INTRODUCTION TO DILUTION STUDIES FOR POTWs IN SF BAY AREA

Bay Area Clean Water Agencies
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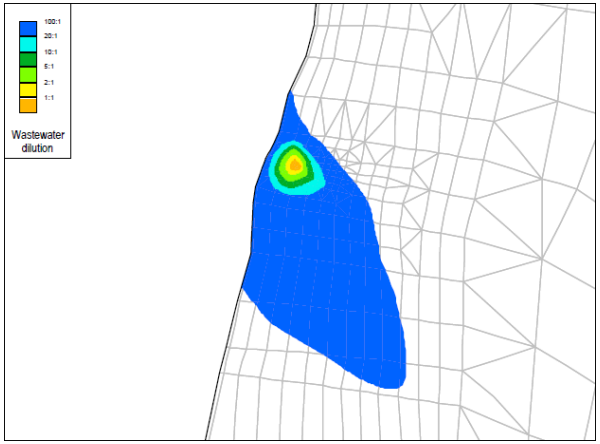
Definitions

- Mixing Zone



- Dilution Ratio – 10:1
- Dilution Credit – 9

State Implementation Policy (SIP)

Indicates that Regional Water Boards:

> "may grant mixing zones and dilution credits to dischargers…"

Different Approaches Depending on Your Discharge

- Shallow / Deep
- Continuous / Intermittent / Seasonal
- Bay / River / Slough
- Tidal / Nontidal

Two Basic Elements For Modeling a Mixing Zone

- **Dynamics of waterbody** (e.g. flowrate, tidal action, currents)
- **Mixing of effluent with waterbody** (e.g. relative flows, horizontal size of mixing zone, stratification, “flushing”)

Dynamics of Waterbody

- Can use separate mathematic model to predict hydrodynamics
- If simple situation, such as central SF Bay or wet weather discharge or small marsh-type system, don't necessarily need separate dynamic model

Mixing of Effluent with Waterbody

- **PLUMES Model –** better for non-boundary systems (such as the ocean or middle of SF Bay)
- **CORMIX Model –** better for systems with boundaries (such as rivers or linear estuaries)
- **"Wedge" –** for when tidal action is predominant driver of mixing in small system
- **"Box" –** for when other nearby outfalls constrain mixing zone available in river system

Shallow Water Dischargers

A mixing zone shall be as small as practicable and shall not:

(1) compromise the integrity of the entire water body;

(2) cause acutely toxic conditions to aquatic life passing through the mixing zone;

(3) restrict the passage of aquatic life;

(4) adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;

(5) produce undesirable or nuisance aquatic life;

(6) result in floating debris, oil, or scum;

(7) produce objectionable color, odor, taste, or turbidity;

(8) cause objectionable bottom deposits;

(9) cause nuisance;

(10) dominate the receiving water body or overlap a mixing zone from different outfalls; or

(11) be allowed at or near any drinking water intake.

Overall Considerations

- Dilution studies take into account (1) dynamics of waterbody and (2) mixing of effluent
- Dilution studies are not always complicated
- Dilution studies can be sometimes be conducted with little or no additional data collection
- Dilution studies are not necessarily expensive or take a long time
- Generally need to customize for each situation
- Approach in Region 2 is currently relatively favorable but may change in future