

Methow Restoration Council

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Participants:

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Paper of the Month

John Crandall – this month’s paper comes from the journal *Environmental Epigenetics: Differential DNA methylation in somatic and sperm cells of hatchery vs wild (natural-origin) steelhead trout populations* (2021). A genetically themed paper, put out by Nilsson, Sadler-Riggelman, Beck, and Skinner from WSU, and a few of us have been looking hatchery programs lately. This paper gets into epigenetics, and I’m learning about that. It’s been known that when hatchery fish spawn with natural origin fish it lowers the fitness of the progeny, which is a negative aspect of those programs, this effect that hatchery fish have on these natural origin fish. In the Methow you can’t really find a natural steelhead due to the hatchery influences. With epigenetics, you can get different things that the fish experience in their environment, which can trigger different chemical pathways in the fish, so this paper looks at the ways that the genetic code plays out in real life – how environmental factors affect chemical pathways that affect gene expression that can have an effect on the progeny. They looked at sperm cells from fish from Winthrop National Fish Hatchery. Sperm and blood cells from male steelhead that came back. They looked at slow growth and fast growth fish (1 year and 2 year release), which have different physical characteristics. The researchers were able to show that there were significant differences between natural origin and hatchery fish. Hatchery conditions affect the growth and expression of traits; when that happens in sperm cells that can enter the population and then those changes enter the broader population, it is more than just who the parents are, the effects can continue. An interesting look at how hatchery programs modify the genes of the natural origin fish.

Robes Parrish – are there population effects or are they on the individual level?

John – at the individual level, looked at individual level and the sperm cells, and then looked at how that would play out. Managers have tried to minimize the effects by limiting spawning, but with these epigenetics they may make changes to the hatchery environment that could minimize the effect of this epigenetic pathway. They say that you can’t really find a natural origin fish, and to get to recovery we will need to restore that diversity

Chris Johnson – an intriguing question of what does it mean to recovery if we don’t have any viable natural origin fish

John – a NOAA question, but it is a cloudy picture when you look at the big picture, but not totally foregone, fish are resilient if we left them alone, but there are a lot of influences that it may take a long time to shake

Jessica Goldberg – classic nature vs. nurture, and how nurture affects your genetics

Tracy Bowerman – epigenetics changes how a gene is expressed, not the code itself necessarily, so there is the opportunity to change it back

Bull Trout & Temperature

John – this is a three year project we’ve been working on for bull trout eDNA surveys and water temperature monitoring. This has been funded by RCO/SRFB and BEF, a good partnership and also WDFW, USFS, USFWS, Cascade Fisheries for help with surveys. Moving on to the reporting phase. An important part of bull trout habitat is temperature; they are selective, and for spawning habitat they select the coldest water that is available. In relation to climate change, that has an important influence, so curious about current temp regimes to look at where we are: how the populations are doing and

where they are now. It has been an interesting time in terms of disturbance, particularly having to do with forest fires; bull trout habitats are almost all in National Forest and in Wilderness, and for these areas if it hasn't burned it is going to. Bull trout are threatened, and information is needed to help managers make better informed decisions. We did eDNA sampling: found 2 new potential spawning areas, increased known distribution by more than 10 km, re-established/confirmed presence of local population believed to have been extirpated, and identified two populations with significant brook trout overlap. Eightmile and Blue Buck need more work to look at those populations. No detections in Libby Creek, very little detection in Little Bridge – only one down at the mouth.

Chris J – differences between what you previously knew?

John – the only one that was really unknown was upper Wolf Creek, there had been some info about the Gold Creek population. Differences between resident vs migratory population, counting redds for residence is not a great way to track abundance, migratory fish redds are bigger, resident redds are very small and it's a challenge. Overall the distribution they had was good, but the local population structure picture they had is more complicated, may be more distinct local populations than are currently identified.

Threats and uncertainties – we're looking at potential restoration options. Bull trout streams can go dry, fish can get isolated upstream of dry patches, and this can pose significant threats to bull trout, especially related to temperature, which triggers migration. Their life history is somewhat tenuous. We did a lot of temp monitoring around spawning areas. It varies a lot depending on where you are in the basin, and elevation matters. We don't know a lot about juvenile and sub adult bull trout in the basin. Some of the areas have been affected by fires, some burned really hot, and this affects the stream temps for a time. Critical period is July and August for temperatures. Can look at what we are seeing now in terms of temperature, and what the 2000 NorWest model is predicting for 2040 under climate change and warming – we have several sites today that are warmer than the 2040 prediction and some are very close to the prediction now. They can also get isolated in downstream migration; in 2019 we had a group stranded in an isolated pool and then it got really cold and they froze. It was probably about half the spawning population in that upper Methow group; it was a bunch of females.

Tracy – does eDNA give an idea about the degree of hybridization between brook/bulls?

John – no, it only tells us both are there, they could all be hybrids, but it opens the door for further things to look at

Robes – in terms of next steps, with temp comparisons to NorWest data set and seeing how systems are responding differentially to warming, it seems like the Lost River, even though it has had a bunch of fire, it seems like it has a somewhat more muted temp profile, and thinking about what you might do for this in terms of restoration prioritization, may choose to put more effort into things that would benefit temperature in certain watersheds based on resilience of the system, likely background geology has a lot of influence.

John – I'm thinking about that, and how to add on to prioritization. For sure the Lost River has burned a lot, but it maintains a really cold profile. Two loggers in the Lost River, but it is really cold stream at a fairly low elevation, and those things don't always go together. Eightmile creek is similar; I think a main driver of that is spring water coming out of the rocks, and that is incredibly important; it may make them the last places where bull trout can reside in the basin. Question is whether to maintain these places or try to improve other places. With warming bull trout habitat is going to be reduced.

Robes – think a lot of stuff here that could be pulled out for site-specific ideas

John – we're working on the final report, and then we're going to have a prioritization crosswalk and an assessment of local populations and migrations. It's when they leave the FMO habitat to the spawning areas that the temperatures are an issue, spawning and rearing is where they are sensitive

Chris j – thinking of RCO presentation, how this leads to projects, are you going to be looking at a next effort to identify project areas?

John – yes. With prioritization, it's the entire range of bull trout, we're going to look into that, and we have the Reach Assessments, but maybe only the upper Twisp gets into bull trout spawning habitat, so can look at whether any of the identified projects will benefit bull trout.

UCSRB Updates

Melody Kreimes – the prioritization workgroup is meeting on June 23rd to go over bull trout and then will load the info onto the web site and then people can look at that; those data will be reviewed at the July 6th implementation team meeting, or you can provide input to Greer or Tracy Hillman. The RTT is scheduled to approve it at July meeting.

SRFB design projects – RTT is interested in providing feedback and early input on SRFB design projects, and they will be discussing that at the July meeting 14. Anything that comes out of the discussion would affect the next grant round.

The QAQC process for projects completed by Dec 2020 is starting; we need to make sure all the projects are in SRP and Greer will start working with sponsors on data and info, need to make sure any completed projects are labeled as such in SRP. Make sure they are labeled as complete

BPA programmatic – BPA is looking at the SRFB project list this year and the RTT scores to look at what they may want to fund, depending on what they select and the budget, there may be a solicitation coming up. Talk to Sarah if you have questions.

Ruckelshaus Regional Evaluation

Melody – there were some questions last month on outreach that people had said that John would have good input

John – I can look at the notes from May MRC and provide some feedback

Melody – the Evaluation had some action items and recommendations. Board doesn't intend to make any decisions about them until they hear broad regional feedback, trying to bin things so we don't have to do it all at once, if there is something that we want to move forward or try to address, BEF is committed to moving things forward in additional phases if we identify things we want to address, there are opportunities. This is a long game, don't expect it to be wrapped up even this year.

Ruckelshaus WAT-related topics:

Funding to participate in the meetings, is there a need?

- Chris J – for a group like MSRF that doesn't have base funding to do this coordination, having assistance from UCSRB allows us to do this. The other funding from BOR, BPA, is targeted to projects, and we appreciate the funding to allow us to do the work. It doesn't cover the full amount, but it allows us to do this, currently we also use BOR funds so that one partner isn't paying for everything, tied to identification and coordination, was started because nobody else in the Methow wanted to coordinate the WAT
- Kristen Kirkby – we are also reliant on our Bureau funding for our participation in the WATs
- Chris J – one of the concerns was keeping things as local as possible, because paying for travel time really eats the budgets
- Steve Kolk – Reclamation is very supportive and understanding all the planning of what it takes to get projects off the ground, we have focused on project development and coordination. My only concern is the repetitive nature of some of the meetings, we want to support people to participate but not feel the need to participate in multiple meetings where most of the information is repeat
- Melody – seems like we often hear that things work well in the Methow

Identify and strategize ways to address common barrier to implementing projects or other issues raised among the WATs

- John – for barriers, each one is kind of a case study, there are no simple projects, permitting, funding, land ownership
- Discussion – IT is a good forum for some issues, like FEMA, or DNR ROE permitting, or Corps/Ecology, to address new requirements or things are not clear, larger issues that affect everyone, often things are identified at MRC to bring up at a future IT meeting
- Melody – do you think the IT is a good forum to address those issues?
- Chris J – think that it is good for staff to do the work to address the issues discussed
- Robes – the current changes in the FEMA rules is a topical example of where having initial discussions at the WAT level with the broader discussions at the IT, a good discussion forum, the value is after those discussions the board can be provided with information to affect change or bring the conversation up the line or to people at higher levels, a value added service that it still provides. Topically driven; I think that it is still valuable
- Melody – the regional directors across the state are meeting quarterly with the Corps and Ecology to see what can be done to improve things, a model that is working, brought up at the WATs, elevated to IT, then Board is working on it

WATs and decision making

- Chris J – do other WATs make firm decisions and vote on things?
- Melody – vote is a heavy word, they do make decisions about outreach, like what to do with the outreach funding on the outreach committee, but they don't make decisions about who gets what money or submits for specific grants
- Discussion – MRC is not designed to make decisions, but we've been doing this long enough that we have found ways to move questions forward, but we don't put an MRC stamp on things, a place for people to provide feedback, decision making was a concern at the beginning but doesn't come up often
- John – we haven't been able to get a unified message, there is diversity among groups and their approach and messaging, hasn't gelled around that, and don't really see that changing with separate entities whose goals are not all aligned. We can't even get agreement on getting logos on certain outreach materials due the vetting process. People can come and ask for support from individual organizations
- Melody – not specifically WAT, but some stuff about decisions on funding from Tributary, or the zipper approach to CAC ranking of projects

WATs vs IT presentation from UCSRB staff

- Steve – blend for in person and virtual works well
- Chris j – seems like the purpose of the IT is to look at barriers to implementation
- Discussion – purpose of IT, ways to reduce redundancy, get targeted information at the reach level vs broad information at the IT level

Provide neutral facilitation at the WAT to reduce conflicts

- Melody – is this something that would be important to the MRC?
- Chris J – don't think we've had disagreements that have driven people away from the WAT, would like to see if we can be more effective with the funds that are available, not sure we need another layer or a person to facilitate projects. We went through a facilitation process a few years ago as well
- Melody – an issue with wearing multiple hats, being both a project sponsor and a facilitator

- Jarred Johnson – we don't have a strong interest to change the model that we are operating under
- Kristen – think that MSRF does a good job and has all the infrastructure in place, it is working well

Interchange between WATs and Forest Health Collaborative

- Chris J – Crystal does both, and she brings things forward that she is asking individual members for support for. Have never heard anyone say that we need more coordination, driven by participation requests or needs
- Melody – do you hear about the Twisp draft EA, and issues about that?
- Chris J – Gene and Lance have made presentations, they are good at coming when they need to give us info
- Discussion – Gene and Lance and Crystal do a good job of coordinating in the Methow, so this may only be an issue in other basins

Anything else?

- Chris J – the consistent refrain that we have had for years and don't really have a solution to is having some mechanism that sponsors can rely on when things don't go well so we can be responsive to landowners when things come up. We don't have a responsive mechanism for adaptive management. Could be an opportunity for people to spend a small amount of money to restore a habitat investment
- Discussion – need for adaptive management, approach at a policy level, address the stigma associated with adaptive, finding creative ways to address these issues and find new tools

Roundtable

Group Discussion – July is the in-water work window, and many would not be available for an MRC meeting. No meeting topics were identified for July. After a suggestion that we cancel the July MRC meeting, the participants agreed that was a good idea. The next MRC meeting would be scheduled for August.

Next MRC Meeting:

August 17th