

Draft Biology Committee Conference Call Summary
April 29, 2014

PARTICIPANTS

Biology Committee: Dave Speas, Melissa Trammell, Jerry Wilhite, Harry Crockett, Tildon Jones for Dale Ryden, Paul Badame for Krissy Wilson, Brandon Albrecht, Tom Pitts, and Pete Cavalli.

Others: Leslie James, Kevin Bestgen, Tom Chart, Jana Mohrman, Kevin McAbee, Tom Czapla, and Angela Kantola.

CONVENE: 9:00 a.m.

1. Proposed approach to evaluate the Green River flow recommendations – Tom Chart said he and Jerry Wilhite drafted a proposed approach (Attachment 2). This is part of the overall Green River Study Plan (per the 2005 Biological Opinion), but we're a couple of years behind in beginning this evaluation. If the Biology Committee supports the concept, then we'll draft a scope of work for Biology and Water Acquisition committee approval. They proposed that Dr. Kirk LaGory would lead the core team. Western has indicated a willingness to provide additional funds for this effort. The core team would have primary responsibility for drafting the evaluation and would be advised by an ad hoc group. As soon as a working draft of the backwater synthesis report is available, the evaluation can be launched and hopefully provide a draft for Program review in one year. Leslie James asked about expected costs and Kirk's availability. Tom Chart thinks the cost will be ~\$100K, with Western perhaps providing half of that. Jerry said Kirk thinks the schedule will mesh well with his work on [LTEMP](#), but Melissa questioned this since LTEMP is scheduled to take another year and a half to complete. Kevin Bestgen said the backwater synthesis consists of Argonne's physical habitat modeling and his biological portion. Kevin thinks he can complete the biological portion by the end of May, then a short amount of time will be needed for some integration (>Kevin will confirm dates with John Hayse and get back to the Committee). Melissa said she thinks the Park Service should be part of the Core Team and she would volunteer in that role. Tom Chart said he's willing to include the Park Service/Melissa on the core team, suggested Kevin Bestgen also should have an elevated role, and suggested expanding the core team to include both Melissa and Kevin. Brandon asked about the role of the ad hoc group and Tom confirmed it would review what the core team develops (the ad hoc team would meet a couple of times, and may essentially be the Biology Committee by default). In any case, participation in the ad hoc group would be available to anyone on the Biology Committee. Cost of the work would be Kirk LaGory's time, with other core team members working in-kind. Later in the discussion, the Committee recognized that Kevin Bestgen's participation as a core team member would also require funding. Tom Pitts estimated it would take 3-6 staff months to accomplish the tasks outlined in the proposal and said it doesn't seem realistic for the core team to commit that kind of time. Tom Chart said much of the responsibility would fall on Kirk LaGory. Dave Speas echoed Melissa's concern that Kirk can meet this timeline in light of his LTEMP work. Tom Pitts requested a scope of work with realistic timeframes and workload. The scope should be broken down by tasks and with estimates of time for each; and, if possible, should include an outline of the report. Dave Speas asked if the evaluation will be primarily qualitative, or if it will include additional analyses and/or modeling. Tom Chart said he doesn't envision much additional analysis, although perhaps some on how smallmouth bass early life history is affected by flow and temperature. Tom Pitts asked how this relates to the experimental approach to Flaming Gorge flow manipulations to disadvantage smallmouth bass. Tom Chart said he thinks actual manipulations of FG to disadvantage smallmouth bass is on a parallel track, but doesn't believe we need to complete that to evaluate the flow recommendations (the same is true of the Larval Trigger Study Plan). Leslie James

asked if other alternatives to nonnative fish are being abandoned in any way; Dave Speas, Tom Chart and others emphasized it is not, and cited the [Nonnative Strategy](#). Dave Speas suggested addressing uncertainties in the Green River Study Plan would be foundational for this evaluation; Tom Chart agreed this is a critical starting point. In addition to the suggested reference documents, Dave Speas also noted the evaluation should consider temperature data, the burbot study plan, and Tate Wilcox's work on northern pike spawning chronologies, and perhaps others. Dave said there might be a need to do more analysis of the temperature data. Dave and Melissa asked if we have to wait until this evaluation is complete before beginning an experiment manipulating Flaming Gorge flows to disadvantage smallmouth bass. Jerry didn't think the evaluation needs to be complete, but much of the information needed for the experiment will be drawn together as part of the evaluation. Tom Chart asked Kevin Bestgen if some the recommendations/options he's outlined for disadvantaging smallmouth bass using flow manipulations could be incorporated in the evaluation. Kevin said much of the basic data has been summarized and he could put together a data report that would be helpful. Dave noted that implementing the experiment would require advance work with stakeholders. The Committee supported the approach; >Tom Chart will call Kirk LaGory to begin drafting a scope of work to evaluate the Flaming Gorge flow recommendations (hopefully in time for the June 11 webinar). Likely, the work would not begin until FY15.

2. Proposed experimental approach to Flaming Gorge Flow manipulations to disadvantage nonnative smallmouth bass (Attachment 3) – Building on the discussion of the previous agenda item, Jerry Wilhite agreed a fair bit of advance work would be required prior to conducting this experiment. Jerry said he received Melissa's comments, and Dave Speas said he'll also provide comments. Jerry thinks this experiment will be something like the Larval Trigger Study Plan, and it may require a multi-year effort. Tom Pitts asked how and when this would be incorporated into evaluation of the FG flow recommendations. Based on timelines, Jerry didn't think this effort or the LTSP could be fully integrated in the flow evaluation report. Tom Pitts asked if any of this information would be needed for downlisting or delisting. Tom Chart said the delisting/downlisting requirements are broader, i.e. provide flows to assist in recovery, which we are doing. Melissa thanked Jerry for putting this together and endorsed the idea of a workshop to begin the process. Tom Pitts encouraged development of a detailed scope of work for this effort, also. Jerry said he thinks this effort will have to be informed by work on the evaluation. Although we didn't have a scope of work to develop the Larval Trigger Study Plan, Jerry offered to develop a scope of work to develop this study plan. Whether this is a standalone scope or a task in the Flaming Gorge flow evaluation scope, Tom Chart thinks some funding will be required. Meanwhile, Dave will brief USBR managers on the potential proposal. Tom Pitts said it will be important to stay within the bounds of the EIS. In summary, Tom Chart said >his office will work with Western, Reclamation, and others to try to move these two "discussion papers" into a draft scope or scopes of work in advance of the June 11 webinar.
3. Update on Colorado Parks and Wildlife proposed work at Elkhead Reservoir –Harry Crockett provided an update to the Committee in advance of the meeting outlining Colorado Parks and Wildlife's proposed work at Elkhead in 2015. The Committee understood / agreed with CPW's rationale for a one-year delay in the overall project timeline. Harry said that since he drafted his one-pager, construction of a physical barrier seems less feasible. As part of this work, CPW will need to write a revised Lake Management Plan. Melissa Trammell expressed concern about the potential use of sterile predatory nonnatives because individuals can still escape into critical habitat and prey on native fish; Harry agreed it would require considerable evaluation. Melissa felt there is not enough information to warrant introduction of wipers into the Yampa River system and suggested that CPW develop a 5-year management plan and reconsider other possibilities at the close of the 5 year period. Melissa is not convinced that a combination of trout, black crappie, and yellow perch wouldn't make a good fishery; Harry agreed, but noted it wouldn't be viewed as a *replacement* fishery. Table C-1 in the *Strategy* summarizes the [2009 Stocking Procedures](#) which prohibit

stocking directly into riverine critical habitat and require that nonsalmonid species be managed in isolated or screened ponds or reservoirs to prevent/control their escapement into critical habitat. Several BC members interpreted that to mean that that unless a spillway screen or some other form of containment can be constructed sterile hybrids should not be stocked. [Note – After the meeting and upon closer review of the 2009 Stocking Procedures, Harry and the PDO agree that the specific language references that the water body “will be equipped or managed with an anti-escapement device or practice acceptable to the Service and the State fish and wildlife agencies.”] Tildon asked about the potential for lethal barriers at the exit; Paul Badame said it’s untried at this scale and the debris load in Elkhead Creek would be a serious consideration. Paul asked if a boom-log system could shunt floating woody debris away from the channel so a net could be used; Harry said estimates indicated that would cost nearly \$1M. Tildon asked if there are any options where the water empties from the spilling basin to the creek. Harry will convey the Committee’s concerns to CPW. Tom Pitts asked about the planning timeline, noting a draft Elkhead Reclamation Plan will need to be approved by the Program, water users, etc., before public release of the plan in the fall of 2014. Tom Pitts asked >CPW to provide an expected date for the draft. Harry and Tom Chart clarified that the revised LMP for Elkhead Res would be reviewed by the signatories to the Stocking Procedures. Tom Chart agreed we’ll need to get buy-in from the local affected parties and parties to the Stocking Procedures. Tom Chart added that he’d like to see Harry more involved in the discussions between CPW and the District.

4. Maybell report – On April 10, Kevin McAbee sent the Committee the Maybell Ditch final report revised according to peer reviewer and Committee comments. The Committee thanked Dave and the reviewers and approved the report; Dave Speas will finalize it and the Program Director’s office will post it to the web. Tom Chart said he believes the Program has satisfied the commitment to evaluate entrainment and expects the Service to consider this in their sufficient progress review.
5. Ridgway – Tom Pitts asked about status; Harry said as far as he’s heard, they still anticipate avoiding a spill. Harry said the recommendation for a regulation change to remove bag and possession limit on bass in the reservoir is in internal review. Tom Pitts emphasized the need to keep whole situation as a top priority.

ADJOURN: 11:30 a.m.

Attachment 1: Assignments (*not reviewed 4/29/14, but new assignments added*)

Note: the order of some assignments has been changed to group similar items together.

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

1. * & Tusher Wash Screening: 1/26/12: **Tom Czapl**, **Dave Speas** and **Kevin McAbee** will draft a Tusher Wash mortality study and literature review RFP (or similar) for review by folks who would not be submitting a proposal. 7/12/12: *no proposals were submitted in response to the RFP, >the ad hoc committee will work on completing the literature search portion of the mortality study (which will aid the discussion in the biological opinion). Need to assign lead.*
 - *The **Biology Committee** will review Jackson Gross's proposed scope of work (to evaluate potential e-barrier impacts) (done). **Tom Czapl** will work with **Kevin McAbee** and **Dave Speas** (and keep Tom Pitts in the loop) on developing a recommendation for how to accomplish Objective 1 of the proposal (determine the minimum electric gradients needed to prevent downstream passage while minimizing the risk of injury). 11/1: *Kevin sent list of BC/PDO questions, comments, and ideas to make the proposal for Obj. 1 more complete to Jackson Gross (who responded he'd begin laying out a strategy to answer the questions). Smith-Root/Program will discuss if this study needs to be accomplished before e-barrier installation (to determine potential effectiveness levels, barrier configuration, or velocity requirements) or only after installation (to determine effective electrical gradients for an existing e-barrier design and structure). Jan 16 – Jackson presented preliminary concepts at BC meeting. 2/21/14: The Committee considered Jackson's recent study outline and framework (Attachment 3 to 2/21/14 meeting summary). Melissa suggested also testing smaller pikeminnow than Jackson is contemplating (adding a third size class) and eliminating the juvenile bonytail size class. Several Committee members questioned whether field conditions can be mimicked adequately in a hatchery and would like to see a schematic of what the testing setup would look like. Dave Speas suggested adding another test variable of no electricity. The Committee suggested considerable cost-share from Smith-Root would be appropriate. >Kevin will discuss Committee ideas and concerns with Jackson and ask for cost estimates. Dave Speas suggested we consider a value engineering study for Tusher; others agreed.**
 - >Dave Speas will work with Peter MacKinnon to develop antenna plan and implement installation; once funding for second set of antennas and salvage operation are confirmed, Kevin will talk to GRCC about logistics & permissions.
2. & Revise the Integrated Stocking Plan (ISP) and related issues. **Tom Czapl** is convening a group to revise the ISP.
 - 9/27/12: *Revised draft ISP sent to ad hoc group by 9/27/12; comments due by the end of October. 5/2/13: Comments received from Zelasko, Wilson and Cavalli; 7/10/13: Czapl will incorporate comments and try to have to Biology Committee by end of July 2013. 9/27/13: Czapl sent revised draft to Committee for review July 31; Cavalli comments submitted September 26, McAbee September 27; 10/10/13 Tom Czapl sent those to the Biology Committee. 1/16/14: **Krissy Wilson** will complete her portion by the end of February and the small group will get it in shape to send it to the Committee.*

Humpback Chub (population estimates)

- 3/7/13: **Program Director's office** will check with Kevin Bestgen on a revised due date for the humpback chub combined population estimate from Gary White. 3/14/13: *LFL will turn this around as quickly as possible after they receive the most recent data from the Service (scheduled for 3/19/13). 3/19/13: The **Program Director's office** will discuss with Kevin Bestgen what it would take to use the 131 analysis of Westwater/Black Rocks to identify clues as to early life history dynamics and recruitment failure. >**Dale Ryden** will provide revised due date. 6/28/13: Three reports are pending: a 2011-2012 Black Rocks report,*

a 2011-2012 Westwater report, and a 1998-2012 combined analysis report. Previous discussion indicated the combined analysis would be provided by LFL and tacked onto the Black Rocks report, but it doesn't fit neatly into either the 2011-2012 Black Rocks or 2011-2012 Westwater reports because it has data from both. Further, Grand Junction CRFP's SOW only covered writing a Black Rocks report, not a combined report. 10/10/13: Biology Committee will discuss later after Kevin, Travis et. al. recommend how to proceed with reporting (after Travis completes this year's fieldwork). 1/16/14: What Kevin Bestgen presented was the joint report and parts of it will appear in the individual reports. A young-of-year sampling effort may need to be added back to the fieldwork. >Czapla will follow up on due dates.

&Humpback Chub (broodstock development / genetics)

- 3/6/12: **Tom Czapla** will remind the humpback chub genetics ad hoc group to submit comments (7/13/12 comments still pending). 1/17/13: Some comments received and incorporated; comments still pending from **Trammell**.
 - *As identified in the 2012 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. 5/2/13: **Program Director's Office** will provide outline to Biology Committee in advance of the July 10, 2013, meeting. 7/10/13: **PDO** will forward the document that a smaller group has worked on and the Biology Committee will discuss in October 2013 (discussed 1/16/14). Tom Czapla received comments on the draft from Dave and Tildon and is trying to reach Wade Wilson regarding his genetics work on the fin clips we've provided. **Dave Speas and Tom Chart** will see if a deliverable on Upper Basin fin clips was mentioned in Wade Wilson's Lower Basin scope of work). After Wade's report is received, a workshop should be held to include discussion of when and where fish would be stocked. Tom Chart recommended outlining questions for a workshop, conducting the workshop, and then finalizing the action plan. 2/21/14: No deliverable on Upper Basin fin clips; cost would be ~\$37K (Committee considering, but not our highest priority; see 2/21/14 meeting summary).
 - 10/16/12: Age-0 Gila from Westwater were going to be brought to the Horsethief Canyon ponds this fall, but river conditions won't allow safe transport until spring (timing will depend on hydrology). Tissue samples from those humpback and fin clips collected from humpback in the field in 2012 will be analyzed by Wade Wilson to provide information needed to determine if we can use local humpback chub for broodstock development, if needed, or if we will need to incorporate fish from the backup broodstock at Dexter NFH (from the Grand Canyon). Fish will be brought in fall 2013. 10/10/13: Dale said they brought ~25 fish they caught into ponds, but have less than a dozen at this point. They will try to build these numbers in future years if the Biology Committee supports that (1/16/14: the Committee supports this).
3. & Flaming Gorge/Green R burbot: **Melissa Trammell and Pat Martinez and Krissy Wilson and Jerry Wilhite** will work on a Flaming Gorge burbot risk assessment. 10/16/12: They held a conference call August 30 and October 15; will have another call November 20, and Melissa will present something to the nonnative fish workshop (done). UDWR is funding two studies (food web and early life history). Late this season, Tildon tried baited hoop nets and other methods in the Green River and did not capture burbot. 12/7/12: **Melissa** will provide a draft to the ad hoc committee members in early February. 1/29/13: Melissa asked if **UDWR** could include larval burbot sampling near the spillway in their current work in Flaming Gorge; Krissy thought they could. Tildon asked and Krissy said they're not doing any sampling in the tailrace for burbot. **Melissa** will provide a draft assessment to the Committee by the end of July 2013. 1/16/14 – Melissa assured she'll have this done by the end of February 2014 (done 2/28/14); Krissy and Jerry will review at that time, then it will go to the Biology Committee. Melissa proposed a review schedule

which comports with Program report review process. The report also will be reviewed by staff from Dinosaur NM, go through some NPS review process, and be 'published' under an NPS 'natural resource' report where it will be available online:

- 2/28/14 - Co-authors and the Program's nonnative fish coordinator (Kevin McAbee) review
- 3/28/14 (after I receive and respond to comments) it goes out for peer review and Biology Committee review; they have 45 days to review
- 5/13/14 BC/peer comments due, plus 4 weeks for my revision and response to comments
- 6/15/14 Final to BC for Program approval.

4. & Nonnative fish management follow-up:

- **Melissa Trammell** offered to work with **Travis** in summer 2013 and report other nonnative fish data (e.g. gizzard shad, nonnative fish captured during Colorado pikeminnow estimates to the Committee each year). The **Committee** will review the information Melissa provides in working with Travis and then discuss what further analysis may be needed.
- In 2013, population estimates for smallmouth bass will only occur in Project 125. The **Committee** will reconsider resuming the smallmouth bass population estimates throughout the current Yampa River population estimate reaches in 2014, based on an analysis from André. 1/16/14: *To be revisited after workshop on projection tool.*
- The **Committee** agreed to suspend all mark / release of northern pike Program-wide in 2013. They made a **firm agreement** to revisit this issue (northern pike population estimates) when results of the northern pike synthesis are available.
- **Harry Crockett** will check to see if Colorado's Parks folks might be interested in administering a harvest incentive program. 7/10/13: *response pending*. 10/10/13: *Harry said CPW is open to considering this in some situations and will discuss further with the Program Director's office (Kevin McAbee, Harry, and Vernal CRFP to discuss and consider bringing proposal on this and a potential White River incentive program to the nonnative fish workshop)*. 1/16/14: *Harry said CPW is discussing this and thinks it may be implemented in one or more places in 2014 (though not on the White River)*.
- ***Walleye:** **UDWR** will modify their proposed addendum to 123a and submit it to the Committee for discussion and approval (via e-mail, if possible). >**Kevin McAbee and Paul Badame** will work on organizing a "walleye summit" with appropriate outside expertise. **PI's** should fully document walleye captures (date/time, length/weight, and river mile). >Protocol for otolith collection is needed before field season begins.
- Walton Creek: Action items after the site visit were to determine if fill material is available and what topography information is available; **Harry Crockett** provided follow-up on this to the PD's office.
- ***Private (LaFarge) Pond near Rifle:** **Harry Crockett** will find out if the landowner will allow and if CPW can reclaim the pond before spring runoff (considering a seismic gun option); >**Tom Chart** will coordinate with **Harry** and **Brent Uilenberg/Bob Norman** on repairing the notches after runoff.
- Starvation Reservoir escapement: The **Committee** will hear more about escapement control options once the **strategy work group** can discuss **Reclamation's** evaluation. **Dave Speas** will see if he can find out when USBR-Provo will provide their *evaluation* (2/21/14: *pending*; *Paul Badame said Reclamation has asked for more information*); **Krissy Wilson and Paul Badame** will call for a follow-up meeting (will include CUWCD). **Paul Badame** will send Tom Pitts his presentation, his report, and the 2005 escapement report and then schedule a call with Tom to review. 2/21/14: *If an in-reservoir net solution is selected, Krissy believes a portion can be paid for with UDWR boating safety funds.*

5. **The Program Director's office** will work with States to compile all the Lake Management Plans. *Pending — McAbee. (Krissy said she believes she submitted information to Pat in the past, but can do so again).*

2/21/14: Kevin received a number of plans from Utah (though three still under review are outstanding), Pete and Harry are working on compiling Wyoming and Colorado's.

6. ***The PD's office (McAbee)** will work with **Harry Crockett, Krissy Wilson, Dale Ryden, and Pete Cavalli** to review the otolith analysis situation and make recommendations for FY14-15. *Deferred pending available funding.* >Dave Speas will discuss with Bill Pine, who has a source(s) for this work (see 2/20/14 meeting notes). **Kevin McAbee** will work with Melissa to refine otolith guidance and then send PI's instructions for when, where, and from what fish otoliths should continue to be collected. *Done.*
7. The **Program Director's office** will recommend boilerplate language (including identifying reduction targets) to be used across applicable nonnative fish management scopes of work. *Pending (PD to include in FY16-17 Program Guidance).*
8. **Kevin Bestgen** and Dale Ryden will work up estimated costs for addressing additional razorback data being collected (need for additional data analysis on both Green and Colorado rivers). *Dale said Kevin wants to wait until after the end of the field season to ascertain the number of records to be analyzed (probably ~150,000 fish records). This may be a fairly involved effort. 2/6/14: FWS project #163 has task for razorback pop. est. in Gunnison and Colorado, though not enough razorback captures/recaptures to do much with the Gunnison River data. Osmundson developed razorback matrix for 2008-2010 and Gary White ran this data through Program MARK in 2013 (data to be reported in 2015). PIs recommend also including 2013 razorback data (from the Colorado River pikeminnow population estimate study) in this analysis (\$2K in SOW for White to help with data analysis in 2015, adding 2013 razorback data shouldn't add to cost). Developing razorback population estimates in the Green and Yampa will be more difficult, probably not in existing SOWs, and probably should be separate effort. PD's office will discuss costs/mechanism (e.g., add-on to #128) with LFL. 2/21/14, cost estimate pending from LFL.*
9. **Brent Uilenberg** and **Harry Crockett** will be working with CPW and Reclamation engineers to evaluate the potential for a permanent barrier downstream of the Ridgway Reservoir.
10. **Tom Chart** and **Jerry Wilhite** will draft a process and discuss Western's monetary contribution with regard to an evaluation of Green River flow and temperature recommendations.
11. **Harry Crockett** will look into what it would take to add a marking pass in Billy Atkinson's reach on the upper Yampa.
12. **Harry Crockett** will contact **Jackson Gross** and let him know the Committee appreciate Smith-Root's interest (and willingness to bring considerable cost-share), but would like to see a proposal that includes evaluation of success and a report.
13. The **Program Director's office** (Czapla) will discuss Ouray electric repairs with Reclamation and Dave Schnoor.
14. **Harry Crockett** will discuss with CPW Krissy Wilson's proposal to provide \$10K to Colorado toward upgrading a hatchery to produce more and larger tiger muskies in exchange for half the fish production.
15. Regarding white sucker hybrids, **Harry Crockett** will talk to **Kevin Bestgen** about any further work needed subsequent to the identification guide that Pat Martinez distributed last year.

16. The **Nonnative Fish Subcommittee** should discuss need for completing long-term syntheses for Yampa River native fish response and Lodore/Whirlpool Canyon (funding has not been available so these syntheses had been placed on hold).
17. The PD's office (**Czapla**) will ask LFL when the cyprinid key will be completed.
18. The PD's office (**Kantola**) will get a link to the CWCB Laserfiche library (which houses the Program's technical report library) on the Program website.
19. The **PD's office** will review and summarize fish screen operations over a longer period of time (and as it relates to hydrology and conditions under which the irrigators are not required to operate the screens). **Jana Mohrman** and **Tom Pitts** will discuss concerns about fish screen operation with Brent Uilenberg and Bob Norman.
20. **Dale Ryden** will provide a revised scope of work for Gunnison fish community monitoring (#163) to cover continued monitoring.
21. **Kevin Bestgen** will confirm dates for completing a draft of the backwater synthesis with John Hayse and get back to the Committee). The **Program Director's Office** will work with **Western, Reclamation, and Kirk LaGory** and others to incorporate the two Flaming Gorge "discussion papers" (evaluation of flow recommendations and experiment to disadvantage smallmouth bass) into a draft scope or scopes of work in advance of the June 11 webinar.
22. **Harry Crocket** will let the Committee know when CPW will make their draft Elkhead plan available.

23. Attachment 2

A Proposed Approach to Evaluate:

Flow and Temperature Recommendations for Endangered Fish in the Green River Downstream of Flaming Gorge Dam (Muth et al. 2000)

1. Suggested authorship –

- We propose that Dr. Kirk LaGory serve as Chairman of the authorship teams. The Chairman would provide general oversight and serve as a lead author through the development of this evaluation.
- Authorship would comprise a Core Team and an Ad Hoc group.
 - The Core Team would consist of representatives from agencies that were included in the Flaming Gorge Biological Opinion (U.S. Fish and Wildlife Service – Paul Abate or PDO (if requested by the Utah Field Office); Western Area Power Administration - Jerry Wilhite; Bureau of Reclamation – David Speas). The Core Team would be the primary working group responsible for drafting the evaluation report.
 - The Ad Hoc Group would consist of Dr. Kevin Bestgen and any BC member that would like to participate. The AdHoc Group’s primary role would be to review draft products produced by the Chairman / Core Team. Biology Committee members can designate a proxy, but we request that only one person sit on the Ad Hoc Group per agency.

2. Suggested timeframe - 1-yr from Program's receipt of a workable draft BW-Synth

3. Suggested approach - Because this will largely be a synthesis of flow related information, we identify the following list of supporting docs that we feel are integral to an evaluation of Muth et al. 2000 -

- Reclamation's FG Annual Operations Reports - this may require a closer look at an evaluation of flows in reach 3.
- FP-Synth (this covers the larval RBS component of 22f);
- BW-synth (which will incorporate larval (Proj 22f) and Age-0 (Proj 138 and 158) pikeminnow sampling and BW-Topo); Breen et al 2011 (should be subsumed by BW-Synth but certainly recognize it);
- Argonne's Levee Breach work;
- Project 161 SMB Integration report and possibly the projection tool (?); possibly other NNF projects, but I think the 161 report will suffice.
- Project 115 Lodore / Whirlpool Integration report (Bestgen et al 2007) and annual reports.
- Proj 128 -CPM pop estimates (we now have preliminary info through 2013)
- Project 129 reports - Deso HBC
- SMB early life history (otolith info) as affected by enviro conditions.
- RBS monitoring plan and(Proj 160 (lower Green RBS larval sampling)
- other NPS - Dinosaur sampling efforts (sed, inverts, etc) - this could complicate matters considerably - BUT this should be resolved up front.
- Ongoing experimentation - LTSP
- Aerial photog (particularly 2011, but there may be other flights) as it relates to floodplain inundation
- Project 85f - RBS spawning bar and evaluation of the sediment transport equations.
- other studies?

We envision that this evaluation will:

- review the anticipated effects of Muth et al. 2000.

- review the status of uncertainties identified in the Green River Study Plan (Floodplain, Backwaters, nonnatives).
- determine the adequacy of Muth et al. (2000), which could result in: a) a determination that all aspects of Muth et al. 2000 remains valid – no revision recommended at this time; b) identifying aspects of Muth et al 2000 that require further evaluation – but, no revision recommended at this time; c) discovery of new uncertainties that require further experimentation (e.g. the LTSP, experimental dam releases to disadvantage nonnative species in Reach 1; higher base flow targets in Reach 2, etc.) – but, no changes recommended at this time; d) sufficient information to proceed with revision of Muth et al. (2000) at the present time, or e) some combination of the above.

We suspect the Core Team will need to meet on an as-need basis. The Core Team and Ad Hoc Group would likely meet (face to face) on at least two occasions over the course of the year.

4. Report Review Process – This Evaluation Report should follow the *Upper Colorado River Endangered Fish Recovery Program Technical Report Review Process - Additional Requirements for Review of Technical Reports on Flow Recommendations* (revised February 2013).

Attachment 3

Proposal to Experimentally Evaluate the Use of Flaming Gorge Dam Releases to Disadvantage Smallmouth Bass in the Green River

Within the Colorado River Basin, Colorado pikeminnow, razorback sucker, bonytail, and humpback chub are currently listed as endangered under the Endangered Species Act of 1973. Recovery goals established in 2002, currently under revision, indicate competition with and predation by nonnative fish is a threat common to all four species and must be addressed to facilitate recovery. The urgency in the need to address threats posed by nonnative fishes is highlighted in the Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy (NNF Strategy) recently approved by the Upper Colorado Endangered Fish Recovery Program (Recovery Program).

One of the primary components of the NNF Strategy is the application of control techniques and implementation of management strategies to reduce nonnative fish impacts on endangered fishes. Until now, the Recovery Program has relied on mechanical removal as the primary tool to control nonnative fish. Research currently underway at the Larval Fish Laboratory at Colorado State University seems to indicate we may have reached a level of maximum population suppression using current control methods. However, this level of suppression does not appear to address the threat of nonnative fish to the extent required to downlist and delist the four endangered fishes in the Upper Colorado River Basin. The NNF Strategy recognizes the need and advocates for multiple actions in addition to removal.

As our understanding of the threats that certain nonnative fish species pose to endangered fishes has evolved, so too has the focus of control efforts which are now primarily targeted at invasive, piscivorous species. The NNF Strategy identifies smallmouth bass as one of the most problematic invasive species within the Upper Colorado River Basin. Work carried out by the Recovery Program indicates smallmouth bass have expanded their range and are now widely distributed throughout the Green River Basin, including the main stem Green River, highlighting the need to employ additional actions that have the potential to affect smallmouth bass on a population scale.

Recently completed modeling indicates actions that reduce egg and larval survival of smallmouth bass, especially cohorts from early in the year, have the potential to produce a population-wide reduction of smallmouth bass. One approach that has that potential is alteration of Flaming Gorge Dam releases.

Use of Flaming Gorge Dam Releases

Flaming Gorge Dam has the ability to regulate volume, flow magnitude, temperature, and timing of flow pulses in the Green River. A suite of factors is considered in determining the operations of Flaming Gorge Dam and are described in the 2005 Environmental Impact Statement on operations and the related 2006 Record of Decision.

The feasibility of using short-duration experimental releases to disadvantage early life stages of smallmouth bass should be explored. It is anticipated that short-duration pulses of cool water (e.g., 10°C) could delay the onset of reproduction in smallmouth bass. Experiments could include altering the temperature of released water using the multi-level intake structure, altering the magnitude of releases, or a combination of both at a time that would most effectively target these early life stages of smallmouth bass.

There are a number of factors that require careful consideration before an experimental approach such as this can be implemented. Below is an initial list of items that will need to be considered in developing this experimental approach:

1. Impacts on smallmouth bass – A robust experimental program that evaluates the success of treatments in achieving hypothesized results needs to be implemented. This would include several years of monitoring to determine if the desired impact on early life stages was being achieved. Additionally, information would need to be collected to determine whether these treatments have the desired population-wide impacts and to what spatial extent these impacts are being realized. This would likely require the Recovery Program to develop new projects and/or amend current projects. However, there are currently funded projects that may help inform this evaluation (i.e., Projects FR-115, 123a, 123b, 161, and 22f).
2. Impacts on other native fishes – Treatments would need to be developed that would be the least likely to negatively impact existing native fish populations not currently federally listed as threatened or endangered. Coordination with state agencies' native fish programs would be necessary during development of an experimental plan.
3. Impacts on endangered fishes – Treatments need to be developed so that risks to endangered fish are minimized. Experimental treatments would need to be designed so that interference with various life-history stages of endangered fishes would be minimized. These stages could include spawning, larval drift, or rearing. Current Recovery Program projects may be drawn upon to monitor impacts to endangered fishes (i.e., Projects 22f, 138, and 160).
4. Impacts on the trout fishery – Coordination with state game fish managers and angling groups would be necessary to minimize impacts of experimental treatments on the trout fishery in the Flaming Gorge Dam tailwaters. The Flaming Gorge Working Group meets twice a year and could serve as a means to interact with these stakeholders. However, it may be necessary to have more targeted discussions with Utah Division of Wildlife Resources' biologist and angler groups.
5. Impacts on other nonnative fishes – It is important that experimental treatments to disadvantage smallmouth bass do not subsequently benefit other nonnative fish, especially northern pike. Current Recovery Program monitoring projects may be sufficient to monitor effects on these other nonnative fishes and determine if flow treatments are benefitting them (i.e., Projects 123 a, b, and FR-115), but additional monitoring may be necessary.
6. Regulatory compliance – There are a number of regulatory items that need consideration when developing an experimental plan. For example, Flaming Gorge Dam was created with authorized purposes defined in the Colorado River Storage Project Act of 1956 and is currently operated according to the 2006 Record of Decision signed after completion of an environmental impact statement required by the National Environmental Policy Act (NEPA). Additionally, in 2005 the USFWS issued a biological opinion on the reoperation of Flaming Gorge Dam as is required by the Endangered Species Act. Careful review would be required to ensure proposed experimental treatments comply with these and any other associated laws and water rights.
7. Impacts on other stakeholders – Since treatment would be of short duration (hours to days), impacts to other stakeholders may be negligible. However, other potential impacts to other stakeholders will need to be identified and quantified. Other stakeholders may include hydropower, land owners, and reservoir users. The Flaming Gorge Working Group may provide an initial venue to initially identify and engage other stakeholders.
8. Impacts on ongoing research – Any experimental treatment must consider potential consequences to other projects and should be developed so as to not confound results of current research. For example, the Recovery Program is two years into a multiyear study, the Larval Trigger Study Plan, looking at altering the timing of releases from Flaming Gorge Dam to advantage larval razorback sucker. Any treatment that alters releases from Flaming Gorge Dam has the potential to interfere with this research.

Proposed Next Steps

It is important that we begin the process of investigating the feasibility of using short-term releases from Flaming Gorge Dam to disadvantage smallmouth bass. However, before any experimental approach using Flaming Gorge Dam releases can be implemented, an evaluation of the Green River Flow Recommendations, completed in 2000 and implemented in 2006, needs to be completed. This evaluation is required by the 2005 Biological Opinion and the Green River Study Plan developed by the Recovery Program. Evaluation of the current flow recommendations would better define any uncertainties that persist in flow impacts on endangered fish and would ultimately better inform this process.

Prior to completion of an evaluation of the Green River flow recommendations there are actions that can be taken that may expedite implementation of this experimental approach. Western recommends convening a workshop that would be led by Dr. Kirk LaGory of Argonne National Laboratory. Invitees to this workshop should include representatives from all partners in the Recovery Program, scientists who conduct research in the upper Colorado River Basin, scientists outside the program with species expertise (especially smallmouth bass), and any other interested stakeholders. This workshop would provide a venue for participants to address the items discussed above as well as other items that are likely to surface. Additionally, participants would be able to begin to identify potential flow treatments and lay the framework for an experimental plan to be completed and implemented upon completion of the flow recommendations evaluation.