



Approved Summary
San Juan River Basin Recovery Implementation Program
BIOLOGY COMMITTEE MEETING
23-24 February 2016

Attendees:

Biology Committee Members:

Bill Miller – Southern Ute Indian Tribe
Jacob Mazzone – Jicarilla Apache Nation
Brian Westfall – Bureau of Indian Affairs
Bobby Duran (alternate) – 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
Vince Lamarra – Navajo Nation
John Alves (alternate) – State of Colorado
Mike Ruhl and Matthew Zeigler (alternate) – State of New Mexico
Tom Wesche – Water Development Interests
Dave Gori – Conservation Interests

Peer Reviewers:

Brian Bledsoe – University of Georgia
John Pitlick – University of Colorado
Steve Ross – University of New Mexico
Mel Warren – USDA Forest Service
Wayne Hubert – University of Wyoming

Program Management:

Sharon Whitmore
Scott Durst
Nathan Franssen

Other Interested Parties:

Susan Behery – Reclamation
Alex Birchfield – OSMRE
Jarrod Bowman – Navajo Nation Department of Fish and Wildlife
Carrie Lile – Southwestern Water Conservation District
D. Weston Furr – U.S. Fish and Wildlife Service, NMFWCO
W. Howard Brandenburg – ASIR
Jen Kennedy – ASIR
Stephani Clark-Barkalow – ASIR
Steve Platania – ASIR
Michael Farrington - ASIR
Daniel Lamarra – ERI
Richard Grimes – APS
Katie Creighton – UDWR
Brian Hines – UDWR
T. Kim Yazzie – Navajo Nation Department of Fish and Wildlife

Introductions and changes to agenda

- Alex Birchfield and Richard Grimes were introduced. Birchfield is a senior ecologist for OSMRE, he is the agency lead for implementation of the biological opinion (BO) for Four Corners Power Plant and Navajo Mine Energy Project (FCPP/NMEP) consultation. Both he and Grimes' BC involvement will be related to FCPP BO implementation.
- The Program Office provided the BC with a Feb 9 2016 NMDGF letter nominating Mike Ruhl to be the BC representative for the State of New Mexico and Matt Zeigler as the alternate. Wesche motioned to approve Mike Ruhl and Matt Zeigler (alternate) as the representatives for the State of New Mexico; Lamarra seconded; and the BC unanimously approved.

Approve draft summary from 1-2 December 2015 BC meeting; review Action Item list

- Comments by McKinstry and Wesche were incorporated into the meeting summary. Wesche motioned to approve; Lamarra seconded; and the notes were unanimously approved.

2015 Project Reports/Presentations

2015 hydrology and 2016 operations – Behery

- There was 620,939 acre/ft of inflow in 2015 and the reservoir ended the year at 6,063 ft in elevation. This was not a perturbation year and the flow recommendation metrics were met for only the 2,500 cfs target. Both the 5,000 and 8,000 cfs targets are past due on the minimum frequency of years between being met. Operational spill occurred during August (up to 650 cfs) to lower the reservoir to 6,063 ft.
- For 2016, the most probable forecast is for a Type IV release for both the 6,063 and 6,050 ft EWYST. Available water equates to 40 days or 60 days at 5,000 cfs for the 6,063 and 6,050 ft EWYST, respectively. Depending on the shape of the Animas runoff, all flow metrics have the potential to be met based on a Type IV release, with 40 or 60 days at 5,000 cfs. Ramp up can be achieved in as little as three days, but there are no other requirements on the ramp up. Ross suggested we have a ramp down over a 1.5 week time span to help keep fish from becoming stranded. Farrington agreed that a ramp down of 1 week to 10 days is needed. Lamarra said 1995 was the last time we had higher flows for a longer period (58 days @ 5,000 cfs) and a large amount of morphological change occurred as a result. Behery is planning to show some different operational scenarios at the upcoming e-flow workshop. The dam has limitations when larger releases are being made for extended periods. For example, the 4x4 outlet requires inspection every 14 days when releases are at 1,600 cfs (inspection takes 1 day). The HJV outlet can release 3,400 cfs but will require inspection every 30 days. There are possible ways to reduce the requirements for inspections. For example, the HJV outlet could be held at 3,200 cfs until the Animas peaks and then only raise it back to 3,400 cfs for the duration of the release.

Water temperature – Miller

- There was no Navajo Dam peak release in 2015. There was slight temperature depression at Farmington from two months of high Animas runoff but the resulting downstream temperatures reflected ambient conditions. No sudden temperature change or prolonged cold water conditions occurred.
- Historically, there has been significant temperature depression at Mexican Hat with or without releases from Navajo Dam. The effects of temperature depression on larval fish has not been detected, potentially due to different sampling protocols over time, limited sample sizes in some years, and the time scales of sampling (weekly time step) not matching the temperature time scales (daily time step). Based on the literature, Colorado Pikeminnow (CPM) and Razorback Sucker (RBS)

prefer warmer water so colder water from dam releases during certain times of the year could be negatively affecting fish although we don't have the data to tell us how. Miller suggested that investigations of temperature depression and its effects on endangered fish should continue. Franssen asked if Miller has looked at temperature variation in other rivers in the upper basin to see how it compares to variation in the SJR. Miller suggested that the backwaters in the other rivers are fairly warm so the main stem gauges may not provide a good measure. Brandenburg said the backwaters in the SJR are also warmer compared to the main channel. Brandenburg suggested that we may need to conduct larval drift sampling to assess variation in spawning success due to temperature depression.

- In addition to continuing synthesizing water temperature data, Miller recommends revisiting thermal modeling to evaluate the potential to moderate temperature due to Navajo Dam releases.

2015 Rare fish stocking summary – Furr

- The stocking program is trying to increase efficiency through acclimatization, increasing the size of fish stocked, assessing the timing and location of stockings, and other physiological conditioning. A total of 5,608 RBS were stocked in 2015. Fish from one stocking truck were released at Animas River RM 1 instead of 5. They are continuing to assess hard versus soft releases and stocking locations. On Nov. 3, 150,000 Age-0 pikeminnow were stocked at PNM sluiceway, 125,800 at Verde del Rio at RM 196 in the San Juan River, and 125,000 fish stocked at Berg Park. Boyd Park was lost as a soft release site. In 2016, assessment of hard vs soft releases and sources of fish and stocking locations will continue. The CPM stocking plan is currently in Phase II (time period: 2010-2020). The current RBS stocking plan (2009-2016) is in the process of being updated. Furr sent out a draft on Feb. 17 and asked for BC review and comment. **Comments on the RBS augmentation plan are due to Furr by May 3.**

NAPI grow-out ponds and PNM Fish passage – Yazzie

- The PNM fish passage operated April 15 – Oct 30, 2015 (220 days), 7 days a week. However, during that time, water was actually flowing through the passage for only 150 days. There was no flow through the passage during the other 70 days due to debris blocking the flow. In 2015, 11,272 fish were captured in the passage with ~10,000 being natives (38 RBS, 32 CPM, and 1 Roundtail Chub). There were 879 nonnative fish, with 764 of those being Channel Catfish. Most of the catfish were collected in July. There was a lot of debris in Sept. and Oct. that was likely responsible for the lower catch rates in those months. The new screen cleaners seem to be improving flow through the passage, but sediment is still building up in front of the passage. Ross asked what the fish loss (mortality) rates were for fish being caught in the debris when screens were pulled out of the trap. Yazzie said they did not specifically record that information. Of the 32 CPM collected at the passage, some were adults and some had tubercles.
- On April 8, 2015, 7,000 RBS (190-225 mm TL) from SNARRC were stocked into two NAPI ponds (only two ponds were in production in 2015). They used two stocking sites for hard and soft releases. Fish health seemed to be poorer in the warmer months so the system was flushed frequently during this time.
- In 2016, they will have only two ponds in operation. They have not been collecting dissolved oxygen (DO) and temperature data but plan to do this in 2016 as well as count the number of mortalities observed. They will also investigate getting aeration in the ponds which may improve poor survival in the ponds.

Fish entrainment at Hogback – Brandenburg

- Investigations using adult fish were started in 2014. All fish used in the 2014 experiment were hatchery fish conditioned to flow, except for RBS >300 mm TL. In 2015, wild catostomids were used in the adult fish trials as well as two size classes of RBS and CPM. Of 1,055 fish stocked, 1.7% of fish were entrained, 14.1% went through the pass back to the river, 62% of fish moved upstream out

of the diversion, and 22.2% stayed in the raceway. None of the 252 wild-caught Flannemouth and Bluehead Suckers were entrained into the canal.

- Investigations using larval fish and neutrally buoyant particles (NBP) were conducted in 2015. Early larval life stages of RBS and CPM reared at SNARRC were marked with oxytetracycline at SNARRC prior to the experiment and released in May and June, respectively. Two densities of nylon NBP's, neutrally buoyant and positively buoyant, were also used in both May and June. In May, of the 100,000 larval RBS released, 78.3% were entrained and 21.7% returned to the river. For the beads, 91.3% of the less dense particles were entrained and 15.2% of the more dense particles were entrained. SJR discharge was 921 cfs and transport rates were faster in the return canal (77 min.) compared to the entrainment canal (45 min.). In June, of the 45,327 CPM released, 61.3% were entrained and 38.7% returned to the river. For the beads, 85.9% of the less dense particles were entrained and 69.5% of the more dense particles were entrained. Transport rates were the same for both canals (~25 min) but flows were much higher (5,056 cfs) leading to more debris during the June trial compared to the May trials.
- The Variable Frequency Drive on the pumps are still a problem for antenna detections but are supposed to be fixed in 2017. Studies planned in 2016 include: a full season of the weir operating using PIT antennae, using flexion mesolarvae (older than larvae used in 2015), and assessment of drifting patterns in native catostomids.
- Potential ways to increase the efficiency of the weir wall and reducing larval fish entrainment include lights to attract larvae away from the weir wall and electrifying the weir wall.

Larval fish monitoring – Farrington

- In 2015, 24 larval CPM and 1,205 RBS were collected. Very few larval fish were collected compared to other years. RBS densities were highest downstream. Catch rates were very low in July.
- Farrington used mixture models instead of CPUE and relative densities to assess variation in densities and identify environmental correlates. For CPM, models suggested that Year is the best predictor of Delta (presence/absence) and null for mu (densities). For RBS, the models suggested Year was the best for presence/absence and densities. Modeling results suggest the environmental variables used were not good predictors.
- When assessing temporal trends in larval densities, Bluehead Sucker was not significantly lower than other years, Flannemouth Sucker densities were higher than the last two, Speckled Dace numbers are down significantly, Common Carp are still low, Channel Catfish numbers were the lowest ever recorded, Fathead Minnow numbers were down (only higher than 2009), and Red Shiner had the lowest numbers ever recorded.
- RERI sites were again sampled in 2015. The relative percentage of native and nonnative fish was similar in control and RERI channels.
- RBS opercular deformities were 18% in 2015, down slightly from 2014.

Small-bodied monitoring – Zeigler/Ruhl

- Ruhl said they noticed significant differences between what was in the small-bodied database and what was in the annual reports. NMGF is in the process of going through the data and fixing the errors. Zeigler created a new database with arguments and is reentering data. They plan to generate a report that summarizes the errors/discrepancies.
- Zeigler reported they caught 19 CPM in 2015. Although, densities of CPM have been relatively constant, and low, through time, **they captured the first known wild spawned age-0 CPM (18 mm TL) in small-bodied monitoring!** The fish was captured in a large backwater at river mile 133.5, just downstream of Shiprock, NM. The back-calculated spawning date showed spawning occurred in mid-August which was about one month later than other larval CPM caught in 2015. Three large RBS (> 400 mm TL) were captured in 2015.

- Most other native species tend to be stable except for Speckled Dace which is declining.
- Nonnative species are also stable except for Channel Catfish which have declined considerably since 2007.

Adult monitoring – Schleicher

- In 2015, 123 CPM were collected with CPUE being lower compared to earlier years. Nine adult CPM (>450 mm TL), 4 sub-adults (400-449 mm), and 10 larger juveniles (300-399 mm) were collected. Lower catch rates were mostly due to low abundances of age-1 and age-2 fish. They continue to see increased numbers of adult CPM. When assessing movement of CPM with three or more captures, some showed site fidelity and some moved a lot. Assuming capture probabilities of 5% for CPM, the demographic downlist criteria for the number of fish >300 mm in the river was not met. The delist criteria for fish 450 mm TL in the river was also not met. Schleicher said CPM grow faster in the SJR but questioned if they just get a head start because they are stocked. Regardless, this should be reflected in the recovery goals.
- Of the 371 RBS collected in 2015, most originated from NAPI (61%), followed by Ouray (27%). Of fish that came from NAPI, most fish came from Hidden Pond (45%), followed by Avocet East (29%), and Avocet West (25%). Scaled CPUE of RBS is much higher now compared to the last time the entire river was sampled in 2010. Assuming capture probabilities of 4% for Razorback Sucker, demographic down-list criterion was met. However, all fish captured in 2015 were likely stocked fish so the 30% recruitment criterion was not met. One RBS captured was stocked in the Green River in 2010 (a total of 542.9 river miles between stocking and capture). This fish moved 448 miles in 321 days to pass through the inundated waterfall in 2011.
- They were able to sample in the Animas River (Aztec downstream to the San Juan confluence) for a couple days and collected 10 RBS as far upstream as the Animas Pump Station barrier that had been stocked further downstream.
- The most abundant nonnative fish in the SJR above the Animas confluence were Flannelmouth and Bluehead Suckers and Speckled Dace. Two juvenile and one adult Roundtail Chub were captured in 2015.
- Westfall reported that Schleicher took RBS muscle plugs for BIA-NIIP Se analysis. It appears Selenium has not increased in 5 years.

Non-native species monitoring and control, Upper SJR – Duran

- Intensive nonnative fish removal is in its 13th consecutive year. Trips are normally conducted in July and August but two had to be done in October and November because of the Gold King Mine spill. In 2015, 22,697 Channel Catfish and 76 Common Carp were removed. They removed many more juvenile Channel Catfish between Hogback and Shiprock compared to earlier years. A total of 3,677 catfish of various size classes were tagged with floy tags in April and exploitation rates calculated. Lincoln-Peterson mark/recapture estimates for adult fish (≥ 300 mm TL) was 31,863 (34,659 upper 95% -29,066 lower 95%), similar to 2014, and for juvenile fish (200-299 mm TL) was 22,491 (27,721 upper 95% - 17,261 lower 95%), a considerable decrease from the last couple years.
- The endangered fish collected in 2015 consisted of 655 CPM (580 individual fish) ranging from 75-705 mm TL (40 individuals were ≥ 450 mm TL). This was the largest number of CPM adults they have ever caught. In 2015, 1,593 RBS (1,308 individual fish) were captured. RBS are retaining long term in the SJR. Twenty six Razorback Sucker captured in 2015 had been in the river over 10 years.
- A study design for 2016 was developed and is set to assess the nonnative removal program.

Non-native species monitoring and control, Lower SJR – Hines

- A total of 5,587 Channel Catfish were removed in five trips in 2015. The mean CPUE in 2015 was about the same compared to earlier years. The exploitation rates are low; they caught a lot of

juveniles. The population estimate for Channel Catfish >200 mm TL in the lower river was just under 20,000. Over time, catch rates tended to increase and exploitation rates tended to increase with fish size. Only six common carp were caught.

- In 2015, 185 CPM were captured. The population (>150 mm TL) was estimated at 329 individuals in the lower river. Most CPM collected were age-2 fish but one was an adult. CPUE decreased from upstream to downstream. Overall, the CPM population in the lower river has not changed.
- In 2015, 151 RBS were captured. The RBS CPUE was the highest since 2002. Temporal variation in CPUE was similar over time/trips. The RBS population was estimated at 279 (213 lower 95% - 389 upper 95%). Most RBS captured were in the 300 to 400 mm TL range but a **240 mm TL wild-spawned RBS was captured, giving us first evidence of spawned RBS recruiting to this size.**

PIT tag summary – Durst

- Since 2011, there has been a consistent decline in PIT-tagged CPM captured and CPUE. The population consists mostly of juveniles persisting a few years post-stocking. More adults were collected across all sampling efforts indicating more adults are persisting in the system.
- The number of PIT-tagged RBS individuals and CPUE has been increasing over time. The number of RBS in the database tracks closely with adult monitoring CPUE. Many age classes are persisting many years post-stocking; however, there is still limited evidence of natural recruitment. Captures with no tags have decreased in the last three years, most likely because tag loss has decreased since SNARRC started pre-tagging fish before they are stocked into NAPI ponds.
- Experiments to evaluate and improve the efficiency of the augmentation program are on-going. Abundance estimates were discontinued due to violation of closed model assumptions and insufficient recaptures for a robust model approach. The priority should be addressing the recruitment bottleneck.

Predicted responses of Channel Catfish to non-native removal – Franssen

- Current exploitation rates are not likely to over-fish or ‘crash’ the population. Currently, the exploitation rate for 275 mm TL catfish is ~15% and an exploitation rate of ~25% would be needed. The highest densities of Channel Catfish have occurred post-2006. Modeling predicts a substantial decrease in the biomass of the population with current levels of nonnative removal. Size structure (length and mass) of the Channel Catfish population has lowered since early 90s.

Fish condition in response to environmental variation – Franssen

- The variation in the relative weight of fish was assessed in relation to environmental flows and temperatures. The relative weight of fish generally decreased with higher flows. RBS showed a unimodal relationship with temperature. No variables were found to be important in predicting CPM relative weight. There was no evidence for density dependence on relative weight.

Habitat monitoring – Lamarra

- There were a lot of storm events in 2015 but no spring release from the dam. Low velocity habitats increased in 2015 compared to 2014 (28,782 m² to 38,729 m²). There was a net loss of only four islands between 2014 and 2015 and a net gain in island area of 1.5 million m². These island areas were associated with a complex of five islands in the “Mixer” complex (RM 134-138) and the Phase II RERI sites. Total Wetted Area (TWA) has shown a significant decline since 1992.
- Re-analysis using additional data from 2014 and 2015 reaffirms previous results. New analysis using flow adjusted TWA shows the same results, i.e., a loss in TWA over time. The apparent decline is likely due to a decrease in Secondary Channels and an increase in Cobble/Sand Bar channel splits (loss of islands and gain of sand bars).
- RERI Phase I channels flow much more frequently compared to historically and flow at lower flows.

Monitoring of secondary channel restoration sites – Gori

- Stage-flow data shows Phase II restoration was successful. High spring flows caused restored channels to deepen and widen while monsoonal floods caused sediment deposition. High spring flows are critical for maintaining restored channels. Combined percent counts of uncommon, low-velocity habitats were lower in the Phase II main channel versus the control channel in April. By November, percent counts were greater in the Phase II main channel.
- Habitat richness was highest for the control channel in April and showed the greatest increase from April – November; richness was intermediate for Phase II main channel and showed a small increase; richness was lowest for Phase II tertiary, which showed a small decrease over time.
- Mean density (CPUE) of native and non-native small-bodied fish was greater in April than July-November. Mean density (CPUE) of natives varied by mesohabitat and was greater in riffles. Mean density of nonnatives was similar across mesohabitats. There was no significant difference in the density of native or nonnative small-bodied fish in Phase II channels versus control channels.
- Ten age 1⁺ CPM were captured in Phase II channels (none were captured in the control channel) indicating the presence of suitable habitat in all three sampling periods. CPM captures were 3.7-6.7% of total native captures in restored channels. Durst mentioned he and Franssen caught three CPM at the Phase II site while sampling after the Gold King Mine spill.
- They plan to increase the small-bodied and larval fish sampling effort in 2016.

Using microchemistry to determine natal origin in razorback sucker – Clark-Barkalow

- The analyses at Woods Hole originally scheduled for December 2015 had to be rescheduled for March 2016. Isotopic and elemental analyses using fin rays can be used to assess natal origin of SJR fish from Uvalde NFH, SNARRC, and Ouray but not NAPI. More work is needed on NAPI fish. They should have a SNARRC signature but if stocked prior to 2006, it might not be possible to distinguish them because some fish reproduced in the ponds and their signatures are the same as the SJR signature.
- The Microchemistry Library is almost complete except elements are still needed from Uvalde NFH.
- The ~220 mm RBS sampled in 2015 was determined to be a wild fish.

General discussion of 2015 project reports, results, and data; overall assessment of what was accomplished; progress toward recovery; questions to be addressed for annual meeting; additional data integration priorities; 2017 scopes of work.

- Hubert asked what contingencies are in place for the nonnative fish removal crew in 2016 if there is high water. Coordination will be needed between the nonnative removal crews and the timing of the spring release to avoid impacting catch rates. Hines said they will not be on the river during that time and Duran said they can adjust trips around the peak.
- Wesche stated the habitat restoration results look good but questioned the scale and costs of these projects in relation to the needed impacts. He also suggested we need population estimates of endangered fish.
- It will be more difficult to get population estimates for fish below the waterfall compared to in the river. McKinstry and others are doing some work this year to get a handle on dynamics below the waterfall but may need a graduate student on the project in 2017. A graduate student at USU will be using floating antennae to get tags detections. This work could potentially be used for population estimates. How could current projects be used to do population estimates? Mazzone thinks we are jumping the gun on population estimates and doing them will take money away from other recovery projects, especially if the same Razorback Sucker is captured three times in the same year. Franssen agreed. Miller and Lamarra said we need solid data points and population estimates could help inform questions of carrying capacity. Ruhl suggested we might want to get N_e estimates of the endangered

fish. Franssen stated these numbers would be different than total population sizes but would be interesting when assessing recovery. Franssen will speak with people at SNARCC about this. The Program Office will be putting together a conceptual document to look into population estimates (with Brian Hines, NMFWCO, and CRFP). **BC members are to supply the Program Office with their ideas on how to get population estimates by April 1.**

- Bledsoe stated it is clear that the river is simplifying and habitat complexity is decreasing over time but asked if fish will respond to restored complexity. The general assumption is that complexity will help fish. Bledsoe said it would be good to learn about channel degradation and aggradation. He suggested removing nonnative vegetation from some small, but important spots, to see how flows affect habitat and growth of nonnative vegetation.
- McKinstry said the habitat monitoring contract ends this year so we need to figure out what we want from habitat monitoring into the future. Lamarra mentioned the detailed reach study and said we need to shift the scale of habitat analyses to tracking complex sites to see if they truly are important to the fish. Several people said it is already known that complex habitat is important to fish. Habitat monitoring needs to be designed to measure the effects of flow releases. Non-native vegetation removal and aggradation/degradation should be monitored. How habitat monitoring proceeds with future environmental flow releases will be a major discussion topic at the second environmental flows workshop in April.
- Gori said TNC has two proposals pending for restoring a large backwater near the Phase II RERI site. This could be used for rearing RBS. Westfall voiced concerns about Selenium and sediment deposition at the site. McKinstry said we should seriously look into the site near Recapture Lodge where a private landowner has expressed interest in doing restoration work to benefit native fish. Some still questioned the suitability of newly restored habitats. Ross said he will send out paper on RBS conservation in Lake Mohave.
- Lamarra asked about getting a video flight of habitat in July. **Lamarra is going to look into it and give Whitmore an invoice to pay for it with NFWF funds.**
- Alex Birchfield asked about reporting for funds spent from 4 Corners Power Plant. Whitmore said we still need to work on this process but the Program Office will take care of the accounting and provide information to OSM.
- McKinstry proposed that the BC fund a project to look at RBS movement and dynamics below the waterfall. There has been some pushback from the FWS ES office on relocating large numbers of fish below the waterfall to the river because of the mortality risk. Durst suggested it will be important to look upstream in the Animas as well. Ross asked how the fish below the waterfall fit into recovery. Whitmore replied that the fish count but it will be hard to get good estimates of numbers and if fish are recruiting or not.
- When discussing new habitat restoration efforts, Westfall said it may be hard to get permits for restoration projects that could increase sedimentation.
- The group identified potential causes for the recruitment bottleneck including, waterfall, dumb hatchery fish, food limitations, habitat limitations, and SJR foodweb changes (roundtail chub were 80% of biomass; now absent). There are a lot potential ideas for what could be the cause(s). The BC voiced support for assessing the food web in other upper Colorado River systems.
- Draft annual reports are due by the end of March.

2017 New Project proposals

Proposal to assess the contemporary trophic positions of Colorado pikeminnow in the Upper Colorado River Basin – Durst reported preliminary isotope data suggesting CPM are feeding relatively low on the food chain. Recruitment dynamics for the SJR are much different compared to other rivers. He

proposes to assess trophic dynamics in the upper basin using isotopes and fatty acids. **He will develop a draft SOW for the May meeting.**

Habitat and water temperature monitoring – Miller reported. In 2015, no release from Navajo Dam, resulting downstream temperatures reflected ambient conditions and no sudden temperature change or prolonged cold water conditions occurred. There was significant difference in water temperature at Mexican Hat with and without a peak release. We are unable to detect differences in larval density due to water temperature because razorback larvae are present pre-release or during release and only low numbers of CPM are collected (single individual or none many years). Also, different collection methods have been used through time (drift sampling 1993-2001 started late June on descending limb of runoff, larval seining 2003-2015). Current temporal larval collections (weekly time step) do not match the timing of water temperature depression (daily time step). Marsh (1985) documented 100% mortality of CPM at 5, 10 and 15 C and abnormalities at 15 C. Bestgen (2008) found higher growth of razorback at 19.5 C and higher than at 16.5 C. Berry (1988) found that sudden cold shock caused significant mortality in 14 day old CPM larvae and Hammon (1981) and Marsh (1985) found optimum incubation temperature for CPM to be 20-22 C. We need more flexibility in the new habitat monitoring and need to determine appropriate monitoring needs. Miller thinks we need to periodically include LiDAR. We need to identify what other monitoring efforts are needed for the expected spring peak this year. **Miller and Lamarra will put together a SOW.**

Geotechnical review of management options at waterfall – McKinstry and Wesche are investigating what it would take to put fish passage at the waterfall. There are risks associated with creating fish passage because of the location (e.g., lake will come up at some point, sediments are unstable, the waterfall prevents NNF from entering river). It is possible that an old channel could be cut and allow the river to move the sediment. A consideration is the cost-benefit of translocation fish over the waterfall. McKinstry sent out a scoping document to the BC on Jan. 27. The proposed approach is to begin with an internal investigation by Reclamation engineers and geotechnical people from the Denver office. The project would start in 2016 and end in FY2017 on the same schedule as the other FY2017 funded projects. McKinstry doesn't know exactly how much it will cost so proposes \$30,000 is set aside to cover salaries and travel, report out at the BC's May meeting, and produce a final written report. **McKinstry and Wesche will clean up what they've already sent out and resend for additional review.**

Larval fish monitoring – The larval fish monitoring contract expires in May 2017. Before McKinstry moves forward with the contract, he wants a nod from the BC. BC members support continuing larval fish monitoring. Farrington recommends that the sampling area move upstream to the Animas. The BC indicated support for moving it upstream. McKinstry will start work on a new contract.

Planning for San Juan River flow workshop #2b – The workshop will be held 5-6 April 2016 in Albuquerque at the NM Ecological Services Office. Whitmore put together a summary of the second workshop and Durst and Franssen are currently reviewing them. The PO will send out the summary and agenda for review. They are currently working on hypotheses based on existing flow recommendations. Westfall asked how the Hydrology Model will be peer-reviewed and said we will need to keep in mind during the upcoming workshop that the hydrology model has not been peer-reviewed. The workshop will begin with an overview of the progress that has been made to date on reviewing and revising the flow recommendations.

PIT tag antenna (re) installation at Hogback and TNC Phase 2 habitat restoration – McKinstry reported that the PIT antenna at Phase II site is out of the water at base flows and needs to be fixed. They also plan to add an antenna in the "pre-return" to the river and the canal. This work will be conducted by Keller-Bliesner using money from the NFWF account.

Update on diversion study – Farrington and Gori said an update was given during the December meeting and a diversion study working group conference call held 4 Jan 2016 to discuss risk factors. The timeline for deliverables has been set. Lyons sent out data for review and Farrington will send out fish data soon. The physical data will be out in early March. The BC should review all materials before 25 March. Study results should be ready to present during the May CC meeting.

Outstanding BC Business

- Non-native fish workshop in winter 2016/2017 - as per the CC request to potentially move forward with NNF program; could piggyback with Dec. BC meeting.
- Revision to Razorback Sucker stocking plan – **Comments due to Furr by 3 May.**
- Non-native fish stocking procedures – Ruhl sent out revised version on 15 Feb. for comments but did not receive any written ones. Zeigler is working on a revision before going out to other signatories.
- Four Corners Power Plant funding – Covered earlier; the initial funds are in place; some categories on using the funding are specific but others are flexible.
- Cost estimates to convert electrofishing fleet to ETS – Davis sent out estimate on 15 Dec. but did not receive any comments; would need to purchase two units for NMFWCO, one for NN, and one back-up unit; BC recommends SJRIP shift over entirely to ETS units; McKinstry, Program Office, and NMFWCO will work on getting these purchased.
- Update on memo to stock further upstream in the Animas River – Durst sent out a memo in August for review; he received comments and is working to address those comments.
- Update on 2016 LRP – Whitmore said comments were due on the 2015 LRP by Jan. 31, 2015; only received comments from Wesche but will also use comments from Tom Pitts from the 2014 LRP review that came in late; will have a revised draft before the May meeting.

Upcoming meetings

- STReAMS training workshop, 14-15 March 2016, Fort Collins, CO
- Flow workshop #2, 5-6 April 2016, Albuquerque, NM
- SJRIP Annual Meeting, 10-12 May 2016, Durango, CO

BIOLOGY COMMITTEE ACTION ITEM LOG						
(Updated 15 December 2015)						
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		P.I.'s to the Program Office	Annually before Jan. 1		
2	Provide Preliminary Draft Report Presentations		Project Leads (authors)	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		Project Leads (authors) to Program Office	Annually by end of March		
6	Scopes of Work		Project Leads to Program Office	Annually by end of March		
7	Provide Final Reports		Project Leads (authors) to Program Office	Annually by end of June		
8	Annual Data Delivery		PIs to Program Office	Annually by June 30		
9	T&E Species Data		BC to Program Office	Annually by Dec. 31		

BIOLOGY COMMITTEE ACTION ITEM LOG						
(Updated 15 December 2015)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
10	Annually compile T&E data and Program progress into summary to address overall Program recovery goals/objectives for presentation at annual meeting		Program Office/BC	By Annual Meeting in May		
11	Distribute Consolidated Data and list of annual data collected and available in the Program's database		Program Office 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		Project Leads	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	FWS Fisheries/Program Office	5/2011 – provide update and extend as needed	5/10/16	
15	Pursue Non-native fish stocking procedures	11/5/09	Crockett and Ruhl	2/23/16	5/10/16	
16	Pursue effects study on Hg/pikeminnow with other groups/programs	1/14/10	Program Office lead	ongoing		
17	Include benchmarks for recovery in LRP	12/5/14	Whitmore	1/5/15	5/10/16	
18	SOW to conduct population estimates for Colorado pikeminnow and razorback sucker	2/20/15	PO	5/12/15	5/10/16	

BIOLOGY COMMITTEE ACTION ITEM LOG						
(Updated 15 December 2015)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
19	Finalize environmental flow workshop notes and summary	3/25/15	Whitmore	5/12/15	2/23/16	3/3/16
20	Investigate costs of converting San Juan electrofishing fleet to ETS units	5/12/15	Davis	9/30/15	12/31/15	12/15/15
21	Comments on the LRP	12/2/15	BC to Whitmore	2/23/16		2/23/16
22	Comments on Animas River stocking memo	12/2/15	BC to Durst	12/31/15		12/31/15
23	Distribute the final 2016 non-native fish SOW	12/2/15	Whitmore	12/31/15		12/7/15
24	Prepare a proposal on a geotechnical review of management options at the waterfall	12/2/15	McKinstry and Wesche	2/23/16	5/10/16	
25	Prepare a Navajo Dam temperature depression proposal	12/2/15	Miller	2/23/16	5/10/16	
26	Status updates for the LRP	12/2/15	PIs to Whitmore	2/23/16	5/10/16	
27	Investigate Upper Basin requests for STReAMS database funding	12/2/15	Whitmore	3/31/16		
28	Memo to Reclamation on 2016 Navajo Dam releases and procedures	12/2/15	PO to BR	2/23/16	5/10/16	

BIOLOGY COMMITTEE ACTION ITEM LOG						
(Updated 15 December 2015)						
Item No.*	Action Item	Meeting/O rigination Date	Responsible Party(s)	Due Date	Revised Due Date	Date Completed
29	Investigate options for making endangered fish stocked into the upper Animas River exempt from some ESA regulations	12/2/15	PO	2/23/16	5/10/16	
30	BC members to supply PO with ideas on how to conduct population estimates	2/22/15	BC to PO	4/1/16		
31	BC comments on RBS augmentation to Furr	2/22/15	BC to Furr	5/3/16		
32	Estimate cost of videography for habitat in 2016	2/22/15	Lamarra to Whitmore	5/10/16		
33	SOW to assess trohpic ecology of CPM in the upper basin	2/22/15	Durst	5/3/16		
34	SOW to monitor habitat	2/22/15	Miller and Lamarra	5/3/16		

* 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

Date	Annual Tasks	PO	CC	BC	P.I.
Oct.	Reclamation administers contracts	X			
Nov.	BC Meeting (peer reviews typically do not attend this meeting) <ul style="list-style-type: none"> Review data integration results from previous year Identify questions for annual data integration Discuss Program priorities LRP review and provide recommendations (with pros and cons) to PO Appoint new BC Chair (every two years) 	X		X	
Dec. 31	RBS/CPM stocking/capture/recapture data to Program Office				X
January	Notification/update of Program rosters/mailling lists	X			
January	Executive meeting (Program Office; Reclamation Fund Manager; CC and BC Chairs) to do preliminary planning for upcoming year	X	X	X	
January	Updated LRP to BC and CC for review	X	X		
January	Reclamation provides a determination of perturbation for BC Review.	X			
Jan. 31	Distribute consolidated PIT tag data and post other data	X			
February	BC Meeting (peer reviewers are expected to attend this meeting) <ul style="list-style-type: none"> Prepare for Annual Meeting Provide preliminary results; draft report presentations Final review of updated LRP Review annual data integration priorities 	X		X	X
Feb/Mar	Final updated LRP to CC (with explanation of input included/not included)	X			
March	CC approval of LRP				
March	Annual guidance/solicitation for SOWs based on LRP/list of prioritized projects	X			
March 31	Draft final reports and SOWs due to Program Office			X	X
April	Preliminary draft Annual Workplan and Budget	X			
May	Annual Meeting <ul style="list-style-type: none"> Program overview P.I. presentations Review preliminary draft AWP Committee reports 	X	X	X	X
May	Annual hydrology meeting to review and solicit information regarding the San Juan River Basin Hydrology Model	X			
June/July	Draft Annual Workplan and Budget	X			
June 30	Provide final reports and data sets to Program Office				X
July	Final reports posted on website	X			
August	Tech review of draft AWP; recommendations with pros and cons to Program Office			X	
August	Revise AWP based on input and transmit final draft to CC with documentation of all input	X			
Sept.	Review and approve final AWP		X		
Sept.	Post final AWP to website	X			