

Kansas Narrative Criteria and NPDES Permitting for Nutrients



2019 Nutrient Permitting Workshop

November 5, 2019

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Kansas' Historic Position on Numeric Nutrient Criteria

- ◆ Biological linkages in streams are too fuzzy to establish a hard number *a priori* which will become basis for permit limits
- ◆ The response variables are more important than the forcing variables to define impairment, e.g., KS WQS set chlorophyll for Lakes @ 10 µg/l
- ◆ Regardless, nutrient concentration and load reduction must happen to fully restore designated uses in Kansas waters
- ◆ Initial reductions to be accomplished through implementing TMDLs

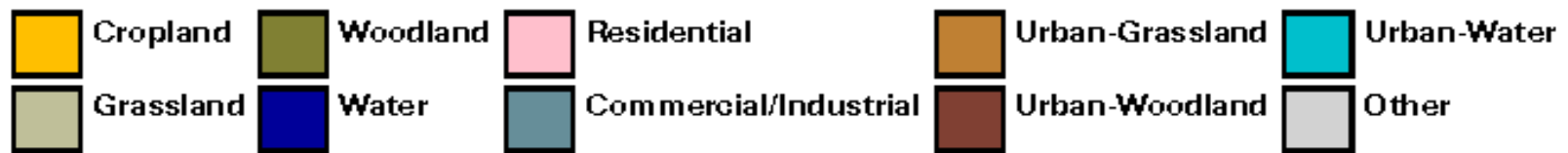
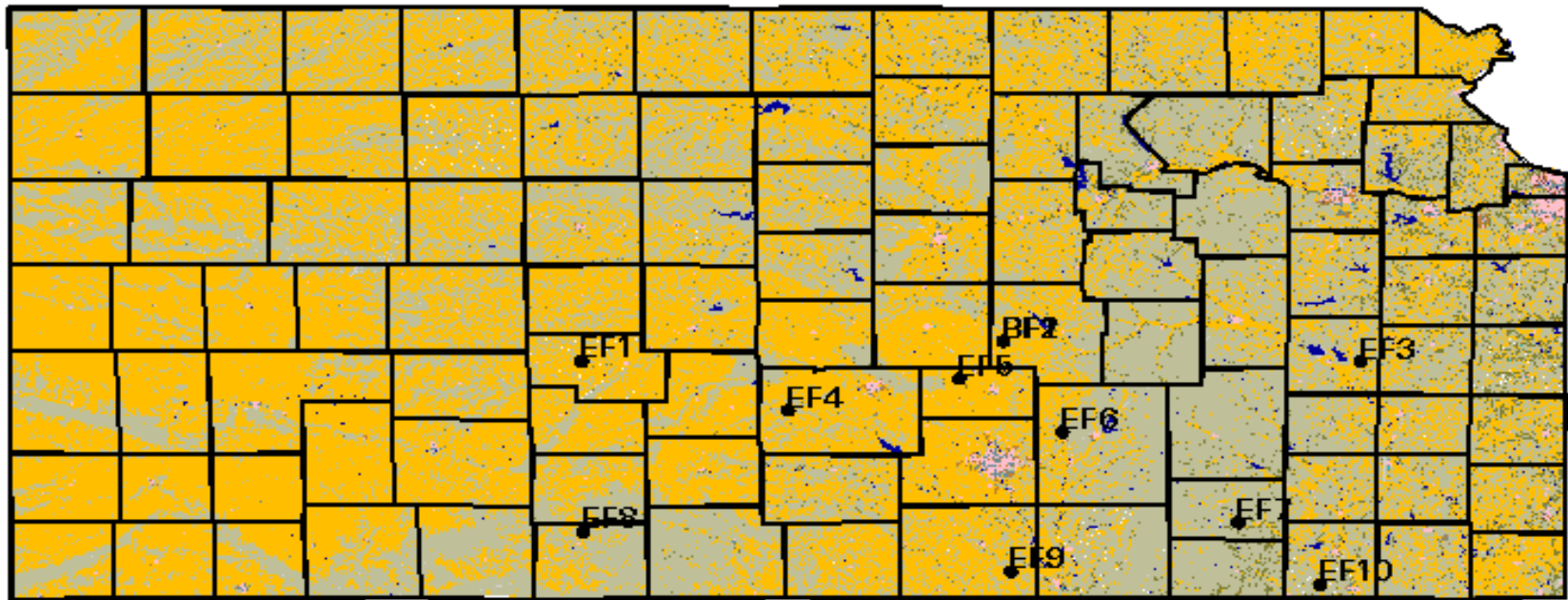
KS Narrative Criteria Provide Indicators of Use Impairment

- ◆ The introduction of plant nutrients into surface waters designated for domestic water supply use shall be controlled to prevent *interference with the production of drinking water* (K.A.R. 28-16-28e(c)(3)(D)).
- ◆ The introduction of plant nutrients into streams, lakes, or wetlands from artificial sources shall be controlled to prevent *the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life* (K.A.R. 28-16-28e(c)(2)(A)).
- ◆ The introduction of plant nutrients into surface waters designated for primary or secondary contact recreational use shall be controlled to prevent *the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating, or emergent aquatic vegetation* (K.A.R. 28-26-28e(c)(7)(A)).

Wastewater Demographics

- ◆ Of the 626 incorporated cities in Kansas, 36 now have population over 10,000; the smallest 503 cities have 9% of state population
- ◆ 69 large NPDES municipal facilities, discharging 1 MGD or more from mechanical plants, comprise a total design flow of 370 MGD
- ◆ 36 mid-major NPDES municipal facilities, discharging 0.5-0.99 MGD, could discharge up to 23 MGD
- ◆ More than 300 3, 4 or 5 cell lagoon systems with retention times of 120-150 days, discharge 0.01 – 0.5 MGD (if they discharge at all) and total 31 MGD; they are the norm for small towns distributed throughout the state.

Kansas Landuse/Landcover



- SGP/CART Facilities

Data Source - Data Access and Support Center, Kansas Geological Survey

Map by A. Cialella
March 1996

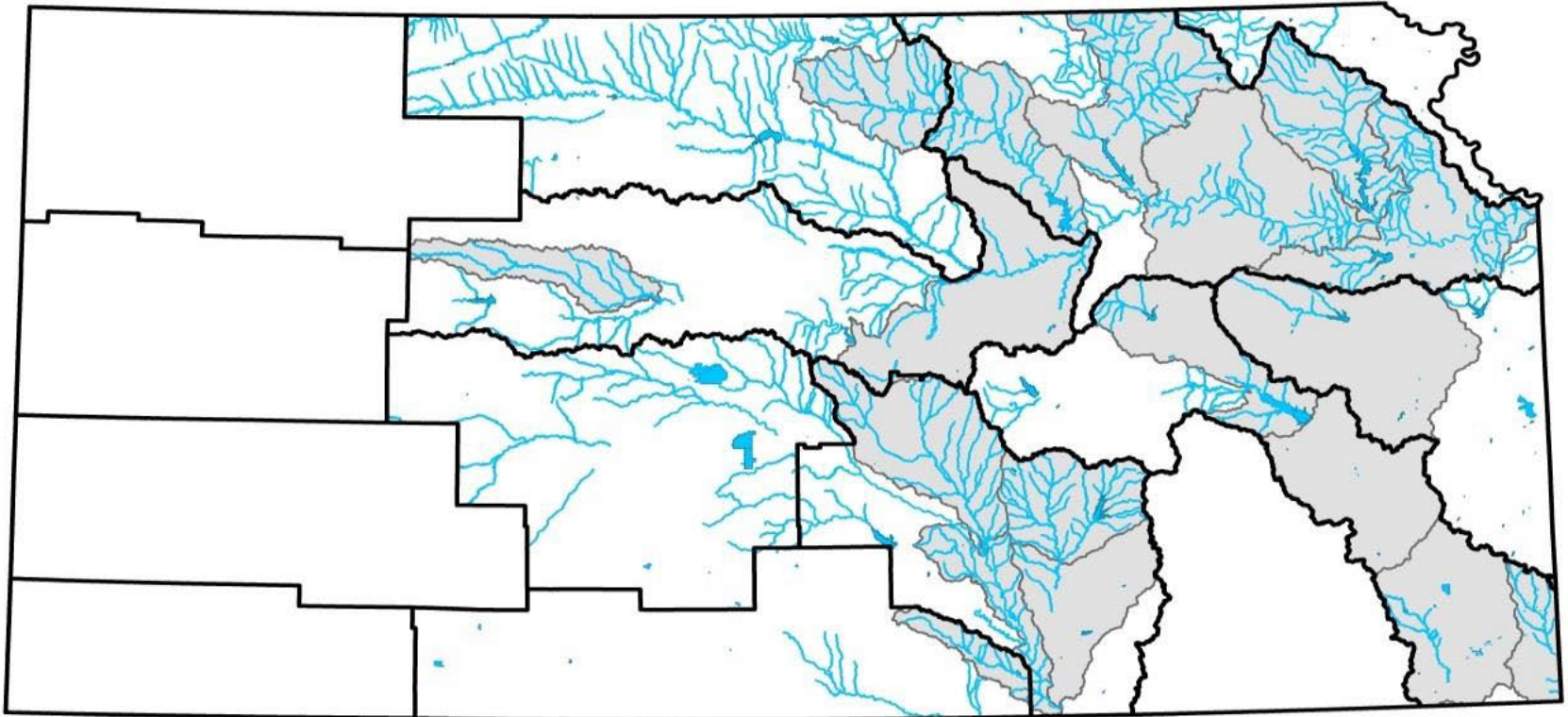
The Land Use Backdrop

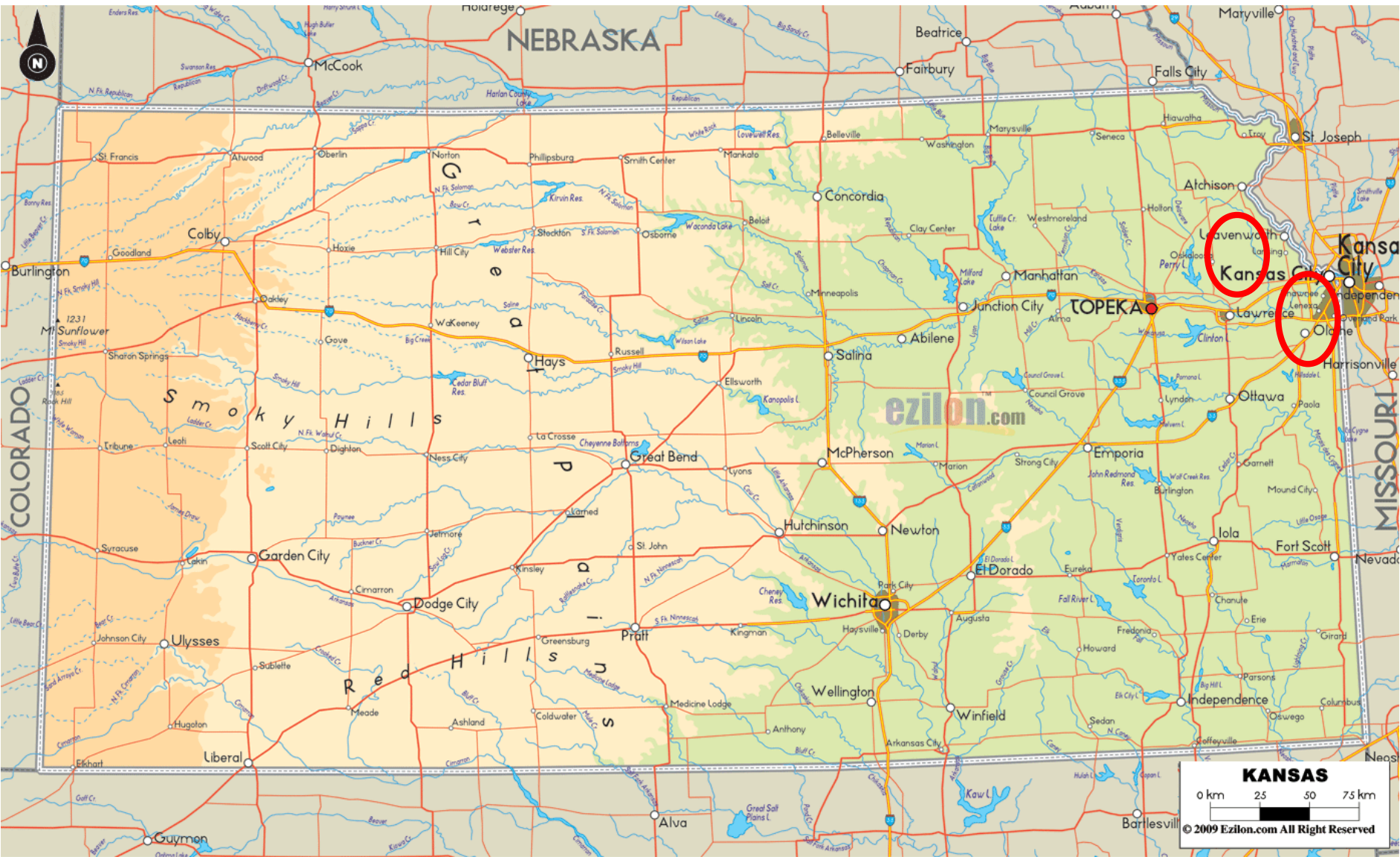
- ◆ 88% of Kansas land is in cropland
- ◆ Only 63 MS4's, typically 5% of a given watershed (urban islands in a sea of corn)
- ◆ In Kansas, land use drives water quality
- ◆ Non-point sources remain immune to water quality standards, especially numeric criteria
- ◆ Animal ag also prevalent (3rd in cattle; 10th in hogs)
- ◆ 99% of land in Kansas is privately held
 - Hostile attitude on government/regulation
 - Absentee ownership confounds BMP adoption

Kansas Nutrient Strategy

- ◆ Nutrient Reduction Framework is carried out by TMDLs; Kansas TMDL Vision set stream phosphorus as priority
- ◆ Began listing streams for TP in 2008; First TMDLs in 2012
- ◆ Ammonia and nitrate have numeric criteria/limits
- ◆ TP Technology: BNR-1 mg/l; ENR-0.5 mg/l; LOT-0.3 mg/l
- ◆ TMDLs set WLA → Mass-based limits as rolling averages
 - Mass invites reuse and land application disposal
 - Averaging discounts biological treatment variability
- ◆ BNR Optimization > ENR Results
- ◆ Opens the door to trading opportunities (WLA -> LA)

◆ TMDL Priority Basins 2012 - 2022



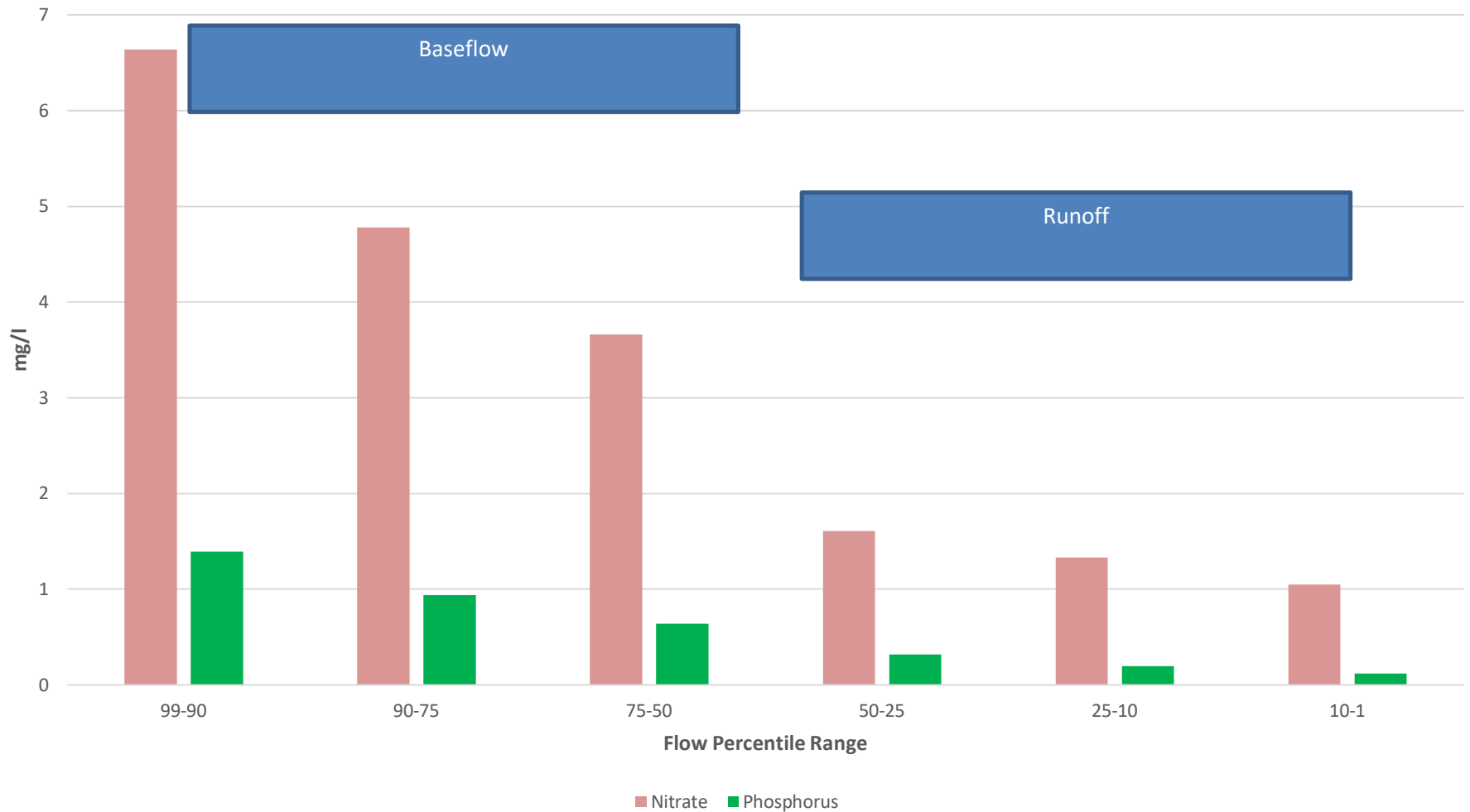


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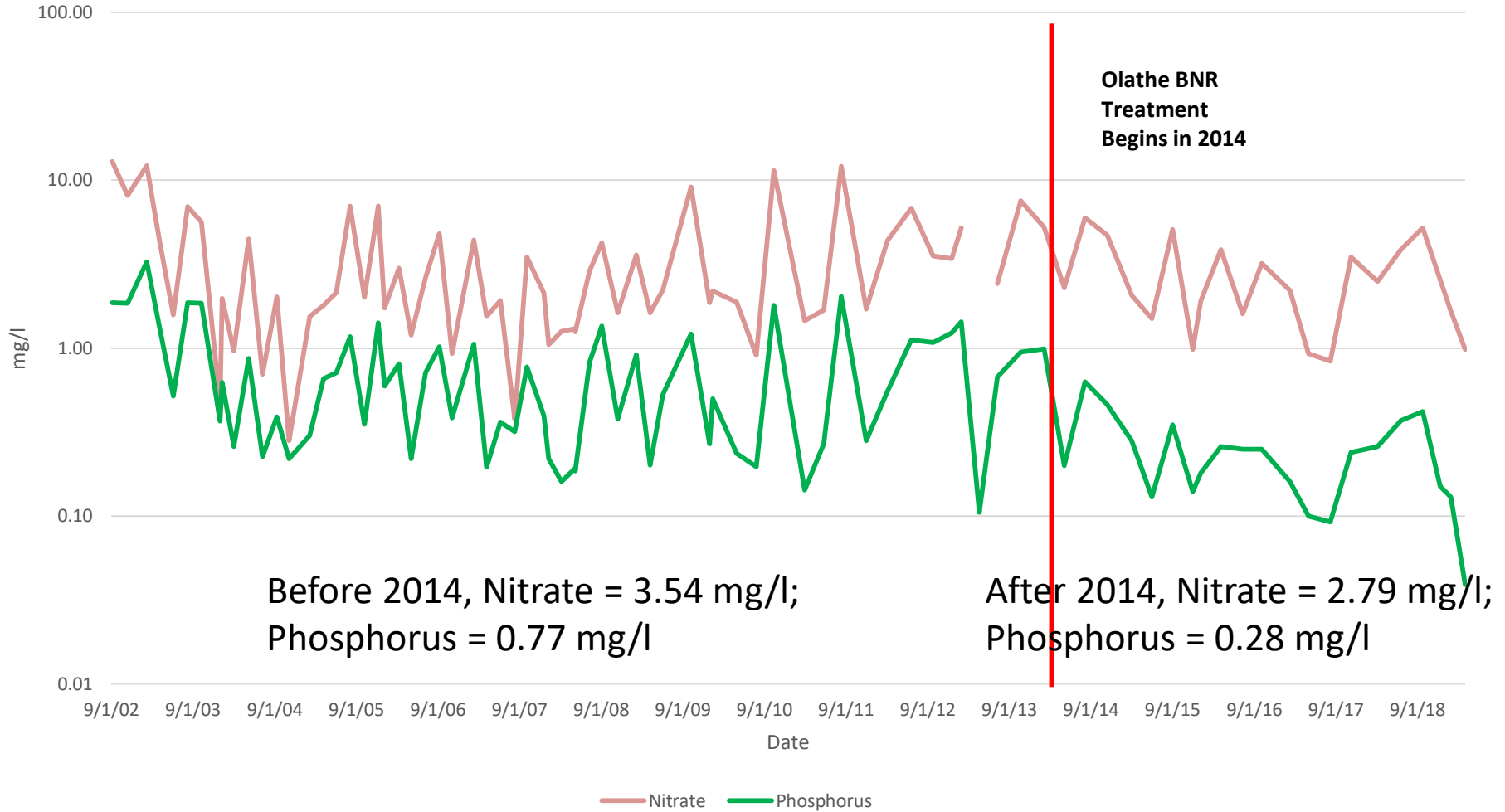
Urban Streams See Impacts at Low Flow

2002 - 2019 Nutrients in Cedar Creek



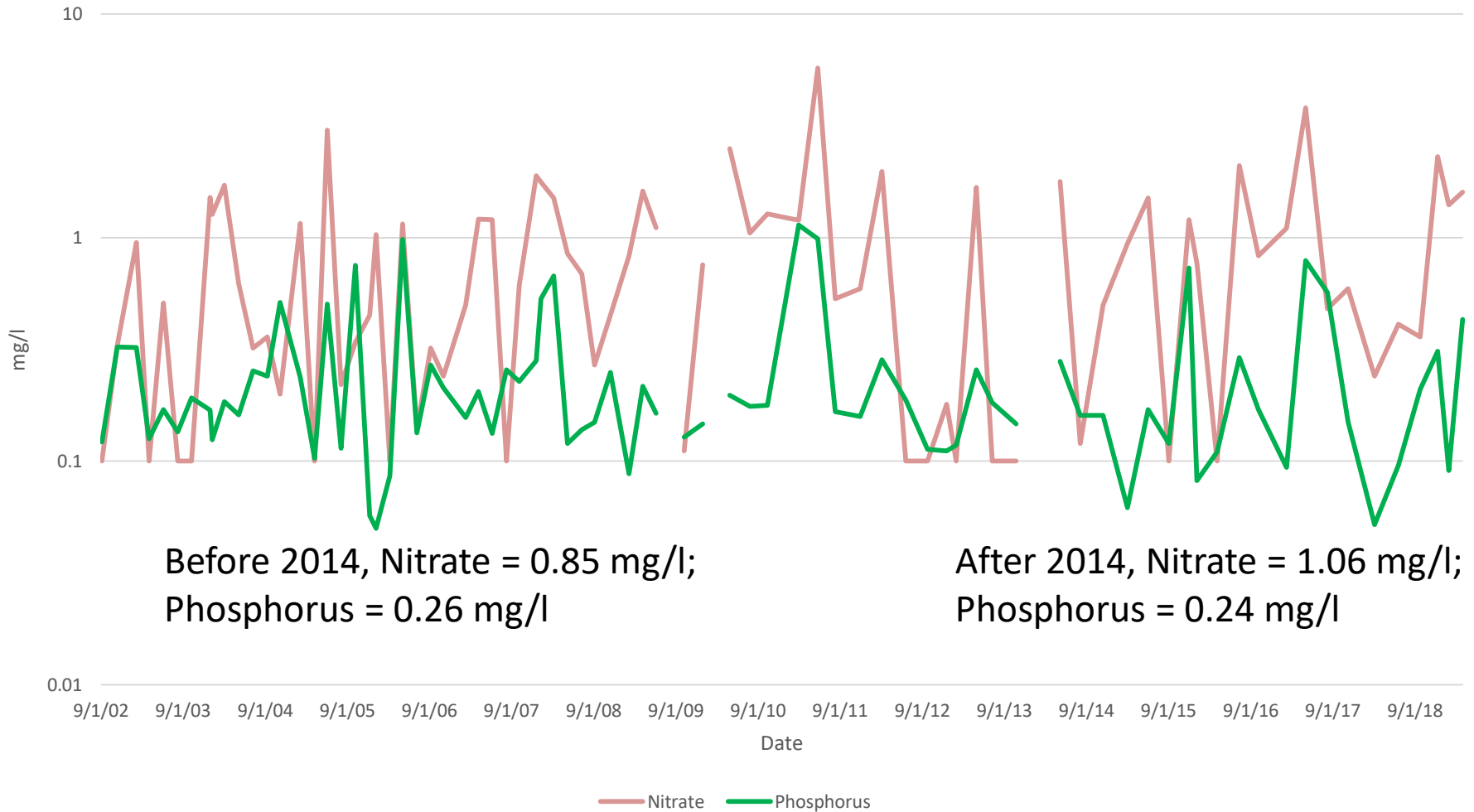
Nutrients Reduced through BNR

Nutrients in Cedar Creek 2002 - 2019



Rural Streams Lower in Nutrients, but Constant Over Time

Nutrients in Stranger Creek 2002 - 2019



Before 2014, Nitrate = 0.85 mg/l;
Phosphorus = 0.26 mg/l

After 2014, Nitrate = 1.06 mg/l;
Phosphorus = 0.24 mg/l

Take Away Messages

- ◆ Narrative criteria can be effective drivers, e.g., TMDLs
- ◆ Concentrate on reducing the status quo, rather than reaching a number
- ◆ Once (BNR) investments are made, opportunities arise
 - Optimization
 - Reuse
 - Land Application
 - Trading (Inverse)
- ◆ Numeric criteria are thwarted by NPS, by small towns and by politics
- ◆ In the end, attaining uses >>>> attaining criteria

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www.kdheks.gov/water/www.html

