Riparian and Wetland Vegetation Communities

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Riparian and Wetland Vegetation Communities

Middle Rio Grande Conservation Action Plan

Ondrea Hummel, Senior Environmental Scientist, Tetra Tech
November 14, 2019
Introduction

- Anthropogenic changes (riverside drain, levees, dams, housing development):
  - Hydrology
  - Geomorphology
  - Vegetative species composition

- Bosque Biological Management Plan (BBMP), Crawford et al. 1993:
  - 1918-1989:
    - Channel changes
    - Increase in bosque acres
    - Introduction of Russian olive and tamarisk in the 1960s
    - Decrease in marsh and open water: 2540 acres to 1486 acres

Among the greatest needs of the riparian ecosystem are the preservation of existing wetlands and expansion or creation of additional wetlands (Crawford et al., 1993).
Managing a river as a diverse and dynamic mosaic of ecological communities that are sustained and restored through natural processes that take advantage of water and sediments afforded by the river.

- Sufficient base flows, periodic flooding, channel migration and sediment transport to create a complex and continually changing riverscape
  - Dynamic Patch Mosaic (DPM)

- Vegetation communities fundamentally dependent on a functional hydrological regime
Working within the constraints of the system

- **Constraints**
  - Infrastructure (dams, levees, etc.)
  - Water
  - Etc.

- **Management options**
  - Agency coordination – flow, land, species
  - Habitat restoration – help ‘kick start’ to meet conservation targets
  - ‘Bring the bosque to the river’
Historically patchy distribution of habitat types
- Riparian wetlands, channels, woodlands, shrub thickets and meadows (Crawford et al 1993)

**Bosque Landscape Alteration Strategy** - Uneven-aged stands of native trees, shrubs, willow swales, side channel construction, alternate uses of water (drains), and wetlands (Najmi, Grogan, Crawford 2005)

**Middle Rio Grande Restoration** – Mosaic of habitat types as well as age, size and composition (USACE 2011; HEAT Evaluation/E-Team, 2011)
- Riparian Gallery Forest Mosaic Restoration: ~ 50% tree community (with 25% tree/grass; 25% tree/shrub), ~30% shrub community, ~16% grassland/herbaceous, ~4% wet meadow/wetland community

Figure 9. Schematic of a bosque forest
Overall Mosaic

Mosaic of habitat types (open water and wet features interspersed with bosque forest types)

Mosaic of ‘bosque vegetation’ interspersed within

Legend

Feature
- Backwater
- Bank Scallop
- Bankline Grading
- Bankline Terrace
- Fuels Reduction
- High Flow Channel
- Revegetation
- Willow Bankline
- Willow Swale

Corps MRG Project
Major Phase I Activities:
Corrales
Sites 1E and 1G

Legend
- Backwater
- Bank Scallop
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Key Ecological Attributes (KEAs)

- **Landscape Context**
  - Hydrologic regime – surface water and groundwater
  - Channel mobility

- **Condition**
  - DPM vegetation:
    - Riparian vegetation abundance
    - Bosque/woodland
    - Shrubland
    - Meadow
    - Marsh/Wetland
    - Upland
  - Cottonwood age classes
  - Species composition/abundance
    - % cover aggressive invasive herbaceous species
    - % exotic woody cover
    - Woodland - % cover herbaceous understory

Knowing what our current system and constraints are what can we do to help improve these?
What data is needed/available to update status?

### Table 1: Riparian and Wetland Vegetation Communities Key Attributes, Indicators, and Status

<table>
<thead>
<tr>
<th>Category</th>
<th>Key Attribute</th>
<th>Indicator</th>
<th>Current Status</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscape Context</strong></td>
<td>Hydrologic regime - surface water</td>
<td>[1] Floodplain connectivity</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[2] Spring flood frequency</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Channel mobility</td>
<td>[4] Bank stabilization extent</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Condition</strong></td>
<td>Dynamic Patch Mosaic (DPM) - Vegetation</td>
<td>[5] Relative abundance of riparian vegetation types (woodland, shrubland, meadow, or marsh)</td>
<td>Fair</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[7] Riparian shrublands - minimum relative abundance</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[8] Meadows - minimum relative abundance</td>
<td>Fair</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[9] Marshes - minimum relative abundance</td>
<td>Fair</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[10] Upland vegetation encroachment</td>
<td>Fair</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[11] Cottonwood age classes</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Species composition / abundance</td>
<td>[12] % cover aggressive invasive herbaceous species</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[13] % exotic woody cover</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[14] Woodland - % cover herbaceous understory</td>
<td>Fair</td>
<td>Very Good</td>
</tr>
</tbody>
</table>
Landscape Context

- **Hydrologic Regime**
  - Floodplain connectivity/spring flood frequency
    - Important at some interval (minimum every 2-3 years)
  - Marsh groundwater depth and duration
    - Frequency of connectivity
    - Water movement

- **Channel mobility**
  - Stabilized banks reduces floodplain connectivity

- **Restoration**
  - Promote floodplain/groundwater connection

- **2019 Update**
  - Update Landscape Context based upon completed habitat restoration or other (levee, bankline protection etc) projects
  - Update based upon changes to hydrology and channel morphology based upon 2016 and especially 2019 flows
    - Channel change
    - Sub-reaching aggradation/degradation (cross-section data, etc.)
Relative abundance of riparian vegetation types
  ▪ What % of the reach is composed of a single type
  ▪ How many types in a reach

Overall targets (Table B-1) used to evaluate condition:
  ▪ Woodland >35%
  ▪ Shrubland >35%
  ▪ Meadows >10%
  ▪ Marshes (wetland) >10%
  ▪ Upland vegetation <5%

2019 Update
  ▪ Recalculate current status:
    – 2016 Hink and Ohmart (H&O)
    – Completed habitat restoration projects

MRG Restoration Project (USACE) – Corrales 1E
Meadow and Wetland Habitat

- Meadow
  - Grass
  - Yerba mansa
  - Wet meadow
    - Connected/disconnected
    - Drain habitat
  - Different values?

- Wetlands
  - Marsh
  - Open water
    - Deep
    - Shallow

San Antonio Oxbow
< 5% of the DPM

Native stands (sand sage, four-wing saltbush, etc.) can provide:
- Transition habitat
- Songbird/ground dwelling bird habitat
- Insect/food source habitat
Cottonwood age classes

- Cottonwood age classes
  - Mature
    - 1940s flood; ~ 80 years old
  - Advanced regeneration
    - Poles and resprouts? ~ 15-20 years old; ~5-15 years old
  - Saplings – 0-5 years old
    - Seedlings, resprouts, poles

- Age class gap

- 2019 Update
  - Update using 2016 H&O
  - Add other woody species (tree willow/Gooding’s willow)
Cottonwood Studies

- Document cottonwood die-off
- Fire effects/cottonwood resprouts
- More detailed study of cottonwood age classes/die off?
- Future tree replacement?
Species Composition/Abundance

- % cover aggressive invasive herbaceous species
  - Ravenna grass
  - Weeds
- % exotic woody cover
- Woodland - % cover herbaceous understory
- **2019 Update:**
  - *Update with 2016 H&O (for woody exotic cover)*
  - *Update with HR project information/invasive species and weed treatment projects*
  - *Herbaceous inventory*
2019 Update Recommendations

- **Landscape Context**
  - Update based upon completed habitat restoration or other (levee, bankline protection etc) projects
  - Update based upon changes to hydrology and channel morphology based upon 2016 and especially 2019 flows

- **Condition/DPM:**
  - **Relative abundance** - How many types in a reach
  - Recalculate current status:
    - 2016 Hink and Ohmart
    - Completed habitat restoration projects

- **Meadows**
  - Different values for wet/dry?

- **Cottonwood Age Classes**
  - Update using 2016 H&O
  - Add other woody species (tree willow/Gooding’s willow)

- **Species Composition/Abundance**
  - Update with 2016 H&O (for woody exotic cover)
  - Update with HR project information/invasive species and weed treatment projects
  - Herbaceous inventory
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