

Bone Lake Carp Barrier



Carp degrade lake water quality



Feeding resuspends sediment

**More phosphorus =
more algae = murky water**



Lake Wingra, WI (Univ. of Wisconsin)



Biol Invasions

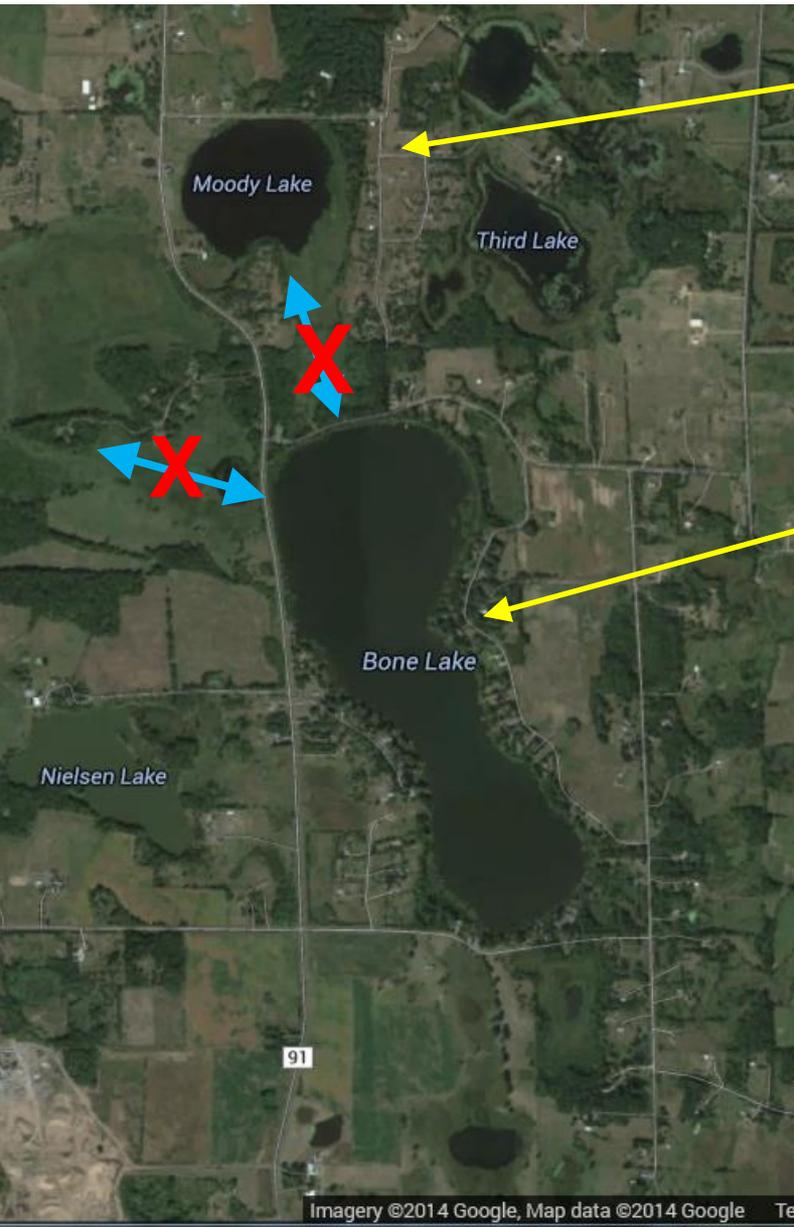
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ORIGINAL PAPER

Recruitment and abundance of an invasive fish, the common carp, is driven by its propensity to invade and reproduce in basins that experience winter-time hypoxia in interconnected lakes

Przemyslaw G. Bajer · Peter W. Sorensen

An interconnected lake system



Moody Lake

Experiences winterkill

Potential spawning place for carp

Water Quality Grade: **D+**

Bone Lake

Carp are degrading water quality

Outlets to Sunrise River (w/ carp)

Water Quality Grade: **C**



Grate fish barrier



Pros:

Simple

Minimal construction

Cost effective

Cons:

**Requires frequent
maintenance**

**Collects aquatic plants and
other debris**

Allows passage of small fish

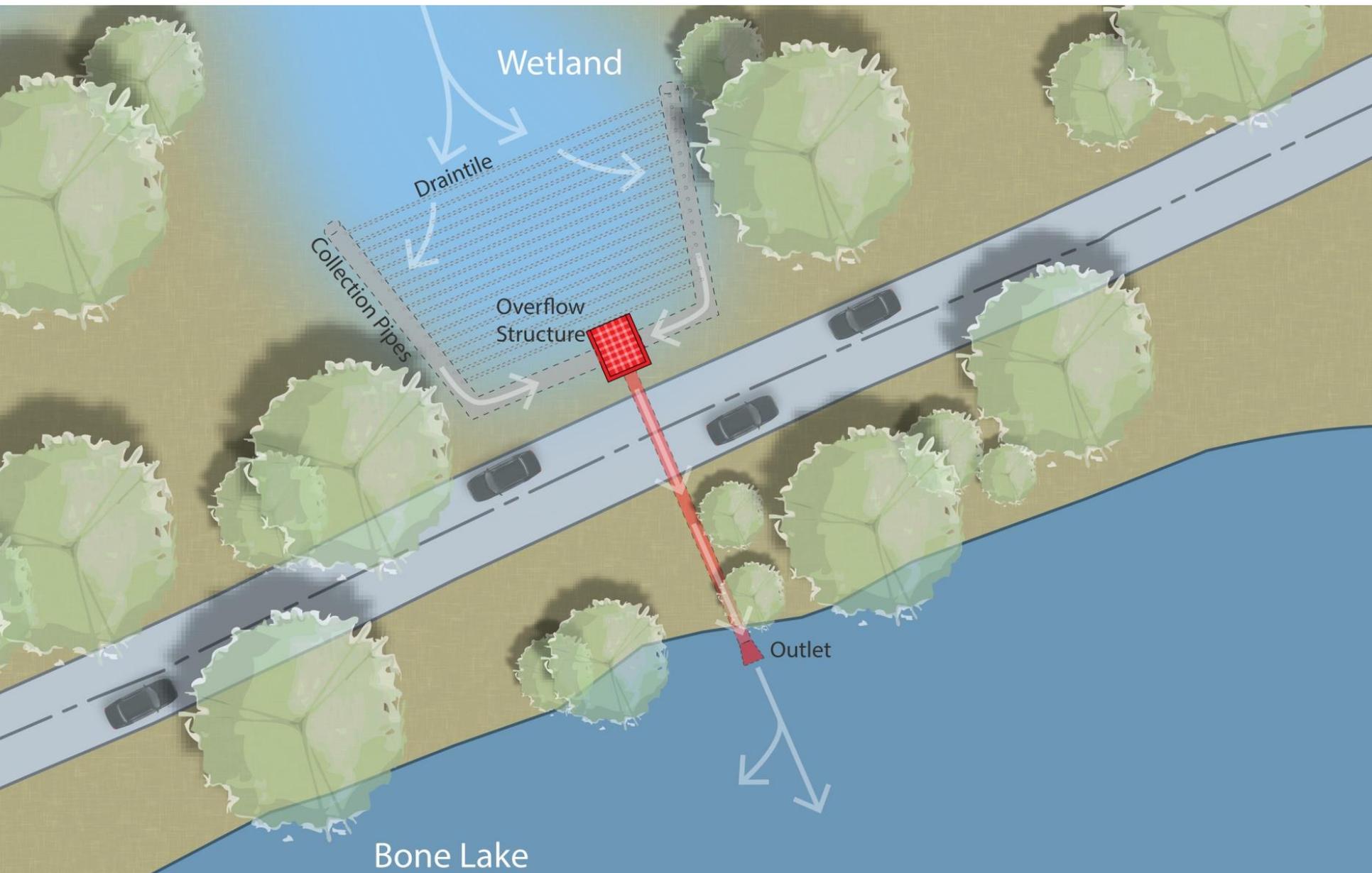


East Metro Fisheries Office

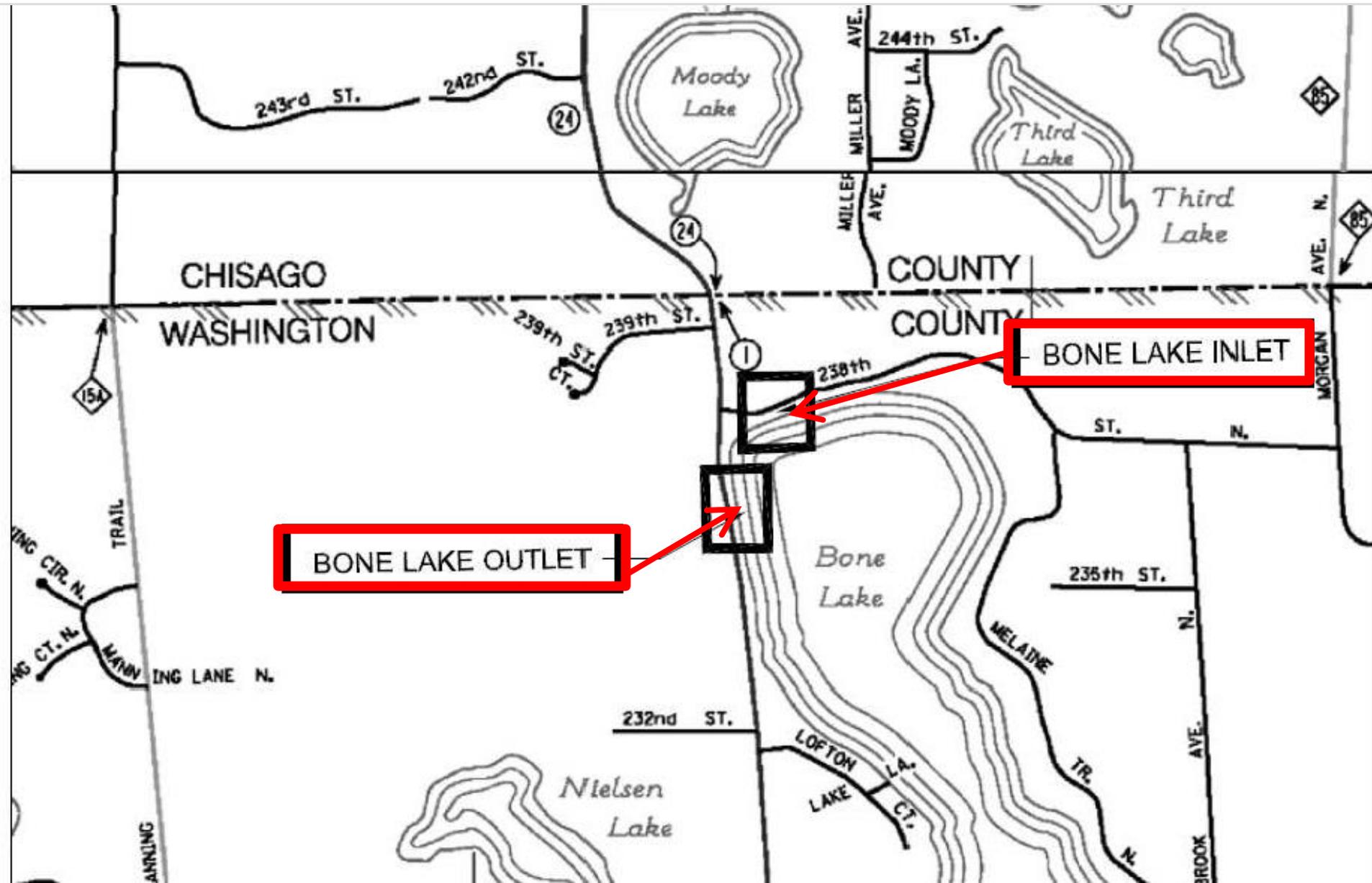
DNR carp barrier goals:

- Maintain lake levels and flows**
- Limit movement of all fish sizes**
- Flexible operation**
- Minimal maintenance**
- Fail safe**

Hybrid fish barrier design



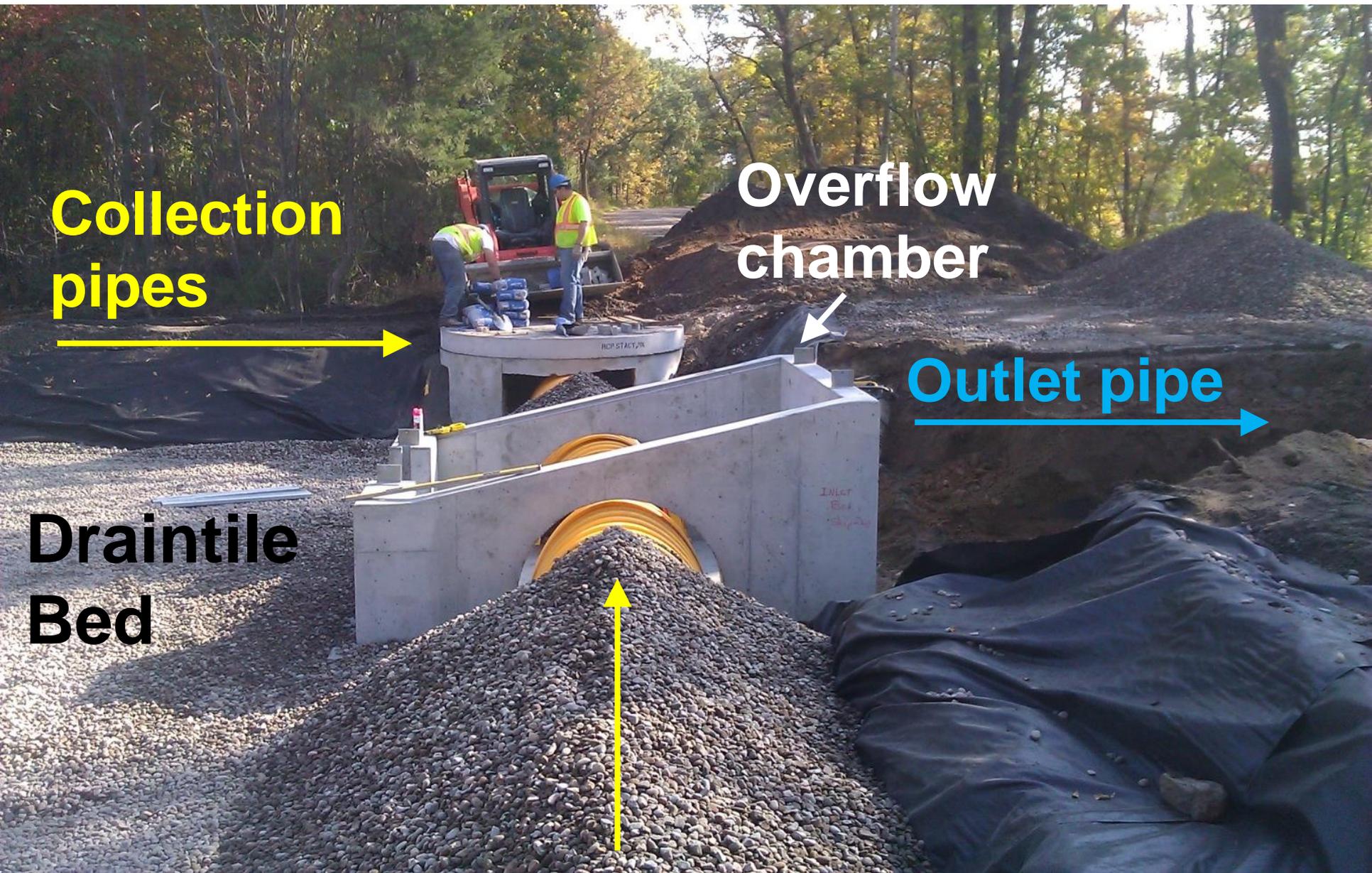
Fish barrier sites



Construction of draintile bed



Construction of overflow chamber



Collection pipes



Overflow chamber



Outlet pipe



Drain tile Bed



Overflow chamber



**Overflow
Grate**

Stop logs

Final construction

**Drain
tile
Bed**



A photograph of a post-construction site. In the foreground, there is a rectangular metal overflow chamber with a grid-like grate. The chamber is set into a concrete base. Behind the chamber is a large, flat area covered in grey gravel, which is the drintile bed. To the left and right of the gravel area, there are piles of larger, light-colored rocks. The background shows a line of trees and some green grass, indicating a natural or semi-natural setting.

Drintile Bed

**Overflow
chamber**

Fall 2012



Snowmelt 2013



Snowmelt 2013



Snowmelt 2013



April 2013



April 2013



Winter 2013/2014!!

Forest Lake Precipitation Data

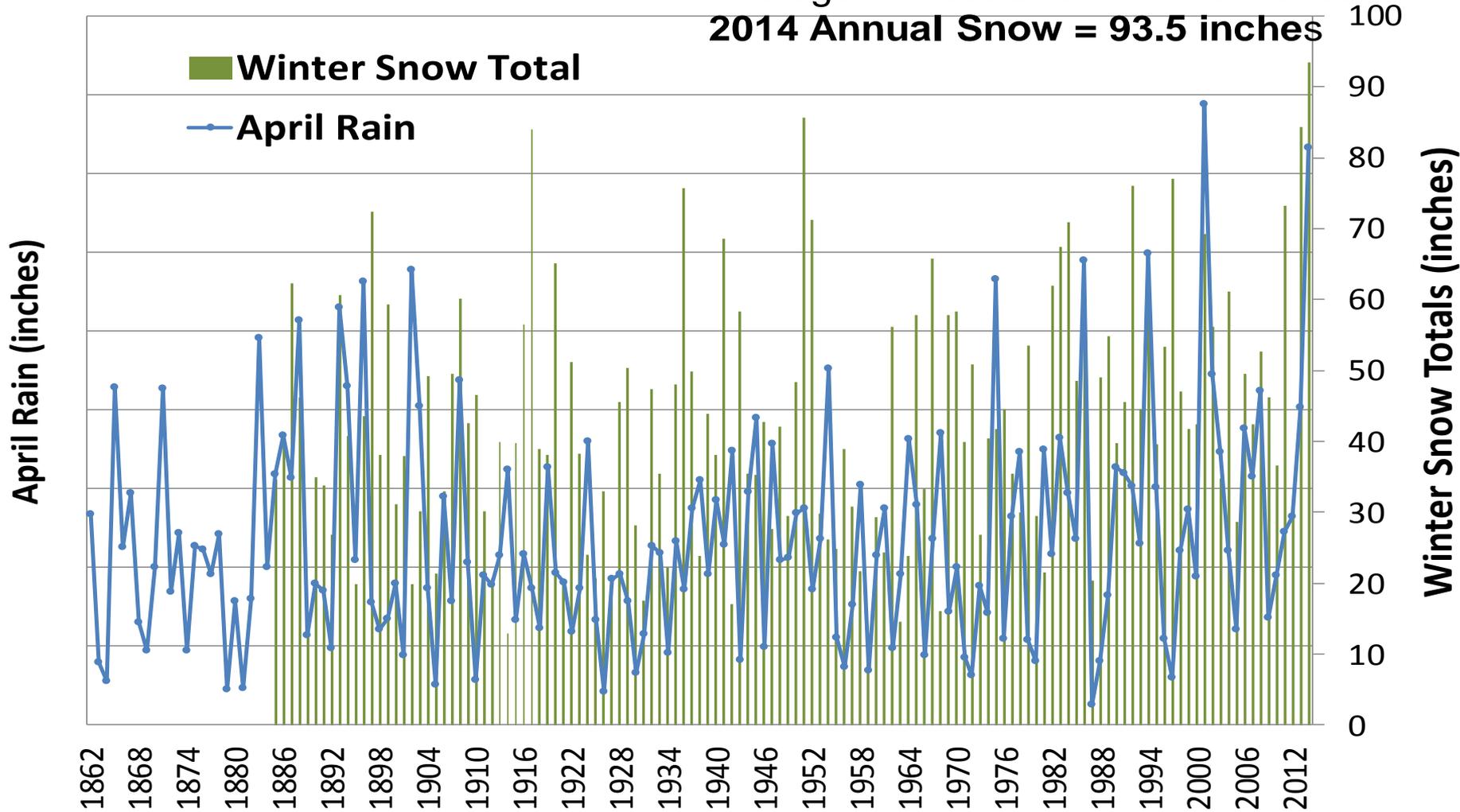
MN Climatology Working Group (nearest station)

Average April Rain = 2.38 inches

2014 April Rain = 7.33 inches

Average Annual Snow = 42.8 inches

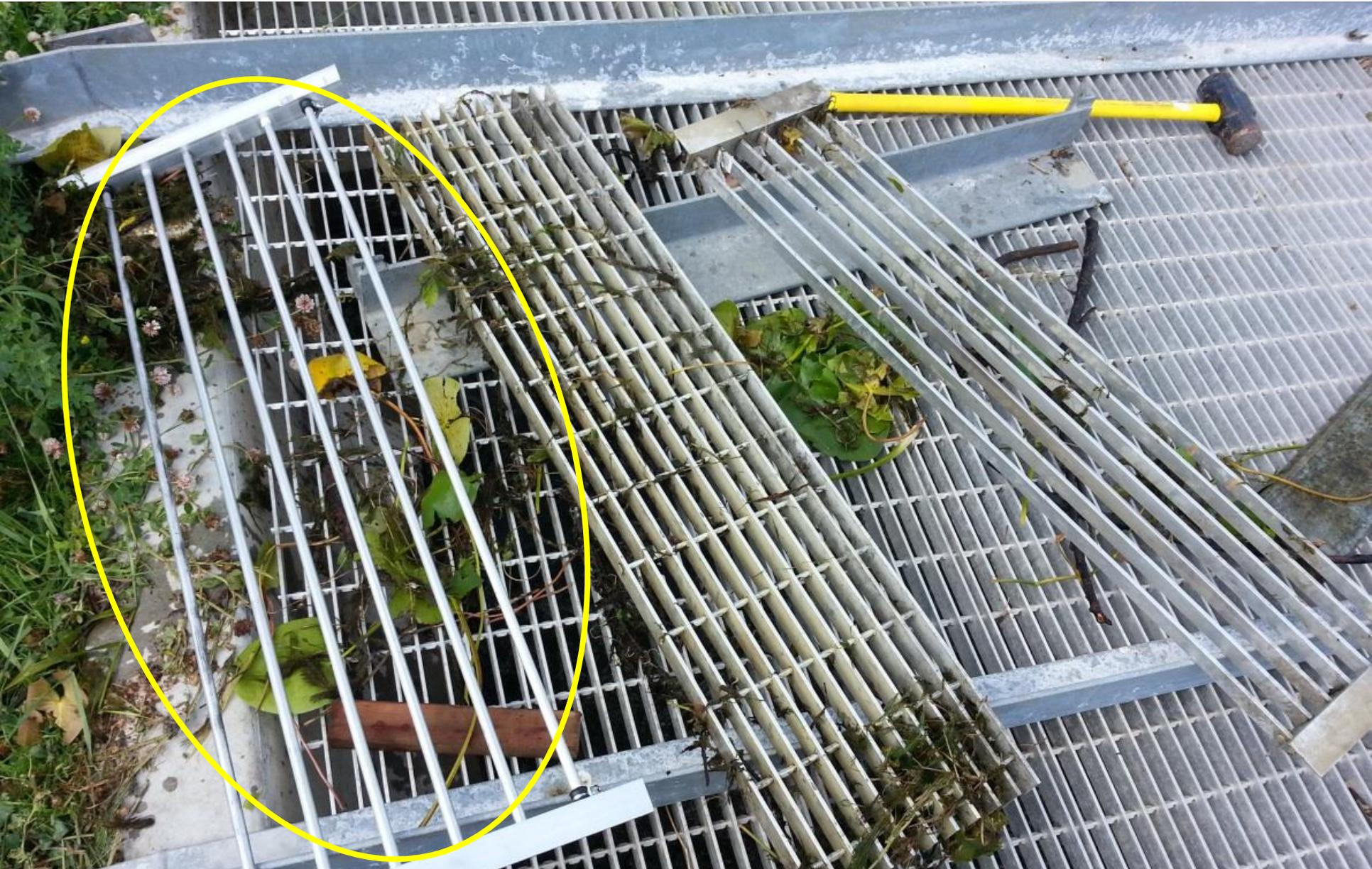
2014 Annual Snow = 93.5 inches



Levels exceed overflow in May 2014



Grates clogged with aquatic plants



High flow trapped turtles against grate



Acknowledgments

