

**Docket No. 58-0102-1401**  
**Water Quality Standards**  
**Mixing Zone Rules**

November 2014/January 2015

# Mixing Zone Examples



Rhodamine dye  
study Spring  
Creek,  
Wayne  
Wurtsbaugh  
photographer,  
accessed from  
[www.aslo.org](http://www.aslo.org)

# Mixing Zone Examples

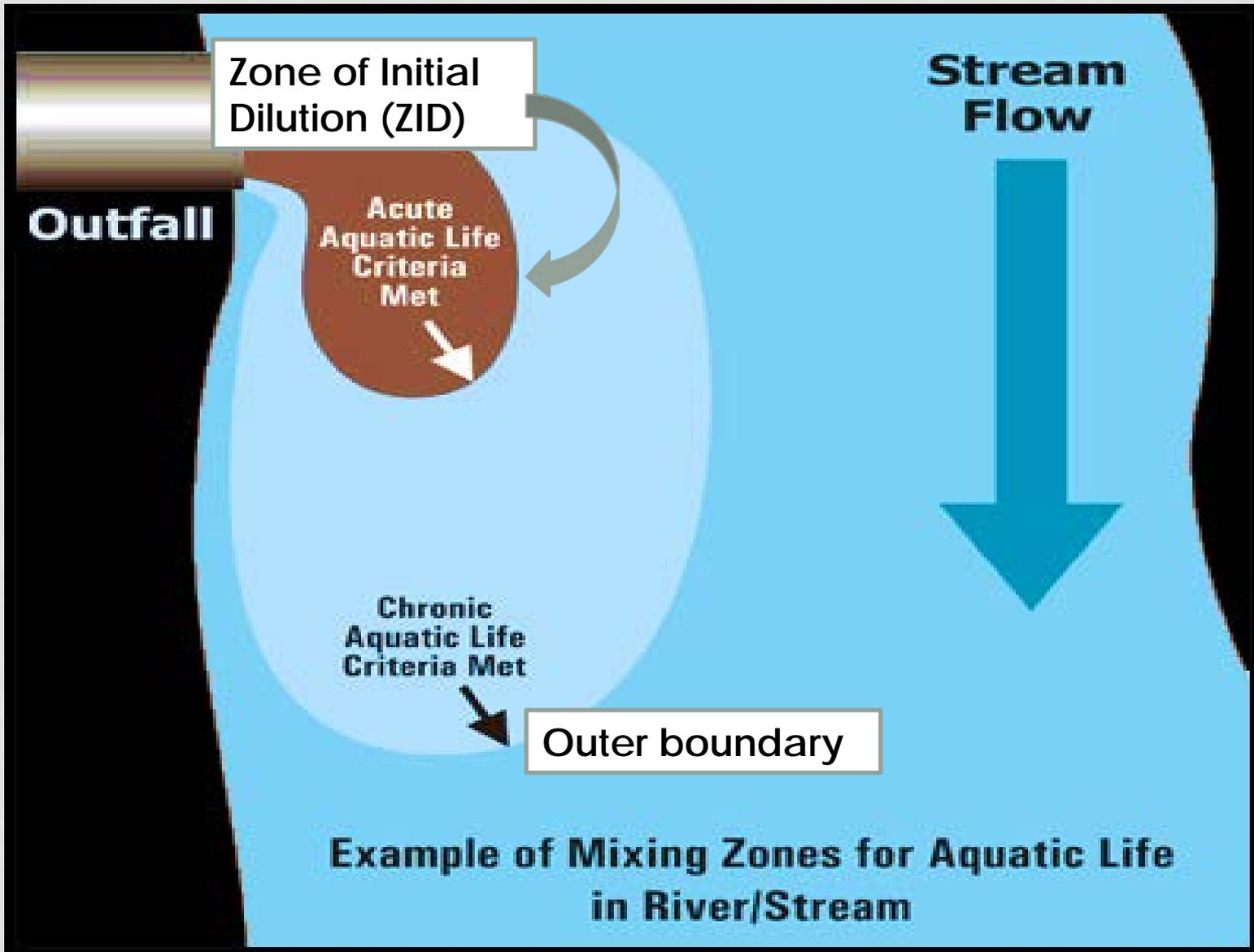


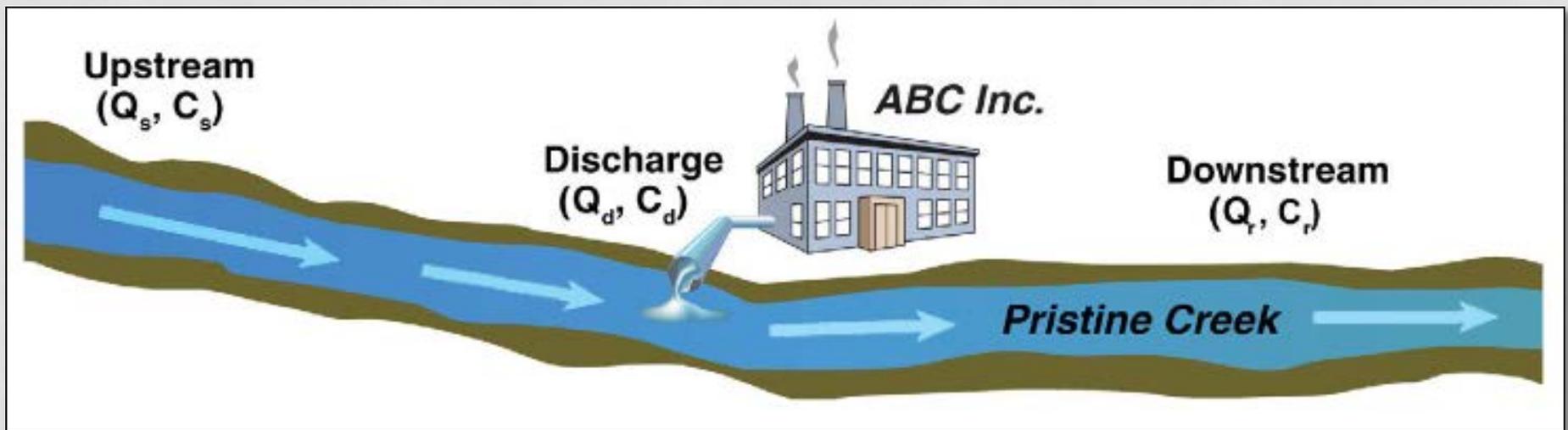
# Mixing Zone Examples



# Mixing Zone Examples







**Mass** = **Flow (Q)** × **Pollutant concentration (C)**  
 in million gallons per day (mgd) or cubic feet per second (cfs) × in milligrams per liter (mg/L)

$$Q_s C_s + Q_d C_d = Q_r C_r$$

where

- Q<sub>s</sub> = critical stream flow in mgd or cfs above point of discharge
- C<sub>s</sub> = critical background in-stream pollutant concentration in mg/L
- Q<sub>d</sub> = critical effluent flow in mgd or cfs
- C<sub>d</sub> = critical effluent pollutant concentration in mg/L
- Q<sub>r</sub> = resultant in-stream flow, after discharge in mgd or cfs (Q<sub>r</sub> = Q<sub>s</sub> + Q<sub>d</sub>)
- C<sub>r</sub> = resultant in-stream pollutant concentration in mg/L (after complete mixing occurs)

Rearrange the equation to determine the concentration of Pollutant Z in the waterbody downstream of a discharge under critical conditions:

$$C_r = \frac{(Q_d)(C_d) + (Q_s)(C_s)}{Q_r}$$

# Why was Rulemaking Necessary?

- DEQ had prepared Mixing Zone Guidance and during public comment the regulated community noted that the rule needed to be revised
- DEQ Recognized Inconsistencies in the existing rule, adopted >20 years ago
- Clarify Mixing Zone Rule Language
- EPA Lawsuit Settlement Proposal

# Estimated Cost to the Regulated Community

- No Costs to the Regulated Community
- Fiscal Impact Statement
  - Not Applicable
  - No Impact to the State General Fund
- Proposed Rule Clarifies How DEQ Will Authorize Mixing Zones

# **Stringency and Federal Law or Regulations (IC Section 39-107D)**

- The proposed changes to these rules are not broader in scope, nor more stringent, than federal regulations and
- Do not regulate an activity not regulated by the federal government.

# Opportunities for Public Involvement

- 3 Negotiated Rulemaking Meetings
  - May 1 (30), June 12 (29), and July 10 (33)
  - Included Associated Public Comment Opportunities
- 2 Policy Papers
  - Unreasonable Interference (6/5/14)
  - Effluent Mixing in Non-Flowing Waters (7/3/14)
- 5 Draft Rules
  - April 4, June 5, July 3, July 17, August 8
  - Included Associated Public Comment Opportunities

# Public Comment and Public Hearing

- Public Comment Sept. 3 to October 3, 2014
- Ten (10) Public Comments Received:
  1. Idaho Conservation League
  2. Clearwater Paper
  3. U.S. Fish & Wildlife Service
  4. Idaho Mining Association
  5. National Council for Air and Stream Improvement
  6. J.R. Simplot Co.
  7. Idaho Association of Commerce and Industry
  8. U.S. National Oceanic and Atmospheric Administration
  9. U.S. EPA
  10. Idaho Cattle Association
- No Public Hearing Scheduled

# Controversial or Contentious Issues

1. How ESA Listed Species are Addressed
2. Definitions of Thermal Shock and Zone of Initial Dilution
3. Determining the Necessity, Size, and Location of the Mixing Zone
4. Application of Narrative Criteria
5. Unreasonable Interferences-
  - a. Bioaccumulation
  - b. Attraction to Mixing Zones

# ESA Listed Species

- ICL, EPA, NOAA, and USFWS questioned the mixing zone impact on threatened and endangered species
  - Concerns over EPA consultation with the Services were raised.
- IACI, Clearwater Paper and Idaho Water Users pointed out that including reference to ESA might require DEQ to attempt ESA analysis similar to the Services
- DEQ believes that protecting aquatic life beneficial uses inherently includes all aquatic organisms, including those listed as endangered or threatened
- DEQ does not have the authority or the expertise to implement provisions of the ESA. For these reasons, DEQ determined to remove all references to ESA listed species and critical habitat
- DEQ did choose to add language to section 060.01.d.i specifically identifying *“impairment to the integrity of the aquatic community”* to address concerns expressed that only fish were being considered during an evaluation of the mixing zone

# Definitions of Thermal Shock and Zone of Initial Dilution

- Thermal Shock
  - EPA commented on the definition
  - DEQ did not adjust the definition, as the comments did not improve or add clarity
- Zone of Initial Dilution
  - DEQ amended the definition 003.119
  - ICL questioned appropriateness of the ZID
  - DEQ response is that the ZID is very small where concentrations of pollutants may exceed the acute criteria
  - Recall that acute criteria include frequency, duration and magnitude components, and
  - ZIDs may exceed the magnitude, but meet the frequency and duration aspects and therefore not impact aquatic life



**OUTFALL**

Regulatory  
Mixing Zone



Acute  
Criteria  
Met

Chronic  
Criteria  
Met

# Determining the Necessity, Size, and Location of the Mixing Zone

- EPA commented that the rule should require submission of an analysis that demonstrates the need for a mixing zone
- DEQ has retained in the rule the requirement that a mixing zone not be larger than necessary.
  - Small mixing zones may not need additional documentation
  - Mixing zones greater than 25% need to submit documentation
  - Guidance to clarify “larger than necessary”
- Added language at 060.01.i.ii. “The discharger shall provide to the Department an analysis that demonstrates a larger mixing zone is needed given siting, technological and managerial options”

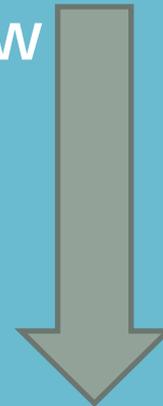
**OUTFALL**

10% for  
cadmium

25% for  
chlorine

Chronic criteria  
met at edge of  
mixing zone

Stream  
Flow



Example of different sized mixing zones for different pollutants present in the same discharge.

# Determining the Necessity, Size, and Location of the Mixing Zone

- Non-Flowing Waters
  - Revised criteria for non-flowing waters
  - New dischargers (7/1/15) to non-flowing waters 060.01.h.ii mixing zone size is limited to:
    - 5% of open surface area ,or
    - 100 meters from point of discharge
    - No shore hugging plumes
    - Diffuser are required
  - Existing dischargers are recognized with a 10% mixing zone limit
  - Mean detention time 15 days or greater are considered non-flowing waters
    - Detention time = mean annual storage volume / mean annual flow rate

# Mixing in Non-flowing Waters



# Application of Narrative Criteria

- DEQ added Narrative criteria to section 01.b and 02.
- 060.01.b “Narrative criteria in subsections 200.03 and 200.05 apply within the mixing zone”
- 060.02 “These alternatives to mixing zones are still subject to requirements outlined in subsections 060.01.a, 060.01.d, 200.03, and 200.05”
- 200.03 “... free from deleterious materials...”
- 200.05 “...free from floating, suspended or submerged matter...”

# Unreasonable Interferences

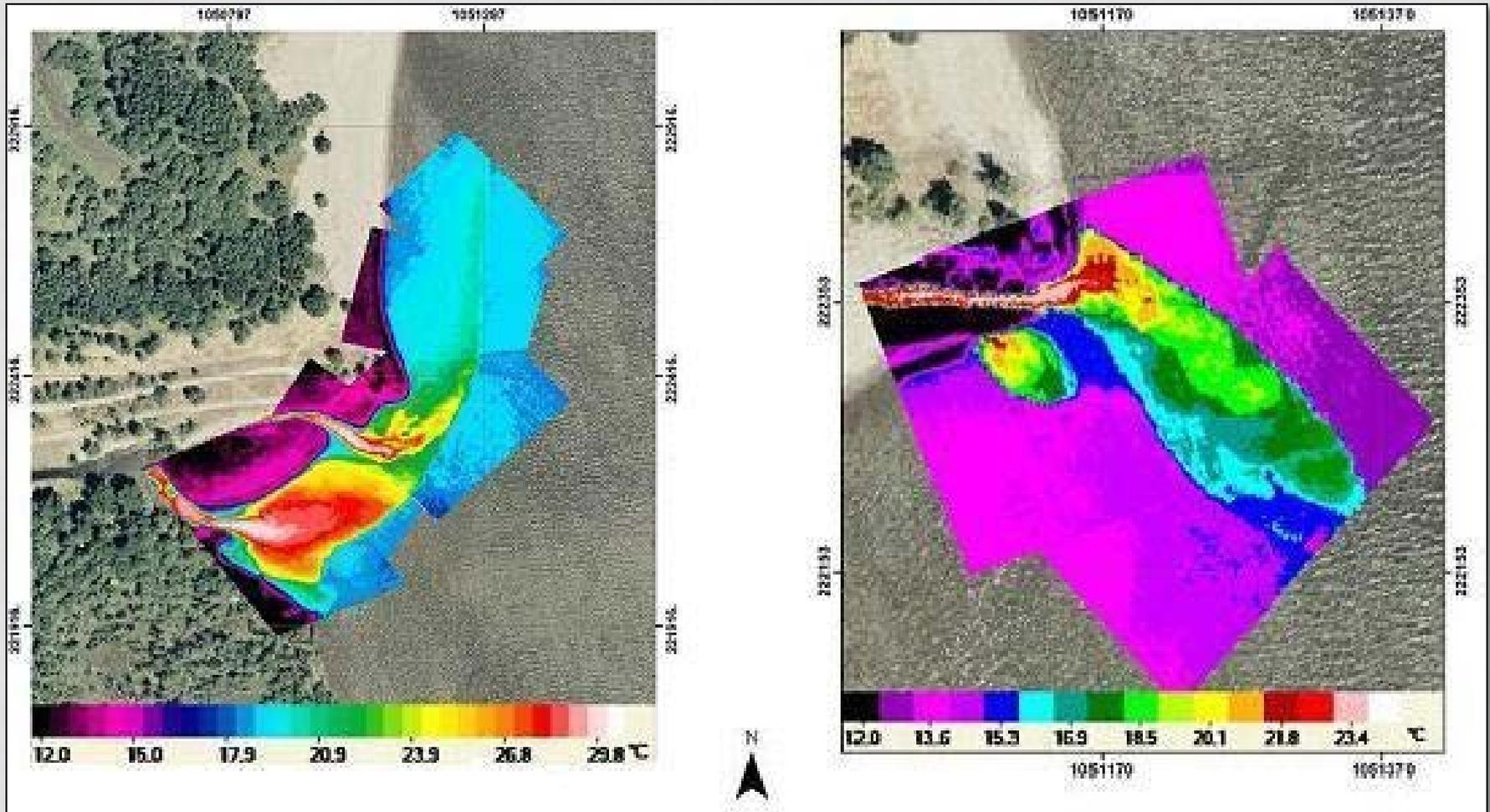
- Bioaccumulation
  - Definition Revised
    - 010.11 Bioaccumulative Pollutants. A compound with a bioaccumulation factor of greater than one thousand (1,000) or a bioconcentration factor of greater than one thousand (1,000).
  - DEQ will not use Bioaccumulation to derive different criteria
  - Bioaccumulation needs to be considered in setting Mixing Zones
  - Mixing Zone Guidance

# Unreasonable Interferences

## Attraction to Mixing Zones

- EPA has concerns over attraction to a mixing zone
- DEQ believes attraction is addressed in 060.01.d in the unreasonable interferences provisions. Language was revised at 01.d.i
  - “Impairment to the integrity of the aquatic community, including interfering with successful spawning, egg incubation, rearing, or passage of aquatic life.”

# Questions?



Examples of multiple outfalls and mixing zone plumes

Source: <http://www.mixzon.com><sup>24</sup>