OWQ Antidegradation Implementation Methodology

Stakeholder Meeting #4

ARKANSAS
ENERGY & ENVIRONMENT

Division of Environmental Quality (DEQ)
Office of Water Quality (OWQ)
NPDES Permits Section

Today's Presentation

- Clarification of comments received in the previous meetings

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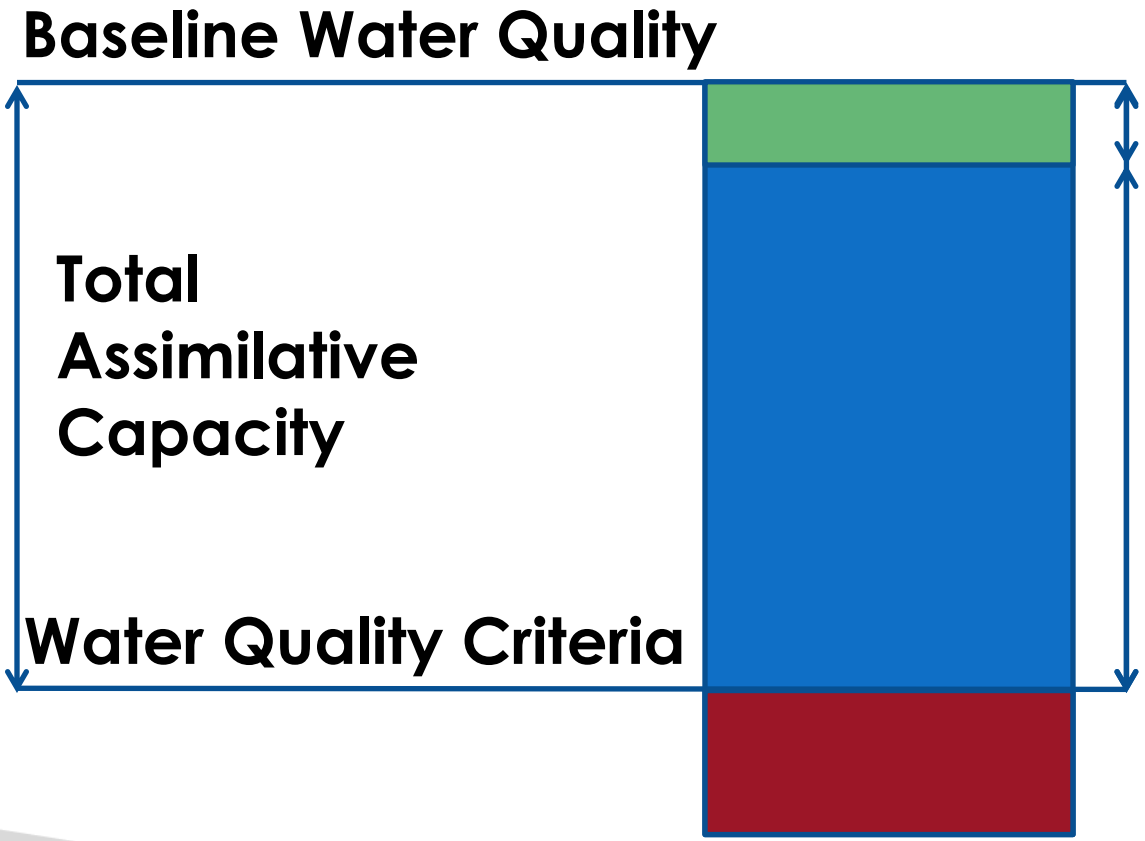
Permit Engineer, Office of Water Quality

Cumulative Caps/Tracking Use of Assimilative Capacity

- Section 8.B.2
- Baseline Water Quality (BWQ), once established, is a fixed quantity
- The total assimilative capacity is the difference between Water Quality Criteria and BWQ, so once the BWQ is established, the total assimilative capacity will also be established
- Any subsequent new or expanding facilities at that location would use the same BWQ and would need to account for the amount of the total assimilative capacity that has already been used by the previous facility

Zachary Carroll, Ph.D.
Permit Engineer, Office of Water Quality

Cumulative Cap Example



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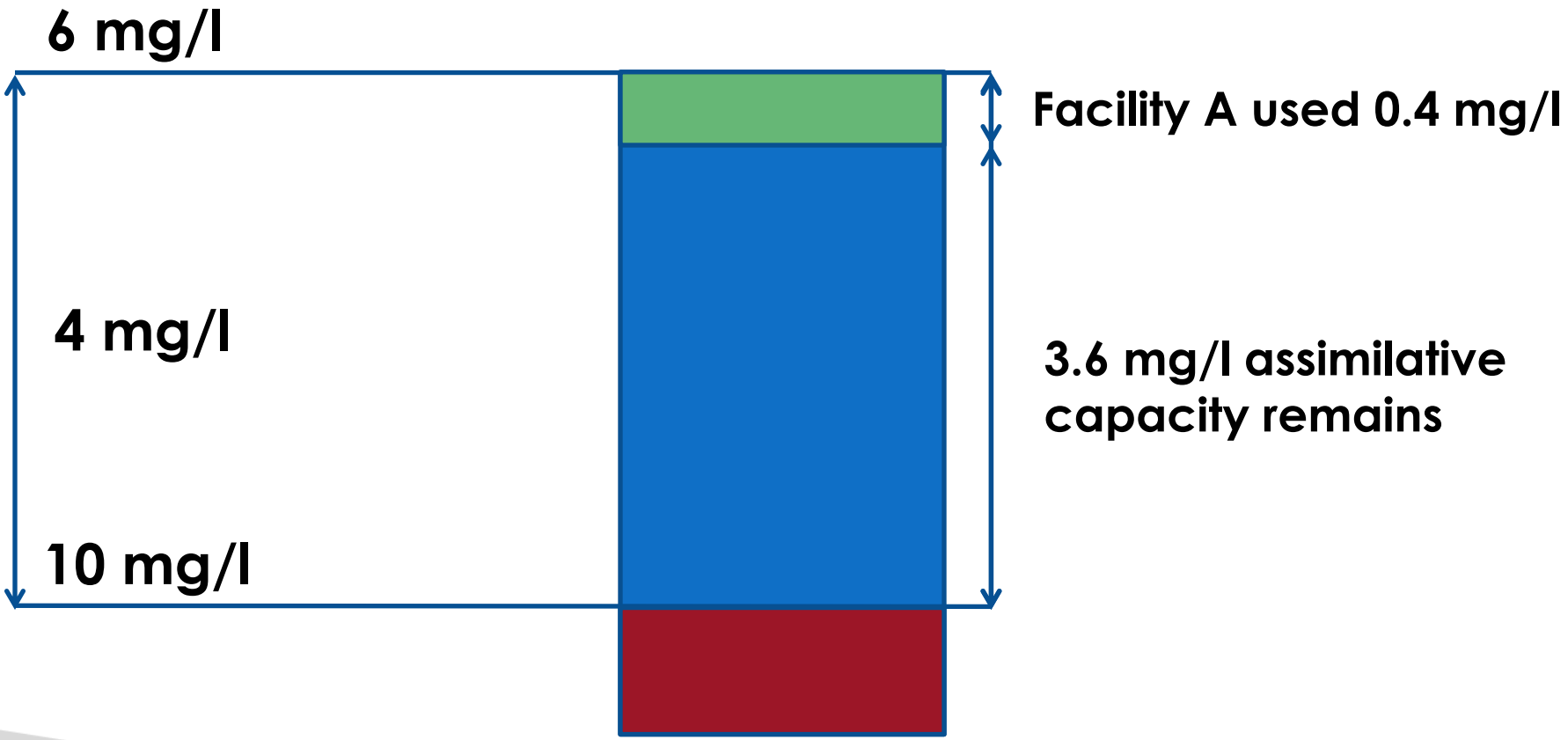
Cumulative Cap Example



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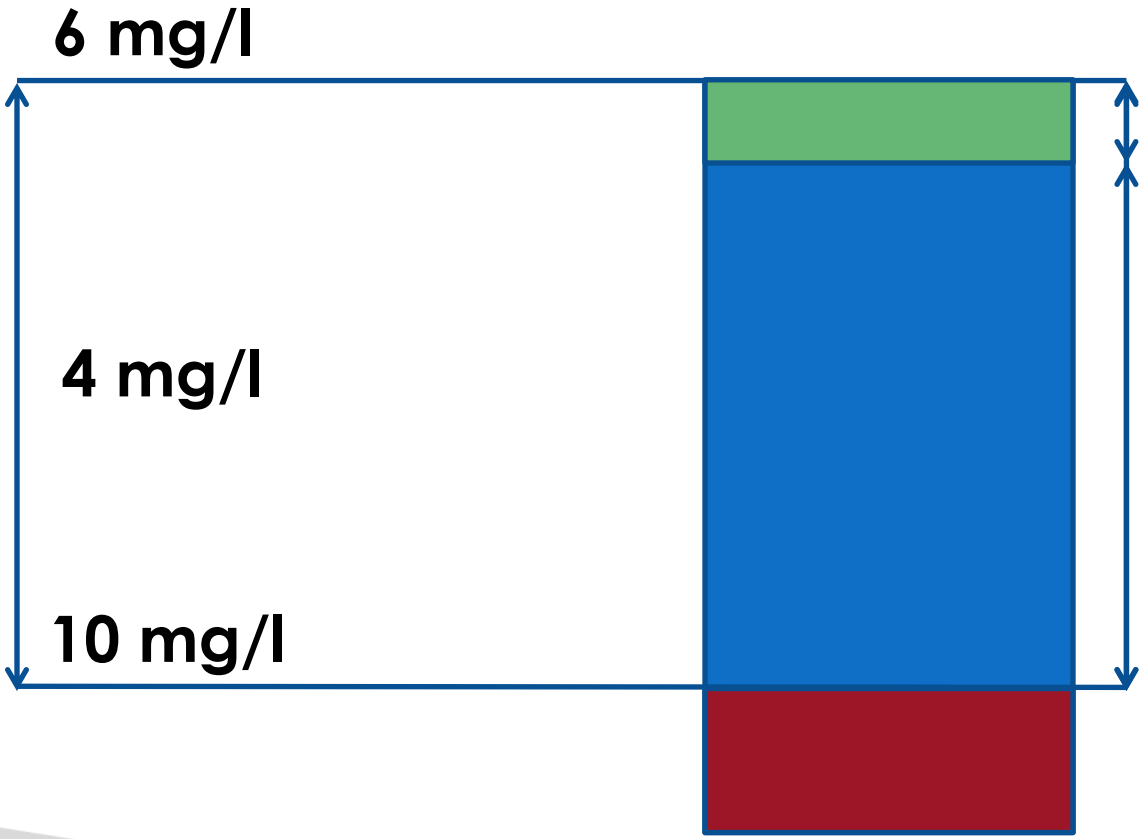
Cumulative Cap Example



Facility A used 0.4 mg/l

Facility B is automatically considered to cause significant degradation

In no case would Facility B be allowed to use more than 3.6 mg/l of the assimilative capacity

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Cumulative Caps/Tracking Use of Assimilative Capacity

- In many cases, we expect to assume significant degradation
- For example, if the critical low flow (7Q10) is zero, then the facility would always have a significant impact if discharging during the low flow conditions
- In these cases, BWQ is not tracked, but all new or expanding facilities are required to do the full antidegradation review, and the cumulative effects of all facilities are accounted for when determining the minimum limits required to meet water quality standards

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EPA's Economic Guidance

- The DEQ developed spreadsheet is based on EPA's economic guidance
- We'll also look into the spreadsheets published by EPA for this purpose

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Baseline Water Quality (BWQ) Estimates

- When the BWQ is higher (i.e. pollutant concentrations are lower), the assimilative capacity is larger
- Because of this, assuming a high BWQ is a less conservative assumption for determining the assimilative capacity

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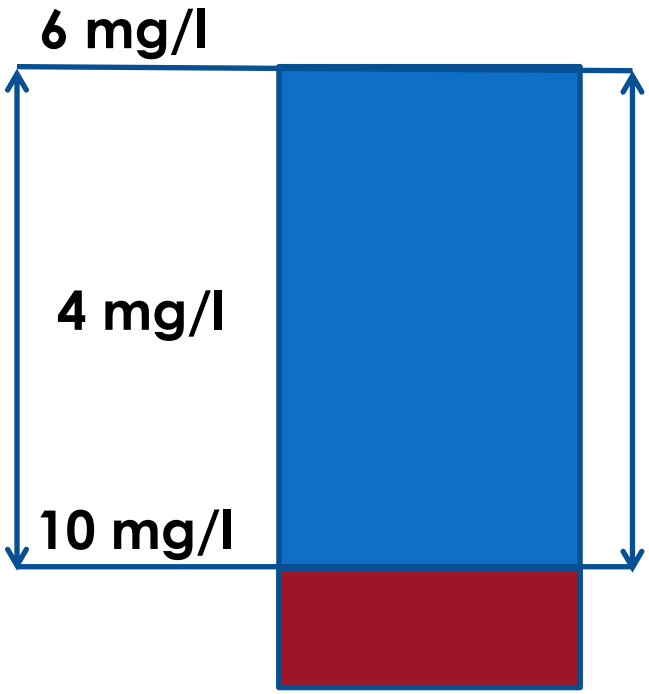
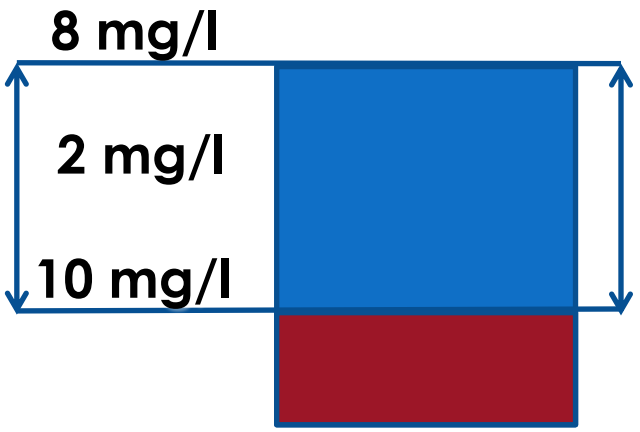
BWQ Estimate Example

Higher BWQ
(lower pollutant concentration)



Up to 4 mg/l could be used by a facility

Lower BWQ
(lower pollutant concentration)



Up to 2 mg/l could be used by a facility

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Consumption of DO Sag (Page 12 of AIM)

- Dissolved Oxygen (DO) sag is modeled based on the Streeter-Phelps equation
  - See Section 3.3 of the CPP for details
- Assimilative capacity for DO consumption is considered very similar to that of pollutants
  - Difference is that a high DO value is considered to be higher quality, so the assimilative capacity is calculated as BWQ – WQC (the opposite of pollutants)
  - For example, if the BWQ for DO is 8 mg/l and the WQC is 6 mg/l, there would be 2 mg/l of assimilative capacity for DO consumption

How is a “waterbody” defined?

- Tier 3 waterbodies are designated in Rule 2.
- Waterbodies with Tier 1 parameters are listed on the 303(d) list.
- Both are shown on DEQ’s Aquaview map:

https://arkansasdeq.maps.arcgis.com/apps/webappviewer/index.html?id=fb5a6aa70fd940cda4c9a3d7bc2fbb15

- All other waterbodies are assumed to be Tier 2 for all parameters unless site-specific data is available that demonstrates otherwise

How is a “waterbody” defined?

- An antidegradation review would not necessarily cover an entire waterbody
  - Also not restricted to a single waterbody
  - Needs to consider all downstream impacts

How is a “waterbody” defined?

- Distance impact continues downstream may vary
  - Depends on volume, concentration, and type of pollutant
  - Dissolved oxygen may recover more rapidly in a well aerated stream than a stagnant bayou
  - Persistent pollutants like mercury may be of concern much farther downstream than biodegradable pollutants like ammonia

New or Expanding Activities to Tier 3 Waters

- AIM Section 4.C
- No additional loading to Tier 3 waters
- An existing permitted facility might be allowed to increase their flow if they install more advanced treatment technology to meet more stringent concentration limits
  - Facility would need to demonstrate that the changes would not increase the mass load of parameters to the water

New or Expanding Activities to Tier 3 Waters

- Suppose a facility is permitted to discharge 5 mg/l of Ammonia at 0.05 MGD
  - 2.1 lb/d
- The facility could be permitted to discharge up to 2.5 mg/l of Ammonia at 0.10 MGD
  - Still 2.1 lb/d
  - Must also demonstrate that the loading of no other parameters is increasing
    - For example, if nitrifying the ammonia to nitrate, they would also need to denitrify to nitrogen gas to prevent any increase in nitrate loading

Questions?