

Rethinking beaver: Can an old nuisance be a new tool to adapt Southwestern stream corridors to climate change?

Cathryn Wild Seventh Generation Institute Santa Fe New Mexico

Introduction

Many Southwestern stream corridors are in poor condition and will likely be further degraded by the heating, drying, and alternating intense droughts and rain events predicted under a changed climate.

This study examined three questions:

- ◆ Could beaver be a practical resilience-building tool to conserve biodiversity in stream corridors?
- ◆ If so, where are priority areas in New Mexico for the use of beaver as a climate change adaptation tool?
- ◆ How does the existing NM beaver population compare with the potential beaver population?

Methods

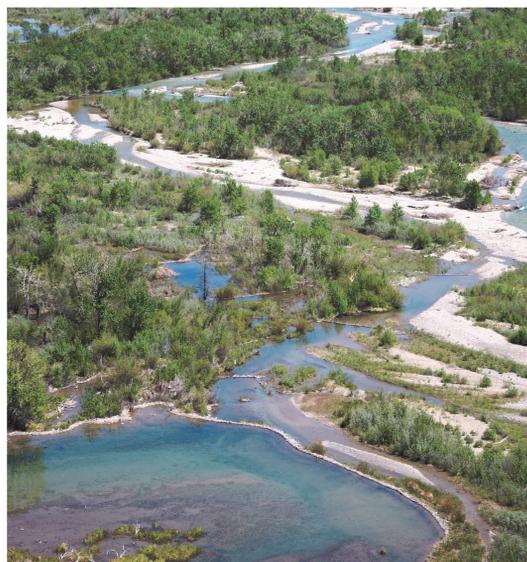
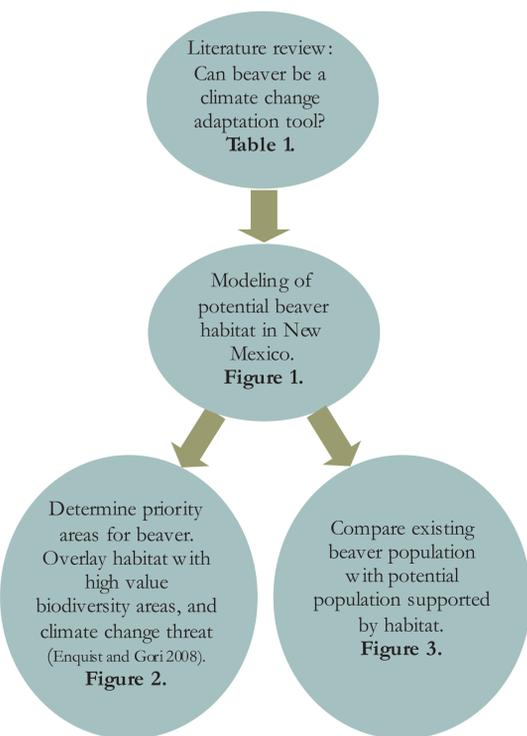


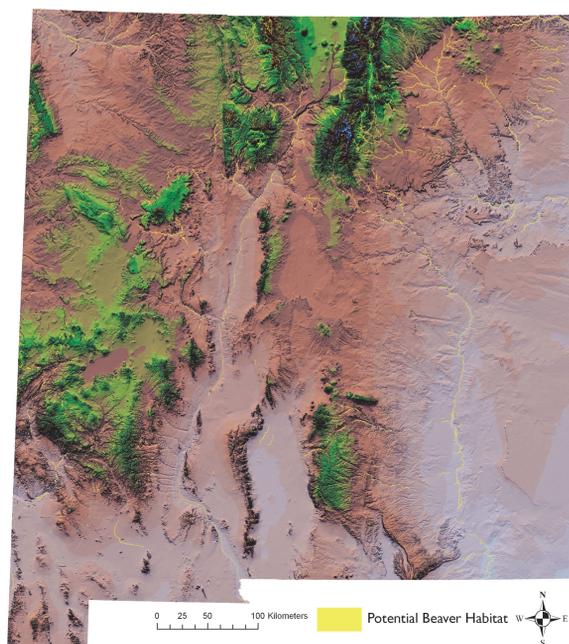
Plate 1. Beaver dam-pond complex.

Results

Table 1. Results of literature review

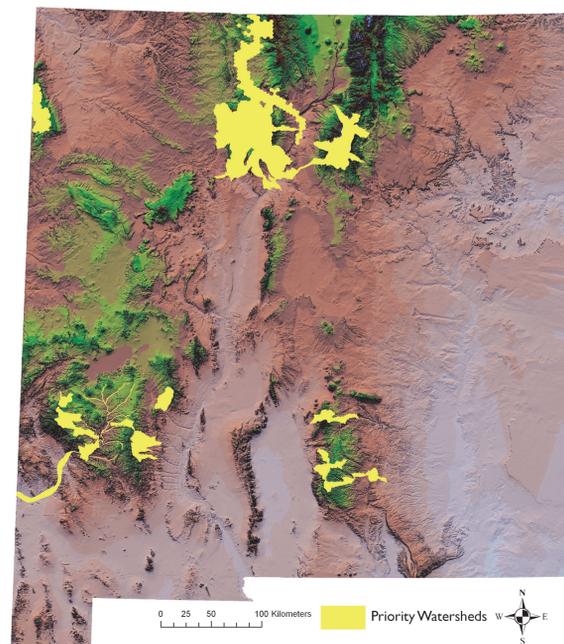
Climate-related Threat	Links to Beaver-driven Resilience
Warmer water temperatures	<ul style="list-style-type: none"> ◆ Increased density and height of shrubby vegetation which shades water and lowers temperatures (Baker and Hill 2003; Collen and Gibson 2001; McKinstry and others 2001; Naiman and others 1988). ◆ Deep pools provide thermal refugia for temperature sensitive species. (Baker and Hill 2003; Pollock and others 2003; Collen and Gibson 2001; McKinstry and others 2001; Naiman and others 1988).
Increased drought; diminished summer flows	<ul style="list-style-type: none"> ◆ Reduced discharge variability (Naiman and others 1988). ◆ Increased water storage in the surrounding soil is slowly released during times of low flow. (Baker and Hill 2003; Pollock and others 2003).
Intensified run-off events and erosion	<ul style="list-style-type: none"> ◆ Decreased water velocity, stream energy and channel down-cutting (Pollock and others 2003; Naiman and others 1988; Gurnell 1998). ◆ Sediment loads are dropped in the slowed water behind ponds. (Baker and Hill 2003; Collen and Gibson 2001; Naiman and others 1988).
Channel incision, loss/alteration of riparian vegetation	<ul style="list-style-type: none"> ◆ Decreased channel incision, aggraded sediment, and elevated water table (Cooke and Zack 2008; Baker and Hill 2003; Pollock and others 2003; Collen and Gibson 2001; Naiman and others 1988).
Shifts in species distributions	<ul style="list-style-type: none"> ◆ Cooler microhabitats in riparian corridors provide refugia and movement corridors for some aquatic, riparian or terrestrial species (CCSP 2008B; Brosfoske and others 1997).

Figure 1. Potential beaver habitat in New Mexico



A habitat suitability model identified 281,385 hectares (695,302 acres) of potential beaver habitat in New Mexico. Historic habitat was likely much greater. In addition to areas occupied by people, many perennial streams have become intermittent.

Figure 2. HUC-12 watersheds for beaver-driven climate change adaptation in New Mexico



Ten priority watersheds were identified where the abundant presence of beaver would be especially valuable to build the resilience that will help conserve biodiversity.

Results

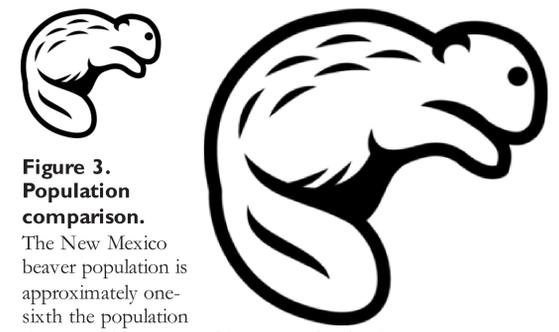


Figure 3. Population comparison.

The New Mexico beaver population is approximately one-sixth the population that could be supported by the modeled habitat.

Conclusions

- ◆ Ecosystem modifications by beaver can be a practical tool to build stream-riparian resilience to climate change impacts.
- ◆ The presence of abundant beaver provides benefits toward the conservation of many other species, as well as improvements in water quantity and quality.
- ◆ Priority sites for beaver tolerance or reintroduction are streams with: 1) high biodiversity conservation value; 2) high risk of climate impacts; and 3) appropriate or potential habitat.

Discussion

- ◆ Beaver abundance is key to achieve optimum resilience.
- ◆ Since beaver are a native species, an increase in the beaver population is a “no-harm” ecosystem management strategy.
- ◆ Where beaver-human conflicts develop, well-established methods for managing beaver impacts can be employed.
- ◆ The long-standing perception of beaver as a nuisance species may present obstacles to their use as an adaptation tool.

References, Further Information

Contact: Cathryn Wild at cwild@seventh-generation.org.



Download the publication **Beaver As a Climate Change Adaptation Tool: Concepts and Priority Sites in New Mexico**.

Download references for this poster.

Acknowledgements

- ◆ Support for the project *Building Riparian Resilience through Beaver Restoration* from: ESRI, the Norcross Wildlife Foundation, the Biophilia Foundation, Patagonia Inc., the USFWS Partners for Fish and Wildlife Program, New Mexico.
- ◆ Technical assistance: Shane Moore.
- ◆ Climate threat in New Mexico data courtesy of The Nature Conservancy of New Mexico and Arizona.
- ◆ Photo Credits: Sally Thomson Photography, Sam Beebe.