A decorative background pattern of light blue circuit board traces and nodes on a dark blue gradient background. The pattern is most dense on the left side and tapers off towards the right.

# CONTINUOUS MONITORING DATA STANDARDS

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# OUTLINE

- **Discussion on the data models for discrete vs. continuous data**
  - **Existing data standards**
  - **Examples of the data standards in practice**
  - **Future activities related to continuous monitoring data**
  - **Other considerations for the NWQMC**
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## WHAT ABOUT SENSORS AND CONTINUOUS DATA?

- EPA is starting to see an increased emphasis on sensors
- EPA has also embraced a new 'Technology Blueprint' that seeks to promote the use of technology to improve how we do business
- With this comes some new challenges, not the least of which is what to do with the data

# METADATA NEEDS CHANGE BASED ON YOUR DATA

- In the water monitoring world, we can classify monitoring into two types:

## Discrete Monitoring

- A **sample** is taken and sent to a lab for further analysis
- Typically a one-time event that can be repeated as needed



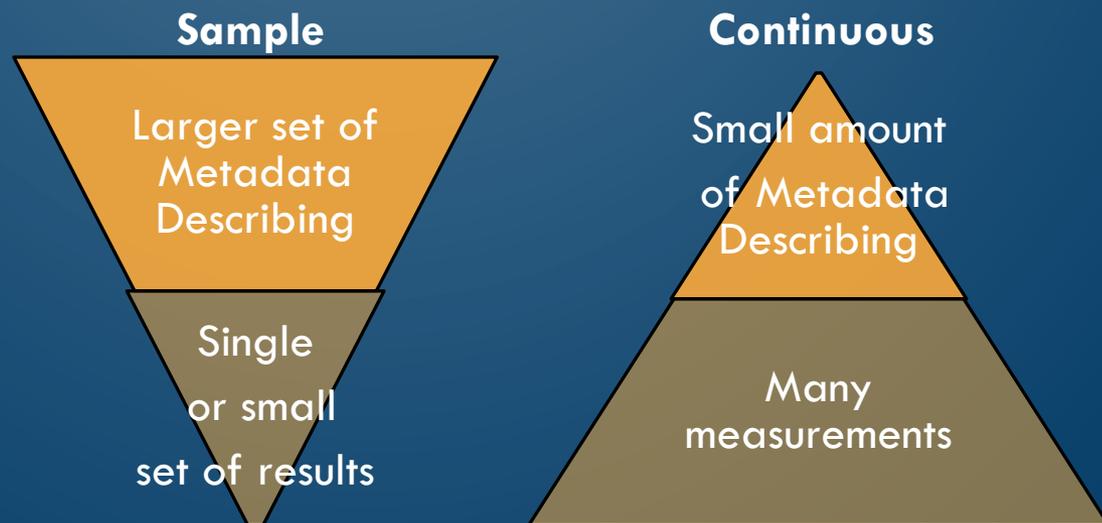
## Continuous Monitoring

- A **sensor** is used to record a continuous stream of data about 1 particular analyte or a small set of analytes (i.e. flow, dissolved oxygen, pH, etc).
- Values are reported at set intervals (i.e. every 15 minutes, 1 hour, etc.)

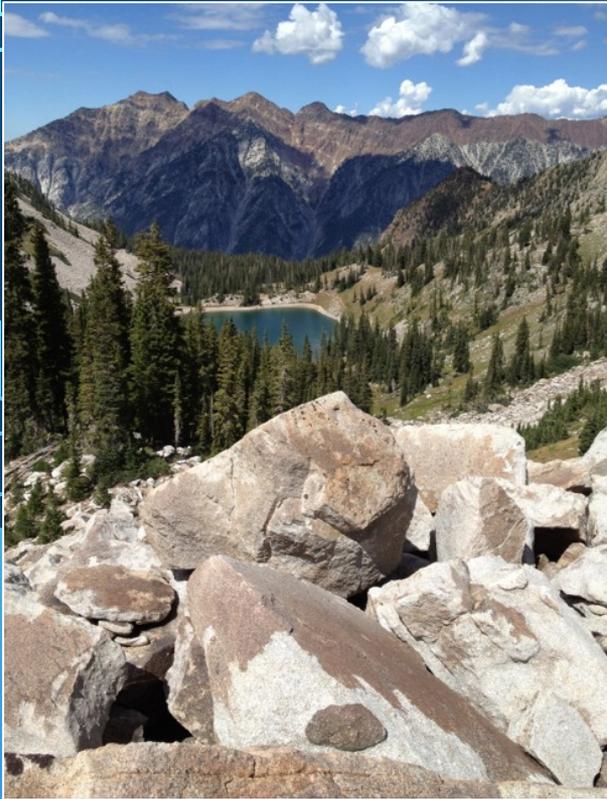


# DATA MODELS ARE LIKELY DIFFERENT FOR SENSOR VS. DISCRETE DATA

- EPA recognizes that WQX is probably not the model for this type of data
- EPA is beginning the process of looking at other approaches for continuous data



# EXISTING STANDARDS



- Data standards exist:
  - Water Quality Exchange (WQX)
    - Works great for discrete data
    - Backbone of the Water Quality Portal
    - Based upon data elements developed by the NWQMC
  - Water Markup Language 2 (WaterML2) – (TimeSeriesML?)
    - Open Geospatial Consortium Standard
    - Works great for sensor data
    - Based upon WaterML 1.0 which was developed by CUAHSI

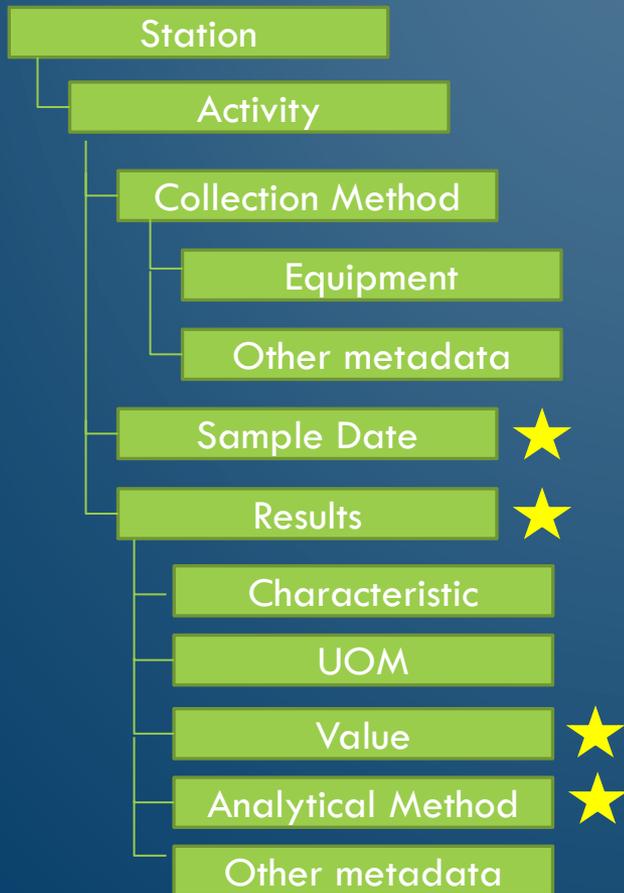
WQX: [www.epa.gov/storet/wqx](http://www.epa.gov/storet/wqx)

WaterML 2:

<http://www.opengeospatial.org/standards/waterml>

# HOW ARE THESE TWO MODELS DIFFERENT?

## WQX

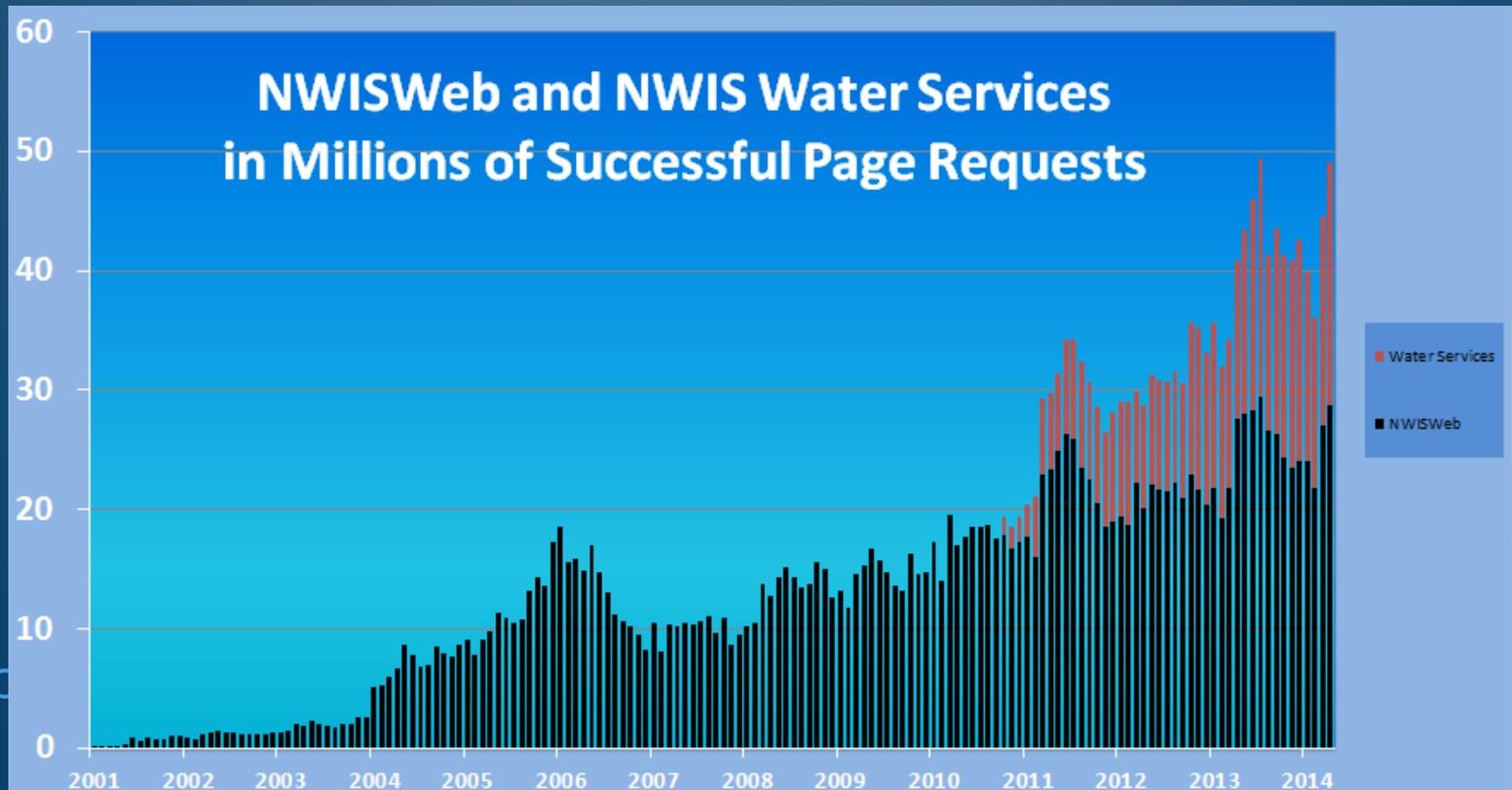


## WaterML 2.0

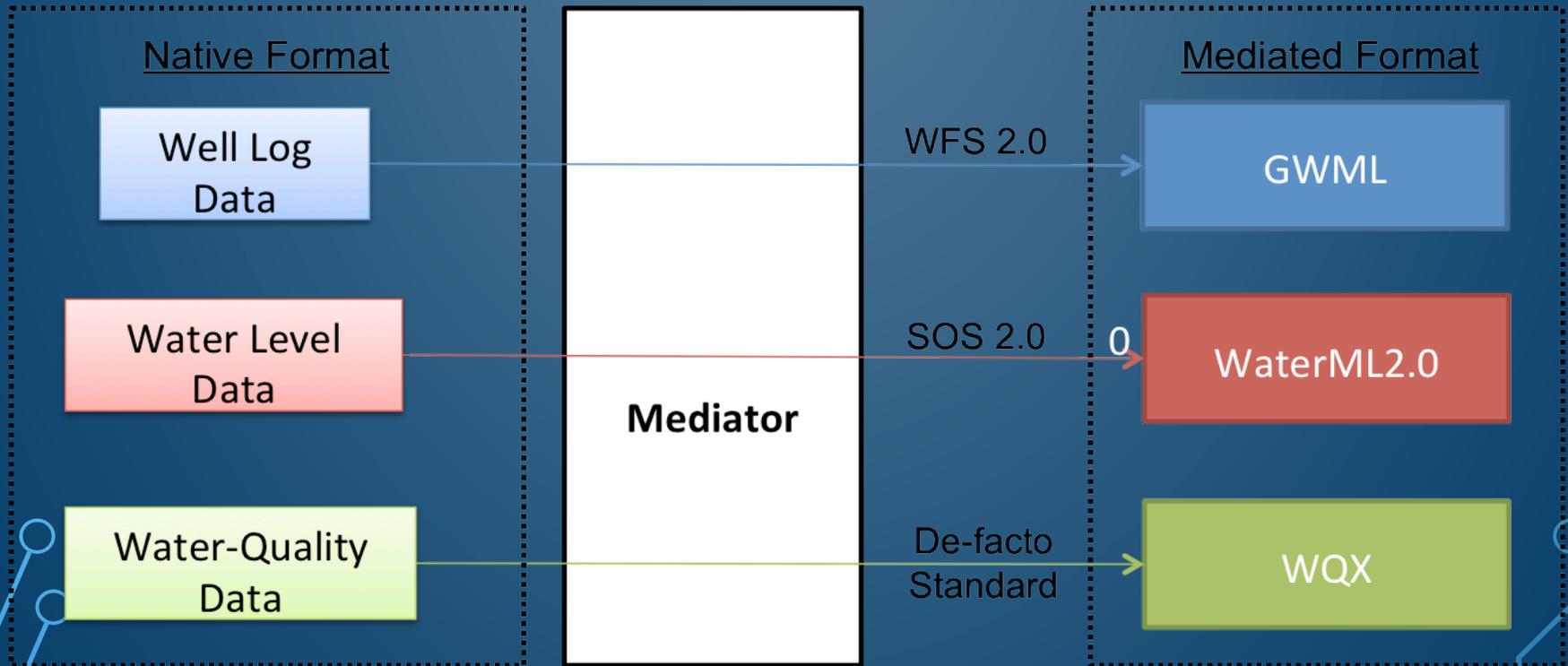


# OTHER FEDERAL AGENCIES ARE ALREADY MOVING IN THIS DIRECTION

- USGS is currently making data available via WaterML 2 using web services



# EXAMPLE: NATIONAL GROUNDWATER MONITORING NETWORK

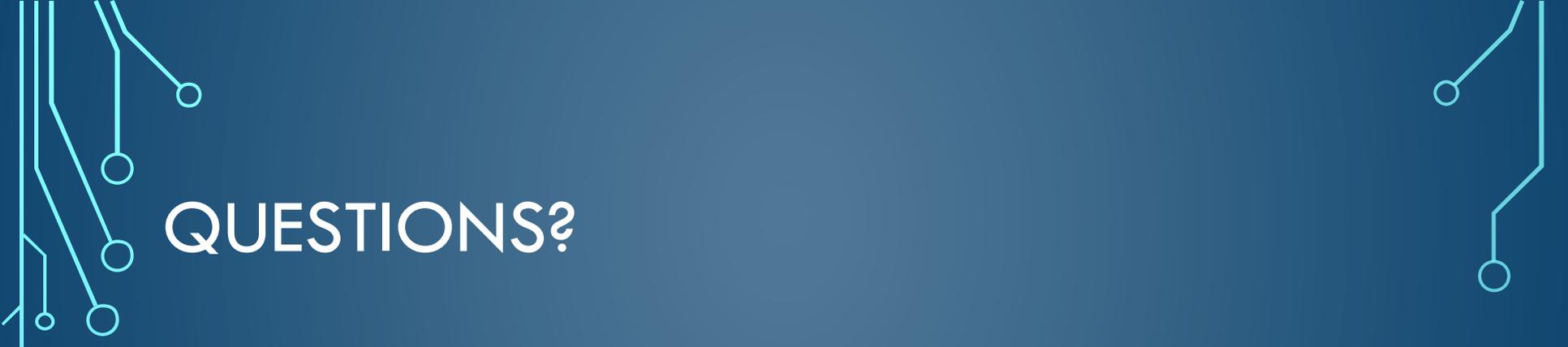


# CURRENT AND FUTURE ACTIVITIES

- EPA State of the Science Report for Nutrient Sensors
- EPA developing a continuous monitoring data strategy
- ACWI Open Water Data Initiative
- EPA leading 'experiments' on sensor data sharing in 2015
- 2015 Draft Exchange Network Grant Guidance

# DISCUSSION TOPICS

- Should the NWQMC further explore adopting WQX as a data standard for discrete data and WaterML 2 as a data standard for sensor data?
- Are NWQMC members interested in working with EPA in formulating a sensor data strategy?
- What role should the NWQMC play in the Open Water Data Initiative?
- What role would the NWQMC like to play in the 2015 'experiments'?



# QUESTIONS?

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