Naturalized Detention Basin Design & Maintenance Recommendations

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Key Discussion Topics

- Importance of naturalized detention basin design & function.
- Stream & lake water quality relationship to detention basin function in urban areas.
- Typical detention basin examples.
- Recommended detention basin design, location, and planting.
- Most common design mistakes.
- Short and long term maintenance of naturalized detentions.

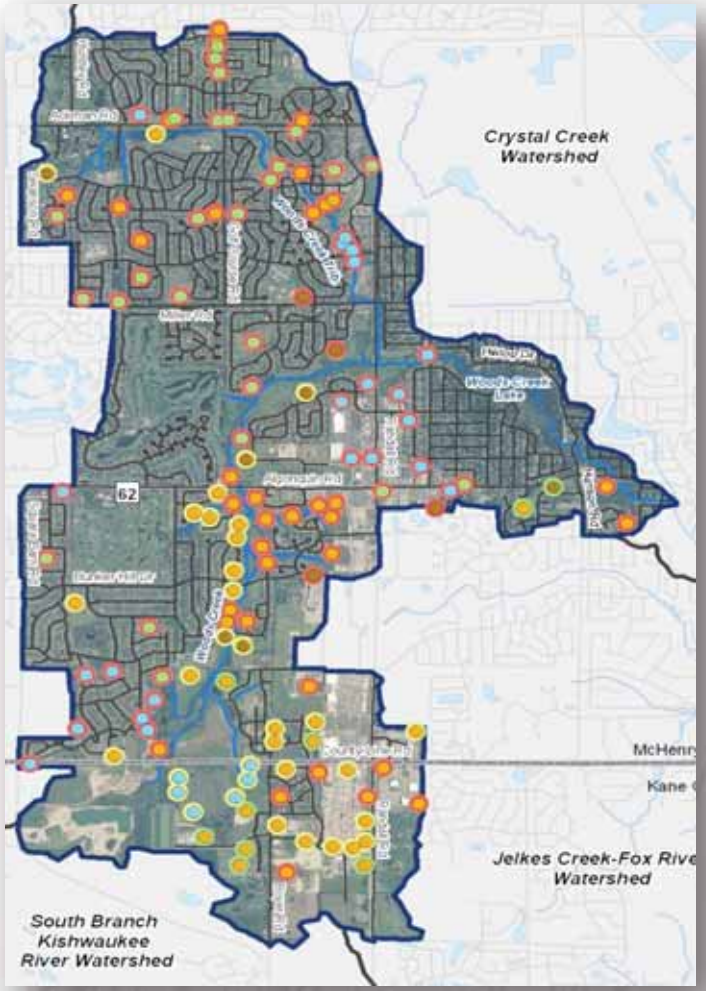
Importance of Naturalized Detention Basin Design & Function

- Water storage, water quality improvement, & wildlife habitat
- Naturalized detention = “Green Infrastructure”
- Excellent water quality benefits through nutrient uptake, filtering, and by gravitational settling.
  - up to 75% total suspended solid removal
  - up to 45% total phosphorus removal
  - up to 50% heavy metal removal
  - up to 30% total nitrogen removal

Source:(City of Wichita/Sedgwick County, 2011).

Water Quality Leaving Detention Basins = Water Quality in Streams & Lakes

- Detention basins in some urban watersheds provide the first and only line of defense to improve water quality to streams and lakes.



Source: Woods Creek Watershed Plan

Typical Detention Examples

Turf Slopes w/ Rip Rap

Steep Turf Slopes

Turf Slopes

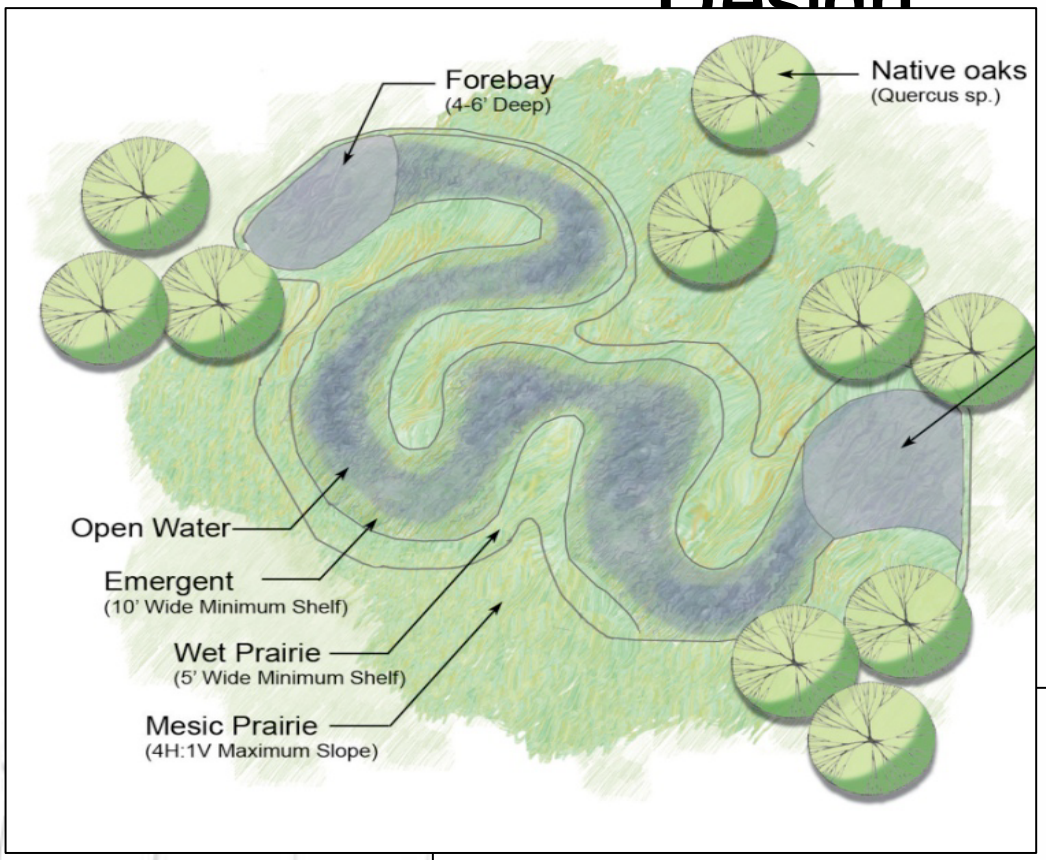
Naturalized Detentions but…..

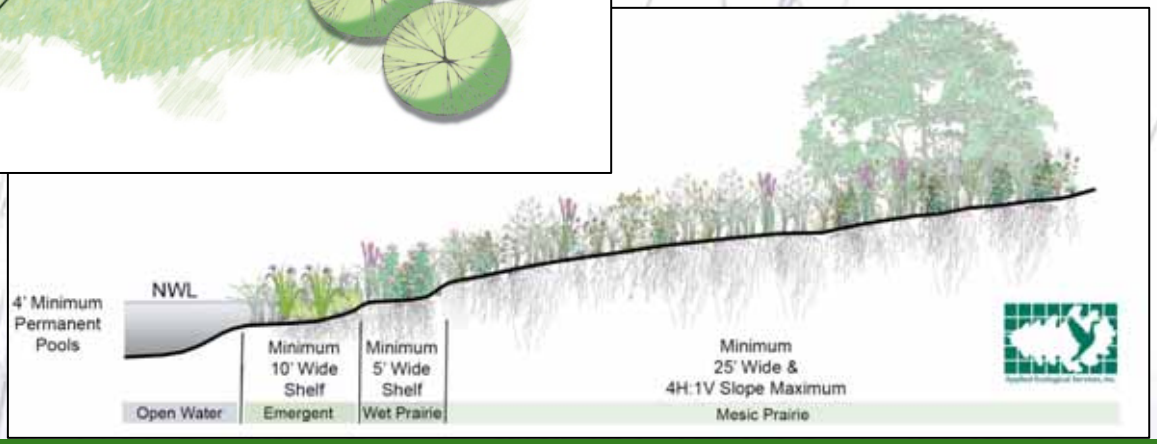
Could provide better water quality benefit

Not maintained

Steep slopes, erosion, no water quality benefit

Recommended Naturalized Detention Design





Recommendation Highlights

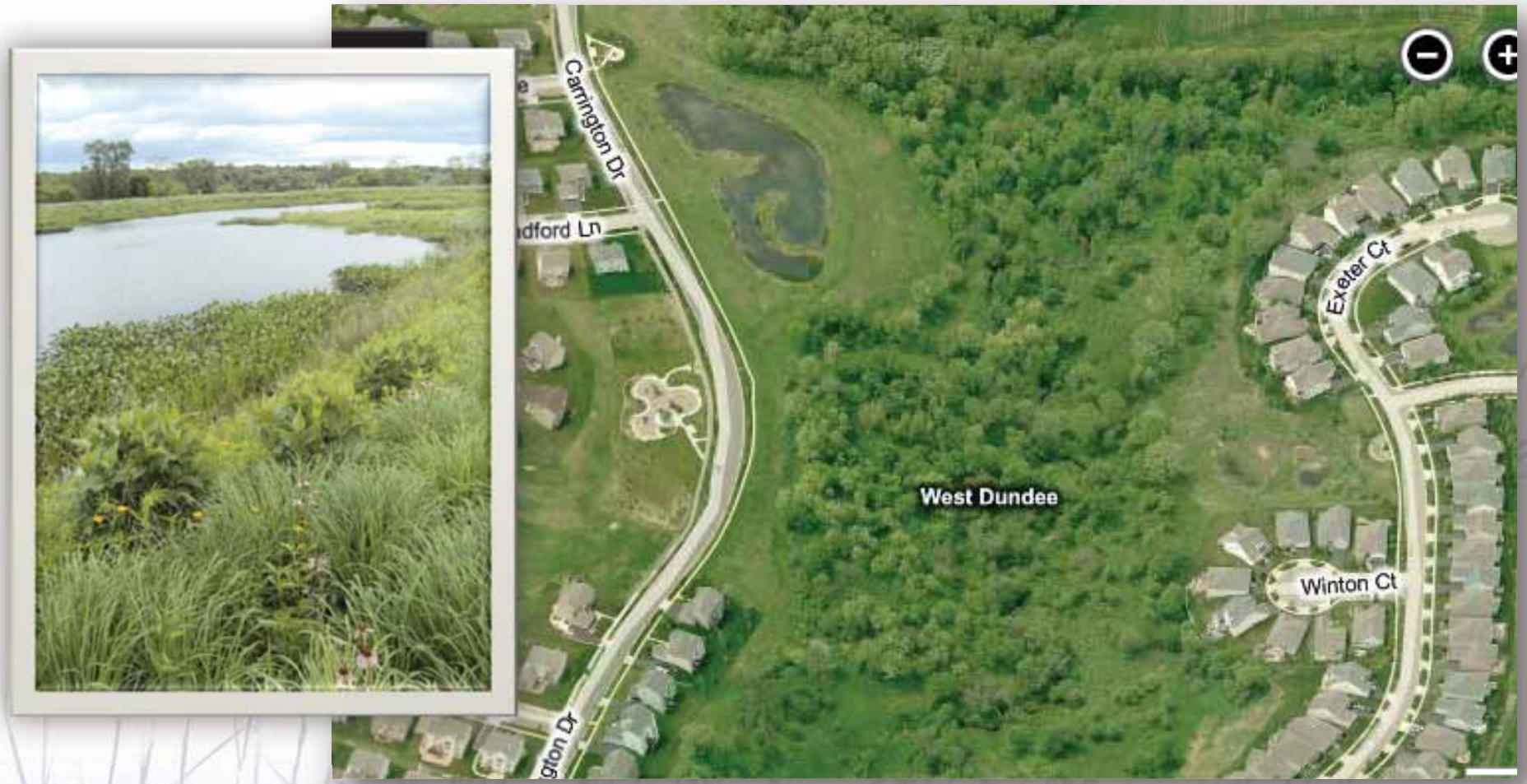
- Side slopes should be no steeper than 4H:1V.
- Use only native oaks (*Quercus sp.*) in buffer.
- 10 foot wide (min) shelf; 5 foot wide (min) secondary shelf.
- Permanent pools should be greater than 4 feet deep.
- Forebay and micropool should be 4-6 feet deep.
- Construct irregular islands and peninsulas.

Naturalized Basins using Recommended Design

Location Recommendations

- Restrict to natural depressions & existing “degraded wetlands”.
- Design larger basins across multiple developments.
- Basins should not be located in any high quality ecological area.
- Outlets should not enter any sensitive ecological area.

Naturalized Detention = Green Infrastructure



Source: Bing Maps

Most Common Design Mistakes

- Plans that do not provide a platform for native vegetation.
- Poorly designed native seed mixes and use of plant plugs.
- Inappropriate shrubs and trees specified in buffer.
- Steep slopes that can not be maintained and easily erode.
- Basins not tied into existing green infrastructure.
- Location/outlets in or adjacent to high quality ecological areas.

Short Term Maintenance Schedule

Year 1 Maintenance
Mow to a height of 6-12 inches in June, August, & September.
Spot herbicide invasive species in early June and August/September.
Year 2 Maintenance
Mow to a height of 12 inches in late June and early August.
Spot herbicide invasive species in early June and mid August.
Plant additional emergent plugs if needed and reseed failed areas in fall.
Year 3 Maintenance
Spot herbicide invasive species in early June and mid August.

Long Term Maintenance Schedule

Year 1 of 3 Year Maintenance Cycle
Conduct controlled burn in early spring. Mow to height of 12 inches in November if burning is not allowed.
Spot herbicide invasive species at least one time during growing season.
Year 2 of 3 Year Maintenance Cycle
Spot herbicide invasive species at least one time during growing season.
Year 3 of 3 Year Maintenance Cycle
Spot herbicide invasive species at least one time during growing season.
Mow in November.

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