Invasive Cattails

What do we know about the system:

* There are many types of cattails
  + Some are invasive and outcompeting native plants in eutrophic sites
  + Disrupting animal
* Wetlands/Chesapeake Bay region
* Lack of knowledge about one of the invasive hybrids
* There are other places where there are smaller, stable populations
* Relationship between human activity and stable vs disturbed/invasive sites

What are some of the important parts of a system:

* Hybridization of the cattails/different species present. One is potentially non-native
* Takes place in a wetland/highly populated area
* Animals are involved as well as other native plants
* Human interaction impacts the system
* Cattail abundance has been increasing, but not everywhere
* Eutrophic sites which encourage growth

What are some of the important interactions:

* Relationship between eutrophic sites and cattail abundance
* Relation between eutrophic sites and human disruption
* Relation between cattail species (hybridization)
* Relation between cattails and other native species

What questions are important:

* How does human activity shape eutrophic sites?
* How abundance is different in/out of eutrophic sites?
* How do the new/invaded habitats compare to native habitats?
* In what ways are the native species disrupted?
* What is the rate of hybridization/how common is hybridization?

Why do we want to build a model, and what will we use it for?

* Understand how the cattails are growing and changing the ecosystem
* Quantify the problem of the invasive species
* Understand how to combat continued

Describe the key ecological, economic, aesthetic, or other problems your group identified related to your scenario.

* Ecological problems
  + Hybridization of cattails leads to vigorous invasive species that can outcompete native species
  + Interfering with animal habitat and fish populations
  + Affects wetland ecosystem services
  + May change the bottom habitats and morphology of Chesapeake Bay
* Economic problems
  + Invasive cattail species may inundate farmland and could destroy crops
  + Tourism to the region may experience a decline due to cattails outcompeting native plants and driving away native fauna
  + Crab industry may be affected by changing ecology
* Aesthetic problems
  + Cattails may interfere with native species that the region is known for (blue herons, blue crabs, osprey, native plants)
  + Invasive species can disrupt the environment, changing the appearance of the area
  + Cattails explode when they are ripe and get fuzz everywhere, which is ugly
* Other problems
  + Could hurt crabs, which taste good :(

Describe the questions that guided your group’s model building.

* How does human activity shape eutrophic sites?
* How abundance is different in/out of eutrophic sites?
* How do the new/invaded habitats compare to native habitats?
* In what ways are the native species disrupted?
* What is the rate of hybridization/how common is hybridization?

Which items in Epstein’s *Sixteen Reasons Other Than Prediction to Build Models* helped guide your group’s model building process?

* *2. Guide data collection:* we can infer that the cattail abundance will impact other species and the environment in general, but how? What species will become more abundant, and which will be harmed?
* 4. *Suggest dynamical analogies*: what other systems work similarly to the Chesapeake?
* *5. Discover new questions:* the lack of information on the origins/native range of invasive cattails may be investigated to inform the model.
* 8. *Illuminate core uncertainties:* the scenario displays cattails that become invasive in some areas and not in others.
* *16. Reveal the apparently simple to be complex:* Initially, it appears to be overpopulation of cattails, yet looking closer hybridization is complexly involved.

Briefly describe each group member’s contribution to the activity:

* I (Olivia) was the group scribe
* We went around and discussed each of the suggestions to consider first and questions to ask as we refine our model
* We then all went into this document and collaboratively answered the report questions, drawing form the notes of our brainstorming

Additional Questions:

I am unclear about the differences between mechanistic and phenological (sp) models – Doug