

Biology Committee Draft Meeting Summary
[Holiday Inn Hotel and Suites](#), 2571 Crossroads Blvd
Grand Junction, Colorado, March 10–11, 2010

Biology Committee: Melissa Trammell, Dave Speas, Michelle Shaughnessy, Pete Cavalli, Krissy Wilson, Shane Capron, Tom Pitts, Brandon Albrecht, and Sherman Hebein. CREDA was not represented at the meeting.

Other participants: Bob Norman, Brent Uilenberg, Tom Chart, Greg Austin, Tom Czapla, Angela Kantola, Manuel Ulibarri, Doug Osmundson, Thad Bingham, Brian Scheer, Barb Osmundson.
By phone: Jana Mohrman, Paul Abate, Kevin McAbee, and Aaron Webber.

Assignments are indicated by “>” and at the end of the document.

Wednesday, March 10

CONVENE: 12:30 p.m.

1. Review/modify agenda – The agenda was modified as it appears below.
2. Tusher Wash – Discussion of mortality associated with turbines (see diagram and map in Attachment 2) – As outlined in Dave Speas’ 3/6/10 e-mail, the Tusher Wash diversion dam and associated irrigation canal and powerplant on the Green River near Green River, Utah, has been the subject of some discussion in the Program for many years. The dam diverts water through a rather large canal (a significant fraction of the river is diverted at low flows) toward a small hydroelectric powerplant (Thayn Hydropower). Most of the water normally passes through the powerplant and generates electricity and the remainder flows past the powerplant into a smaller irrigation canal. The power plant likely entrains and perhaps kills an unknown fraction of fish, and some entrainment likely also occurs in the irrigation ditch. Building a screen to exclude all fish from both the powerplant and the irrigation canal is one effective but costly option. Screening *only* the irrigation canal and installing more fish-friendly turbine runners in the powerplant is another option. The runner upgrades are only an option if the Program and the Service can accept some level of turbine mortality (which would likely be at least 10%). Survival is size-dependent, probably approaching 100% for smaller fish, but dropping for larger fish. Based on turbine type, current mortality may be as high as ~30%. If no mortality is acceptable, an exclusion device may be necessary in front of the powerplant and canal. Bob Norman said installing fish-friendly runners on the turbines would allow us to screen only the 35 + 60 cfs of irrigation water. The 60 cfs could be screened with a traveling belt screen and the 35 cfs screened separately. O&M costs for these screens would be less than that for our Grand Valley screens, and a portion of those costs might be offset by increased efficiency of the hydro plant. Tom Chart said he believes the Service will want to assess potential mortality in the context of the Green River Colorado pikeminnow population. At Maybell Ditch, the Service allowed take up to 1% of adult population. For comparison purposes, Tom Pitts added that screens in the Grand Valley do not operate 100% of the time. Reclamation could determine current mortality in the turbines, if that information is needed. Melissa noted that current mortality rates would be reflected in

our Green River Colorado pikeminnow population estimates. Dave Speas emphasized the need to know mortality thresholds by size classes. Sherman Hebein said Steve Heibert (USBR) likely has information on this. Pete Cavalli noted that when he found the razorback sucker on Tusher's trash rack a decade or so ago, a deflection wall had been placed in the canal that really changed the flow pattern; that wall was subsequently removed.

Brent Uilenberg said Green River Canal Co. is interested in raising the dam because at very low flows they currently have difficulty taking their full decreed water right. At the current dam height, fish can pass at most flows. If the Canal Company raises the dam, they would bear the cost of fish passage. Bob Norman said the Program can move ahead with screening (all or partial) prior to knowing if the dam will be raised, we'll just need to build a screen large enough to accommodate a potential raised dam.

The tentative budget for a full screen is \$7M. >The Program Director's office will prepare a list of issues to be resolved (e.g., what levels of mortality are 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).

3. Approve Biology Committee January 14 meeting summary – Approved as written.
4. Review previous meeting assignments – See list at end of this meeting summary.
5. Northern pike exclusion on the Yampa River – Tom Chart e-mailed Mark Wernke's trip report to the Committee on 2/18/10. Although we need to heed Reclamation's warning about modifying this habitat (everyone agrees that we don't want to create another Butch Craig situation), Tom believes we should review other options for reducing this pike spawning habitat. Pete Cavalli said he's realized that a structure further back probably wouldn't work, but wonders if anyone has experience with electric barriers. Sherm Hebein noted that any electrical barrier solution would need to consider effects on deer and elk which use these areas heavily. Sherm also noted that a new Federal regulation becomes effective in April 2011 that will require a permit to apply rotenone, so if we're contemplating piscicides, we'll need to apply them this summer or a public comment period will be required. Pete wondered if the site(s) could be treated with copper sulfate to eradicate some of the aquatic vegetation that is enhancing the habitat. Sherm proposed a large gravel berm that would reduce the amount of water that gets back into the rest of the channel. At one point the channel is wide and fairly shallow. The owner said they were contemplating a gravel pit, but there was no source of power. If we fill the side channel pools with river-run gravel, spawning habitat could be greatly reduced, it wouldn't interfere with return water at flood stage, and the opposite bank wouldn't be affected. Sherm thinks they could pretty much eliminate pike habitat at high flow, and it wouldn't be too expensive (although additional gravel might need to be added over time). There's a gravel source onsite and the landowner has construction equipment. A 404 permit would be required, of course. Clearly, this couldn't be done before this spring's runoff. >CDOW will work with Reclamation to flesh out this proposal; >CDOW also will review other options (e.g., plant eradication, barriers, etc.). This will be on the next Biology Committee agenda. Tom Chart pointed out that Chris Hill's study showed that the fish are getting into these areas before ice-out.
6. Nonnative Fish Subcommittee (NNFSC) updates – Dave Speas distributed the March 3

NNFSC call summary. Escapement from Elkhead remains a concern, but will be addressed as part of CSU's synthesis. The NNFSC will ask the Biology Committee to approve the 2008 and 2009 workshop summaries. The NNFSC recommends that the prioritized list of workshop recommendations be updated and used as the foundation for a basinwide nonnative fish control strategy (Dave will be providing an outline to the NNFSC to consider at a meeting in June 30 – July 1). The PD's office summary of report recommendations should be included. (With regard to recommendations in annual reports, Sherm noted that when these aren't appropriately vetted by supervisors or the PD's office, they can cause consternation among anglers. Tom Chart emphasized that individual report recommendations haven't necessarily been fleshed out or agreed upon by Program participants.) Tom Chart suggested that prioritization of recommendations is the most important task of the NNFSC. The NNFSC also will consider if they are taking on too much and perhaps some tasks should be led by the states. Sherm added that the NNFSC discussed that the value of recommendations from previous workshops lies not in putting them on a list, but in being able to put these in scopes of work for evaluation. This should be considered for FY 11 SOWs. Melissa agreed, comparing these recommendations to those in the Yampa strategy which were subsequently made part of the RIPRAP and then SOWs. Tom Chart said he thinks a strategy document would be helpful in looking at the big picture, including policy and prevention pieces of nonnative fish management.

7. RIPRAP (discussion of this agenda item continued through much of the following morning) – Angela Kantola posted RIPRAP documents to the listserver Feb. 11, 2010 in two emails.
 - a. Review summary of annual and final report recommendations – The Committee noted that annual report recommendations seem fairly inconsistent, with some very lengthy and others quite helpfully concise. Dave Speas said that C18/19 contains recommendations for considerable additional work, which we may not support. Just because recommendations are in this summary doesn't mean we're going to implement them. Sherm asked if these essentially unedited annual reports should be posted on the web. The Program Director's office believes they should, as they are public documents. The Program Director's office will add a caveat at the beginning of this annual and final report summary in the future to make it clear that these just compilations of recommendations, which haven't necessarily been adopted by the Program. Sherm emphasized the importance of PI's supervisor's reviewing recommendations to be sure that they are grounded in the data. Krissy agreed that this is the supervisor's responsibility; and noted that PI's should understand we take recommendations seriously. The Committee agreed. > The Program Director's office will include this reminder in instructions for annual reports in future years.
 - b. Review RIPRAP tables – Comments are embedded in the RIPRAP tables, which Angela Kantola will provide to the Management Committee by March 24.

The Committee discussed ongoing and potential threats of oil and gas related spills which could impact recovery. There was a fish kill in the White River last year. Spill response plans are in place, but additional prevention and enforcement are needed. The permitting process begins with the states (endangered fish critical habitat should be one of the things the states consider, but often isn't). The Committee would like to get a briefing from the Service's Colorado and Utah Ecological Services offices about

what's written in current biological opinions; how pipeline crossings/shutoffs are being handled, current spill response plans, and how we address issues on non-federal lands. The Committee also would like to get similar briefings from the states. Sherm Hebein said he would be glad to bring in Kim Kaal, the NW energy liaison for this discussion. This will be on the next Biology Committee meeting agenda.

- c. Review RIPRAP text – The Committee noted the Jackson 2010 citation in section 3.1.2 should be Elverud in prep.
- d. Review budget estimate tables – As previously noted, the Program's FY 11 budget is very tight. The San Juan Program addressed similar situation with absolutely zero-based budgets (no increases whatsoever allowed in SOWs from 2009 to 2010 and 2011). We have tried to do this in the Upper Basin, but have made a few exceptions. Angela outlined the limited (~\$50K) flexibility in the FY 11 budget and reviewed "contingency" projects not currently included in the budget, but which we'll likely need to fund (especially Elkhead water lease ≤\$100K, PIT tags \$120K, and easement management \$50K). The Program Director's office is doing everything they can to carry funds from FY 10 into FY 11 to cover these costs, but does not expect any significant additional funds to be available for new work in FY 11 (e.g., Gunnison River study plan, bonytail monitoring plan, sediment work, etc.). Therefore, the only option for funding new activities under annual funds in FY 11 would be to re-prioritize and drop some ongoing work. Krissy Wilson noted that Utah has scaled back the Deso/Gray humpback chub population estimate which significantly reduced their FY 11 costs (this is accounted for in the FY 11 totals Angela just discussed). The Program Director's office will post that revised SOW to the web.

ADJOURN 5:00 p.m.

Thursday, March 11

CONVENE: 8:00 a.m.

(RIPRAP review continued)

8. Capital projects

Ponds – Michelle Shaughnessy said the Grand Valley Propagation Facility currently uses 8 or 9 free and leased ponds to meet razorback sucker production targets, but re-capturing fish from the ponds is inefficient, and *Iernea* infestation and otter predation are problems. One of the best production ponds will revert to gravel production this year; leases expire on 4 other ponds this year and on two more next year. Michelle reviewed a proposal to build new ponds at Horsethief in conjunction with the SJR Program (which likely revise their stocking plan to increase numbers of Age-0 pikeminnow). The initial proposal to build 20 0.25-acre ponds at the Horsethief facility is undergoing a value engineering (VE) study this week, and 12 0.25-acre ponds and 4 half-acre ponds are now a more likely proposal. This revised proposal also would include re-working the current Horsethief and Peter's ponds (line, etc.), improving redundancy.

Krissy Wilson acknowledged the benefit of pulling all the growout production into one location, which will streamline disease certification in the future. Krissy cautioned that the Service and Reclamation will need to address potential whirling disease (WD) if Horsethief fish will be released in Utah; Sherman indicated that the Colorado River has been tested WD positive. Barb Osmundson suggested that the Service test the alluvial hatchery source water for both WD and *Iernea*. Sherman H. offered the services of their State Fish Pathologist, Dr. Carol Gunn, DVM, to assist with disease testing and treatment in the future.

Melissa noted that CSU's preliminary razorback stocking survival information may cause us to revise our Integrated Stocking Plan; Michelle indicated that their proposal would put them in better position to address potential changes to that plan. With regard to other possible hatchery uses at the Horsethief facility, Tom Czaplá reiterated the need to backup our bonytail broodstock, currently held at Dexter NFH as well as building some flexibility into our hatchery program to accommodate humpback chub. Krissy mentioned that Wahweap has 5-8 ponds available, which may be a better location for bonytail.

Brian Scheer indicated that a hydrogeologist reviewed the infiltration gallery proposal and suggested incorporating a membrane lining, which could reduce the influx of water associated with local shales (selenium concern). Test wells that have been drilled at the Horsethief site could be converted into back-up production wells. After a few years of production the VE group predicts that 90% survival may be achieved at the Horsethief facility.

The estimated costs for pond construction are \$4M; \$4.6M for ponds plus renovation of existing ponds/facilities. The San Juan Program has ~\$2M in capital funds available that will be lost if not spent this year. Tom Chart said he'd like the Committee's approval to move forward with this proposal; the Committee approved.

Krissy asked about increased O&M costs. Michelle said lease costs will decrease and travel times will decrease since all ponds will be in the same location. Electricity costs will increase. >Michelle's office will make O&M comparisons as soon as the VE study is completed.

Discussion of other potential capital projects (weirs for nonnative fish management, PIT-tag reader at Maybell Ditch to monitor entrainment, etc.) was deferred, but the Biology Committee believes it would be appropriate to review the "big picture" of what still may be needed, especially with regard to floodplain management. Krissy would like to consider Wahweap in this list – maximizing efficiency and use and constructing a hatchery building.

9. Review reports due list – >Angela Kantola will send the Committee a revised list.
10. PIT-tag pocket readers – Dave Speas purchased two for CSU and has the option to buy six more and still be under the FY 10 PIT tag budget. The pocket readers are a less expensive, smaller handheld device, with ~4" read range. Brandon said he considers them good for backup, but finds them be difficult to get a reading from. Krissy said Utah uses something similar in their three species work and has no problems with them. In theory, they'll read both tag frequencies. The Committee suggested deferring this until we see how the two purchased for CSU test out.

11. Activities to avoid jeopardy funds – Dave Speas said only one proposal was received under this Reclamation funding source this year (it's not an appropriate source for endangered fish work, but is for three species work).
12. Update on new demands/needs for research/monitoring or other projects resulting from the Aspinall PBO – Tom Chart referenced the new demands/needs for research, monitoring and other projects from [Aspinall PBO](#) (Attachment 3). The Grand Junction CRFP office has drafted a SOW, but the Program Director's office recommends examining our overall approach before committing to a specific SOW. Should be considered as part of development of the Gunnison R Study Plan. The Committee discussed briefly whether a population estimate in the Gunnison River is feasible given the small number of fish and how this would compare Green River population estimate methodology (Yampa and Green estimates are made in the same years, rather than opposing years as proposed in the draft CRFP SOW). Tom Chart suggested we may need to consider more of a fish community catch-per-effort approach like that being done in Lodore. This will be on Committee's next meeting agenda.
13. Floodplain management (short discussion to lead into scheduling next meeting coincident with BC site visits with Ryan Mollnow, Ouray NWR). The Committee agreed to schedule a meeting to focus on this issue, but it will have to occur after the May meeting in Grand Junction. >Angela Kantola will send out a "Doodle" request to find an appropriate date for that meeting. The Committee discussed the Vernal CRFP's Old Charley Wash proposal wherein Aaron Webber proposes to use Old Charley Wash as a floodplain acclimation site in addition to Baeser Bend. This would require ~\$4,100 to pump in water this year, and then about ~\$5500 to harvest the fish from Old Charley in the fall of 2011. Fish would be harvested from each site every other year to allow each site to reset. The Committee decided to consider this in the overall context of floodplain management, but thanked Aaron for beginning to develop ideas for how these sites may be used. >Aaron will outline a set of options for consideration at a meeting focused on floodplain management.
14. Schedule next meeting – May 6 and 7 from 12:30 p.m. on the 6th through noon on the 7th in Grand Junction at the Holiday Inn and Suites (if available). Agenda items will include:
 - Tusher Wash fish screen
 - Review of CDOW proposal and additional options to reduce pike spawning habitat on the Yampa River.
 - Briefing from FWS Ecological Service's offices and appropriate State personnel (e.g. Kim Kaal from Colorado) on ongoing and potential threats of oil and gas related spills which could impact recovery.
 - Gunnison River study plan development.
 - Discussion of results of Kolz and Martinez resistance load tests with three VVP-15B units (see attachment 4). In a brief discussion of this item, Sherman Hebein said he needs to order new units within the next few weeks; Tom Chart recommended sticking with the GPPs since it doesn't appear Pat and Larry are recommending switching to VPPs. If that changes, someone else might purchase VPP's to exchange with CDOW.

ADJOURN 12:00 p.m.

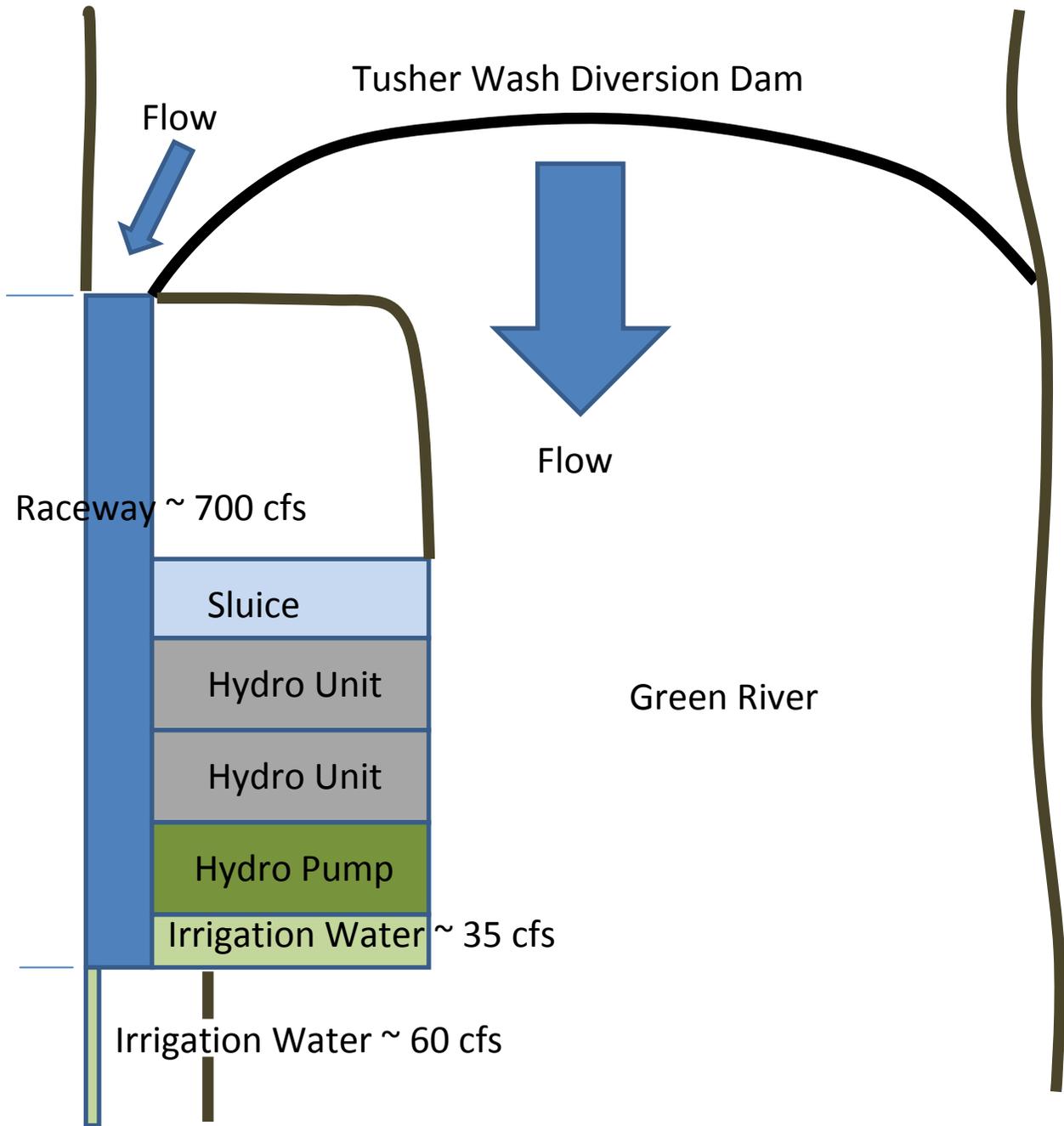
Attachment 1: Assignments

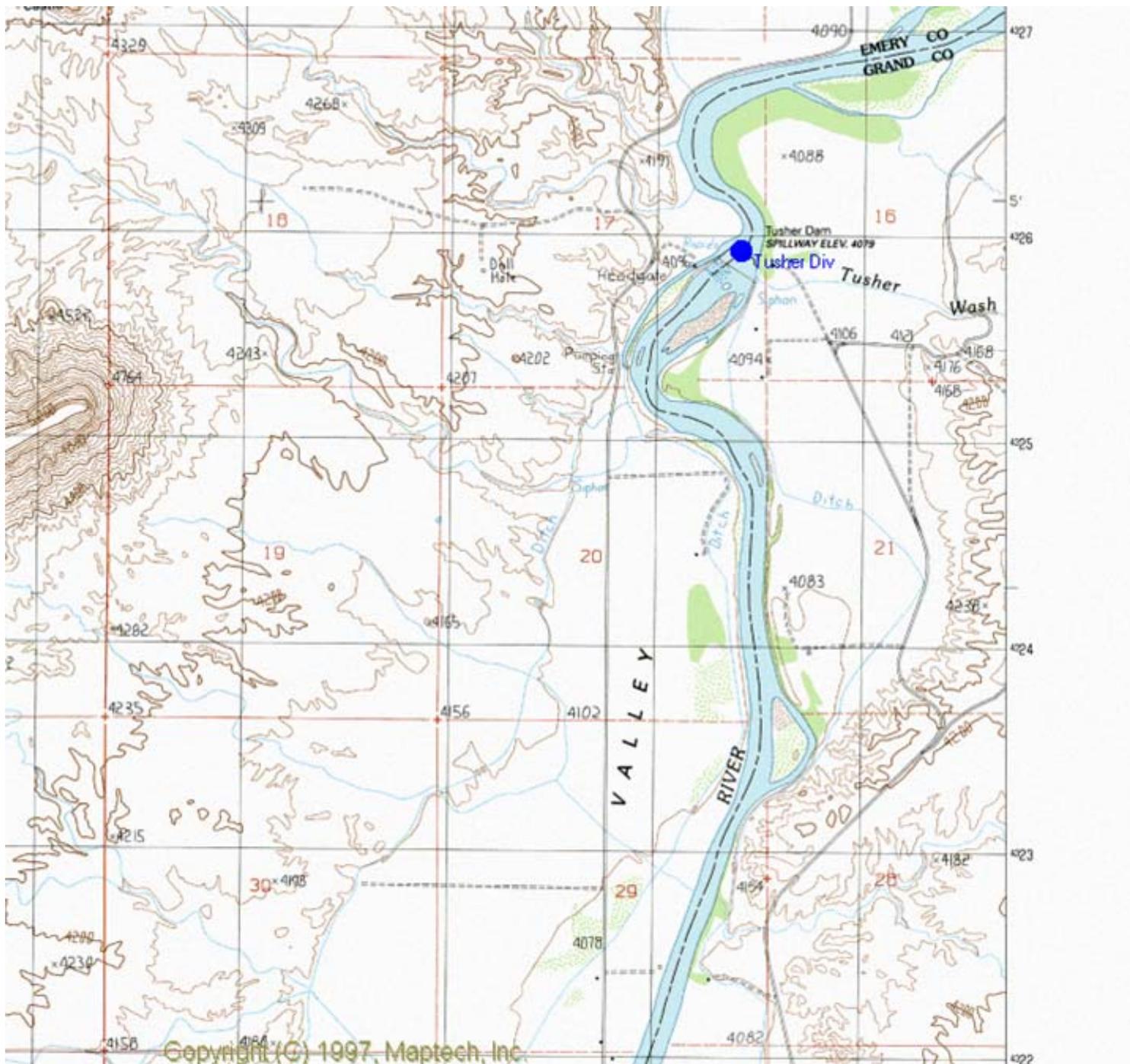
1. Tom Nesler will check on the status of revision of the Yampa River Aquatic Management Plan. 1/15: To be completed by 5/1/09. 7/8: In CDOW review/revision with commitment to MC to provide by early July. 7/13: Draft will be available for internal review by mid-July. CDOW will send the draft out the States and Service (NNFSP) prior to Greg Gerlich's final approval. 9/21: The draft final will be distributed to the Recovery Program office and the NNFSP Agreement signatories as a courtesy copy for review and comment. Pending comments received and further revision, Greg Gerlich and Tom Nesler will approve the plan. 10/6: The plan has been sent to the Program Director's office and the signatories to the NNFSP for courtesy review (comments due by the end of October). 1/15/10: FWS provided comments in early November. Tom Nesler will check with Sherm to see if Wyoming provided any comments; CDOW will respond to comments and copy the Biology Committee. 3/10: **Sherm Hebein** said he **and Tom Nesler** hope to finalize this by March 19.
2. The Program Director's office will work with CDOW and Aaron Webber on the potential for designing a permeable, hydrologically-stable (gravel?) berm to prevent northern pike access to the oxbow slough at RM 151 on the Yampa, and then clean it out once and for all. 10/30 CDOW has contacted the property owners of the RM 151 backwater, but hasn't been able to meet with them yet. Mark Wernke from Reclamation is willing to take a look at the property with CDOW. A fairly long berm would be required (>3,000') and we'll need to determine the best type (more permanent configurations could be very expensive). The funding source would need to be determined, with Partners for Fish and Wildlife, lottery funds, grant funds, etc. as possible sources to be explored. 1/15: Tom Nesler said they plan to get engineers develop specs/estimates this spring for something like a 10-year berm structure; the next step will be to find funding (perhaps as a habitat project through GOCO). This would be the first of three or four such projects. Tom Pitts suggested that if the Program provides some matching funds (annual or capital), it might improve the probability of getting GOCO money. Tom also suggested that if we have a project in the hopper, we might be able to compete for end-of-year Reclamation funds. 2/10: The PD's office considers this a high priority and will contribute funds, if available (see revised FY09 budget). 2/20: Recovery Program funds likely available; CDOW working to get engineers on the ground; Nesler considering different approaches (berm, fill the oxbow, etc.). 4/20: Tom Nesler said they've met with the landowner and Reclamation engineers will do an onsite survey as soon as the snow melts. 1/5/10: Project deferred indefinitely; Reclamation cautions that the lesson from the Butch Craig floodplain site is to be very cautious before considering modifying habitats. Based on the channel dynamics in this area of the Yampa River, it would be unwise to construct an impervious dike at the mouth of this backwater. 1/14/10: The Committee discussed other options to eliminate spawning in this area; the >PD's office will provide Mark's trip report to the BC and work with CDOW to outline options for Committee discussion at the next meeting (options could include: make the entrance too shallow for adults; a dike set back instead of right at the river; direct removal/net sets; piscicides, etc.) 2/22: PD's office provided Mark's report. 3/10: **CDOW** will work with Reclamation to flesh out their gravel proposal and also will review additional options (e.g., plant eradication, barriers, etc.). This will be on the May 6-7 Committee agenda.
3. Within the next month, >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. The Program Director's office will use the information currently available to >develop a position paper on Price River flow recommendations for Committee review. *10/16 Pending; out by the end of November-1/5: February 2009. 2/20: Bob Muth said he's making good progress on this and he'll have a draft to the Committee by ~~early March~~ end of April. 7/8: Mohrman and Chart expect to provide drafts of this and Price River report by the end of August 2009. 7/13: 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. 9/21: Chart and Mohrman have made good progress on this, but other priorities have so far prevented completion. 1/14/10: still pending and the PD's office will continue to communicate with Reclamation re: Narrows. 3/3/10: PD's office is communicating with SLC-ES to determine the best way to move this forward.*

4. *Melissa believes an Environmental Assessment of the impacts of the Humpback chub captivity management plan (also addresses how to deal with captured roundtail chub) will need to be written; Krissy will work with Melissa on the EA. 7/13: Melissa needs to coordinate with the NPS if this is the case and she intends to do that in the next few weeks. 10/6: John Reber reported that **Melissa Trammell** will do the EA for this (pending).*
5. **Krissy Wilson** will provide Utah's Health Condition Profile to **Tom Czapla**. *4/20: Krissy has asked for a formal write-up from their hatchery folks. 7/13: Krissy will condense relevant information gleaned from hatchery managers and consider organizing workshop(s) in the future. 10/6: Krissy provided this information to Tom Czapla and will work with Tom to determine if we'll host a workshop for hatchery personnel (pending, will schedule after new hatchery manager is in place at Ouray NFH). 3/10: Workshop for hatchery folks will be scheduled in late summer or early fall, probably in Grand Junction (to allow someone from the Mumma Hatchery to attend).*
6. The **PD'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. 10/6: **Travis Francis** said they plan to complete the reports, then revisit a SOW for assistance from Gary White. 3//10: pending.*
7. The **Program Director's office** will review the 121a report recommendations (as well as the Gunnison PBO) and determine what items need to be included in the RIPRAP. *2/22: PD's office recommended this be incorporated into the Gunnison River Study Plan.*
8. The Service will review Modde's plan and develop a plan to implement rotational floodplain management. *2/22: PD's office recommends **Biology Committee** review; Angela Kantola sent to the Committee on 3/10. 3/11: **Angela Kantola** will send the Committee a "Doodle" request to schedule a meeting to visit floodplain sites and review overall floodplain management. **Aaron Webber** will outline a set of options for using Baeser Bend and/or Old Charley as razorback acclimation sites for consideration at the Biology Committee's upcoming meeting focused on floodplain management.*

9. **COW** will review the Loudy-Simpson escapement data and make a recommendation for where to translocate fish prior to the field season. *3/10: Sherm said their preliminary work indicated that less than 1% of the fish stocked into Loudy-Simpson 2007-2008 escaped back to the river (p-hat 3-8 fish), so they think escapement very minimal. COW will continue to evaluate and will defer stocking northern pike into Loudy-Simpson until after the river recedes and no Loudy-Simpson is no longer connected (the same will apply to Yampa R. SWA). In light of likely overwinter survival, Tom Chart asked COW to continue to focus on Headquarters Pond as long as it will sustain the number of fish being stocked.*
10. The **Program Director's office** will prepare a list of issues to be resolved regarding Tusher Wash screening (e.g., what levels of mortality are 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).
11. **Angela Kantola** will add a reminder to future annual report requests about the importance of PI's supervisors' reviewing recommendations to be sure that they are grounded in the data and that the Program takes these recommendations seriously.
12. **Michelle Shaughnessy** will provide cost comparisons for O&M of the proposed new Grand Valley fish rearing ponds versus existing ponds as soon as the value engineering study is completed.
13. **Angela Kantola** will send the Committee a revised reports due list.





New demands/needs for research, monitoring and other projects from [Aspinall PBO](#)

Recovery Program Obligations under the PBO:

Monitor fish populations in Gunnison River: Program monitors pikeminnow populations and is developing a basin-wide razorback monitoring program to include monitoring of multiple life stages. Monitoring program design is expected to be completed in fiscal year 2010. Implementation to begin in 2010 and include multi-life stage monitoring on the lower Gunnison. Density estimates will be developed for Colorado pikeminnow and razorback sucker in the lower Gunnison River.

Collect tissue samples during monitoring: During fish community monitoring in the lower Gunnison River, tissue samples will be collected from razorback suckers, as well as a chosen surrogate species, to determine selenium concentrations.

Assist in development of Study Plan to evaluate effects of Aspinall reoperation and how it improves habitat & contributes to recovery. Complete within one year of PBO. Include an evaluation of the effects of reoperation on critical habitat in the Gunnison River and Colorado River from the Gunnison River confluence to Lake Powell. Focus on previously identified uncertainties related to geomorphic processes, floodplain inundation, and temperatures:

While relationships among initial motion, significant motion and streamflow are well defined, duration of flows necessary to accomplish habitat work is not completely known. Because flow duration recommendations were developed based on a wet period, the recommended durations require a large volume of water that may not always be available.

Water availability may limit the ability of the Gunnison River to meet the Flow Recommendations under certain conditions.

Because of timing and other differences in runoff patterns of the Colorado and Gunnison rivers, it is difficult to predict the effect of Gunnison River flow changes on the Colorado River.

The trade-off facing Colorado pikeminnow between stream bed maintenance and temperature regime in the Gunnison River is an uncertainty that may need to be evaluated by the Recovery Program.

The Recovery Program may need to evaluate the trade-off between high spring flows and base flows needed during the mid- to late summer to operate Redlands (and, to a lesser extent perhaps, maintain movement of sediment through the system).

Conservation Recommendations: (Discretionary agency activities to minimize/ avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.)

Selenium: Recovery Program initiate investigations to determine appropriate levels of selenium to insure recovery of Colorado pikeminnow and razorback sucker. Any new studies would follow established Recovery Program protocol for priority and funding.

Attachment 4

Larry Kolz completed some resistance load tests with three VVP-15B units. Larry and Pat Martinez just completed a discussion of the data, results and implications for Recovery Program electrofishing personnel. Here are some items for a future discussion:

- 1) The key difference between waveforms of the VVP and the GPP 5.0 is the duty cycle. The field data sheets providing records of electrofisher settings from Walford/Hawkins were essential in helping to identify the significance of this difference.
- 2) The field observations provided by Cameron in his Researcher's meeting presentation regarding superior taxis of fishes in response to the VVP is attributable to the VVP's capacity to operate at a duty cycle (~30) that is twice that of the GPP (~13). Both levels of duty cycle are within the recommended range (10-50), but higher duty cycles tend to be associated with better electro taxis of fish within the effective electrical field.
- 3) The GPP cannot achieve these higher duty cycles unless it is operated at frequency of 120 Hz. Since the percent of range adjustment is operationally fused with duty cycle in the GPP design, it may not be feasible to operate the GPP at a more favorable, higher duty cycle as it would require adjusting the percent of range upward such that it may be applying too much voltage which may injure fish.
- 4) Neither the VVP or the GPP offer the best solution to the range of conductivities encountered in UCRB rivers by aluminum-hulled electrofishing boats. The VVP is only able to maintain sufficient power to capture fish up to about 400 $\mu\text{S}/\text{cm}$. The GPP can operate across most of the conductivity range encountered, but the catch by a VVP-15B would be expected to prove consistently higher at the lower conductivities, provided the unit was operated and functioning properly (a range of operational variability was noted in the units tested - Crockett's will require service to correct a faulty duty cycle adjustment knob).
- 5) For aluminum electrofishing boats operating on UCRB rivers, this issue of electrofisher performance appears to have the most immediate implications for the Yampa River because of its generally lower water conductivity. While boats can be wired to accommodate either system, deploying both on an individual boat is impractical due to the need for two different generators (GPP generators are proprietary). While the use of a VVP may optimize SMB capture at 100-400 $\mu\text{S}/\text{cm}$, its use would become ineffective during early season passes when water conductivities are higher or in high conductivity backwaters which may hold other targeted species (e.g. northern pike).
- 6) Fleet standardization remains a desirable and recommended goal. By standardizing the electrodes, we have been able to provide performance evaluations of the electrofisher options. Reducing anode sizes in an attempt to expand the utility of the VVP is discouraged. This defeats the standardization of the effective field of fish capture by reducing the effective field to boost power output which may result in more fish injury.
- 7) Further analyses revealed a 17% difference in electrical resistance between half-submerged and fully-submerged spherical anodes. Insulating the top half of the anodes with a non-conducting covering would help stabilize the electrofishing circuit and reduce the degree of

power surges due to varying degrees of anode submergence resulting from boat motion or water conditions. This anode treatment would be particularly helpful when operating at maximum power in high conductivity, and may facilitate more effective fish capture under these extreme conditions.

Larry and Pat look forward to discussing these data and their implications with the Biology Committee at their next meeting (April or May 2010).