BIOLOGY COMMITTEE MEETING
17-18 February 2021

BIOLOGY COMMITTEE (BC) MEMBERS:	REPRESENTING:
Ryan Besser	U.S. Bureau of Land Management (BLM)
Harry Crockett	State of Colorado
Stephen Davenport	U.S. Fish and Wildlife Service (USFWS)
AJ Keith	Conservation Interests
Vince Lamarra	Navajo Nation
Colin Larrick	Ute Mountain Ute Tribe
Jacob Mazzone	Jicarilla Apache Nation
Mark McKinstry	U.S. Bureau of Reclamation (BOR)
William Miller	Southern Ute Indian Tribe
Carrie Padgett	Water Development Interests
Benjamin Schleicher	U.S. Fish and Wildlife Service
Brian Westfall	U.S. Bureau of Indian Affairs (BIA)
Matthew Zeigler (Chair)	State of New Mexico

COORDINATION COMMITTEE (CC) MEMBERS:	
Ryan Christianson	U.S. Bureau of Reclamation
Jojo La	State of Colorado
Christina Noftsker, CC alternate	State of New Mexico

PROGRAM OFFICE (PO):	
Melissa Mata, Program Coordinator	U.S. Fish & Wildlife Service
Eliza Gilbert, Asst. Program Coordinator	U.S. Fish & Wildlife Service
Scott Durst, Science Coordinator	U.S. Fish & Wildlife Service

OTHER INTERESTED PARTIES:	
Mike Greene	PNM
Aaron Chavez	City of Farmington
Dan Lamarra, BC Alternate	Navajo Nation
David Speas, BC Alternate	U.S. Bureau of Reclamation
Susan Behery	U.S. Bureau of Reclamation
Adam Barkalow, BC Alternate	New Mexico Department of Game and Fish
Jill Wick, BC Alternate	New Mexico Department of Game and Fish
Ben Zimmerman, BC Alternate	Southern Ute Indian Tribe
Mel Warren, Peer Reviewer	U.S. Forest Service
Nathan Franssen	U.S. Fish and Wildlife Service
Weston Furr	U.S. Fish and Wildlife Service
Steven Mussmann	U.S. Fish and Wildlife Service
Melody Saltzgiver	U.S. Fish and Wildlife Service
Tracy Diver	U.S. Fish and Wildlife Service
Brian Hines	Utah Division of Wildlife Resources
Katie Creighton	Utah Division of Wildlife Resources
Ken Sayer	U.S. Bureau of Reclamation
Rob Hilldale	U.S. Bureau of Reclamation
Steve Mussmann	U.S. Fish and Wildlife Service

Matt Bogaard	Kansas State University
Keith Gido	Kansas State University
Sophia Bonjour	Kansas State University
Casey Pennock	Utah State University
Emily DeArmon	University of New Mexico
Kim Yazzie	Navajo Nation Fish and Wildlife
Jerrod Bowman	Navajo Nation Fish and Wildlife
Steven Platania	American Southwest Ichthyological Researchers
Stephani Clark Barkalow	American Southwest Ichthyological Researchers
Michael Farrington	American Southwest Ichthyological Researchers
Jeff Arnold	National Park Service

Approve draft summary from 15-17 December 2020 BC meeting; review Action Item list

It was requested that a discussion and vote for AJ Keith as a BC member representing Conservation Interests (The Nature Conservancy) should be added to the agenda.

Durst stated he only received comments from Zeigler on the draft summary of December BC meeting and most were minor edits. Miller motioned to approve the draft summary, Mazzone seconded. No one was opposed, the draft summary was approved.

Review of the Action item list:

#26 BC was to provide comments on the diversion prioritization to Gilbert by Dec. 28, completed, on today's agenda.

#27 BC was to provide questions they would like addressed at the nonnative fish symposium by Dec. 31, completed, on today's agenda.

#28 BC was to revise their comments on the habitat workshop wrap up by Miller and Zeigler by Jan. 31, completed, on today's agenda.

#29 Zeigler was going to send a memo to the CC about prioritizing SOWs if there is a funding shortfall for FY2021. Action item was removed due to full funding coming through for FY2021.

Discussion and vote for AJ Keith joining the BC representing Conservation Interests.

McCarthy provided the BC with TNC's recommendation letter and AJ Keith's CV via email this morning. McKinstry asked if Keith would be able to get out in the field sometime to see the river as it is much different from a lot of other systems in the west. Keith said he would be interested in doing that if TNC would support it. Crockett asked about Keith's field experience. Keith gave extensive list of previous field work. Westfall asked if TNC could commit to supporting some field work for Keith. Keith reiterated he would ask TNC, but he was very interested in seeing the river. Davenport noted New Mexico Fish and Wildlife Conservation Office (NMFWCO) are starting river work next week for the next 6 weeks and extended an invitation for Keith to join if interested. Zeigler polled the BC for voting on Keith to join the BC, all BC members present voted "yea". Keith was admitted as the BC representative for TNC.

2019 Project Reports/Presentations

Behery - 2020 hydrology, possible 2021 operations, and overview of Hydrology Model Technical Workgroup meeting.

The 2020 hydrology of the San Juan River Basin resulted in no release from Navajo Dam due to low water availability, and very dry soil moisture going into the 2020 season. Due to no release, none of the high flow targets were met in 2020.

Currently, the basin has 89% of average snowpack overall, but the eastern side of the basin has more moisture. The soil moisture in the basin in November of 2020 were at record lows, with the last three years having below average soil moisture. In Water Year 2021, there was a small decline in Navajo dam releases in December 2020 to help channel maintenance at Turly-Manzanares Ditch.

The 2021 hydrology will likely have a similar runoff to 2020. However, available water has been increasing since January but we will need at least another 250,000 acre-feet in order to have a spring release. Therefore, flow targets in 2021 will likely not be met, unless the Animas River has a large runoff and comes as one peak.

Zimmerman asked if there was any update on the San Juan River Water Commission requesting a release from Lake Nighthorse in March. Chavez said the water commission wants to collect data on the flows in the Animas when irrigation is not occurring to investigate the amount and distribution of flows downstream. It should be a small and short release but the dates have not been set. The maximum release would likely be 300 acre-feet, so around 30 cfs for 5 days. Behery is aware of the request and currently has it accounted for in her model. Durst asked if there was going to be fish monitoring coinciding with the release to assess potential nonnative fishes exiting the lake. Behery stated there were plans to monitor fish, but she had no further details.

Behery gave an update on the Hydrologic Modeling Technical Workgroup (HMTW) meeting summary-meeting held 7 January 2021. The overall goal of the group is to investigate ways to meet the flow recommendations by optimizing Navajo dam operations. The questions they plan to answer include: What flow targets are met under the Gen 4 Baseline Model?, What is the sensitivity of the flow targets to overall depletion levels in the basin?, Are there flexibilities in the current decision tree that can be modeled to improve flow target performance?, and Are there operations outside of the decision tree that will improve flow target performance? Westfall asked when they plan to start model runs because there are still outstanding questions about the Navajo-Gallup depletion guarantee. Behery stated they are starting as soon as possible and hope to be finished by the end of April. Westfall will check with Pollock on where the depletion guarantee stands. Gilbert asked about Lake Powell and the “24-month study”, and if that was a concern for Navajo Dam operations. Behery said the 24-month study is a collaborative modeling effort to assess the possibility of Lake Powell dropping below 3,525 ft of elevation. The models are being run monthly now but any actions are not anticipated at this time. Behery doesn’t currently have any information about Navajo Reservoir potentially contributing water to Lake Powell. Right now, they are in the monitoring phase and it is not clear what reservoirs, or the amount of water that may need to be released to keep Lake Powell at desired elevations.

Dan Lamarra – 2020 Habitat monitoring

Lamarra noted that the aerial videography had some issues with distortion so they only recently received the data. Therefore, his presentation is shorter than normal but the annual report will contain all results. The imagery was captured on Sept. 3, 2020, at a 10cm resolution, when flows were 531 cfs at the Four Corners USGS gauge. The flight only took one day because the new camera had a wider image capture field.

The San Juan River peaked at 3,383 cfs during first week in June 2020. The total wetted area was similar to previous years at similar discharges, indicating data capture was comparable to previous data sets. Island counts, used as surrogate for channel complexity, were similar in 2020 (n = 163) and 2017 (n = 154), a year with similar flow during data capture. There is a strong positive relationship between flow at mapping and number of islands.

In 2020, there were 1,369 low velocity habitats making up 98,107 m^2 and was 5,478 m^2 higher compared to 2017 (a year with similar flows at mapping). However, there was about 20,000 m^2 less area in 2020 compared to November 2019. In 2020, backwaters numbered 965 and consisted of 74,908 m^2, embayments numbered 404 with 23,199 m^2.

Overall, the lack of a size-able spring runoff reduced the number of island complexes in all reaches except Reach 5. The loss of islands did not result in large secondary channel backwaters as seen in previous years. Large bank backwaters were present in relatively high numbers, likely due to sand not being removed from the system. Low velocity habitats in 2020 were the second highest since the early 1990s and this is likely attributed to the numerous bank backwaters.

Durst asked if the habitat had responded to any monsoons. Dan Lamarra answered that if they occurred they likely filled in side channels. Vince Lamarra reiterated that it appears there were smaller, but more frequent backwaters, potentially increasing the 'stickiness' of the river. McKinstry asked if Dan Lamarra could provide some sequential aerial photographs of the secondary channels constructed by the Program. Dan Lamarra responded that he could. Barkalow asked if there were similar sequences with a high flow year followed by a low flow year? Lamarra responded yes, but he would have to go back to mine those data. Keith asked if they have ever investigated riparian vegetation encroachment over time. Dan Lamarra said not recently. Vince Lamarra reminded the group of previous investigations on riparian vegetation are on the Program website. Westfall highlighted how good the imagery was compared to other aerial surveys (e.g., Google Earth).

Furr - Rare fish stocking summary

Colorado Pikeminnow (CPM) – 2,621 age-1 CPM were stocked ~0.3 miles upstream of the Highway 162 bridge, near Aneth, UT on October 21, 2020. 1,558 individuals were pellet-fed while 1,063 were prey trained and all fish were PIT tagged. Additionally, 259,754 age-0 individuals were stocked at the same location and date, without PIT tags. Miller asked why those age-0 fish were stocked. Durst replied that Dexter produced the fish but didn't need to retain those numbers to rear fish to age-1 as was planned by the BC. Miller didn't recall the BC agreeing to stock age-0 fish. Durst said he thought the BC was made aware of this stocking but would look at previous meeting notes to make sure.

Razorback Sucker (RZB) – In total, 12,221 RZB were stocking into the San Juan River in 2020. NAPI ponds were stocked May 6, 2020, with the 2018 year class from Dexter (~175 mm TL). Stocking occurred later than normal and fish looked slightly smaller compared to previous years. East Avocet started with 3,500 fish, of those 2,378 were returned and stocked. West Avocet started with 3,517 fish, and returned 3,663 fish, the increase in fish numbers is under review by Furr and Bowman. Hidden pond started with 3,500 fish and returned 2,905. All fish that met the minimum stocking length (300 mm TL) were stocked out at either Bloomfield, Penny Lane, Montezuma Creek, or PNM weir. Nearly 2,400 fish did not make the size limit, and were then stocked below the Piute Farms waterfall (with PIT tags) at the recommendation by the BC. A total of 555 fish was lost to predation or scavengers while fish were being held prior to transport. The Ouray National Fish Hatchery Grand Valley Unit stocked 3,276 fish from the 2019 year class averaging 357 mm TL (range = 300-450 mm TL). These fish were stocked at Bloomfield, PNM weir, and Montezuma Creek.

Miller asked about the status of the "Source x Site" experimental stocking design. Durst said the PO has not conducted that analysis. Miller asked that someone conduct it so we can decide if the stocking design is necessary.

Bowman - NAPI Ponds management

Season started with the inlet pipe to the ponds bursting and cla-vals breaking due to freezing. These valves are not manufactured locally and are being discontinued, therefore they are getting expensive to replace. The new SOW recently approved by the CC to replace the valves should solve the problem. Aquatic Consultants, Inc. (ACI), repaired the inlet pipe before 10,517 RBS were stocked into the ponds. Three

sample counts were conducted in June, July, and August. Feed was also changed to a new provider because Skretting was unable to make RBS food. Passive harvest was not conducted due to staffing issues caused by COVID-19. Active harvest was completed October 5-9 by Navajo Nation and ACI staff. 6,703 fish were stocked at various sites on the San Juan River and 2,302 fish <300 mm TL were held over in East Avocet until October 30th. On this date, fish that reached >300 mm TL were stocked at PNM weir, and the smaller fish were stocked below Piute Farms waterfall.

Overall, 8,681 fish were stocked from NAPI ponds (82.5% return rate overall), 6,977 fish >300 mm TL were stocked into the San Juan River whereas 1,704 fish <300 mm TL were PIT tagged and stocked below the waterfall. Fish were not stocked at Berg Park (Animas River) due to low water, these fish were subsequently stocked at the Penny Lane Boat Launch in the Animas River.

Barkalow asked if water quality monitoring occurs in the ponds? Bowman said yes, but not continuously. They mostly use small chemical kits, and water quality in the ponds was similar to that in the San Juan River measured at PNM passage. Barkalow suggested they add some continuous water quality monitoring devices to their SOW to get a better understanding of potential water quality issues in the future.

Yazzie – Operation of PNM Fish Passage

Crews have started scanning all Bluehead and Flannelmouth Sucker for PIT tags following work conducted by Kansas State University. Yazzie requested these fish be floy-tagged in the future to aid their identification. Two new PIT antennas were installed by McKinstry and McKinnon on 18 February 2020, but there were some periods of time thereafter that they were not operational. PNM helped open the passage by removing the screens 27 February 2020. Crews also added cobbles to the concrete skirt below the passage. New chain links were added to the brush chain. They have been using the water cannon to remove debris in front of the passage.

The passage was ran as nonselective from 9 June – 2 November, 2020 for a total of 147 days. PNM reset the south screen on 2 June. A sand bar did not form in front of the ladder this year, precluding any work on the trash rack in front of the passage. The passage had a large number of CPM enter the trap on August 4, ranging in size from 350 – 545 mm TL, 55 of the 58 fish did not have tags.

Overall, 282 endangered fish and 3,998 other native fishes were passed. 148 nonnative fishes were removed from the river. Miller asked if Yazzie could give numbers of each species and sizes in their annual report, Yazzie affirmed the request.

Davenport – Nonnative fish management

Davenport reported that Daniel Kaus left NMFWCO for a job in Reno, NV, and Bobby Duran's term has ended. Nonnative removal occurred between River Miles 77 and 119 between 22 January and 12 March 2020. Removal consisted of one marking pass and three removal passes with two rafts. Exploitation rates were assessed by pass.

Of the 920 Channel Catfish that were tagged, 213 were recaptured. Overall exploitation was 23.15% but increased with fish size. Exploitation rates for fish 300-399 mm TL were 16.77%, 400-499 were 29.47% and fish >500 were 31.03%. A total of 4,244 Channel Catfish were removed from the river. Franssen asked why they reported two different overall exploitation rates. Davenport noted that they calculated it overall as well as by each pass where the removed fish were included in pass-specific calculations.

Overall, exploitation rates looked fairly good compared to previous years when there was a lot more effort.

Farrington – Larval fish monitoring

Farrington said they are still working on identifying larvae from 2020, so results he presents today are preliminary. There were six sampling efforts between Sand Island and Clay Hills RM 76.4-2.9 over early

June through mid-August. Therefore, he post-processed previous data to the same reach of river as sampled in 2020. The upstream expanded monitoring area in 2020 was moved to RM 188.3 to 159.4 during a single monitoring pass in May to target larval RZB. Two sampling efforts were conducted below the waterfall between 4-18 August over RM -1 to -17.

Density of CPM larvae were fairly high with a mean estimate of >5 fish/100 m^2 in the long term monitoring area. Farrington only had data for RZB in May so far. Forty-two larval RZB were collected between RM 188.3 and 159.4, with one collected at RM 184.3, the highest upstream collection ever reported indicating a spawning bar upstream of there. Razorback Sucker densities averaged 6.5 fish/100 m^2 in this reach.

Overall, partial data for RZB indicated a likely "average" year. The upstream distribution of RZB increased by 4.5 miles. The upstream most San Juan River collection was upstream of the Animas River confluence. This is the first collection upstream of the Animas River confluence. Colorado Pikeminnow densities were similar to known "good" years. The lack of the April sampling due to COVID-19 restrictions will have to be considered in future analyses of the 2020 data.

Barkalow-Small-bodied fish monitoring

COVID reduced spatial distribution of sampling in 2020 so only ~50% of the proposed length of river was sampled. ASIR conducted the work and were funded by BOR. Sampling occurred 9-15 September, 2020 from near Bluff, UT to Clay Hills takeout. Thirty-seven sampling locations were taken with 7,027 m^2 of habitats seined. Sampling data in 2020 were compared to the same reach conducted in previous years.

6,953 fish were captured, 2.7% were native fish. Most frequent species were Red Shiner, followed by Western Mosquitofish, Channel Catfish, Speckled Dace, Fathead Minnow, and Flannelmouth Sucker. Six age-0 CPM were captured, no age-1 CPM were encountered. Age-0 CPM averaged ~40 mm TL. No Razorback Sucker were captured in 2020. Flannelmouth Sucker and Red Shiner density estimates were the highest observed since 2003.

Barkalow asked if age-0 Razorback Sucker are susceptible to capture by seines if they are much larger than the usual size of fish collected. Seining appears to be only efficient at collecting fish <100 mm TL and the age-0 RZB collected in 2018 averaged ~130 mm TL.

Overall, small-bodied sampling detected age-0 CPM in 4 out of the last 5 years. Seining may not be effective for sampling age-0 RZB if they are >100 mm TL.

Miller asked if sampling should be moved earlier to capture age-0 RZB. Barkalow said that is an option but that may reduce the susceptibility of age-0 CPM if they are too small.

Hines – Wild age-1 Razorback Sucker monitoring

Demographic monitoring did not occur as planned in 2020 due to COVID-19 restrictions. Therefore, 3 passes were conducted through the canyon-bound reaches (Mexican Hat, UT to Clay Hills) to search for potential wild age-0 RZB. Sampling occurred between August and September, 2020 with two electrofishing rafts and only small suckers were netted. All potential age-0 RZB on the second and third passes were fin-clipped and their ancestry was genetically analyzed at the Southwestern ARRC in Dexter, NM.

A total of 84 fish was presumed age-0 RZB and 24 were called 'hybrids' in the field. Genetic assessment revealed there were no pure RZB collected and most individuals were F1 hybrids with Flannelmouth Sucker. Franssen asked about the 2019 age-0 RZB and if they were analyzed. Hines reported that those fish were also analyzed and they too were mostly F1 hybrids with no pure RZB. Therefore, no wild age-0 RZB were confirmed in 2019 and 2020.

Frequency of hybrids detected from larval fish genetic analyses indicated hybridization rates were much lower, <10% in most years. Hines suggested that low water years may change RZB's spawning times and

areas which could lead to increased rate of hybridization. McKinstry asked Farrington how many larval fish he identified as 'potential hybrids' in the larval fish in 2020? Farrington said there seemed to be a lot more that couldn't be keyed-out to either species. Miller asked if there were any Bluehead Sucker hybrids, "no" replied Hines, all were Flannelmouth Sucker hybrids.

Saltzgiver – Quantifying effective number of breeders

Genetic sampling of larval RZB and CPM were conducted from samples collected in 2019. Nearly 175 RZB and 225 CPM were analyzed.

Nb for RZB in 2019 averaged 213 (95% CI = 169-278) and estimates did not increase when larval fish collected below the waterfall were collected, indicating fish were likely spawned in the river proper. Temporal variation in RZB Nb looks to have stabilized over time.

Nb for CPM was estimated at 58 (95% CI = 52-65). 2020 mean Nb estimates were the highest to date.

Census size (Nc) of the RZB and CPM populations in 2019 were not available for her to calculate the ratio between Nb and Nc. Durst reported that the population estimate for adult CPM in 2019 was ~142.

Discussion turned to the large number of age-0 Razorback-Flannelmouth hybrids collected in 2019 and 2020. Platania said ASIR will look at their data and report on how many individual RZB and fish identified as "catostomidae" that could be genetically analyzed to assess hybridization. Saltzgiver also noted that Dexter will use a sex-linked marker in the future to identify which sexes of species are contributing to hybridization.

Bogaard – Summary of long-term data from Piute Farms Waterfall

Razorback Sucker have been collected below the waterfall from 2016 through 2020 in early March in an about 1.5 km reach. Fish were implanted with a PIT tag if one was not present and fish were transported 2-4 km above the falls. In 2020, 41 individual RZB were implanted with radio tags and transported above the waterfall and tracked with stationary and mobile receivers and antennas. Fish were then tracked via PIT tags at stationary PIT antennas, and surveys with radio antennas.

PIT tag antennas below the waterfall were used to estimate population sizes over time. These data also showed that there are likely two periods RZB are migrating to the waterfall, one before and one after spring runoff. Population estimates indicated ~750 individual RZB annually migrate to the waterfall, with detectability estimates ranging from 0.73 to 0.93 annually. However, less than 25% of individuals were annually transported above the waterfall between 2017 and 2020.

Age-structure of RZB below the waterfall indicated most fish were <age 7, however two large age-classes are coming through the age structure. These fish belonged to the 2010 and 2011 age-classes. Most fish have originated from the Ouray National Fish Hatchery–GVU, followed by SNARRC, followed by fish tagged in the Colorado, Green, and San Juan Rivers.

In 2020, fish were sampled below PNM weir before COVID-19 restrictions were in place. Based on PIT antenna detections, fish were not present at that time and no fish were collected.

In total, 156 RZB were moved upstream in 2020 (42 were implanted with radio transmitters) with 1557 detections from fixed radio receivers and 1216 detections from mobile telemetry surveys upstream. These contributed to 42 individual GPS locations of only 10 individuals being detected an average of 74 days after moving and ranged between 1 and 153. Most fish were detected in the canyon with fewer upstream. Most other fish were collected downstream of the waterfall. Overall, fish that are moved above the waterfall tend to stay in the river during the spawning season but then ultimately return to the area below the waterfall and Lake Powell.

In 2021, several new stationary radio receivers will be installed and more intensive monitoring will occur to investigate finer scale movements and potential spawning locations.

Principal Investigators – Covid19 impacts on FY2021 field activities

Zeigler stated New Mexico Game and Fish are planning on sampling in 2021.
Platania stated ASIR are not anticipating any problems.
Davenport said nonnative fish removal was planned to start next week.
Creighton said UDWR are planning to sample as planned in 2021.
Schleicher was still planning on sampling Shiprock to Clay Hills this spring for age-1 Razorback Sucker as well as helping KSU at PNM.

Zeigler asked about the status of the Remote Biologist (formerly Dan Kaus) for operations of Phase III wetland this spring. Davenport said they think they should have it covered with current personnel and potential new hires.

Westfall asked about the significance of all the hybrid age-0 RZB that were collected and what that means for the Program. Durst summarized by saying "It's not good".

Miller asked about the status of the Pittsburg State SOW (James Whitney). Gilbert said they are planning on starting the project in 2021 and have already hired a student for the project.

Thursday 18 February 2021

McKinstry – Update of FY2021 funding

The US Bureau of Reclamation has received their budget for 2021 and money has been allocated from the Western Area Power Administration (WAPA) to fund the environmental programs in full. McKinstry noted that the money needs to be shared among the Upper Colorado River Recovery Program the Grand Canyon Adaptive Management Program (GCAMP), and the SJRIP. Therefore, he will prioritize funding Navajo Nation first and then contract ASIR to start their sampling. He will be a little later in sending funds to other Program participants but those groups should have money from last year to hold them over.

McKinstry has no other information about funds for next year, but with the Democratic party controlling the House, Senate, and Presidency he would predict they should be able to get a budget passed more easily. Miller asked if there was full funding for the SJRIP? McKinstry responded in the affirmative, but there was not a cost of living increase and doubted that one would be included before 2023.

McKinstry reported that WAPA thinks they will be able to provide $12-12.5 million for the 10 years following 2023, but the remaining budget shortfall will need to come from someplace else. Moreover, those funds will likely be spent on the GCAMP as they will unlikely be able to secure funds elsewhere. Therefore, the SJRIP will likely have to proceed with fewer funds than they have in the past.

McKinstry also noted that the Ranchman Project didn't get PIT antennas installed due to short time frame and freezing river conditions, so those are planned to go in this coming August or September during low water. The Hogback antennas were also not installed but they were going to try again later this summer. The three solar-power systems were installed at the autonomous antenna locations but not the PIT-tag antennas, those will likely be installed later in the summer as well. Durst asked about the locations of the three autonomous PIT antennas. McKinstry stated they were 3 20-foot antennas, one around RERI phase II site, one near the 'Powerline' river camp, and one downstream of the confluence with McElmo Creek.

The new trapping systems below the waterfall are going to be tested this spring starting on March 8th. The Hogback pumps are still interfering with PIT antennas, BOR is now looking to replace the entire system to

solve the issues. BOR is also moving forward with NAPI pond improvements this spring but it may be difficult to get that work done before the ponds need to be filled.

Zeigler – FY2021 project prioritization

This agenda item turned out to be unneeded due to funds being restored in FY2021. However, the BC may have to revisit project prioritization if funds are reduced in the future.

BC – General discussion of FY2020 results and progress toward recovery and submission of FY2022 SOWs

Vince Lamarra asked that we move Pennock's presentation on his proposal to after the presentation of the next steps on habitat improvements. Miller asked if the BOR Technical Services Center draft reports on the waterfall and APS weir were sent out. Durst sent the reports to the BC on 2 February, 2021. Barkalow asked Hines if they encountered any age-1 CPM this last fall. Hines reported he didn't think so.

McKinstry asked for an update on the CPM broodstock collections that occurred in the upper basin this last fall. 2021 will be the last year that Dexter will be able to accept CPM due to space limitations. Creighton thought there were 546 individuals collected from the Colorado and 1,024 from the Green River. Platania mentioned that there were two distinct size classes so Dexter needed to separate them to reduce cannibalism. He also noted they collected 400 in one backwater so their trip wrapped up in two days, overall it was a great year. Mussmann thought there was a total of 1,200 individuals alive at Dexter from the collections in 2020. Dexter's proposed study to investigate ways to reduce stress on fish during collection was not conducted but they are looking to complete that this coming fall. This should help future collections but not necessarily collections in 2021. McKinstry reiterated that eventually the new broodstock will be split and half will be moved to someplace in the upper basin and the other half will be kept at the Southwestern ARRC.

Durst asked if anyone had any ideas how to tackle the new hybrid issue with age-0 RZB. Miller asked if Nb could be estimated from the hybrids to get an indication of how many parents contributed to those individuals. Saltzgiver and Mussmann thought that would be difficult due to them being hybrids. Mussmann said he may be able to assess the possibility of Flannelmouth Sucker genes contributing to higher survival of the hybrids, especially given their plan to conduct Next Generation sequencing in the 2020 larval fish.

McKinstry asked Farrington how many 'catostomids' (potential hybrids) he usually finds annually? Farrington thought 1-2%, so there may only be <100 individuals that have been preserved in ethanol. Barkalow wondered if we would also need to analyze the other suckers to get a full understanding of hybridization rates. Farrington thought there were 155 'catostomids' from 2020 that could be analyzed. Crockett shared a paper that he thought could be useful to the group: Mandeville EG, *et al.*(2017). Inconsistent reproductive isolation revealed by interactions between *Catostomus* fish species. *Evolution Letters*: 1–14. Miller asked if any hybrids were collected below the waterfall, Saltzgiver didn't know. In the future, all age-0 RZB <300 mm TL should be fin clipped and kept for genetic analysis.

Franssen asked if the BC would be interested in investigating more basic reproductive ecology of the stocked RZB in the river. He is currently working on a revision to a manuscript with Diver, Mussmann, and Durst, that attempted to explain the relatively low Nb of RZB. He suggested simple metrics of age at maturity, fecundity, age/length and egg quality could be assessed in addition to locating specific spawning locations. Furr asked if selenium contamination in RZB could be the issue. Westfall said the Bureau of Indian Affairs is conducting a study with Kevin Buhl from the USGS to answer that question. Davenport thought it would be good to get a better understanding of the reproductive ecology of RZB in the San Juan River and thought they could help with such a study. Barkalow agreed that getting basic reproductive ecology information from the RZB stocked into the river would be a good idea, but stated that those investigations yield information about the potential for a Razorback Sucker to reproduce. He stated that if the program is interested in which fish are reproducing in the River it would be possible to asses this with high-throughput sequencing similar to what is done with Salmonids in the Pacific Northwest. This was

discussed by the group and while it was agreed that this could provide information on which Razorback Suckers are successfully spawning Mussman assumed that this would require too much effort and funding.

Zeigler asked Durst if he found documentation about stocking 200,000 age-0 CPM in fall 2020. Durst said he didn't find specifics where the BC agreed to stock them, however, Dexter's approved SOW for 2020 stated they were going to produce and stock 400,000 age-0 CPM. Thus, the change to stocking 12,000 age-1 CPM likely occurred after they produced the 400,000 individuals.

Miller asked if the PO was going to provide a list of priorities for the Program before the BC starts discussing potential projects. The PO did not provide a list and will revisit that process. Durst noted that alleviating recruitment bottlenecks is still a high priority. Miller thought more attention should be given to the CPM bottleneck as most recent work has been conducted on RZB.

Zeigler – Habitat workshop summary and next steps

Zeigler reported that all BC members had responded to the habitat ranking exercise and he and Miller averaged BC responses. Zeigler reviewed the rankings with the highest ranked question to be address as "What habitat is critical for age-0 Razorback Sucker recruitment? Tactic - identify the most likely hypothesis and weigh supporting and refuting evidence for predictions." The lowest ranked question was "How much is needed? Tactic - estimate the number age-0 fish needed to produce a self-sustaining population of ~5800 adults." For potential projects, the highest ranked one was "Stretch available river to utmost extent possible" with "Heavily constructed off channel ponds" being the lowest. Vince asked if new data could be used to put sideboards on potential projects. Farrington responded that most larval RZB are found in lateral washes, but numbers are highly variable due to changes in water levels. Overall, flows of ~1,400 cfs tend to inundate those washes. Zeigler stated the plan was just to add these rankings to the Habitat Workshop summary to complete their assignment. Durst said the CC will likely have comments but we should send this document along as "completed". The summary will be sent to the CC for review.

Pennock – Enhancing instream habitat for native fish

Pennock briefly summarized the draft proposal to investigate if placing nonnative vegetation in homogenous reaches of river could increase habitat complexity. Barkalow stated he liked the experimental design but questioned the applicability to actual management, and would prefer more permanent structures. Pennock responded that doing larger scale woody structure could be done but they would be harder to evaluate. He thought a first step would be to test the idea before scaling up. Barkalow asked if floating debris from the structures could impede other projects like the small-scale channel maintenance SOW. McKinstry liked the idea because, unlike the channel maintenance project, this work could be completed anywhere, not only in currently present secondary channels. Mazzone agreed this would be much easier to implement than working on secondary channels. Westfall mentioned that one monsoon spike could displace all the structures and liked the idea that more permanent structures could help form islands. Pennock agreed but was concerned with using heavy machinery in the river. Miller suggested we should focus on complex reaches that may be simplifying over time. Vince Lamarra responded that this debris will likely end up in those complex reaches anyway. McKinstry noted Holden's study back in 2006 determined age-1 CPM were found in root wads. Barkalow mentioned he didn't think small-bodied fish monitoring was very effective at sampling age-1 CPM and thought the Program should find ways to better estimate their densities and habitat use riverwide not just in the limited study area proposed. Pennock responded that this project should give a better idea of their habitat use as the 12,000 CPM planned to be stocked this fall will be PIT tagged. Zeigler asked about any potential permitting hurdles. Pennock had looked into it and found the Army Corp of Engineers would likely want a nation-wide fill permit, but it shouldn't be a problem to get one issued.

Mazzone asked Barkalow if NMDGF was proposing changes to their small-bodied fish sampling SOW. Barkalow responded they would be interested if the BC agreed it was a good idea. Especially if wild age-0 RZB are going to be >100 mm TL when they usually sample the river. Furr replied that age-0 RZB from NAPI ponds were ~135 mm TL after one growing season. McKinstry thought that may be a high estimate due to the benign hatchery setting. Trammel thought that was about the size of fish that are being returned

from the wetland nurseries in the Upper Basin, but those are very productive habitats. Westfall asked what changes needed to be made to NMDGF SOW, Zeigler didn't think any changes needed to be made right away. Mazzone wanted to see any potential changes reviewed during the annual SOW process.

Hilldale, Sayer – BC questions and discussion of Technical Service Center draft reports on passage at APS and Piute Farms Waterfall

APS Weir

Keith requested that the reports be emailed to him as he was not on the BC list serve when they were originally sent out. Zeigler reiterated that comments on the reports are due by 28 February, 2020 to McKinstry and/or Gilbert. This is just an opportunity for the BC to ask questions about the reports before their comments are due. Gilbert received comments from Miller after last meeting about incorporating minimum velocities for other native fishes. Gilbert worked with Bill Rice to include those. Hilldale wanted to highlight that the cost to dig the new channel around the waterfall would only cost ~$500,000 and the biggest costs were associated with the selective fish trap and weir that would be constructed at Clay Hills. McKinstry noted that the APS report presentation was given to APS personnel the week prior and they were concerned with any structure being constructed upstream of the weir that could influence hydraulics near their intake structure that could affect permitting. Miller asked about debris loads on the baffles at the Price Stubb fishway. Sayer responded that they do require relatively frequent maintenance to remove debris, mostly by hand. Hilldale also thought the rock ramp would be better at naturally shedding debris and would be less likely to reduce fish passage if debris does become captured. Sayer mentioned that the rocks in the rock ramp may also need to be rearranged after high flows. However, he increased the size of rock estimated for the APS ramp significantly larger than the rocks that were used at the Hogback passage to hopefully reduce that issue. Sayer also noted that the hydraulic drop at APS is smaller than at Hogback, so effects of high flows may be less.

Miller asked if planning for boat passage was still on the table. Hilldale responded "yes", but that would likely occur in more advanced planning stages. McKinstry noted that field crews call APS ahead of time to get them to lower their gate, and then rafts are lined over the weir via ropes. Hilldale stated rafts may be able to pass through the fishway, but it would be a bumpy ride. Miller asked if rounded rock could be placed in the fishway to improve raft passage. Hilldale said yes but that may increase costs substantially. Miller continued, the Heartland passage on the Gunnison River has very large pre-cast rocks that we could use. Durst asked if we need to prioritize boat passage, especially if it could reduce fish passage? Hilldale responded by stating that is a question for the BC. He also stated the second design phase could include a couple options, but that will also increase the cost of planning. Mazzone agreed that at least we should not make boat passage worse and fish passage should be the focus. Zeigler agreed, as long as we don't make boat passage harder. Furr asked if the design at Penny Lane could be used at APS. McKinstry didn't think so due to the location of the thalweg at both places.

Vince Lamarra thought NEPA may have to make boat passage a requirement. Sayer didn't recall having to supply boat passage at Hogback, but that was a long time ago. May have to look into it. Besser also mentioned that adding any boating structure may also increase its use, potentially impacting riparian areas. McKinstry asked which design would be better for boat passage? Hilldale thought the baffle system would be better because it is only going to impact a small section of the weir and boats could still be lined over the weir if APS lowers their gate. Schleicher was concerned with staggering large boulders on the weir, Hilldale responded that they wouldn't have to use large boulders but could also just increase the height of the weir slightly. Hilldale reiterated that APS was not excited about any upstream structures. Mazzone was interested in hearing APS's concerns after they have reviewed and commented on the report. McKinstry said he didn't think the report needed a recommendation from Hilldale and Sayer. He also noted that the third option is to not do anything at APS. Mata disagreed and cited the Four Corners Power Plant Biological Opinion that stated fish passage needed to be addressed. Keith asked where the flow velocities were evaluated in the report. Hilldale said the report focused on flows around the structures and not velocities specifically, those will be evaluated from empirical equations during later design phases. Davenport agreed that fish passage at APS should be a priority.

Piute Farms Waterfall

Zeigler thought the long passage around the waterfall with selective fish passage at Clay Hills was the better option. Hilldale raised the concern of the reservoir raising and impacting any structure built near the waterfall, but Clay Hills would be less likely to be affected. Franssen asked if selective fish passage was absolutely necessary, Westfall agreed. Crockett mentioned the upper basin was very concerned with nonnative fishes and Colorado Pikeminnow recovery. Furr noted that Stripped Bass and Walleye have been collected pretty far upstream in the San Juan River when the waterfall was passable. There have not been many centrarchids or Northern Pike collected in the river proper though. Franssen asked if they were planning on a weir to block nonnatives in the Colorado River inflow to Lake Powell. Crockett responded that they have considered that idea, but the costs were extremely high. McKinstry stated that we have more evidence that fish want to get over the waterfall than any other barrier in the basin. Mazzone thought the nonnative fish issue is debatable in the San Juan River. Davenport would like to see how the Trap and Transport project fairs first before making a recommendation. Furr asked if the two migration periods of RZB below the waterfall shared all the same individuals? Bogaard responded that no, they are mostly new fish during each period. Schleicher didn't think a non-selective passage was an option and was interested in seeing how the new traps increased passage rates. Miller reminded the group that older reports when the waterfall was passable showed lots of nonnatives in the lake, but very few, if any in the river proper. McKinstry supported postponing recommendations at the waterfall until after the new traps have been evaluated.

PO – Path forward for nonnative fish symposium

Gilbert summarized the proposed process to develop an adaptive management plan for Channel Catfish. The proposal describes a half day review of available data and then an afternoon to discuss a 'straw-man' outline of the adaptive management plan developed by BC volunteers. Davenport and Furr volunteered to help with the outline. Miller thought the time frame was too short and suggested the data review be completed in one day and another half day for the discussion. Davenport asked how far back do we want to assess data? Miller wanted to know what has been effective and under what environmental conditions, for example turbidity, discharge, temperatures. Additionally, previous tagging studies could be reevaluated to better understand fish movements. Westfall previously didn't think catfish were an issue until the BC seemingly decided it was a problem after the diet study of Hedden et al. (2020) and subsequent extrapolation to the potential numbers of age-1 CPM consumed annually by the PO. Durst thought there was a general agreement among the BC as well. McKinstry agreed with Westfall's concern but agreed with the general conclusions of the study. Zeigler stated that there are issues with the extrapolation of data but thought development of an adaptive management plan was needed and volunteered Barkalow to assist. Besser asked if any other indirect effects of nonnative removal have been evaluated? Franssen summarized a recent diet study assessing catfish <250 mm TL in the river. Small catfish generally consumed aquatic insects and no fish eggs or fish were found in their diet. Besser asked if catfish and CPM are spawning in the same habitats. Warren didn't think so as catfish are usually cavity spawners and nest guarders. We know we can't get exploitation rates needed to crash the population and will likely have to manage nonnative fish forever. McKinstry noted electrofishing during the summer also harms CPM. Miller asked if Warren was familiar with 'slat traps', Warren was, but questioned their efficiency in the San Juan River compared to large rivers in the Mississippi River basin. Those traps also take some time to become 'seasoned' before catfish seem to be susceptible, meaning they would have to be held in the river for a while, causing potential issues with high flows. Mazzone asked if we have any data from using other traps in the San Juan River. Davenport said they would have to look for any old reports that potentially used traps.

Crockett, Besser, Keith, and Padgett liked the idea of an adaptive management plan but were concerned with the planned time frame to review available data. Mazzone agreed 1.5 day meeting would be better. Zeigler concluded the BC was in favor of the workshop but asked if an outline of the plan needs to be prepared beforehand? Davenport thought there should be a draft outline prepared. Franssen asked what specifically would the BC like to see for a data review. Warren would like to see the diet extrapolation again and would like to see the newest winter nonnative removal exploitation rates evaluated in the catfish population model. Besser asked if endangered fish monitoring has occurred in relation to catfish removal.

Durst replied that the work conducted in 2016 and 2017 had treatment and control reaches to evaluate endangered fish responses, those reports should be on the website. Zeigler summarized that the symposium will be 1.5 to 2 days with the goal of having a draft outline of the adaptive management plan after the end of the second day. A date for the symposium was not set.

Gilbert, Mazzone, Durst, Franssen, Zeigler, Miller – Diversion prioritization in the San Juan River Basin to minimize entrainment and provide passage

Gilbert described the excel worksheet that BC members were supposed to fill out to enable prioritization of potential barriers and entrainment issues. Miller explained the actual number ranking was somewhat difficult and several small group members described their process for providing numerical rankings. The small group estimated it would take no more than two hours for each BC member to fill out the sheet. Gilbert noted the kmz file that was provided should enable BC members to rapidly search all the sites in Google Earth and look back in time at different flows. Gilbert reiterated that the overall goal of the exercise is to develop a long-term plan for getting actual work conducted on the ground. The BC responses are requested by the end of March, after which the small group will compile the data and present it to the BC.

BC discussion on disposition of stocked Razorback Sucker < 300 mm TL

This was a continuation of the discussion that was held at the BC December meeting. There was several thousand RZB that did not meet the 300 mm TL threshold for stocking and were subsequently stocked below the waterfall with PIT tags in 2020. McKinstry suggested if the numbers of small fish were <1,000, they could be held overwinter at NAPI. Miller suggested we could use some individuals to radio tag and assess habitat use of small RZB. McKinstry noted that the battery life for transmitters in those small of fish may be relatively short. Schleicher was concerned that after the KSU work is completed, who would be responsible for tracking fish? Miller responded that there are remote radio telemetry antennas in place that could track fish, although they wouldn't be able to assess small-scale movements. McKinstry didn't want to discount information that could be gained if they are stocked below the waterfall. Yazzie stated NAPI could hold over some fish overwinter but noted water availability is always a concern and didn't know how many fish could be held. It was suggested that NAPI should decide how many fish they thought necessary to make a special trip to the waterfall to stock fish. Zeigler, Davenport, Westfall and Crockett were in favor of stocking fish below the waterfall. Yazzie asked what the minimum number should be in order to make the trip to the waterfall for stocking. Westfall suggested Navajo Nation should come up with that number. It was determined that Bowman and Yazzie along with the PO will come up with a plan and present it at the May BC meeting.

BC recommendation on moving forward with Peer Review Panel

BC members were supposed to come up with any ideas about Peer Review for this meeting. McKinstry thought they should remove Bledsoe from the panel because he seems too busy to make any meetings and suggested someone from the GCAMP might be a good replacement. Otherwise we could bring Peer Reviewers on as an ad hoc basis. Vince Lamarra thought a multi-discipline ecologist could be good to have on the panel. Davenport agreed, we already have a lot of fish biologists in the Program so a systems ecologist could add value. Crockett suggested we could ask Kurt Fausch, although he may be busy. McKinstry was asked if he was asking about the overall framework or specific people? McKinstry responded "both" and suggested someone from the USGS Powell Center might be good. Crockett suggested we have at least three Peer Reviewers, Warren agreed and would like to have a habitat person, an ecologist, and a fish biologist. Mazzone, Zeigler, and Westfall thought a broader ecologist would be good to have. McKinstry asked the BC to provide names of people that could be potential Peer Reviewers.

Wrap up with scheduling upcoming meetings, recap decision points, assigned action items, and adjourn

The next meeting will be scheduled via doodle poll from the PO.

New Action Items:

1. ASIR will look at their data and report on how many individual RZB and fish identified as "catostomidae" that could be genetically analyzed to assess hybridization.

2. Comments on the fish passages reports are due to McKinstry and Gilbert by the end of February. Please make comments via line numbers.

3. Bowman, Yazzie, and the PO will come up with a suggested plan to deal with RZB from NAPI that are <300 mm TL.

4. BC complete the diversion prioritization exercise by end of March.