Kanawha Valley System Source Water Monitoring Program

Ohio River Valley Water Sanitation Commission
Technical Committee Meeting, October 2018

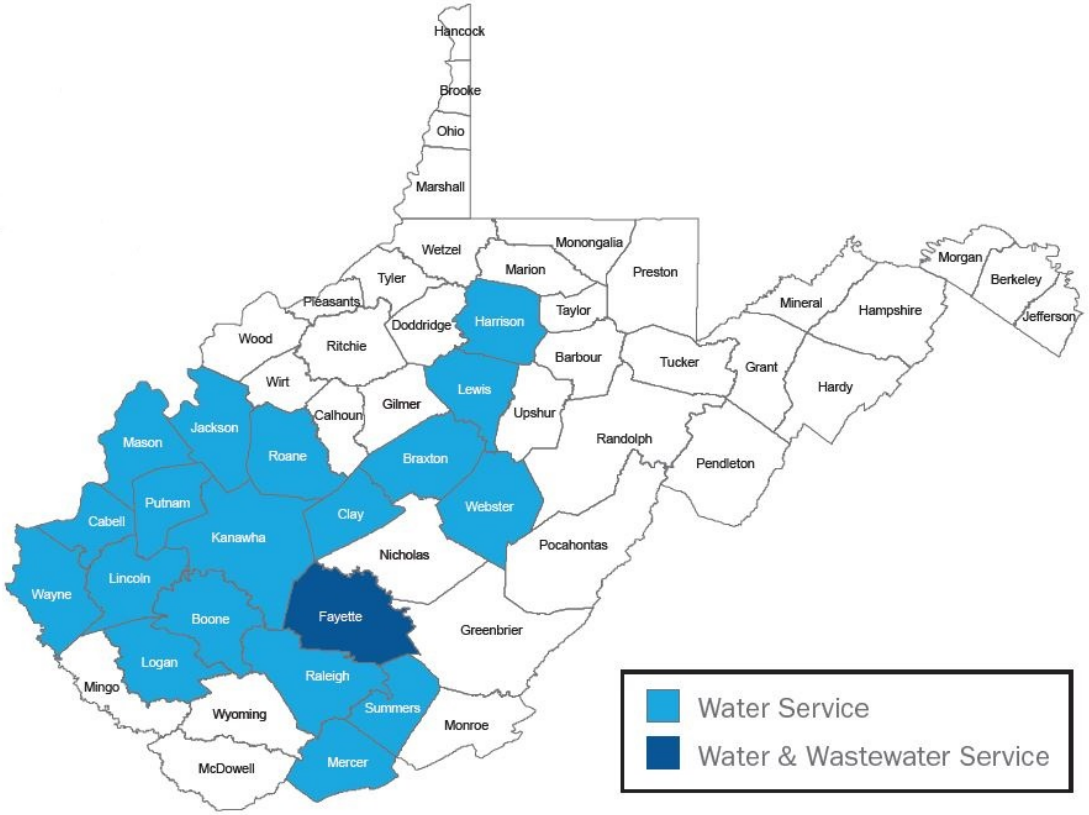
WEST VIRGINIA
AMERICAN WATER

About Us

- Proudly serving WV since 1886
- 530,000 people in 19 counties and 362 communities
- Approx. 1/3 of WV population

- 8 water treatment facilities
- 2 wastewater treatment plants
- 4,300 miles of water main
- 10,400 fire hydrants

- Outstanding environmental and compliance record



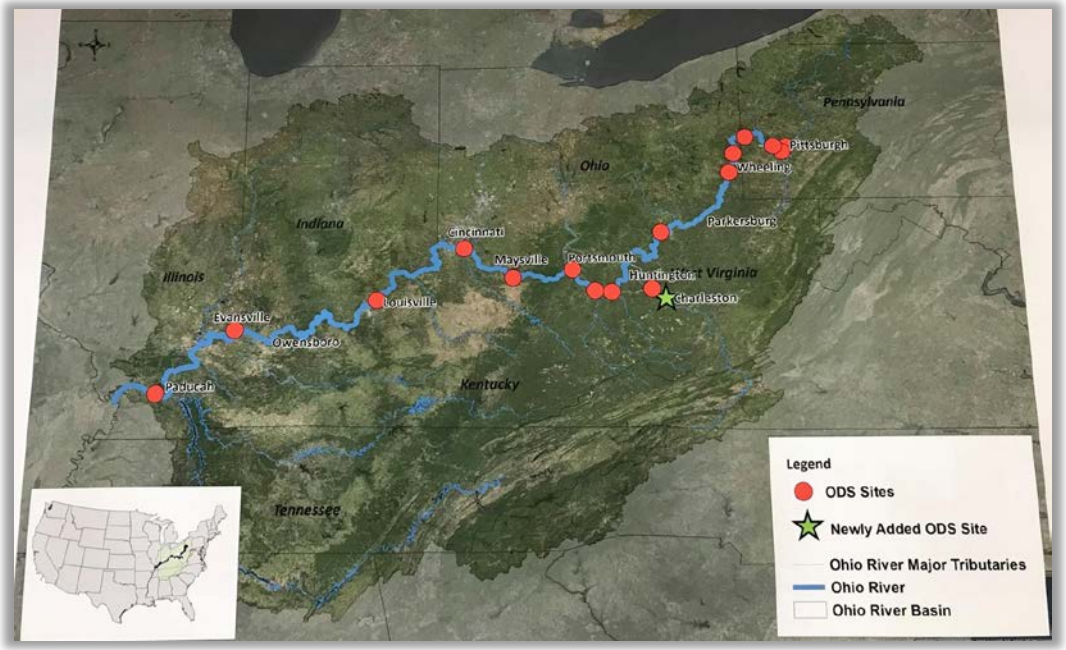
WVAW has been recognized through the **Partnership for Safe Water** for outstanding commitment to delivering superior quality drinking water to customers.

ORSANCO Partner

- Nearly 40-year relationship
- Huntington, WV one of original utility members
- Active members of Water Users Advisory Committee
- ODS Workgroup member

Kanawha Valley System

- Newest member of ODS network
- Largest and most complex in WV
- Rated capacity 50 MGD
- Serves population of 200,000+ in portions of 9 counties
- 175 pressure gradients
- Over 2,200 miles of main



Source of Supply: Elk River

Source Water Protection

Identify and mitigate potential risks to maintain or improve the quality of drinking water source(s)

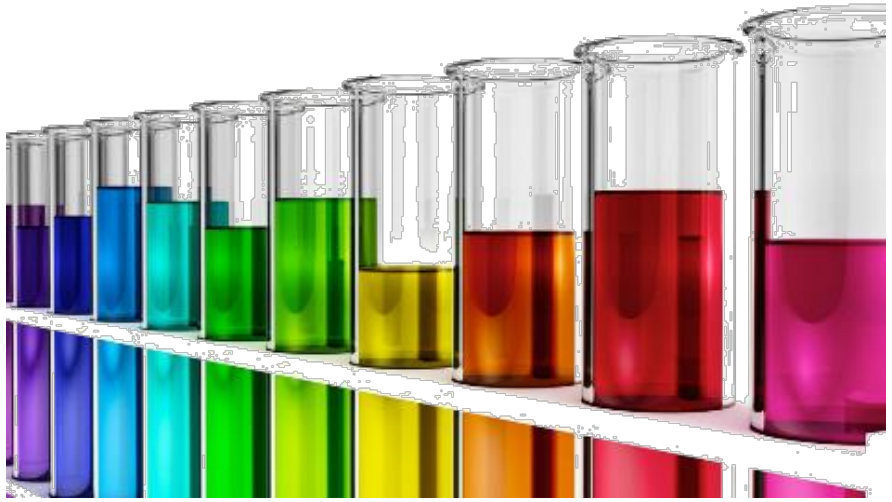
Source Water Monitoring

- Based on risk assessment
- Builds awareness and understanding of conditions
- Informs decision-making

State Policy Framework

WV Senate Bill 373 (2014)

- Utilities to assess feasibility of source monitoring systems
- Required testing for utilities serving 100,000+ customers



§24-2G-1. All public water utilities that provide water to more than one hundred thousand customers, including public service districts providing water service and municipally owned and operated utilities, subject to the requirements and limitations of this article, shall implement a regular monitoring system as specified to the same technical capabilities for detection as utilized by the Ohio River Valley Water Sanitation Commission.

https://www.wvdhhr.org/oehs/eed/swap/

Monitoring Workshop

- EPA and industry experts
- Strategies and technologies to meet WV requirements
- Recommended continuous indicator monitoring

Source Water Contaminant Detection Workshop: Early Warning and Response

Considerations for examining the technical and economic feasibility of implementing an early warning monitoring system

Purpose

The information in this fact sheet is provided to assist West Virginia drinking water suppliers as they implement the source water protection planning requirements set forth in West Virginia Code Chapter 16.

Background

In response to a chemical spill on January 9, 2014 in the Elk River in Charleston, West Virginia, lawmakers passed legislation to protect drinking water supplies statewide by decreasing the risk of source water contamination from above ground storage tanks (ASTs) and improving utility resiliency to effectively deal with spills should they occur. A workshop was held on August 19, 2014 to provide West Virginia drinking water utilities with information on meeting the requirements of West Virginia Code Chapter 16. The workshop addressed requirements for updating or completing source water protection plans and public water utility monitoring requirements. The workshop further focused on the technical and economic feasibility of implementing an early warning monitoring system.

By bringing together water sector experts to discuss existing contaminant monitoring technologies, the workshop provided an overview of the newest monitoring approaches and expert opinions on deployment feasibility. Although continuous real-time monitoring was discussed in depth throughout the workshop, it was noted that it is not the only method for early detection of contaminants in source water.

Protecting Source Water – Early Warning Monitoring and Response Systems

Subsequent Reports

✓Review of Source Water Quality Monitoring System to Comply with Senate Bill 373, 12/2014

✓Report to the Joint Committee on Government and Finance, 2015

Our Monitoring Program

Design Goals

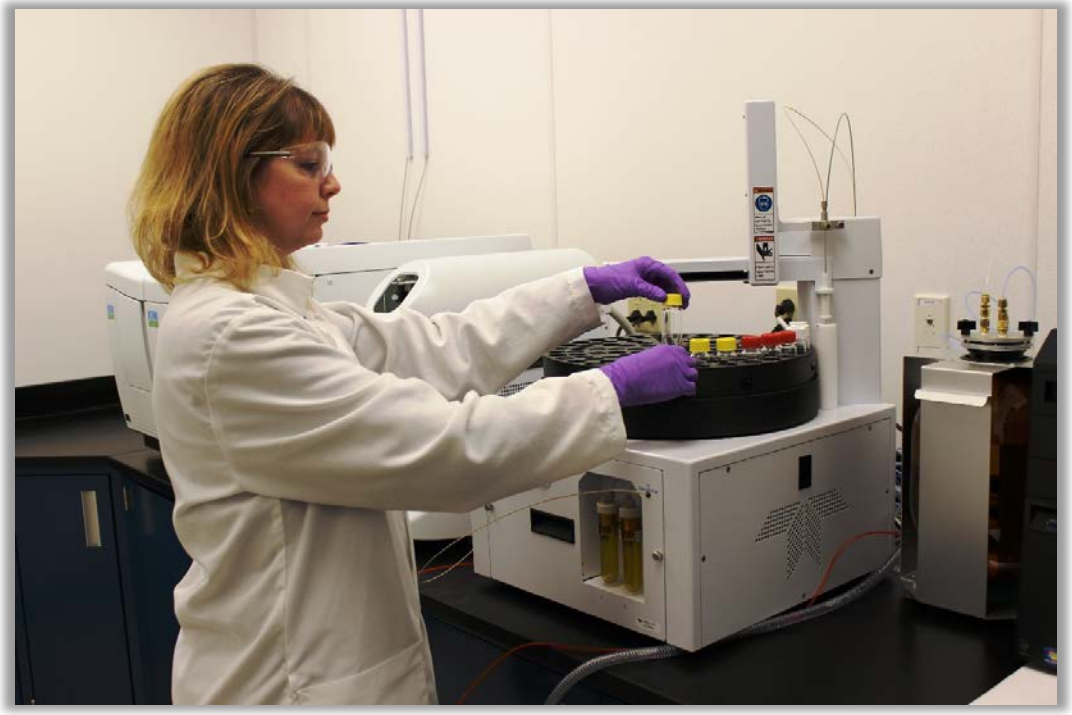
- Meet and exceed applicable regulatory requirements
- Optimize treatment process
- Detect potential changes from contamination incidents

System Components

- Analytical laboratory
- Online GC on ODS network
- Online monitoring panel
- Portable field equipment
- USGS streamflow gage
- Upstream monitors (TBD)

Analytical Laboratory

- Installed in 2014
- GC/MS volatile (purge & trap)
  USEPA Method 524.2
- GC/MS semi-volatile (SPE)
  USEPA Method 525.2
- GC/FID DRO & ORO (SPE)
  USEPA Method 8015



Perkin Elmer and Horizon Technology equipment

Online Gas Chromatograph

- Installed in 2017
- PSC Settlement commitment
- Inficon CMS 5000 equipment
- Near real-time monitoring & alerts
- Connected to ODS network

Online Monitoring Panel

- Installed in 2015*
- Continuous real-time monitoring and visibility
- Informs plant operations
- Identifies changes in water characteristics from baseline

**Panels installed at all WVAW treatment plants*

Equipment Selection

Considerations

- Design goals
- Reliability & service
- O&M requirements
- Location
- Cost

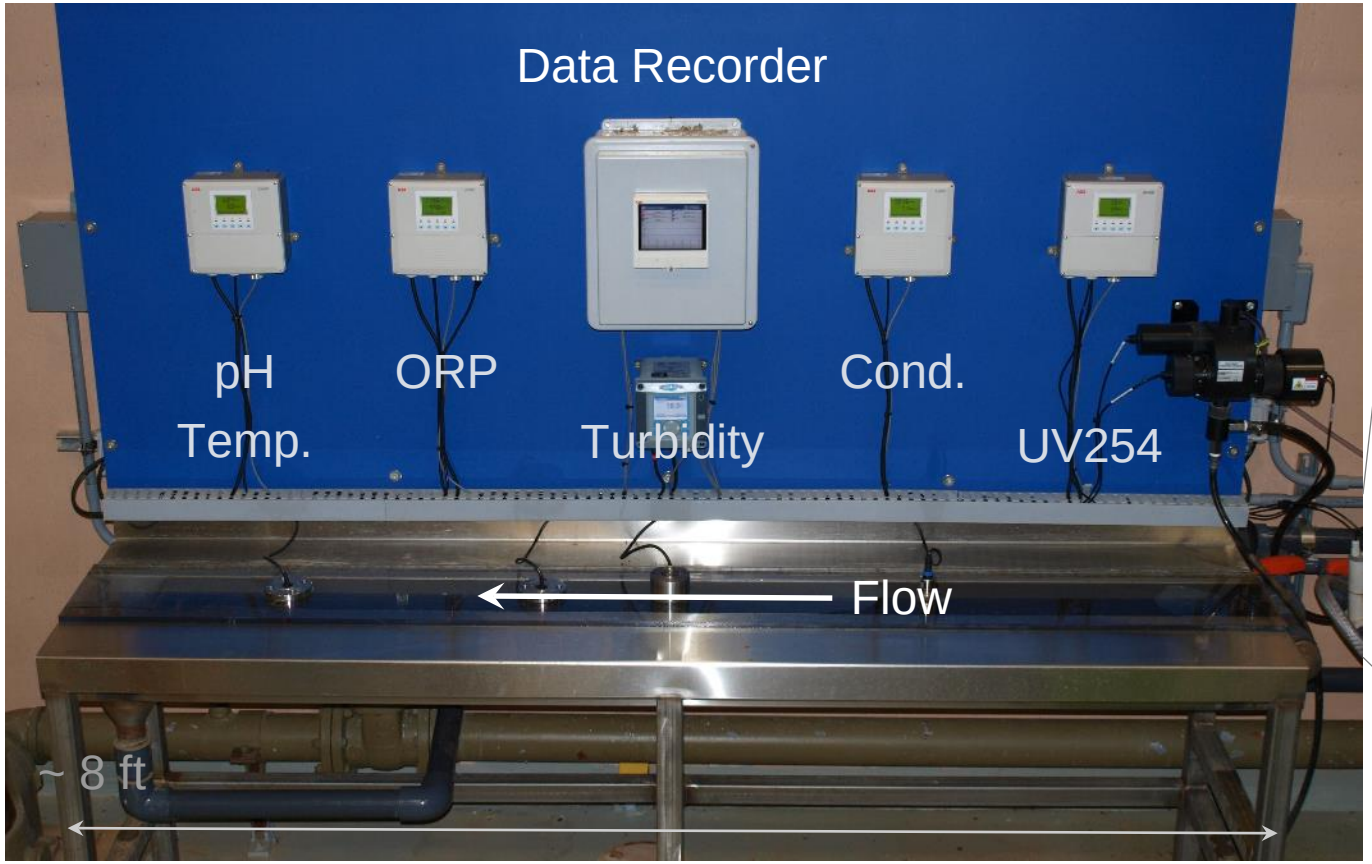
ABB

- pH (S.U.)
- Conductivity (µS/cm)
- Temperature (ºC)
- Oxidation Reduction Potential (mV)
- Dissolved Oxygen (ppm)
- Dissolved Organic Carbon via UV254 (ppm)
- RVG200 Data Recorder

HACH

- Turbidity (NTU)
- SC200 Controller

Online Panel Configuration

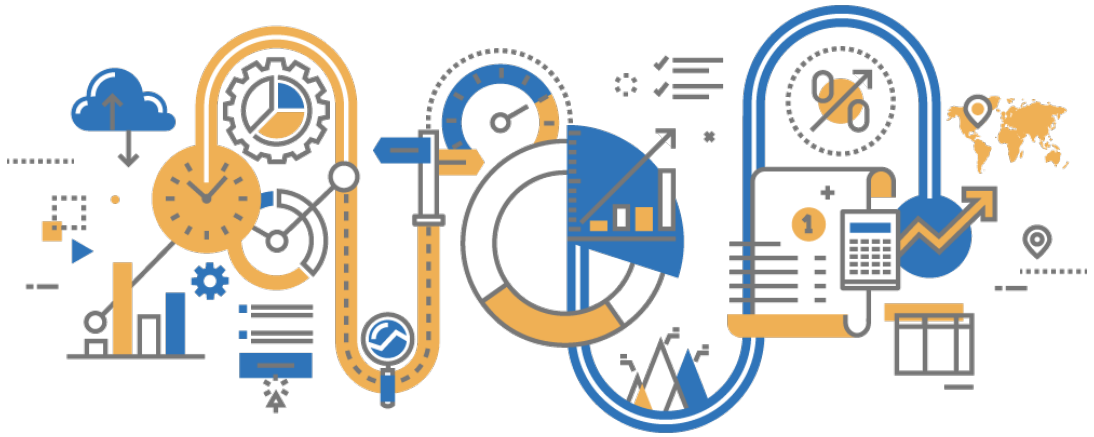


Flow-Through Bench Weir

Flow
Setup

Data Collection

- Online sensors provide continuous feed of data through recorder
- Measurements every 2 minutes
- Automated data analysis methods



14,716,800

Total measurements recorded each year

40,320

Measurements recorded every day

56

Sensors collecting data every 2 minutes

8

Sites with 7 sensors each

Event Detection

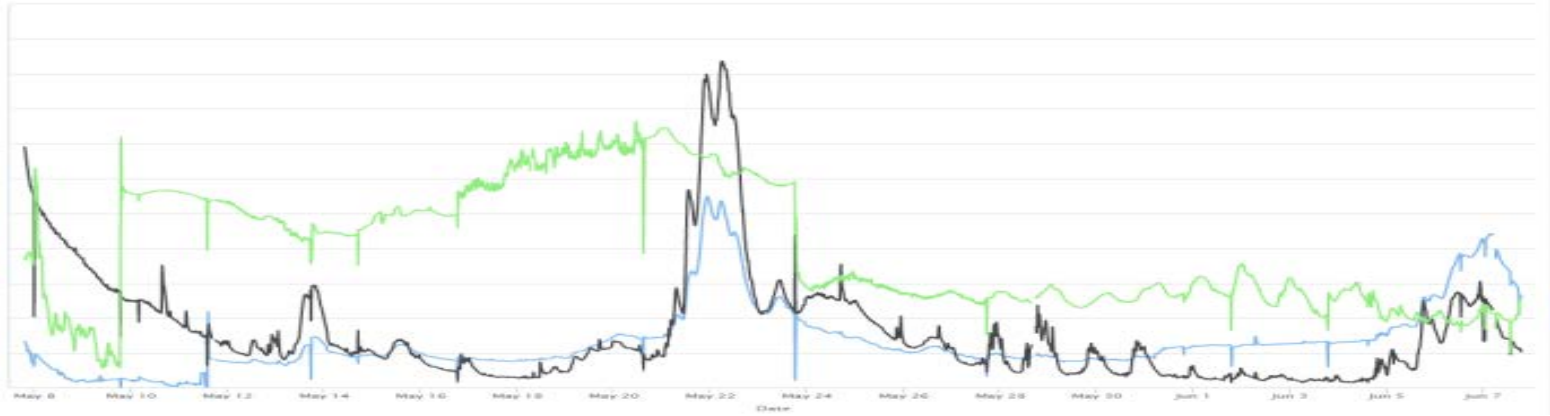
Objective: Provide notification of water quality anomalies so that effective response actions can be implemented

- Source vs. distribution
- Various analysis methods
- Real-time analysis and alerting capabilities

Solution

WaterSuite & Detector

- Analyze data from multiple sensors in real time
- Alerting using “rare combination” comparison
- Reviewing alerts in observation mode



WaterSuite

Portable Monitoring

Purpose

- In-stream field monitoring as needed
- Compare panel sensor readings

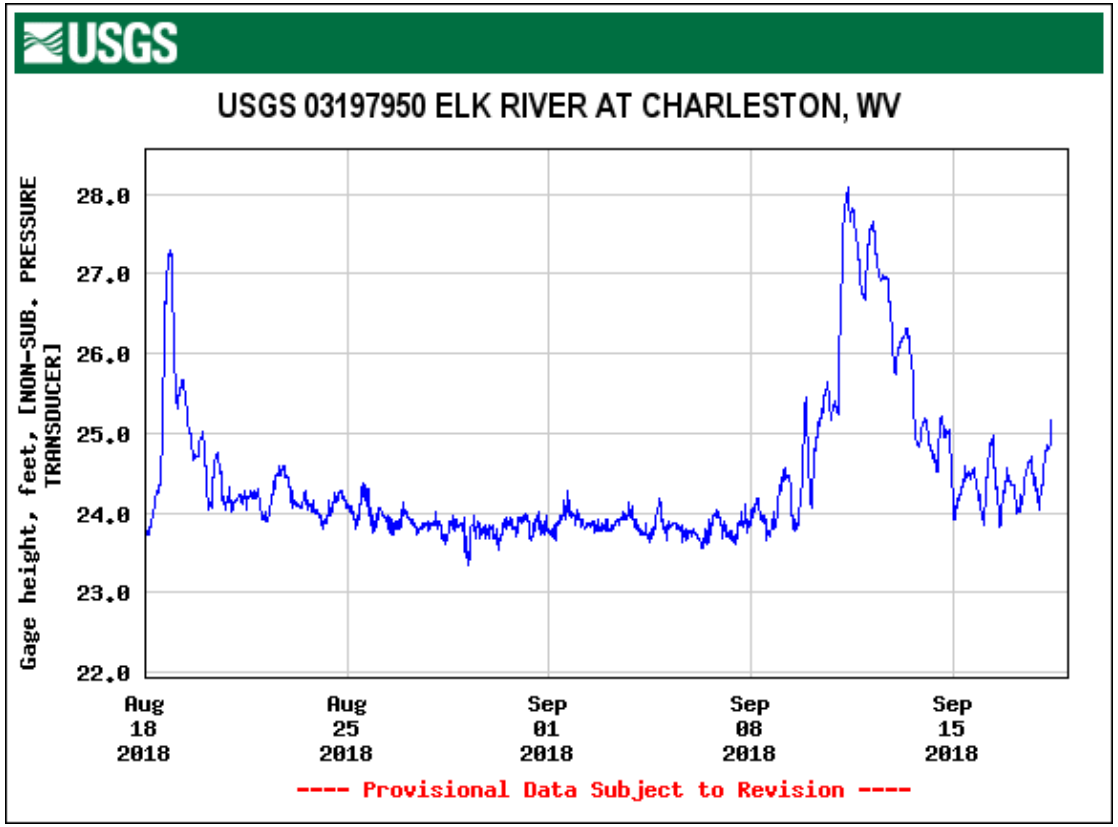
Multiparameter

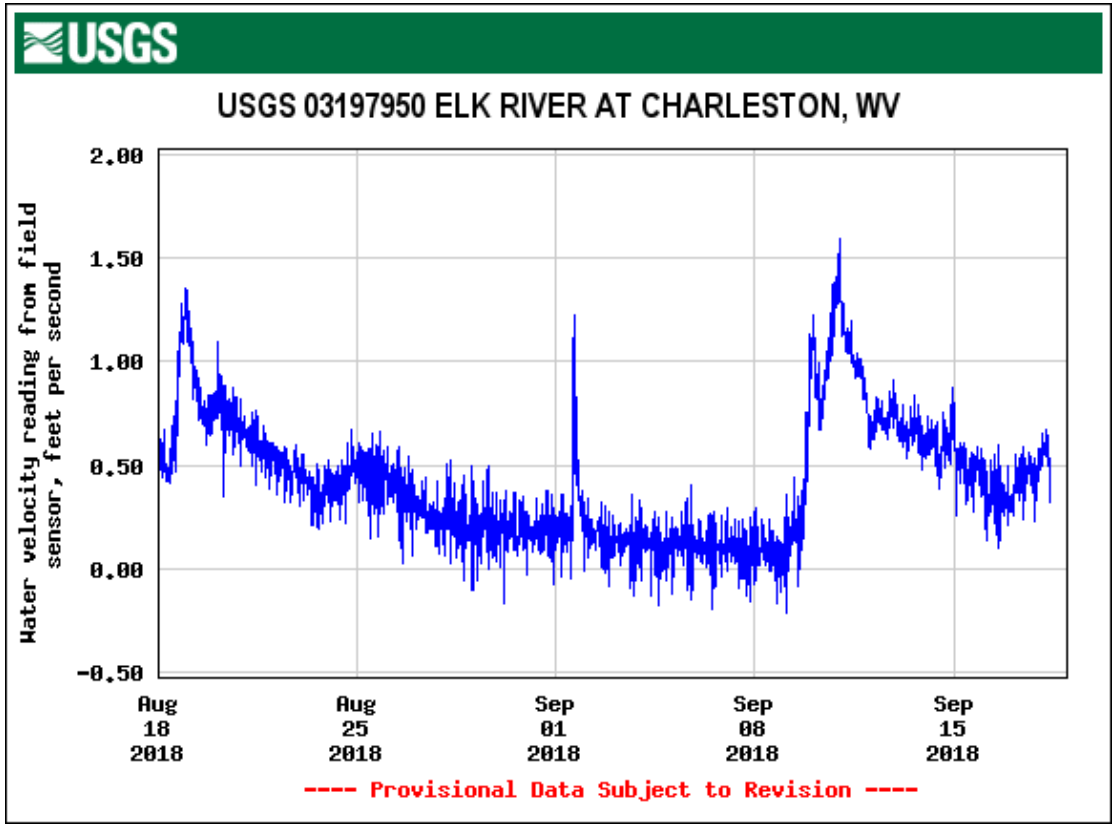
- pH, temperature, conductivity, ORP, dissolved oxygen

USGS Stream Gage

- Installed in 2018 on Elk River
- Previous nearest gage ~18 mi
- Measures stage and velocity
- WVAW partnership with USGS - MOU for installation and O&M
- Became 13th voting member of WV Water Gaging Council

Stage and Velocity Data





Upstream Monitoring

PSC Case No. 14-0872-W-GI, B.4, Monitoring for Contaminants

- *If it is able to obtain necessary approvals, WVAWC will prepare a three-year pilot study and install upstream monitoring of the Elk River above the KVTP intake at two locations approximately 30 minutes and 60 minutes above the intake at average river flow.*

Upstream Pilot Study

Considerations

- Physical limitations
- Interference with navigation
- Permitting and approvals
- Long-term maintenance

Preliminary Design

- Buoy with signal
- In-Situ datasonde
- PetroChek
- Battery & solar power
- Cell communication

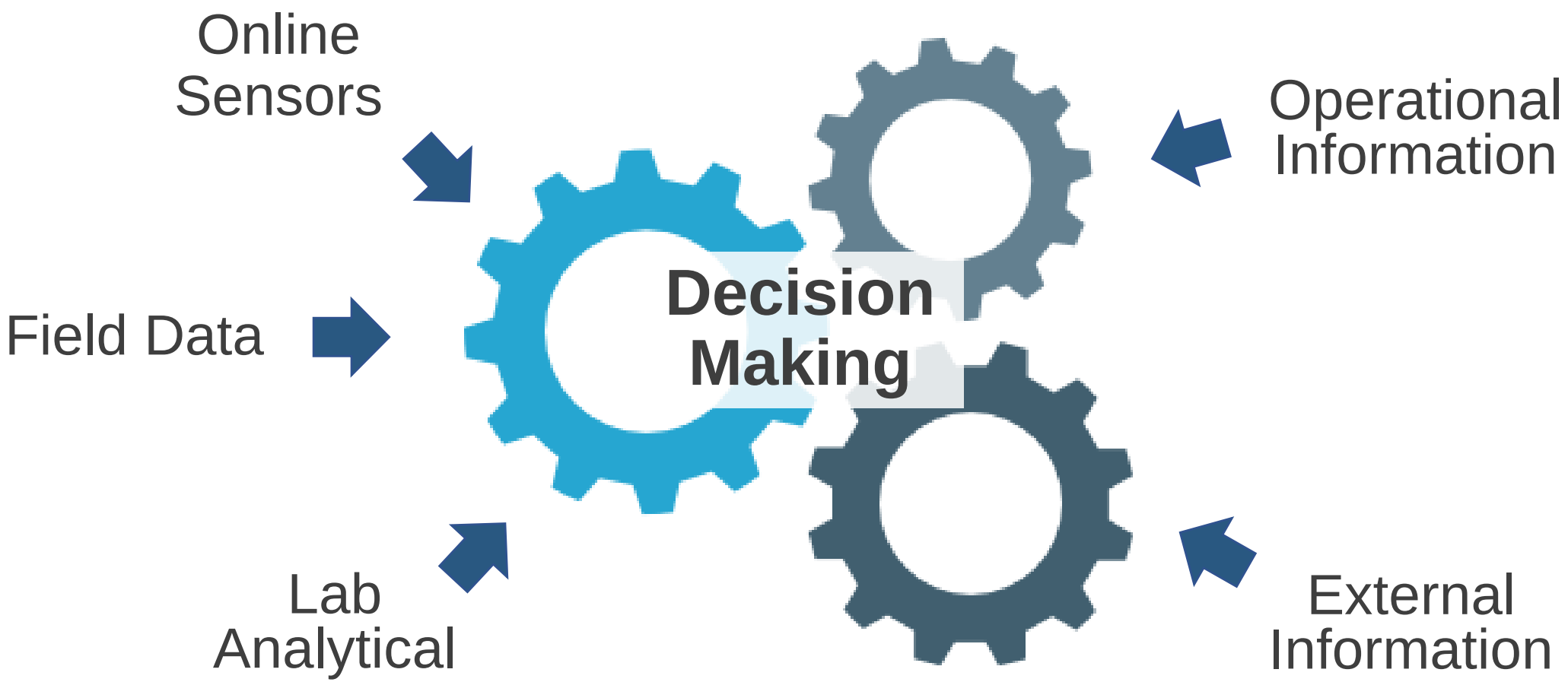
Example buoy setup

Upstream Pilot Status

- Upstream siting study
- Anchoring design
- Mussel habitat survey
- Full mussel survey
- Endangered species recommendations
- Obtain necessary approvals and permits

Figure 1. Potential Stream Monitoring Locations on the Elk River.

Integrated Systems



Conclusion

Summary

- Monitoring an important part of overall program
- System integration is key
- Data informs operations and decision-making

Recommendations

- Develop an end-to-end plan
- Phased approach helps with cost and implementation
- *Remember the big picture!*

Contact

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THANK YOU