# Investigating Wetland Function in the Federal Reservoirs of Kansas

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9 November 2017

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# Agenda

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

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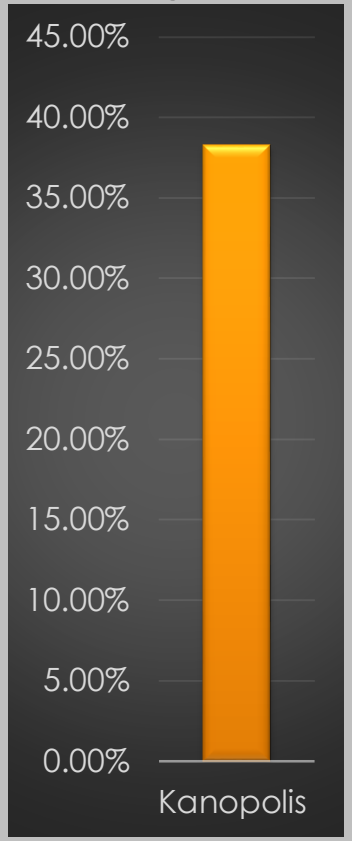
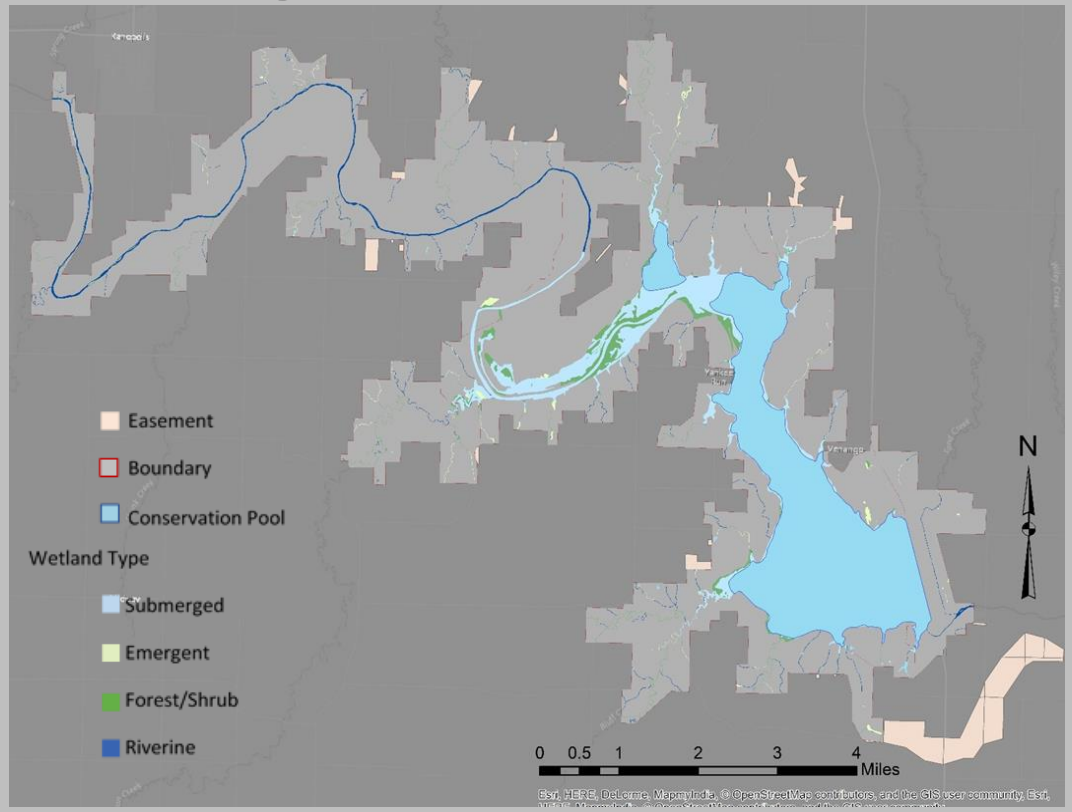
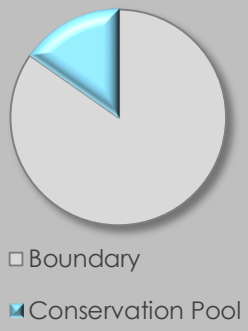
# Project Background

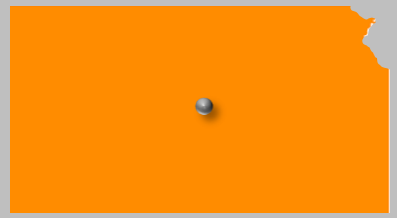



Percent loss of multi-purpose pool capacity as of 2015 projections (KBS & Kansas Water Office, 2016).




| | |
|---|---|
| Boundary Size (acres) | 21344 |
| Conservation Pool (acres) | 3263 |



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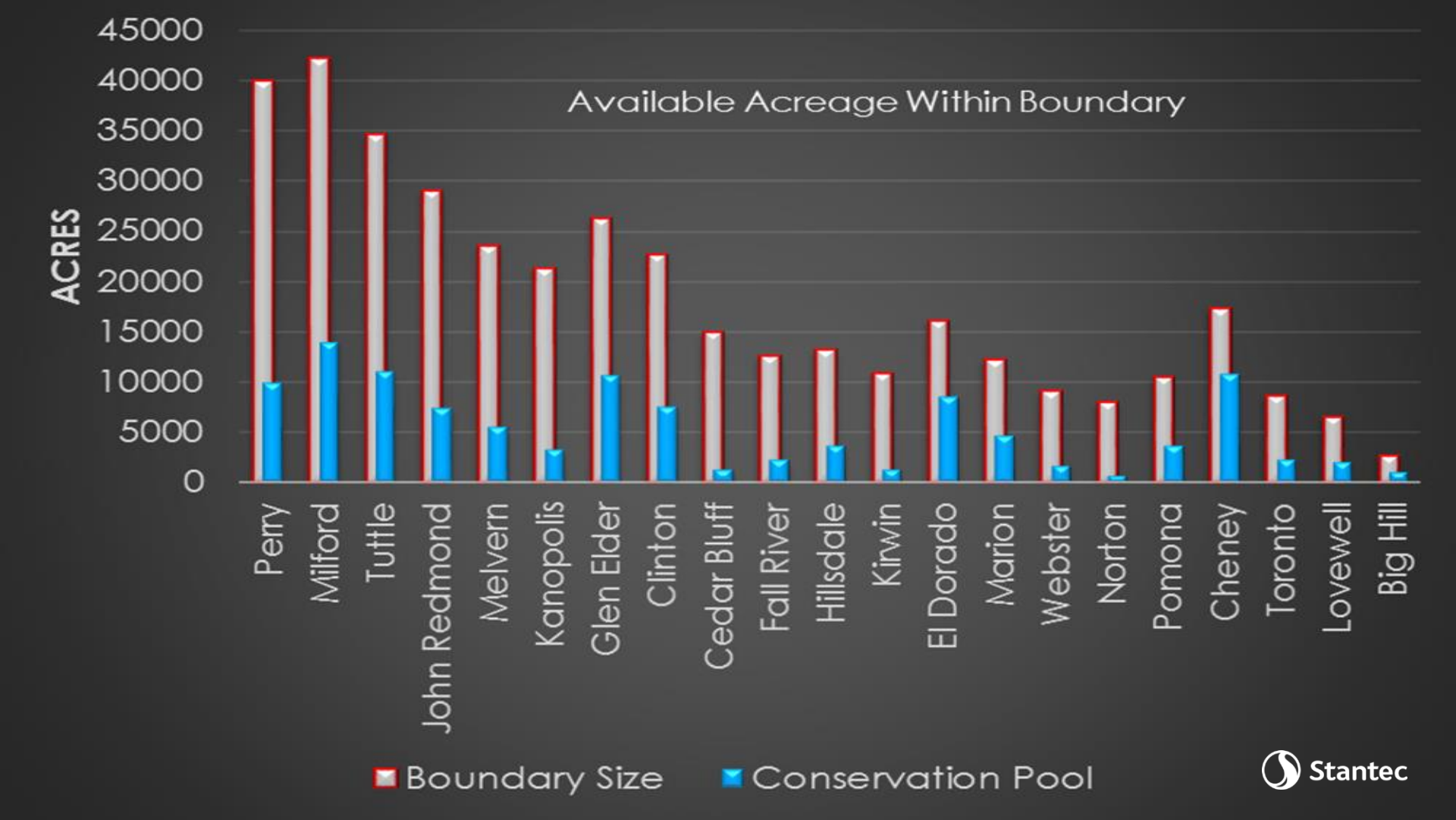
Available Acreage Within Boundary
ACRES
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Perry
Milford
Tuttle
John Redmond
Melvern
Kanopolis
Glen Elder
Clinton
Cedar Bluff
Fall River
Hillsdale
Kirwin
El Dorado
Marion
Webster
Norton
Pomona
Cheney
Toronto
Lovewell
Big Hill
Boundary Size
Conservation Pool
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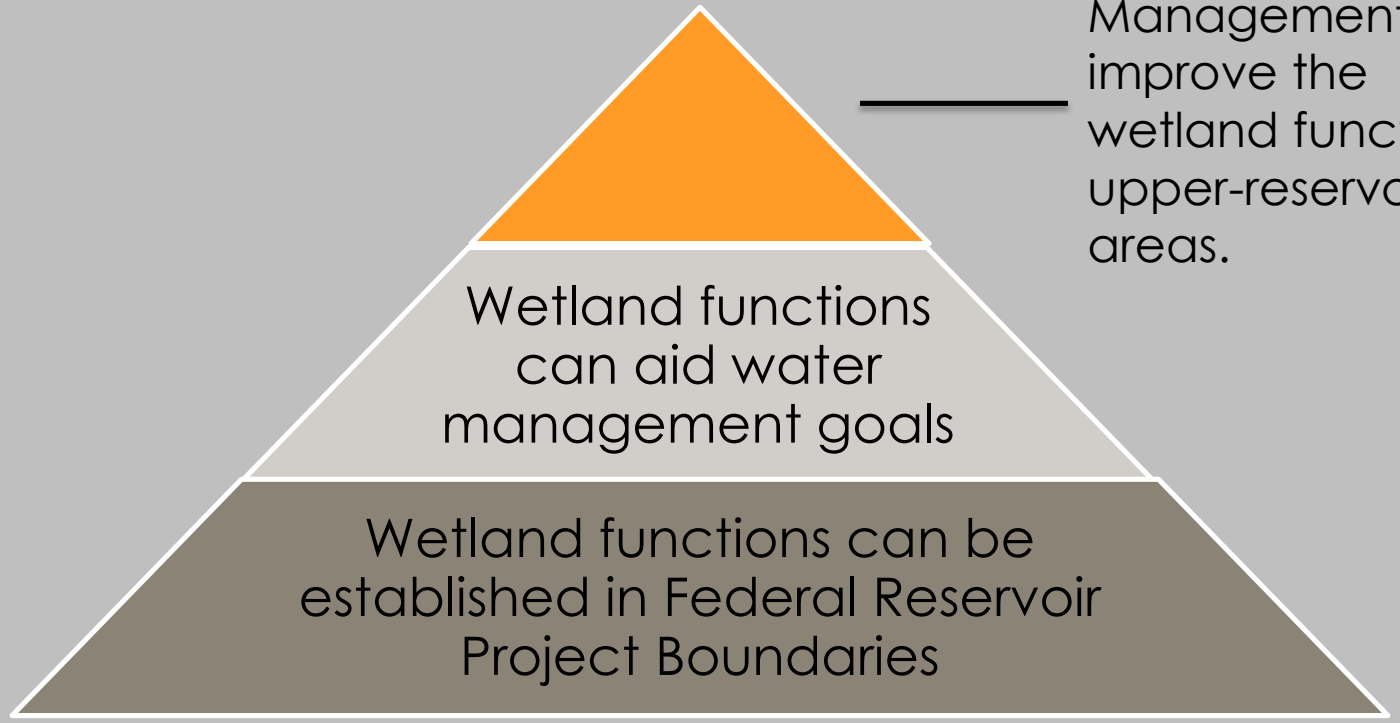
# Project Background




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

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# 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)

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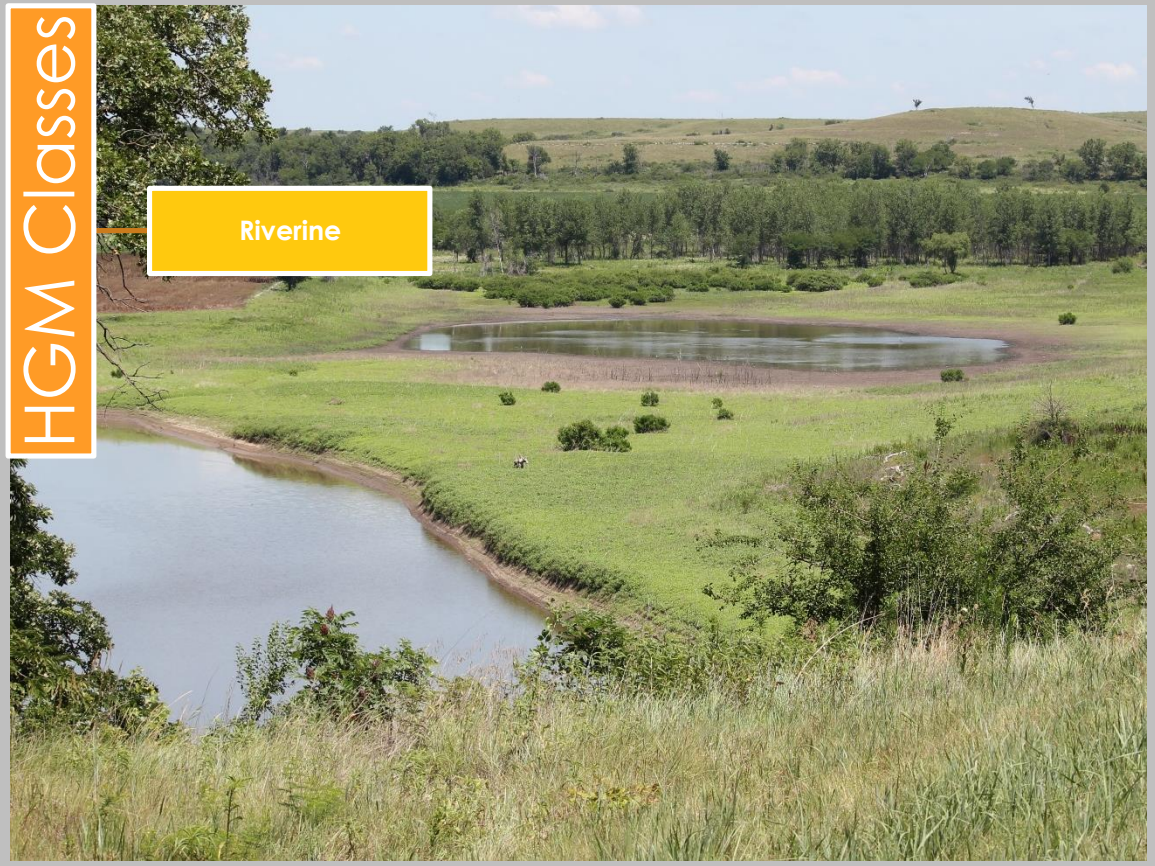
- Seasonal or semi permanent wetlands
- Support both emergent and submergent wetland species
- Other Names: Stream pools

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




(Koons, 2017)

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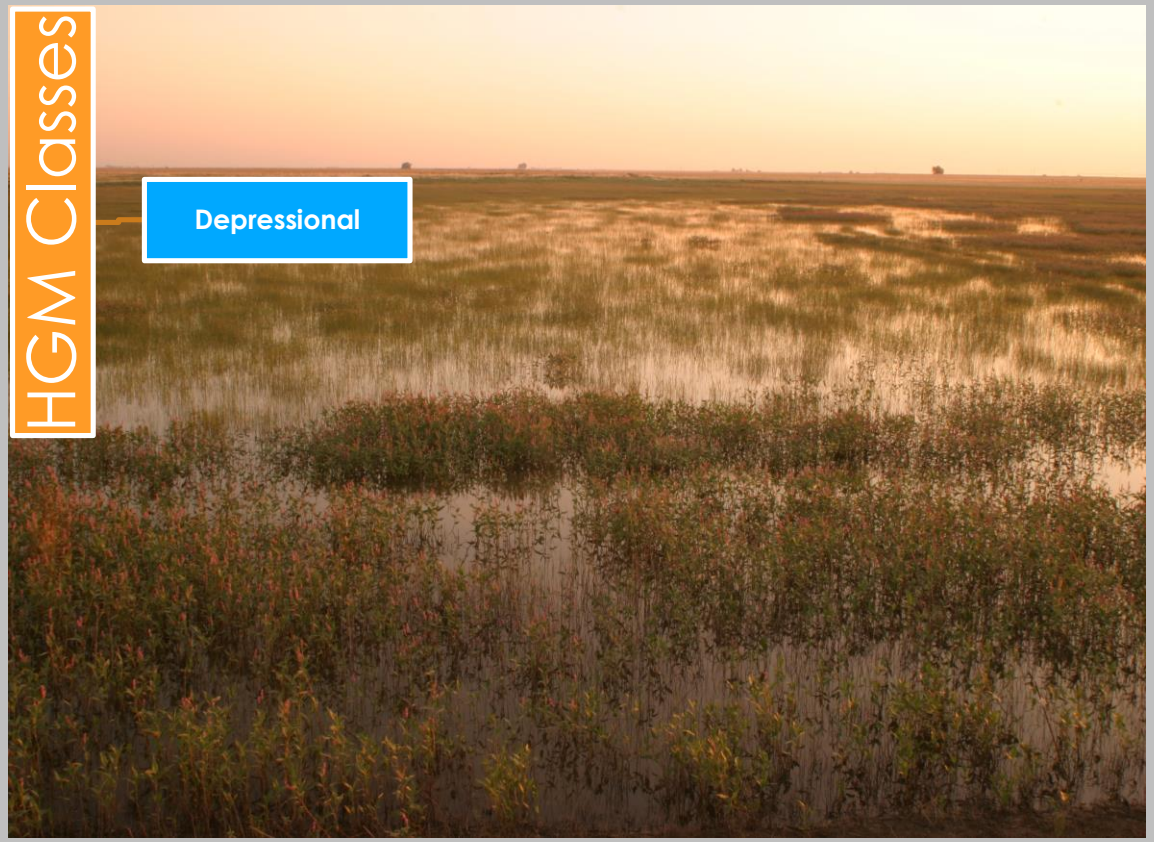
- Temporary wetlands that occupy shallow depressions
- Duration and frequency of inundation is highly dependent on precipitation
- Support both wetland and upland plants
- Other Names: Playa, sink, pothole, and rain-water basin

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




Playa (Brian Slobe, 2016)

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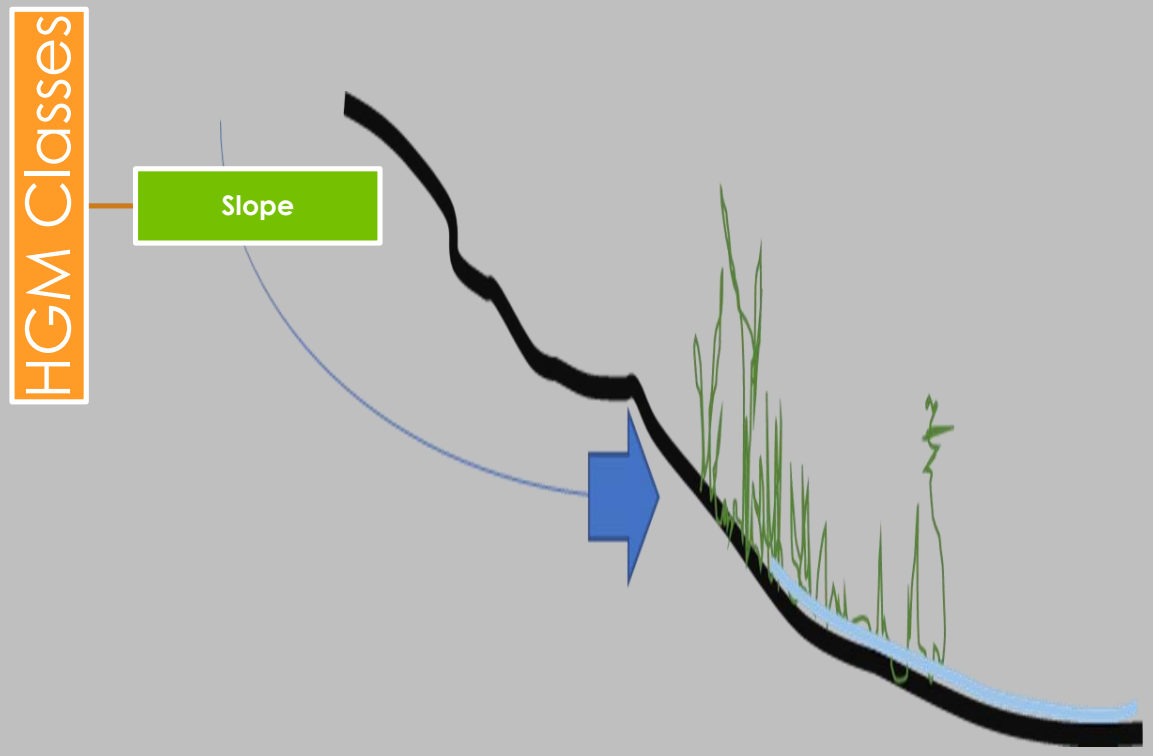
- Semipermanent and permanent wetlands
- Occur along a slope
- Water source is groundwater seepage
- Soil is saturated during mot of the year
- Other Names: spring, fen, and bog

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




By Gary Koons

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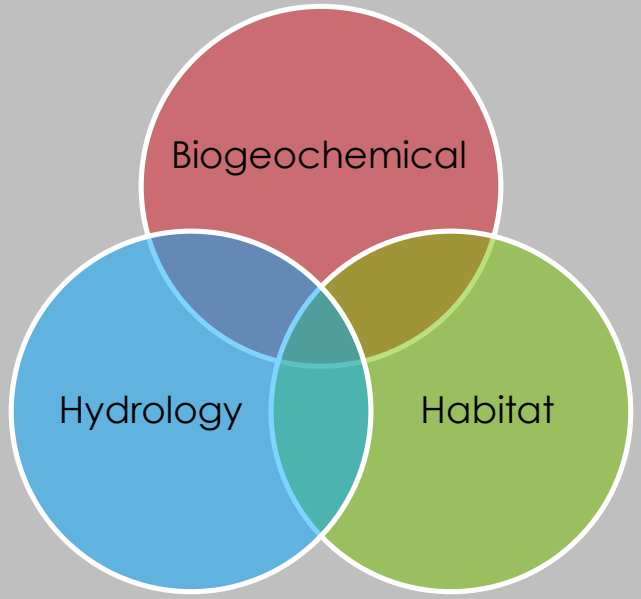
# Wetland Function

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# Biogeochemical Functions

## (Riverine)

| Function | Description |
|---|---|
| **Removal** | **Removal of imported elements and compounds** |
| **Particulate** | **Retention of particulates.** |
| Organic | Exports Organic Carbon and Detritus |

(NRCS, 2007a)

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# Habitat Functions
## (Riverine)

| Function | Description |
|---|---|
| Plant | Maintain characteristic plant community. |
| Detrial | Maintain characteristic detrital biomass. |
| **Habitat** | **Maintains Habitat Structure within wetland.** |
| Interspersion | Maintain interspersion and connectivity. |
| Invertebrates | Maintain distribution and abundance of invertebrates. |
| Food Webs | Maintains Food Webs |

(NRCS, 2007a)

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# Hydrology Functions
## (Riverine)

| Function | Description |
|---|---|
| Dynamic | Dynamic surface water storage. |
| Long-term | Long-term surface water storage. |
| Dissipation | Energy dissipation. |

(NRCS, 2007a)

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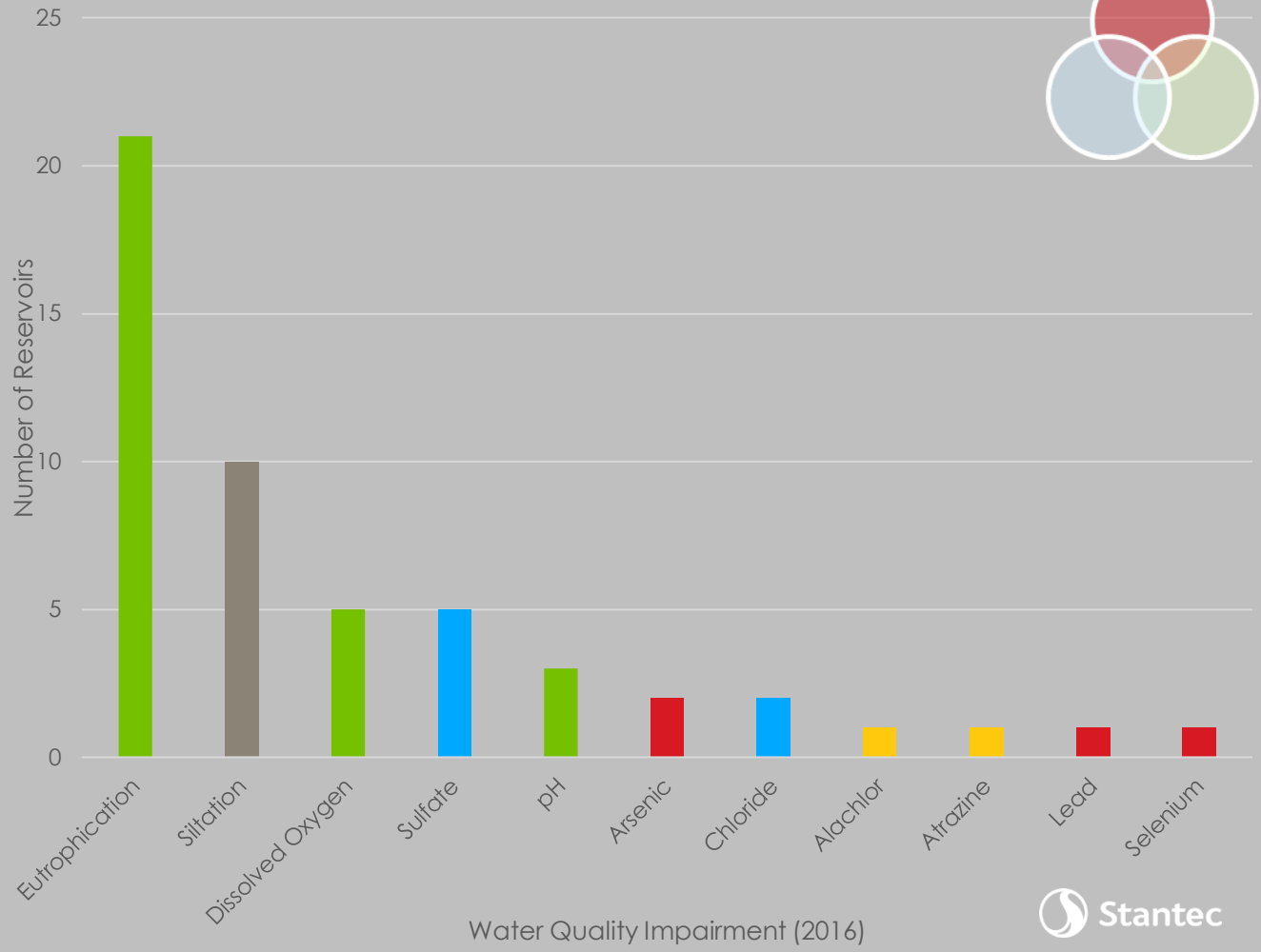
| Category | Number of Reservoirs |
|---|---|
| Excess Nutrients | 22 |
| Siltation | 10 |
| Geologic Sources | 5 |
| Heavy Metal | 3 |
| Herbicide | 1 |

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

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**Federal Threatened and Endangered Species**

- Piping Plover
- Least Tern
- Whooping Crane

**Game Wildlife**

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

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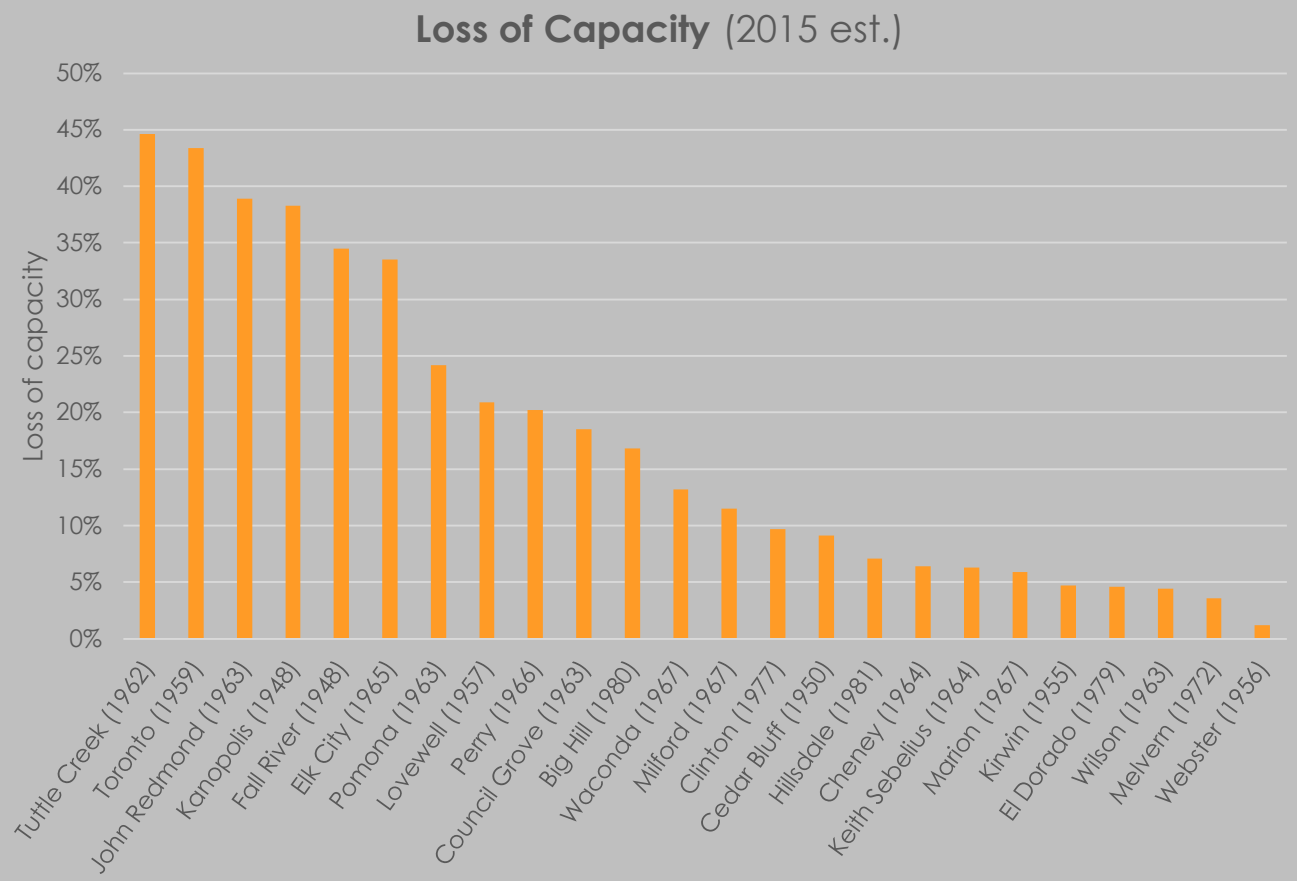
## Particulate Removal

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




Percent loss of multi-purpose pool capacity as of 2015 projections (KBS & Kansas Water Office, 2016).

(deNoyelles & Kastens, 2016)

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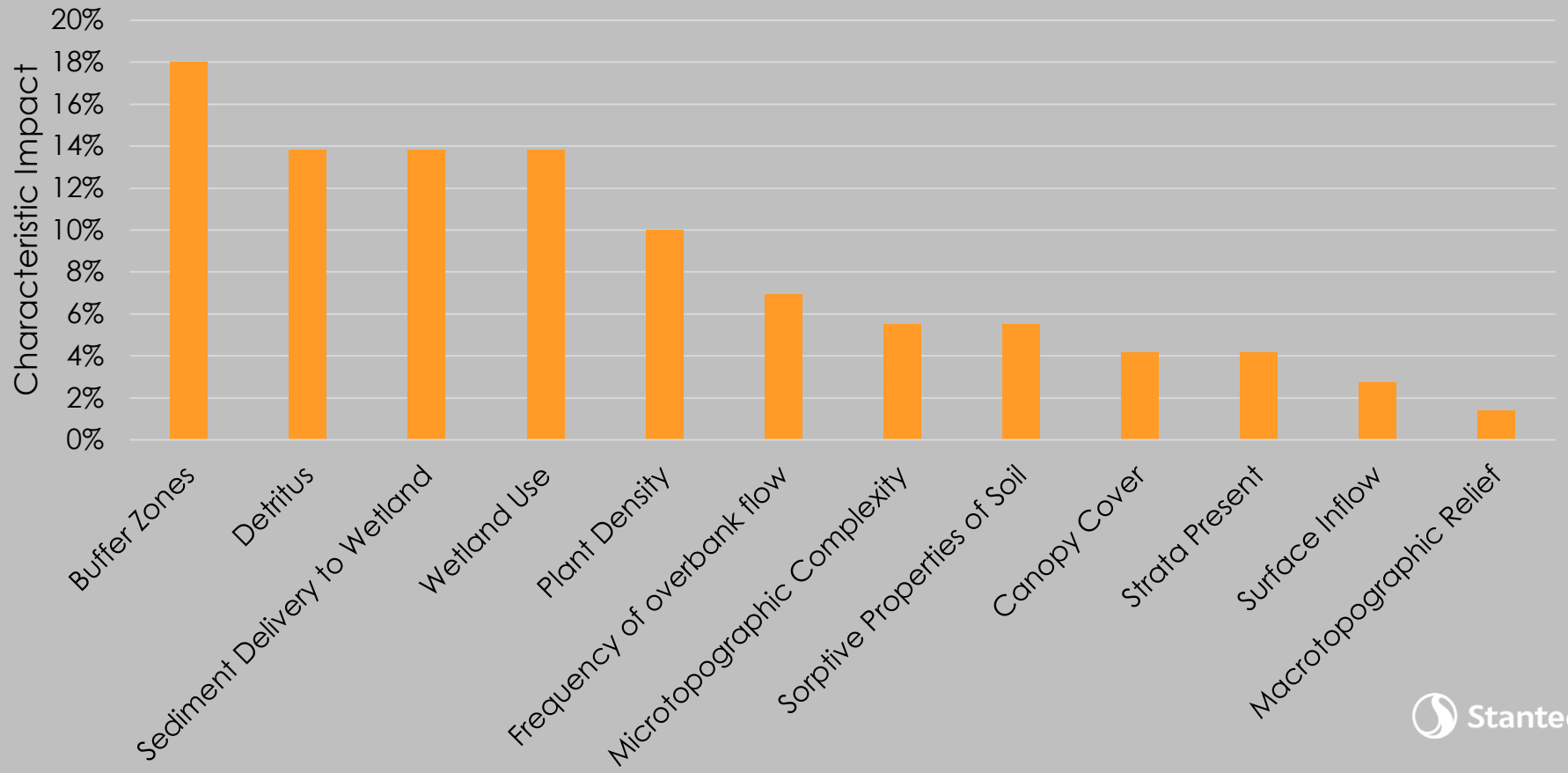
# Site characteristics that Impact Key Wetland Functions

According to Kansas FCI

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# Challenges

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

Milford wetland area
(Koons, 2017)

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# Next Steps

- **Quantify** benefit of reference wetland.
- **Evaluate** current functionality of upper-reservoir sites.
- **Develop** management strategies to increase desired function.

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# Questions or comments?

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Gary Koons: Gary.Koons@stantec.com

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