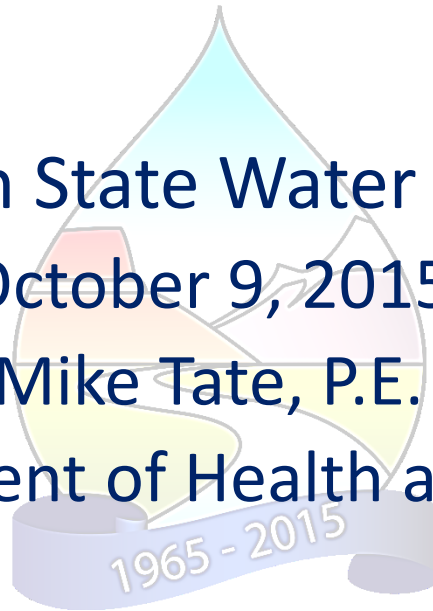

WQ2 Legacies

Western State Water Council

October 9, 2015

Mike Tate, P.E.

Kansas Department of Health and Environment

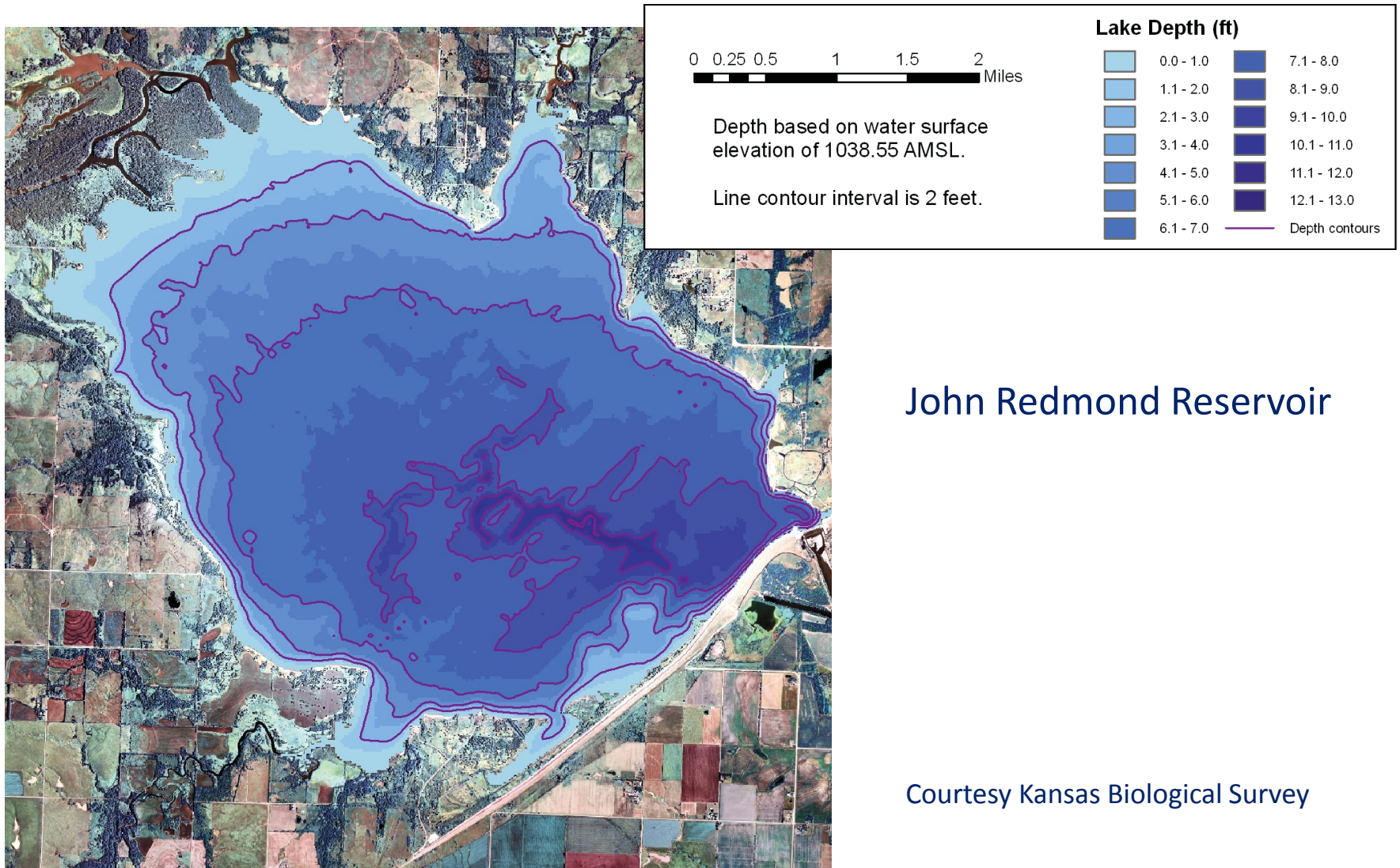


Legacy Pollution

- ◆ All of our states have legacy pollution that affects our water resources
 - Mining
 - Chemical manufacturing
 - Refining
 - Smelting
- ◆ At the time, probably did not seem too bad
- ◆ Today we know better
 - But, we still live with the affects and costs of remediating those past practices
 - We should know enough to foresee and eliminate future problems

Some Kansas Legacies

Sediment



Sediment

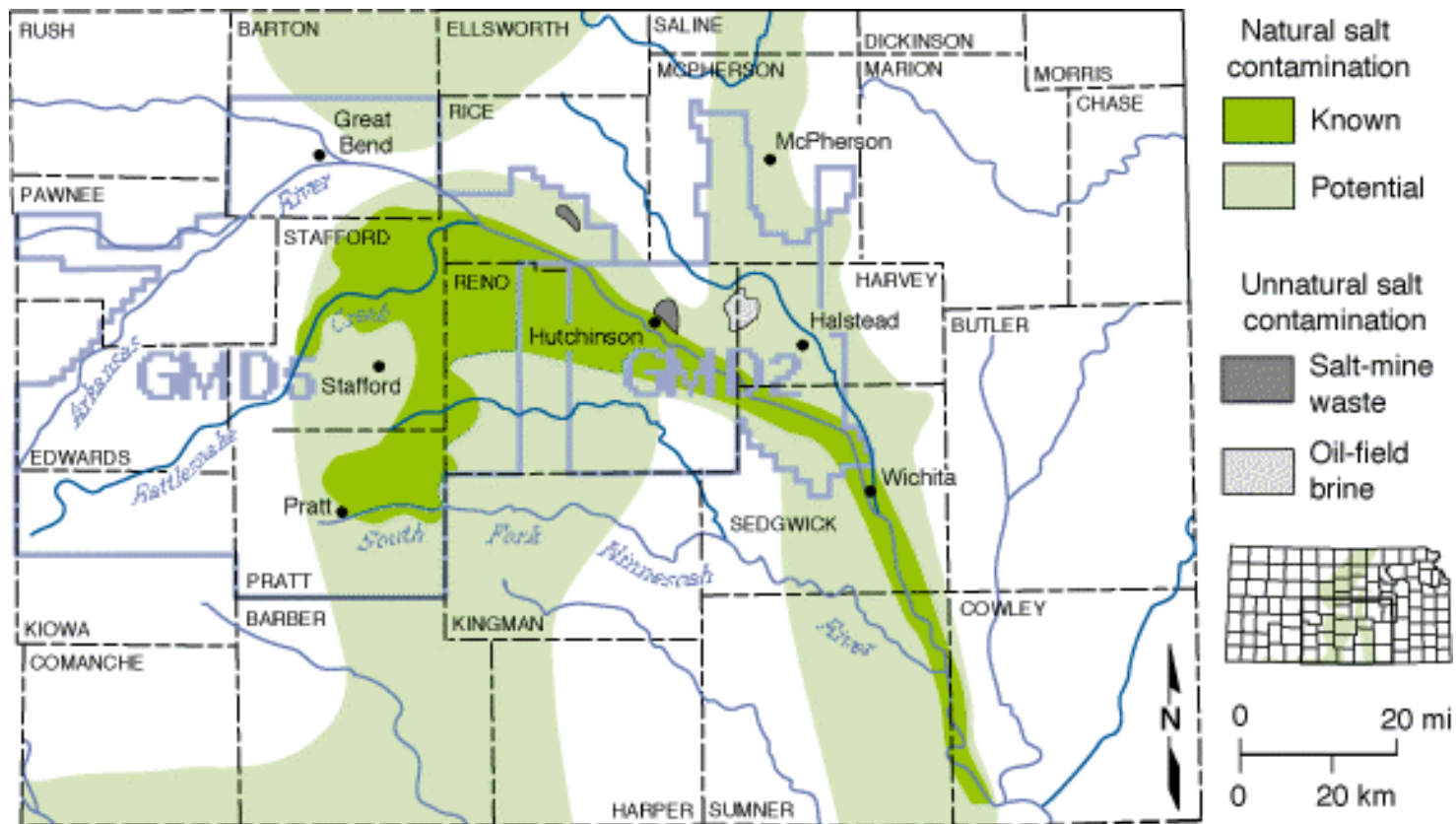
◆ Solutions

- Raise conservation pool level for water supply storage
- Dredge a portion of the reservoir
 - 600K cubic yards
 - Cost approaching \$30 million
- Intensively apply watershed soil conservation practices



Salt

South Central Kansas



Courtesy Kansas Geological Survey

Salt

◆ Solutions – Hutchinson, KS

- Built reverse osmosis drinking treatment plant to treat and reuse
 - For salt and VOC contaminants
 - 10 MGD plant = \$35M
 - Plant, collection & distribution, and two Class 1 UIC disposal wells



Oil and Gas

South Central Kansas

18—Southeast Missourian, Cape Girardeau, Mo., Fri., July 11, 1980

Conway: Small Kansas community not ready to fold up and move out

By SCOTT KRAFT
Associated Press Writer
CONWAY, Kan. (AP) — This tiny Kansas village, much of its water polluted by underground propane leaks that pose some threat of explosion, is balking at the chance to sell itself to four big oil companies who say they can't pinpoint the leaks.

"Why should little people like us be forced to move out just to make way for big oil companies?" asked Elsie Schafer, 67, as she sat on her shady lawn Thursday. "I'm not against big oil companies, but they shouldn't force us out."

Few of the 60 or so residents of Conway are inclined to accept the offer, which was advanced at a town meeting Wednesday

night by a lawyer representing Getty Oil, Home Petroleum, National Cooperative Refineries Association and Mid-America Pipeline System. The firms already have bought four homes in town and they now are offering to buy all 39 households and half-dozen businesses.

They have provided water storage tanks and paid to have water brought daily to affected residents. But Hadley Sizemore, attorney for the companies, says he doesn't know how long the companies will continue that.

"We didn't say we were going to cut them out of water, but we also didn't say we would continue it," Sizemore said of his meeting

with townspeople.

The community, which has peacefully coexisted for more than 20 years with the mammoth underground facilities at its perimeter, isn't inclined to fold up and move its 100-year-old settlement.

"It's kinda hard to think of selling out," says Mrs. Schafer, who has lived in Conway 60 years. She and her husband, a retired worker for one of the storage facilities, learned this week that their well, too, was polluted.

"It's not fair really," she said. "Most everybody who lives here came here intending to make it their home. And families shouldn't have to worry everytime they go to bed

that the house might explode."

So far the propane hasn't leaked into the well of Junior Martin, the manager of the grain elevator at Conway for the past nine years. But he heads a citizens' committee investigating the problem and already has made up his mind — "I'm staying. I ain't moving."

Since January, the town has been plagued by intermittent pollution of its wells by the leaking propane. The problem resurfaced early this week when state officials tested the wells and found a high level of propane in many of them.

Sizemore said no lawsuits have been brought or threatened. But he added the com-

panies still haven't been able to determine how to stop the contamination.

Geologist Bill Bryson of the Kansas Department of Health and Environment said the propane poses a danger of explosion if it accumulates in a house or well. He said the leak is difficult to pinpoint because it appears to move around and affect different water supplies.

Bryson speculated that the propane was leaking from the storage cavities through some kind of fracture system and had found its way to an area right above the groundwater level. He said state officials were setting up a relief well system to purge the old wells and drill new ones to intercept the propane and blow it out. They also are continuing to monitor propane levels in the town's wells.

An isolated propane leak on Roy Burns' farm just outside of town was discovered in the late 1950s, shortly after the four oil

Illinois taxpayers seek state sales tax relief

By BOB SPRINGER
Associated Press Writer
SPRINGFIELD, Ill. (AP) — Gov. James R. Thompson

sign a bill eliminating by mid-1982 the local and state sales tax on food and drugs. Seventy-three-year-old

assured Nelson that the governor would get them when he returned.

"It may not sound like a

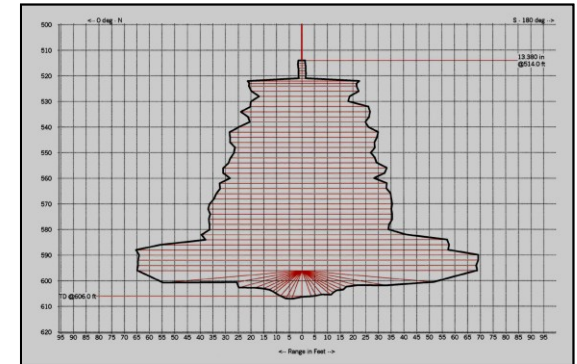
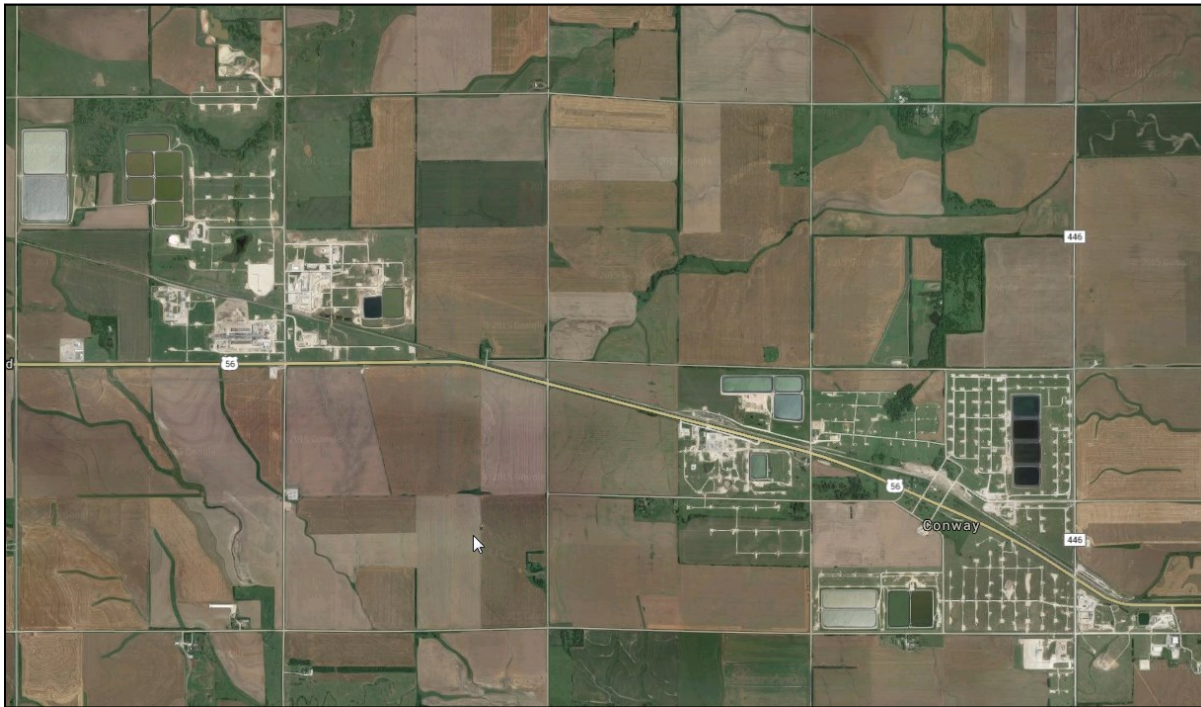
citizens on a low, fixed income.

But Thompson has indicated he likely would veto the bill supported by the

Oil and Gas

◆ Solutions

- Hydrocarbon companies bought out the town
- Spurred state regulation of storage



Our Legacy – Good or Bad?

- ◆ What is our legacy to future generations of water users?
- ◆ Will we improve or degrade quality?
 - Important question
 - Improve = more high quality water available at reasonable cost
 - Degrade = less high quality water
 - Either unusable or usable only with a significant treatment cost
 - » We can treat the heck out of water today
 - Just takes capital and energy
 - What are the opportunity costs of spending more to treat water?
 - With ever growing societal costs, it behooves us to minimize our water costs

Kansas Take on Leaving a Positive Legacy

Nutrient Reduction

Public Perception of Nutrient Problem: Blue Green Algae

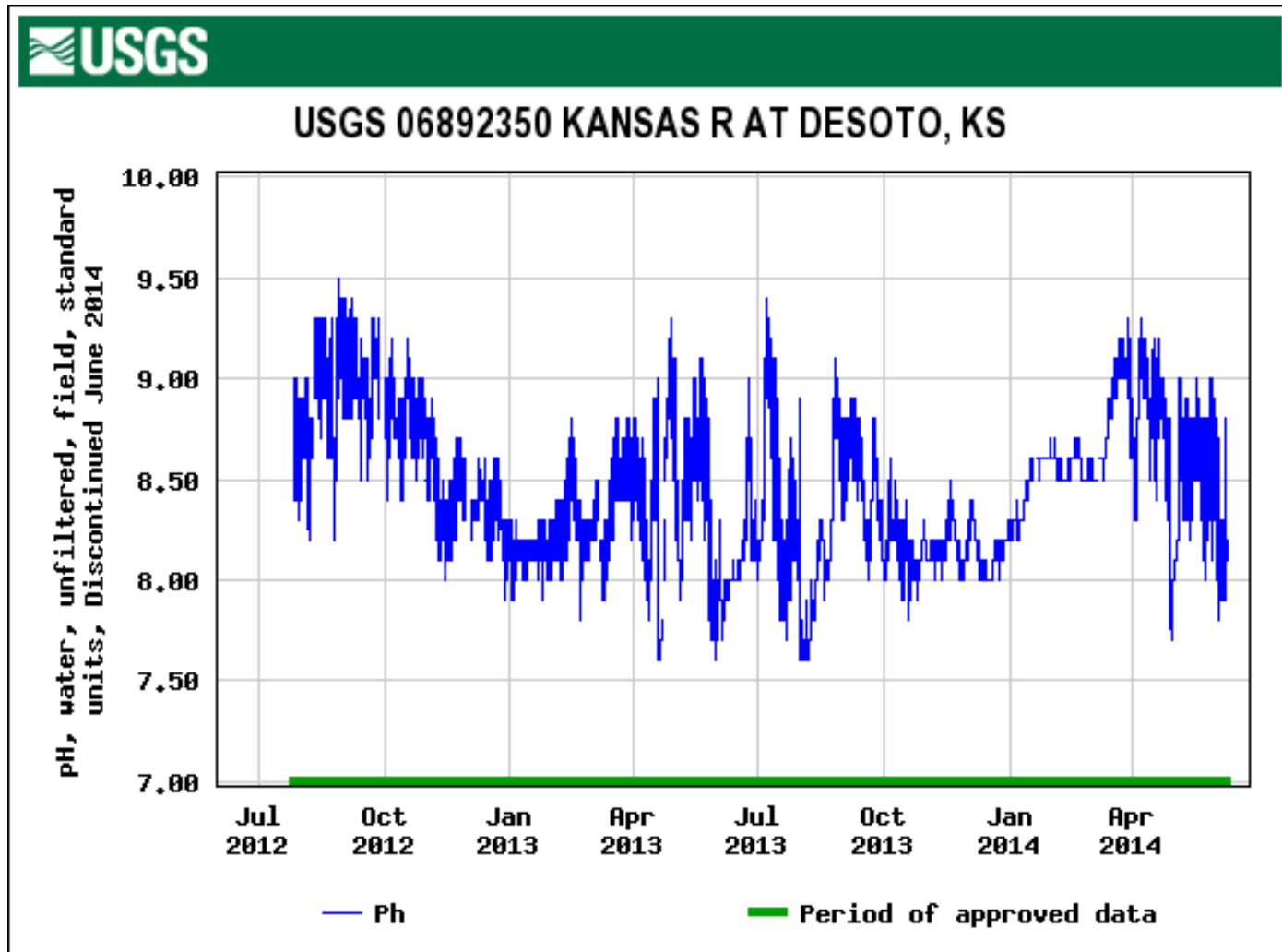


Nutrients Are a Huge Problem

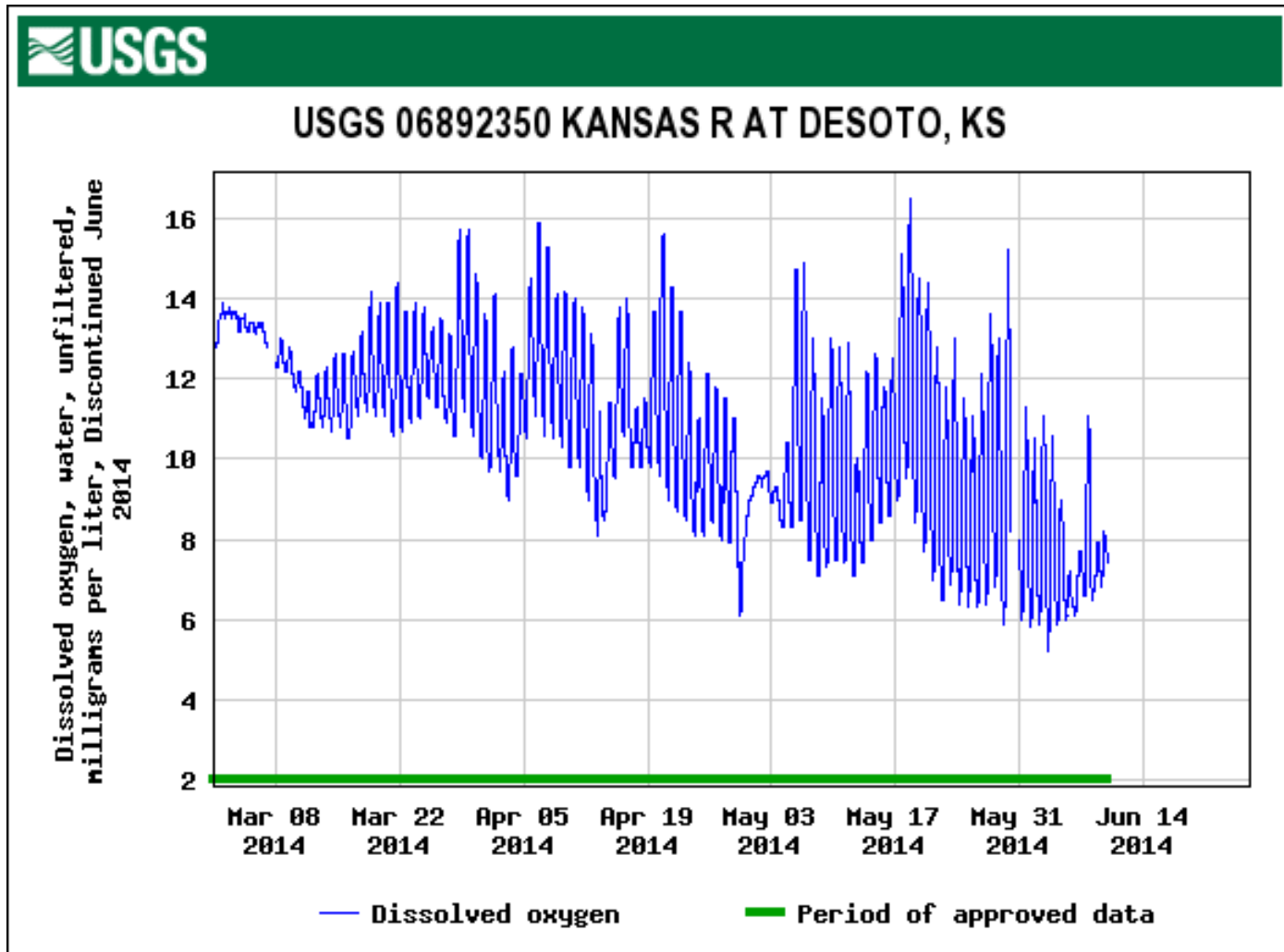
- ◆ Plenty of signals nutrients are problematic
 - Legal Battles
 - City of Des Moines Waterworks
 - Nitrate from farm field drainage tiles
 - Community Assn for Restoration of the Env v Cow Palace
 - Ruled over-applied dairy manure (NO₃) falls under RCRA
 - Gulf of Mexico Hypoxia
 - Extending compliance date by 20 years – to 2035
 - Counting on state reduction plans to hold off lawsuits
 - HAB (Harmful Algal Bloom) Guidance
 - Identified stringent guidelines for drinking water toxins
 - Microcystin and Cylindrospermopsin
 - ~400 times more stringent than WHO

Environmental Effects - Photosynthesis

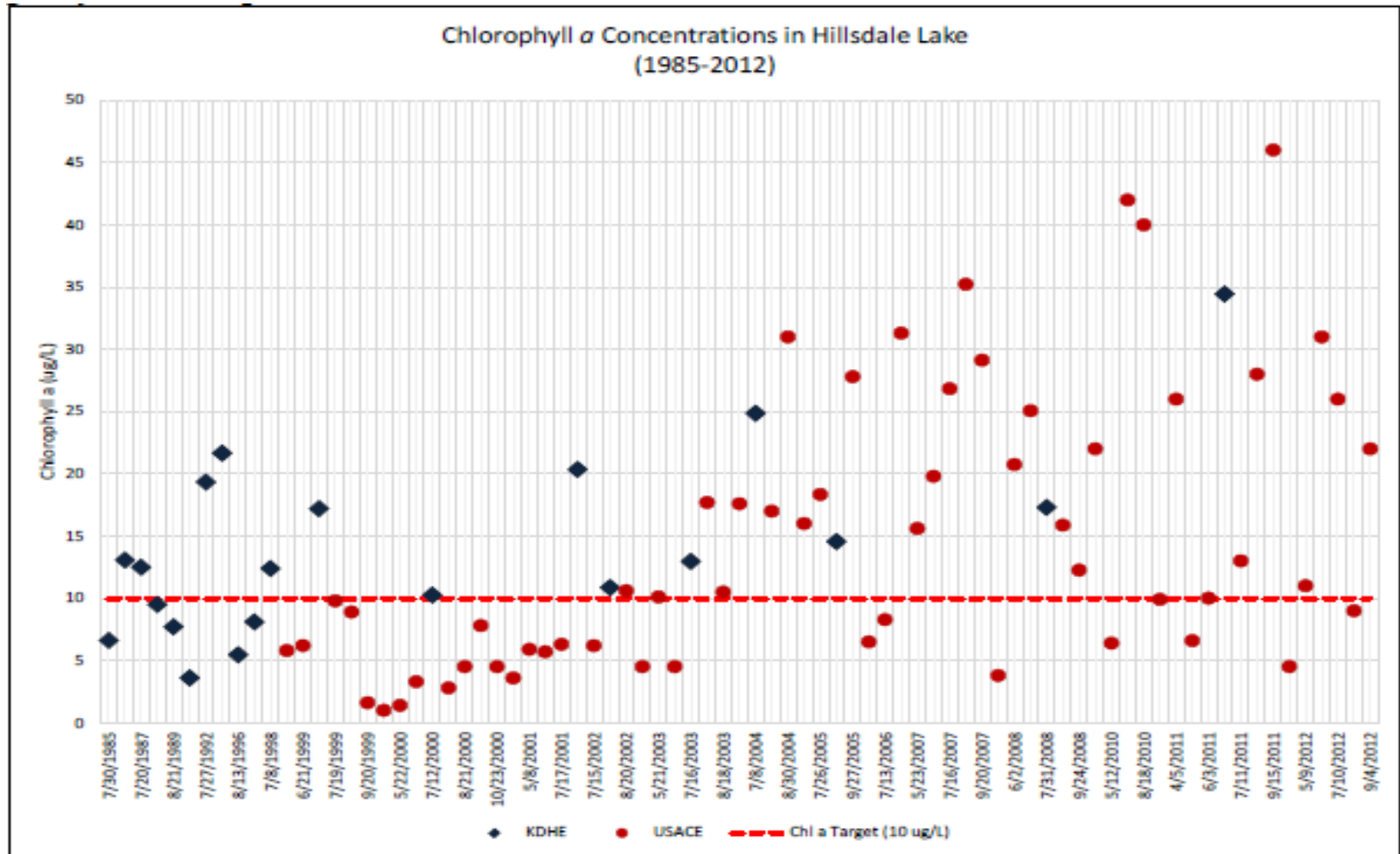
Generating High pH



Environmental Effects - Excess Organic Material Leads to DO Sags



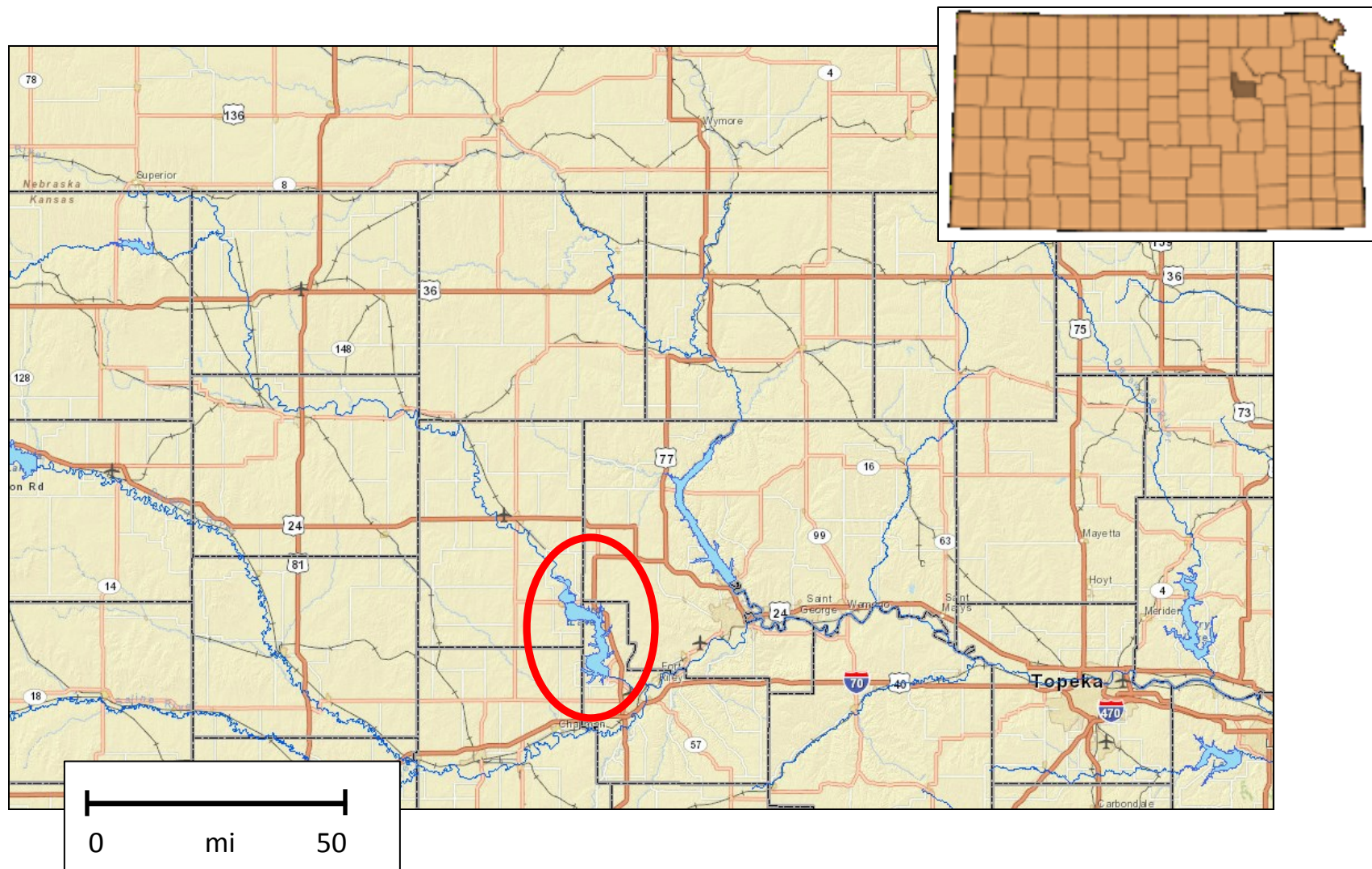
Environmental Effects - Lake Trophic State



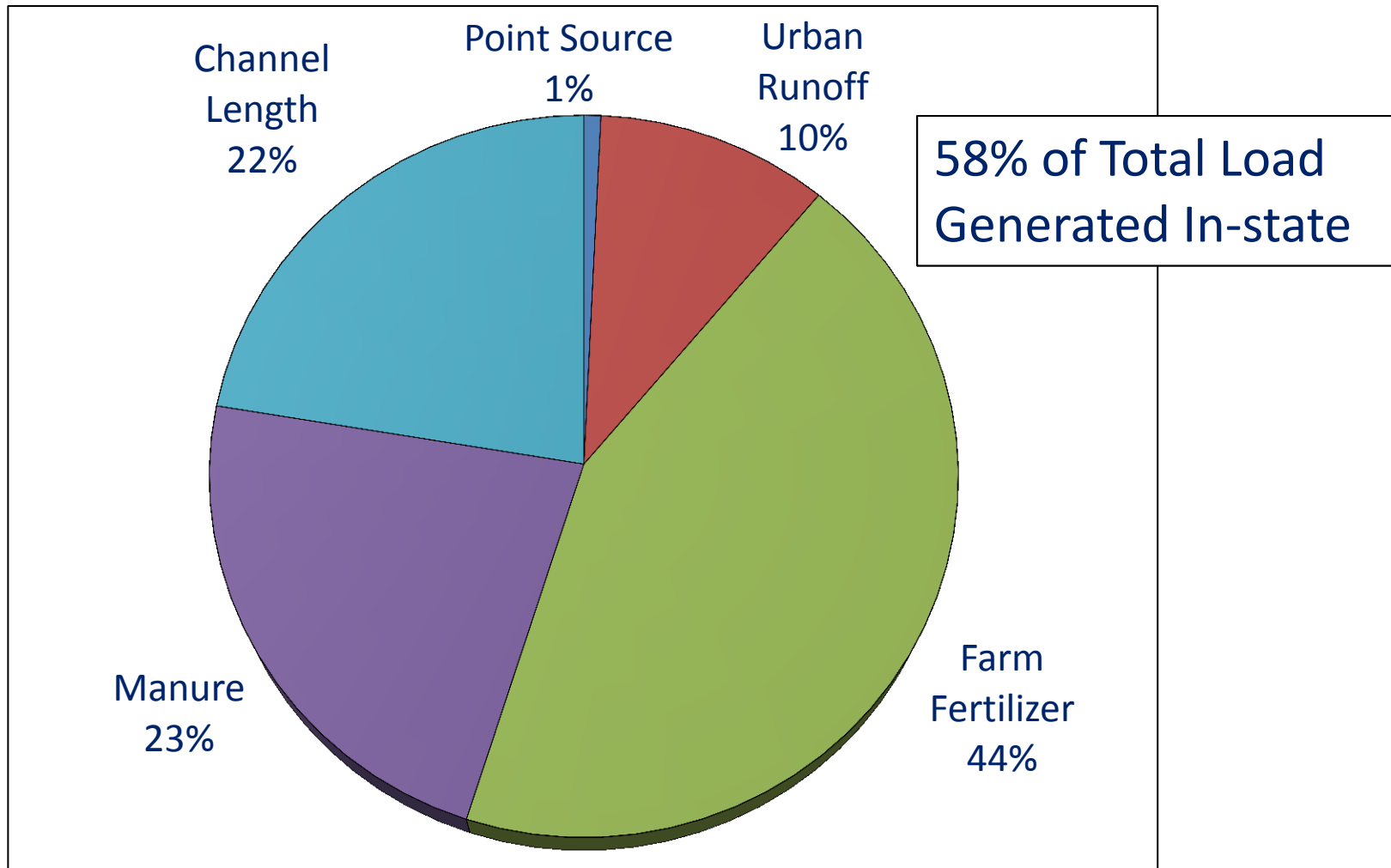
Kansas Approach In a Nutshell

- ◆ Reduce TN/TP loads leaving KS border by 30%
- ◆ PS and NPS making equitable TN/TP reductions
- ◆ Major NPDES (≥ 1.0 MGD) – Biological Nutrient Removal
 - **Annual Average** of 1.5 mg/L TP / 8.0 mg/L TN
 - Later modified to 1.5/8.0 or 1.0/10
 - Acknowledges TP is typically greater freshwater problem
 - Some designers think 8.0 TN is too tough to hit
- ◆ Better target nonpoint source (NPS) funds
- ◆ Specific Nutrient Criteria derived through TMDL and/or WRAPS efforts

Milford Reservoir



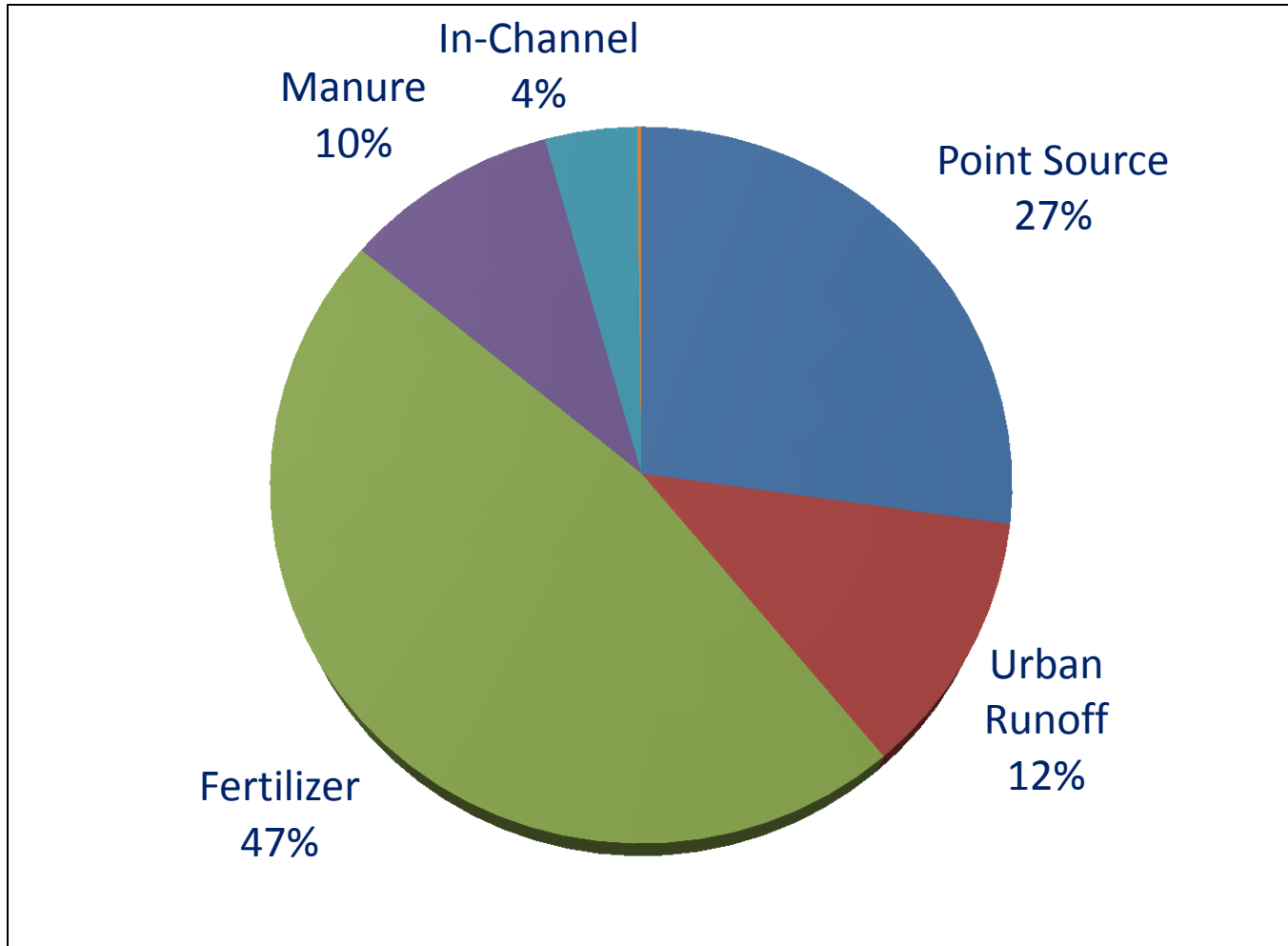
Source of TP Entering Milford Reservoir



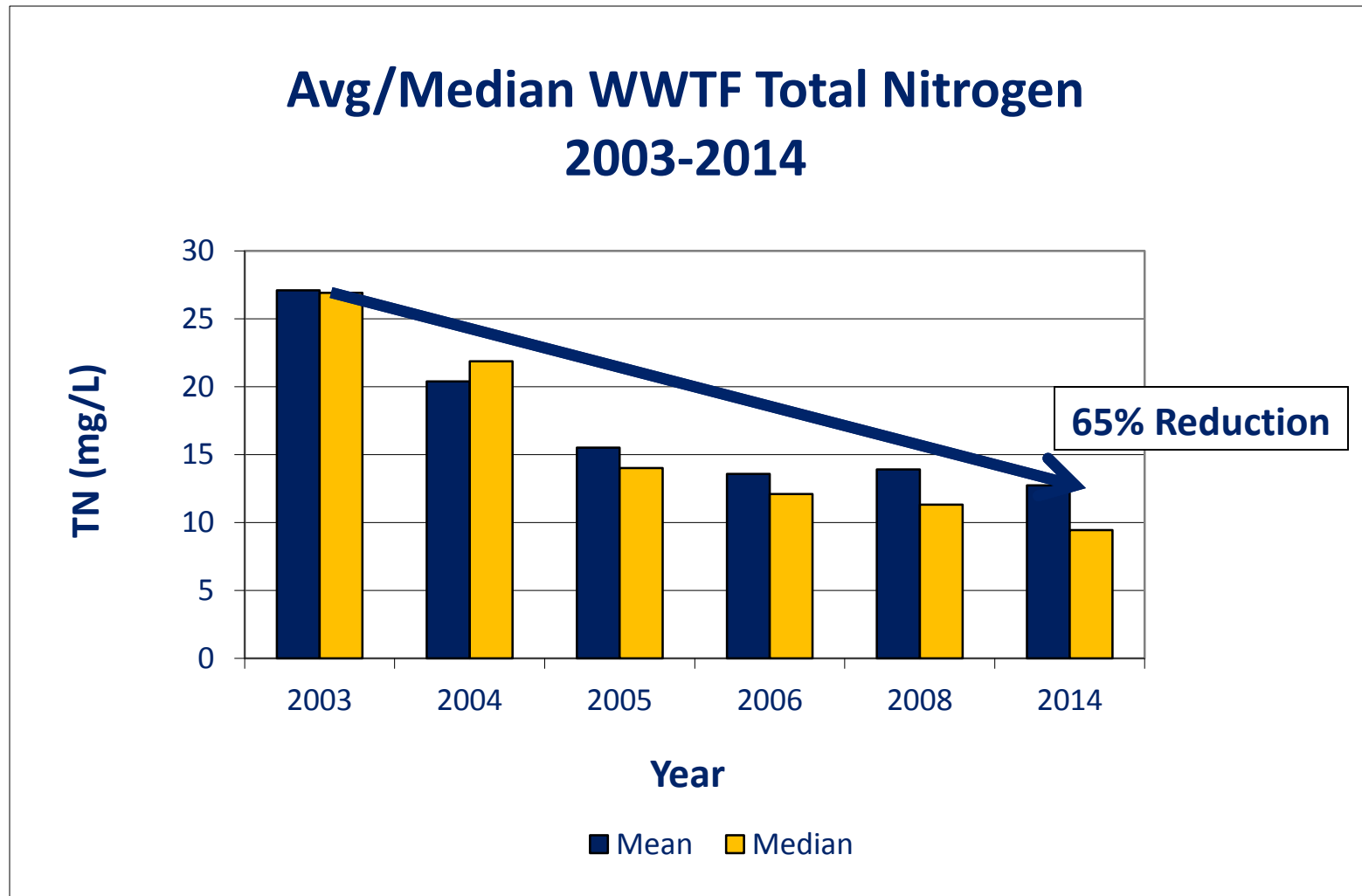
Kaw Reservoir - Oklahoma



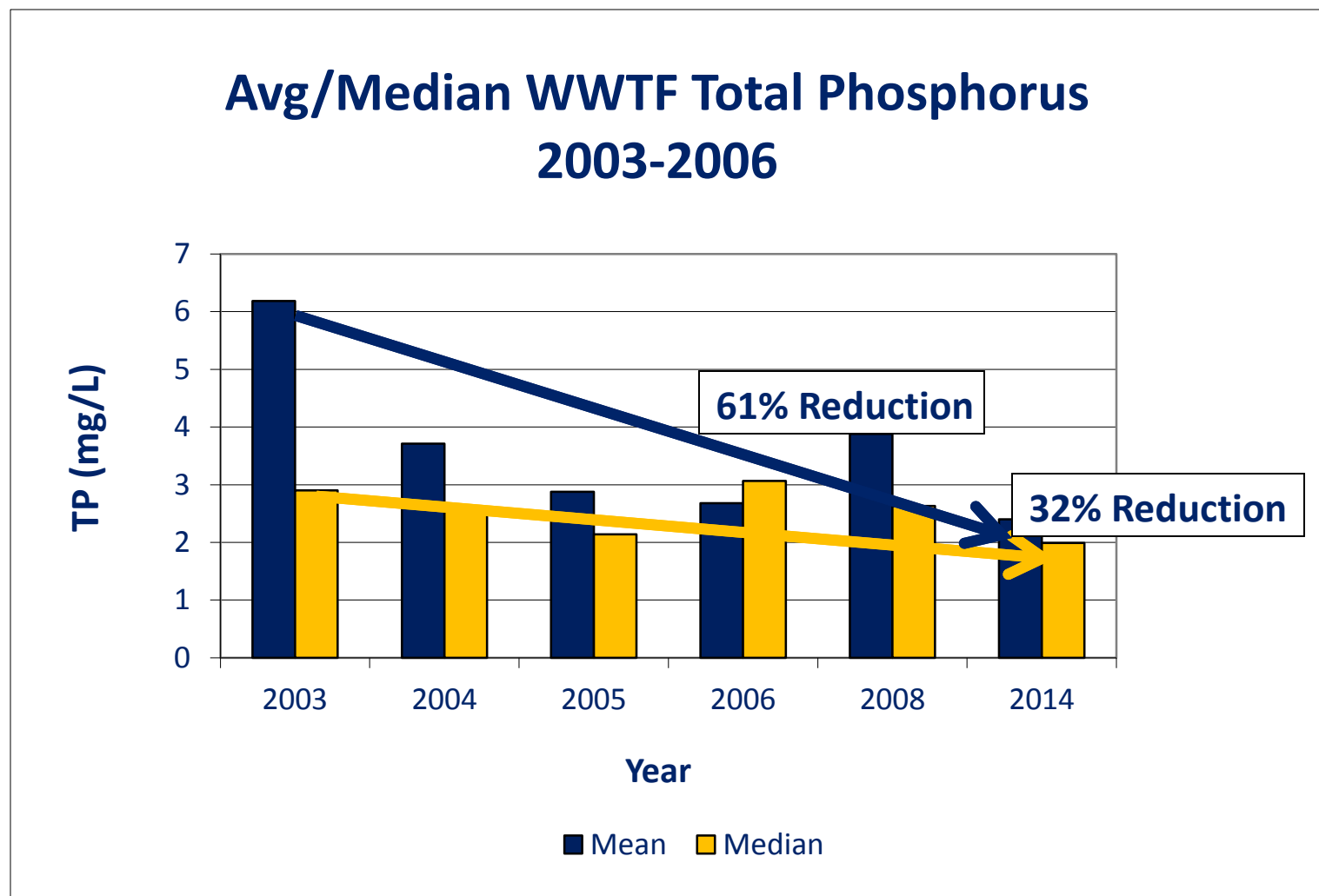
Source of TP Entering Kaw Reservoir



Where is KS TN Discharge Headed?



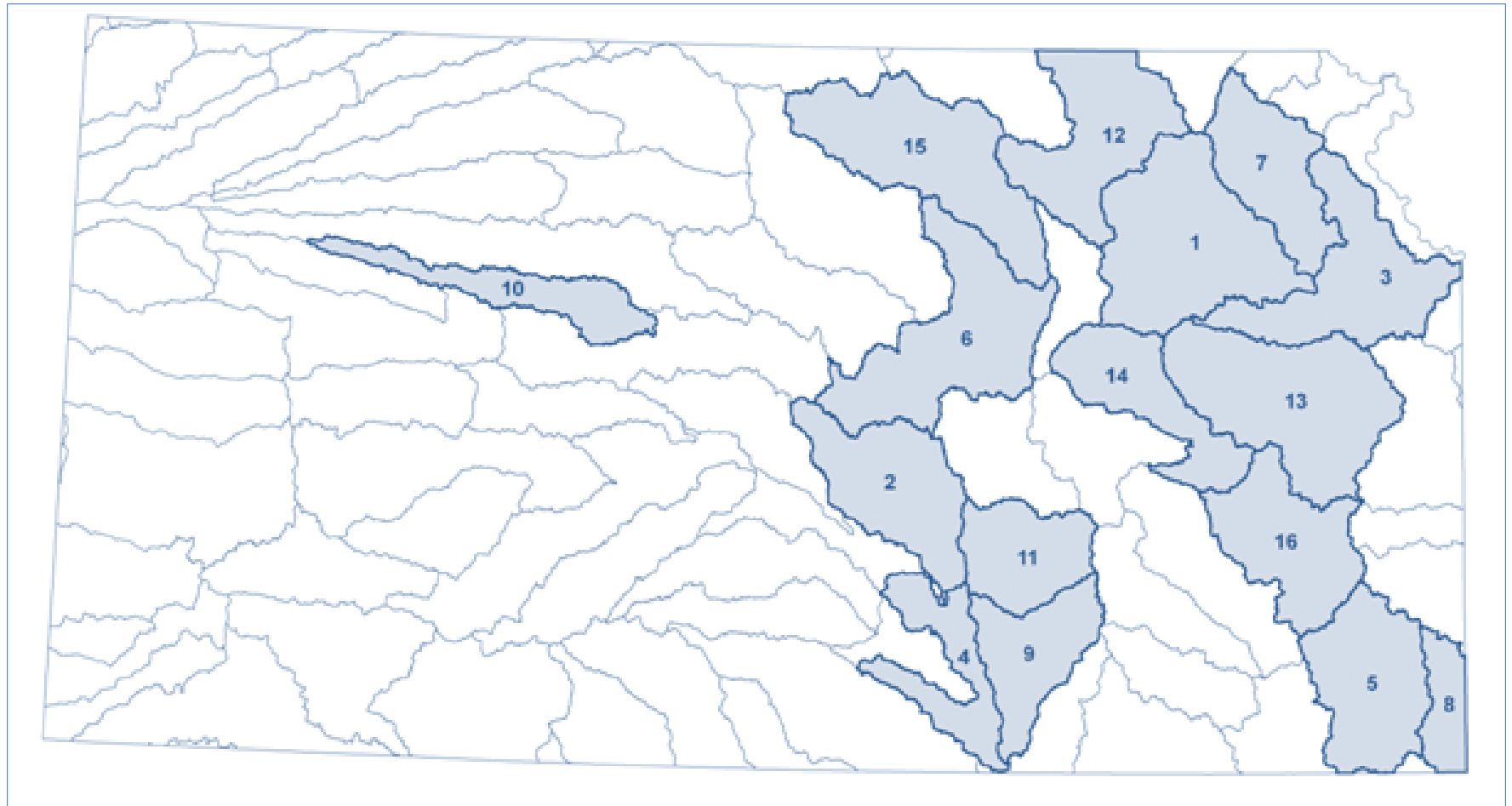
Where is KS TP Discharge Headed?



Kansas TMDL Vision Priorities

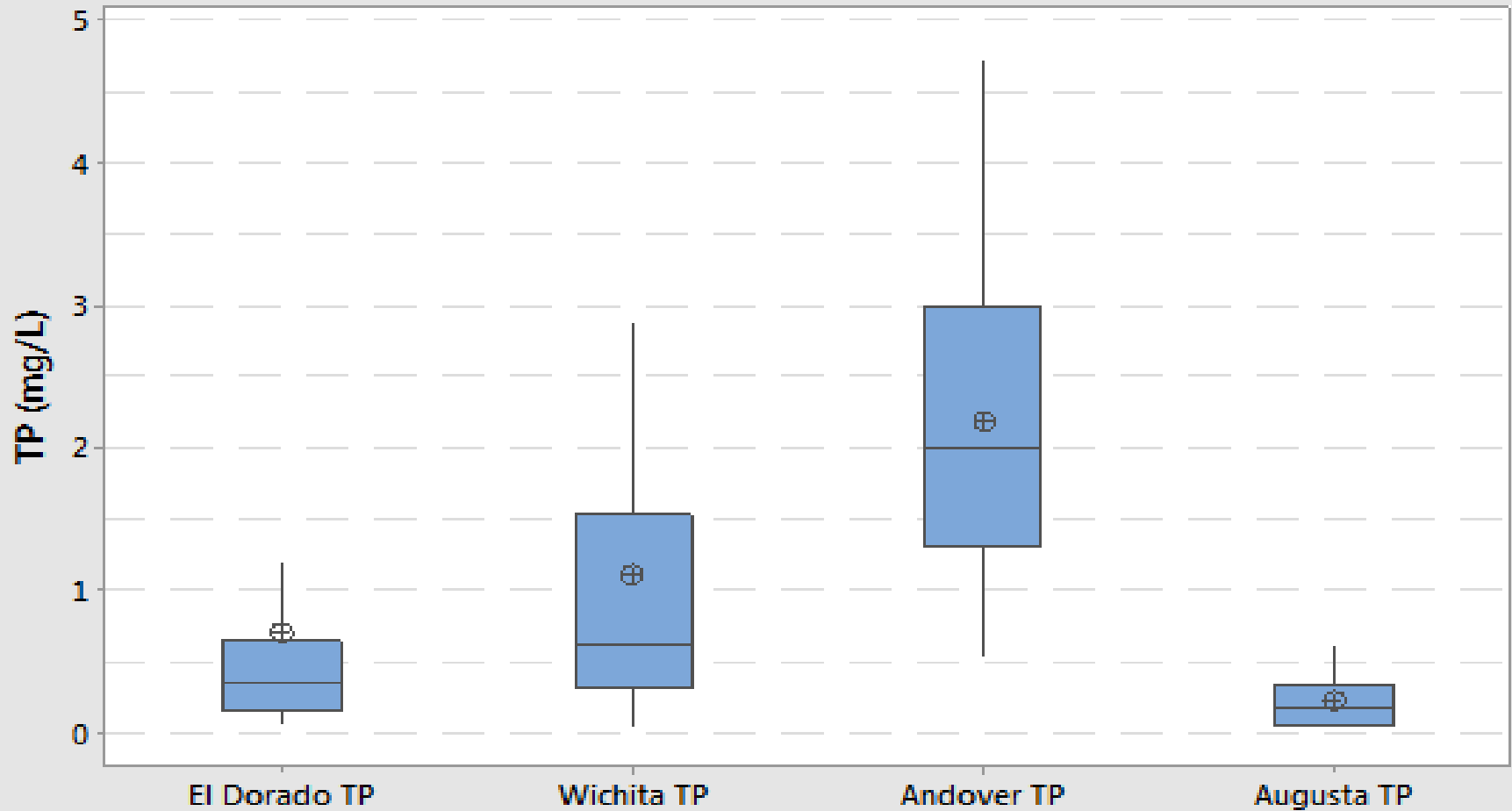
- ◆ 16 Priority HUC 8's in Eastern and Central Kansas
 - Almost all important water supply reservoirs
- ◆ Stream phosphorus and/or nitrate impairments
- ◆ TMDLs for 19 stream stations approved, complete or drafted through 2014
- ◆ 57 more stream stations need TMDLs between 2015 - 2022

Kansas Priority HUC 8's for Nutrients

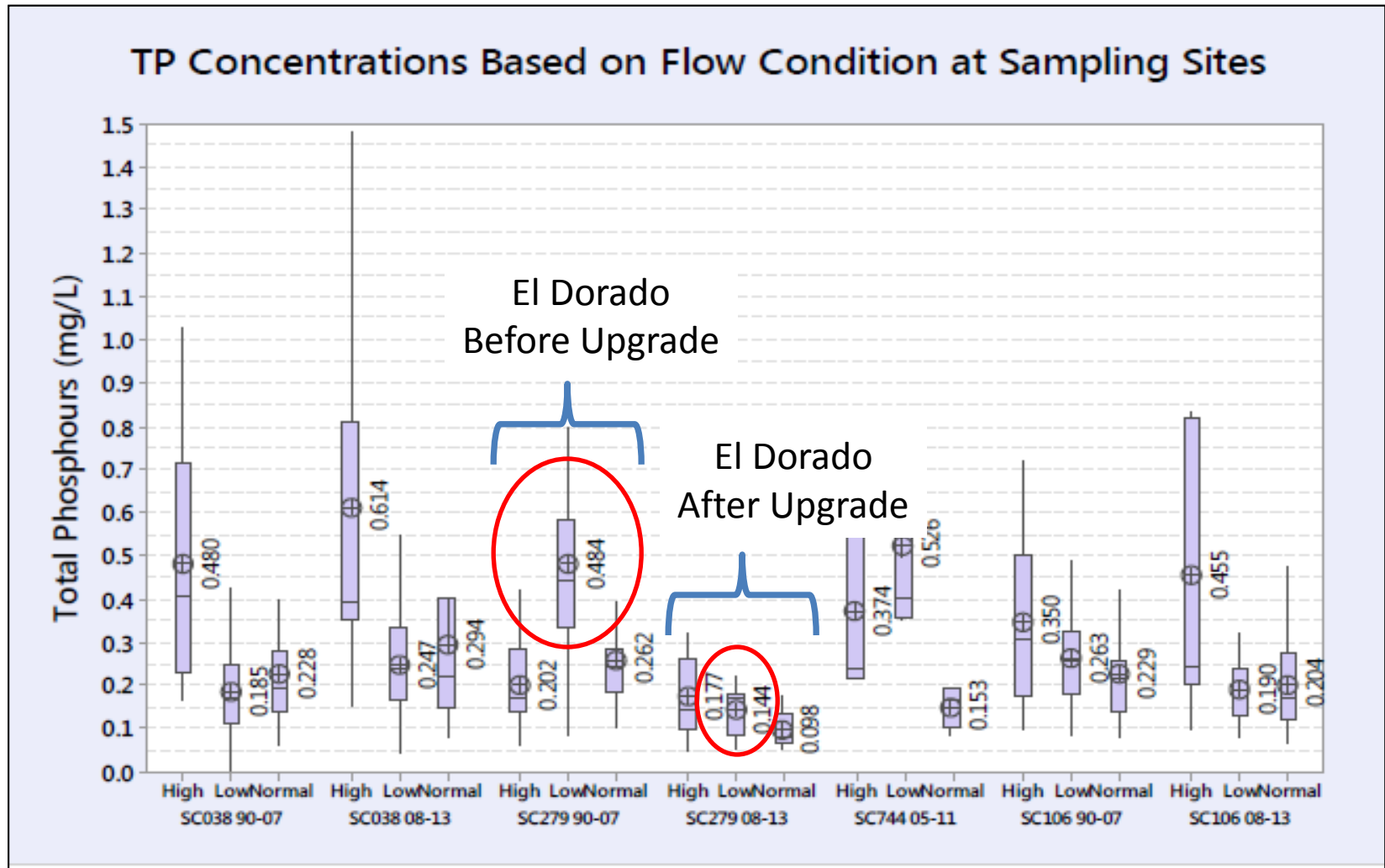


TMDLs Look to Push NPDES TP Downward

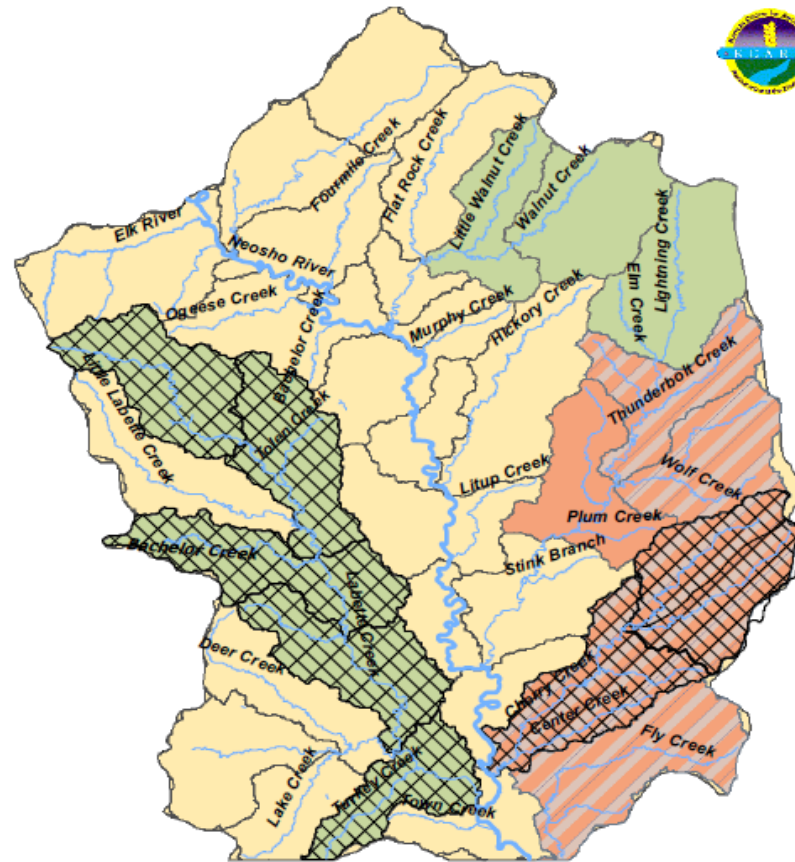
DMR Total Phosphorus 2011-2013



NPDES Reduces Nutrients, Loads Driven by Runoff & NPS



Targets May Vary with NPS

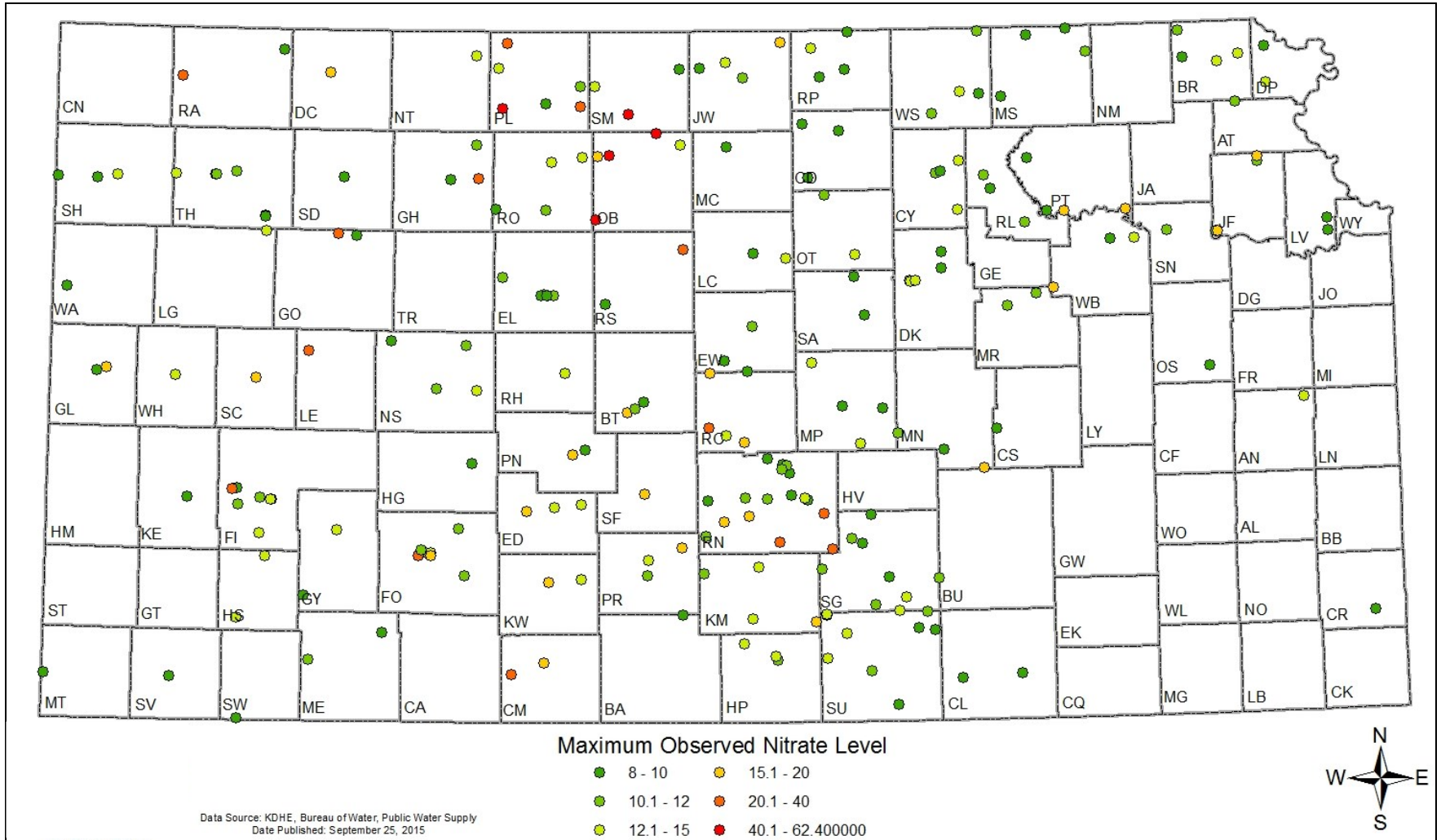


- 🔲 Cropland Targeted Areas
- 🔲 Livestock Targeted Areas
- 🔲 Poultry Targeted Area
- 🔲 High Priority TMDL Targeted Areas

Where is KDHE Heading?

- ◆ Pushing forward – can't slack off
- ◆ Original plan was 8.0 mg/L TN and 1.5 mg/L TP
 - Now, allow that or 10 mg/L TN and 1.0 mg/L TP
 - Recognize main problem is TP, with some TN contribution
- ◆ Ammonia will drive some upgrade
 - Also denitrify at the same time
 - Look at phosphorus
- ◆ Continue targeting NPS \$\$
- ◆ Looking at nitrate groundwater impacts
 - Driving expensive drinking water treatment construction
 - Studies also indicate that NO₃ contamination mobilizes U
 - Nasty 2 for 1
 - U is costly to deal with

PWS Wells - Nitrate > 8 mg/L



What Will Be Our Legacy?

- ◆ For me, for Kansas
 - Won't solve the nutrient problem in my career
 - Hopefully, will continue to reduce nutrients and adaptively manage our approaches to achieve cost effective results

An aerial photograph of a large body of water, likely a lake or reservoir. The water is divided into two distinct color zones: a vibrant green area on the left and a murky, brownish-purple area on the right. A single wooden post is visible in the water, standing at the boundary between the two zones. In the background, a grassy shoreline with trees and some buildings is visible under a clear sky.

Questions?