Iowa Nutrient Reduction Strategy: Stream Water-Quality Monitoring

Adam Schnieders
Water Quality Coordinator
Iowa Department of Natural Resources

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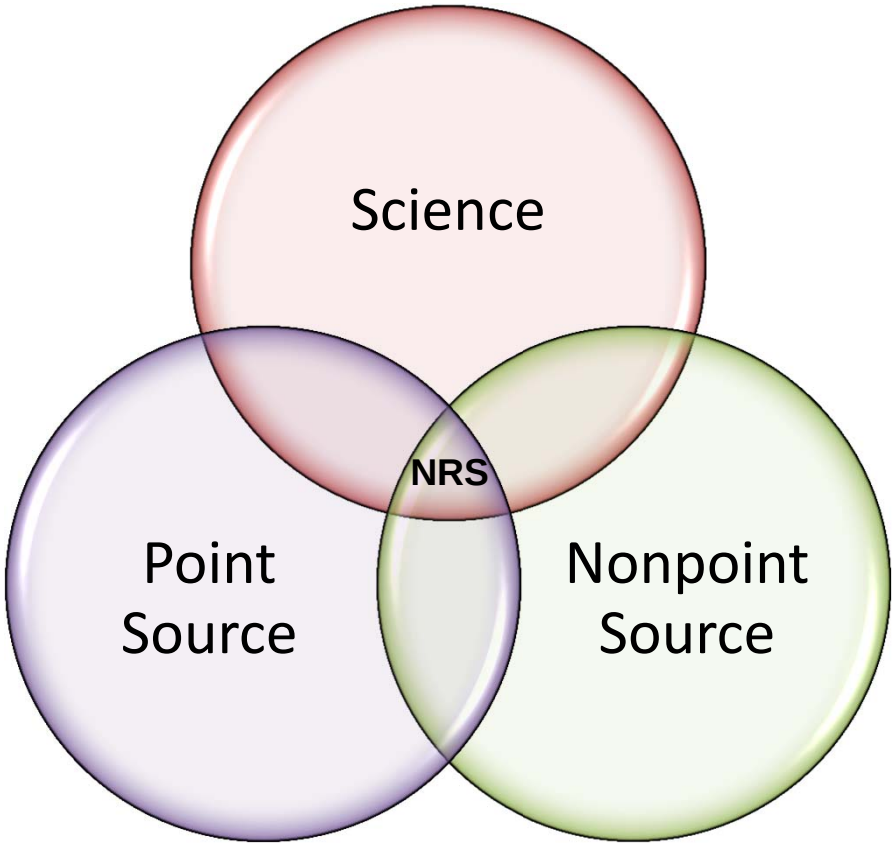
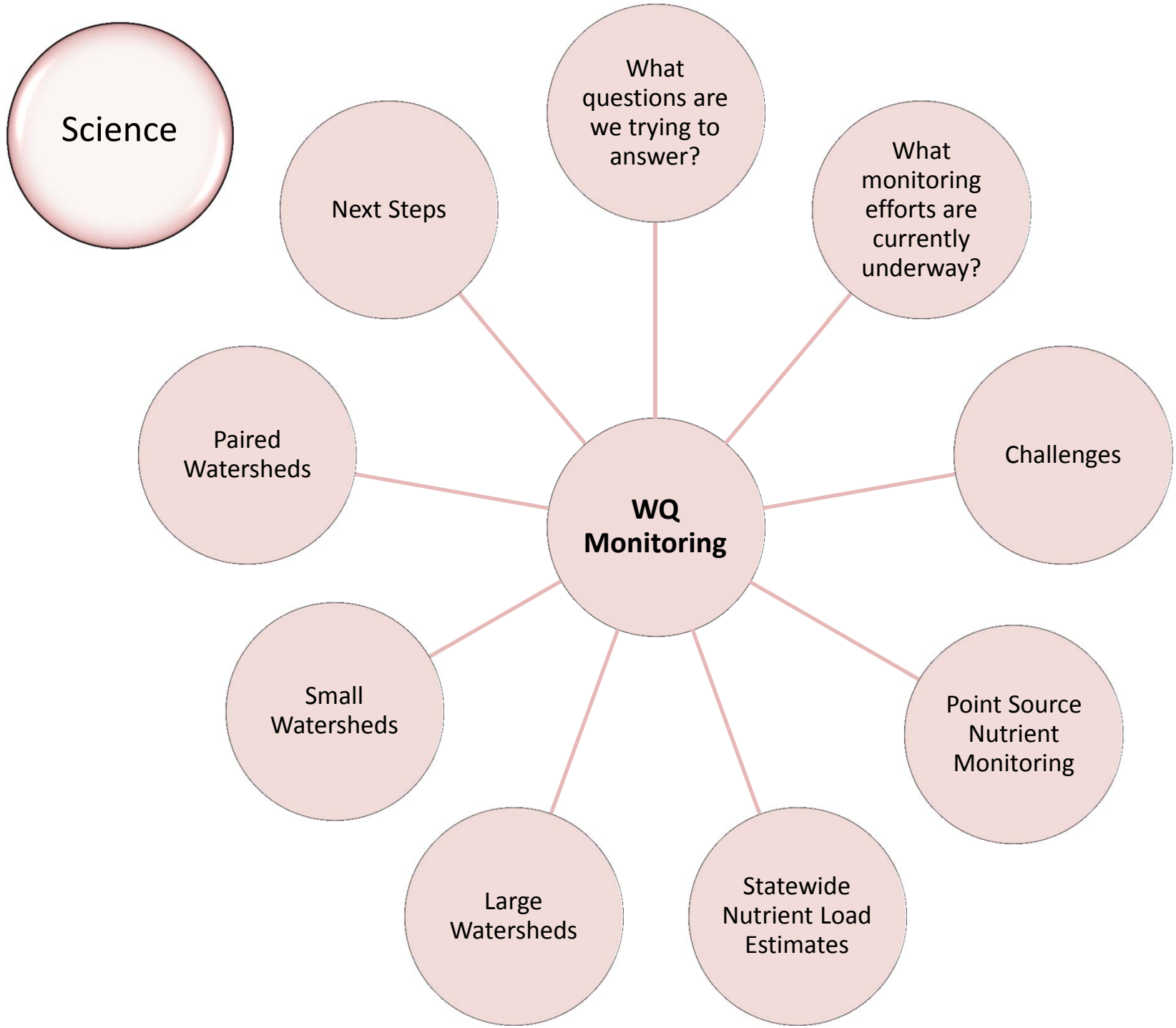

Science
NRS
Point
Source
Nonpoint
Source


Science
What questions are we trying to answer?
Next Steps
What monitoring efforts are currently underway?
Paired Watersheds
WQ Monitoring
Challenges
Small Watersheds
Point Source Nutrient Monitoring
Large Watersheds
Statewide Nutrient Load Estimates

Purpose of Report

- To describe and report on current known stream nutrient monitoring efforts in Iowa in context of the framework
- To discuss the challenges in collecting and using water quality data to demonstrate progress towards meeting the goals of the INRS
- To suggest ways to improve and coordinate the collection and evaluation of WQ data for these purposes

What questions are we trying to answer? (FOCUS)

Monitoring programs are designed to provide data to answer a specific question:

- **“How much is nitrogen reduced by a bioreactor?”**
- **“How much phosphorus is removed by a city wastewater treatment plant?”**
- **“By how much is nitrogen reduced when a given amount of cover crops are planted and maintained in a watershed of 1,000 acres?”**
- **“How much phosphorus is discharged from the Iowa/Cedar River basin annually over a 20 year period?”**

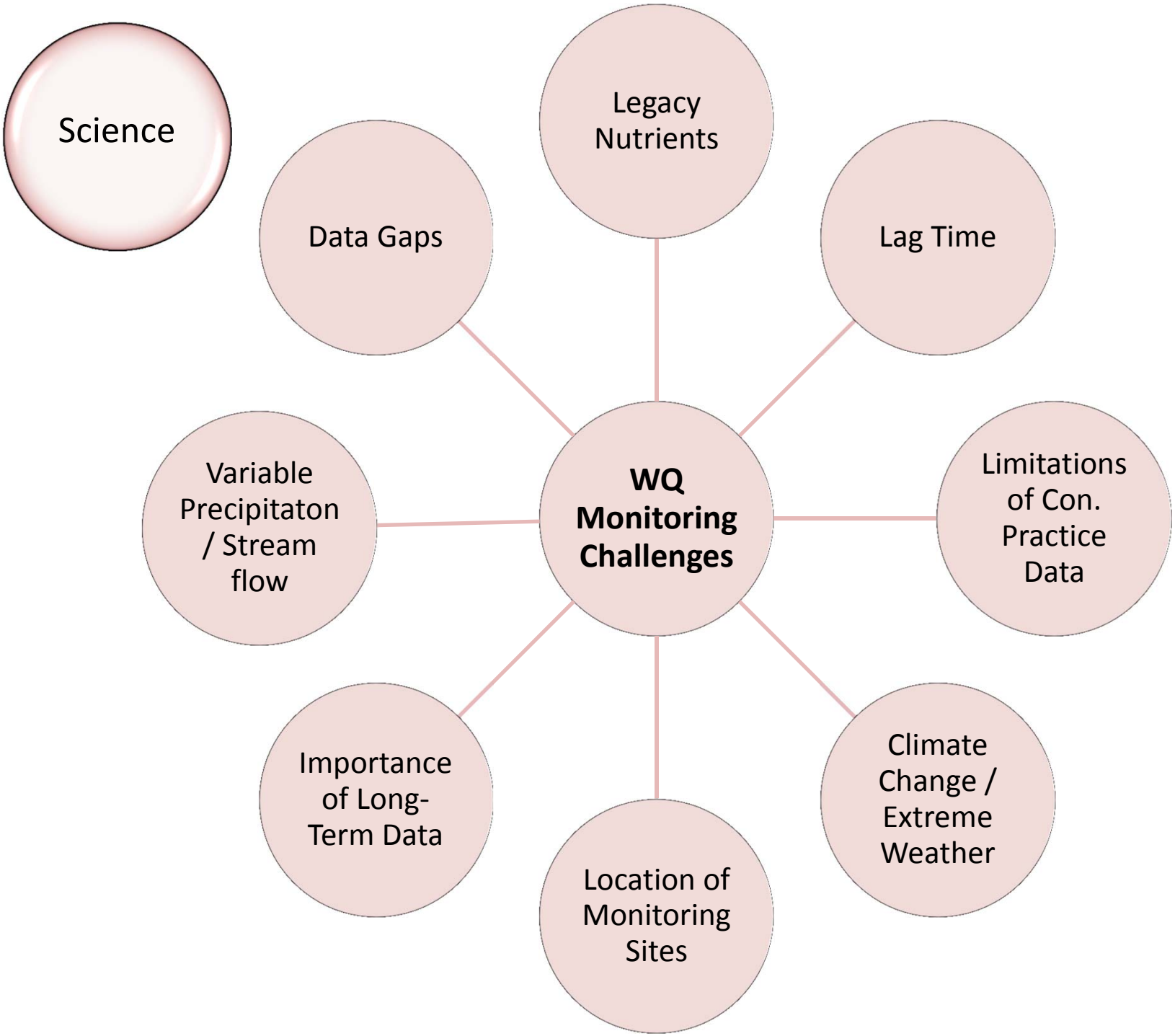
What questions are we trying to answer? (DESIGN)

- For monitoring programs to reliably assess changes in water quality they should be designed to answer specific questions and should consider a number of factors including, but not limited to:

  - the size of a watershed to be monitored,
  - the number of locations that need to be sampled,
  - how soon results are needed,
  - and the costs and other resources available to collect and analyze samples and interpret results.

What questions are we trying to answer? (ACTUAL)

- **How much nitrogen and how much phosphorus are being exported from Iowa?**
- What reductions in nitrogen and phosphorus occur following implementation of nutrient reduction practices by non-point sources?
- What reductions in nitrogen and phosphorus occur following installation of nutrient reduction technologies by point sources?
- What water quality monitoring resources are available and what additional monitoring is needed to measure the impact of the INRS on reducing nutrient loads in Iowa waters?
- What are the challenges associated with measuring changes in stream water quality?


Science
Legacy Nutrients
Data Gaps
Lag Time
Variable Precipitaton / Stream flow
WQ Monitoring Challenges
Limitations of Con. Practice Data
Importance of Long-Term Data
Climate Change / Extreme Weather
Location of Monitoring Sites

Probability of Measuring a Reduction in Nitrate in the Raccoon River over Time

	Percent Load Reduction Over the Timeline			
	5%	10%	20%	42%
Timeline	Proportion of Simulations resulting in a significant ($p<0.05$) load reduction			
5 Years	3.5%	4.5%	8.0%	18%
10 Years	4.0%	6.0%	13%	40%
20 Years	4.5%	8.5%	22%	70%

HTF Baseline and Goals via the Framework

Measurement	TN delivered (Metric Ton)	TP delivered (Metric Ton)
Baseline period for 1980-1996	1,575,176	137,276
5-year moving average for 2011-2015	1,249,400	155,220
20% reduction goal by 2025	1,260,141	108,821

What nutrient monitoring and assessment efforts are underway in Iowa?

- Summary of known stream WQ monitoring data and information
- Follows the Framework based on watershed size
- Analyzes:
  - Frequency
  - Duration
  - Parameters tested
  - Watershed name and size
  - General purpose of each effort

Recommended Next Steps

- This is all we know for nutrient monitoring in Iowa streams
- Highlights the importance of the determining TP loads
- Emphasizes the importance of paired watershed studies
- Calls for a re-evaluation of point source load estimates
- Emphasizes the importance of having information on the types and amounts of nutrient reduction practices
- Recommends a technical work group to develop recommendations for a monitoring design to measure INRS progress

What questions do you have?

Adam Schnieders

515.725.8403

adam.schnieders@dnr.iowa.gov