EVALUATING RESTORATION SUCCESS AND APPLYING ADAPTIVE MANAGEMENT IN THE MIDDLE RIO GRANDE BOSQUE

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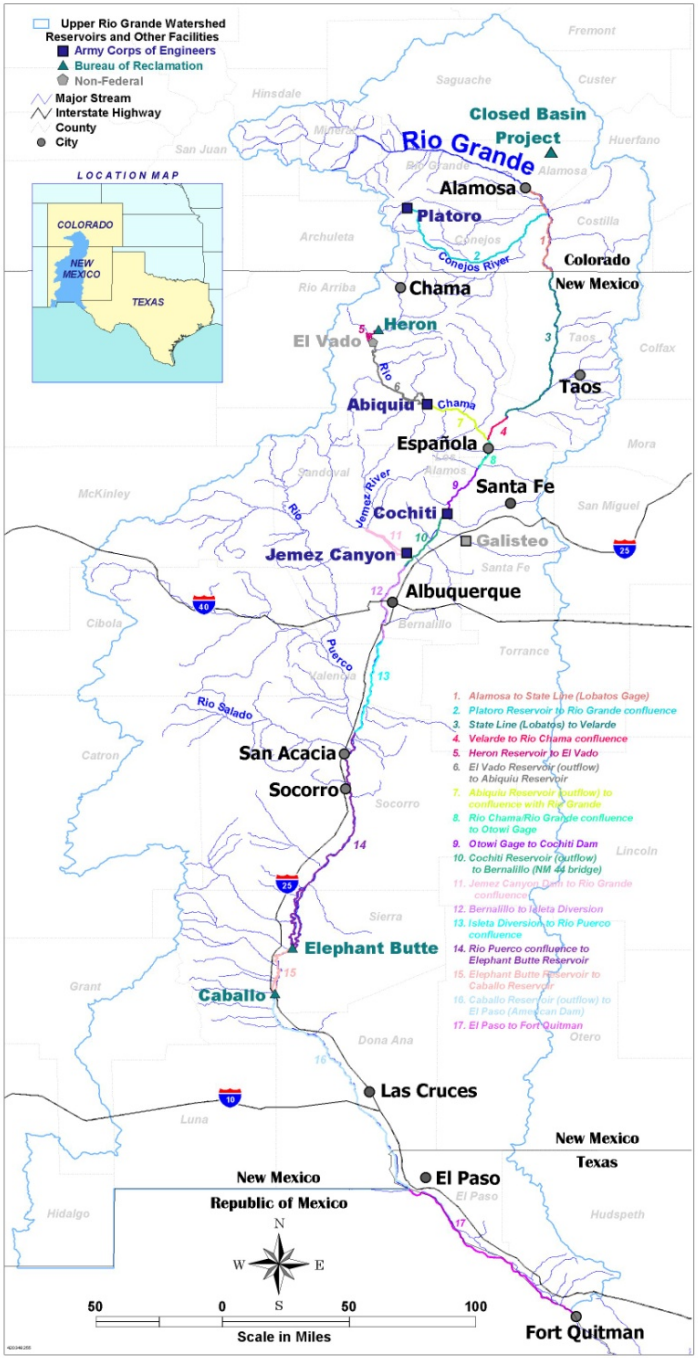
Albuquerque, New Mexico

Summary

- Overview of Middle Rio Grande Bosque Restoration Projects
- Completed and ongoing monitoring
- 'Adaptive Management' – changes to implementation of restoration based on monitoring results



Upper Rio Grande Basin
Water Operations Review and EIS

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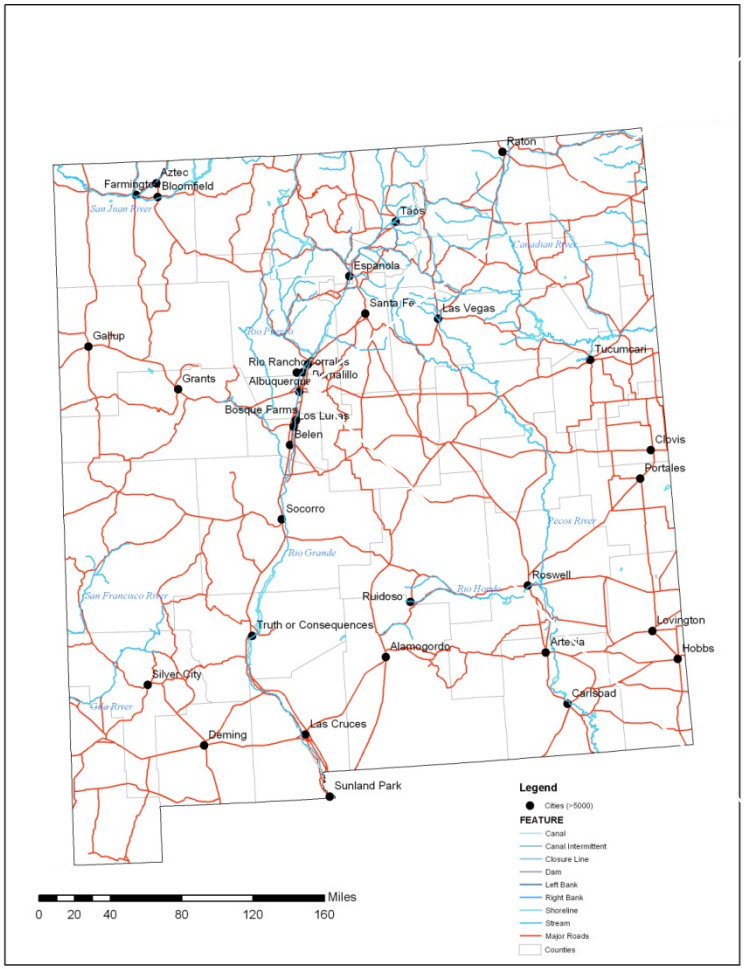
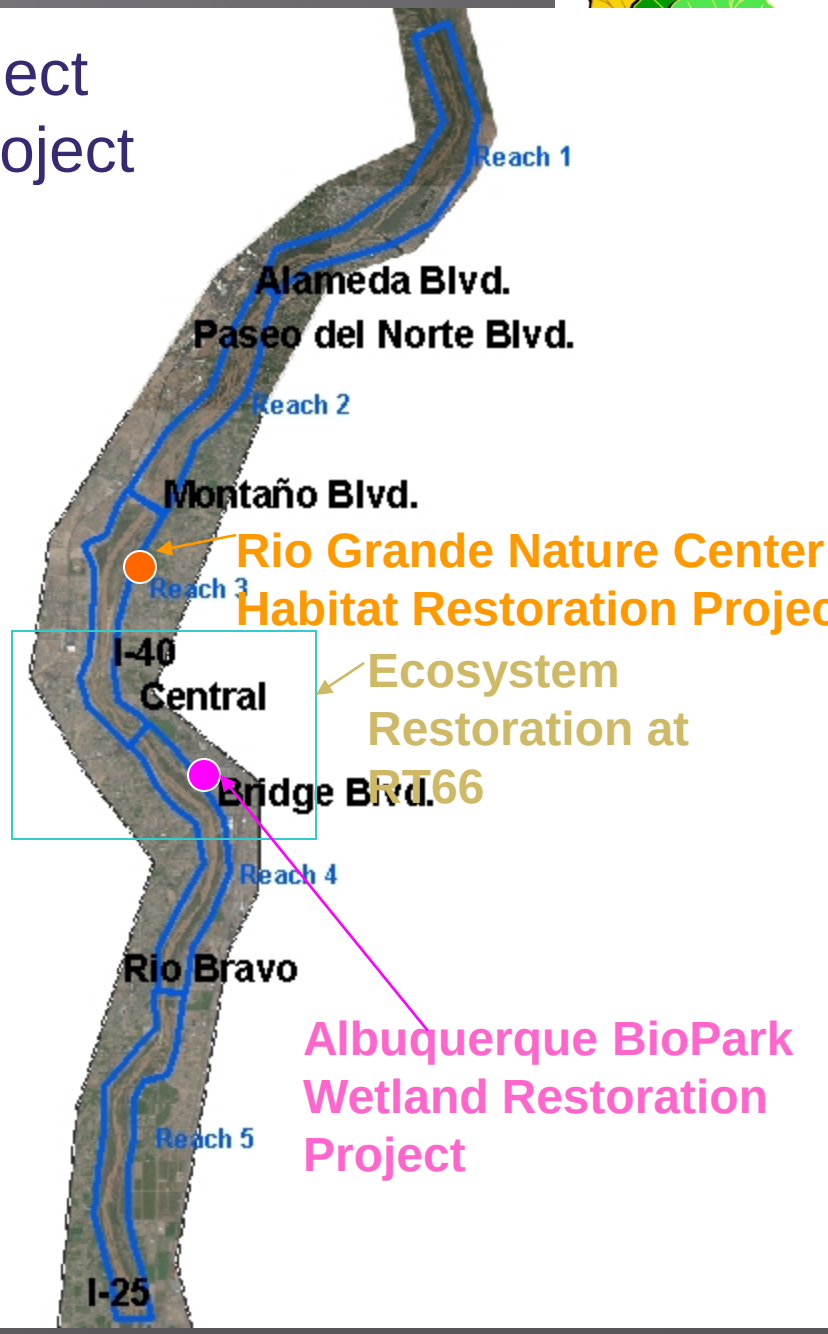
Bosque Wildfire Project
MRG Restoration Project





Why restoration is needed

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- Loss of hydrologic connection between river and 'bosque' (forested area along the river)
- Loss of native riparian habitat (due to the cumulative effects of agriculture, urban development and flood protection measures initiated over the last seven decades resulting in a disruption in the original hydrologic (hydraulic) regime)
- Presence of non-native vegetation
- Fire danger due to lack of 'flushing' flows and populations of non-native vegetation

MRG Restoration Projects

- *Restoration* under various authorities including the following types of work:
  - Thinning of non-native vegetation (salt cedar, Russian olive, Siberian elm, Tree of Heaven) and dense 'dead and down' material – using various methods
  - Revegetation, creation of wetland habitats, reconnection of hi-flow channels, construction of willow swales
  - Since 2004, worked in approximately 750 acres over 3 counties; Fall 2011 – beginning work on another ~950 acres

Bosque Restoration

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Monitoring Efforts

- Avian surveys before, during and after restoration work
- Willow restoration study – measure success of restoration feature and techniques

- Other monitoring efforts:
  - Effects of mulch depth
  - Success of seeding methods
  - Use of indicator species
  - Surface water-ground water interactions

Avian surveys

- Avian surveys of restoration areas before construction – raptors, tree and ground nesting
  - Stayed 3-500 feet away from observed nests
  - Continued monitoring nests
- Long-term monitoring 2004-2009:
  - Song-bird transects
  - Raptor surveys
  - In different types of 'treated' areas

Avian Survey Results

- Initial decrease in bird density after thinning (due to understory thinning);
- Density and richness increases in successive years;
- Increase in richness in areas where wet habitat created

Willow Restoration

- Six pilot projects implemented in 2005.
- Monitoring indicates variable results.
- Research underway to guide future design and adaptive management.

Willow swale construction

Willow Swale Study

- Evaluate vegetation, soil and groundwater characteristics associated with "successful" and "unsuccessful" willow wetland projects.
- Evaluate differences in soil fertility and ground-dwelling arthropod diversity in constructed willow wetlands compared to adjacent "unrestored" sites and natural willow bars.

Adaptive Management based on Monitoring

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- Avian Survey results – more selective thinning in order to leave understory habitat (some non-natives) and phasing of removal to allow new vegetation to move into understory
- Willow swale study- further development of methods for design and construction of willow swales
  - Size, plantings, method of construction, etc.

Use of modeling with monitoring

- Habitat Evaluation Assessment Tool (HEAT)
  - Used during feasibility analysis
  - Conducted baseline surveys in the field:
- Vegetation – tree density, tree canopy cover, shrub canopy cover, ground cover, species count/composition, % native/non-native; overall percent cover
- Hydrology – flood frequency, flood duration, depth, velocity, wetted area, groundwater depth

Use of modeling with monitoring

- Using measurements taken in HEAT model baseline and continuing in Monitoring and Adaptive Management Plan, plus
  - Avian monitoring – species diversity
  - T&E Species (BO requirements) - Southwestern Willow Flycatcher, Rio Grande silvery minnow
- Monitoring the success of ecosystem restoration (Implementation Guidance, 8/31/09, Section 2039 of WRDA 2007)

Adaptive Management based on monitoring

- Overall goal is to protect and provide habitat for wildlife while balancing with human needs (fire risk reduction, recreation, etc.)
- Implementation of restoration needs to be conducted while protecting species
- Careful planning, phasing, and monitoring to continue 'adaptively managing' restoration process on the ground is key

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