Identifying Wetland Jewels in the Sante Fe National Forest

Analysis of Wetland Mapping & Functional Assessment on the Carson and Santa Fe National Forests, New Mexico

Esri User Conference
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Project Overview

• Partners: Amigos Bravos, Western Environmental Law Center and Saint Mary’s University of MN

• Utilized new State of New Mexico wetland mapping for analysis and evaluation

• Objective was to identify important headwater wetland complexes and wetland jewels within the Carson and Santa Fe

• Identify preservation and restoration opportunities for incorporation in 10 year NF plans

• Develop criteria and methods for prioritizing management activities based on watershed needs

• Potentially restorable wetlands
What are Wetland Jewels?

- Comprised of either a single wetland or a complex of several wetlands occurring in a discrete geographic area.

- Provide several important ecological functions to the terrestrial and aquatic landscape as well as to downstream communities.

- A tool to build ecological and community resilience in the face of climate change.
Why Protect Wetland Jewels?

Wetland Jewels are a keystone element of action to foster resilient, interconnected, landscape-scale ecological and community systems.

- maintain stream flow essential for irrigation and wildlife
- create habitat for wildlife
- provide clean water for downstream communities
- mitigate the risk of flooding
- Reduce climate impacts – drought, earlier runoff, wildfire
Wetland Mapping in New Mexico and Collaborative Science

Develop a collaborative approach to wetland assessment and management activities based on:

- EPA Core Elements Framework
- Current science, tools, data and methods
- Professional guidance and review
- Stakeholder engagement

Support local decision making with landscape level, remotely sensed data
Collaborative Science and Decision Support

A couple of other project examples:

- Douglas County, Wisconsin
- Marengo River Watershed
- Matanuska-Susitna Basin, Alaska
- White Mountain Apache Reservation, Arizona
Project Activities

Project Partners and stakeholders engaged at each project stage to achieve the following:

• Inventory of the wetland landscape
• Incorporate additional hydrogeomorphic and other metrics
• Correlate wetland characteristics to ecological functions
• Establish key wetland management issues and objectives
• Prioritize preservation, enhancement and restoration
• Develop tools and messaging for data communication
Northeastern New Mexico Study Area Description

- **Watersheds**: Upper Canadian, Upper Rio Grande, Upper Pecos, Rio Chama, Cimarron Rivers
- **Total Area**: 16,000 sq. miles or 10 million acres
- **Counties**: Colfax, Mora, San Miguel, Taos, Rio Arriba, Union, Harding and Santa Fe
- **Previous Wetland Mapping**: None, limited site specific NWI
- **Major Ecoregions**: Sub-alpine and montane forests, foothill shrub lands, tableland shrub and grasslands, high plains
Technical Advisory Committee

1. Establish project scope: classification systems and study area boundaries
2. Investigate availability of imagery and collateral spatial data
3. Establish image interpretation and mapping conventions
4. Provide review and quality assurance
5. Develop wetland functional correlation matrix
**Mapping and Classification Systems**

- National Wetland Inventory (NWI) - Cowardin (1976)
- System for Mapping Western Riparian Areas - USFWS (2009)
- Landscape Position, Landform, Waterbody Type, Water Flow Path (LLWW) - Tiner (2013)
- Hydrogeomorphic Method (HGM) - Brinson (1993)
Comprehensive wetland assessment enabled advocacy groups to engage in proactive planning and site level prioritization and management

- Partners included Amigos Bravos and Western Environmental Law
- Mission: Protect and Restore the Waters of NM
- Stakeholders: Citizens, students, land owners, environmental activists, ranchers, communities
- Developed the Wetland Jewels Program to “Create resilience in the face of climate change through protection and restoration of mountain wetlands”
Stakeholder Engagement

Opportunity: USFS National Forest 10 yr. Plan Input:

- Wetland assessment used to identify Wetland Jewels
- Stakeholder engagement to rank ecological functions
- Identify key wetland complexes that support key functions
- Develop numerical scoring of wetlands and complexes
- Delineate Jewels using HUC 10 watersheds and topographic boundaries.
Stakeholder Engagement

Advocacy organizations facilitated stakeholder engagement meetings:

- Participation of over 100 individuals
- Materials: presentations, printed overviews and discussions
- Potential functions included:
  - Basin and Saturated Slope
  - Headwater
  - Headwater with Discharge to Stream
  - Spring-fed
  - Adjacent to Known Spring Locations
  - Connected to Coldwater Fish Bearing Streams
  - Connected to Impaired Streams
  - Surface Water Detention/Flood Control
  - Contribute to Streamflow Maintenance
  - Adjacent to Other Wetlands
  - Active or Recent Beaver Activity
  - Fish and Aquatic Invertebrate Habitat
  - Waterfowl Habitat
  - Carbon Sequestration
  - Nutrient Transformation
  - Sediment Retention
  - Groundwater Recharge
Stakeholder Engagement

Advocacy organizations facilitated stakeholder engagement meetings:

- A Dot-Voting approach was used to gain consensus
- Discussions and educational materials used to ensure understanding
- Results were tallied and presented for final consensus
- Final functions for ranking included:
  - Contributes to Streamflow
  - Groundwater Recharge
  - Fish and Aquatic Invertebrate Habitat
  - Threatened and Endangered Species
  - Surface Water Detention
  - Waterfowl Habitat
  - Beaver Habitat Headwater
  - Restoration Potential
  - Carbon Sequestration
Function Ranking:

- Each function was assigned a base score:
  \[
  \frac{\text{# of function votes}}{\text{total # of votes}} \times 100
  \]

- Each wetland was assigned an overall score:
  \[
  \sum \text{of individual function scores}
  \]

- Each wetland was further described by total areal extent and whether it was isolated or part of a wetland complex.
Stakeholder Engagement

Function Ranking:

- Cumulative scores and graduated shading were used to identify specific geographic aggregations of highly functioning wetland complexes.
- Wetland Jewels were delineated using watershed and topographic boundaries to indicate wetland aggregations that should be considered for preservation, enhancement or restoration.
1 What are Wetland Jewels?

Wetland Jewels can be comprised of either a single wetland or a complex of several wetlands occurring in a discrete geographic area of national forest lands. These wetlands provide several important ecological functions to the terrestrial and aquatic landscape.

Due to their critically important ecological and community role, we have identified Wetland Jewels in the Santa Fe National Forest to not only bring attention to their importance, but to secure their long-term protection and restoration.

Ultimately, Wetland Jewels can be used as a tool to build ecological and community resilience in the face of climate change.

2 Why Protect Wetland Jewels?

3 New Mexico’s Completed Wetland Mapping

4 What are Priority Wetland Functions?

5 How Were Wetland Jewels Identified?

6 The Santa Fe National Forest Wetland Jewels

http://smumn.maps.arcgis.com/apps/MapSeries/index.html?appid=70a492acfe8b415dba825a7866bb5af
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