DPR's Copper AFP Leach Rate Determination & Mitigation Recommendations per AB 425

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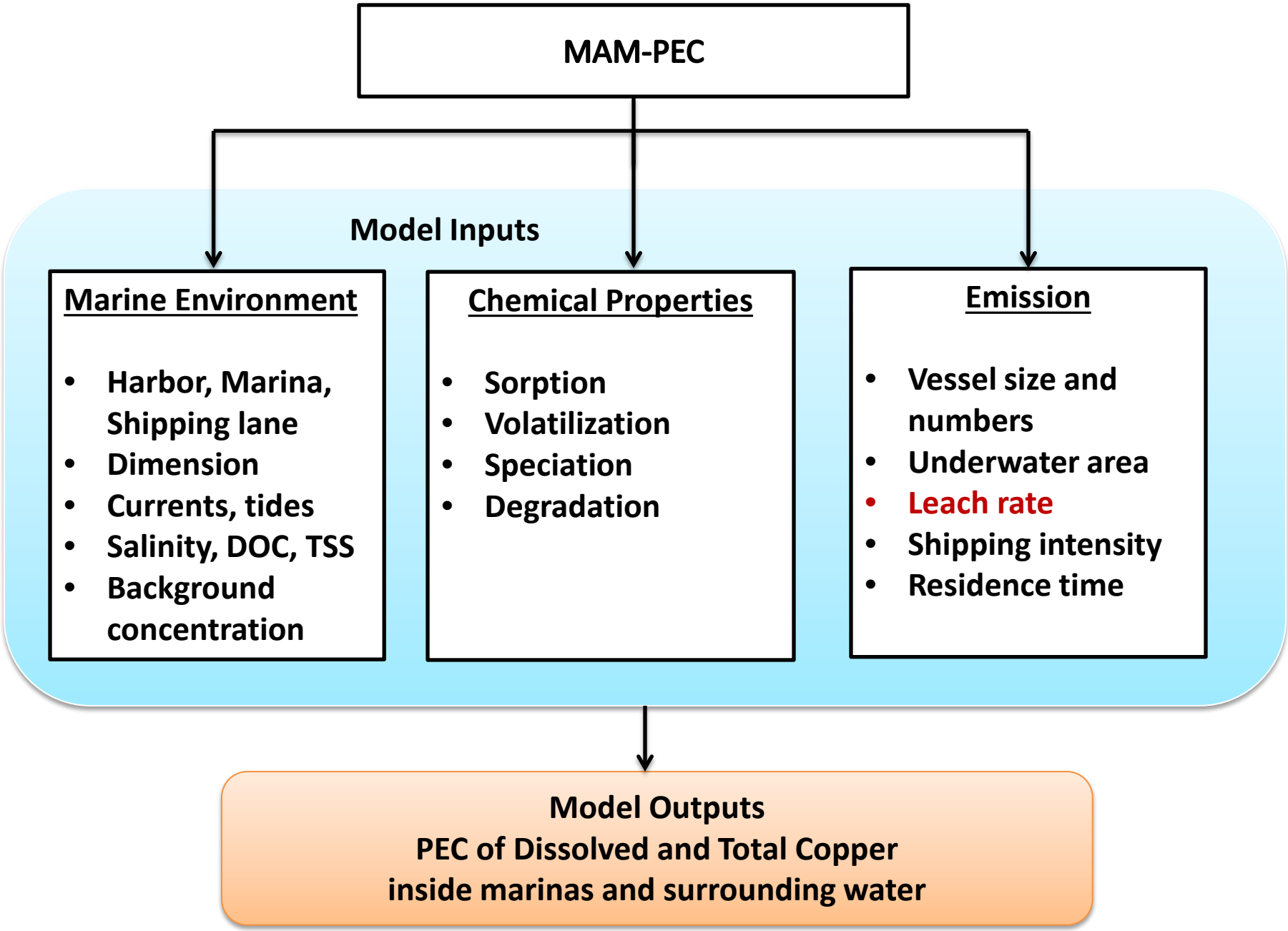
Background

- Copper TMDLs
- AFS Workgroup
- AFP Investigations
- Port of San Diego Activities
- DPR Reevaluation & Data Requirements
- Passive Leaching/In-Water Hull Cleaning Study
- SB 623 (Kehoe)
- AB 425 (Atkins)
- DPR MAM-PEC Modeling – Xuyang Zhang

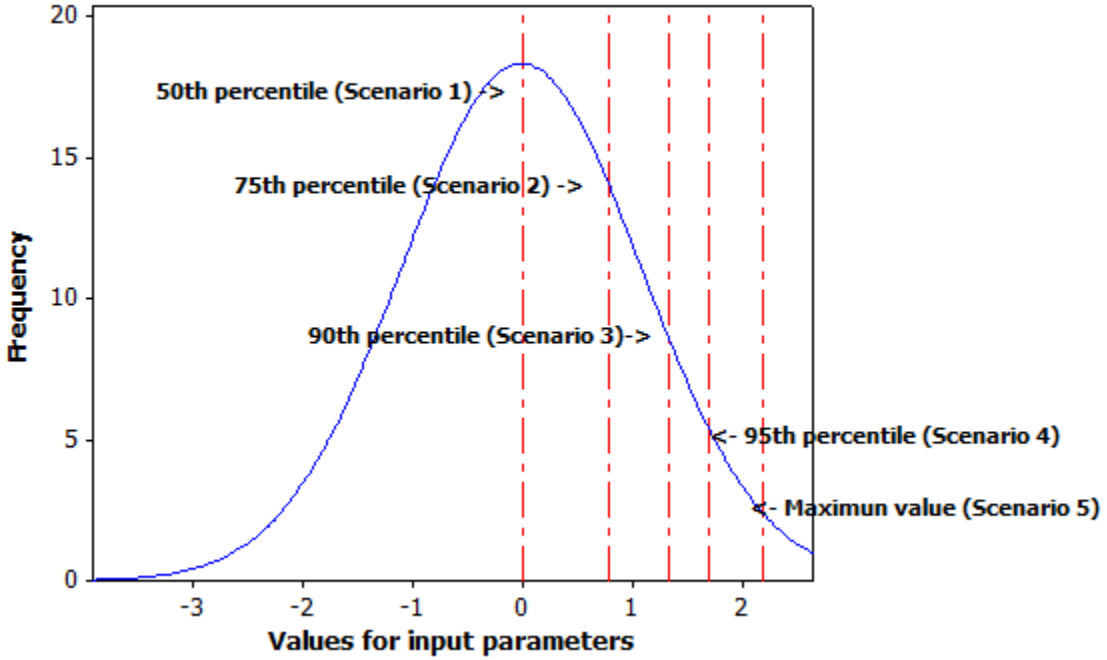
The MAM-PEC model

- Marine Antifoulant Model to Predict Environmental Concentrations
- Developed by researchers in the Netherlands in year 1999
- Has been widely used worldwide including the European countries, New Zealand, and the United States.
- U.S. EPA used MAM-PEC in their reregistration for copper products

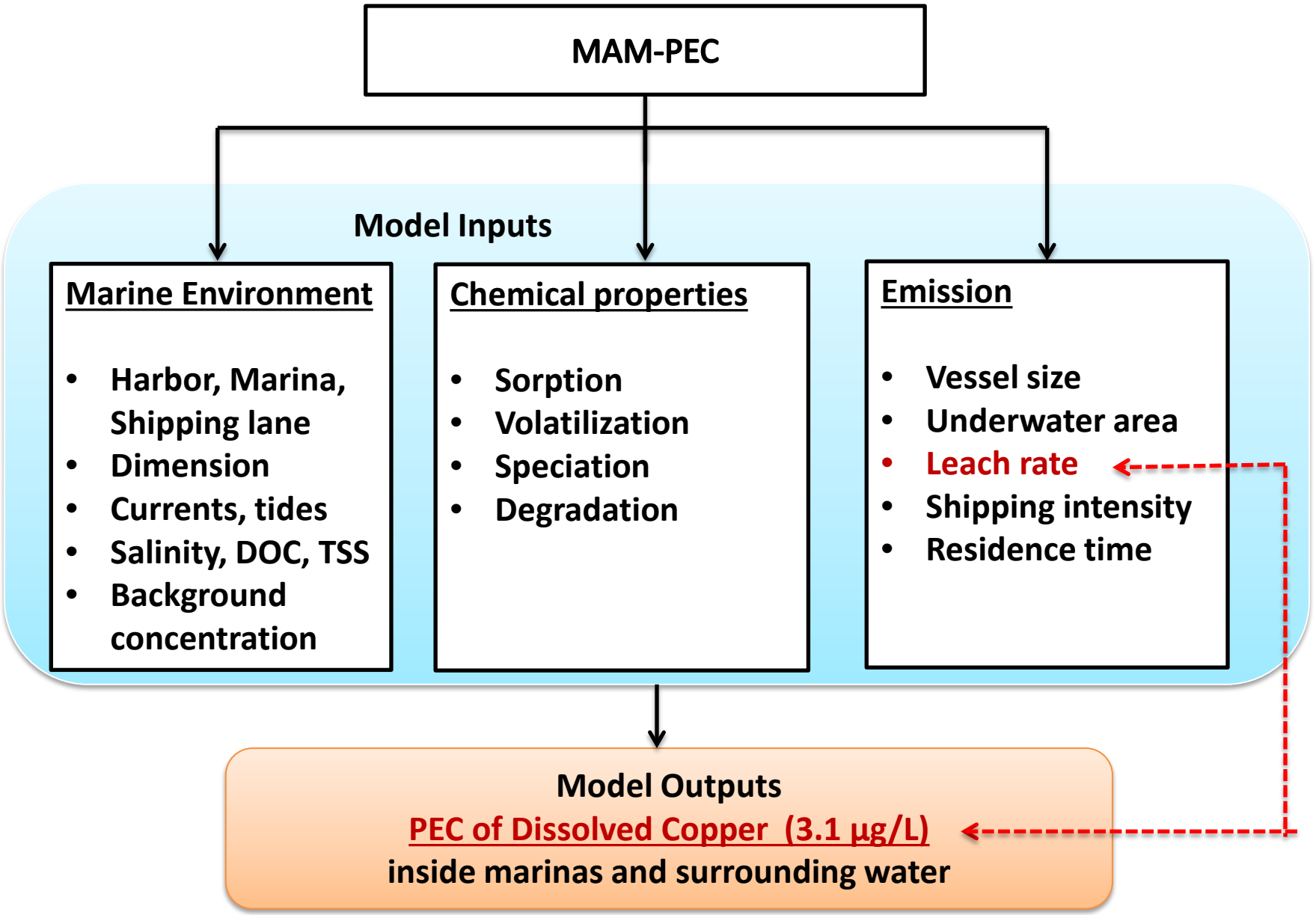

MAM-PEC
Model Inputs
Marine Environment
• Harbor, Marina, Shipping lane
• Dimension
• Currents, tides
• Salinity, DOC, TSS
• Background concentration
Chemical Properties
• Sorption
• Volatilization
• Speciation
• Degradation
Emission
• Vessel size and numbers
• Underwater area
• Leach rate
• Shipping intensity
• Residence time
Model Outputs
PEC of Dissolved and Total Copper
inside marinas and surrounding water

Typical marina scenarios

- Representative of California Saltwater Marinas
- Sample dataset with 20 marinas in CA
- 5 scenarios: copper loading increase from scenario 1 to 5



Modeling procedure



Leach rate adjustment for hull cleaning

- Based on results from Earley et al (2013)
- Assume a 3-year life cycle

$$AdjustingFactor = \frac{100 - average\ loading\ contribution\ from\ cleaning}{100}$$

For example; cleaning with BMP:

AdjustingFactor = $\frac{100-(41.2+44.6)/2}{100}$ = 0.57

$LR_1 = LR_0 \times 0.57$

Mitigation

- Copper AFP Product Reformulation
- DPR Mitigation Recommendations
- Collaborative Problem Solving
    - Significant DPR commitment
- What Now?
    - DPR's copper AFP reevaluation
    - Mitigation outside of reevaluation
- General Timelines
- Questions