Investigating Wetland Function in the Federal Reservoirs of Kansas

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9 November 2017
Agenda

1 Project Background
2 Literature Review
3 Challenges
4 Next Steps
5 Questions
Project Background


Boundary Size (acres)  21344
Conservation Pool (acres)  3263
Available Acreage Within Boundary

ACRES

- Perry
- Milford
- Tuttle
- John Redmond
- Melvern
- Kanopolis
- Glen Elder
- Clinton
- Cedar Bluff
- Fall River
- Hillsdale
- Kirwin
- El Dorado
- Marion
- Webster
- Norton
- Pomona
- Cheney
- Toronto
- Lovewell
- Big Hill

Boundary Size
Conservation Pool
Project Background

Wetland functions can aid water management goals

Wetland functions can be established in Federal Reservoir Project Boundaries

Management could improve the wetland function of upper-reservoir areas.
HGM Classes

Riverine: Occur in flood plains and riparian corridors in association with stream channels

Depressional: Occur in topographic depression. Dominant water sources are precipitation, ground water discharge, and both interflow and overland flow

Slope: Found where there is a discharge of ground water to the land surface

Lacustrine Fringe: Adjacent to lakes where the water elevation of the lake maintains the water table in the wetland

Mineral Soil Flats: The main source of water is precipitation

Wetland classifications established for Kansas. (NRCS, 2008)
• Seasonal or semi permanent wetlands
• Support both emergent and submergent wetland species
• Other Names: Stream pools

(Monda, Wedel, Schenck, & Kansas Wetland & Riparian, Areas Project, 1993)
• Temporary wetlands that occupy shallow depressions
• Duration and frequency of inundation is highly dependent on precipitation
• Support both wetland and upland plants
• Other Names: Playa, sink, pothole, and rain-water basin

(Monda, Wedel, Schenck, & Kansas Wetland & Riparian Areas Project, 1993)

Playa (Brian Slobe, 2016)
- Semipermanent and permanent wetlands
- Occur along a slope
- Water source is groundwater seepage
- Soil is saturated during most of the year
- Other Names: spring, fen, and bog

(Monda, Wedel, Schenck, & Kansas Wetland & Riparian, Areas Project, 1993)
Wetland Function

- Biogeochemical
- Hydrology
- Habitat
# Biogeochemical Functions
(Riverine)

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal</td>
<td>Removal of imported elements and compounds</td>
</tr>
<tr>
<td>Particulate</td>
<td>Retention of particulates.</td>
</tr>
<tr>
<td>Organic</td>
<td>Exports Organic Carbon and Detritus</td>
</tr>
</tbody>
</table>

(NRCS, 2007a)
# Habitat Functions (Riverine)

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>Maintain characteristic plant community.</td>
</tr>
<tr>
<td>Detrial</td>
<td>Maintain characteristic detrital biomass.</td>
</tr>
<tr>
<td><strong>Habitat</strong></td>
<td><strong>Maintains Habitat Structure within wetland.</strong></td>
</tr>
<tr>
<td>Interspersion</td>
<td>Maintain interspersion and connectivity.</td>
</tr>
<tr>
<td>Invertebrates</td>
<td>Maintain distribution and abundance of invertebrates.</td>
</tr>
<tr>
<td>Food Webs</td>
<td>Maintains Food Webs</td>
</tr>
</tbody>
</table>

(NRCS, 2007a)
## Hydrology Functions (Riverine)

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic</td>
<td>Dynamic surface water storage.</td>
</tr>
<tr>
<td>Long-term</td>
<td>Long-term surface water storage.</td>
</tr>
<tr>
<td>Dissipation</td>
<td>Energy dissipation.</td>
</tr>
</tbody>
</table>

(NRCS, 2007a)
Summary of water quality impairments of federal reservoirs in Kansas (Bureau of Water, 2016)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Reservoirs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess Nutrients</td>
<td>22</td>
</tr>
<tr>
<td>Siltation</td>
<td>10</td>
</tr>
<tr>
<td>Geologic Sources</td>
<td>5</td>
</tr>
<tr>
<td>Heavy Metal</td>
<td>3</td>
</tr>
<tr>
<td>Herbicide</td>
<td>1</td>
</tr>
</tbody>
</table>

Water Quality Impairment (2016)
Federal Threatened and Endangered Species

- Piping Plover
- Least Tern
- Whooping Crane

Game Wildlife

- Duck Goose
- Quail
- Pheasant
- Turkey
- Deer
- Raccoon
- Muskrat
- Beaver
- Coyote
Particulate Removal

• 44% cumulative storage reduction by 2105
• Most sediment comes from stream bank and channel erosion

(deNoyelles & Kastens, 2016)
Site characteristics that Impact Key Wetland Functions
According to Kansas FCI
Challenges

• Reservoir may skew the HGM Classification or FCI assessment of functions
• No proven method to manage for multiple functions
Next Steps

- **Quantify** benefit of reference wetland.

- **Evaluate** current functionality of upper-reservoir sites.

- **Develop** management strategies to increase desired function.
Questions or comments?

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References


