Building Environmental Intelligence

2013-2014 Global Seminar Series: Panel 1

Case Studies:
USGS Great Lakes
Puget Sound Partnership
December 6, 2013

Event Webpage:
http://www.chesapeakebay.net/calendar/event/21128/

Overview:

The Scientific, Technical Assessment, and Reporting Team is hosting a Global Seminar Series to gain insights on unique and innovative approaches to monitoring, including but not limited to: network design, funding, interactions with stakeholders, technology, and analysis techniques. This case studies are monitoring networks from across the United States, Australia, and Ireland. The insights gathered during this Global Seminar Series will inform the next steps of Building Environmental Intelligence, leading the future of water quality monitoring in the Chesapeake Bay. The presenter was asked the following questions:

- What are the objectives of the monitoring network(s) and supporting network design?
- What is the operational model of how the sample collection, lab analysis, and data management are conducted?
- What is the business model of how the network is funded?
- What is the governance structure of the restoration effort and how do they oversee the monitoring program?
- List the three biggest successes and challenges in sustaining the network(s).

USGS Great Lakes

Presenter: Norm Grannemann, USGS Great Lakes Coordinator

Link to: Presentation

Case Study Location: Great Lakes Watershed, USA

Case Study Monitoring Priorities:

- Respond to Directives/ Inform Decision Making

- Provide Baseline Information
- Provide support for measuring restoration progress
    - Fisheries Fishery Value : >$5 Billion (Great Lakes)

- Drinking Water
- Toxics and Emerging Contaminants/ Public Health Risks
- Invasive Species
- Nearshore and non-point source pollution
- Climate Change

Monitoring Program Design:

- Map available for National Monitoring Network (NMN) coastal waters tributary sites and land uses on presentation slides.
- Sampling is performed at stream gage location at about half of the NMN sites.
- Monthly storm event samples are collected
- Use automated samplers when feasible.
- Add multi-sensor probes at most sites.
- Parameters monitored: Physical, Nutrients, Major Ions, Suspended Sediment, Pharmaceuticals and Personal Care Products

Challenges in Sustaining Monitoring:

- Decrease in Resources for Monitoring:
    - Toxics and Emerging Contaminants, $1 Million to $550,000
    - Nutrients through base-flow and storm sampling, $1 Million to $600,000
        - Decreased the number of stations to maintain higher frequency sampling, shuffled funding brought the budget up to $770,000.

- Resources designated to restoration activities, with a de-emphasis on monitoring

Innovative Operations of Monitoring Networks/ Technology:

- Monitoring related to fisheries, monitoring of pre fish, sport fish, and lower trophic level are coordinated by EPA, NOAA, and state government.
    - Prey fish is the single biggest monitoring network in the Great Lakes

- Great Lakes Restoration Initiative established 5 priority watersheds where BMP implementation was anticipated. Edge-of-field monitoring stations were placed in the priority watersheds before BMP's were implemented. Monitoring took place before implementation, during implementation, and after. Interest in this data for modeling efforts.

    - Currently looking at singular BMP's but moving towards monitoring clusters of BMP's.
    - This helped explain what was happening at the field level

- Coordinated science and monitoring program rotates intensive sampling to one lake per year.
- Real-time sensors (currently installing nitrogen sensors at the edge-of-field sites) and the development of surrogate regression equations to potentially reduce the cost of long term monitoring.
- Integrated passive organic bio-concentrating samplers (POCIS/SPMD)
- Chromophoric dissolved organic matter sensors (CDOM) and autonomous underway vehicles (AUV) to relate tributary impacts to embayment and the near shore.
- Sampling for Pharmaceuticals and Personal Care Products at Long-Term Coastal Waters Monitoring Network sites
- Remote sensing for toxic algal bloom forecasting in coordination with NOAA and NASA

Innovative Business Models and Leveraging Resources:

- Great lakes Observing System has been successful with gaining sponsorship for buoys (i.e. energy companies, universities) for recognition.
    - Sponsors will pay for the equipment and installation, harder to gain support for on-going maintenance needs.

Engaging the Public/ Citizen Science/ Non-traditional Partners:

- 60 Beaches Monitored in the Great Lakes has been transitioned from a program supported by EPA, NOAA, and State Health Departments to State and County level agencies. One million dollars of funding has decreased to $600 thousand in the last three years.
- Citizens collect dead birds on beaches to monitor botulism.
- Installed monitors on charter boats.

How the Monitoring is incorporated into the Governance Structure:

- Managed by two countries, eight states, and two provinces through three international agreements which form the basis for most water resources management.
- Lake Management Plans are used for restoration progress, monitoring progress is included in these plans.

Puget Sound Partnership

Presenters: Dr. Nathalie Hamel, Puget Sound Partnership

Link to: Presentation

Case Study Location: Puget Sound Watershed, USA

Case Study Monitoring Priorities:

- Mandate: recover Puget Sound, coordinate efforts
- Leads science and recovery plans and priorities
- Provide a monitoring framework that supports the Action Agenda and recovery goals
- Evaluate progress recovery of Puget Sound , accountability, reporting

Monitoring Program Design:

- More information: https://sites.google.com/a/psemp.org/psemp/

Challenges in Sustaining Monitoring:

- Funding cuts to ongoing programs for example to iconic Pacific Salmon.
- The majority of monitoring funds are managed by individual agencies and typically dedicated to specific programs or mandates. This limits opportunities to fund other priorities, and can make program integration more difficult. However, silos offer security to funding sources wishing (or required) to support specific activities, and can sometimes be easier or more efficient to manage.
- Prioritization of Monitoring Needs

Innovative Operations of Monitoring Networks/ Technology:

- All data collection and analysis is done by partnering agencies
- Through an exercise of "How often is sampling necessary?" sediment monitoring is done every 10 years because the change is slow.

Innovative Business Models and Leveraging Resources:

- ***Regional Stormwater Monitoring Program*** a product of the Stormwater Workgroup to pool funding resources from permittees. Monitoring requirements imposed on individual permittees through the municipal storm-water permits would result in significant duplication of efforts and greater overall costs. By creating a system that allows permittees to contribute to a common funding pool, individual costs are reduced and a much more robust regional monitoring program was designed. Plan includes monitoring effectiveness and water quality parameters.

- Operations model was not working for the municipalities, and they were not seeing how the data collected was used to inform decisions. They wanted to do something more valuable, and were encouraged by the Regional Stormwater Monitoring Program.

- Under the terms of NOAA's annual ***Pacific Coast Salmon Recovery Fund Grant***, 10% of all project funding must be spent for related monitoring. Funds are allocated by the Salmon Recovery Funding Board in open public meetings. Transparent and open process for the public to follow the rational for these decisions. Total PCSRF grants have averaged ~$26.5M annually. Therefore, ~$2.65M annually for monitoring, which has been typically allocated for effectiveness monitoring, intensively monitoring watersheds, and Status & Trends.

How the Monitoring is incorporated into the Governance Structure:

- Charter describes operation as a quasi-independent, umbrella organization chartered to *coordinate* existing monitoring programs to improve focus improve efficiency and cost-effectiveness. To encourage more objective evaluation of Puget Sound Partnership and regional partner's success in achieving recovery goals.

- Vital Signs are the indicators tracking ecosystem status and progress towards their target, organized by goals, rolled up to represent all of Puget Sound. Vital Signs are geared towards managers not scientists.
    - Data sources include over 30 scientists and their teams (unpaid by Puget Sound Partnership)
    - Types of Vital Signs: Bio-physical (16), Human wellbeing (3), Pressure (3), Management response (9), Societal Response (1)
    - Hired social scientists to help balance the vital signs, to include the human wellbeing and societal response
    - Successful at partner and people engagement.
    - Successful communication with leadership on the importance of monitoring, "**Intelligence Gathering"** to determine where to invest money.
    - The Vital Signs Wheel allows all indicators to be all in one place, no long list of indicators.
    - The vital signs gives a sense of "priority" for what monitoring is desired, and gather support for efforts of recovery

- Status bars displaying the Current Status towards meeting restoration targets