on the four USGS gages in NM throughout the duration of the Program to provide important water temperature data in support of recovery activities or until the BC deems them not needed.

BC Discussion

- The ideas discussed within this element were brief and which included the following:
 - Data analysis of fish moving through PNM passage (in progress 2018)
 - Add backwater gauges along river habitats to monitor inundation
 - Phase III-Managed ponds
 - Elevated base flows-two aerial flights (500 vs. 1000), ADP Montana Freshwater map,
 - Animas River stocking/entrainment
 - APS Passage—Gilbert, McKinstry and Franssen will take lead and start to evaluate this with potential outside experts.
 - Annual opening of secondary channels mouths opportunistically (Excavator versus hand tools, is probably site dependent)
 - Future waterfall work-invite fish passage expert to review options for passage or trap system—Gilbert and McKinstry will take lead on this.

Element 3 - Management of Non-Native Aquatic

Future Direction:

- 1) Until information is gained that suggests different actions are warranted to address the threat of nonnative species to recovery, continue to implement the nonnative species monitoring and control project using the current control-treatment nonnative removal methodology.
- 2) Analyze data and evaluate results annually and modify methods, if needed.
- 3) Prioritize studies investigating the effects of nonnative species on the endangered fish and recovery efforts to inform decision-making.

BC Discussion

- Element 3 Management of Non-Native Aquatic Species was not discussed due to the fact that this discussion was going to occur at the Nonnative Fish Workshop to be held on November 30, 2017.

Element 4 - Monitoring and Evaluation of Fish and Habitat in Support of Recovery Actions

Future Direction:

- 1) Continue to provide annual Program support for the centralized STReAMS database by providing funding to the database manager and by providing Program Office staff assistance in support of the effort.
- 2) Insure Program P.I.'s and researchers utilize the database to its full capacity to standardize UCR fish data and streamline data sharing between researchers to improve efficiency of data entry and retrieval, and to prevent duplication of records and efforts between and among the various investigations.
- 3) Conduct large-bodied fish community monitoring but evaluate if the current frequency and spatial extent of the effort is appropriate. These may be important considerations so more effort can be devoted to management actions that directly benefit recovery rather than monitoring populations.
- 4) Conduct small-bodied fish community monitoring but evaluate if the current frequency and spatial extent of the effort is appropriate. These may be important considerations so more effort can be devoted to management actions that directly benefit recovery rather than monitoring populations. If it is determined that any reduction in the level of effort for this project is appropriate, additional funding would be freed-up to conduct on-the-ground management activities for the benefit of recovering endangered Colorado Pikeminnow and Razorback Sucker
- 5) Conduct larval fish monitoring but evaluate if the current frequency and spatial extent of the effort is appropriate. These may be important considerations so more effort can be devoted to management actions that directly benefit recovery rather than monitoring populations.
- 6) When spawning is documented upstream of APS Weir, a pumping plan will be implemented to limit entrainment of larvae at that location. This may also highlight the need to conduct additional management to limit entrainment at sites such as Hogback and PNM as well as to help understand upstream limits to spawning by endangered fishes.
- 7) Continue to implement SJR specimen curation/identification of UCR Larval fish collection to provide a secure and organized repository for SJR specimens of fishes, collection data, and field notes taken under the SJR Recovery Program to facilitate access to these resources by researchers.
- 8) Continue to work with a post doc to accomplish data integration tasks outlined in the SOW including evaluation of PIT tag arrays, improve biological metrics and inferences from remotely detected PIT tags, conduct cost benefit analyses of remote antennae for future management and data collection, and assess the efficacy of PNM fish passage facility on endangered San Juan River fishes.
- 9) Evaluate riverwide habitat goals and objectives for recovering Razorback Sucker and Colorado Pikeminnow and develop a comprehensive plan for habitat management and restoration for at least the next 5 years.
- 10) Reevaluate habitat monitoring data and results after the 2018 field season and determine habitat monitoring needs for 2019 and beyond.
- 11) Support the completion of the incidence and consumption of endangered fishes by channel catfish in the SJR study with funding and Program Office support in 2018 and 2019.
- 12) After completion of the incidence and consumption of endangered fishes by channel catfish in the SJR study, assess results to determine its impact on the Program's nonnative fish management program.
- 13) Fund this one-year study in 2018 to obtain SJR-specific growth rates for the two endangered fishes.
- 14) Continue to calcein mark stocked fish and evaluate effectiveness of marking techniques.
- 15) Continue to work with the Kansas State University P.I.'s to further refine and accomplish the Razorback Sucker study objectives of: 1) estimating adult population size in Lake Powell; 2) determine the number of stocked fish from the SJR that move to Lake Powell; 3) identify spawning and

- recruitment of individuals in the SJR-Lake Powell habitat complex; and, 4) characterize movement behaviors within the SJR-Lake Powell habitat complex.
- 16) Review data and results from all projects annually with the P.I.'s and determine if there are any insights from each year's sampling to inform decision-making.
 - 17) Assess and identify the Program's PIT tag antenna goals and objectives for at least the next 5 years and develop a comprehensive riverwide plan for existing locations, additional installations, collection and processing of data, and O&M.
 - 18) Reevaluate PIT tag antenna needs prior to the 2019 to assist with development of future SOW's.
 - 19) Conduct a nonnative fish control program workshop annually and utilize results in management decision-making.

BC Discussion

In general, some of this discussion was repetitive from the previous day for the following ideas: waterfall sampling, temperature study, Phase III Restoration Project. Additional information can also be found in the previous day's summary per category. The discussion on recruitment bottlenecks was not a lengthy conversation; however, the Program will be convening a Recruitment Bottleneck Workshop in February 2018.

Habitat

- The Program may want to consider late-summer small-bodied fishes sampling to capture intermediate age classes that are missing from ongoing monitoring and to assess which habitats these early life stages are using in the summer. This could possibly indicate how much room (available habitat) fish will need to become juveniles. This may include additional seine hauls and/or trips. We have some of this information in the complex reach study with regards to habitat use and density relationships.
- We need more actions to create habitat that the endangered fish will use. Phase I and Phase II habitat projects provide some information to identify these types of habitats.
- Do we know the behavior patterns of larvae or small-bodied fish to tell us when and how they will use created habitat? We could create habitat and they may disperse right past habitat we create without ever using it. Understanding this behavior would be important.
- The Green River has observed increased density of fish in embayments and tributary mouths and it is assumed that this is from fish abandoning secondary habitats.
- It was suggested that the Program should move forward with habitat creation. If the focus is on secondary channels, they can easily become bermed off, as we see with the Phase I and II restoration sites due to elevated flows and deposition. Installing control head structures at the mouths of secondary channels could be a potential fix.
- Can we opportunistically open up secondary channel? Would it be feasible to apply effort to areas that would provide backwaters or are near known spawning habitat? What are the permitting requirements to conduct this type of habitat work? It could be as easy finding access for a dedicated excavator to open up channels.
- Instead of putting all our eggs in one basket by moving forward with Phase III, would it be more beneficial to create more secondary channels by opening them up? Efforts to open secondary channels may be accomplished by manually removing debris piles at the upstream end of secondary channels. We are aware that Navajo Nation EPA may have some concerns with using an excavator to open up secondary channels within the Nation. We would need to discuss this with Navajo Nation EPA to see if it was even possible.
- As mentioned yesterday, the PIs for Phase III were asked to incorporate comments from the report review and ensure the plan incorporates more biology and not just engineering. It is imperative for the SOW to have clearly articulated objectives and a thorough monitoring component with measures of

success. The Phase III project is a proof of concept plan and TNC checked with the engineers (i.e. Bliesner) that they did consider other restoration projects when developing their concept designs. The goal for this project is to see if fish from the river can be retained in the managed backwater, can survive until a juvenile stage, and can then be released back into the river. Juveniles 60 mm or more are the measure of success. There was some skepticism that those size classes can be observed.

- If the Phase III project works, what does this mean? Will the Program be expected to create additional similar habitats? Not necessarily, but it would tell us if this type of habitat would rear Razorback Sucker and provide us an opportunity to measure the impact. The project may identify a recruitment bottleneck.
- Should nonnative fish be screened out? There is information that suggests Razorback Suckers can survive in spite of the presence of nonnative fish species in backwater habitats; however, nonnative fish should not be allowed to overwinter in this habitat and should be removed by drying out the pond every year.
- The Phase III restoration site is proposed for River Mile 107 which is high enough up in the river so the number of fish that would go over the waterfall might be lessened, maybe allowing them to “stick” better in the San Juan River system.
- The BC needs to continue through the planning process by reviewing and commenting on the next draft of the Phase III Restoration Project Concept Report. The report should be distributed to the BC prior to the February 2018 meeting.

Waterfall discussion

- It may be worthwhile for the Program to invite experts to visit and determine what types of fish passage or trap can be feasibly constructed at the waterfall. Need to bring in folks with different ideas and backgrounds that could provide some ideas.
- PO should consider or investigate different types of gear for capturing fish including floating trammel nets to actively capture and move fish upstream of the waterfall. This may provide an alternative to removing or bypassing the waterfall.
- Again, as it was voiced yesterday removing the waterfall is a concern because it could increase our probability of introducing nonnative fish into the San Juan River. In Lake Powell, biologists are starting to see higher abundances of Walleye and Gizzard Shad. Smallmouth Bass would also have the potential to increase which are currently not a problem in the San Juan River but are very problematic in the Upper Colorado River.
- The waterfall is also a bottleneck to gene flow. If fish cannot move upstream, those individuals will not spawn in the San Juan River to diversify the genetic pool. These species have existed through migration and it is critical to recovery for these species to maintain genetic connectivity.

Recruitment Bottleneck

- What types of information do we need? What are the factors limiting fish from moving from larval to juvenile stages? Food limitations, temperature, behavior, selenium, and predators could all be limiting factors. Do Razorback Sucker behave differently than other native suckers (e.g., are they more drifters and end up in Lake Powell more frequently?)
- Is there a contaminant issue for Razorback Sucker such as selenium? Could it be a temperature effect from the temperature depressions that occur in the main channel of the river?
- The Program should consider elevated base flows in the summer. It needs to be determined how habitat and fish respond to elevated flow. This could be accomplished by having two separate aerial

flights conducted to compare inundation on the river at different river flows and 3-D imaging conducted to evaluate larval drift at different flow stages.

Other ideas

- Utah would like to sample again in the lower canyon in the spring since that is where they are observing Channel Catfish and it hasn't been sampled in a while.
- The Program should consider changing the frequency of how often the canyon is sampled.
- N_e work should continue. Parentage analysis could be used to identify whether a suspect wild fish is part of the parentage of fish stocked.

Brief bulleted project ideas

- Add backwater gauges along river habitats to monitor inundation
- Phase III Restoration Project
- Elevate base flows-two aerial flights (500 vs. 1000), ADP Montana Freshwater map. ERI will discuss with the PO to see whether Blue Sky could conduct the flights.
- Animas River stocking/entrainment
- APS Passage
- Annual opening of secondary channels mouths opportunistically (excavator versus hand tools, site dependent)
- Waterfall passage investigation - invite fish passage experts to review options for passage or trap system
- Late-summer sampling to capture intermediate sized fish, more small-bodied fish monitoring.
- Assess Lower Canyon - frequency
- Larval fish work below the waterfall

List of BC Questions discussed during Brainstorming Session

How can we increase recruitment of Colorado Pikeminnow and Razorback sucker?

How does elevated baseflows affect low velocity habitat?

How can the frequency of flowing secondary channels and associated backwater habitats be increased?

Does increased backwater habitat increase recruitment?

What are the trade-offs of elevated base flow and the frequency of high spring releases?

How much permanent emigration is the waterfall causing to fish in the river – both species and life stages?

How can passage at diversions and range be increased in the San Juan River Basin?

How can entrainment be reduced in the San Juan River Basin?

How can we improve survival of stocked fish, both Colorado Pikeminnow and Razorback Sucker? How do we distinguish between wild and hatchery fish?

How much do stocked fish negatively affect wild fish?

How does temperature vary in low velocity habitats compared to the river?

How can upstream passage be increased at the waterfall?

What other methods can be used to reduce Channel Catfish populations in the San Juan River?

What habitats are wild juvenile Razorback Suckers using in the San Juan River?

How can we quantify the number of spawning fish and relate it to environmental variability?

BIOLOGY COMMITTEE ACTION ITEM LOG (Updated January 24, 2018)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
1	Provide RBS/CPM stocking/capture/recapture data		PIs to PO	Annually before Jan. 1		
2	Provide Preliminary Draft Report Presentations		PI	Annually at Feb. meeting		
3	Review LRP		BC	Annually at fall meeting		
4	Review Peer Review Comments from the February and May meetings		BC	Annually at fall meeting		
5	Provide Draft Reports		PIs to PO	Annually by end of March		
6	Scopes of Work		PIs to PO	Annually by end of March		
7	Provide Final Reports		PIs to PO	Annually by end of June		
8	Annual Data Delivery		PIs to PO	Annually by June 30		
9	T&E Species Data		BC to PO	Annually by Dec. 31		
10	Annually compile T&E data and Program progress into summary to address overall Program recovery goals/objectives for presentation at annual meeting		PO/BC	By Annual Meeting in May		

BIOLOGY COMMITTEE ACTION ITEM LOG (Updated January 24, 2018)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
11	Distribute Consolidated Data and list of annual data collected and available in the Program's database		PO to BC	Annually by Jan. 31		
12	Recapture analysis on PIT tagged fish		Durst	Annually by March		
13	Coordinate CPM stocking closely with Reclamation to avoid negative impact due to high flows/releases		PIs	Annually		
14	Revise RBS Augmentation Goals (based on the outcome of experimental stocking and analysis by Franssen and Durst). What is the appropriate numbers of fish to stock?	5/10/10	NMFWCO/PO	5/2011 – provide update and extend as needed		
15	Pursue Non-native fish stocking procedures	11/5/09	Crockett and Ruhl	2/23/16		
16	Pursue effects study on Hg/Colorado Pikeminnow with other groups/programs	1/14/10	Program Office lead	ongoing		
17	Include benchmarks for recovery in LRP (amended to also included in Pathways document and monitoring protocols)	12/5/14	Whitmore	1/5/15	ongoing	
18	Status updates for the LRP	12/2/15	PIs to Whitmore	2/23/16	ongoing	
19	Make Program peer-reviewed publications available to Program participants	11/29/16	PO (Mata)	02/21/17	ongoing	

BIOLOGY COMMITTEE ACTION ITEM LOG (Updated January 24, 2018)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
20	Determine disposition of Razorback <300 mm TL	02/21/17	NMFWCO	5/16/17		11/28/2017 but TBD FY 2019
21	Draft a plan for Pikeminnow stockings	02/21/17	PO, NMFWCO, and NMDGF	2/21/17	On hold	
22	Determine if BIA selenium study can be shared with BC and share if permission granted	5/16/17	BIA and PO	7/13/17	2/20/2017	
23	Consider what criteria would make Phase III wetland project a “success”	5/16/17	BC	7/13/17	2/20/2018	
24	Provide BC a list of technical projects PO is suggesting be included in AWP	7/13/17	PO	11/28/17	2/20/2018	
25	Develop structure for Monitoring Plan and Protocols 2012 to be incorporated into other SJRIP documents	7/13/17	PO	11/28/17	2/20/2018	
26	Email the Peer Review Assessment to the CC	11/28/17	PO	2/20/2018		12/6/2017
27	Coordinate with BOR in getting APS on the list of capital projects to fund	11/28/17		2/20/2018		
28	Email temperature experiment PowerPoint to BC member and Bestgen Report	11/28/17	PO (Gilbert)	11/30/17		11/30/17
29	Send PIT tag data to Casey Pennock in January	11/28/17	PO (Durst)	2/20/2018		1/5/17

BIOLOGY COMMITTEE ACTION ITEM LOG (Updated January 24, 2018)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
30	Evaluate the feasibility and use of 9mm PIT tags	11/28/17	BOR (McKinstry)	2/20/2018		
31	Add the topic of flow regime to February agenda	11/28/17	PO	2/20/2018		
32	Email Angela Hills report on peak flows	11/28/17		2/20/2018		
33	Provide comments to TNC on the Phase III Project concept report	11/28/17	BC	01/01/2018		
34	Develop a revised Phase III Project Report/SOW	11/28/17	TNC	02/20/2018		
35	Contact Southern Ute Tribe with regards to the Roundtail Chub stocking efforts	11/28/17	PO	2/20/2018		
36	Develop a SOW to get experts to evaluate the water and/or fish passages	11/28/17	BOR/PO	2/20/18		
37	Coordinate aerial flights for base flow imaging	11/28/17	BC (Lamarra)/PO (Franssen)	2/20/18		
23	Review and comment on Pathways document	11/29/16	BC	7/15/17		10/19/2017
39	Review complex reach study for discussion on revision of habitat monitoring SOW	7/13/17	BC	11/28/17		11/28/17

BIOLOGY COMMITTEE ACTION ITEM LOG (Updated January 24, 2018)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
40	PO to provide August calcein sampling results and obtain BC input 2017 marking of fish to be stocked.	7/13/17	PO and BC	Week of 8/7/17		8/7/17
41	Send BC draft flow document	7/13/17	PO	End of August		8/30/2017

*Items were re-numbered after changes were made

Yellow highlight indicates annual action items

Green highlight indicates new action items

Red highlight indicates completed action items that will be removed from the next iteration of the Action Item Log