

Biology Committee Webinar Draft Summary
8:30 a.m. - 2 p.m., Friday, September 30, 2011

PARTICIPANTS

Biology Committee: Melissa Trammell, Dave Speas, Dale Ryden, Krissy Wilson, Shane Capron, Tom Pitts, Brandon Albrecht, Harry Crockett, Pete Cavalli, and Bill Davis.

Other participants: Jerry Wilhite (who will eventually replace Shane Capron on the Biology Committee), Pat Martinez, Tom Chart, Angela Kantola, Jana Mohrman, Dave Schnoor, Michael Mills (Central Utah Water), Matt Breen, Kevin Bestgen, Kevin McAbee, Amy DeFreese, Martha Moore, Heather Hermansen. Alan Butler, Brent Uilenberg, Tildon Jones, Aaron Webber, Trina Hedrick, and Dave Schnoor. (Nanook the Cat also joined from Utah; however “meows” were not recorded here as the notetaker was, sadly, unable to translate their meaning.)

Assignments are indicated by “>” and in Attachments 1.

CONVENE: 8:30 a.m.

1. Review/modify agenda – The agenda was modified as it appears below.
2. Review previous meeting assignments and discuss ways to manage (consolidate) the assignments list – Melissa suggested keeping a long form of the assignment list on the web, but reduce it to just current assignments in the agenda and meeting summaries; Dave Speas agreed. Pete disagreed and Brandon said he also finds the history helpful. Tom Chart likes the current bulleted format; Shane agreed. Dale said it’s a helpful history, but sees Dave’s point of not carrying it forever; so perhaps the idea of the longer version on the web might be useful. Angela said maintaining two lists would be unwieldy. We could be more aggressive in deleting older bulleted items, as they are memorialized in previous meeting summaries; the Committee agreed. Shane suggested condensing the bullets under each item and citing the previous meeting summary where additional information is found.
3. Reports
 - a. Review of draft final report: Price River – Tom Chart e-mailed the draft final on 6/22/11. Comments were submitted by Tom Pitts 9/29/11; Tom apologized for submitting substantial comments so late. He observed that this report raises issues of how we conduct the Program and do consultation (he thinks that the 2000 Narrows consultation was inconsistent with Section 7 agreement and its conclusion that the Service would look at sufficient progress in the subject basin as a whole and in the Program as a whole, rather than on a tributary basis). The report raises the question of how the Program can provide flows to meet the flow recommendation and whether this is needed for recovery. The first two concerns would fall under Management Committee purview, but whether the flow recommendation is needed for recovery falls to the Biology Committee. Melissa believes the report is based on the best available information. Tom Chart cautioned against characterizing how the Service might conduct future consultations in light of this report. He said he tried to respect what the Program stands on (e.g., water use has and will occur) in the report. The report attempts to characterize the current condition, and

recommends protecting that in years where pikeminnow habitat would be available. Melissa agreed, saying she'd like to discuss the technical merits and believes the connection to recovery has been made pretty well.

Tom Chart described comments and how he addressed them. Pete Cavalli's concern to look at the whole reach (not just to the Woodside gage) has been addressed, as has his concern about reference to visual flow estimates in the earlier draft. Tom included a pers. comm. with Pete Cavalli to clarify why (budget constraints) aerial radiotelemetry was not employed to investigate pikeminnow winter (1996-1997; 1997-1998) use. With regard to data from nearby gages, which were operational in 1996 and 1997, Tom incorporated Pete's suggestion to run a correlation with the Woodside gage – the results of those analyses were summarized in the most recent draft. Many hydrological analyses were updated. Pete said Tom did a good job of addressing his major concerns. Dave Speas/Reclamation had commented regarding whether this constitutes new information for consultation purposes. Reclamation also discussed how we might go about securing water for fish; Tom included language about those options in the final draft (as well as references to the supplemental EIS). Krissy's comments generally echoed Pete's and provided information from Green River mainstem, which is now referenced in the final draft. Krissy believes recovery actions in places like the Price River is addressed in Program documents (e.g., the Blue Book). Tom Chart changed the recommendations to clarify that we don't anticipate additional work in the Price River in the near future, but if State investigations provide new endangered fish use information, that will be considered. (Dave noted that Reclamation funded PIT antennas in the Price River this year through "activities to avoid jeopardy," for example). Tom Chart said the bottom line is protecting current conditions and keeping the system wet. Krissy believes Tom Chart's responses adequately addressed Utah's concerns; the question now is how to move forward in light of Tom Pitts' comments. Amy DeFreese said questions she had with the technical aspects of the paper have been resolved. The Service has been waiting for approval of the document so they can determine if this represents new information as related to the Narrows project (a requirement of that consultation was completion of this report). Tom Chart hasn't had a chance to delve into Tom Pitts' technical questions (e.g., daily flows). Tom Pitts said he had a hard time understanding the hydrological analyses. With regard to focusing on 1996, Tom Chart said it was the lower year, and since this has come down to a minimum flow issue, using 1996 made sense, since Pete Cavalli captured similar numbers of endangered fish in both years. Tom Pitts offered to separate out and better define a list of technical issues for Biology Committee discussion. Melissa, Pete, and Dave feel like they've already thoroughly addressed the technical issues; Melissa said she'd like to be able to approve the report on its technical merits today. >Tom Chart and Jana Mohrman will meet with Tom Pitts quickly to try to work out technical issues, and get recommended revisions back to the Committee as soon as possible. Kevin McAbee said the Service believes it is in everyone's (Service, Reclamation, and applicant's) best interest to have ~~would like to see~~ the report finalized as quickly as possible. Tom Pitts expressed concern about assigning emergency pool to the Narrows Project. Tom Chart said he's willing to remove specific references to Narrows; the Biology Committee agreed. Melissa proposed (and the Committee agreed) that the Committee tentatively approve the report pending Committee e-mail (or potential conference call) approval of changes to be provided via the listserver from Tom Chart subsequent to he and Jana meeting with Tom Pitts. Tom Chart said he anticipates

clarifying hydrologic analyses, but not overall report recommendations. Tom Pitts agreed, noting that he will still file a minority report on the non-technical issues. These issues will be discussed at the Management Committee, but the technical revisions likely will not be resolved and voted on by the Biology Committee by that time.

- b. Update on White River flow recommendations report – Jana Mohrman has received comments from TNC, WRA, Biowest, Salt Lake City ES office (Kevin McAbee) Reclamation (Dave Speas), State of Utah (Krissy & Matt). Jana also has now received comments from Heather Hermansen and James Greer. Comments included clarifications to improve readability, but also more information on the value of this river to recovery. Conflicting comments have been received on minimum base flow (200 vs. 300 cfs). Flows do drop below 200 cfs 3% of the time and there is no augmentation pool (although Kenney Reservoir 1982 biological opinion consultation says 200 cfs or inflow, whichever is less). Jana has not yet had opportunity to address these comments. Tom Pitts has asked Jana for an extension on the comment deadline.
 - c. Review reports due list – Angela Kantola e-mailed an updated list on 9/28/11. The FR-BW Synth report was left of that list and now has been added. The date for the C18/19 report has been corrected. Angela will send out a revised list (done).
4. How to approach the required review of the Flaming Gorge flow and temperature recommendations and identifying which recommendations are most in need of review/reconsideration in light of new scientific findings – Tom Chart referred to the information the Program Director’s office provided (see Attachments 2 and 3) to begin Committee review of two issues: 1) How to apply the findings of Bestgen et al. 2011 to the annual Flaming Gorge spring flow requests (this will build largely on Reclamation's questions which were presented by Dave Speas to the Committee and which formed the basis of Bev Heffernan's presentation to the Management Committee); and 2) timing/content of a Recovery Program RFP to evaluate the Flaming Gorge flow recommendations (with timing being critical in light of current limited funds and critical data gaps (e.g. backwater synthesis and CSU's analysis of smallmouth bass early life history as affected by environmental conditions). Tom said the responses in the first item would form the basis of a letter to Reclamation which he would like to provide by the end of this calendar year. Heather and Dave thanked Tom for these very helpful draft responses. Heather understands there’s a request to shift to a real-time biological trigger, look at flows in Reach 2 (Jensen), with focus on 18,600 cfs target and 14 day duration. She appreciated the caution that geomorphologists might argue more sediment transport might be accomplished by matching the peak of the Yampa. Heather asked if flow recommendations are based on critical habitat, then wouldn’t that habitat be maintained by sediment transport? Tom said the out of bank and connected floodplain habitats are critical, as well. That said, Tom clarified that the cautionary note was intended to recognize the risk of using a larval trigger; i.e. Flaming Gorge peak releases occurring post-Yampa peak could have sediment transport tradeoffs. But our best available information (Bestgen et al. 2011) clearly directs us to experiment with this larval trigger. Heather’s concern is that the modeling and hydrological analyses have always been Yampa post-peak and she’s concerned that in shifting to the larval trigger, we won’t be able to maintain statistical frequencies over the long-term. On that basis, Heather would recommend deleting percent exceedance ranges from the responses to questions. Also, Reclamation has been relying more on Yampa flows to meet the recommended high flow target frequencies.

In 2008, for example, Flaming Gorge was moderately dry, but the Yampa was moderately wet and they were able to meet the wet or average target of 18,600 cfs. Tom Chart said he steered clear of the duration issue, focusing instead on getting the river up on the floodplain when larval razorback are present. That said, he understands what Heather is saying and tried to work in some flexibility (e.g. minimal floodplain inundation targets) during the drier years. Melissa Trammell said it seems to her that the responses reference appropriate caveats. Tom agreed, saying it's "as possible." Heather expressed concern about the characterization of 14,000 cfs in question 2 (meeting in dry years). (Dave noted this could be read as a different minimum than Muth et al). Tom Chart reiterated that the spring flow targets are all characterized as thresholds that should be met or exceeded, and therefore requests to achieve 14,000cfs in Reach 2 in dry-average and some moderately dry years does not contradict Muth et al. Tom said the draft responses do not propose floodplain connection in all years and said question 3 addresses dry and moderately dry years. >Reclamation will provide comments on the current draft responses to questions by October 14 (others may comment as well). Comments on both documents are due by October 14. Shane noted that experimentation of Bestgen et al. 2011 and the larger evaluation of Muth et al. 2000 appeared to be linked. He suggested that the draft responses appeared programmatic, but perhaps they should instead be written as an experiment, focusing on the questions we're trying to answer. Tom agreed, but sees evaluation of the flow recommendations as a much bigger issue, and offered that perhaps we need something between the two documents he provided to address the larval trigger experiment and how we evaluate it. Shane agreed, noting that we need to outline why we're shifting to the larval trigger and acknowledge that in doing so, some other considerations won't be met. Since this will be hydrologically driven, that may extend the time for the larger evaluation of flow recommendations. Melissa and others emphasized that we need to include a specific analysis of this in the Program work plan. Shane said >Western is willing to offer Kirk LaGory to chair an ad hoc group to address questions of a larger study plan (and Tom Chart said he thinks that the flow request letter should tier off of that). Ad hoc participants will include: Kirk LaGory, Kevin Bestgen, Tom Chart, Shane Capron, Dave Speas, Brandon Albrecht, and perhaps Melissa Trammell; Jana Mohrman also is willing to help. Tom Pitts asked if the experimentation we are discussing pushes beyond considerations in Muth et al. 2000. Tom Chart said he thinks this is well within the flow recommendations; Kevin Bestgen agreed, and directed attention to table 5.3 in Muth et al. Under both onset and duration, it lists forecasted and actual flow, and initial appearance of larval suckers, as well as presence for determining duration. Dave said he thinks the hydrological analyses/modeling was more focused on "chasing the Yampa" as opposed to addressing all the factors in Table 5.3. Our current way of implementing the flow recommendations does not appear to be achieving what we'd hoped, so we need to review the range of considerations, especially presence of larval razorback sucker. Tom Pitts recalled that Clayton Palmer had some other issues they want to get on the table; Shane said he thinks the ad hoc group can address what Tom Chart has laid out in the white paper on evaluation of the flow recommendations.

5. Elkhead summer releases update – Tom Chart said the Program called for high flow releases from Elkhead for a few days in August to support a sustained flow of ~1000 cfs in the Yampa River at Maybell. Releases were made through the screened dam outlets to prevent nonnative fish escapement. The purpose of these releases was to allow researchers to capitalize on the wet conditions to more effectively manage the nonnative smallmouth bass and northern pike. Tom said they coordinated with River District on very short notice for a

300cfs release from Elkhead for 4 days. Tom appreciated the District's and water users' cooperation to experiment with this release. Even with this release, we left about half of the Program's water in Elkhead this year (base flows have remained fairly good so far, currently are at ~300cfs at Maybell). Dale Ryden said Tildon noted he might have been able to get folks out for an additional pass in Yampa Canyon had they been aware of the release. >Tom Chart recognized that, in retrospect, there was room for more outreach prior to this Elkhead Res. release and that the PDO will strive for greater communication (including all potentially affected researchers) should this opportunity arise again.

6. Ad hoc group work to revise the Program's integrated stocking plan – The group is primarily discussing size at stocking and conditioning. >Tom Czaplá will send the draft plan to the ad hoc group next week and get a conference call for review in October or early November. Dale Ryden said Vernal CRFP recommends stocking locations (the reach downstream of Split Mountain [where there are no rapids] and the Jensen to Ouray stretch [the alluvial stretch of river]). Bill Davis asked if there's any effort to integrate MSCP and perhaps Grand Canyon stocking needs with Upper and San Juan stocking plans. Tom Czaplá said integration likely will be discussed with regard to humpback chub. Dave Speas noted that MSCP folks attended the Dexter meeting.
7. Schedule next meeting/webinar/or conference call – The Committee scheduled a webinar/conference call for November 22, 8:30 a.m. to 2 p.m. The Flaming Gorge items will be the primary agenda topic, along with the Price River report (if needed) and other items, as time allows (>the Flaming Gorge ad hoc group will let the Committee know how much time they'll need on the agenda). The next meeting will be January 26 in Grand Junction (this is the day after the January 24-25 researchers meeting, which Colorado Parks and Wildlife is hosting this year). Agenda items for the meeting may include:
 - o Final report reviews:
 - o Review of White River flow recommendations
 - o Westwater humpback chub population estimate
 - o Razorback emigration from Stirrup
 - o Native fish response to nonnative fish management in the middle Green
 - o (Note: final sediment report review will be on October 13 joint webinar with the Water Acquisition Committee)
 - o Humpback chub action plan
 - o Basinwide nonnative fish management strategy
 - o Review of 2012-2013 contingency list and cuts to nonnative fish management budgets (this review will be most timely after the 2012 budget picture becomes more clear and the Committee reviews recommendations from the December 7-8, 2011, nonnative fish workshop)
8. Basinwide nonnative fish management strategy – The Committee received the draft strategy in early September. Dave Speas, Brandon Albrecht and Randy Hampton have provided comments. (Harry sent comments later on 9/30/11). Pat Martinez attended AFS in Seattle and spoke with three potential peer reviewers: Julian Olden of the University of Washington, Brian Grebb of South Dakota State, and Jackson Gross of USGS in Bozeman. Pat agrees with Dave Speas' suggestion to reconvene the Nonnative Fish Subcommittee and update Appendix 1 before revising the strategy to incorporate comments received and sending it out for peer review. The NNFSC should meet before the December Nonnative Fish workshop; a

meeting was set for November 28th in Grand Junction, pending Randy Hampton (or another Information and Education Committee representative's ability to join either in person or via phone). Meanwhile, Pat's been accumulating additions to the report based on breaking information. Pat also is meeting with the states in October to discuss illegal introductions (law enforcement representatives will attend as possible). Pat noted that items discussed there may raise concerns for Randy Hampton similar to those he's expressed about the draft basinwide strategy. Harry asked about the follow-up piece on sustainable sportfisheries and Pat said that's still pending and would be part of the revisions before this goes out for peer review. >Pat will draft something to lead the NNFSC discussion on this topic November 28. >Krissy will check flight times for Monday morning to help determine the start time. It will be a full-day meeting. Tom Pitts suggested adding a table of contents to the strategy. >Pat will add Jerry Wilhite from Western Area Power Administration to the NNFSC list, as well, as he will be segueing into Shane Capron's place.

9. Thunder Ranch – The high runoff damaged floodplain management structures at Thunder Ranch. Of the three breaches in the riverside levee and the setback levee we constructed there, flows overwhelmed the armored notch and damaged ~350' of levee. Tom Chart and Brent are working with Dan Schaad to determine the cost of repair (which we're required to make under the terms of our flood easement with the owners of the Ranch), and to estimate the cost of a water control structure that would retain water to maintain entrained larval razorback through the winter and allow the site to be re-set. (The Biology Committee identified a water control structure at Thunder Ranch as a very high priority after last year's floodplain tour.) Brent Uilenberg said if we put a control structure in the outlet channel of the flood control levee on the south side of the easement, we should be able to maintain ~4' of depth at this site. For additional depth, we would need to install facilities in the notches just upstream riverside. The outlet is ~50' wide at the mouth. A concrete weir with a radial gate in it should be able to sluice the channel and get water back to the river. What we don't know is how fast we'll have seepage back to the river, but it could be pretty fast. Brent said they could put a temporary earth fill in the outlet and observe how long it holds water next year. Dale said Vernal CRFP would like to be able to overwinter fish at this site, but realizes that seepage losses may prevent that; thus, he agreed it would be wise to test seepage. Trina agreed with the stepwise process; she noted that Stirrup maintains ~4', but it's been a struggle to maintain water quality at that depth. This site is a few hundred acres (much larger than the Stirrup). Aaron Webber wondered if the three springs that come up at this site could be manipulated to maintain water levels. (Aaron believes the site has overwintered fish based on multiple age classes of several nonnative fish species.) Tom Chart said it looked like a fairly sizable area could maintain 3-4' depth. The invert elevations are:

- outlet - 4829'
- notch 1 - 4833.7'
- notch 2 - 4834.8'
- notch 3 - 4833.6'
- notch 4 - 4833.4'
- notch 5 - 4833.0'
- notch 6 - 4831.9'
- notch 7 - 4832.0'

Tom Chart thinks we could achieve a maximum depth of 4' at the lower end of the site for some period of time provided notches 6 and 7 were backfilled. Matt and Trina and others observed that several of the upper notches have filled in.

Reclamation will assess the notch elevations when they fix the levee. Trina recommended selecting a notch that can be easily maintained. Brent asked if we block the outlet to test seepage if we might strand fish, but the group didn't think this was a concern. Tom Chart noted that a high spring flow could wash out the earthen plug. Brent Uilenberg suggested making a site visit and drafting a comprehensive work plan (and subsequently sent the Committee an e-mail outlining the overall approach). The work likely would occur next March. Aaron will be sampling in October and will >review and photograph the notches. >Matt also will forward post-peak flow photos of the notches. The BC tentatively agreed to this approach; Brent will let Kerry Southworth know. Melissa asked about a provision for removing the plug; Brent said it will be removed.

10. Tusher Wash – (See also item #5 in the assignments list, Attachment 1). The Committee reviewed previously-discussed options for someone to conduct a literature review of turbines in the eastern U.S. and/or doing a surrogate species mortality study (cost is a concern). The Committee's charge is to make a recommendation based on Tusher's current configuration. Tom Chart said it would be good to have an idea of potential cost of a mortality study (Section 7 funds might be an option). Melissa Trammell thinks we may need to do an RFP. Tom Chart would be interested in a description/specifications of the hardware there now to help us understand if it can be retrofitted. >The Program Director's office will ask if Brent Uilenberg and Bob Norman can address that. Meanwhile, >Tom Czapla will send a Doodle request to reconvene the ad hoc group to discuss who should do the literature review.
11. Disposition of 100K+ excess fingerling (40-120mm) razorback suckers at Ouray NFH – Tom Czapla said these fish won't be tagged, so if they are released, it would confound our ability to detect natural recruitment. Therefore, he recommends stocking these fish in Colorado River arm of Lake Powell, per the disposition policy. Dale said this might confound the San Juan inflow study. Dale said they were thinking about dye-marking the fish (~\$1,000/100,000 fish). The marks would last about a year. The committee agreed this would not solve the problem of confounding natural recruitment. Dave Schnoor said that the fish are moved to ponds as fry. Melissa Trammell suggested offering the fish to the Lower Basin MSCP. Krissy asked if we might want to consider rearing some (perhaps not all) at Wahweap if an excess pond is available. >Krissy will find out what UDWR could do at Wahweap. Dave Schnoor said Ouray might be able to overwinter the fish that aren't yet 150mm. Some fish also could be held back to grow to 400mm+ next year for stocking. He will plan on doing that and will >get a proposal back to the Committee by mid-October. Survival was very high this year, so the fish are smaller. Ouray does plan to reduce their stocking rate into the ponds next year to improve growth. Krissy asked if we will have additional fish requiring additional PIT tags (potentially 30K or more additional tags, but see #12, below). Harry said Mumma might be another option.
12. PIT tags and equipment options – Dave Speas said Reclamation recently awarded a contract to Biomark, Inc. for procurement of PIT tags and other PIT related supplies including antennae, readers, implanters, and other items. Credit goes to Mark McKinstry for much of the work in getting this new contract established. Dave reviewed available products. Tags are down from \$3 to \$1.70 each and we have a wide variety of products available, including a \$1.62 tag (which, although they have a slightly better read range, might not perform as well if several fish moved through a stationary antenna at the same time). We can also get 9mm tags now (and 8.4mm, but they didn't perform well). Preloaded tags in trays can be had at

similar prices. Dave's very interested in trying out the more convenient, durable 601 readers (but they won't read old tags). We also will be able to buy large portable, self-contained flat plate antennas on contract. Circuit board modules also will be available which may be useful for custom antenna applications. >Dave will send out a price list to folks who may be writing SOWs involving this kind of equipment.

13. Humpback chub genetics management plan ad hoc group – At the recent Management Committee meeting, Tom Pitts recommended the Biology Committee develop an action plan for establishing refugia for humpback chub and avoid getting bogged down in genetic analysis. Dave Speas had suggested asking Manuel Ulibarri to provide a summary of the recent hatchery meeting at Dexter that touches on this topic. Mike Roberts had recommended also building in limiting factor/life history studies to better understand what's going on in the system that's affecting humpback chub populations. As discussed under assignments list, Tom Czaplak is gathering the group and will set a date for the first conference call next week.
14. Research framework – Committee members were to review the [Research Framework](#) recommendations in advance of reviewing the FY 12-13 work plan in July (see Attachment 4). >Committee members will send comments via e-mail (to the entire Committee) by October 31 as to whether they see items in those recommendations that should be captured in our current list of contingency projects or the next round of Program Guidance.
15. Consent items: Review and approve July 11-12, 2011, meeting summary – Approved as previously revised (correcting the spelling of Fontenelle and information on the Roots Reservoir screen). Angela Kantola will post the revised summary to the listserv (done).
16. Committee chairmanship – Will pass to Harry Crockett in January.

ADJOURN 2:23 p.m.

Attachment 1: Assignments

For earlier history of items preceded by an ampersand “&”, please see [previous meeting summaries](#).

1. & The **Program Director’s office** will work with **CDOW** and **Aaron Webber** on the potential to design a permeable, hydrologically-stable (gravel?) berm to prevent pike access to the oxbow slough at RM 151 on the Yampa, and then clean it out once and for all.
 - 9/30/11: Harry said the site has changed and may now be a less formidable backwater.
 - 3/11/11: Harry Crockett provided a list of habitats CDOW would like to work on (attachment 3 to [March 1-2, 2011 BC meeting summary](#)). A rapidly eroding bank at the Yampa SWA is the highest priority, but CDOW can’t access funds to stabilize it until July 1. **Harry and Dave Speas** will talk with Brent Uilenberg about the possibility of getting capital funds; **Harry** will follow up with CDOW to make sure they could move forward with the temporary fix this year. **CDOW** also will look to see if other funds might be available. Other items on the list may be considered after a synthesis of the northern pike data.
 - 5/2/11: *Sherm Hebein at CDOW found funding and the bank stabilization project at Yampa SWA was completed on April 13, 2011, just prior to rapidly-increasing flows. Billy Atkinson reported that the project appears successful and we shouldn’t see further bank erosion this in stretch. Connectivity to the adjacent pond system has potentially been alleviated. CDOW will do more permanent work on this Yampa SWA site later this year. Harry clarified that in an exceptionally high water year like this, there will still be sheetflow over the site from upstream, but hopefully the bank will hold so that the site doesn’t connect in lower water years. CDOW will still be looking for funding for other items on their “bucket list.”*
 - 9/30/11: *Harry said the site held up fairly well in the high flows (no erosion or destabilization to the reinforced portion). Some of the unreinforced portion (downstream) experience erosion (but not back to the ponds) and should be fixed before next spring. With their capital funds currently on hold; CDOW is looking for ways to complete this work.*
2. & The **Service and Program Director’s office** will provide the Committee a draft addendum to the White River report that will present the measured flow requirements in a historical hydrologic perspective. The Program Director’s office also will research where we left Schmidt and Orchard’s draft report on peak (channel maintenance) flows and recommend whether to have it reviewed by the geomorphology panel.
 - 5/6/10: *The Program Director’s office will complete the addendum to the White River report and provide a status update and recommendation on the draft Schmidt and Orchard report on peak (channel maintenance) flows for Biology Committee review by July 1, 2011.*
 - *Sent to BC July 1, 2011. 9/30/11: conflicting comments have been received, Tom Pitts has asked Jana for an extension on the comment deadline. See also agenda item #3b.*
3. & **Program Director’s office (Jana Mohrman and Tom Chart)** expect to provide a draft of the Price River report by the end of August 2009. 7/13/09: *Dave Speas said the goal for the Narrows EIS is to get it out for public review in the fall, so the above schedule should work. The PD’s office will keep the Service’s SLC-ES shop in the loop on Price River.*
 - 12/12/10 *Program Director’s office will use the information currently available to >develop a position paper on Price River flow recommendations for Committee review. The Program Director’s office will revise the draft Price River position paper and get it to the Biology Committee within the next week, with comments due a month later.*

- *Price River position paper sent 12/30/10 with comments due Jan. 31/ 11. UDWR may submit a Price River PIT tag proposal for “activities to avoid jeopardy” funding.*
 - *3/11/11: **Tom Chart** will respond to comments and revise the report (in consultation with the Service) and bring it back to the Committee by July 1, 2011.*
 - *6/21/11: Sent to Biology Committee; on 7/12/11 agenda (7/12/11: review/approval deferred to 9/30/11 at Tom Pitt’s request); 9/29/11 Pitts’ comments submitted; 9/30/11: See agenda item 3a: >**Tom Chart and Jana Morhman will meet with Tom Pitts** very quickly to try to work out technical issues, and get recommended revisions back to the Committee as quickly as possible. The Committee tentatively approved the report pending Committee e-mail (or potential conference call) approval of changes to be provided via the listserver from Tom Chart subsequent to he and Jana meeting with Tom Pitts. Tom Chart anticipates clarifying hydrologic analyses, but not overall report recommendations. Tom Pitts will still file a report on the non-technical issues. These issues will be discussed at the Management Committee on October 12, but the technical revisions likely will not be resolved and voted on by the Biology Committee by that time.*
4. &The **Program Director’s office** will prepare a list of issues to be resolved regarding Tusher Wash screening (e.g., levels of mortality acceptable for what size classes, potential O&M costs, etc.) to help move this decision forward (and provide that to the Biology Committee and the Service). *Done.*
- *5/6/10: A small group (Melissa, Kevin McAbee, Dave Speas, Tom Pitts, and Tom Czapla) will work with Kevin Bestgen to review/build on the risk assessment, focusing on understanding existing impacts and what could be gained by various screening options. Tentatively, it would seem the best choice would be fish friendly runners with a screen on the irrigation ditch (contingent on further analysis). BC to submit proposal to MC by 12/31/10.*
 - *12/13/10 BC discussion: The Biology Committee recommended >starting with a literature review (there may be good information from low-head structures in the eastern U.S.); working on outlining what would be needed in a mortality study (including engineering considerations); and further investigating whether the owners would consider full or partial decommissioning.*
 - *3/1/11 As Kevin McAbee gets engineering info from the irrigators, he will share it with the ad hoc group. Kevin also will inquire more about the purpose of the 9” (at riverbank) – 20” (at center) concrete cap, to determine whether it is to benefit the existing diversion, or both the existing diversion and the proposed diversion on river left.*
 - *5/13/11: Dave provided a list of questions from Juddson Sechrist; the Tusher ad hoc group reviewed and discussed these on April 4 (summary sent to BC 4/20/11), agreed to have another meeting (site visit) this summer, and re-iterated the need for an initial literature search/review focusing on fish mortality at other sites with small hydro-electric facilities and smaller hydraulic head differentials. Krissy Wilson would like to participate in the site visit. >**Tom Czapla** will schedule the site visit (and talk to Kevin McAbee to see if he can arrange for the group to tour the inside of the facility). The **Program Director’s office** and **Reclamation** will discuss how to get the mortality study done after we determine the information needs and timeframe.*
 - *9/30/11: The **Program Director’s office** will ask if Brent Uilenberg and Bob Norman can provide description/specifications of the hardware at Tusher to help us understand if it can be retrofitted. **Tom Czapla** will send a Doodle request to reconvene the ad hoc group to discuss who should do the literature review.*

5. & Tasks related to stocking and genetics have been gathered here under revising the Integrated Stocking Plan. **Tom Czapl**a is convening a group to revise the plan, address humpback chub genetic issues, and develop a humpback chub action plan; he will send out a draft revised stocking plan in early October 2011 and convene a conference call of the ad hoc group to review it in October or early November.
 - *5/13/11: Cost-benefit analyses should be included in the revised stocking plan; Tom Chart said he thinks the **Program Director's office** can initiate this analysis. Results of the health condition profile meeting held at Dexter in March should be incorporated into the revised stocking plan. Discussion of humpback chub and back up pikeminnow broodstock were prominent in this meeting. Horsethief pond water may be whirling disease positive, but Krissy said that Utah can apply for a variance from their Fish Health Board since the fish will be stocked where whirling disease is present and razorback are not known to carry WD.*
 - *6/2/11: Core ad hoc group identified: Harry Crockett, CDOW; Krissy Wilson, UDWR; and Pete Cavalli, WFG; Dale Ryden and/or Dave Schnoor, Travis Francis, USFWS; Dave Campbell and Scott Durst, San Juan Recovery Program; and input from hatchery managers as needed (particularly as it pertains to space at facilities).*

Humpback Chub

The **Program Director's office** will communicate with Gary White to determine how many and which of the questions from the HBC workshop to focus on. *Pending.* **Derek Elverud** will provide the database for Westwater for Gary White to combine with Black Rocks, which will require a separate SOW.

- *5/13/11: Black Rocks and Westwater data have been transferred to Gary White; **Program Director's office** will check to make sure we've got this analysis covered.*

After the ad hoc group meets, Melissa Trammell will draft an Environmental Assessment of the impacts of the humpback chub captivity management plan (also addresses how to deal with captured roundtail chub); **Krissy Wilson** will work with **Melissa** on the EA. **Tom Czapl**a will send out the briefing paper he received with the humpback chub genetic data to the Biology Committee (*done*). **Melissa Trammell** will review Dexter's new plan to see if it may impact this (also will talk to Tom Czapl).

- *3/11/11: **Melissa** will talk to the Park about what they want to do with the chubs in captivity at Ouray and Mumma (likely return them to the river after acclimation) if the Program does not want to keep them. Melissa suggested assessing morphology now that the fish have matured somewhat (Travis said he's seen the fish and they don't look like humpback to him). The Committee agreed to keep the fish in captivity for now.*
- *5/13/11: >**Harry Crockett** will check with CDOW to be sure the putative humpbacks at Mumma get moved to Ouray NFH – Randlett (requires an import permit from Utah Dept. of Agriculture). (Krissy noted that all states now require imports to have AIS certification (**Krissy** sent the criteria to the Committee on 7/7/11, as well as disease certification.) >**Dale Ryden** will also talk to Dave Schnoor.*

As identified in the sufficient progress assessment and requested by the Management Committee, the **Program** will develop an action plan for establishing refugia for humpback chub (avoiding getting bogged down in genetic analysis). Mike Roberts has recommended building in limiting factor/life history studies to better understand what's going on in the system that's affecting humpback chub populations.

Razorback Sucker

The **Service (GJ-CRFP and the Program Director's office)** will make recommendations for how/where to manage the razorback sucker spawned this year at the Grand Valley facility and bring those back to the Biology Committee.

- 3/11/11 *The Biology Committee directed Dave Schnoor to focus on size, not numbers, and not to try to harvest fish in the spring, since additional funds are not available.*
- 9/30/11: *Ouray NFH has ~100K extra fingerlings. >Krissy will find out what UDWR could do at Wahweap. **Dave Schnoor** said Ouray might be able to overwinter the fish that aren't yet 150mm. Some fish also could be held back to grow to 400mm+ next year for stocking. He will plan on doing that and will >get a proposal back to the Committee by mid-October. Survival was very high this year, so the fish are smaller.*

The **Service's CRFP office** is working to salvage as many fish as possible from the soon-to-be-discontinued leased ponds this year. Analyses show fish stocked in the summer have the lowest survival rate, so the **Service** will recapture and stock the fish as soon as possible.

- 9/30/11: *In progress; will be in stocking report.*

Dale Ryden and **Dave Schnoor** will write up the Ouray hatchery needs (water source for Randlett and generator for Grand Valley) and submit this to the Program via Tom Czapla. **Dale** also will seek Service funding for these needs. The report will include a discussion the relative risks of power outages at Grand Valley. Melissa suggested that for the long-term, we need a feasibility study for alternative water sources for Randlett.

- 5/13/11: *Dale said Reclamation says alternative water sources would have a \$10M price tag. The Service has been discussing the manganese problem and will convene a group to discuss (Program Director's office, hatchery folks, Reclamation, etc.). Dave Schnoor has explored the idea of a generator for the Grand Valley unit. The **Service** should have a more comprehensive idea about these things in a few months.*
- 7/6/11: *Dale e-mailed write-up (discussed briefly at 7/10-11 BC meeting).*
- 8/24/11: *Service purchased Grand Valley Unit generator. Service/Reclamation met to discuss manganese; proposal to hire contractor and install additional filters pending.*
- 9/30/11: *Proposal has gone to the Management Committee for contractor review of alternatives for remediating the manganese problem.*

Bonytail

Tom Czapla and **Krissy Wilson** will develop recommendations for where and when to stock the Wahweap bonytail (e.g., floodplains before spawning) and send those to the Committee.

- 5/4/11: *~6,780 bonytail were stocked at the Stirrup in early April 2011 (because movement will be detectable by the remote antennae).*
- 5/13/11: *UDWR has an additional 13,000 fish that are not PIT-tagged yet that need to go out in the fall (and will convene a **group** to discuss where they should be stocked – may be discussed along with integrated stocking plan revisions).*
- 9/30/11: *Wahweap normally stocks 10,300 bonytail in 3 sites in the upper, lower Green and the Colorado. Discussions about improving survival have centered on finding backwater or off-channel sites close to these planned stocking locations. The Lower Green stocking site is normally at Green River State Park, but just downstream is the Grand Wash, an oxbow in the river that backs into the wash and is always connected. Utah has chosen that as the Lower*

Green River stocking site for 7,781 fish (Krissy will send a map). Upper Green fish are normally stocked at the Jensen Bridge; many backwaters in this area don't remain connected. They've discussed stocking fish into Leota 4, but Tim Modde had difficulty removing fish from Leota in the past. Stirrup or Stewart Lake are other options. Tildon Jones has recommended Johnson Bottom, which they believe will overwinter fish (based on several cohorts of black crappie) and will connect to the river (with other options being Wyasket or Old Charlie) Another location is Red Wash. The Colorado River site is Dewey Bridge or Cisco Beach just downstream of the CO/UT border. There is no suitable slackwater site nearby (without going into Colorado, which presents a permitting problem), so those fish may still go in at Cisco Beach. Over 19K fish will be stocked (making up for the shortfall last year due to bird predation at the Hatchery). >By next Wednesday, Krissy and Tom Czapla (working with field folks) will draft a 1-page recommendation describing where the fish should be stocked and why. Done, Utah recommended stocking:

- 7781 to Grand Wash, Lower Green River. This is to replace the Green River State Park location.
- 3890 to Johnson Bottom, Upper Green River. This is to replace the Jensen Bridge location.
- 3890 to Cisco Beach, Lower Colorado River. A suitable alternative was not determined for this site without going upstream into Colorado (which is not feasible at this time due to import permit requirements).

6. The **Biology Committee** will work on prioritizing their list of potential additional capital projects at a future meeting. *Ongoing.* By September 22, 2010, **Committee members and others** who suggested capital project ideas will provide short explanatory/descriptive text (preferably just a paragraph), and then the **Committee** will decide when to take the next steps (individual ranking, group discussion of combined ranking, etc.). *UDWR comments submitted; next BC discussion on hold.*
7. The **Program Director's office** will follow up on establishing a process to track percentages of hybrid suckers using standardized protocol for identification of hybridization at fish ladders and in monitoring reaches. *Pending. Reclamation approved a CU study (through "other activities to avoid jeopardy") to crossbreed suckers and test fitness.*
8. Northern pike synthesis – 5/13/11 **Harry Crockett** will let Billy Atkinson know it will be helpful to compare the recruitment information to Billy's tag records from above Hayden (Harry will ask Billy to make his data available to Kevin Bestgen and Koreen Zelasko).
9. **Biology Committee members** will review the Research Framework recommendations in advance of reviewing the FY 12-13 work plan in July. *Not done; suggest review for FY 14-15 Program Guidance.* The **Program Director's office** will revise the Research Framework report on the web include a "last updated on" statement and a caveat that clarifies that this was incomplete and was a "point in time" database and direct users to the Program's laserfiche library and Program website. They also will correct the wording at the bottom of the second page of the report that suggests it is a "review draft." *Pending.*
 - 9/30/11: *Committee members will send comments via e-mail (to the entire Committee) by October 31 as to whether they see items in those recommendations that should be captured in our current list of contingency projects or the next round of Program Guidance.*

10. Spring Flows 2011 – aerial photography - 7/10/11: *See Attachment 2 for reaches flown. The **Program Director's office** will look into potential partners to help fund stitching and georeferencing. 8/24/11: In progress. 9/30/11: CWCB's floodplain mapping unit has offered to assist. COE may help, but hasn't found funds yet. WAPA also may be interested.*
11. **Krissy Wilson** will forward the Committee UDWR's plan for larval light trapping in Flaming Gorge Reservoir (looking for burbot) when she gets it. 9/30/11: *this survey for larval burbot couldn't be completed as the likely window was missed this year; willing to consider in next year's work plan. This will be discussed at the nonnative fish workshop.*
12. The **Program Director's office** will make a recommendation regarding whether or not to password protect the PIT tag GIS site. *Pending.*
13. As the FY12-13 budget situation becomes more clear, the **Biology Committee** will review and prioritize current contingency projects and the passes that were cut from nonnative fish projects. 8/25/11: *Pending; it may be most efficient to defer this exercise until the 2012 budget picture becomes more clear and the Committee reviews recommendations from the December 7-8, 2011, nonnative fish workshop.*
14. **Reclamation** will provide comments on the current draft responses to questions on the Flaming Gorge larval trigger by October 14 (**others** may comment as well). Comments on the document outlining topics for Biology Committee consideration regarding evaluating the Green River flow and temperature recommendations also are due by October 14. Western offered to have **Kirk LaGory** chair an ad hoc group to address questions of a larger study plan (and Tom Chart said he thinks that the flow request letter should tier off of that). Ad hoc participants will include: Kirk LaGory, Kevin Bestgen, Tom Chart, Shane Capron, Dave Speas, Brandon Albrecht, and perhaps Melissa Trammell; Jana Mohrman also is willing to help. The **ad hoc group** will let the Biology Committee know how much time they'll need on the November 22 webinar/conference call.
15. **The PDO** will notify all potentially affected field personnel in the event of future Elkhead releases.
16. NNFSC items: **Pat Martinez** will draft something to lead the NNFSC discussion on the topic of sustainable sportfisheries. **Krissy Wilson** will check flight times for Monday morning to help determine the start time for the NNFSC meeting on November 28. **Pat Martinez** will add Jerry Wilhite from Western Area Power Administration to the NNFSC list
17. As part of determining if a water control structure should be installed at Thunder Ranch, **Reclamation** will assess notch elevations when they fix the levee. Brent Uilenberg suggested making a site visit and drafting a comprehensive work plan (and subsequently sent the Committee an e-mail outlining the overall approach). The work to install an earthen plug to test seepage likely would occur next March. **Aaron Webber** will review and photograph the notches when he samples in October. **Matt Breen** will forward post-peak flow photos of the notches.
18. Dave Speas will send a price list to folks who may be writing SOWs involving PIT tag and detection equipment.

Attachment 2

Bureau of Reclamation's questions posed to the Management Committee on August 11, 2011 as related to future Recovery Program Spring Flow Requests

- 1. Is the timing of peak flows to larval presence meant to occur a) with the current ROD flow targets in place or b) can those targets be relaxed or 'suspended' under certain circumstances (*sensu* FWS letter from spring 2011)?**

Proposed Response - In the years when the Recovery Program would like to achieve some level of floodplain inundation (see our responses to Q3 and Q4 below) we request that Reclamation time their Flaming Gorge Dam (FGD) spring release coincident with or soon after the detection of larval native sucker in Reach 2, irrespective of Yampa River hydrology. That is, based on the best available information, the Recovery Program would like to focus future experimentation on providing floodplain connection when native sucker larvae are present in the system. Therefore, the Recovery Program believes that the ROD flow targets could be relaxed, under certain circumstances, while Reclamation experiments with providing floodplain connection coincident with the presence of larval native suckers.

Caution: The BC needs to fully consider the associated tradeoff / implication of this proposal. This line of experimentation implies that to best assist in endangered fish recovery, at this point in time, fewer days of flow greater than 14,000cfs (considered a minimal floodplain inundation flow level; refer to our response to Q2 below) when larvae are present would be more important than the same or greater number of days of higher flows prior to larval native sucker presence. A geomorphologist might argue that matching the Yampa River peak would accomplish more sediment transport in the main channel, and a greater amount of riverine / floodplain connection (even if it occurs prior to the presence of larvae) which contributes important nutrient input to this desert river ecosystems.

- 2. Using larval presence as a trigger during average years could be particularly challenging.**

Background – The Recovery Program agrees, but ask that Reclamation experiment with the larval trigger to better understand how challenging it will be to provide floodplain connection at the appropriate (biologically) time. Muth et al. recommended achieving significant floodplain inundation (i.e. peak flows of $\geq 18,600$ cfs) in Reach 2 in the wetter portion (30-50% exceedance) of the 'average' years and maintain $\geq 18,600$ cfs for two weeks in Reach 2 in the wettest (30-40% exceedance) of the 'average' years.

Proposed Response - The Recovery Program proposes that Reclamation experiment with releases to achieve significant floodplain inundation ($\geq 18,600$ cfs) at the recommended frequencies coincident with the presence of larval native suckers. The Recovery Program recognizes that Reclamation will need to take into account reservoir elevation and projected / actual reservoir inflow in their operations to meet or exceed this peak flow threshold.

In our response to Q1 we recognized that it may be necessary to relax the ROD flow targets. More specifically, the Recovery Program suspects that if FGD releases were timed coincident with the presence of native sucker larvae in Reach 2 this could compromise durations of flows $\geq 18,600$ cfs and could compromise Reclamation's ability to achieve 18,600 cfs.

In the drier portion (50-70% exceedance) of the 'average' years (those in which Muth et al. recommended peaks of $\geq 8,300$ cfs), the Recovery Program proposes that Reclamation experiment with releases to achieve at least a minimal level of floodplain inundation in Reach 2 ($\geq 14,000$ cfs) coincident with larval presence. The Recovery Program recognizes that Reclamation will need to take into account reservoir elevation and projected / actual reservoir inflow in their operations to meet, exceed, and sustain a minimal level of floodplain inundation.

3. Does the Recovery Program expect to apply the larval trigger under any and all hydrologic conditions?

Proposed Response – Based on the best available information and in an experimental context, the Recovery Program proposes that the larval trigger be considered the standard mode for timing FGD releases whenever the hydrology supports at least minimal levels of floodplain inundation, i.e. $\geq 14,000$ cfs in Reach 2.

The Recovery Program recognizes there will be years (eg. 'dry', some 'mod dry') when the hydrologic forecasts will not likely support floodplain connection. During those years, the Recovery Program requests that Reclamation schedule their FGD spring peak release to match the peak of the Yampa River to maximize sediment transport. The Program (and Muth et al.) does not expect that we can provide nursery habitat (inundated floodplain habitat) for larval razorback sucker in every year.

4. Would requests appear similar among hydrologic categories, or would they be tailored to specific hydrologies?

Proposed Response - As mentioned above, the Recovery Program requests that Reclamation experiment with FGD releases to achieve significant floodplain inundation (Reach 2 peak flows of $\geq 18,600$ cfs) in 50% of all years, i.e. the 0-50% exceedance years, (as per Muth et al) – coincident with larval native sucker presence. The Recovery Program understands that achieving significant floodplain inundation in Reach 2 coincident with the presence of native sucker larvae will be particularly challenging when the expected inflow to Flaming Gorge falls within the 'average' category. Operations to maintain duration of significant floodplain inundation will be even more complex and challenging. The Recovery Program will commit to providing real-time, technical input to Reclamation to assist in their operations.

Also as mentioned above, in the drier 'average' years and some 'moderately dry' years the Recovery Program will strive to achieve at least minimal floodplain inundation, i.e. $\geq 14,000$ cfs in Reach 2 coincident with the presence of larval native sucker. In the remainder of years, i.e. some 'moderately dry' and 'dry' years the Recovery Program would request that Reclamation time their FGD peak release to match the Yampa River peak to maximize in-channel sediment transport.

Attachment 3

An Evaluation of the *Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam (Muth et al. 2000)*:

Topics for Consideration by Biology Committee
September 30, 2011

- I. A Review of the Flow and Temp Recommendation Evaluation Process identified in the Green River Study Plan (Green River Study Plan *ad hoc* Committee 2007)**
- II. An assessment of where we are in that Evaluation Process and what has changed since 2007.**
- III. Program Director's Office proposed update to the Flow and Temp Rec. Evaluation Process.**

- I. A Review of the Flow and Temp Recommendation Evaluation Process identified in the Green River Study Plan (Green River Study Plan *ad hoc* Committee 2007)**
 - In 2007, the Recovery Program approved the Green River Study Plan (Study Plan), which identified three resource categories considered most important in our evaluation of Muth et al. 2000. Those categories were:
 1. Floodplain inundation for larval entrainment, rearing, and subsequent movement of subadult razorback suckers into the mainstem in Reach 2.
 2. Backwater formation and maintenance for the rearing of young Colorado pikeminnow.
 3. Nonnative fish management in Reach 1 and upper Reach 2.
 - The PDO does not believe the priority information needs, i.e. the resource categories, have changed appreciably since 2007.
 - In the Study Plan we outlined an approach to gather necessary information in each of these resource categories. That approach included completion of various ongoing studies, initiating several new studies, and coordinating synthesis efforts to pull together long term datasets. The synthesis reports were *to be* considered “checkpoints”, which were intended to *evaluate the efficacy of the flow and temperature recommendations and to reassess, as necessary, the direction of the studies, as well as reduce extraneous data needs*. Our hope was to have the necessary information from the ongoing studies and the synthesis efforts completed by 2009.
 - Also in the Study Plan we hoped to *provide an overall integration of these category-based syntheses and perform a comprehensive assessment of the effects of flow and temperature recommendations* starting in 2009 (with an expected completion date of 2010).

II. An assessment of where we are in that Evaluation Process and what has changed since 2007.

NOTE: The Recovery Action Plan was revised, beginning in 2008, to track progress of these Study Plan actions (see below). The overall integration / comprehensive assessment (identified as Item # I.D.2 in the Green River section of the RIPRAP) is now scheduled to occur in 2012.

Resource Category: Floodplain

The following provides a status update of studies and the synthesis called for in the Study Plan as related to three subject areas in the Floodplain Resource Category:

- New Start C6 RZ-RECR – Stirrup report: in final review process.
- Project C6 RZ-ENTR – Razorback sucker larval entrainment report – Hedrick et al. 2009 complete.
- Project 85f – USGS Sediment Transport Study: in final review process.
- New Start FR-FP Synth - Floodplain Synthesis – LFL leads a synthesis of historic larval razorback collection information, findings from C6 RZ-ENTR, Yampa and Green River hydrology, etc.– Bestgen et al. 2011 complete.
- Project 22f – larval razorback monitoring – study continues; dataset from 1992 thru 2009 incorporated in Floodplain Synthesis (Bestgen et al. 2011).

Resource Category: Backwater Nursery Habitats

The following provides a status update of studies and the synthesis called for in the Study Plan as related to two subject areas in the Backwater Resource Category:

- Project 138 – Age-0 CPM monitoring – study continues; UDWR recently summarized dataset from 1986 thru 2009 (Breen et al. 2011).
- Project 22f – larval CPM monitoring – study continues; dataset will be summarized as part of New Start Backwater Synthesis (see below).
- Project 144 – Native fish response to nonnative removal in Green River; in final review process.
- New Start FR-BW Synth – Backwater Synthesis – LFL and Argonne National Labs collaborate to summarize results from biological studies (Projs 138, 22f, 144) and physical measurement (BW sandbar topography) to evaluate aspects of Muth et al. 2000; in progress, expected due date

Resource Category: Nonnative Fish

The following provides a status update of studies and the synthesis called for in the Study Plan as related to two subject areas in the Nonnative Fish Resource Category:

- Project 115 – Lodore and Whirlpool Canyons nonnative fish removal / fish community monitoring; LFL has provided periodic integration reports. Next reporting effort will focus on environmental effects on the early life history of SMB (via otolith analysis). Because the BC asked that LFL include data collected in 2011 (a very high water year) this report will not likely be complete until late 2012 at the earliest. The PDO considers this an important component of an evaluation of Muth et al 2000.

- Project C18/19 – otolith isotope investigations to determine provenance of fish collected in the river. This study applies to Flaming Gorge ops as a potential evaluation technique for nonnative fish escapement from the reservoir. Recovery Program approved expansion of this study (looking at crayfish as a sedentary sentinel species) in 2011, which will delay completion of this report until January 2012.
- Project 161 – Smallmouth bass synthesis – although not called out specifically in the Study Plan the Recovery Program has initiated this effort to evaluate our SMB control program. Among a variety of analytical approaches, LFL as the project lead, will explore how the SMB populations throughout the Upper Basin respond to environmental conditions – The PDO considers this an important component of an evaluation of Muth et al 2000.
- Burbot – Potential entrainment (as result of reservoir spills) of this nonnative, new-comer into the Flaming Gorge Reservoir fish assemblage into the Green River was not analyzed in Reclamation’s EIS, nor in our Study Plan. The NNF Sub-Comm will discuss the risk of establishment of this species in the Green River below Flaming Gorge at their NNF Workshop scheduled for December 2011. The PDO considers this an important consideration in our evaluation of Muth et al. 2000.

III. Program Director’s Office proposed update to the Flow and Temp Rec. Evaluation Process.

The PDO believes that progress made to date in the Floodplain Resource Category is adequate to proceed with our assessment (*the overall integration*) of Muth et al. 2000. However, in the Study Plan our intent was to be able to base that assessment on information gained on all three resource categories. We believe that critical pieces of information in the Backwater and Nonnative Fish Resource Categories are lacking and therefore the assessment should be postponed until that information is available.

More specifically the following reports / analyses will prove critical to our assessment of Muth et al. 2000):

- the FR-BW Synth,
- a summary of the effect of environmental conditions on the early life history of SMB (a component of project 115) in Reaches 1 and 2 coupled with the more comprehensive assessment of effect of environmental conditions on SMB populations throughout the basin via the SMB Programmatic Synthesis (project 161), and
- a better understanding of the risks associated with future spills at Flaming Gorge Dam and the associated release of burbot.

Significant progress has been made on all these information fronts and PI’s are scheduled to submit draft reports by late CY 2012.

With those pieces of information the Recovery Program can then develop an RFP that clearly identifies the questions that will comprise our assessment of Muth et al 2000. The PDO believes we can begin development of that RFP in FY 2013 (provided funds are available).

If the BC and MC agree with this updated schedule the RIPRAP should be revised to show that Green River item I.D.2 will occur in FY13.

Attachment 4 Research Framework Recommendations

The following are recommended ongoing and new research activities that the Recovery Program should consider incorporating into the RIPRAP, based on the above evaluation of biotic and abiotic controlling factors. These recommendations were drawn from Tables 13-16. These research recommendations include only those activities that are not currently being addressed through existing or planned projects.

1. Continue to identify and address sources of mortality (e.g., predation and competition) for age-0 Colorado pikeminnow in nursery backwaters and develop strategies for reducing this threat. Activities related to this include non-native fish management, sampling under projects 22f, 138, the backwater data synthesis (FRBW synth), and joint USFWS and UDWR, Vernal (project 158) sampling in backwaters in the middle Green River.
2. Continue to determine the most suitable summer and fall flows for age-0 Colorado pikeminnow nursery backwater formation. Activities related to this include sampling under projects 22f, 138, the backwater and geomorphic data synthesis (FR-BW synth), and joint USFWS and UDWR, Vernal sampling in backwaters in the middle Green River (project 158).
3. Continue to identify and address sources of mortality (e.g., predation and competition) for late age-0 and age-1 Colorado pikeminnow after they leave the nursery backwaters and develop strategies for reducing this threat. Aspects of this are being investigated under projects 22f, 138, FR-BW, and pikeminnow abundance estimation efforts, which link recruitment and relative abundance at early life stages with juveniles, recruits, and adults. Other modeling tools are also available to investigate this further, including an individual-based recruitment model for Colorado pikeminnow.
4. Continue to implement innovative techniques to evaluate the effectiveness of nonnative fish management, such as recruitment models to help assess the necessary reduction levels of nonnative fishes, as well as the effectiveness of these actions on the endangered fishes. Aspects of this are being developed by ongoing non-native fish management workshops and work conducted under project 161, the smallmouth bass data synthesis, and recruitment analyses conducted in conjunction with abundance estimates. Additional intensive sampling to disrupt smallmouth bass reproduction is being conducted in the Yampa River in 2010 (projects 98 and 125, as are investigations of the most efficient electrofishing gear [project 147]). Ongoing investigations to assess timing of spawning and hatching of smallmouth bass in the Green and Yampa rivers (projects 115 and 140) may also assist with development of strategies to reduce their reproductive success via dam operations at Flaming Gorge.
5. Implement a climate change initiative that outlines a strategy for dealing with the effects of drought, reduced stream flow, and associated effects in the context of

recovery of the four endangered fishes. Climate change initiatives should also assess effects on invasive species, and their potential interactions with natives. . Such work is being considered under the Southern Rockies Landscape Conservation Cooperative (LCC) but other sources of support should also be investigated.

6. Continue to evaluate the effects of water pollutants, including selenium, mercury, and pharmaceuticals on the four endangered fish species. The Recovery Program continues to support activities associated with toxicant and pollutant studies (mercury, selenium, and pharmaceuticals) which is generally conducted by other agencies such as the Environmental Protection Agency, USGS, Reclamation (e.g., Selenium Management Plan in the Gunnison River subbasin), and the states under their respective water quality plans (e.g., Stewart Lake selenium remediation).

7. Identify and address sources of mortality (e.g., predation and competition) for age-0 humpback chub in nursery habitats. Aspects of this are being investigated via non-native fish management activities in reaches where chubs occur, projects 115 and 161, and through ongoing non-native fish workshops.

8. Identify and address sources of mortality (e.g., predation and competition) for age-1 humpback chub in rearing habitat. Aspects of this are being investigated via non-native fish management activities in reaches where chubs occur, projects 115 and 161, and through ongoing non-native fish workshops.

9. Develop a strategic plan for control and removal of white sucker from the upper basin. Ongoing studies include assessment of white sucker hybridization and abundance patterns related to flows and water temperatures (project 115), removal of white sucker from some reaches being conducted in an experimental framework (State of Utah's 3 spp. efforts, projects 115 and 125), and consideration of those effects in range-wide "3 species" investigations.

10. Continue to assimilate and assess information on all stocked endangered fish recaptured in the upper basin to better understand factors that affect survival, growth, and recruitment. Ongoing aspects of this include database management activities, assessment of survival rates of stocked and recaptured razorback sucker in the Upper Colorado River Basin (project 159).