Protecting and Restoring Illinois Waters...

Amy Walkenbach
Illinois EPA
amy.walkenbach@illinos.gov
217/782-3362
• Clean Water Act
• Illinois EPA
  • Monitoring & Assessments
    • Surface Water
    • Ground Water
  • Point Source Program
    • NPDES
    • CAFO
    • MS4
  • Non Point Source Program
    • 319
    • IGIG
    • KIC 2025
    • Nutrient Strategy
  • Total Maximum Daily Load Program
Historical Impetus for Water Pollution Controls

- Clean Water Act 1972
  - Primary objective:
    - Restore/maintain integrity of nation’s waters.
  - National goals:
    - Eliminate the discharge of pollutants;
    - Achieve water quality levels that are fishable and swimmable.
Clean Water Act Strategies

- Clean Water Act 1972
  - requires major industries to meet performance standards to ensure pollution control;
  - charges states and tribes with setting specific water quality standards appropriate for their waters and developing pollution control programs to meet them;
  - provides funding to states and communities to help them meet their clean water infrastructure needs;
  - protects valuable wetlands and other aquatic habitats through a permitting process that ensures development and other activities are conducted in an environmentally sound manner.
National Progress

In 1972:

- Only one third of the nation's waters were safe for fishing and swimming.
- Wetlands losses were estimated at about 460,000 acres annually.
- Agricultural runoff resulted in the erosion of 2.25 billion tons of soil and the deposit of large amounts of phosphorus and nitrogen into many waters.
- Sewage treatment plants served only 85 million people.

Today:

- Two-thirds of the nation's waters are safe for fishing and swimming.
- The rate of annual wetlands losses is estimated at about 70,000-90,000 acres, according to recent studies.
- The amount of soil lost due to agricultural runoff has been cut by one billion tons annually, and phosphorus and nitrogen levels in water sources are down.
- Modern wastewater treatment facilities serve 173 million people.
• Water Chemistry
  • Started in 1978
  • 55(+) parameters
  • 146 (was 214) sites sampled 9x/year
  • 11 Mississippi River sites sampled 4x/year
  • Pesticide subgroup
  • Chlorophyll subgroup

INTENSIVE BASIN SURVEYS
• Five Year Statewide Rotation began in 1981
• Chemistry (IEPA)
• In-Stream Habitat (IEPA/IDNR)
• Biology
  • Fish (IDNR)
  • Macroinvertebrates (IEPA)
Ambient Lake Monitoring Program

- Approx. 50 lakes / year
  - 30 core lakes (3 yr. cycle)
  - 3 sites/lake + 1 deep site
  - 5 visits/yr (April-Oct.)
- Parameters
  - Water/Sed Chemistry
  - Macrophytes/Phytoplankton
  - Metals/Organics at PWS Lakes

Illinois Clean Lakes Program

- 2-3 projects/year (if funding)
- Same sites and parameters as ALMP
- Plus:
  - Monitor 12 months of the year (2x/month May – Oct, 1x/month other months)
  - Tributary monitoring
  - Inflow & Outflow
  - Macrophyte/ Shoreline Erosion Surveys
  - Fish Tissue Analysis

Volunteer Lake Monitoring Program

- Since 1981
- Citizen Volunteer Monitors
- ~170 lakes/year
- Usually 3 sites/lake
  - Secchi Disk Transparency
  - 50 Water Quality Sites

Lakes
Assessed Waters – All Uses
(Source: Draft 2010 Integrated Report)

<table>
<thead>
<tr>
<th>Uses:</th>
<th>Stream Miles</th>
<th>Inland Lake Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>At Least One Use Assessed</td>
<td>17,010</td>
<td>148,014</td>
</tr>
<tr>
<td>Total</td>
<td>119,244</td>
<td>253,224</td>
</tr>
<tr>
<td>% of Total</td>
<td>14.3</td>
<td>58.5</td>
</tr>
</tbody>
</table>

Uses:
- Aquatic Life
- Swimming
- Aesthetic Quality
- Drinking Water
- Fish Consumption
Emerging Issue - HAB, Harmful Algal Blooms – 2005 to present - Algal Toxin Monitoring
## Potential *Causes* of Use Impairment (Draft 2010 Integrated Report)

<table>
<thead>
<tr>
<th>Streams</th>
<th>Inland Lakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fecal Coliform</td>
<td>Total Suspended Solids</td>
</tr>
<tr>
<td>Low Dissolved Oxygen</td>
<td>Total Phosphorus</td>
</tr>
<tr>
<td>Mercury</td>
<td>Aquatic Algae</td>
</tr>
<tr>
<td>PCBs</td>
<td>Mercury</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>Manganese</td>
</tr>
<tr>
<td>Manganese</td>
<td>Aquatic Plants</td>
</tr>
<tr>
<td>Sedimentation/Siltation</td>
<td>PCBs</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>Cause Unknown</td>
</tr>
</tbody>
</table>
## Potential Sources of Use Impairment (Draft 2010 Integrated Report)

<table>
<thead>
<tr>
<th>Streams</th>
<th>Inland Lakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Unknown</td>
<td>Source Unknown</td>
</tr>
<tr>
<td><strong>Atmospheric Deposition</strong></td>
<td><strong>Agricultural Crop Production</strong></td>
</tr>
<tr>
<td>(Mercury)</td>
<td></td>
</tr>
<tr>
<td><strong>Agricultural Crop</strong></td>
<td><strong>Shoreline Erosion</strong></td>
</tr>
<tr>
<td>Production</td>
<td></td>
</tr>
<tr>
<td><strong>Stream Channelization</strong></td>
<td><strong>Atmospheric Deposition</strong></td>
</tr>
<tr>
<td></td>
<td>(Mercury)</td>
</tr>
<tr>
<td><strong>Municipal Point Sources</strong></td>
<td><strong>Urban Runoff/Storm Sewers</strong></td>
</tr>
<tr>
<td><strong>Urban Runoff/Storm Sewers</strong></td>
<td><strong>Nutrient Enriched Sediments</strong></td>
</tr>
</tbody>
</table>
Emerging Issue – Nutrients, Phosphorus and Nitrogen

The impact of excess nitrogen and phosphorus in rivers, lakes, streams and the Gulf of Mexico has become a very high profile water quality issue. Under the right conditions, nutrients can cause excessive algal blooms, low oxygen and nuisance conditions that adversely impact aquatic life, drinking water and recreational uses of the water.

Nitrogen and phosphorus come from:
- municipal wastewater treatment;
- private wastewater treatment (septics);
- urban stormwater;
- row crop agriculture;
- livestock production;
- industrial wastewater; and
- combustion of fossil fuels
- lawn/agricultural fertilizer
- pet waste

http://www.epa.state.il.us/water/nutrient/index.html
Ambient Groundwater Monitoring Network -

• Monitor 350 Community Water Supply (CWS) wells
• The goal is to represent the detection of pesticides and other chemical contamination in the wells across the state;
• Provides an overview of the groundwater conditions;
• Establishes baseline water quality in the major aquifers;
• Identifies trends; and
• Evaluates long-term effectiveness of Clean and Safe Drinking Water Act programs;

• There are approximately 3,300 active CWS wells in Illinois. Since it is not practical for Illinois EPA to sample all of these wells on a regular basis, a statistical approach was developed to represent the entire population. The AN wells were randomly selected and stratified using three different variables:
  • depth
  • aquifer, and
  • surficial vulnerability.
• The network is designed to reduce bias caused by the specific location of the well and the time of year that the sampling was done. The wells are sampled within a fixed three-week time frame every other year since 1996. Samples are analyzed for:
  • inorganic chemicals (IOC),
  • synthetic organic pesticides (SOC), and
  • volatile organic/aromatic compounds (VOC)
Emerging Issue – Volatile Organic/Aromatic Compounds (VOCs)

“VOCs are organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas, such as helium, and, subsequently, analyzed by gas chromatography. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They often are compounds of fuels, solvents, hydraulic fluids, paint thinners, and dry-cleaning agents commonly used in urban settings. VOC contamination of drinking water supplies is a human-health concern because many are toxic and are known or suspected human carcinogens.” - U.S. Geological Survey, 2005
Right-to-know notifications performed since 2002 where volatile organic compounds (VOCs) have been detected in community water system (CWS) wells.

A total of 81 percent of these notices were based on detections of perchloroethylene or its break down products

- trichloroethylene;
- cis 1,2 dichloroethylene;
- trans 1,2 dichloroethylene;
- 1,1 dichloroethylene; and
- vinyl chloride
National Pollutant Discharge Elimination System - NPDES Program

NPDES has its origin in the Federal Clean Water Act. The program requires permits for the discharge of treated municipal effluent, treated industrial effluent and stormwater. The permits establish the conditions under which the discharge may occur and establish monitoring and reporting requirements. This federal program is delegated to the states; Illinois received delegation on October 23, 1977.

State Construction/Operating Permit Program

• Permits are required for the construction of new sewers, sewage pumping stations, and for connections to the public sewers

• Permits are required for the construction of new sewage treatment plants, pretreatment equipment & industrial wastes treatment plants. Permits are required for the remodeling of sewage treatment plants, pretreatment equipment and industrial wastes treatment equipment

• State permits are required for the land application of treated municipal sludges to cropland or other areas.

• State permits are required for the operation of non-discharge wastewater treatment systems, such as spray irrigation of treated wastewater.
NPDES Continued:
Stormwater -

• Municipalities located in urban areas as defined by the Census Bureau are required to obtain NPDES permit coverage for discharges from their municipal separate storm sewer systems (MS4s).

• Municipalities located outside of urbanized areas may need to comply within 180 days notice or as determined by the NPDES Permitting Authority.

• Beginning on March 10, 2003, construction sites that disturb one acre or more are required to have coverage under the NPDES general permit for storm water discharges from construction site activities.

• Municipalities under 100,000 population will no longer be exempt from the construction site storm water requirements and the industrial storm water requirements effective March 10, 2003. (WWTPs 1.0 mgd or more will need a General Storm Water Permit for Industrial Activities)

• Definition of industrial storm water has been revised to expand the "no-exposure" exemption to all industrial categories except construction.
MS4 Permit Requirements:

Develop a storm water management program comprised of best management practices (BMPs) and measurable goals for each of the following six minimum control measures:

• Public education and outreach on storm water impacts

• Public involvement and participation

• Illicit discharge detection and elimination

• Construction site storm water runoff control

• Post construction storm water management in new development and redevelopment

• Pollution prevention/good housekeeping for municipal operations
Emerging Issue:
U.S. EPA developing new stormwater requirements

Will be considering:
• Green Infrastructure
• Performance Standards, pre and post construction
• Area of disturbance for construction activities
• Monitoring
Concentrated Animal Feeding Operations (CAFO) – Evolving Issue-

• Despite substantial improvements in the nation's water quality since the inception of the Clean Water Act, nearly 40 percent of the nation's assessed waters show impairments from a wide range of sources. Improper management of manure from CAFOs is among the many contributors to remaining water quality problems.

• Rules written in the 1970s have become outdated as technology has undergone dramatic change since then.

• There was a need to address continued discharges and runoff of manure from all sectors of the livestock industry, in many areas of the country, including Illinois.

• The new CAFO rules update regulations to reflect structural changes - consolidation - in the industry that have occurred since the 1970s.

• The rules target improvement of the CAFO regulations' effectiveness to help correct improper management practices.
What's Required Under The New CAFO Rules?

• In Illinois, the rule may affect
  • 500 "Large" CAFOs
  • as many as 2,700 "Medium" CAFOs.
• Under the permits for these livestock operations, CAFOs will be required to:
  • Apply for a National Pollutant NPDES Permit;
  • Submit an Annual Report; and
  • Develop and implement a manure and wastewater handling plan (Nutrient Management Plan).
Other Programs to Restore and Protect Illinois Waters:

• Establish water quality standards to protect aquatic life and/or other beneficial uses of the water;

• Monitoring and assessment to determine attainment of standards;

• Listing of waters not meeting attainment;

• Development of Total Maximum Daily Loads (TMDL);

• TMDL load limits are required to be implemented through NPDES permits;

• TMDL load limits for non-point source pollution is through voluntary implementation of best management practices (BMP);

  • Cost-share incentives to implement/install BMPs

• New and expanding municipal wastewater treatment plants are required by Illinois Pollution Control Board regulation to limit phosphorus in their discharges; and

• The development of a statewide Nutrient Strategy
### Other Programs to Restore and Protect Illinois Waters:

<table>
<thead>
<tr>
<th>Program</th>
<th>Details</th>
</tr>
</thead>
</table>
| **319 NPS Grant Program**                    | • Matching grant program for local entities to implement water quality best management practices, watershed planning, information/outreach and monitoring activities  
• Restoring waters impacted by nonpoint source pollution |
| **Illinois Green Infrastructure Grant Program** | • Matching grant program for local entities to implement green infrastructure best management practices  
• Restoring waters impacted by stormwater, specifically looking to reduce combined sewer overflows |
| **Illinois Clean Lakes Program**             | • Matching grant program to:  
• Diagnostic/Feasibility Studies  
• Implement recommendations in the study  
• Restoring Illinois in-land lakes and reservoirs |
Other Programs to Restore and Protect Illinois Waters:

Wastewater State Revolving Funds (SRF)

- Water Pollution Control Loan Program (WPCLP) for wastewater projects
  - offered annually through federal capitalization funding & state matching funds
  - Low interest rate payback of loan
  - aimed at reducing point source pollution

KIC 2025

- The Illinois Council on Best Management Practices developed a nutrient stewardship program—“Keep It for the Crop by 2025.”
  - establishes goals for reducing nutrient losses from agriculture
  - through adoption of the 4R’s of Nutrient Use:
    Right Source, Right Rate, Right Time, Right Place.
Illinois EPA, Bureau of Water – Hot topics (in no particular order and missing many!)

• Nutrients
  • Local water quality protection
  • Gulf Hypoxia

• VOCs in groundwater

• Water quality standards
  • Narrative
  • Numeric

• CAFOs

• TMDLs

• Performance Standards

• Shrinking staff

• Lowered funding levels