Lab 1 (Sept 25, 2019) – Tributyl Tin – Estuaries – Resource Management

In this lab, we will build a simple box model that allows us to effectively manage a small estuary affected by TBT contamination for use as a marina for recreational vessels and as a habitat for growing commercially valuable oysters. First order attempt at Best Management Practices.

Two Questions to think about prior to the actual lab period in order to set up and run this box model are:

1. What are the stocks (reservoirs) that must be accounted?
   a. Marina characteristics (size / volume, number of boats)

2. What are the transfers (sources - input / sink – loss terms) that need to be taken into consideration?
   a. physical (marina flushing times)
   b. chemical (leaching rates, degradation rates)
   c. biological (lethal effects – oyster success rates)

NOTE: In order to gain a sense of the relevance of these questions and reasonable answers to each, read the assigned article by Alzieu (1998, on Blackboard). If you are interested in more background on this topic and its importance as a marine pollution issue, read the other two articles also posted on Canvas (Goldberg, 1986; Francois et al., 1989).

Question to consider regarding the generality of the model to the real world

3. What are the key assumptions / limitations of this simple model?
   a. efficiency of estuarine mixing (varies with river flow / tides)
   b. dependence of contaminant degradation rates on environmental conditions (salinity, temperature, presence / absence of biological catalysts)
   c. products of degradation and their respective chemical behavior / toxicity
   d. sublethal (versus lethal) impacts of contaminant (and its degradation products) on viability of oyster fishery / commercial value of this marine fisheries resource