

July 13, 2009

Biology Committee Conference Call Summary
June 30, 2009

Biology Committee: Dave Irving, Melissa Trammell, Pete Cavalli, Dave Speas, Tom Nesler, Shane Capron and Krissy Wilson. (The water users, environmental groups were not represented at the meeting.)

Other participants: Ryan Fitzpatrick, Mike Montagne, Tom Chart, Angela Kantola, Tom Czaplak and Sarra Jones.

Assignments are indicated by ">" within the document.

CONVENE 1:30 p.m.

1. Review/modify agenda – The agenda was modified as it appears below.
2. Scheduling the annual researchers meeting – The Committee scheduled this meeting for January 26-27, likely in Grand Junction (to facilitate travel by personnel from Colorado), but this needs to be confirmed with Utah (since the 2010 meeting normally would be held in Utah). Traditionally, this meeting is held at least a week earlier, but Shane Capron would like to schedule a Grand Canyon researchers meeting for the week of January 11 and CDOW has a conflict with the first two days following the Martin Luther King holiday the following week. Scheduling the upper basin researchers meeting the last week of January will delay the release of the annual draft RIPRAP revisions and assessment from the Program Director's office, but that is acceptable in an even (non 2-year-work-planning) year. In 2011, however, the Grand Canyon program will need to give deference for the upper basin meeting to be held during an earlier week in January. Shane agreed.
3. Project C18/19 - proposed project expansion to determine provenance of riverine fishes. Dr. Brett Johnson (CSU) has proposed (Attachment I) to expand what he and his graduate student, Brian Wolff, are learning about distinct reservoir isotopic signatures and apply it to fish found in the river. This expansion would not affect current reporting commitments to the Program, and might actually speed that process. Their proposal is intended to expand their research findings to assist the States in nonnative fish management. Tom Chart said this likely will be discussed during the July review of 2010-2011 scopes of work, so the Committee does not need to make a final decision today, but he would like to start the conversation. The third objective of the current scope of work addresses this in part, however the current focus is in a pilot project mode intended to validate a technique. The proposed expansion would be a much larger-scale investigation. Dave Speas commented that this is hard to gauge this since we haven't seen the results of the current work (and Dave hasn't had a chance to review Brett's Powerpoint Angela sent to the Committee.) The Committee would like to see some sort of summary of results to date that explains where we are in the investigation and what

information needs will be left unfilled with the completion of the current scope of work. Objective 2 of the proposed new work would seem to be a rephrasing of objectives 2 and 3 of the current work. With regard to the field collections in collaboration with ongoing studies with some extra sampling to fill in the gaps in Task 2, Dave Speas asked if additional sampling is necessary (in light of concern about the amount of sampling we're doing). Dave says he supports the concept of the work; he just wants to have a better understanding of the big picture. Melissa said she thinks our primary goal is to answer a one-time question regarding where the nonnative fish sources are, and questioned the need for an ongoing monitoring effort. Tom Nesler believes this technology can provide important information to our very costly nonnative fish management activities, but agrees that we need to have a stronger understanding of where we're at today before approving expansion. Dave suggested this scope of work be on the same schedule as the other nonnative fish scopes (discussed in December prior to approval for the next year). >Tom Chart will ask Brett to provide an update and progress report to the Committee before the beginning of next year. At this point, the Committee believes we need to stay the course and that it's too early to commit to expansion. Shane added that there may be some potential for use of this technology on trout in the Grand Canyon.

4. Review/approval of Yampa Pike Sources report (R. M. Fitzpatrick and D. L. Winkelman. 2009. Use of Otolith Elemental Signatures in Estimating Sources of Northern Pike Recruitment in the Yampa River, Colorado.) Melissa apologized for not reviewing the report more carefully earlier, but having now reviewed the scope of work, noted that the report does not address two objectives in the [05-06 scope](#) (and those objectives are not identified in the report): 1) identification of the portion of fish in river that came from these different sources and 2) evaluating the trophic relationships of pike in the reservoirs and Yampa using stable isotope analysis. Tom Chart said temporal variation in the reservoirs was a confounding factor in the first objective. Tom Nesler confirmed that the second objective was not addressed. The Committee agreed the report needs to identify the objectives in the scope of work and explain what changed, what wasn't achieved and why. (This project was funded partially by the Recovery Program and partly by CDOW and apparently some of the project update information wasn't communicated in the project's annual reports.) >Tom Nesler will work with Ryan and Dana to do a track-changes revision to the report and provide that to the Biology Committee by July 10 (for review/approval during the Biology Committee meeting the following week). Ryan added that now we have the strontium isotopes that are stable over time, we should be able to estimate the portion of recruitment from upper Yampa sources (and possibly estimate pike movement).
5. Humpback chub draft captive management plan. Committee members were to have provided comments back to Tom Czapla on this plan by May 20; Tom said he received no comments. Pete asked if it's still reasonable to collect the fish over a 10-year period or if we need to accelerate in light of the apparent population status. Tom Czapla said it seems there's still good annual production of young *Gila* at this point. Mike Montagne said Yampa Canyon field crews have been counting anal fin rays of 10 and still calling these fish roundtails. Dave Speas said Tildon says these fish just don't look like classic humpback (Melissa added that the ray count isn't necessarily definitive). Tom Czapla

said we could consider capturing 100 fish per year, but Melissa has concerns about removing too many fish. Melissa said Connie Keeler-Foster was leaning toward taking more fish in a shorter period of time if recruitment is very poor, but the reality is that we don't really know how well the Yampa Canyon population is recruiting. Tom Nesler said we want to establish a credible broodstock, noted that we haven't had great luck establishing refugia populations, and thus believes we should focus on capturing fish to form a minimum, functional broodstock of 25 adult males and 25 adult females (capturing juveniles at whatever level the Park is comfortable with). Connie has said that 500 is just a target and geneticists recognize we have to take what we can get. With regard to concerns about relatedness, Melissa said Connie seems pretty confident that they can identify siblings. Melissa suggested that we consider some of the 25 x 25 language from the razorback plan. The plan currently doesn't go into detail at this point about developing the 25 x 25 matrix because it's a captive management plan, not a broodstock development plan. If we don't test for relatedness prior to developing a broodstock, we will have to have a disposal plan for any unintentionally-produced progeny. Tom Czapla said he thinks we need to test genetics of fish annually (e.g., if all were siblings in a particular year, we might not want to maintain them all in captivity). Tom Nesler urged the Program to go ahead and develop a propagation and broodstock plan (at least concurrently). >Melissa and Tom Nesler need to agree upon an acceptable plan for returning the roundtails to the river by the next BC meeting. Krissy asked that we also consider Ouray's annual disease certification from Utah. Mike said another option would be to hold the fish long enough to propagate them and then use some of their progeny to sacrifice for disease testing. Shane asked how this fits into the big picture of species recovery, Czapla replied that there is to be no net loss according to the recovery goals. Dave Speas wondered if this is covered in the RIPRAP, Czapla responded with only under the General Plan of maintaining genetic diversity. >PDO needs to add a line in RIPRAP under the Yampa section about the annual removal of *Gila* from the Yampa for a refugia and potential broodstock and propagation program. Montagne noted that he will need to get red shiner surrogates from the Yampa River for disease testing prior to any collections of *Gila* this fall. Czapla mentioned this plan is the initial development to meet the requirements of the Monument so we could go back and collect more *Gila*; a broodstock and propagation plan should follow. Melissa believes and Environmental Assessment of the impacts of this effort will need to be written; Krissy said she would work with Melissa on the EA.

6. Genetic testing of *Gila* from Ouray NFH and Mumma – Gila genetics - Mike Montagne said they've already taken tissue samples from the 24 humpback chubs they're holding (which are now in the ponds). ~132 roundtail are still in the hatchery (16 had tissue samples taken). All the fish are doing very well. Colorado, the Park Service, and Utah still need to discuss the fate of those roundtail. Tom Czapla provided answers to the Committee's questions from Connie. The committee agreed to support the SOW for genetic testing; Speas was going to look into the need for a new agreement with Dexter or transfer the funding to the PDO if overhead was not too much.
7. Next meeting – Beginning at 1 p.m. on July 13 and adjourning by noon on July 14 at the Doubletree in Grand Junction, Colorado. The primary agenda item is review of the draft

2020-2011 scopes of work (see the fws-coloriver message from Angela Kantola posted June 19, 2009). Other items will include review of the revised Winkelman report, review/approval of previous call and web conference summaries, and review of assignments. This meeting will be followed by an afternoon meeting of the nonnative fish subcommittee meeting with the principal investigators on the smallmouth bass synthesis project (Biology Committee members also are invited to participate).

ADJOURN 3:30 p.m.

Attachment I

Preproposal for additional otolith chemistry research
Dr. Brett Johnson
Dept of Fish, Wildlife and Conservation Biology
Colorado State University

Background/Rationale:

Work to date on the reservoir fingerprinting project (C-18/19) is proving the validity and application potential of otolith microchemistry for determining origins and movements of nonnative fishes. We have shown that strontium isotope ratios of nonnative fish otoliths are 1) temporally stable, 2) similar among species within a location, and 3) distinguishable across a wide range of reservoirs situated within and among river basins. Further, this chemical marker appears to discriminate fish which have inhabited reservoirs from river resident fish, even in rivers immediately below reservoirs. In summary, the method is working surprisingly well and has even more promise than we had originally hoped.

The objectives of the scope of work for the current study were to

1. identify species/water-years/locations with the highest risk of emigration from reservoirs,
2. quantify chemical "fingerprints" of fishes within study reservoirs and evaluate the degree of inter-annual variation in those fingerprints.
3. determine if fish sampled in rivers in the vicinity of study reservoir possess otolith core signatures that identify them as having originated from one of the study reservoirs.
4. improve our understanding of the degree to which immigration or transfers from reservoirs contributes to the load of nonnative fishes in critical habitat of the Upper Colorado River basin.
5. provide recommendations to guide management efforts to reduce the influx of nonnative fishes from reservoirs.

When coupled with ongoing modeling and data analyses we will be able to accomplish all of these objectives by the end of the current study. However, I believe the Recovery Program could gain much more from the application of this methodology by investing in some additional research. What is needed now is research to determine "how do we put this new technology into practice?"

Proposed new research

I believe the next logical step is to exploit the newfound capabilities of Sr isotopes for directing the management of nonnative riverine fishes. Questions that remain to be addressed are:

1. What is the optimal sampling and monitoring program for detecting reservoir escapement, given variability, sampling costs and analysis costs?
2. Within a river/reservoir system, where are the majority of the nonnative fishes originating from?
 - a. within the river or emigration from reservoirs?
 - b. if reservoirs, which ones?
3. What is the temporal pattern of emigration from reservoirs?
 - a. Is there a life-stage at which escapement is highest within each reservoir?
 - b. Is escapement correlated with hydrology or reservoir operations? How do these findings align with modeling predictions from the current study?

Study Area

The area of study for the new project will be the same set of large reservoirs within the Upper Colorado River Basin that we are focusing on in the current study: Yampa River system: Stagecoach, Catamount, Elkhead reservoirs; Colorado River system: Harvey Gap and Rifle Gap reservoirs; Gunnison River

system: Crawford and Paonia reservoirs; Green River/Duchesne system: Flaming Gorge, Midview, Red Fleet, and Starvation reservoirs; White River system: Kenney and Rio Blanco reservoirs; Dolores River system: McPhee reservoir.

Study Methods/Approach

CSU will maintain oversight of this project and will coordinate field sample collection with assistance of CDOW. Dr. Brett Johnson of the Department of Fish, Wildlife and Conservation Biology at CSU will supervise a graduate research associate to conduct and oversee microchemical analyses, evaluate data and provide findings.

Task 1. Optimal sampling program

Design and optimality of sampling programs is an area of considerable expertise in my Dept. The student would take coursework in the topic and work with faculty to use variances and costs derived from the current study to design an optimal sampling and monitoring program to make the best use of agency field labor and minimize laboratory prep time and analytical costs (which can be more than \$1,200/day).

Task 2. Field collections

To the degree possible, nonnative fishes will be collected by standard fisheries sampling techniques, collateral to ongoing sampling by state, federal or university efforts. CSU will conduct additional field sampling as needed to obtain the desired sample sizes. The number of species varies by reservoir and river, but will include northern pike, smallmouth bass, largemouth bass, black crappie and walleye. Ideally, the number of species would be minimized based on results from the current study and Task 1 above.

Task 3. Laboratory analyses

Lab methods will be similar to the current study. Sagittal otoliths will be extracted from fishes using non-metallic forceps, rinsed with distilled water, and stored dry in polyethylene vials until preparation for analyses. Otoliths will be embedded in Epo-fix® epoxy, sectioned in a transverse plane using an ISOMET low-speed saw, and polished to reveal annuli. Otolith thin sections will be mounted on acid-washed glass slides using 3M® double-sided tape, ultrasonically cleaned for 5 min in ultrapure water, and dried for 24 h under a laminar flow hood. We will employ well-established methods for the microchemical analysis using LA-ICP-MS (Campana 1999) in addition to new techniques developed with Recovery Program funding by Whitley et al. (2006). Analytical work will be conducted at the Woods Hole Oceanographic Institution (WHOI). Additional laboratory analyses may be contracted with facilities providing services unavailable at WHOI (e.g., Denver U.S.G.S. Mineral Resources Laboratory, University of Melbourne, Australia, and the University of Alaska-Fairbanks).

Because we will be interested in more detail about temporal patterns of escapement in this study, we will need to gather detailed growth information on all the fish that show evidence of moving from a reservoir to a river. Thus, development and validation of precise aging techniques will be required. This will involve thinner sectioning and more polishing of the right otolith (left is used for microchemistry) to provide age information. Comparisons with alternative aging structures (e.g., spine sections) will be used to corroborate otolith ages and known age/growth from tagged fish will also be used in age/growth validation where possible.

Task 4. Emigration assessment

Use results from Tasks 1-3 to determine emigration rates of nonnative fishes from study reservoirs during period of collections and recommend sampling, monitoring and analysis protocol for tracking escapement of nonnative fish from each reservoir in the future.

Schedule

Recruit MS student to begin in January 2010. Student takes statistical coursework and prepares research proposal January-May, 2010. Laboratory analysis (preparation of otoliths and age determination), and field collections: May-August 2010, May-August 2011. Microchemical analysis at Woods Hole Oceanographic Institution: August 2010, December 2010, May 2011, August 2011. Final report: December 2012.

Deliverables

Annual presentations at Researchers' meeting; annual written progress reports to Tom Chart and Recovery Program; Final written report to Tom Chart and Recovery Program.

Budget

	2010	2011	2012	
PERSONNEL				
Faculty (0.5 mos)	4,450	4,673	4,906	14,029
fringe	979	1,028	1,079	3,086
grad student	20,400	21,420	11,246	53,066
fringe	816	849	883	2,547
student hourly	1,650	1,716		3,366
fringe	66	69	71	206
TRAVEL				
progress reporting meetings	500	520	541	1,561
national meeting			2,000	2,000
field travel				
Tuition (2 sem)	6,200	6,820	7,502	20,522
SUPPLIES				
misc. lab supplies	1,000	1,040	1,082	3,122
misc. field supplies	1,500	1,000		2,500
Analytical costs	20,000	10,000		30,000
page charges and reprints			500	0
Total Direct Costs	57,561	49,134	29,809	136,004
Indirect Costs	10,073	8,598	5,217	23,801
Total Request	67,634	57,732	35,026	159,805

Tentative project schedule

2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Student begins				lab work	annual report						
	classes	classes	classes	classes	classes			classes	classes	classes	classes	classes
2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	lab work	lab work	lab work	lab work	lab work	lab work	lab work	lab work	lab work	lab work	lab work	annual report
	classes	classes	classes	classes	classes			classes	classes	classes	classes	classes
	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis	Data analysis
2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	classes	classes	classes	classes	classes							final report
	Data analysis	Data analysis	Data analysis	Data analysis	write thesis							