Collaborative monitoring efforts to detect changing baselines

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Office of Research and Development
Full Name of Lab, Center, Office, Division or Staff goes here.

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A Very Collaborative Endeavor

- **EPA Regions 1, 2, 3, 4, 5, 7, 10**
- **State participants from each EPA Region with RMNs**
- **Tribal participants from nearly every Region**
- **Other agencies (USFS, USGS)**
- **Fairfax County, VA**
- **Other parts of EPA (OW)**
- **Contractor support (Tetra Tech)**

Goal of This Monitoring Effort

- Identify long-term trends in biological, thermal, and hydrological conditions using continuous sensors and annual surveys in streams and lakes

Data Collection in Streams

Biological

Benthic macroinvertebrates, optional fish and periphyton

Temperature

Continuous water & air temp.

Hydrology

Continuous water level data

Habitat

Qualitative & Quantitative

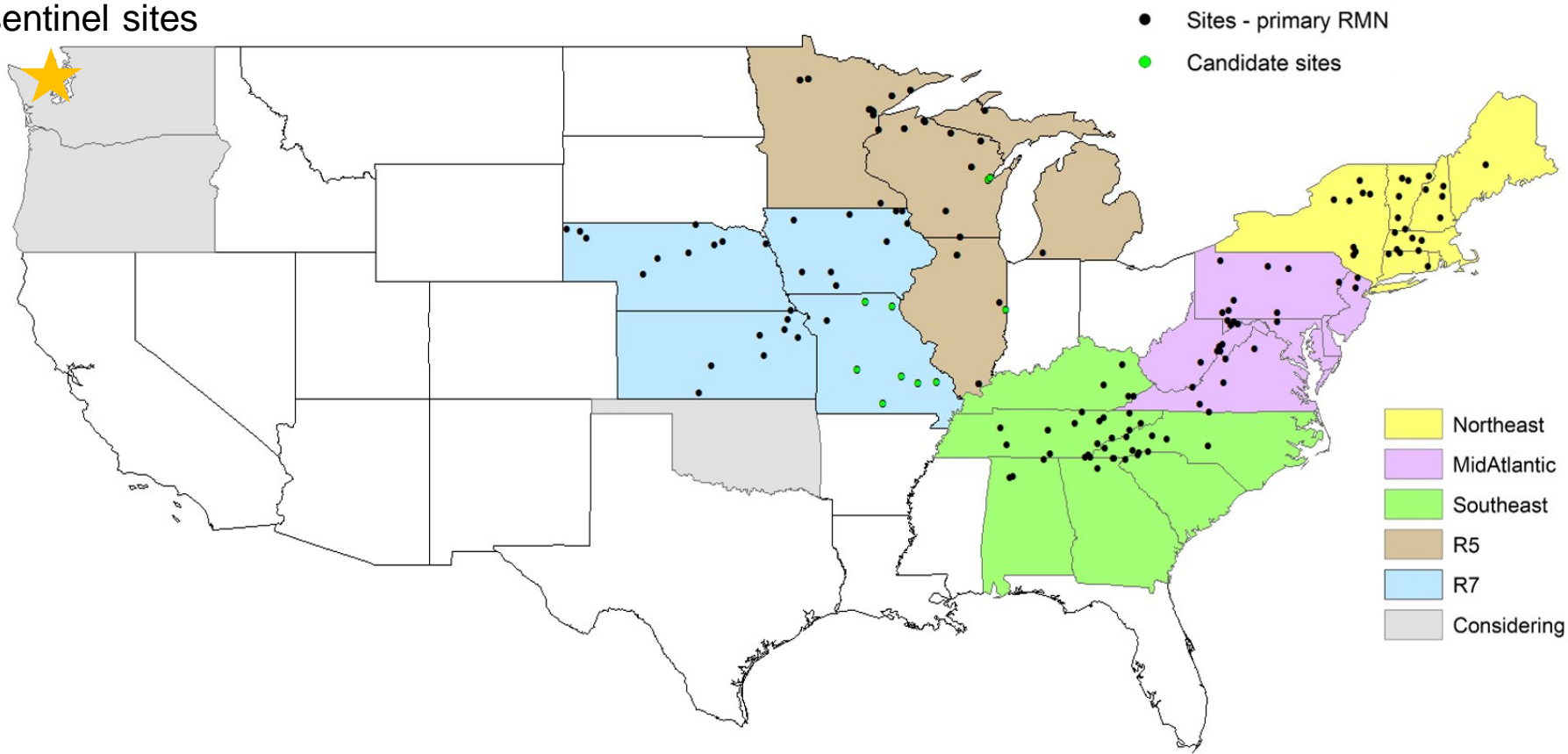**Water Chemistry**

In-situ, optional Lab Samples

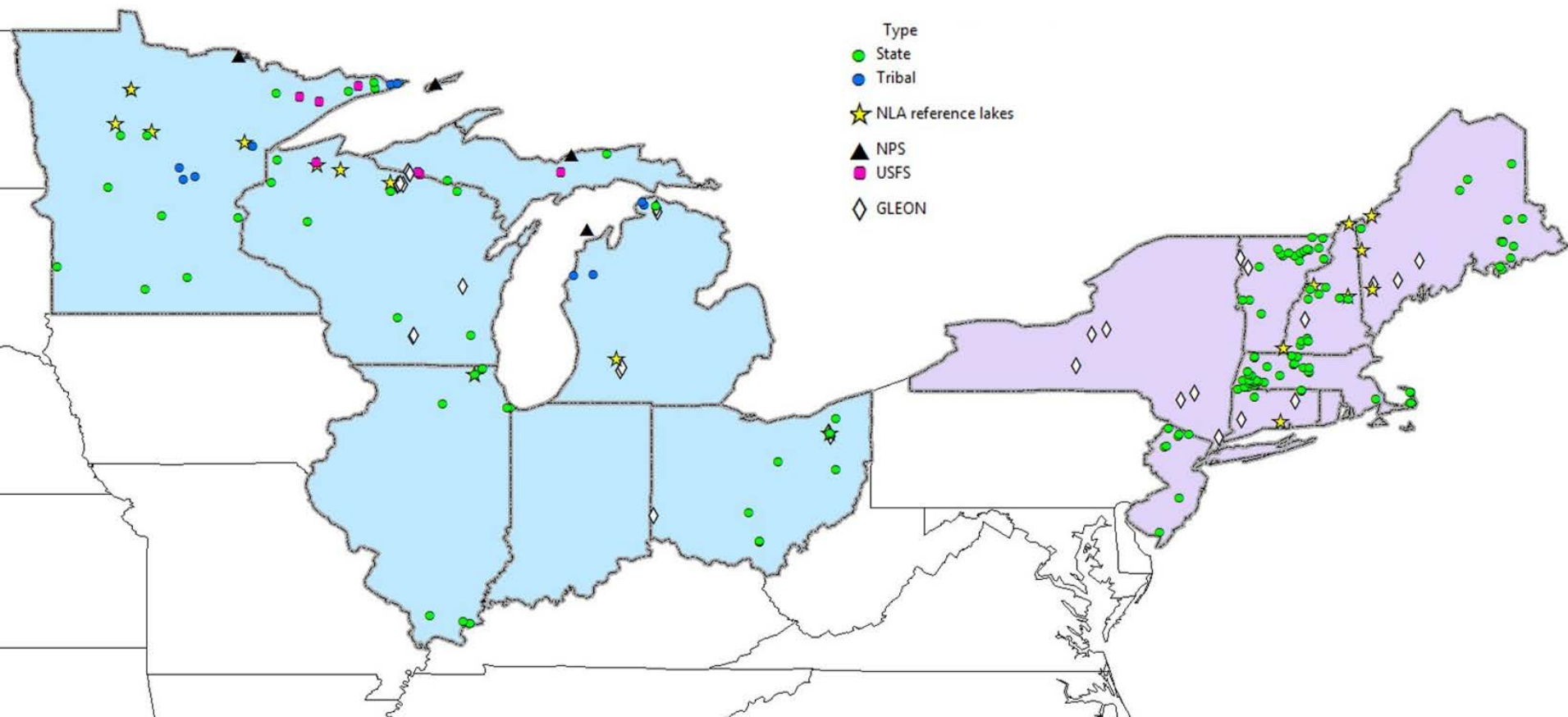**Other**

Cont. Conductivity, Photos

Where are the Stream Sites?

Puget Lowland sentinel sites

Where will Lake Sites be?

Candidate sites (3/12/2018)

Advantages of Collaborating

- Share the burden of long-term monitoring by pooling data
- Increase power to detect small, long-term trends
- Share expertise
- Leverage resources
- Share monitoring protocols and lessons learned
  - particularly for newer sensors
- Test innovative methods

# Leveraging Example: Lakes

- Coordinate sites, protocols with National Lake Assessment where practical
- GLEON partnership
  - Lake Observer website and app
  - Experience with continuous sensors and data
- University of Minnesota request to collect CDOM
- Red Lake BIA grant to develop R tools, Shiny apps that could benefit all RMN partners

Innovative Methods Example

- Collaboration among Regions 2, 3, 5, ORD, and USGS
- Further develop Flow Pictures Explorer
  - Stores images of streams and hydrographs
- Develop algorithms to estimate water level and discharge based on images
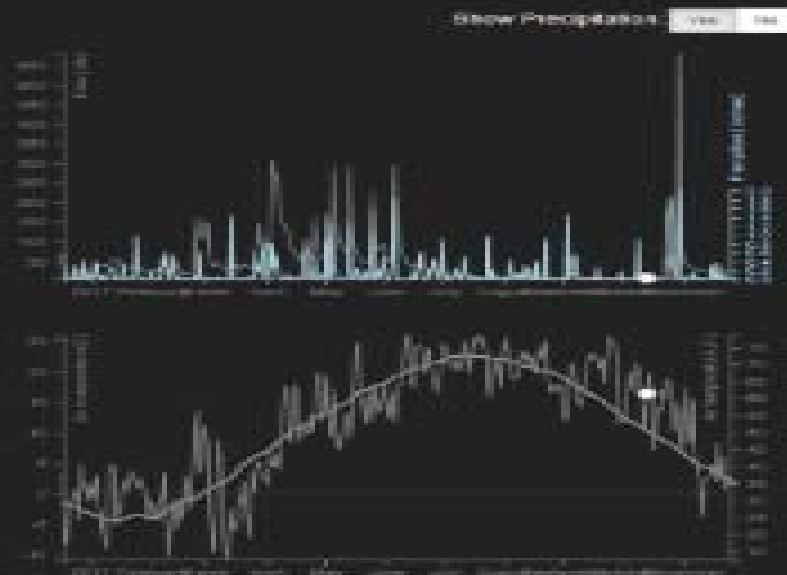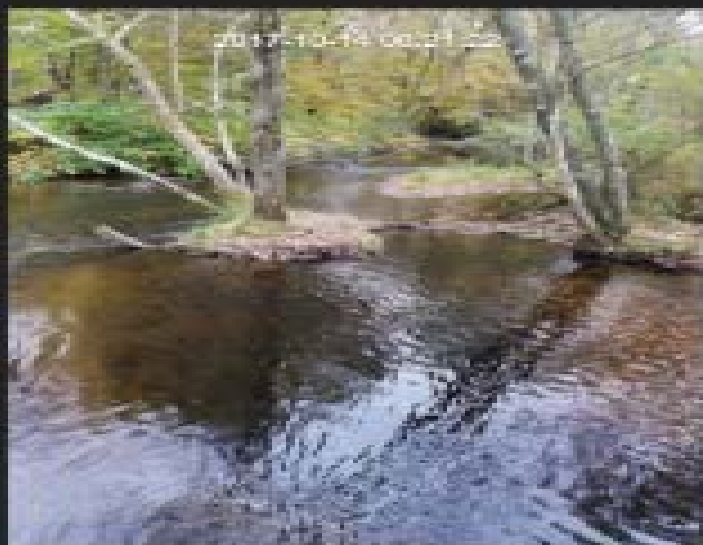
How Are Data Used?

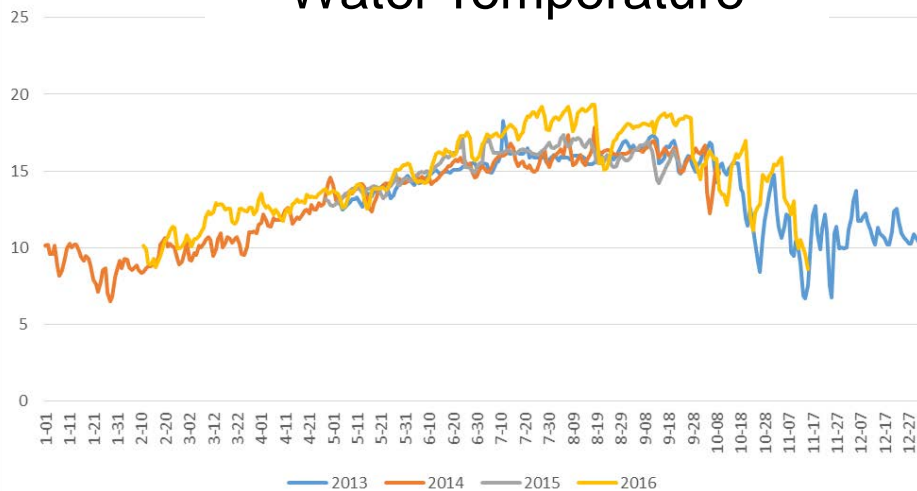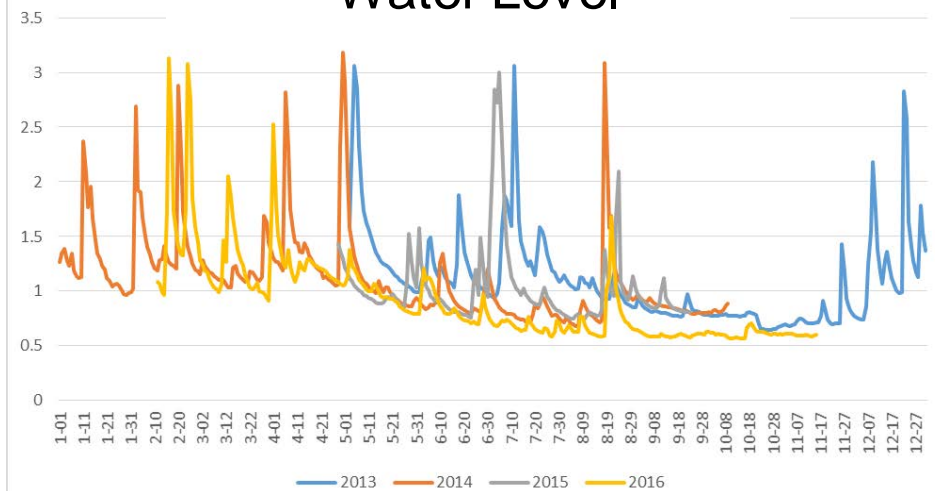| Timeframe	Application
1-2 years	Establish current conditions
3+ years	Support Clean Water Act programs
5-10 years	Detect trends in high quality waters
10+ years	Detect long term water quality trends

Tracking Variability

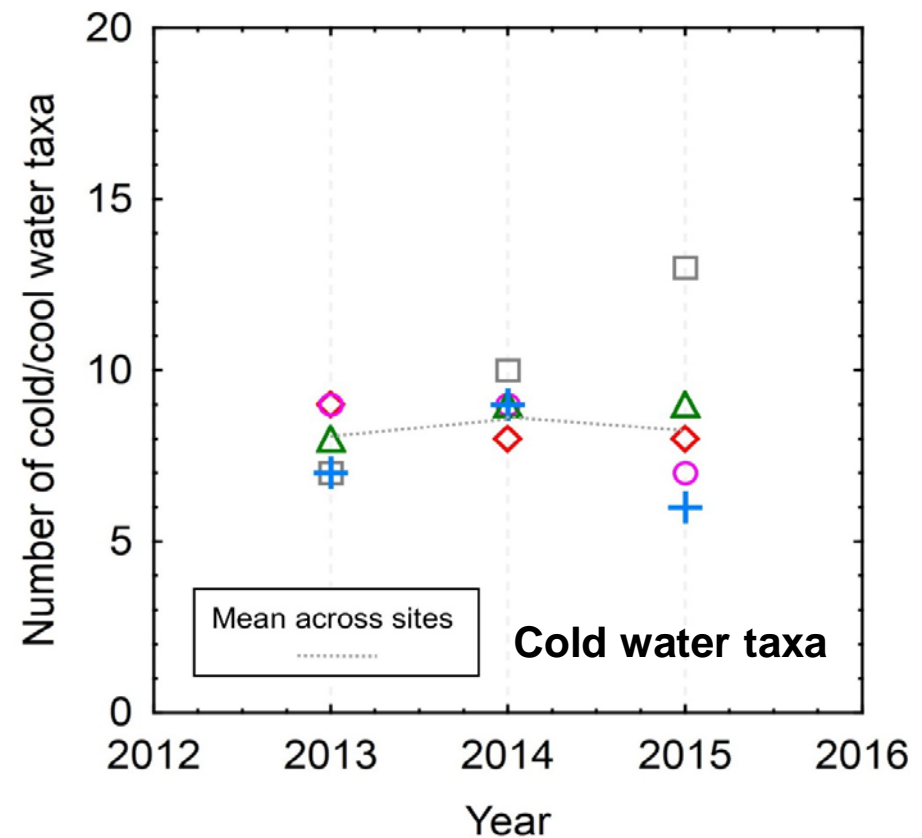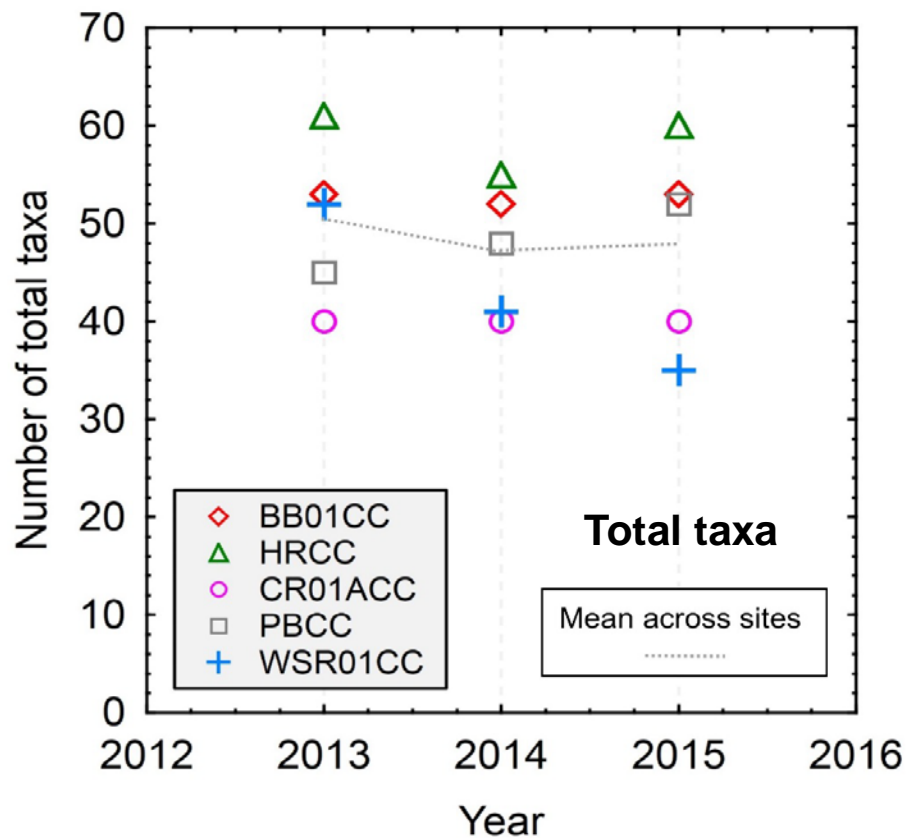- Better understanding of year-round thermal and hydrologic regimes and how much they vary

Data provided by TN DEC

Tracking Variability

- Better understanding of variability in biological data across sites and over time

Total taxa

Legend:
- ◇ BB01CC
- △ HRCC
- ○ CR01ACC
- □ PBCC
- + WSR01CC

Mean across sites ·········

Cold water taxa

Mean across sites ·········

Data provided by MA DEC

Other Data Uses

- Refine ecologically relevant classifications
- Improve or validate stream temperature and flow models
- Use data to inform criteria refinement or development
- Develop biological indicators for protection planning
- Evaluate and refine metrics and indicators for long-term trend detection

Coming Soon: One Site to Further Collaboration

An official website of the United States government.

We've made some changes to EPA.gov. If the information you are looking for is not here, you may be able to find it on the EPA Web Archive or the January 19, 2017 Web Snapshot.   Close ✕

EPA United States Environmental Protection Agency

RMN website – DRAFT design

Environmental Topics   **Laws & Regulations**   **About EPA**   Search EPA.gov 🔍
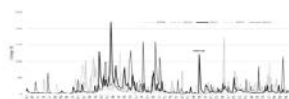
CONTACT US   SHARE f 🐦 📌 ✉

Regional Monitoring Networks (RMNs)

Framework

- What are RMNs?
- Who can participate?
- Where do RMNs exist?
- How do I join?

Tools

- Continuous sensor data
- Biological data
- GIS-based site screening

Related EPA research

- Resiliency
- Vulnerability assessments
- Adaptation Design Tool

Other related research

- National Reference Network
- NPS
  - Eastern Rivers and Mountains (ERMN)
  - Great Lakes Inventory & Monitoring Network

Streams

- Protocols
- QAPP
- Site selection criteria
- Data management
- Data analysis
- Publications

Lakes

- Protocols
- QAPP
- Site selection criteria
- Data management
- Data analysis
- Publications

Wetlands

- Publications

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How Else Do We Stay In Touch?

- Regional leads for each RMN

- Webinars with partners
  - Status updates
  - Training (QA/QC, protocols, sensors, etc.)
  - Information sharing, new ideas

- Status update forms

- Workshops at conferences
  - Training on methods, sensors, QA/QC, data management

QUESTIONS? COMMENTS?

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