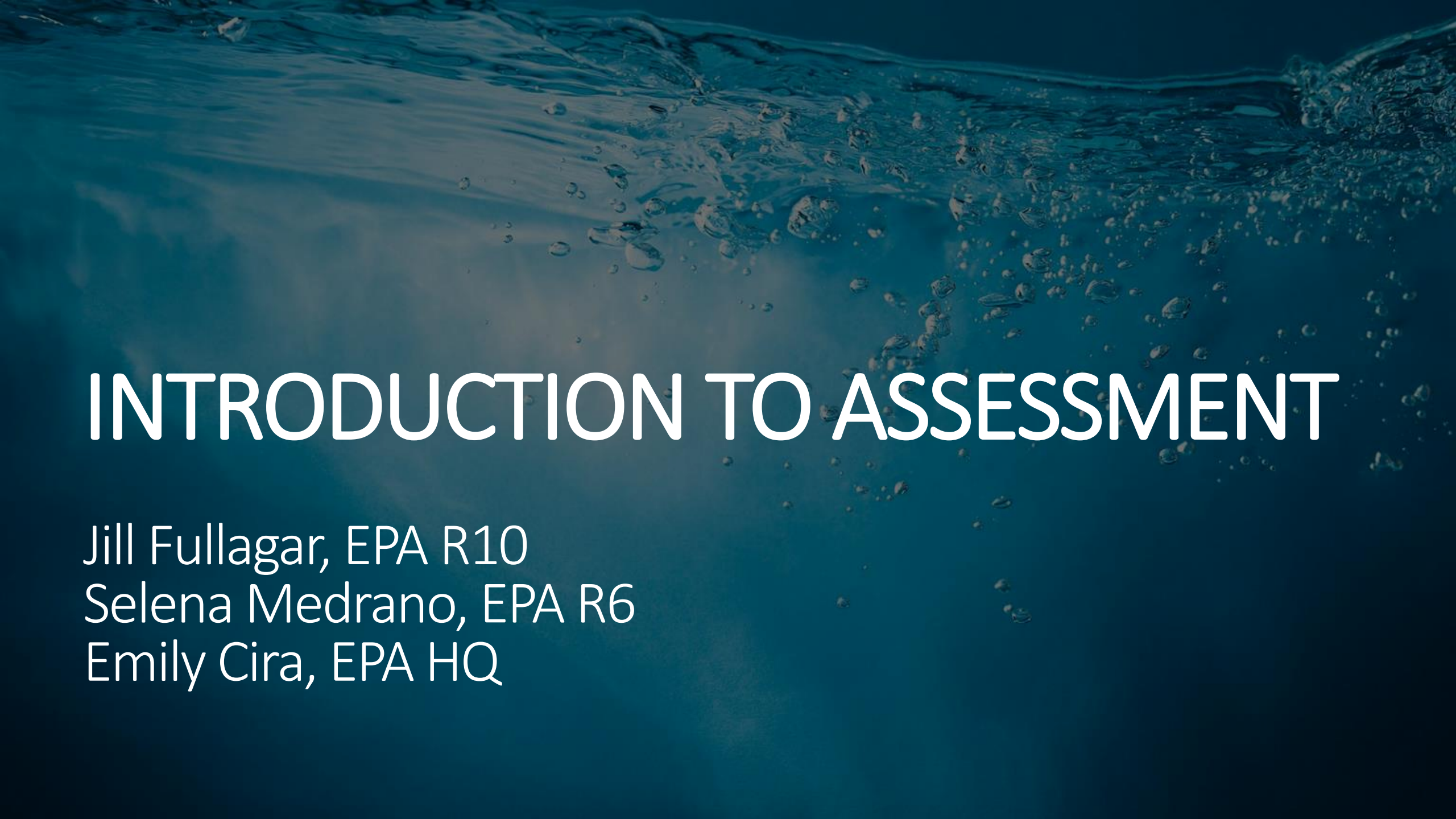

INTRODUCTION TO ASSESSMENT

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Disclaimers

This presentation does not:

- *Impose any binding requirements*
- *Determine the obligations of the regulated community*
- *Change or substitute for any statutory provision or regulatory requirement*
- *Change or substitute for any Agency policy or guidance*
- *Control in any case of conflict between this discussion and statute, regulation, policy, or guidance*

The views expressed in presentation are those of the author[s] and do not necessarily represent the views or policies of the U.S. Environmental Protection Agency.

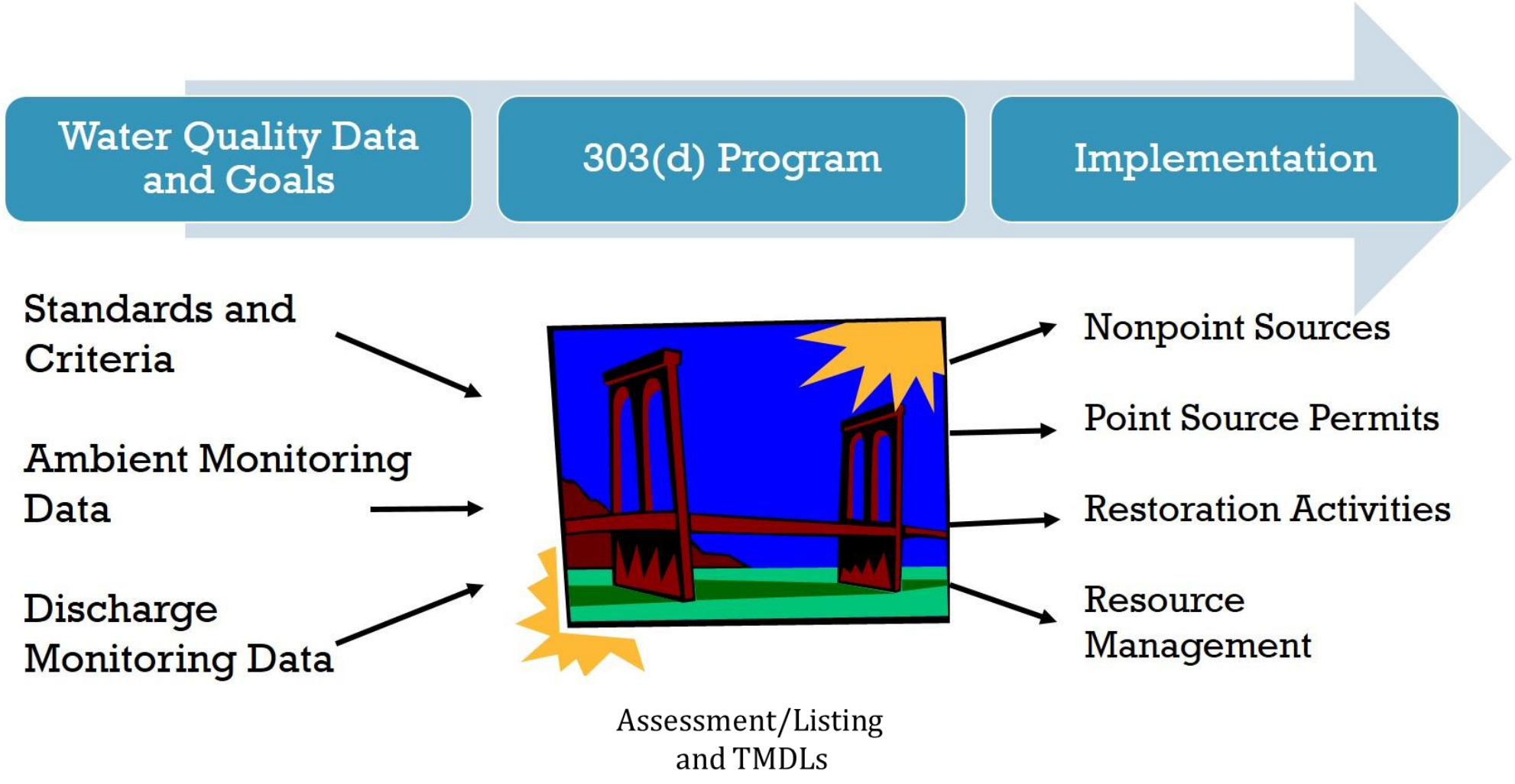
Session Overview

This session provides a brief introduction to 303(d) Assessment.

Participants will learn about:

- How 303(d) assessment fits in the CWA implementation framework
- Relevant regulatory background and requirements
- Basic approaches for assessing water quality data
- The Integrated Report (IR) submission process

Bridging Water Quality Goals and the Actions needed for Restoration



What is the 303(d) List?

Applicable Regulations: 40 CFR 130.7

The 303(d) list consists of waters that:

- Do not meet water quality standards even after the implementation of technology-based limitations or other pollution control requirements, often referred to as “impaired waters.”
- Are not expected to attain water quality standards in the next listing cycle (2 years), referred to as “threatened waters.”

What are the 303(d) Listing Roles?

States, territories, and authorized Tribes:

- Identify waters not meeting WQS based on "all existing and readily available information"
- Identify the pollutant causing or expected to cause the impairment
- Establish priorities for TMDL development
- Develop schedule of TMDLs to be developed within 2 years
- Include supporting documentation in list submittal
- Request and Respond to public comments on their draft 303(d) list
- Submit the final 303(d) list to EPA on April 1st of each even year for review and action

EPA has 30 days to approve or disapprove a submitted 303(d) list

- If EPA disapproves a list, EPA has 30 days to develop list for the state, territory, or authorized Tribe

How are waters placed on a 303(d) List?

Monitoring

- Collect and evaluate monitoring data to determine condition of the waterbody.
- Assemble all readily available data and information.

Assessment

- Use assessment methodologies and procedures, consistent with the WQS and sound science, to determine whether waters are impaired or threatened.

Listing

- Develop a list of those impaired or threatened waters every two years with public participation and submit to EPA.

How is the 303(d) List Submitted to EPA?

303(d) list* (impaired/threatened waters)

305(b) report (overall health of waters)

\+ **314 report** (health of lakes/reservoirs)

= **Integrated Report (IR)**

The 303(d) list and 305(b) report are both due April 1st of every even-numbered year. EPA has recommended an Integrated Report since the 2002 reporting cycle.

**Requires EPA approval/disapproval*

Integrated Reporting Categories

Impaired, but does not require a TMDL:

Category 4A: A TMDL to address a specific segment/pollutant combination has been approved or established

Category 4B: A use impairment caused by a pollutant is being addressed by the state through other pollution control requirements

Impaired, a TMDL may be needed:

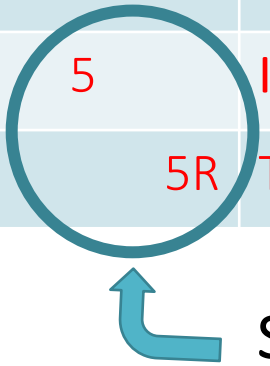
Category 4C: A use is impaired, and there is a "non-pollutant pollution" cause of the impairment. Impaired waters must also be in category 5 unless it can be shown that a pollutant is not causing or contributing to the impairment

Impaired, requires a TMDL (this is the 303(d) list)

Category 5/303(d) Listed Waters: Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed

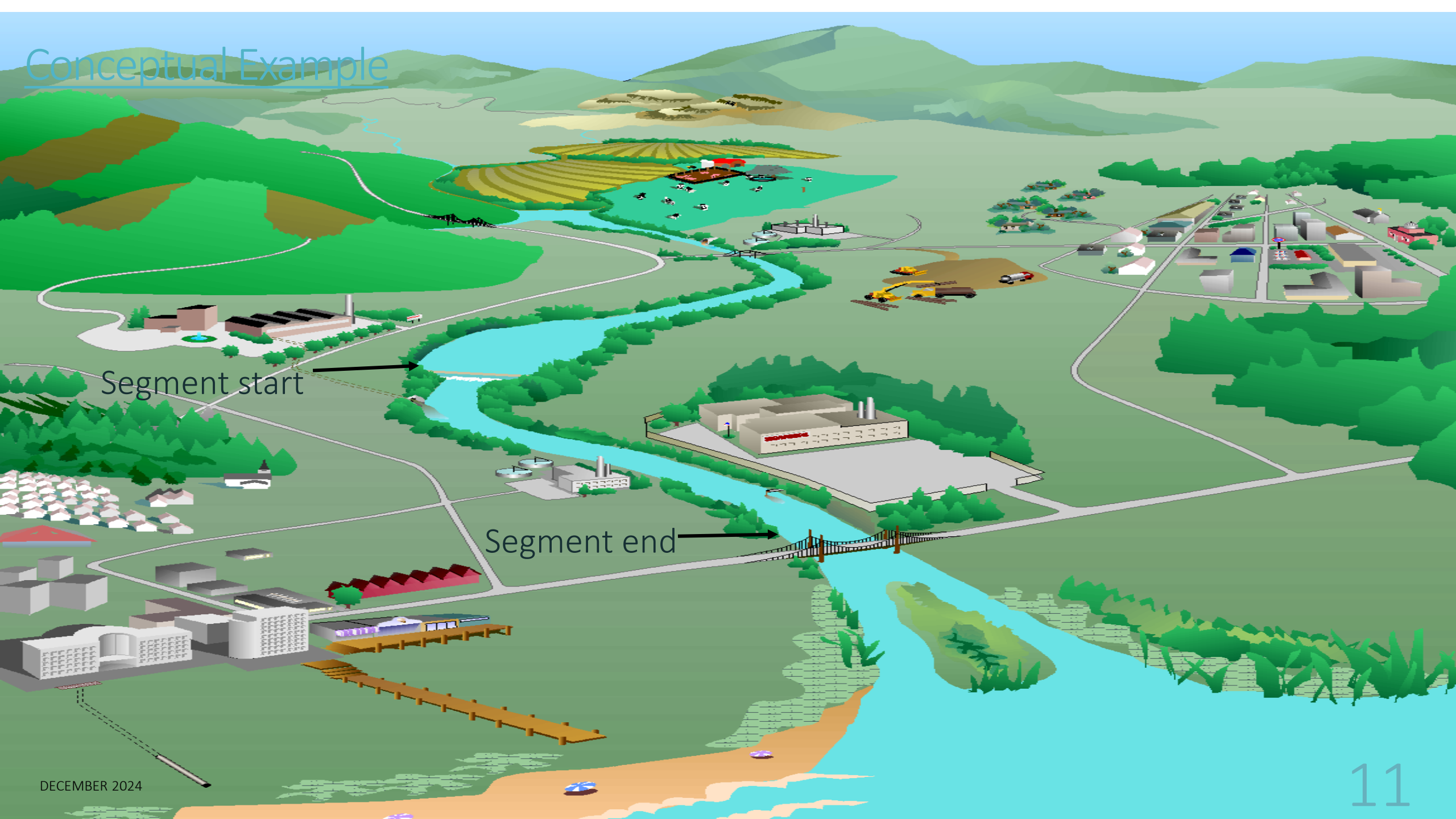
Five Integrated Report Categories

Category	Description
1	All designated uses (DU) met
2	Some, but not all, DU met
3	Can not determine if DU are being met
4	**Impaired/Threatened** – TMDL not needed
4A	TMDL established
4B	Addressed through other pollution control requirements
4C	Non-pollutant cause of impairment
5	**Impaired/Threatened by pollutant** – TMDL required
5R	TMDL required but lower priority assigned while restoration plan is pursued



Section 303(d) list / impaired waters list

Conceptual Example



Important principles to remember

Listing decisions are based on:

- CWA Water Quality Standards
- Requirements under CWA Section 303(d)
- Sound science

Basic Assessment Approaches

- Introduce basic approaches of assessing data for specific water quality parameters
- Acute and chronic water quality criteria
- Sample size when evaluating water quality data
- How parameters are evaluated against water quality criteria

Numeric Water Quality Criteria

- EPA develops recommended human health and aquatic life water quality criteria as guidance for use in developing criteria. Levels adopted are applied to monitoring data to assess water quality
- Numeric criteria are expressed as
  - Less than, such as nitrate is *not to exceed* 10 mg/L
  - Greater than, such as the 7-day average of the daily mean dissolved oxygen should be *at least* 8.5 mg/L
  - A range, such as pH shall be *within the range* of 6.5 to 8.5 S.U.
  - No more than one exceedance of the calculated criteria in three years: WQC = $(e^{(x[\ln(hardness)]+y)})$*z

Parts of a Numeric Water Quality Criterion

Explicit Value = actual number/magnitude

Hypothetical Example: Should not exceed 10 mg/L annually more than 5% of the time.

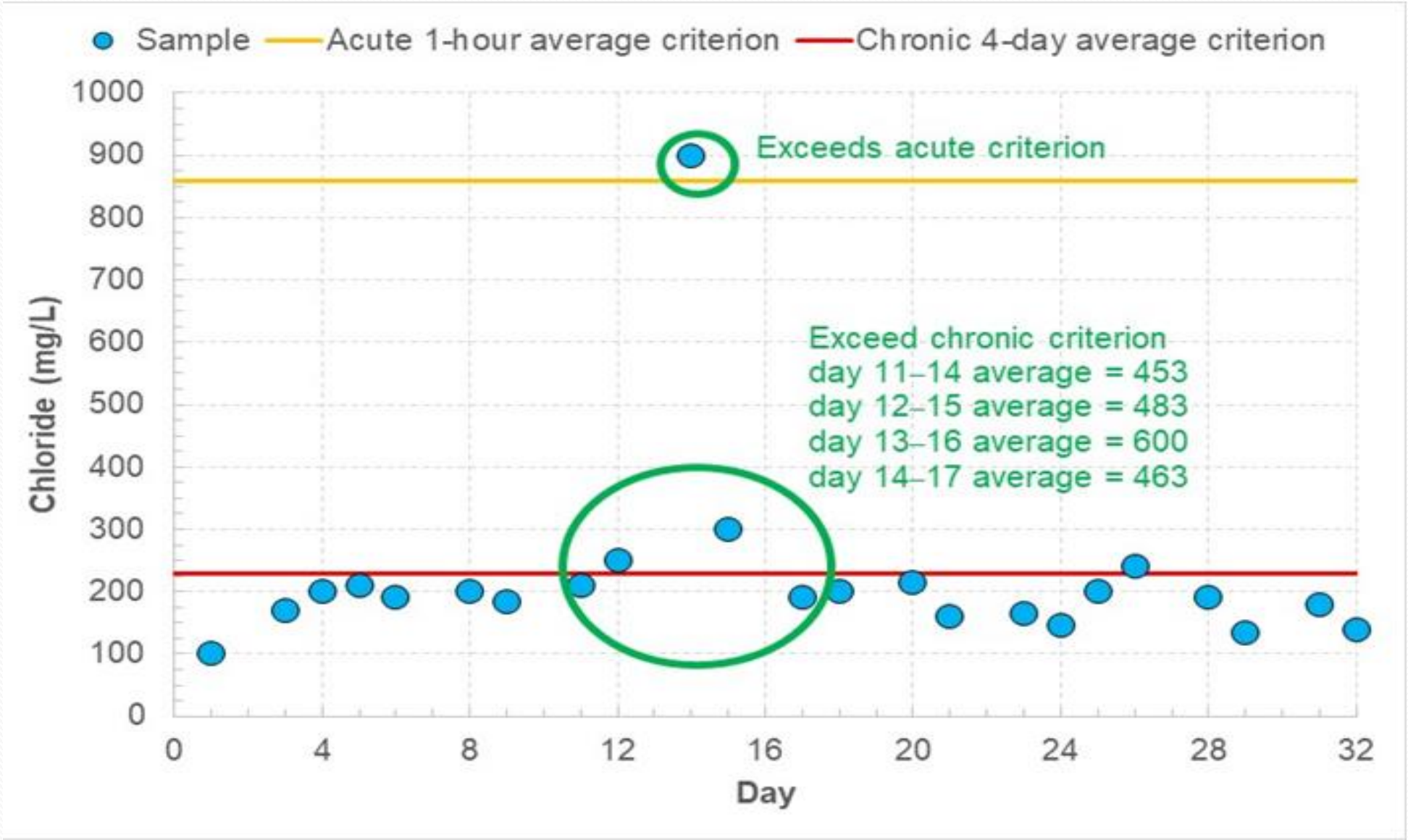
Duration = period of time

Frequency = recurrence interval

Considerations for Acute and Chronic Water Quality Criteria – Aquatic Life

- *Acute*: Toxicity at higher concentrations over short time periods
- *Chronic*: Lower concentrations, longer term exposures
- Example: chloride criteria magnitude for aquatic life
  - Acute 860 mg/L
  - Chronic 230 mg/L

Chloride Example

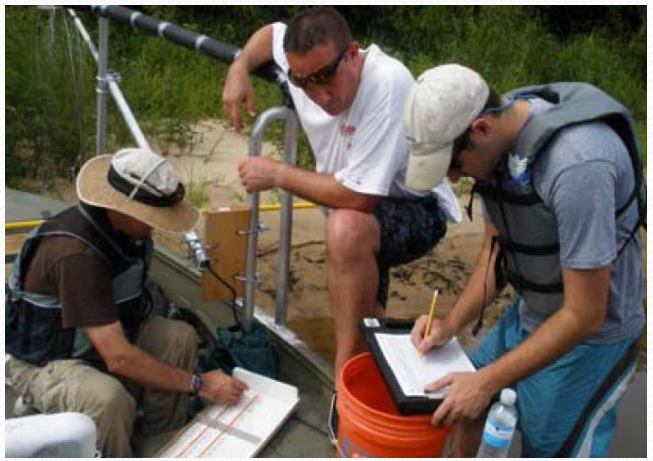


860 mg/L

230 mg/L

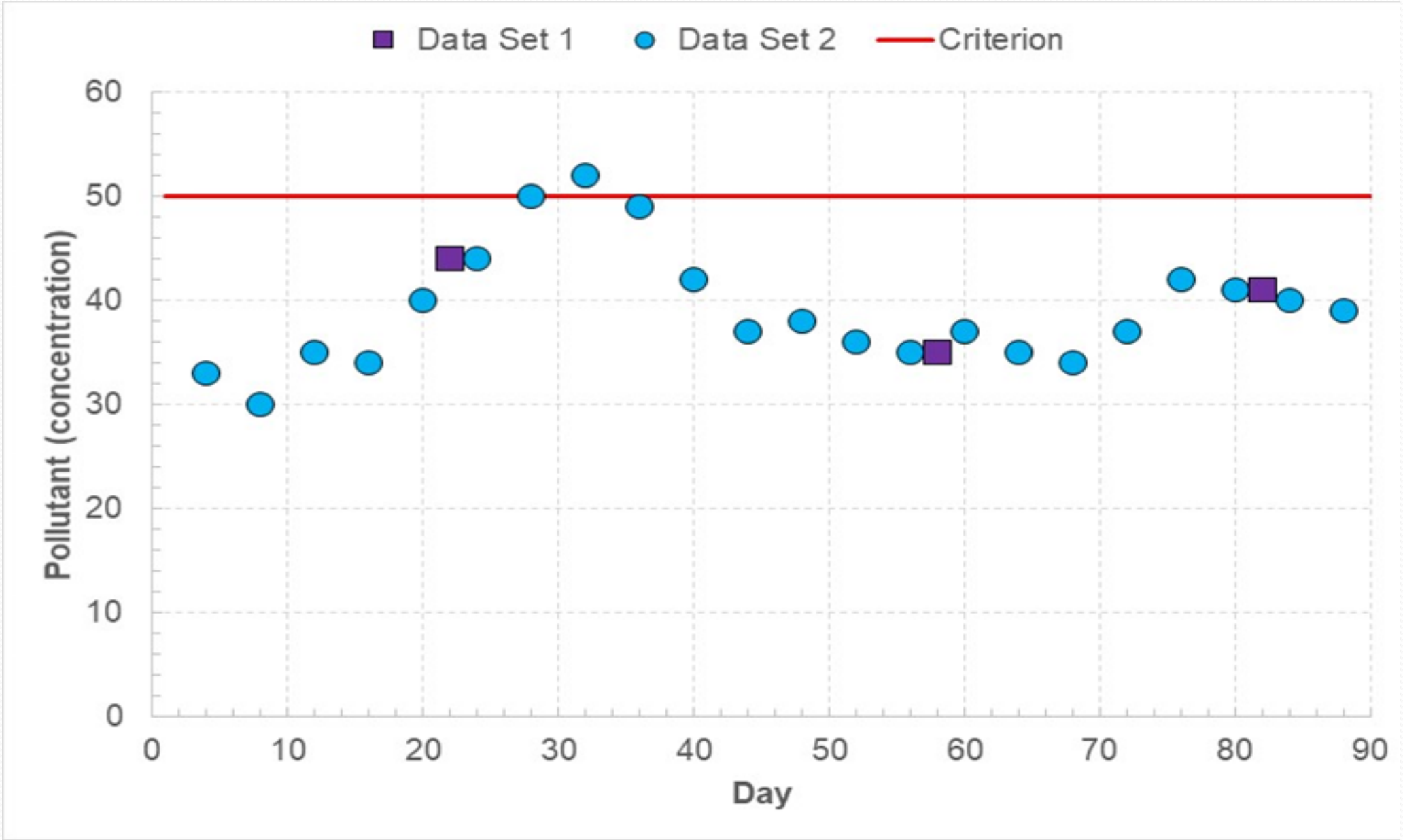
Considerations for Sample Size

- **Sample size should target research questions**:
  - Types of waterbodies to be assessed
  - High/low flow conditions to be considered
  - Parameters of interest & seasonality



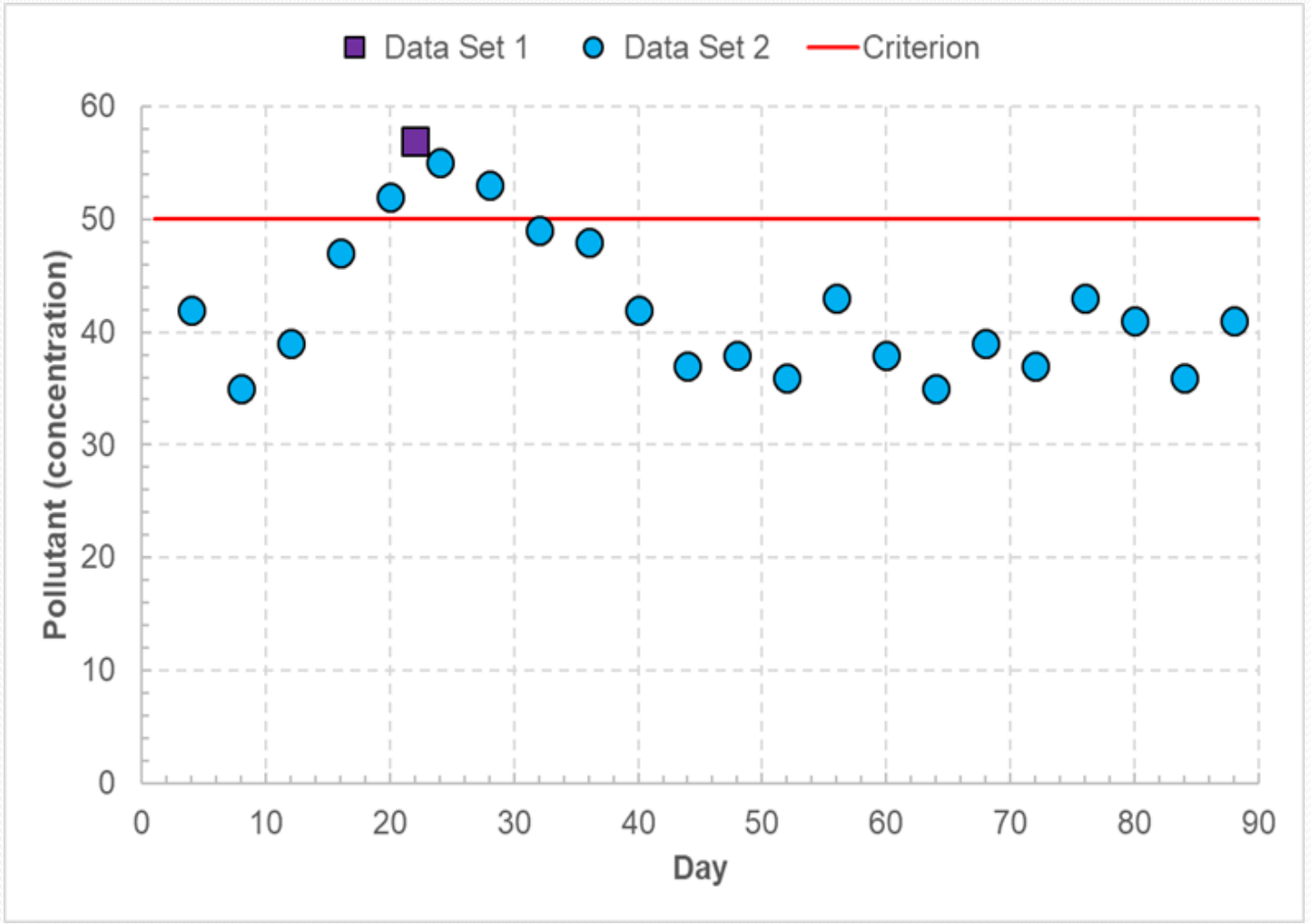
- **Number of samples to be taken**
  - Balance cost and completeness of dataset (seasonality coverage, etc)
  - Note: Not meeting a target sample size does not always mean you cannot make a decision

Sample Size Example



Considerations for Sample Size

- Aim to collect enough data to interpret the numeric criterion
- You may need to make decisions with a small dataset
- Numerous factors are considered when developing a sampling frequency, but that is for another module



WQS: Designated Uses

Examples of beneficial use designations:

- Drinking water source
- Swimming (primary contact)
- Boating (secondary contact)
- Aquatic life support (fish, etc.)
- Cultural and traditional uses
- Agricultural, industrial, other uses

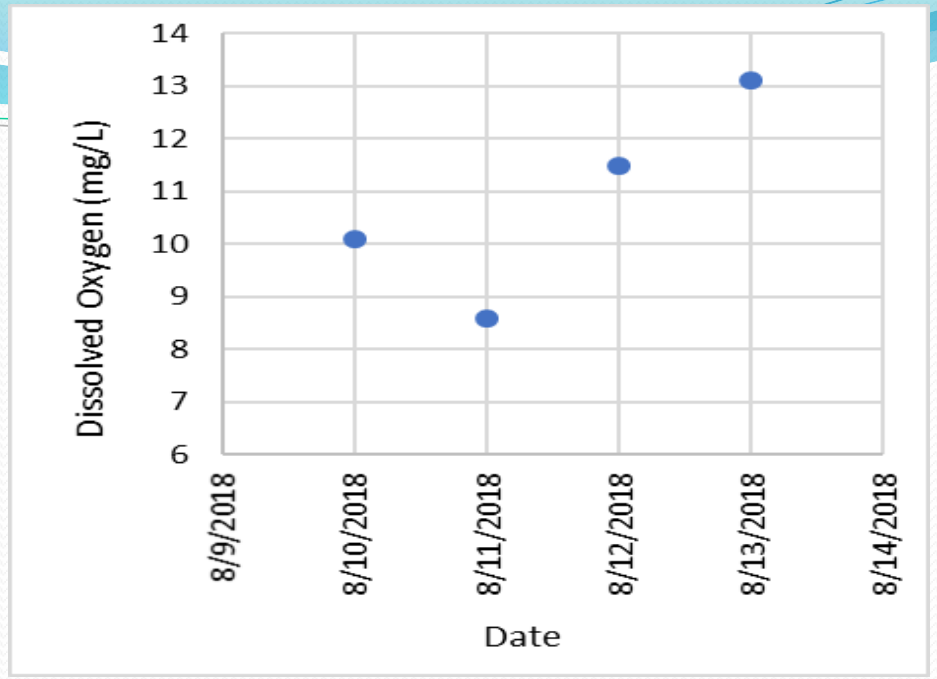
Mississippi River Headwaters

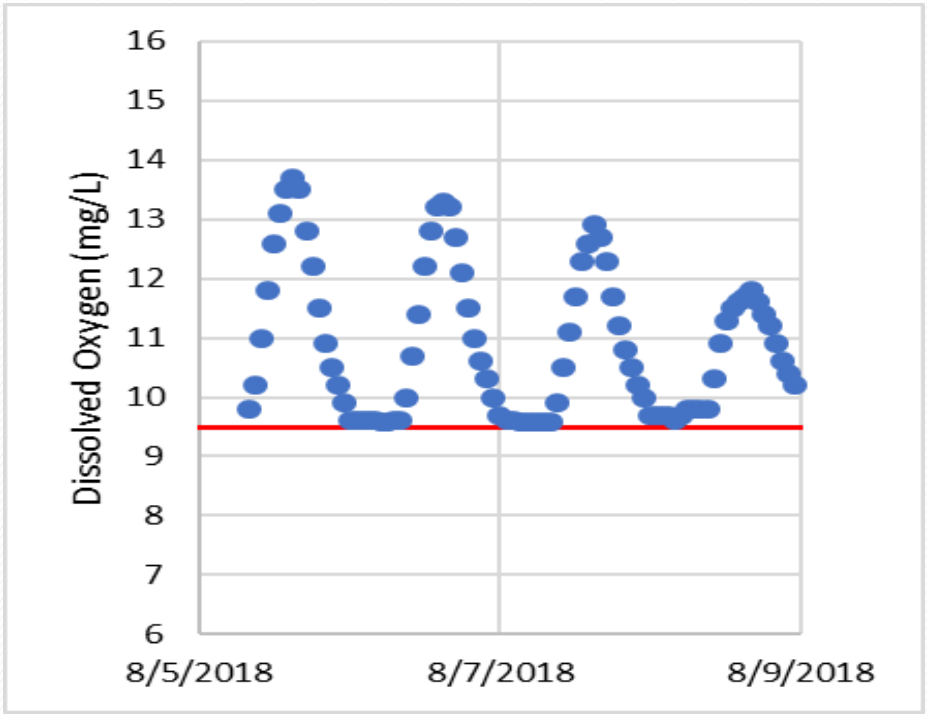
Assessing Data

Dissolved Oxygen

- Critical for life!
- Causes of low dissolved oxygen
- Relationship with temperature
- Discrete and continuous measurements
- How can you be confident of your DO readings?

CALIBRATE





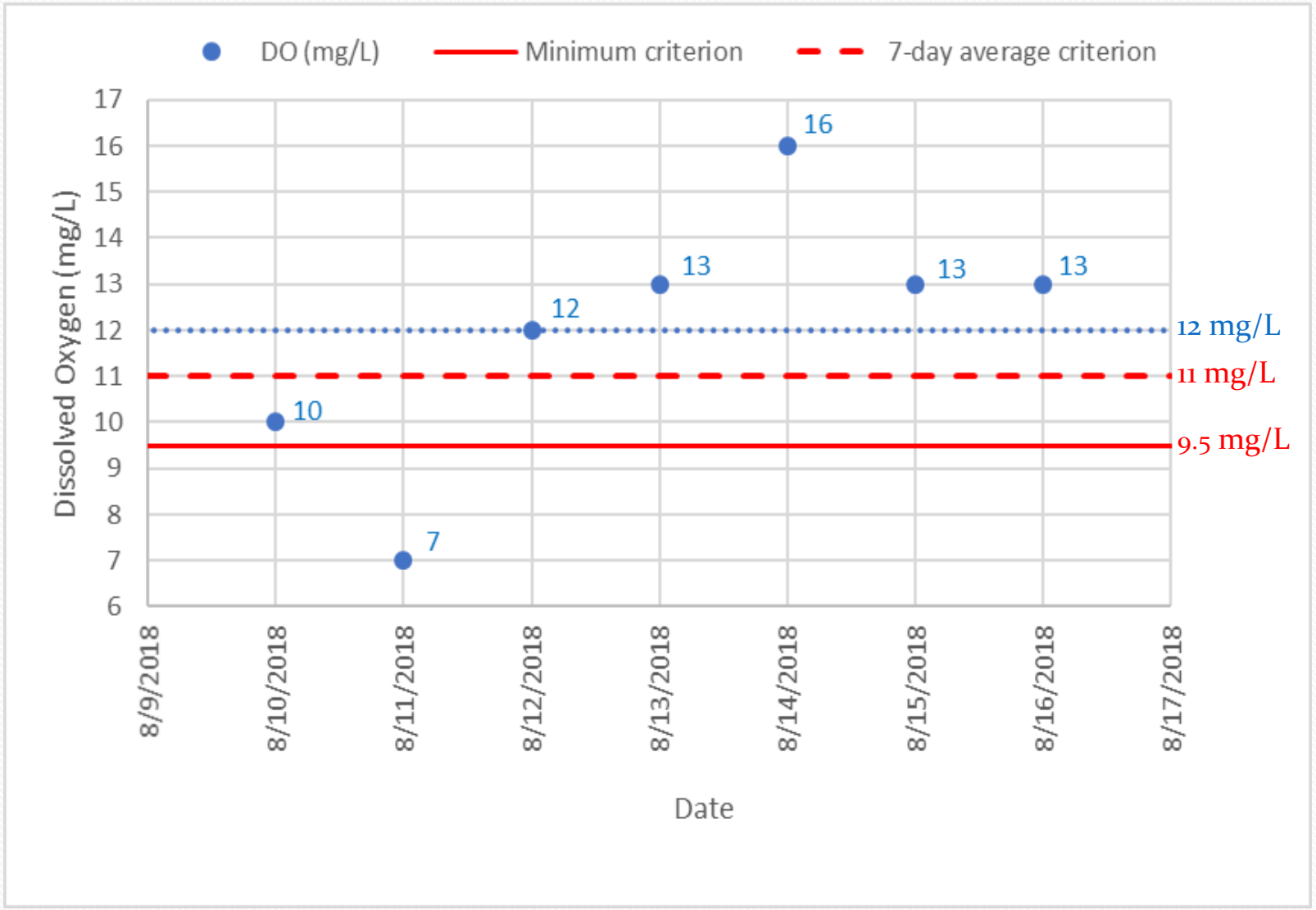
Examples of Dissolved Oxygen Criteria

- Salmon and trout spawning
  - 7-day average of the daily mean dissolved oxygen: 11 mg/L
  - Minimum: 9.5 mg/L
- Salmon and trout rearing and migration
  - 7-day average of the daily mean dissolved oxygen: 8.5 mg/L
  - Minimum: 6.5 mg/L

https://nwtreatytribes.org/loomis-great-day-salmon-tribal-treaty-rights-everyone-lives/

Dissolved Oxygen Assessment

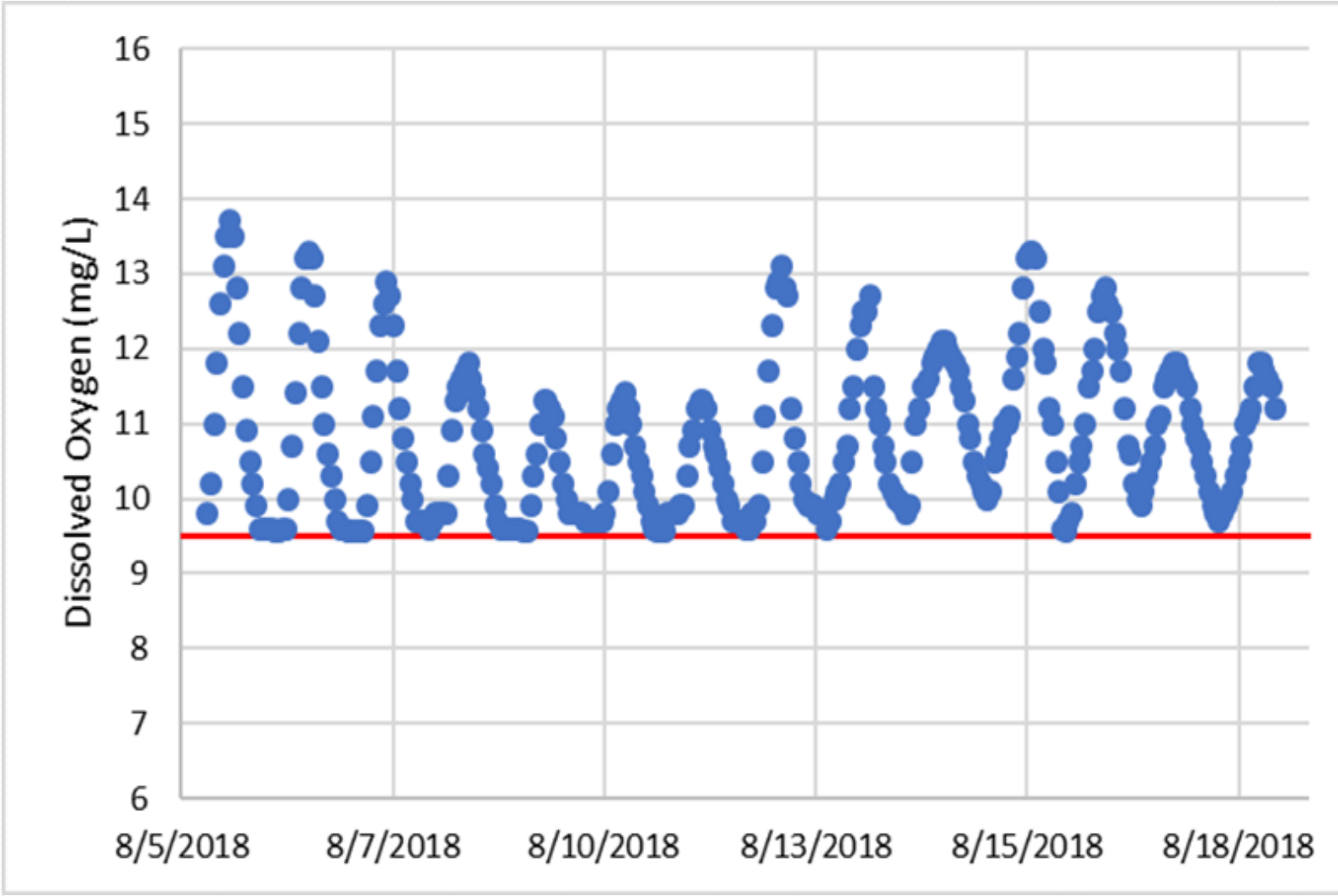
- Salmon and trout spawning water
  - 7-day average of the daily mean dissolved oxygen: 11 mg/L
  - Minimum: 9.5 mg/L
- 7-day average: 12 mg/L
- Range: 7–16 mg/L



Dissolved Oxygen Assessment

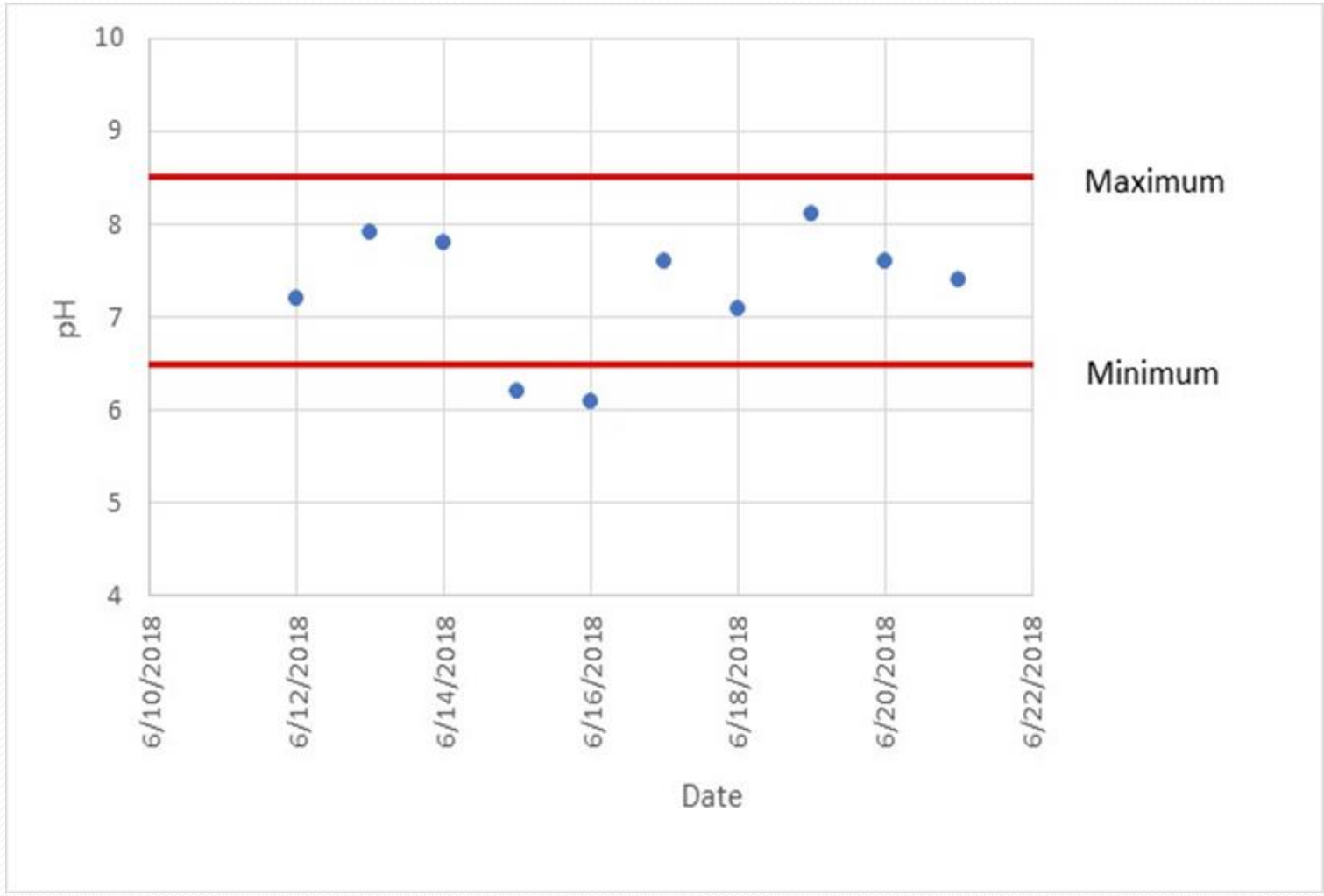
Salmon and trout spawning water criteria:

- 7-day average of the daily mean dissolved oxygen: 11 mg/L
- Minimum: 9.5 mg/L



pH Criteria

- A measure of acidity and alkalinity of the water
- Criteria require keeping pH within a specific range
  - To protect human health, the pH must be within the range of 5 to 9
  - To protect aquatic life, the pH must be within the range of 6.5 to 9.0 for freshwater and 6.5 to 8.5 for saltwater

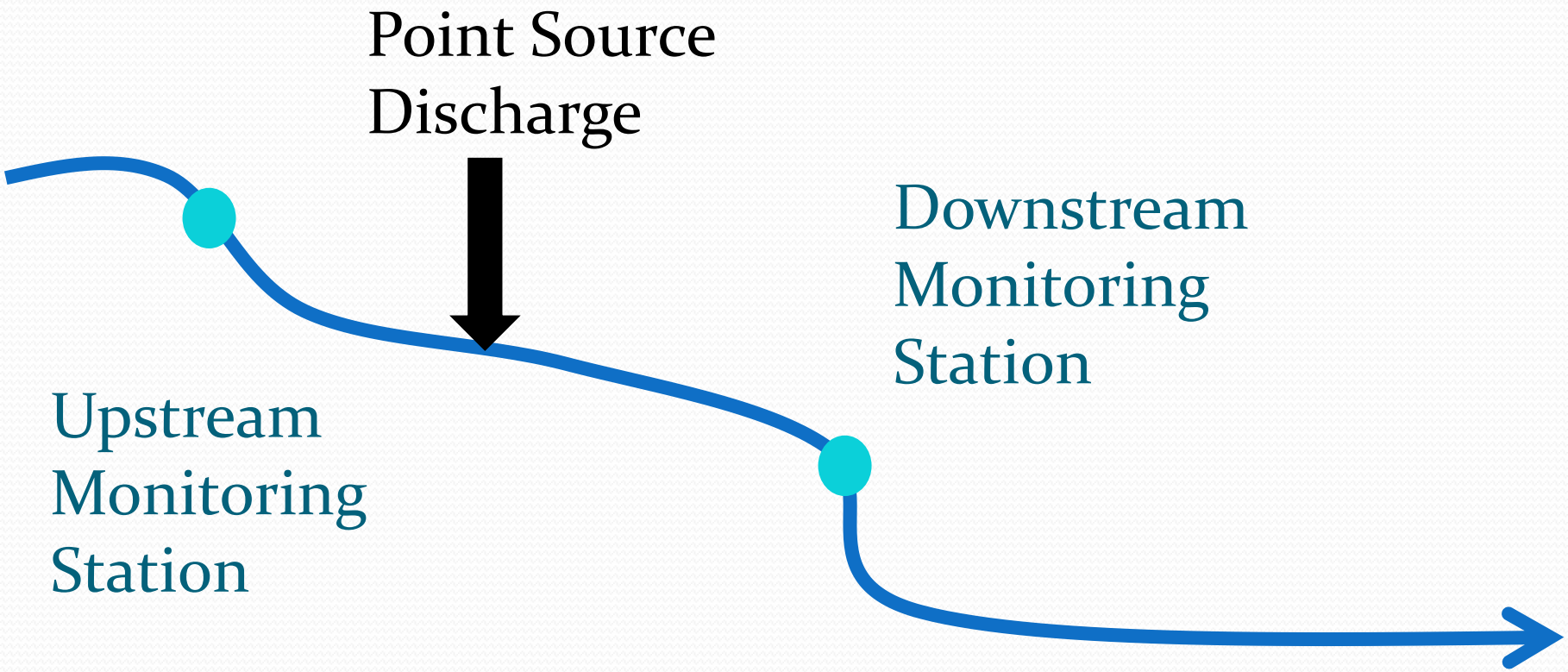


Temperature

- Criteria focused on aquatic life support—warmwater and coldwater

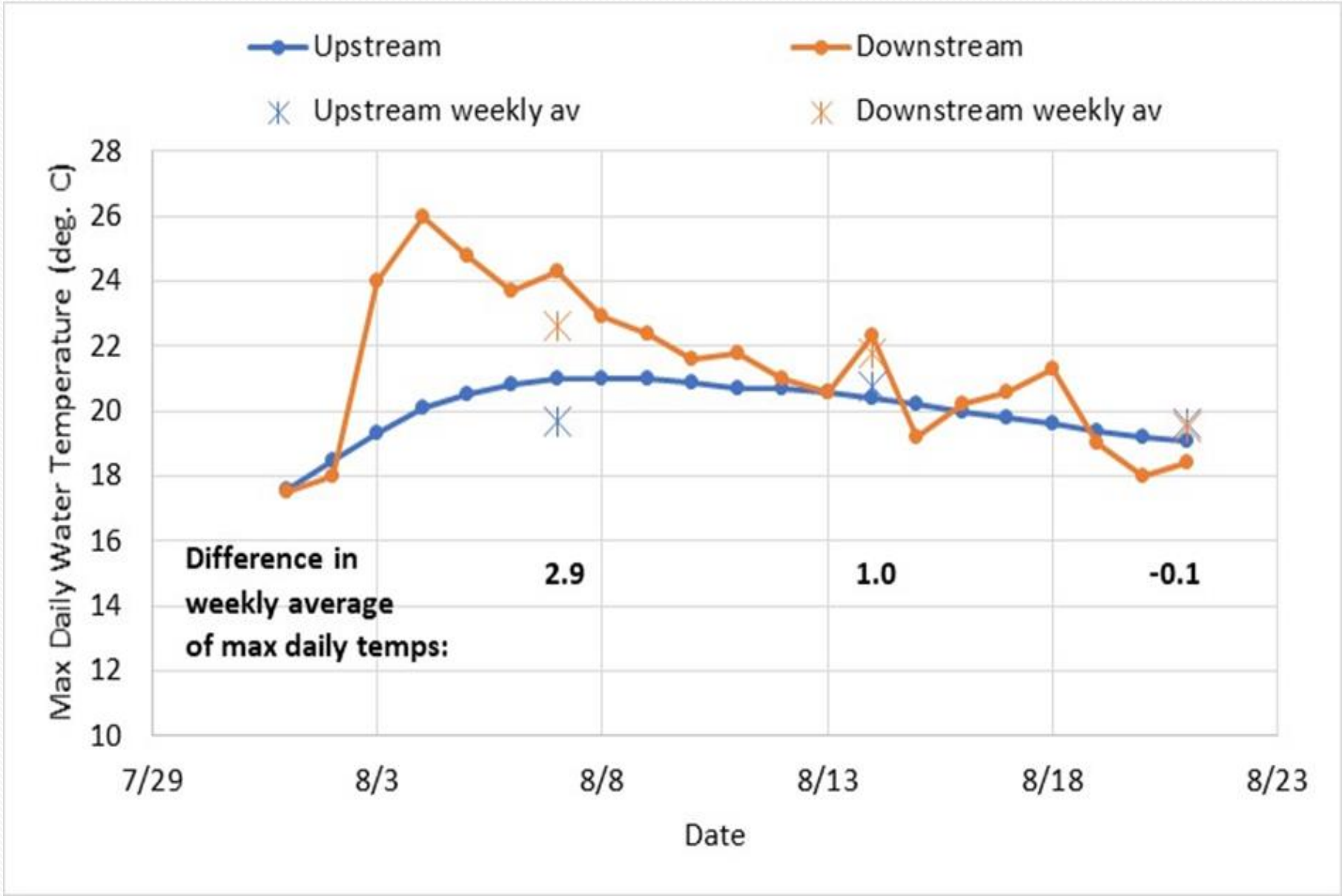
- In a stream, the introduction of heat by other than natural causes shall not increase the temperature, as measured upstream from the point of introduction, by more than 2.7° C (5° F), based on the weekly average of the maximum daily temperatures measured at mid-depth or three feet, whichever is less.

Temperature



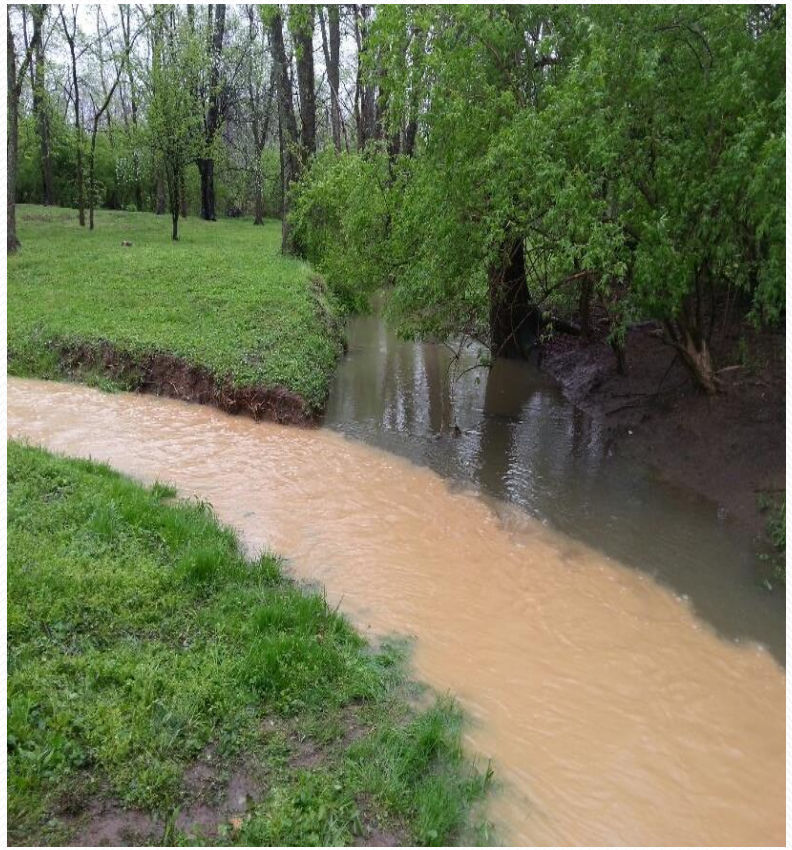
Temperature

No increase in the weekly average of the maximum daily temperature between upstream/ downstream locations that is greater than 2.7° C



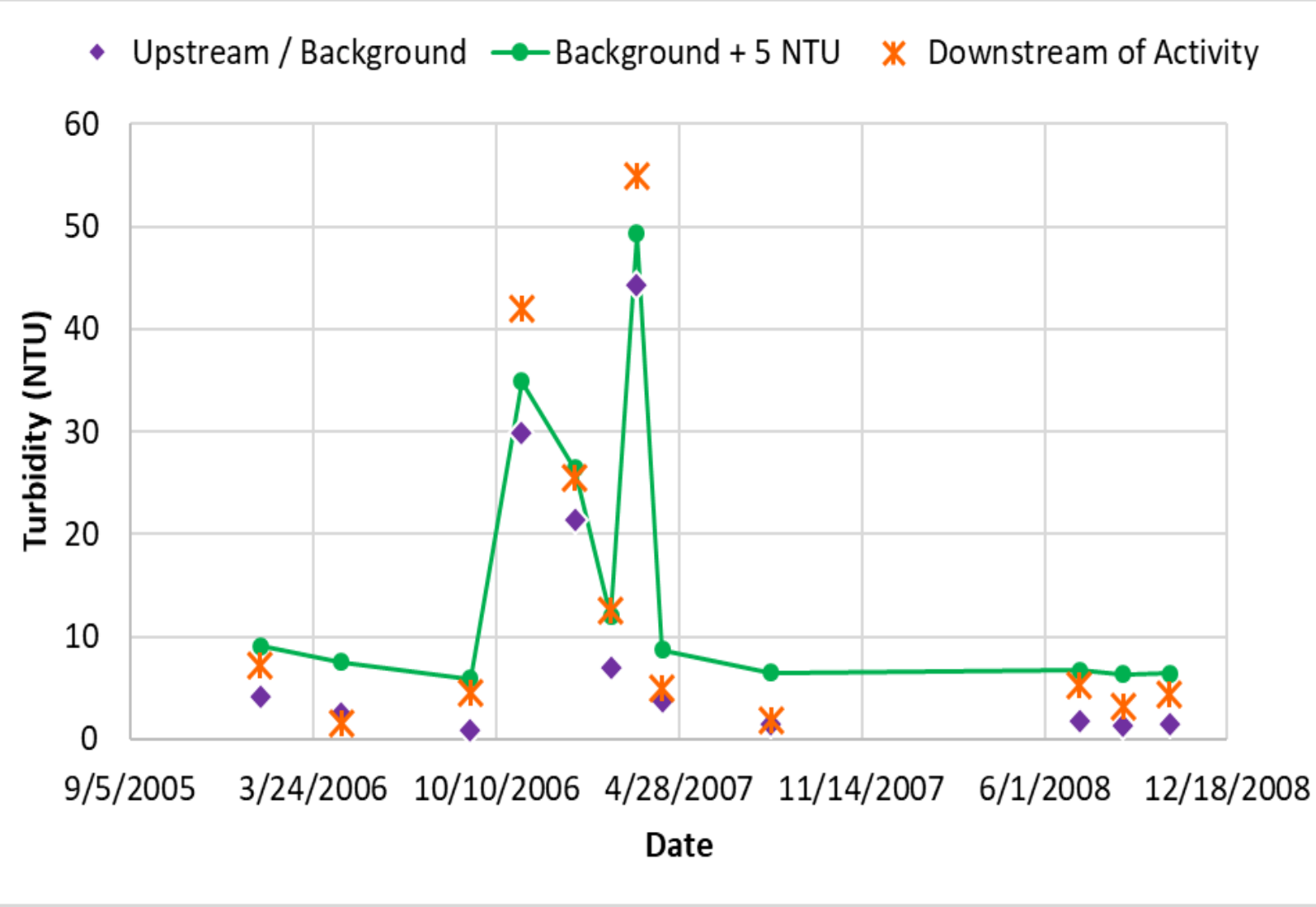
Turbidity

- Measure of cloudiness of water
- Turbidity shall not exceed 5 NTU over background when background turbidity is 50 NTU or less, with no more than a 10 percent increase when background turbidity is more than 50 NTU.
- Turbidity shall not exceed 25 NTU



Turbidity: Increase over Background Turbidity Example

- Turbidity shall not exceed 5 NTU over background when background turbidity is 50 NTU or less, with no more than a 10 percent increase when background turbidity is more than 50 NTU.
- Note conditions when criteria is exceeded



Copper

- Aquatic Life Use
- Relationship with hardness
- Toxic
- Criterion magnitude calculated using an equation and site-specific hardness:

$$WQC = (e^{(0.8545[\ln(hardness)]-1.3862)})*0.960$$

Where:

WQC = water quality criteria
e = Euler's number (~2.71828)
ln = natural log
hardness = hardness collected concurrent with your sample

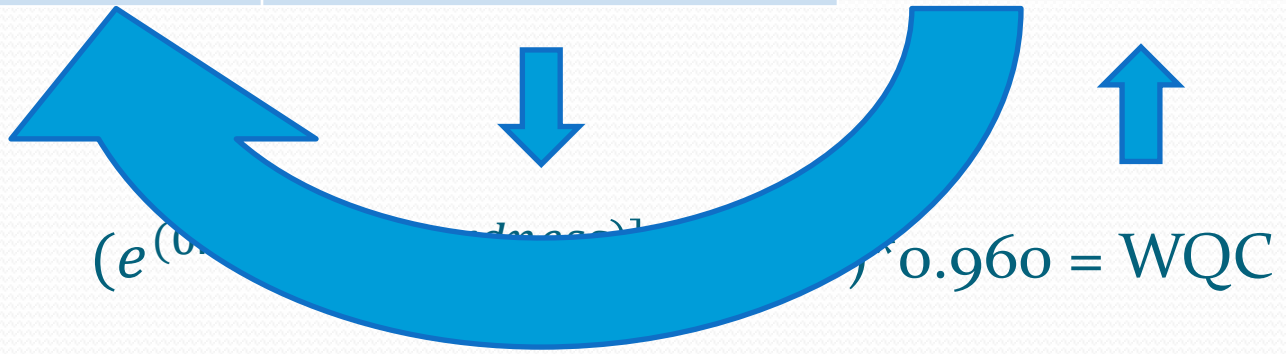
Copper – Example

The Aquatic Life beneficial use designated for a waterbody shall be deemed to be fully supported with respect to any individual toxicant parameter if there is no more than one exceedance of the acute or chronic criterion for that toxicant listed in the table within a three-year period:

Parameter	Acute (µg/L)	Chronic (µg/L)	Conversion Factor
Copper	$e^{(0.9422[\ln(\text{hardness})] - 1.3844)}$	$e^{(0.8545[\ln(\text{hardness})] - 1.3862)}$	0.960
Lead	$e^{(1.273[\ln(\text{hardness})] - 1.460)}$	$e^{(1.273[\ln(\text{hardness})] - 4.705)}$	1.46203 – 0.145712 *[ln(hardness)]
Zinc	$e^{(0.8473[\ln(\text{hardness})] + 0.884)}$	--	0.978

Copper - Assessment

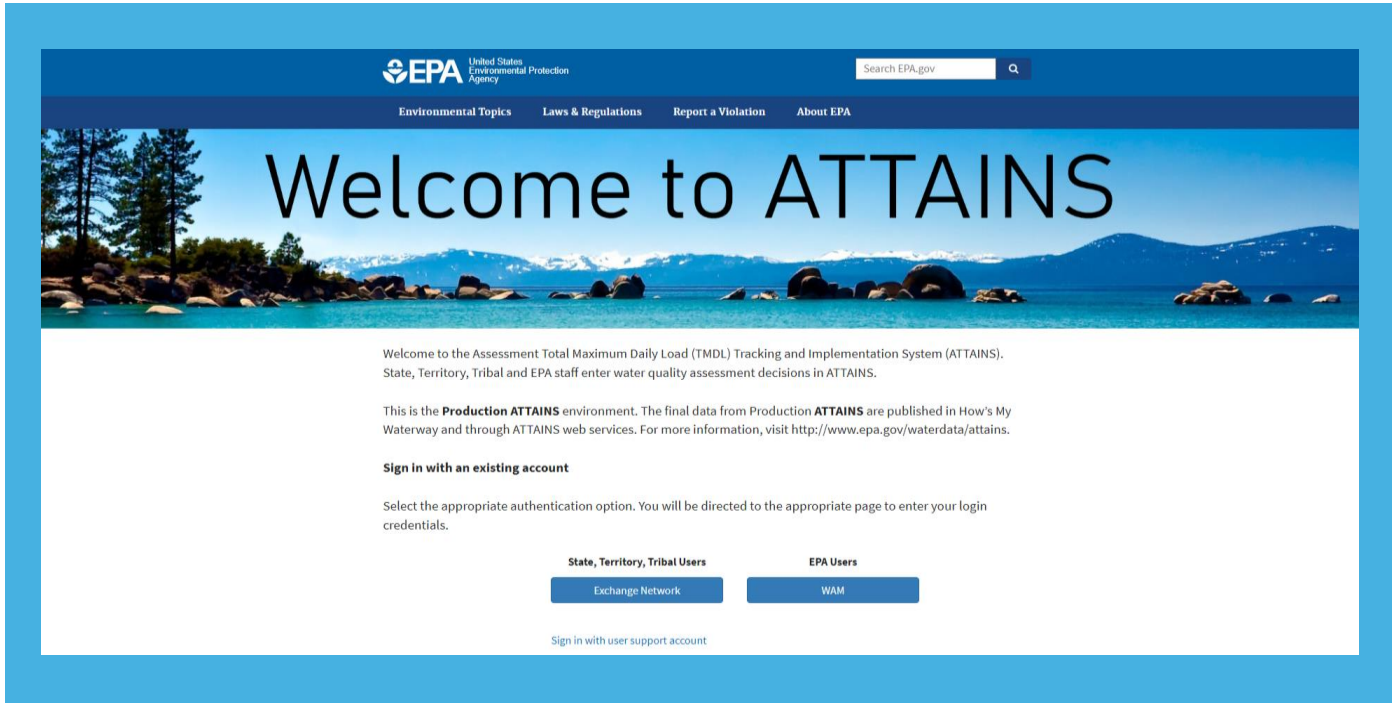
Date	Copper (µg/l)	Hardness, Ca, Mg (mg/L)
11/12/2021	0.895	27.3
2/18/2022	4.582	25.9
8/25/2022	1.789	36.4
11/17/2022	6.465	44.4
3/9/2023	0.815	25.2



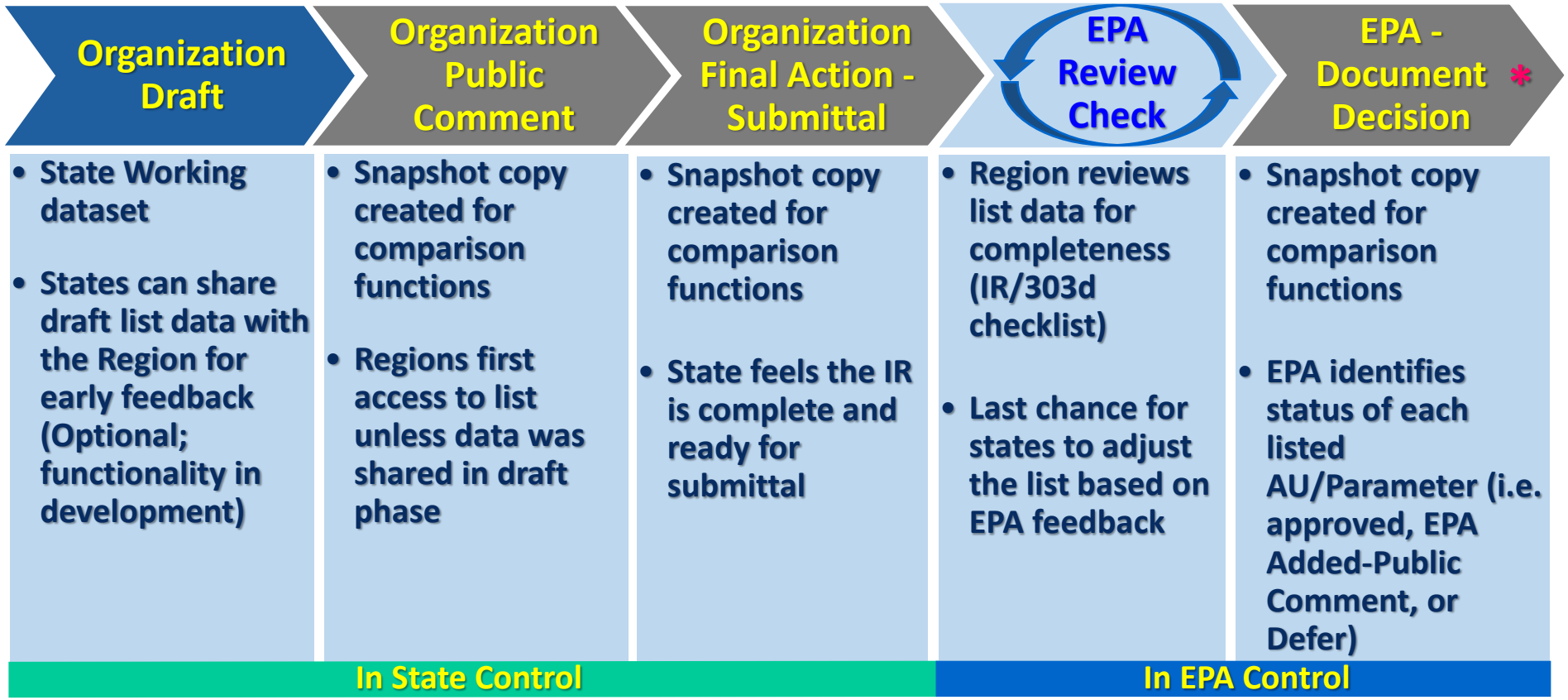
The IR Submittal

Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS)

- ATTAINS is EPA's database that houses assessment determinations, restoration activity information, survey data and geospatial information.
- ATTAINS includes state or Tribal-reported information on support of water quality standards or Tribal goals in assessed waters, impaired waters, identified causes and sources of impairment and the status of TMDLs or other restoration activities.
- ATTAINS is available to Tribes, regardless of 303(d) TAS status.



ATTAINS: State IR Data Submission and Promotion Process



* If full approval, list will be promoted to **EPA Final Action** status.
If partial approval/disapproval, or defer, list will be promoted to **EPA Interim Action** status, and additional steps will follow before it can be promoted to **EPA Final Action** status.

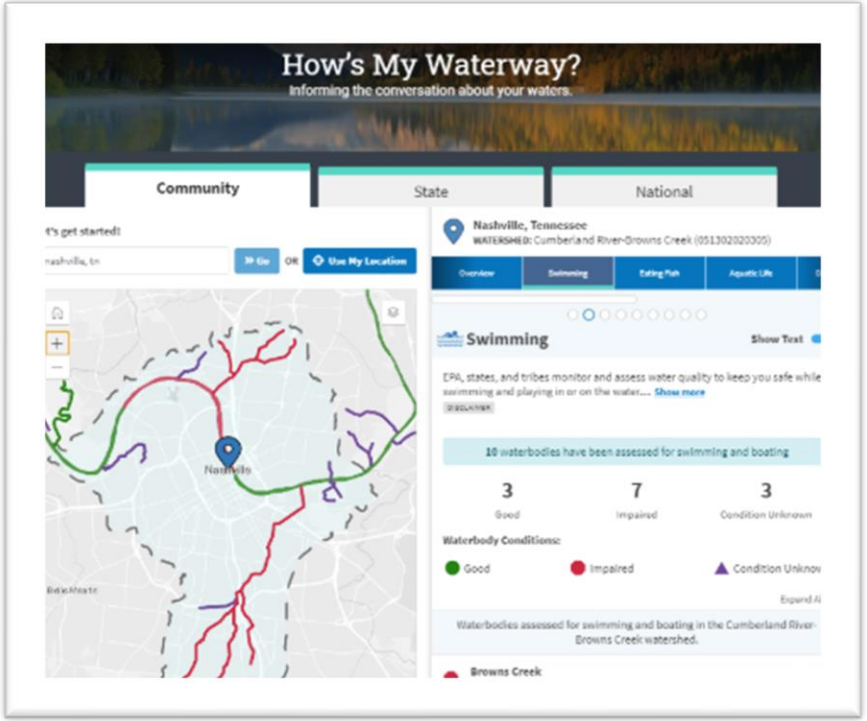
List Review

What Does EPA Look For?

- The State's **identification of WQLS**, that are not meeting applicable WQS, still requiring TMDL(s), the pollutants causing the impairment and **priority ranking for TMDL development** (including WQLS targeted for TMDL development within the next two years).
- A description of the **methodology** used to develop the list
- A **description of the data and information used** to develop the list
- A **rationale for any decision to not use any existing and readily available data and information**
- **Any other reasonable information** requested by the Regional Administrator.
- States must demonstrate **good cause** for not including a water or waters on the list.
- The basis for these required elements can be found in 40 CFR § 130.7.

How's My Waterway

- How's My Waterway (HMW) is an EPA website that provides the public with **information about the condition of their local waters** based on data that states, federal, Tribal, local agencies and others have provided to EPA. HMW uses data from the **Water Quality Portal to display monitoring station information** and **ATTAINS web services to display assessment decision data** in a user-friendly way.
- In addition to assessment information, other data layers can be enabled to display such things as permitted facilities, restoration projects, monitoring stations, and demographic statistics to paint a more complete picture of potential influences on and communities impacted by water quality.



How's My Waterway

HMW can be found at: https://mywaterway.epa.gov/

Additional Tools and Resources

- Clean Water Act Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs) | US EPA
- Resources, Tools and Databases about Impaired Waters and TMDLs | US EPA
- Refer to state/territory/Tribe website for Integrated Reports and information on comment periods.
- Integrated Reporting Memoranda under CWA Sections 303(d), 305(b) and 314 | US EPA – this page also has related resources (IR memo Table of Contents + IR memo Topic index)
- Go to Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS | US EPA) site to access reported data at different scales.
- How's My Waterway | US EPA provides access to data for multiple water programs in a user-friendly format at the national, state and local level.

Questions?

Thank you!!