Delaware Valley
Early Warning System

SE District PA AWWA & Eastern Section WWOAP Conference
March 4, 2020
Agenda

Part 1
• EWS History

Part 2
• EWS 3.0 Improvements

Part 3
• EWS 3.0 Preview

Part 4
• Discussion
Philadelphia Water Department
One Water Utility

Drinking Water
- Source: Delaware and Schuylkill Rivers
- 1.7 million drinking water customers
- Three Water Treatment Facilities
- Over 300 million gallons treated per day
- 3,000 miles of water mains, 25+ pumping stations

Wastewater
- 2.2 million wastewater customers
- 3 Water Pollution Control Plants
- Over 522 million gallons treated per day
- 3,716 miles of sewers, 19 pumping stations
- Biosolids handling facility

Stormwater
- Roughly 60% Combined Sewer, 40% Separate Sewer
- Green City, Clean Waters - Large-scale green stormwater infrastructure program to reduce CSOs
PWD Source Water Protection

- PWD serves drinking water to 1.7 million people
- Philadelphia’s jurisdictional area covers less than 1% of the area influencing its water supply
- PWD understands the need for a partnership approach
- PWD uses the EWS to be better informed about upstream water quality and events
## Delaware Valley EWS Brief History

<table>
<thead>
<tr>
<th>Source Water Assessments &amp; Protection Plans</th>
<th>EWS Development</th>
<th>EWS Improvements</th>
<th>EWS 3.0 Deployment</th>
</tr>
</thead>
</table>
| These reports identified the **need** for an **early warning system** to be established in the Lower Delaware River Watershed | PWD developed the EWS with support from drinking water and regulatory partners | • Website  
• Telephone notification  
• Industrial Intakes  
• Tidal Spill Model | • Full smartphone functionality  
• Map upgrades  
• Tidal Spill Model enhancement  
• Focus on simplifying user experience |
EWS Coverage Area

• Lower Delaware River Watershed:
  • New York border to Delaware border

• 124 intakes in the EWS Coverage area

• Over 7,400 stream miles are in the EWS coverage area

• EWS water and industrial users provide critical services to the 6.8 million people residing in the EWS coverage area
  • Drinking water
  • Wastewater
  • Energy
  • Manufacturing
EWS Building Blocks

- Partnership
- Notification System
- Monitoring Network
- Website
# EWS Partnership

Over **450** registered users from **55** organizations

<table>
<thead>
<tr>
<th>Drinking Water Suppliers</th>
<th>Industrial</th>
<th>Regulatory</th>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 18 utilities</td>
<td>• 12 companies</td>
<td>• PADEP</td>
<td>• US Coast Guard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NJDEP</td>
<td>• County Health Departments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• EPA</td>
<td>• EPA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Delaware River Basin Commission</td>
<td>• EPA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Offices of Emergency Management</td>
</tr>
</tbody>
</table>

**Member directory** available on the EWS Website
EWS Subscription Fees

• Drinking Water and Industrial organizations pay an annual subscription fee for access to the EWS.

• Subscription fees are based on the average water withdrawal (MGD) and the location of a facility's intake(s).

• EWS Drinking Water subscribers collectively pay $75,000 per year.

• EWS Industrial subscribers collectively pay $25,000 per year.
EWS Event Reporting

431 events have been reported since the EWS began in 2005

Report events that have the potential to contaminate surface water supplies within the EWS coverage area

Examples:
• Spills (fuel and chemical)
• Transportation Accidents
• Sewage Treatment Plant Upsets
• Illegal Dumping of Waste
• Major Fires

Credit: NOAA
Major EWS Events

- **Athos I Oil Spill - 2004**
  - 275,000 gallons
  - Delaware River (Paulsboro, NJ)

- **Fly Ash Spill - 2005**
  - 100 million gallons
  - Delaware River (Bangor, PA)

- **Cyanide Discharge - 2006**
  - 25 gallons
  - Wissahickon Creek (North Wales, PA)

- **Vinyl Chloride Spill - 2012**
  - 25,000 gallons
  - Mantua Creek (Paulsboro, NJ)

- **Potassium Cyanide Theft - 2017**
  - Situation upstream of Philadelphia

- **Diesel Spill - 2019**
  - 3,000 gallons
  - Delaware River (Philadelphia, PA)
EWS 3.0

What's new:

• Full Mobile Device Functionality
• Map Upgrades
• Tidal Spill Model Enhancement
• Organization-centric Approach
• Focus on Simplifying User Experience
Log in

Username

Password

Remember me?

Login

Forgot your password?
1 event has been reported in the past 24 hours.

Last 3 Events

<table>
<thead>
<tr>
<th>Event Id</th>
<th>Last Updated</th>
<th>Location</th>
<th>Risk Level</th>
<th>Status</th>
<th>View Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>790</td>
<td>Today 3:40 PM</td>
<td>Philadelphia City, Philadelphia County, PA</td>
<td>High Risk</td>
<td>Updated</td>
<td></td>
</tr>
<tr>
<td>789</td>
<td>2/3/2020 12:25 PM</td>
<td>Delanco Township, Burlington County, NJ</td>
<td>Low Risk</td>
<td>Reported</td>
<td></td>
</tr>
<tr>
<td>788</td>
<td>1/31/2020 9:33 AM</td>
<td>Tobyhanna Township, Monroe County, PA</td>
<td>High Risk</td>
<td>Reported</td>
<td></td>
</tr>
</tbody>
</table>

Report an Event
Real-time River Conditions

Delaware River

Schuylkill River

Home
Real-Time River Conditions
## Recent Events

**Map zoom + popup**

<table>
<thead>
<tr>
<th>Id</th>
<th>Last Updated</th>
<th>Location</th>
<th>Risk Level</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>790</td>
<td>Today 9:25 AM</td>
<td>Philadelphia City, Philadelphia County, PA</td>
<td>Low</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>789</td>
<td>2/3/2020 12:25 PM</td>
<td>Delanco Township, Burlington County, NJ</td>
<td>Low</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>788</td>
<td>1/31/2020 9:33 AM</td>
<td>Tobyhanna Township, Monroe County, PA</td>
<td>High</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>787</td>
<td>1/31/2020 9:32 AM</td>
<td>West Easton Borough, Northampton County, PA</td>
<td>High</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>786</td>
<td>1/31/2020 9:25 AM</td>
<td>Hamilton Township, Mercer County, NJ</td>
<td>High</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>785</td>
<td>1/24/2020 2:50 PM</td>
<td>Philadelphia City, Philadelphia County, PA</td>
<td>Low</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>784</td>
<td>1/24/2020 1:14 PM</td>
<td>Philadelphia City, Philadelphia County, PA</td>
<td>Low</td>
<td>Resolved</td>
<td>Details</td>
</tr>
<tr>
<td>783</td>
<td>1/23/2020 1:32 PM</td>
<td>Hamilton Township, Mercer County, NJ</td>
<td>High</td>
<td>Reported</td>
<td>Details</td>
</tr>
<tr>
<td>779</td>
<td>1/22/2020 2:54 PM</td>
<td>Bristol Township, Bucks County, PA</td>
<td>Low</td>
<td>Updated</td>
<td>Details</td>
</tr>
<tr>
<td>782</td>
<td>1/22/2020 1:14 PM</td>
<td>Bethany Borough, Wayne County, PA</td>
<td>High</td>
<td>Updated</td>
<td>Details</td>
</tr>
</tbody>
</table>
Report a New Event

Step 1: Information
- Event Date: 27 February 2020
- Time: 3:00 PM
- Risk Level: Low
- Status: No
- Description: Enter the description

Step 2: Location
- Find and select the event's location on the map.

Step 3: Review
- Review the information and then report the event.

General Information:
- Event Date: 27 February 2020
- Time: 03:00 PM
- Risk Level: High
- Status: Reported
- Description: Tractor trailer accident on Bayly Ross Bridge. An estimated 2,000 gallons of diesel fuel has entered Delaware River.

Location:
- Municipality: Philadelphia City, PA
- Watershed: Delaware
- Receiving Waterway: Delaware River
Event Details

Summary (Reported)

Today 3:40 PM

By
Alex Ridyard

Event Date
2/27/2020

Time
3:00 PM

Risk
High

Status
Reported

Description
Tractor trailer accident on Betsy Ross Bridge. An estimated 2,000 gallons of diesel fuel has entered Delaware River.

Location

Municipality
Philadelphia City, Philadelphia County, PA

Watershed
Delaware

Latitude & Longitude
39.98561531, -75.06937553

Receiving Waterway
Delaware River

Affected Water Intakes for your Organization

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Arrival Time with current flow</th>
<th>Arrival Time with historic max flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWD-Baxter1</td>
<td>Tidally Affected</td>
<td>Tidally Affected</td>
<td>Tidally Affected</td>
</tr>
</tbody>
</table>

Map of Delaware River with marked locations and water intakes.
Update Event

Step 1: Information

Step 2: Location

Step 3: Review Update
EWS Freshwater Spill Model

Applies to Freshwater Rivers and Streams in the EWS Coverage Area

- User enters spill location
- USGS’s National Hydrography Dataset (NHD) is used to assign the spill location (subwatershed) to the nearest stream to route the spill
- Uses USGS stream gage data to determine downstream flow & velocity, to estimate spill travel and intake arrival time
- 92 USGS stream gages are logged into the EWS

Estimates spill travel and intake arrival time using current and historical maximum flow conditions
EWS Tidal Spill Model

Applies to the Tidal Delaware River from Trenton, NJ to Wilmington, DE

• User enters spill location
• Uses the National Oceanic and Atmospheric Administration’s (NOAA) Delaware Bay Operational Forecast System (DBOFS) model to create a real-time hydrodynamic forecast of water and spill movement in the tidal Delaware River and Bay

Uses real-time current and wind conditions to estimate spill travel and intake arrival time
EWS Spill Model Analysis Tool

Applies to both Non-tidal and Tidal Waters of EWS Coverage Area

- User enters spill location
- Generates a list of affected intakes and travel times to each intake using current flow and historical max flow

- The Spill Model Analysis Tool will **NOT** trigger an EWS event, and is provided for analytical and planning purposes
- Allows user to evaluate the route of a contaminant introduced to a waterway
What's on the Horizon?

Incorporating *situational awareness* into the EWS

- Algal Blooms
- Flood Warnings
- Fly & Mosquito Spray Advisories
- Dam Demolition
Upcoming EWS Events

EWS 3.0 Deployment

• EWS 3.0 deployed on March 12, 2020
Questions?

Kelly Anderson
PWD Watershed Protection Program Manager
Phone: 215.685.6245
Mobile: 215.906.8577
kelly.anderson@phila.gov

Bill Cesanek
EWS Development Lead
Phone: 732.259.5129
CesanekWE@cdmsmith.com

Alex Ridyard
EWS Outreach
Phone: 267.602.3402
alex.ridyard@phila.gov