ASSESSING BEAVER HABITAT ON FEDERAL LANDS IN NEW MEXICO

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Assessing Beaver Habitat on Federal Lands in New Mexico Goals

- Identify beaver habitat on all federal lands in NM using a Geographic Information System (GIS) Model
- Exchange information at a Beaver and Wetlands Workshop
- Update wetland mapping and classification for 3,900 square miles in North-Central New Mexico
- Timeline: 2011-2016
- Funding: Wetlands Program Development Grant from EPA Region 6 to NM Environment Dept.
Project Need

- National Wetland Inventory is incomplete
- Many streams in New Mexico are incised from historic land practices
- Streams are also denuded of vegetation from grazing (livestock and wildlife)
- Beavers are absent from a large part of their historic range
- Dam-building beaver have the potential to reconnect rivers to their floodplains
- Assessment of habitat on federal lands was needed to prioritize areas to improve beaver habitat.
Incised Streams
Lack of Woody Vegetation
Beaver Dams in New Mexico
Assessing Beaver Habitat Project Area
Assessing Beaver Habitat Model Development

- Hired Contractor WildEarth Guardians/Subcontractor Bird’s Eye View GIS
- Literature search on key beaver habitat parameters
- Technical Steering Committee of beaver/hydrology/wetland scientists
- Gathered applicable public domain GIS data
- Built model, applied model to federal lands
- Consulted with Technical Steering Committee for adjustments
- Ground-truthed model in Jemez Mountains
Beaver Habitat GIS Model – Potential Habitat Layer

Abiotic Habitat Requirements for Model

- Perennial streams
- Stream gradients < 15%
- Stream order 1-5
- On federal land
Biotic Habitat Requirements for Model

- Vegetation type = woody riparian (optimal)
- Canopy cover = 40-60% (optimal)
- Road density (surrogate for human development)
Stream reaches where beaver were known to exist in 2013
Ground-truthing Beaver Habitat Model

- Model was ground-truthed in the Jemez Mountains.
- Student interns measured vegetation type, canopy cover, and stream gradient at 18 sites.
- Resolution of spatial vegetation layer was a limiting factor.
- Model is a landscape scale tool.
- On-the-ground data must be collected before any action is taken for habitat enhancement or beaver re-introduction.
Ground-truth Site #26
Beaver and Wetlands Workshop Agenda

- Dr. Jennifer Frey, NM State University - science & ecosystem services of beaver and wetlands
- Maryann McGraw, NM Environment Department Wetlands Program - introduction to Assessing Beaver Habitat of Federal Lands in NM project
- Joe Wheaton, Department of Watershed Sciences, Utah State University - 1) Beaver Restoration Assessment Tool (BRAT), 2) beaver habitat restoration projects in UT & OR
- Bryan Bird, WildEarth Guardians, and Kurt Menke Bird’s Eye View GIS - Beaver Habitat Model
- Justin Dolling, Utah Division of Wildlife Resources - development of 10 year Utah Beaver Management Plan (2010-2020)
- Julia Barnes Facilitator - opportunities and challenges for wetlands and beaver, including questions, views and concerns about scientific and sociological aspects of beaver.
- Phil Carter, Animal Protection of New Mexico, and David Blagg, Beaver Expert - strategies and techniques to help humans and beaver co-exist without conflict.
Riparian planting projects
Before/After Riparian Planting

La Jencia Creek 2006/2012

Bluewater Creek 2009/2015
Mapping and Classification of Wetlands in the Jemez Mountains

Update wetland mapping for 3,900 square miles in Northern New Mexico at a scale of 1:12,000 using aerial photography and collateral data, using:

- National Wetlands Inventory (Cowardin et al. 1979) classification
- A System for Mapping Riparian Areas in the Western United States classification (USFWS, 2009)
- Landscape Position, Landform, Waterbody Type, Water Flow Path- LLWW classification (Tiner, 2011)
- Hydrogeomorphic classification (Brinson, 1993)

AND

- Functional Correlation
51,540 acres of wetlands, riparian and deepwater habitat were mapped and classified.

26,000 polygons (each representing wetlands >½ acre) and

11,000 linear features (total length 6,676 miles) were mapped and classified.

2.06% of the total project area is wetlands, riparian or deepwater habitat.

Based on the Cowardin classification:

- 70% of the wetlands in the project area are palustrine,
- 24.66% are lacustrine, and
- 5.34% are riverine
Technical Advisory Committee and Field Verification
Example from NWI Mapper
Examples of LLWW and HGM
# Functional Correlation from Wetlands Mapping and Classification

<table>
<thead>
<tr>
<th>#</th>
<th>Function</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Aquatic Invertebrate Habitat</td>
<td>Provides habitat for aquatic invertebrates</td>
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<tr>
<td>2</td>
<td>Bank and Shoreline Stabilization</td>
<td>Wetland vegetation helps bind soil to limit or prevent bank and shoreline erosion</td>
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<td>3</td>
<td>Carbon Sequestration</td>
<td>Serves as a carbon sink that helps trap and store atmospheric carbon</td>
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<td>4</td>
<td>Fish Habitat</td>
<td>Provides habitat for a variety of fish (including a special category containing factors that maintain cold water temperatures for certain species including trout)</td>
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<td>5</td>
<td>Groundwater Recharge</td>
<td>Sustains sub-surface water storage, base flow and hyporheic exchange.</td>
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<td>6</td>
<td>Nutrient Transformation</td>
<td>Encourages the cycling of nutrients from natural sources or anthropogenic sources.</td>
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<td>7</td>
<td>Sediment and Particulate Retention</td>
<td>Acts as filters to physically trap sediment particles before they are carried further downstream</td>
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<td>8</td>
<td>Streamflow Maintenance</td>
<td>Provides a source of water to sustain streams from drying up during periods of drought conditions or low discharge</td>
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<td>9</td>
<td>Surface Water Detention</td>
<td>Stores runoff from precipitation events or spring melt waters which reduce the force of peak flood levels downstream</td>
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<tr>
<td>10</td>
<td>Unique, Uncommon, or Highly Diverse Wetland Plant Communities</td>
<td>Sustains natural vegetation and ecosystems including unique and uncommon wetland types and rare species</td>
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<tr>
<td>11</td>
<td>Waterfowl and Waterbird Habitat</td>
<td>Provides habitat for waterfowl and other water birds</td>
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<td>12</td>
<td>Wildlife Habitat</td>
<td>Provides habitat for a variety of wildlife (resident and migratory)</td>
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Example uses of mapping products

- Project planning for wetlands restoration on USFS, NPS and state-managed lands
- Evaluating wetlands downstream of NPDES outfall
- Advising statewide planning efforts (e.g. forest plans)
- Developing Wetland Action Plans with watershed groups
- Amigos Bravos proposed USFS Wetland Jewels for special protection
Acknowledgments & Contact Information

Acknowledgements:

• US EPA Region 6
• Saint Mary’s University of Minnesota - GeoSpatial Services
• Wild Earth Guardians
• Bird’s Eye View GIS
• UC Santa Barbara - Bren School of Environmental Science interns
• Beaver and Wetlands Workshop speakers
• Members of technical committees for Assessing Beaver Habitat Model and Mapping and Classification of Wetlands in the Jemez Mountains

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