Riparian Restoration in Western Montana: The Role of Beavers

On October 26-27, 2017, the National Wildlife Federation and the Clark Fork Coalition co-hosted an interactive, participatory dialogue among key public resource managers and their partners about promoting expansion of beavers to help restore aquatic and riparian habitats, focused on lessons learned in Montana and drawing from experiences in other parts of the West.

This event could not have occurred without the active support from and participation by the Lolo National Forest, Montana Department of Fish, Wildlife & Parks, Montana Wildlife Federation, Wildlife Conservation Society, The Nature Conservancy and the Turner Foundation. The U.S. Forest Service Northern Rockies Training Center provided workshop facilities at no charge, and landowner Paul Roos generously hosted our field trip on his ranch in the Upper Blackfoot River Valley. We appreciate the contributions of all of our partners, as well as the preparation and leadership provided by our three lead speakers, four discussion leaders and facilitator, Jennifer Boyer.

We gathered people together with these stated objectives:

- Share expert information about beavers and beaver mimicry
- Understand benefits and challenges of beaver expansion
- Identify opportunities and partners
- Prioritize needs and next steps

<u>Key Points in Presentations and Discussion</u> (presentations and a list of key references are provided in separate attachments)

Nick Bouwes, Eco Logical Research, Inc., Logan, UT: ***Partnering with Beaver to Restore Fish and Wildlife Habitat in the Western U.S.***

- Beavers offer a cost-effective way to accomplish restoration of small streams by slowing water down and extending flows in the late season
- Beaver dam analogues (BDAs) speed up natural recovery process for incised streams and often draw beavers to repopulate
- Research has confirmed these benefits:
    - Raised water table (1-3 inches in Oregon study)
    - Lower/stabilized water temperatures (cold water upwelling from shallow alluvium)
    - Improved fish numbers (steelhead fishery in Oregon)
- Questions and discussion:
    - Bank stability: Goal is dynamic system, so "bank blasters" may be used to recruit sediment as desired, as opposed to armoring the bank against erosion
    - Forage impacts: Some evidence of improved production in Nevada studies; monitoring is ongoing and important to understand this relationship
    - Beaver presence or absence: Their movement is not fully predictable, and BDAs are effective even if they don't repopulate the area
    - Fish passage: Highest rates of success when flows are high; flows appear to be more important factor than structure porosity
    - Mitigation for lost snowpack: Study in UT estimated as much as 80% of lost snowpack made up by beaver structure storage

Paul Roos, Amy Chadwick and Nick Bouwes engage with field trip participants about the potential for beaver mimicry to restore an incised stream and improve the fishery and riparian habitat on a tributary of the Blackfoot River

Jeff Burrell, Northern Rockies Program Coordinator, Wildlife Conservation Society: ***Use of Beaver Dam Mimicry for Riparian Restoration in Western Montana***

- BDAs mimic the dynamic processes in which beaver structures are built, blow out and are rebuilt, as well as the other components of complexity (e.g. vegetation)
- Essentially, we are "getting in the way of water" to get more value out of it as it moves through the system by increasing its residence time on the land (ponding, infiltration, floodplain inundation, aquifer recharge, etc.)
- BDAs are recommended in areas so degraded that beavers can't repopulate; provide the base structures for them to build upon and take over
- Structures include stream-spanning dams and spurs that protrude from bank and help reshape the channel
- In Montana, there are concerns about permitting and impacts on water rights
    - Conservation Districts issue 310 permit for work on stream bed or banks, including BDAs
    - As long as structure mimics natural processes, no water right issue
- Fish passage can be facilitated by a series of loose dams, or below-surface structures (sluice boxes) to increase resistance.
- Questions and discussion:
    - Self-sustaining structures: Best scenario is if beavers return to maintain them, but vegetation and other changes will benefit the stream even without beavers
    - Social perceptions of beavers: Research is incomplete, but attitudes are improving; one survey showed more awareness of benefits among general public than agency fish biologists in OR. There are both continued concerns and increased interest among landowners. (One landowner: "When we had the most beavers, we had the most fish.")
    - Limitations on BDAs: Primarily related to gradient and velocity; in steep streams, partial structures (rather than dams) are effective
    - Impact on water rights: So far, DNRC is comfortable with early-season slowing/storage; enhanced late-season flows actually benefit most downstream water rights holders; in UT, you can obtain a water right for the storage created by a BDA
    - Comment: When practiced throughout a basin, flood irrigation imitates beaver activity, with similar benefits—but generally less habitat complexity
    - Impact of trapping: Probably not the main limiting factor on beaver populations; habitat availability and connectivity likely more influential (trapping currently driven primarily by damage complaints)

Lisa Eby, Assoc. Prof. Aquatic Vertebrate Ecology, Univ. Montana: ***Research on Beaver Dam Impacts on Aquatic Life in Western Montana***

- Beaver-occupied habitat supports many other species, including amphibians, birds, reptiles and fish, and there are multiple cross-system subsidies (higher proportion of aquatic carbon, which reaches further into the riparian zone than in non-beaver watersheds) due to beaver activity
- Research into impacts on fish movement revealed that many studies cite perceived barriers without data to support these claims; the greatest potential impacts are for fall-spawning fish when flows are very low
- Overall, the impact of beaver structures on aquatic life are positive
- BDAs need to be placed in consultation with experts to consider all impacts on aquatic life
- Questions and discussion:
    - Cutthroat trout: Thrive in beaver-modified habitat and appear more likely to persist long-term with beaver dams in their habitat (even with brook trout competition) than without beaver dams
    - Reasons for improved growth rates: Beaver modifications extend the growing season and expand prey base
    - Barrier impacts: Beaver activity may shift spawning (especially in very low flow years), but does not seem to affect population of bull trout

Photo courtesy Bryce Maxell, Montana Natural Heritage Program, and discussion group leader at workshop

Synthesis of Identified Goals and Opportunities from Work Group Discussions

1. **Public outreach and constituency building**
   - Expand social tolerance and appreciation for beavers
   - Improve tools and incentives for landowners to work with beavers
   - Build a constituency, with demonstration projects
   - Foster public-private partnerships to accomplish projects
   - Improve coordination between agencies and with partners
   - Engage agency leadership
   - Develop a peer-to-peer landowner network

2. **Coordination and planning**
   - Gather and share information from other states' experiences as an interim step toward a statewide management plan
   - Set up a statewide website with information and resources
   - Expand the circle of dialogue and learning; keep partners engaged
   - Improve inter- and intra-organization and agency communication
   - Seek opportunities to include beavers in public land planning (e.g. watershed condition assessment)
   - Forest Service-FWP begin dialogue on beaver relocation protocols on public land

3. **Develop and share guidance for restoration practitioners**
   - Develop a state-of-the-practice guide, drawing on lessons from Montana and other states
   - Convene follow-up meetings with a focus on site selection, implementation, etc. (more specialized, technical)
   - Develop and share information about variability in different landscapes
   - Work with DEQ and MT Wetlands Council, as well as other partners

4. **Standardize monitoring protocols**
   - Protocols should be informed by practitioners and researchers
   - Convene follow-up meeting to establish protocols and trainings to share them
   - Coordinate with MWCC monitoring work group?
   - Support continued monitoring to continue existing data sets
   - Seek to include funding for monitoring in all projects

5. **Research needs**
   - Address gaps in understanding of outcomes of BDAs and beaver activity:
     - Water storage
     - Late season flows
     - Impacts on fisheries, especially fall-spawning species
     - Impacts on livestock forage
     - Relation to fire recovery
   - Social science inquiries:
     - Public understanding/tolerance
     - Professionals' understanding/tolerance

Next Steps

Participants expressed a strong interest in building upon the foundation of knowledge and networking established in this workshop. The National Wildlife Federation and Clark Fork Coalition want to maintain the momentum of enthusiasm and interest in this topic that was tangible in the workshop. Based on the products of the work groups, and feedback from the workshop evaluations, the NWF and CFC propose to pursue the following actions:

1. Begin planning follow-up activities in western Montana. In particular, we would like to do another event, perhaps a small symposium, which addresses a number of specific topics of interest, and will include hands-on field learning, particularly about beaver dam analogs, and about beaver deceivers, pond levelers and other practical techniques for minimizing the nuisance issues, and living with beavers.

2. Develop a series of events for the general public to learn more about beavers and their potential positive impacts on water resources and fish and wildlife habitat. Help the public understand basic approaches to minimize beaver nuisance problems. As an initial step, we are collaborating with the International Wildlife Film Festival to organize multiple beaver-focused activities for children and adults at the upcoming 2018 event (April 14-22, Missoula).

3. Seek funding for a next events, both for practitioners and the public, in coordination with partners.

4. Look for opportunities to implement and document practical beaver habitat restoration projects, on both public and private lands, in western Montana.

5. Support the development of a stronger more consistent approach to monitoring the impact of beaver dam analog projects. This will involve getting practitioners and academics together to share experiences and approaches to monitoring this type of work. Holistic, science-based story-telling needs to be part of the monitoring approach.

6. Investigate barriers/challenges identified in the workshop and develop practical approaches to overcome them, drawing on experiences in Montana and other western states.

For more information, please contact:

Sarah Bates, National Wildlife Federation; BatesS@nwf.org; 406-541-6730

Will McDowell, Clark Fork Coalition: will@clarkfork.org; 406-396-7716