Negotiating Nutrient Removal Terms – What's in Your Back Pocket?

2017 Five Cities Plus Conference

August 14, 2017

Guy Jamesson, City of Columbus

Elizabeth Toot-Levy, Geosyntec Consultants

5 CITIES + Columbus 2017

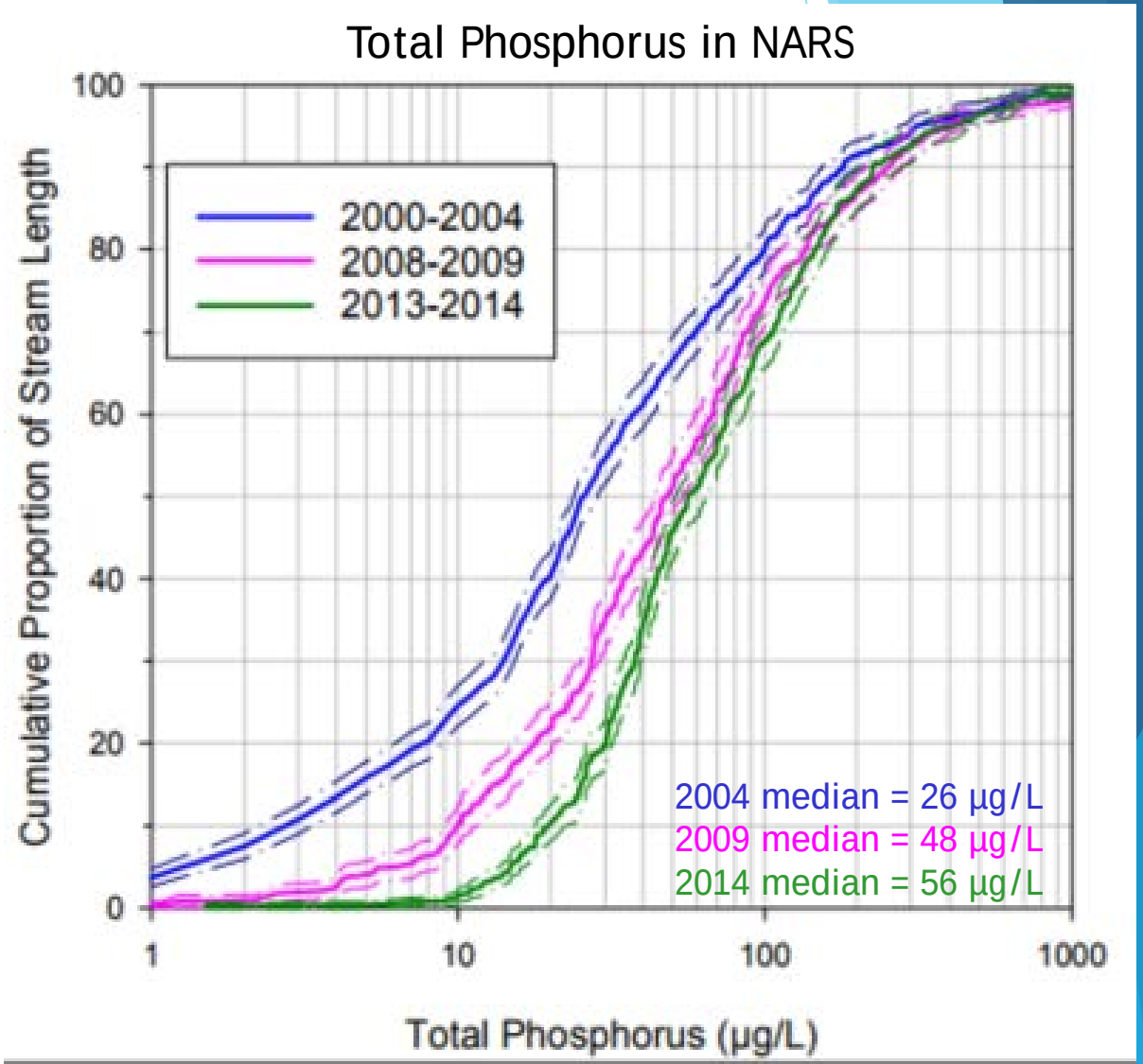
THE CITY OF COLUMBUS
ANDREW J. GINTHER, MAYOR
DEPARTMENT OF PUBLIC UTILITIES

Geosyntec consultants

National Aquatic Resource Surveys (NARS)

- 1,000 river & stream sites
- trending up everywhere
- Remote/undeveloped, developed areas

- Similar trends for lakes



The Nutrient Challenge

US EPA Nutrient Reduction Framework (2011)

1. Prioritize watersheds
2. Set goals
3. Point source permits
4. Agriculture and targeted watersheds
5. Stormwater and septic systems
6. Accountability and verification
7. Reporting
8. **Numeric Nutrient Criteria**

How to Address Nutrients in NPDES Permits

Natural Sources of Nutrients:

- Soil and phosphorus–containing rocks
- Fixation of atmospheric nitrogen gas
- Atmospheric deposition of nitrogen compounds

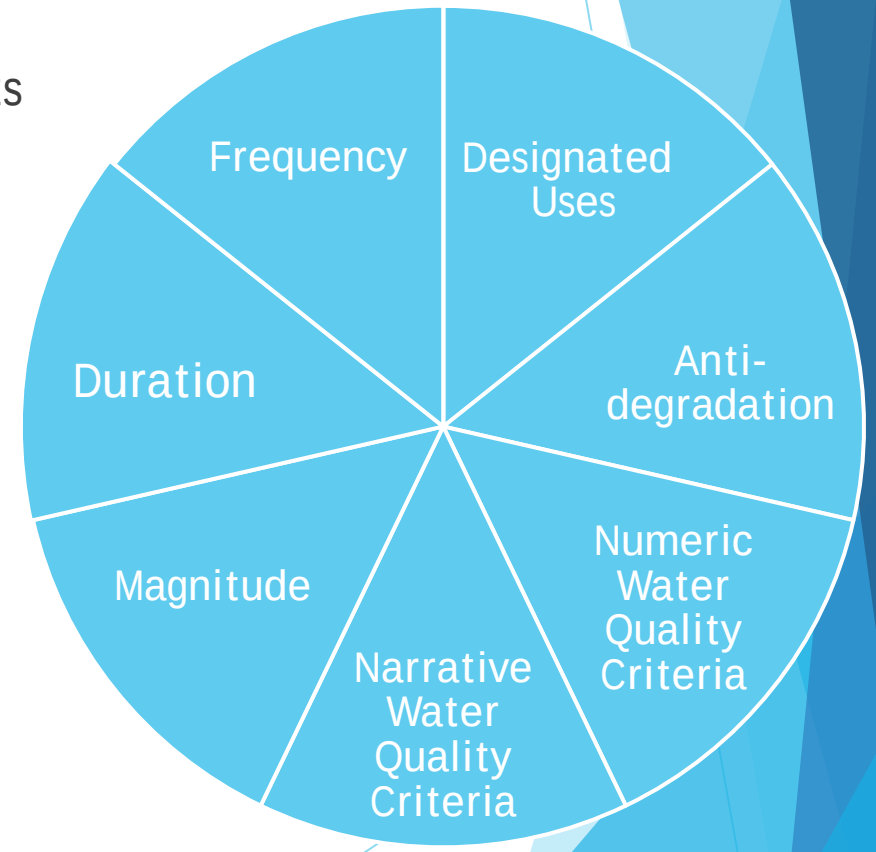
Anthropogenic Sources of Nutrients:

- **Municipal wastewater discharges ✱**
- **Industrial wastewater discharges ✱**
- **Urban stormwater runoff ✱**
- Row crop agriculture
- **Concentrated animal feeding operations (CAFOs) ✱**
- Animal feeding operations
- Atmospheric deposition

✱ *Regulated in NPDES permits*

Options for Addressing Nutrient Pollution in NPDES Permits

- Technology-Based Effluent Limits
- Water Quality-Based Effluent Limits
- Determine Applicable Timeframe for limits (Annual/Seasonal)
- Compliance Schedules
- Water Quality Standards Variances
- Watershed-based Permitting
- Water Quality Trading
- Flow-Based Permitting



Roadblocks to Innovative Permitting

- **Regulatory Capacity:** Budget cuts limit regulators' ability to support innovation
- **Environmental Equity:** Innovative approaches result in geographic differences ("hot-spots")
- **Lack of data:** How will watershed reductions be determined and verified?
- **Economics:**
  - Costs a lot of money
  - Economic implications unknown
  - afford to invest if it doesn't make a difference

NACWA's Focus on Advancing Nutrient Outcomes

- Increased and more meaningful engagement by all with balanced accountability
- Greater utilization of existing CWA flexibilities
- More widespread adoption of collaborative approaches
- Acceptance and adoption of mid-to-long-term adaptive management
- Increase the amount and flexibility of funding for cost-effective controls
- Enhance monitoring

Examples – Various States

Phosphorus Requirements in Kentucky

- Application of the narrative standard via numeric limits
- Technology-based limits based on Wisconsin's non-water quality based effluent limits
- Total phosphorus limits for waters impaired for nutrients
  - 1.0 mg/L monthly average
  - 2.0 mg/L weekly average

Phosphorus Requirements in Indiana

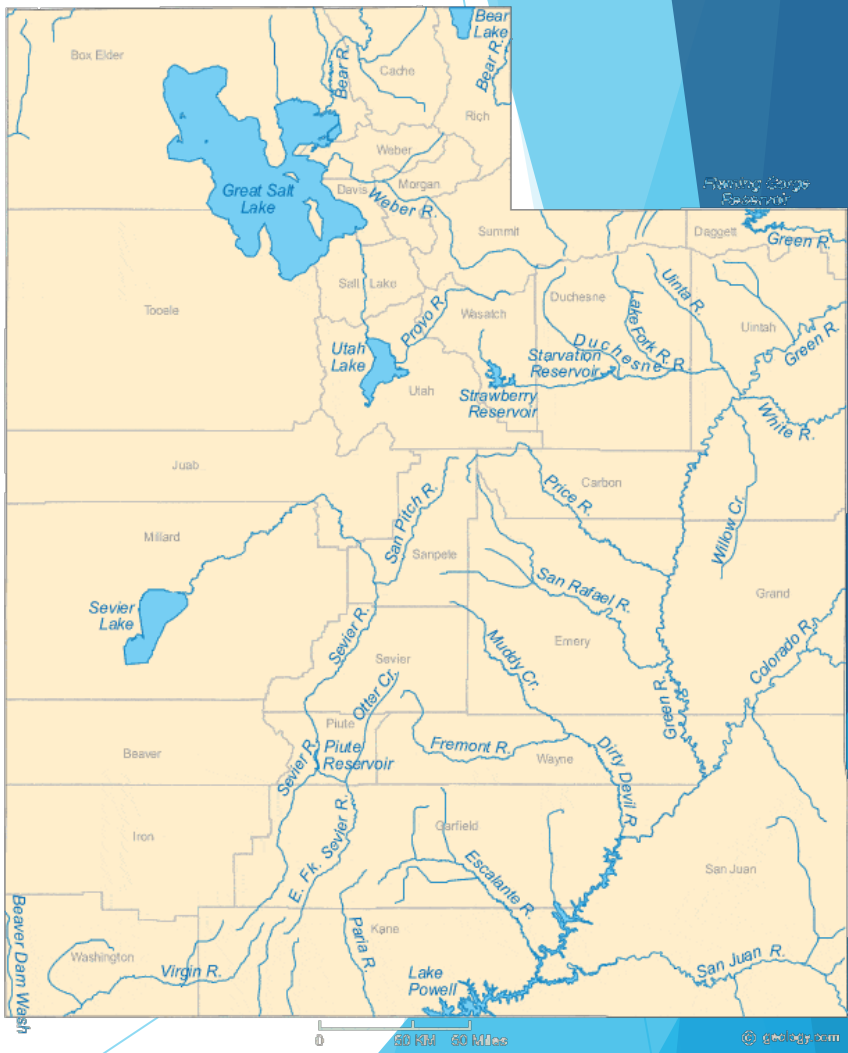
- 1 mg/L total phosphorus limit for major POTWs

Phosphorus Requirements from Missouri

- Effluent limitation of 0.5 mg/L TP (monthly average) for Lake Taneycomo & Table Rock Lake watersheds
  - <22,500 gpd exempt if permitted prior to 1994
- Lake and reservoir nutrient criteria (aquatic life & drinking water)
  - Site-specific TP, TN, Chlorophyll-a
  - Ecoregional chlorophyll-a with screening values for TP, TN, and chlorophyll-a (serve as TMDL targets)
- Monitoring Requirements implemented for point sources greater than 100,000 gallons/day

Utah

- Technology-Based Phosphorus Effluent Limits must be met by January 1, 2020
  - Mechanical plants required to achieve 1.0 mg/L
  - Lagoon and pond-based plants have total phosphorus caps of 125 percent times current phosphorus discharge.
- New rule for control of phosphorus discharges *expected to* reduce phosphorus in receiving streams by 50%



Wisconsin

Point Sources

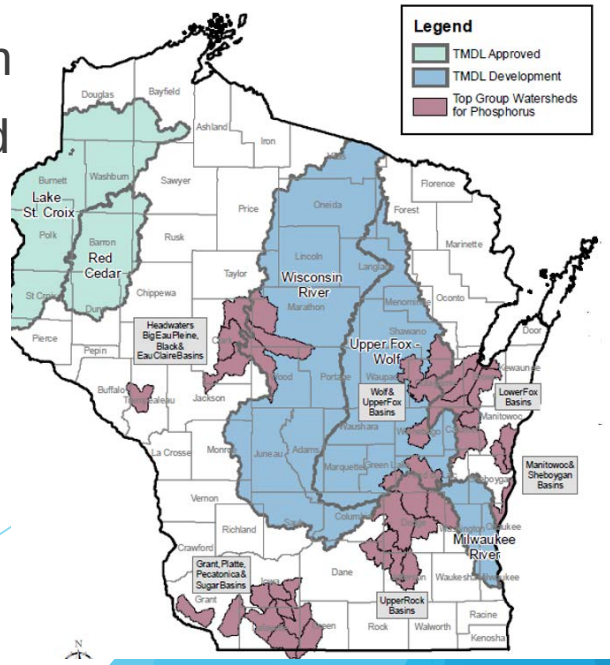
- Permits have phosphorus limits
- Optimize current operations
- Adaptive Management
- Water Quality Trading
- Multi-Discharger Variance

Non-point Sources

- 9 Key Element Plans
- Performance Standards
- Nutrient Management Plans

Partnerships Are Making Progress

- Municipalities
- County Land & Water Conservation Departments
- USDA NRCS
- Farmers, dairymen
- Environmental and Watershed Groups
- Academia



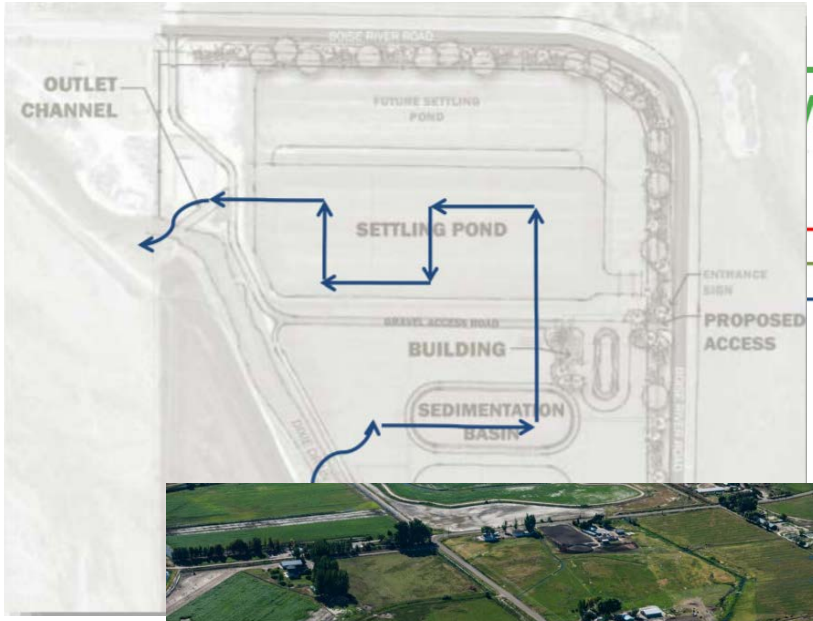
Boise, Idaho

- Treated Effluent was 6 mg/L
- 94% reduction considered to be cost effective
  - Biological removal
  - $35 million
- 98% reduction is not cost effective
  - Membrane filters, chemicals
  - Little environmental benefit

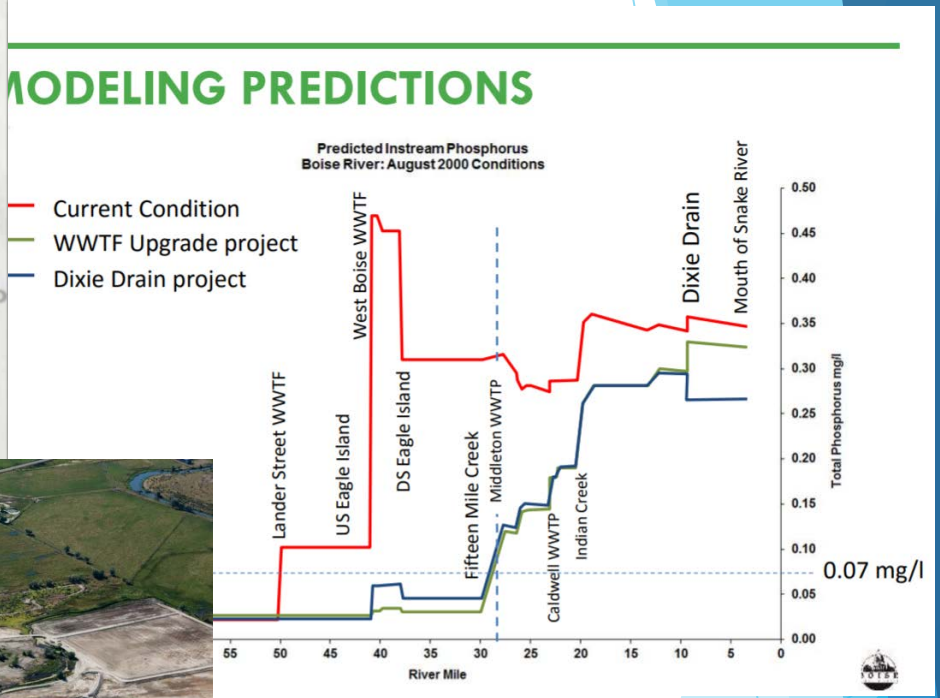
- WWTF Upgrade Alternative:

  Dixie Drain Enhanced Wetland Treatment System
  - 70% instream TP reduction
  - Sedimentation
  - Wetland Treatment
  - Phosphorus precipitation

Boise, Idaho



MODELING PREDICTIONS



Illinois

- Technology based limits as a stop-gap measure
  - 1 mg/L for 11 years
- Watershed Workgroup responsibilities in NPDES permits
- Collect new base-line data and update models
- Quantify improvements and identify additional projects
- Non-point sources Feasibility Analysis
- Phosphorus Discharge Optimization Plan

“Typical” Ohio Permits

	Lake Erie Watershed	Ohio River Watershed
Total Phosphorus	1.5 mg/L (weekly) 1.0 mg/L (monthly)	Monitoring only
Nitrate + Nitrite	Monitoring only	
Ammonia	Summer and winter limits and/or monitoring; varies based on receiving water conditions	

Phosphorus Requirements in Ohio Permits

All permits since 2016

- Monitor for Dissolved P (grab)

Lakewood *(L Erie Basin)*

- TP seasonal limit 0.7 mg/l (Mar thru Sept)

Dayton; Montgomery County Western Regional *(Ohio R Basin)*

- TP seasonal load limit (July – October) equivalent to 1.0 mg/l, based on historical flow

Bowling Green *(L Erie Basin)*

- Goal: monthly avg 0.5 mg/l TP
- If goal not achieved within 49 mos, prepare *Phosphorus Discharge Optimization Evaluation* plan – including implementation schedule

All POTW permits without existing TP limits

- Submit Technical and Financial Capability Study to Reduce Phosphorus by 12/1/2017. (Study applies to existing facilities, does not require plant additions or upgrade.)

Ohio – Unique Approach to WQS (*under development, to be final ~2018..?)*

- **Narrative criteria translator** *INSTEAD* of numeric criteria
- Weight of evidence assessment of nutrient enrichment (**SNAP**)
- If nutrients impair or threaten WQ , then implement control actions
- Focuses on iterative adaptive management (AM) to implement cost-effective management actions
- Ability to implement alternatives, evaluate effectiveness, adapt and continue, based on approved AM Plan

SNAP (Stream Nutrient Assessment Procedure)

1. Determine biological water quality criteria attainment
2. Determine if nutrient response variables are elevated
   - 24-hr DO swing
   - Chlorophyll
   - BOD_5 (large rivers only)
3. Check that non-nutrient factors are not the cause

Tools

More, better data!!!

- Watershed Nutrient Mass Balance
- Importance of real data
- Broader nutrient source accountability
- Modeling Capabilities
- Trend Analysis
- Biological attainment status
- Habitat quality
- Watershed Assimilative Capacity

Communication

- Point sources and non-point sources
- Suite of stakeholders
- Challenge assumptions
- End the blame game

Economics

- Resources are limited
- Choices have consequences
- No one can afford bad decisions
- Local- and National-scales

Integrated Planning

- Competing Priorities
- Traditional approaches have significant economic impacts
- Watershed solution likely necessary
- Large pool of stakeholders

CWA Flexibilities

- Greater Utilization
- Unique combinations of flexibilities
- Realistic expectations
- Creative Water Quality Standards

TAKE-HOME:

Permit negotiation ideas

- Request seasonal rather than monthly discharge limits
- Longer Implementation Periods
- Watershed-Based Permitting
- Request loading rather than concentration discharge limits
- Propose development of adaptive management plan for your watershed in lieu of immediate nutrient limits
- Consider outside-the-plant ideas: NPS projects; water quality trading; environmental improvements

Questions

Elizabeth Toot-Levy, Geosyntec Consultants – etootlevy@Geosyntec.com

Guy Jamesson, City of Columbus – gmjamesson@columbus.gov