

Review of Mixing Zone Studies

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Science and Policy Intersection

- Science
 - e.g., data analysis, mixing theory, equations, model selection and results
- Policy
 - e.g., model inputs and associated assumptions, decisions related to narrative guidelines
 - And obviously, final delineation of the mixing zone size/dilution

Applicant Documentation

- Detailed description of discharge
- Detailed description of receiving water
- MZ restrictions applicable to this discharge
- Dilution model applied and why
- Minimum dilution-with-distance table(s)
- Model inputs/outputs attached to report
- Model files shared with the agency

Conservative assumptions are key

- Must seek minimum dilution scenario
 - Minimum flow in rivers
 - Range of current speeds and stratification in marine waters (e.g., 10th and 90th percentiles)
 - Range of effluent flow that includes maximum
 - High end (e.g., 95th percentile) upstream/
background concentration

Dye Studies

- Interesting real-world info, but...
- Issue 1: Did study period represent critical conditions...i.e., minimum dilution?
 - Likely not
 - Models allow us to combine conservative assumptions
 - They are reasonably well-tested tools
- Issue 2: Did dye sampling hit the main plume?

Dye study result could trump model result if measured dilution is less than modeled minimum dilution

Any examples of this out there?

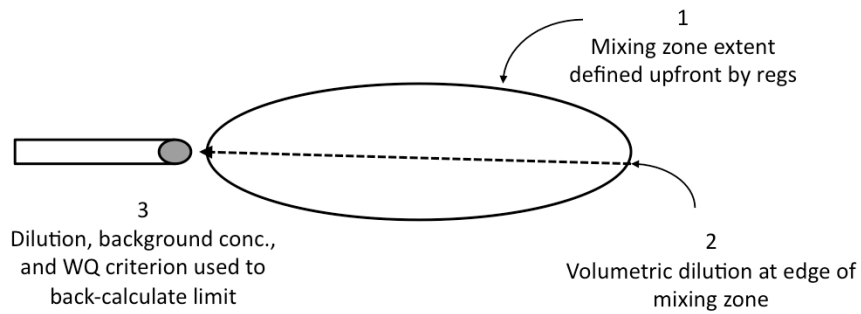
Agency responsibilities

- Implementing all the narratives
- Use of conservative dilution estimates
 - Gives confidence that the actual radius of criteria exceedances will be equal or less than the authorized radius
- Analysis of “applicant need” for dilution

Two directions of analysis

Direction 1:

Start with allowable size based on state rules, determine dilution with distance using mass balance or model, and back-calculate the allowable effluent concentration.



...The other direction...

Direction 2

Start with the expected effluent concentration, determine dilution with distance using mass balance or model, and estimate the distance to point where the waste field is diluted to the standard.

