

**Transferring knowledge about beaver as a restoration partner
to address drought conditions in the Montane Western United States**
An Association of State Wetland Managers Concept Paper

Project Background: States in the arid western region of the United States are faced with a mounting number of problems, including drought, lowering water tables, changing stream flow regimes, temperature increases, heightened wildfire potential and threats to habitat critical for supporting fish and wildlife populations. Restoration and creation of wetlands in these areas are well-documented tools for addressing these problems¹. Additionally, EPA's 2011 National Wetland Condition Assessment found that the Western Ecoregion of the United States has wetlands in the poorest condition. There is a clear need for aquatic resource restoration efforts that can address these concerns.

One emerging approach is the use of nature's own restoration experts – beavers. Beavers can be a tool to create, restore and enhance wetlands, improving both wetland condition and function and supporting wildlife diversity. The presence of beavers has long been associated with high-functioning, healthy hydrological systems in the arid west. However, during the 1800's beavers were largely eliminated from the western landscape by trapping. Combined with large-scale destruction and conversion of wetlands as well as stream relocation and straightening to enable agricultural production, the loss of this keystone species has contributed to the region's overall challenges maintaining groundwater tables, supporting native fisheries and wildlife habitat, slowing the precipitation runoff and keeping fire risk from escalating.

Researchers and practitioners in these western states and elsewhere have been working on solutions that include the release of beavers onto private and public lands in areas that beavers historically occupied². Beaver dams create massive, leaky sponges (the valley bottoms) that hold back water and slowly release it, including during the hot dry months of summer. These efforts have been found to improve habitat for fish and wildlife, including many endangered species (e.g. Sage Grouse³) and increase the resilience of watersheds to drought. These efforts have met with success in a growing number of areas, transforming landscapes from high-risk zones to more complex hydrological systems, with the cascading effects of improved wildlife habitat, sustained water flow, increased water storage, reduced fire danger, and other landscape and ecological improvements.

A wide range of research studies and project reports strongly indicate that beaver reintroduction may be able to mitigate impacts of drought and even replace stream flow lost due to declining snow packs. Although there are many examples of beaver reintroduction success, models and case studies across the U.S. and especially in the arid west, this information has not been shared widely nor reviewed as a body

¹Albert and Trimble, 2000; Apple, 1985; Aschwanden, 2002; Babik and Meyer, 2013; Baker, 1995; Bird, O'Brien and Peterson, 2011; Burchsted et al, 2010; Fouty, 2008; Hood and Bayley, 2008; Kemp et al, 2012; Malcom, 2014; McCaffery, 2009; McKinstry, 2001; Methow Beaver Project, 2013; Nummi and Hahtola, 2008; Pollock et al (2015); Pollock et al, 2014; Runyon, 2013; Tippie, 2010; Vore, 1993; Washington Department of Fish and Wildlife, 2012; Wheaton, 2013; Wheaton et al, 2012.

² Pollock, M.M., G. Lewallen, K. Woodruff, C.E. Jordan and J.M. Castro (Editors) 2015. The Beaver Restoration Guidebook: Working with Beaver to Restore Streams, Wetlands, and Floodplains. Version 1.02. United States Fish and Wildlife Service, Portland, OR. <http://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Beaver.asp>

³ Donnelly et al. (2016). Public lands and private waters: Scarce mesic resources structure land tenure and sage grouse distributions. *Ecosphere*. 7(1): e01208.1002/

of resources to identify general guidelines and best practices from region to region. While there is great interest in learning from other practitioners, most beaver restoration practitioners have been working largely in groups isolated from one another, unaware of many resources that could be useful to them.

Project Description:

Working with a range of critical stakeholders, this multi-year project will document and promote the transfer of best practices for the use of beaver to slow water flow and increase water storage in the Montane West. This project will fill a critical gap by formally documenting local hydrologic impacts from beaver restoration work and developing existing practices into transferable technical tools that will be promoted in the region. It will identify specific locations where beaver can be introduced with the highest likelihood of success. The project will develop and share best practices, information about individual state legal and regulatory constraints and opportunities, success stories and specifics about what works and what has not as well as how to message this information are all critical to effectively transferring this information within the region. The project will include a Beaver Summit to bring together experts to discuss these areas and culminate with a series of webinar- and workshop-based trainings to help partners invested in addressing climate change and water resources in the Montane West benefit from well-designed beaver reintroduction restoration activities.

Project Tasks:

To meet these needs, project will include:

- **Document hydrological impacts of beaver reintroduction on demonstration ranch-based sites.** The project will first assess and document site conditions, followed by full reintroduction and monitoring of beaver impacts on site hydrology (quantity and timing of flow), capturing information about how much longer beaver restoration sites keep water on the land than current retention in the same locations. (Lead: Utah State University)
- **Estimate the impacts of larger watershed-based beaver reintroduction projects** using an existing modeling tool to run larger geographic scenarios with multiple reintroductions on larger geographic areas around the pilot sites. (Lead: Utah State University)
- **Identify priority locations where beaver reintroduction is likely to be most successful** by running modeling with Utah State University's Beaver Reintroduction Assessment Tool (BRAT) in the project states. (Lead: Utah State University)
- **Conduct a state-by-state policy analysis of beaver-related laws and regulations** affecting beaver reintroduction projects in ten states. The analysis will identify current state laws and regulations affecting beaver restoration activities in Montane Western states, as well as barriers/opportunities to address legal and regulatory barriers. The analysis document and links to associated resources will be posted on the ASWM.org website. (Lead: Association of State Wetland Managers)
- **Identify beaver restoration best practices** that are agreed upon by a wide stakeholder working group. These best practices will be vetted and disseminated through multiple networks with wide reach to ranching and natural resource management communities. (Lead: Association of State Wetland Managers)

Project Tasks, Continued:

- **Work with partners to encourage adoption of beaver reintroduction as a practice** (e.g. inclusion in the NRCS Field Operators Technical Guide). Identify and capitalize on existing and new federal and state agency communication resources to encourage adoption of beaver reintroduction as a practice (Lead: Association of State Wetland Managers)
- **Develop and deliver a series of recorded webinars** and hold one or more formal workshops for the Montane West Region to transfer knowledge about the new best practices and provide opportunities to gather additional information about the role of beaver in adaptive drought management in the region.(Lead: Association of State Wetland Managers)
- **Document project findings in a final report**, including all relevant contextual information, treatment description, results, findings, and conclusions, as well as recommendations application of findings and future research. The report will be posted on the ASWM.org website and accessible to the public.(Lead: Association of State Wetland Managers)

Potential Project Partners

- Association of State Wetland Managers*
- Association of Fish and Wildlife Agencies*
- State and Tribal Wetland Programs*
- U.S. Forest Service*
- Natural Resource Conservation Service*
- Bureau of Land Management*
- Utah State University*
- U.S. Fish and Wildlife Service
- USFWS Migratory Bird Joint Ventures (Intermountain West JV)
- State Wildlife Agencies
- State Water Management Agencies
- LCCs
- Nonprofit organizations
- Farmers and Ranchers
- Beaver reintroduction consultants

*Have indicated interest in participating in the project. ASWM has a list of over 50 federal, state or tribal agencies, nonprofits, consultants, and academics interested in this proposal. ASWM has been working with this group of stakeholders to identify barriers and opportunities to improve beaver reintroduction efforts. This proposal is designed to address the barriers they have identified.

Project Cost: It is estimated that the total cost for the entire project will be approximately \$650,000. More specific cost information is available upon request.

For more information about this concept paper, please contact Jeanne Christie, Executive Director, Association of State Wetland Managers at (207) 892-3399 or via email at jeanne.christie@aswm.org.