

Policies Related to Mixing Zones

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Mixing Zones

- Allow less stringent effluent limits while protecting beneficial uses
- Result in increased concentration and mass of discharge to surface waters

February 2012

- NPDES Discharge to High Quality Waters
- Discussion: Should we reduce degradation of high quality waters by limiting discharges?
 - Limit mixing zones
- Case-by-case determination

August 2012

- Information item on NPDES effluent limit development and mixing zones
- Covered both technical and policy aspects of mixing zones

Permits with Contested Dilution Issues

- June 2012
 - Modesto, Nevada City, Linda CWD
- October 2012
 - Dunsmuir, Mt. Shasta, City of Angels
- December 2012
 - Tracy

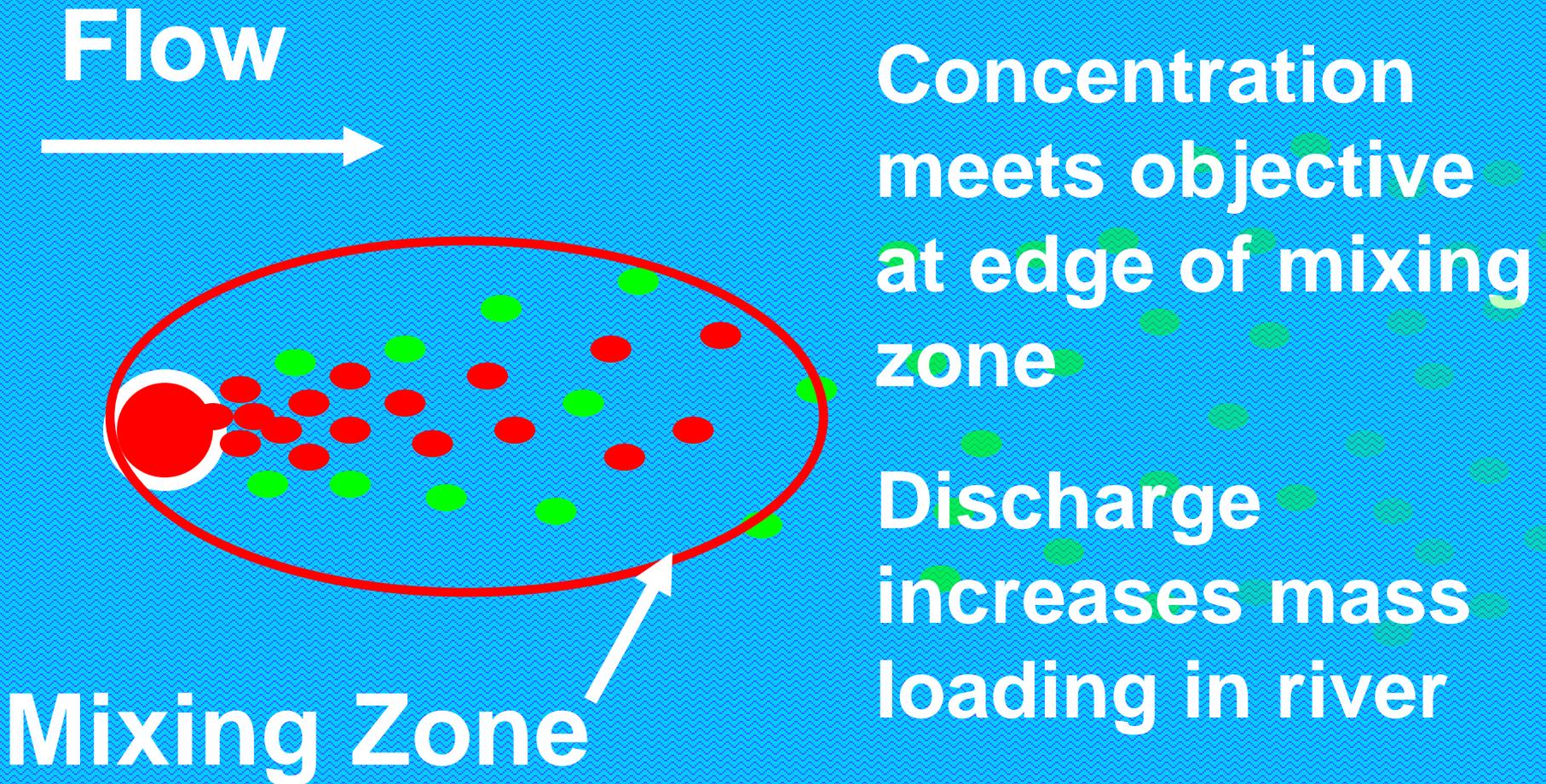
Concentration / Mass

- Water quality objectives generally as concentration – mg/L or ug/L
- Mass Loading is total mass of the chemical based on concentration and volume or flow – pounds
 - Mass = concentration x volume

Mixing Zones

A Mixing Zone is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

Mixing Zone Basics



Mixing Zones





No Mixing Zone when...

- There is no dilution available

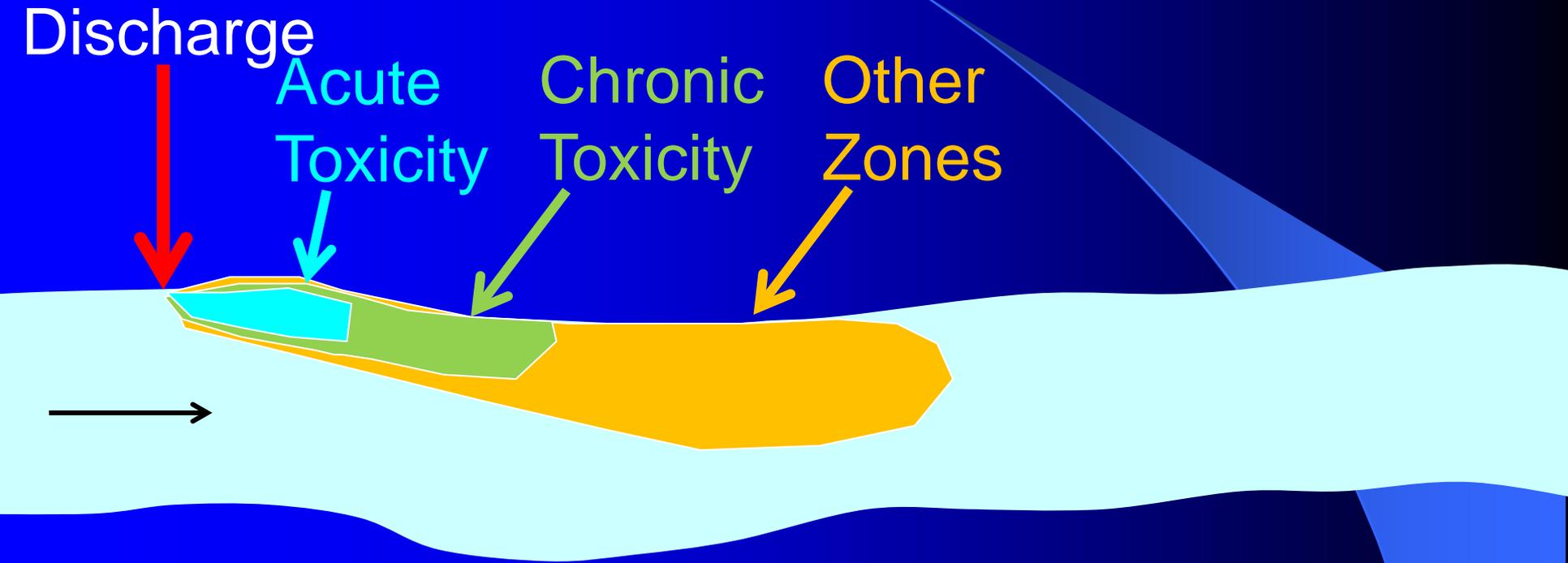


No Mixing Zone when...

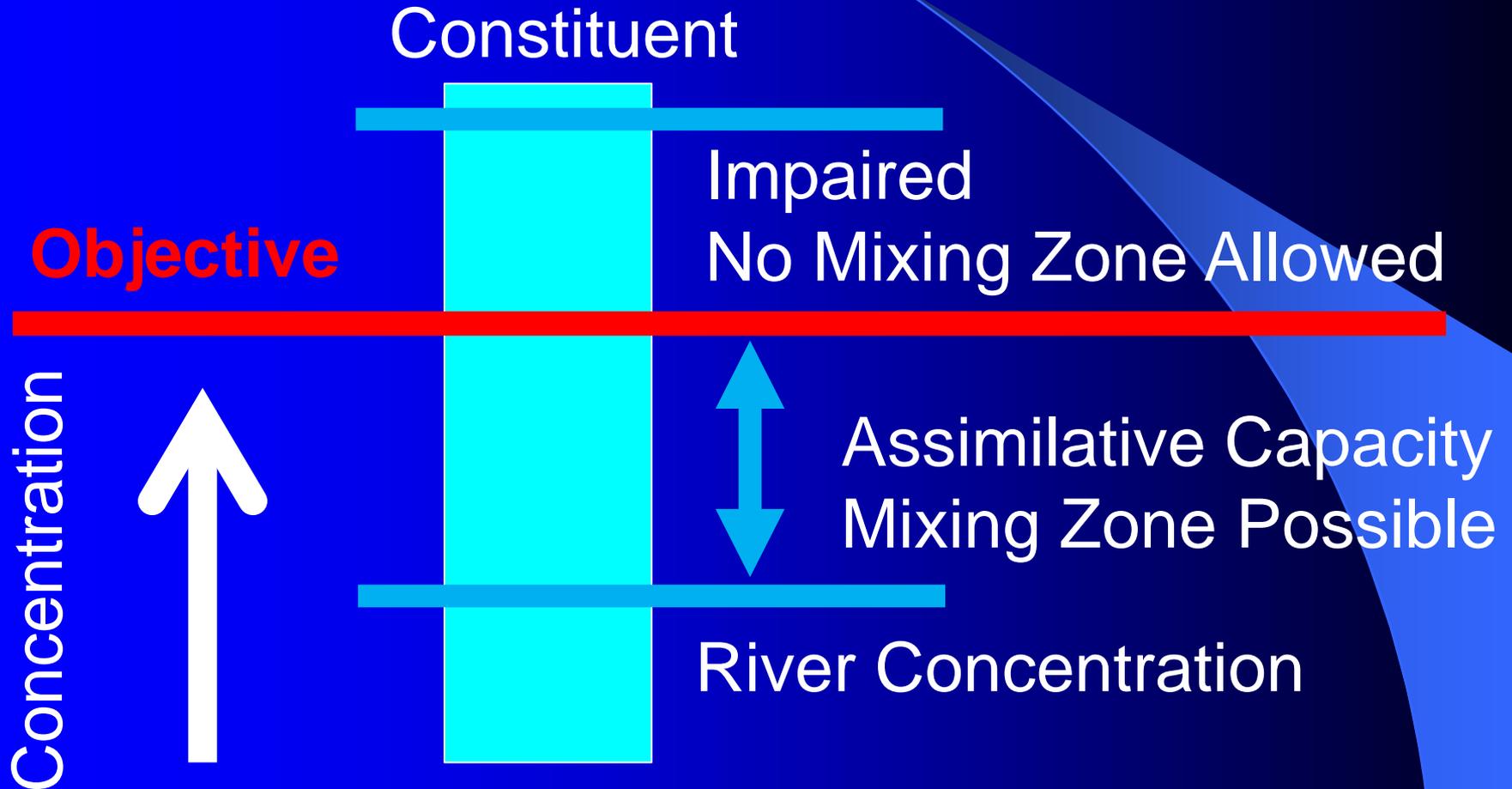
- The water body exceeds water quality objectives



Multiple Mixing Zones



Can Mixing Zone be considered?



Governing Regulations

- For California Toxics Rule (CTR) and National Toxics Rule (NTR) constituents:
 - State Board *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP)*

Regulations/Guidance

- Non-CTR/NTR constituents:
 - Basin Plan
 - SIP (as guidance)
 - USEPA Guidance: *Technical Support Document for Water Quality-based Toxics Control (TSD)*

SIP Mixing Zone Conditions

- Applicable to all beneficial uses
 - Compromise integrity of entire water body
 - Dominate receiving water or overlap other mixing zones
 - Produce undesirable or nuisance aquatic life
 - Result in floating debris, oil, or scum
 - Produce objectionable color, odor, taste, or turbidity
 - Cause objectionable bottom deposits
 - Cause nuisance

SIP Mixing Zone Conditions

- Applicable to aquatic life
 - Cause acutely toxic conditions to aquatic life passing through the mixing zone
 - Restrict passage of aquatic life
 - Adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws

SIP Mixing Zone Conditions

- Applicable to drinking water
 - Shall not be allowed at or near any drinking water intake
- All applicable SIP conditions must be met before dilution can be granted
- Some conditions are subject to interpretation

Mixing Zones

- Site-specific determination in permits
- Mixing zones can be denied or limited
 - To protect beneficial uses
 - Comply with other regulatory requirements

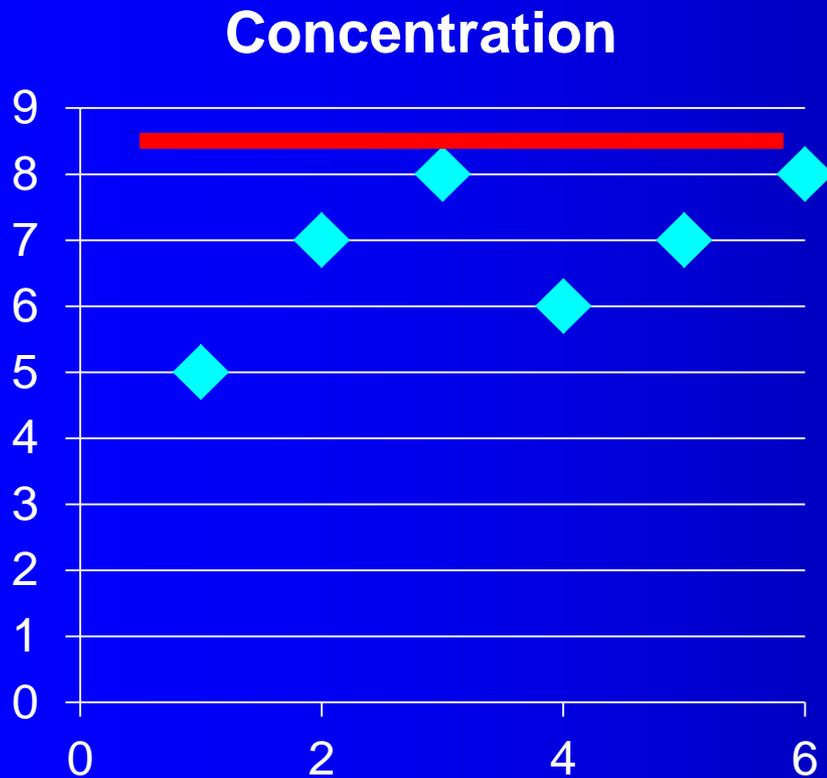
Discretionary

- Discharger requests mixing
 - Provides supporting studies
- Mixing Zone does not have to be granted
- Not all assimilative capacity has to be granted

Current Effluent Performance

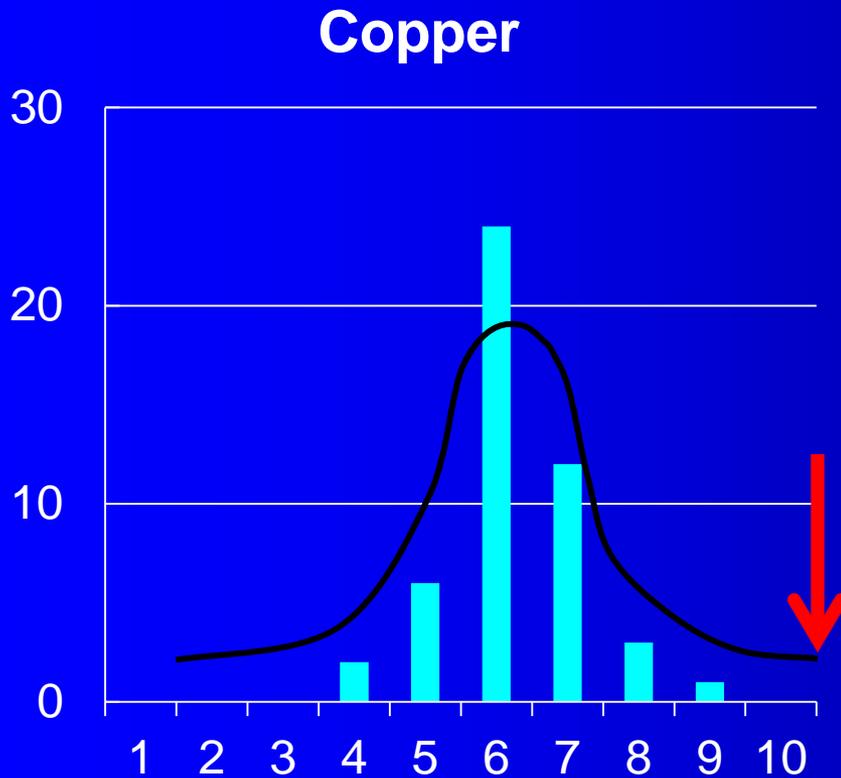
- What effluent quality does current treatment system produce?
 - Can effluent limits be met?
 - Is a mixing zone needed?
 - Evaluated for each chemical

Current Performance Limited Data



- Six data points
- May not represent highest effluent concentration
- Safety factor needed

Current Performance



- Statistical projection of maximum effluent quality.
- Safety factor.
- Representative of current quality?
- Representative of future quality?

Mixing Zone Size

Discharge

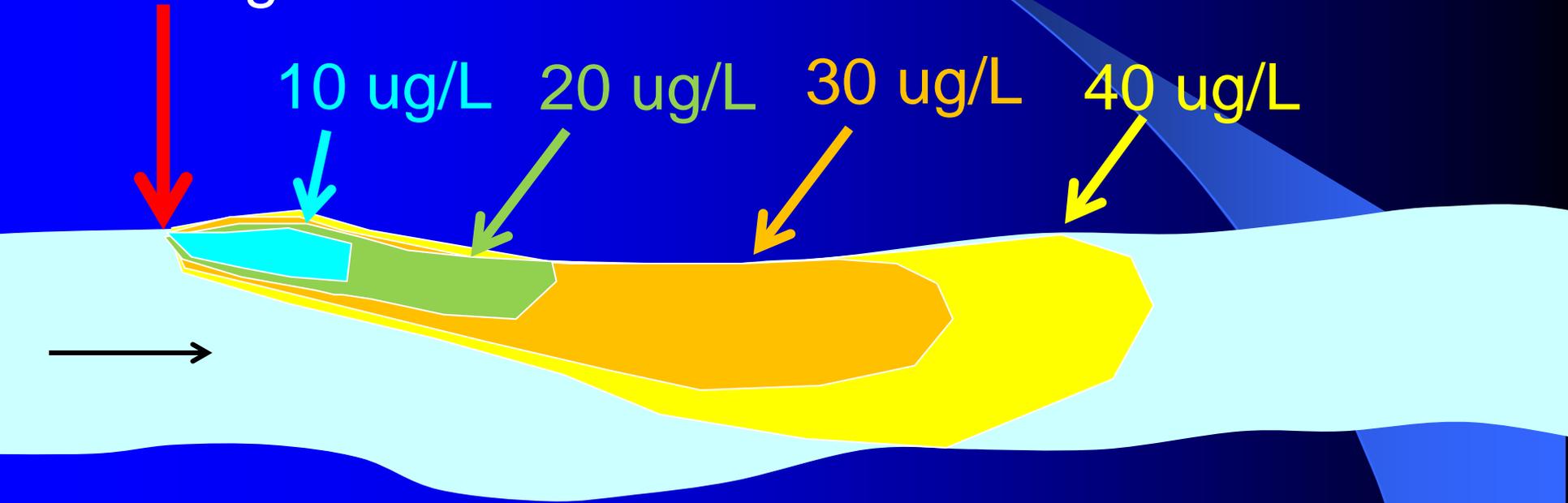
Effluent Limit

10 ug/L

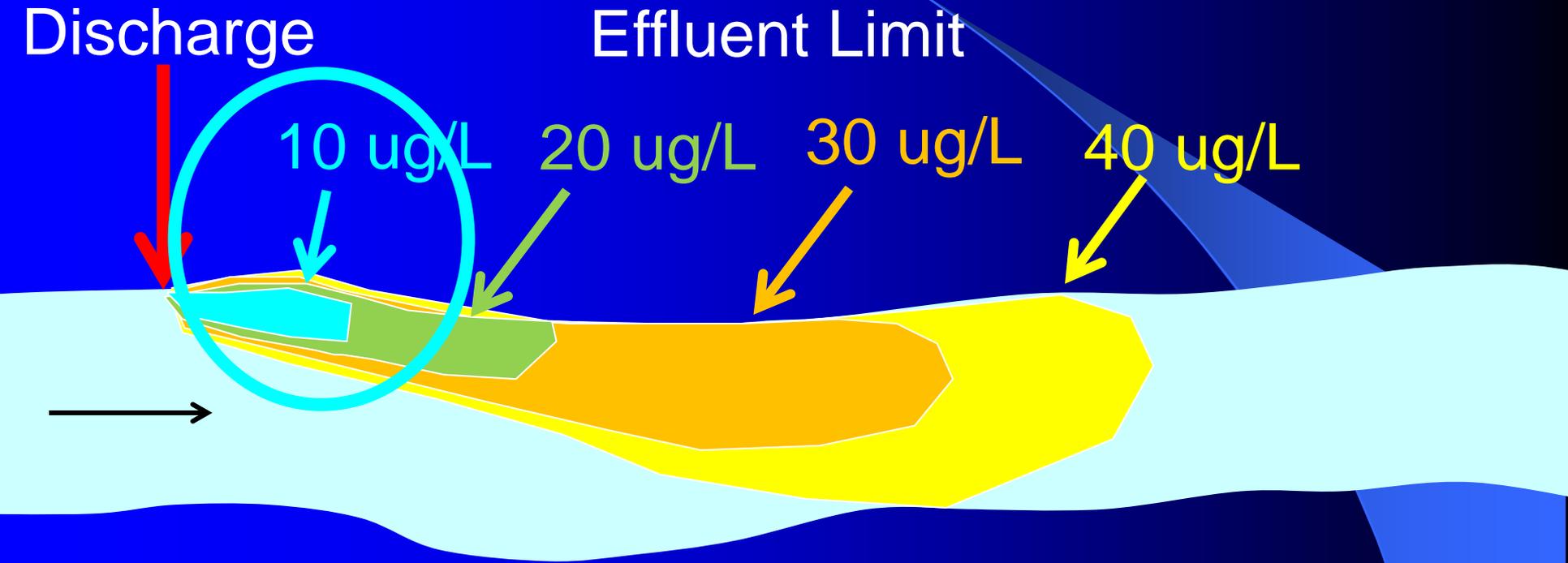
20 ug/L

30 ug/L

40 ug/L



Mixing Zone Selection



- SIP – Smallest Practicable Mixing Zone
- Anti-Degradation Policy

SIP Section 1.4.2.2

Mixing Zone Conditions

- A mixing zone shall be as small as practicable. The following conditions must be met in allowing a mixing zone:
 - A mixing zone shall not:
 - [Conditions 1 – 11 listed]

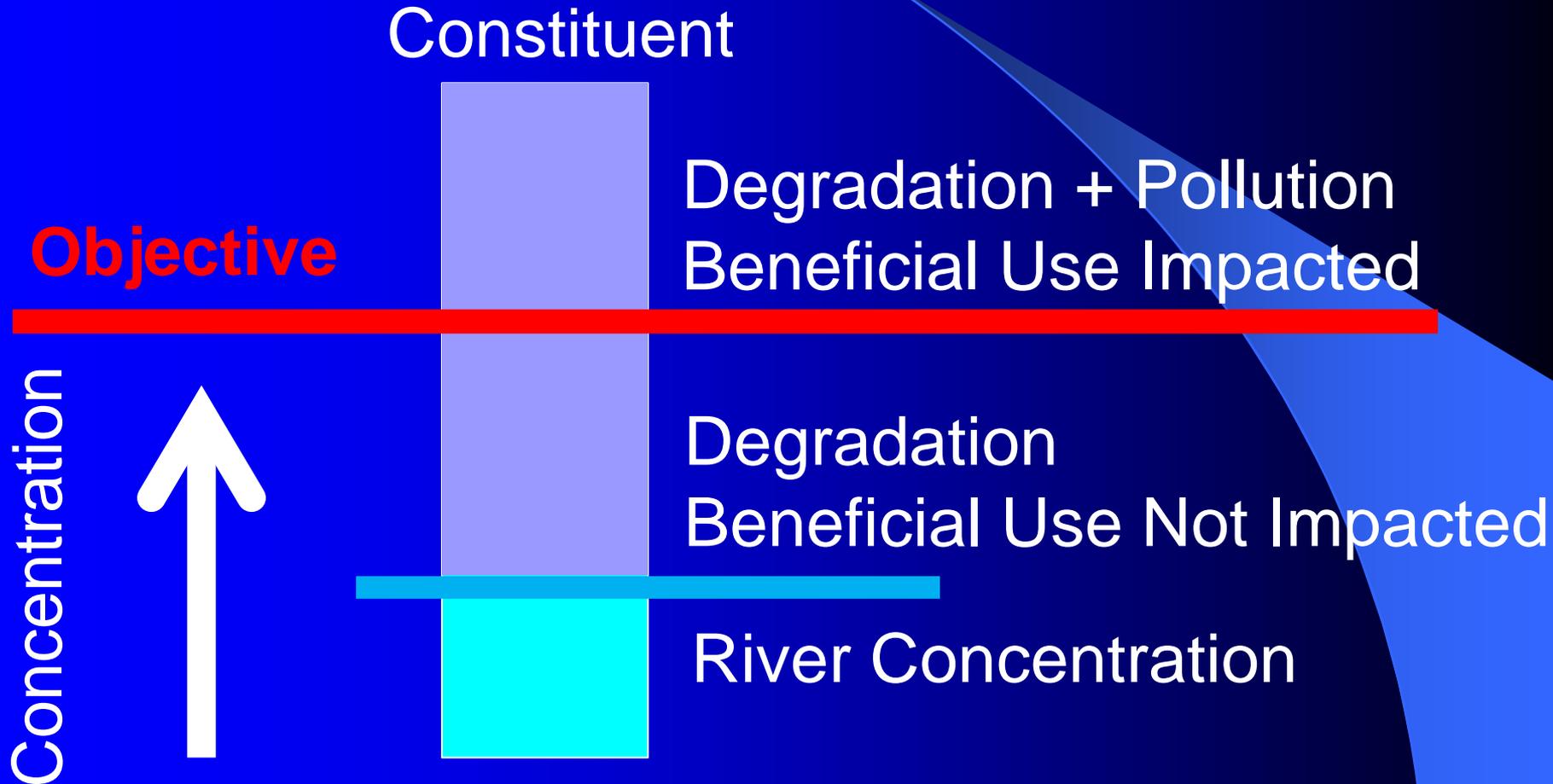
Practicable

- Not defined in SIP
- **Merriam-Webster.com**
 1. capable of being put into practice or of being done or accomplished : FEASIBLE
 2. capable of being used : USABLE
- Does not mean “possible”

Practicable

- Is it technically feasible?
- Is it economically feasible?
 - Economic costs to discharger
 - Economic costs to environment

Degradation



Anti-Degradation Policies

- Federal and State Policies
 - Federal 40 CFR 131.12
 - Waters of the US – surface waters
 - State – State Board Resolution 68-16
 - Waters of the State – Surface and Ground Waters
- Terminology used is for State Policy
 - Compliance with Federal Policy is similar, although terminology is different
- State Policy covers requirements of Federal Policy
 - Don't have to do two separate analyses

Why have Anti-Degradation Policies?

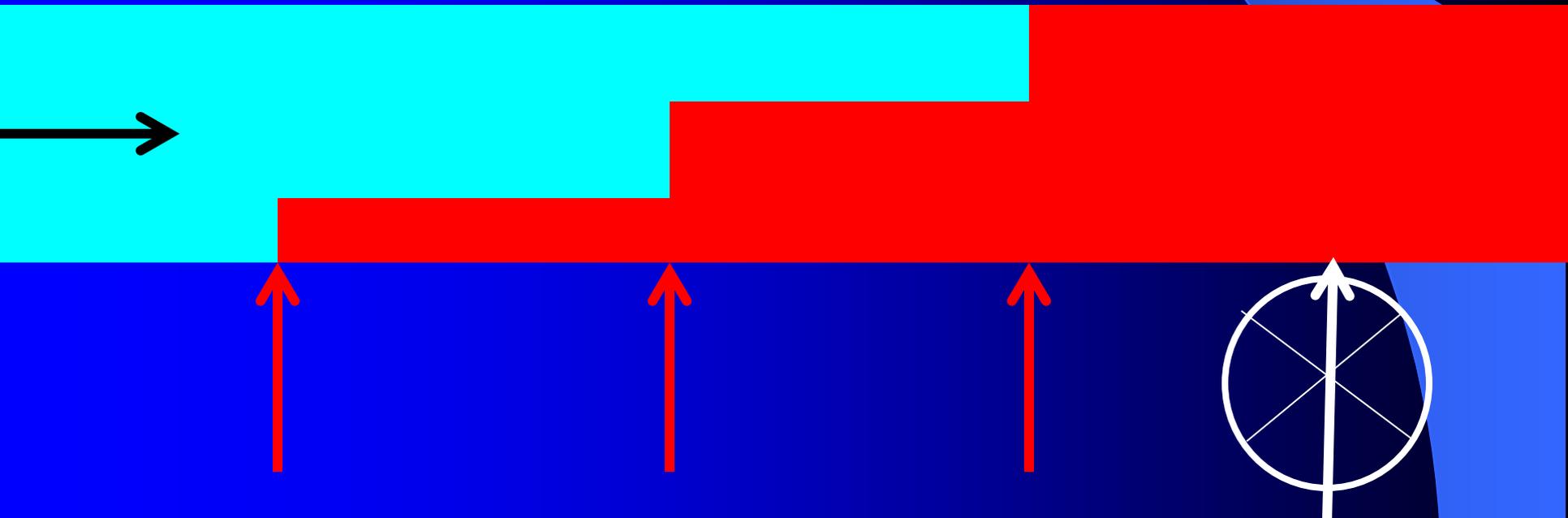
- Purpose of Anti-Degradation Policies
 - To maintain the highest practicable level of water quality
- Two approaches used to set discharge limits
 - Beneficial use protection
 - Determine uses
 - Determine water quality objectives to protect uses
 - Calculate effluent limits

Anti-Degradation

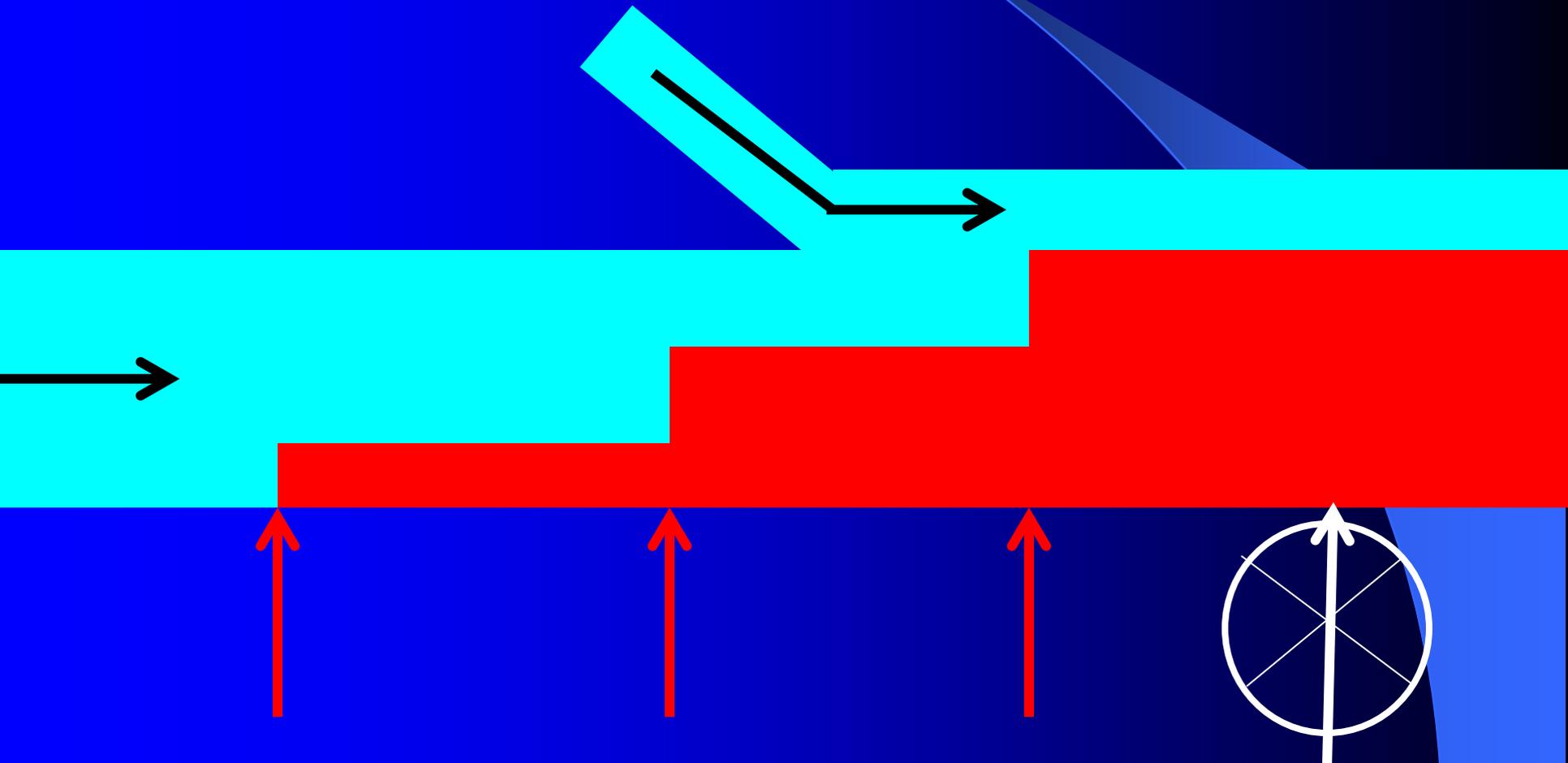
- Some degradation may not harm beneficial uses
- Balance degradation against societal benefits of allowing the degradation
- Not a “no-degradation” policy

Capacity can be used up

River barely meeting water quality objectives



Capacity may be available



Mixing Zones

- Compliance with Antidegradation Policy
 - Does not apply within mixing zone
 - Must consider increased pollutant loading
 - Best Practicable Treatment or Control
 - Case-by-case BPTC determination

When is an Anti-Deg Analysis Needed?

- Anti-Deg must be ***considered*** in all permit actions
 - If a new analysis is not needed, findings are made to explain why no new analysis is needed
- An Anti-Deg analysis must be ***conducted*** if:
 - The permit change would allow an increase in pollutant discharges in an existing permit, or
 - If the previous Anti-Deg analysis is judged to be inadequate.

Why grant dilution?

- Less stringent effluent limits
 - Avoid treatment plant upgrade
 - Lower operational costs
 - Less chemical and energy use
 - Environmental cost
- Overall cost savings
- Protects beneficial uses

Why limit dilution?

- Less assimilative capacity downstream
 - Reduced factor of safety
 - Less dilution for downstream dischargers
- As small as “practicable”
- Anti-Degradation

How much dilution to grant?

1. None
2. Grant the limited dilution available
3. Only what is needed for current performance
4. Largest mixing zone meeting SIP conditions
5. Something between 3 & 4

Current performance

Discharge

Effluent Limit

10 ug/L

30 ug/L



- Smallest Practicable
- Least degradation

- Trigger extensive toxicity studies

Largest possible dilution

Discharge

Effluent Limit

30 ug/L



- Highest limit
- Violations have significance

- Smallest practicable?
- Allowing the least degradation?

Mixing Zone Size

Discharge

Effluent Limit

10 ug/L

4,000 ug/L



- Smallest practicable mixing zone?
- Minimize degradation?
- High concentrations probably won't actually be discharged

Intermediate Mixing Zone Size

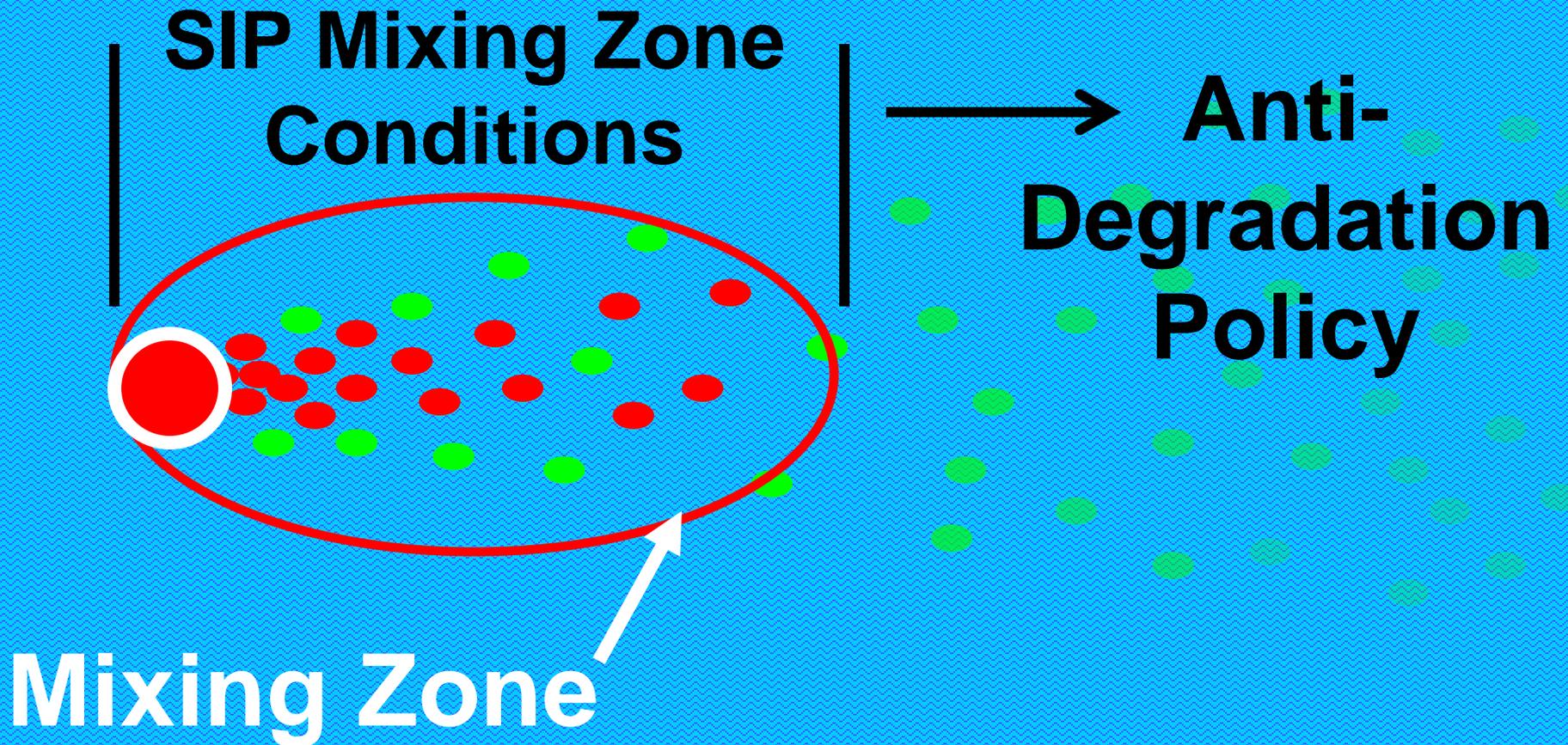
Discharge

Effluent Limit



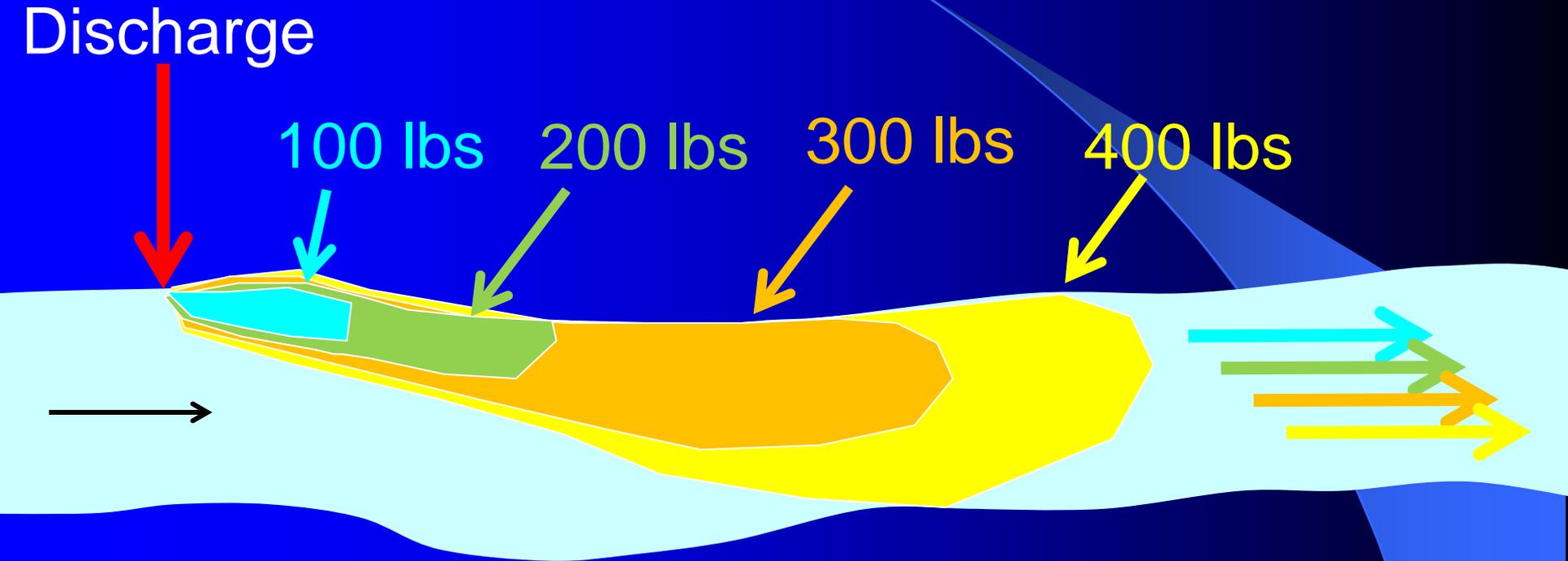
- Not smallest mixing zone, but not largest
- Not least degradation, but limited
- Less chance of meaningless violation
- No guidance for setting intermediate dilution

SIP and Anti-Degradation



Anti-Degradation Policy

Discharge



Summary

- Regulation and guidance for mixing zones
 - Mixing zones are discretionary
 - Sets maximum allowable mixing zones
- Permit-by-permit decision base on site specific conditions.
- Staff recommends the largest allowable mixing zone considering of all factors discussed
 - Board may come to a different conclusion



Questions?