Current Events:
Olympia Oyster Populations Threatened

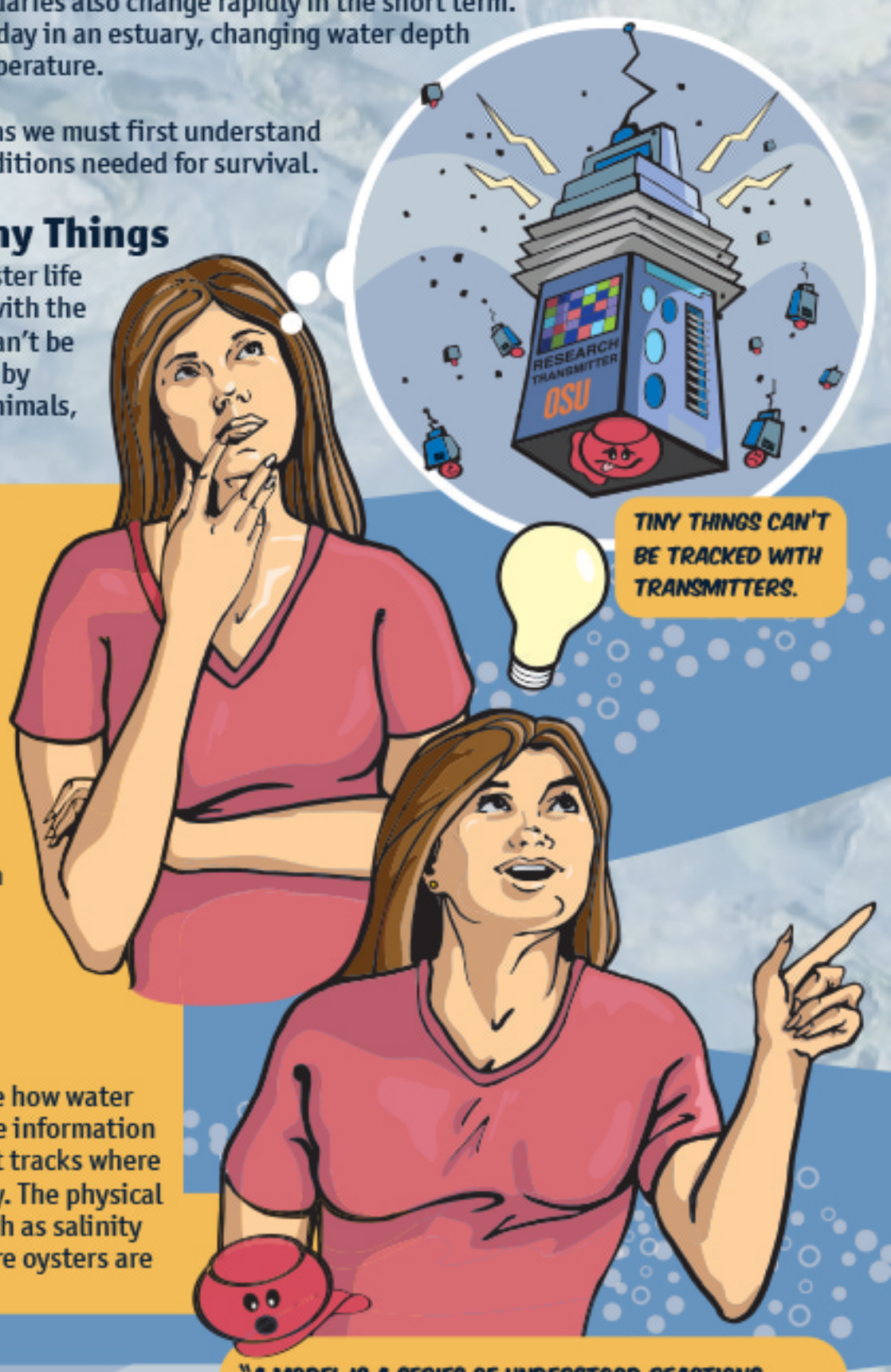
Restoring Olympia Oyster Populations

Olympia oyster populations are threatened because of a variety of natural and human-made causes. Olympia oysters live where a river meets the sea, known as an estuary. Estuaries have changed over time due to natural and human events such as earthquakes and dredging. Estuaries also change rapidly in the short term. Tides mix ocean and river water about twice a day in an estuary, changing water depth and other properties, such as saltiness or temperature.

Before we can restore native oyster populations we must first understand the oyster's environment and the estuary conditions needed for survival.

The Challenge of Tracking Tiny Things

Oyster larvae (babies) are one stage in the oyster life cycle. They are microscopic and move around with the currents of the water surrouding them. They can't be tracked by radio tags, a common method used by scientists to understand behaviors of larger animals, like whales.



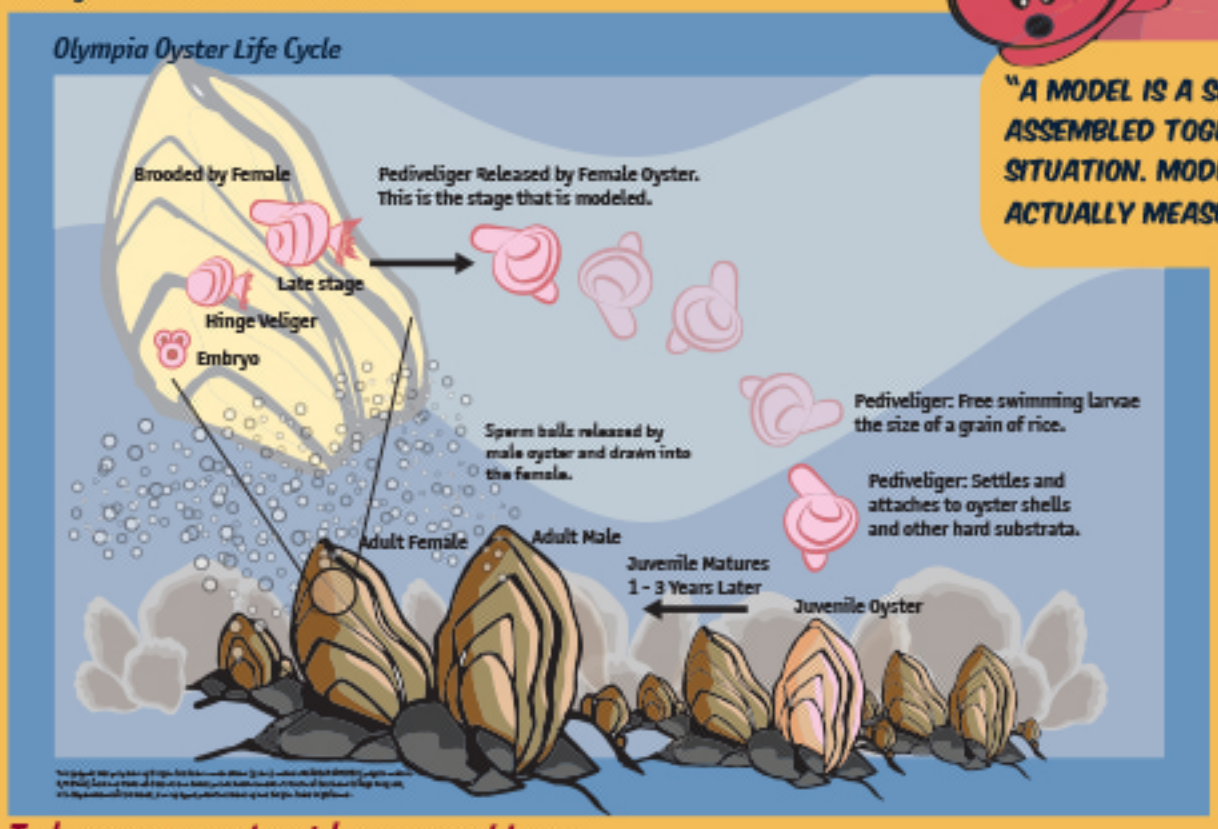
A Great Idea!

Oyster larvae float and flow with the water currents so studying these currents gives scientists insight into how larvae move. To understand where oyster larvae might settle scientists create *models* to help predict their movements.

Models simulate real life situations and are useful when we can't actually measure all of the elements in a system, such as the larvae in the estuary. To create the *model* many things about the estuary need to be studied first.

Using the Model for Olympia Oyster Restoration

Scientists can use a physical model to calculate how water flows throughout an estuary. They can then use information about this flow to make a biological model that tracks where oyster larvae are transported to in that estuary. The physical model can also determine water properties such as salinity and currents that can be used to estimate where oysters are likely to be able to survive.



To learn more about larvae and how they travel, visit the LARVAE exhibit.

Building the Physical Model

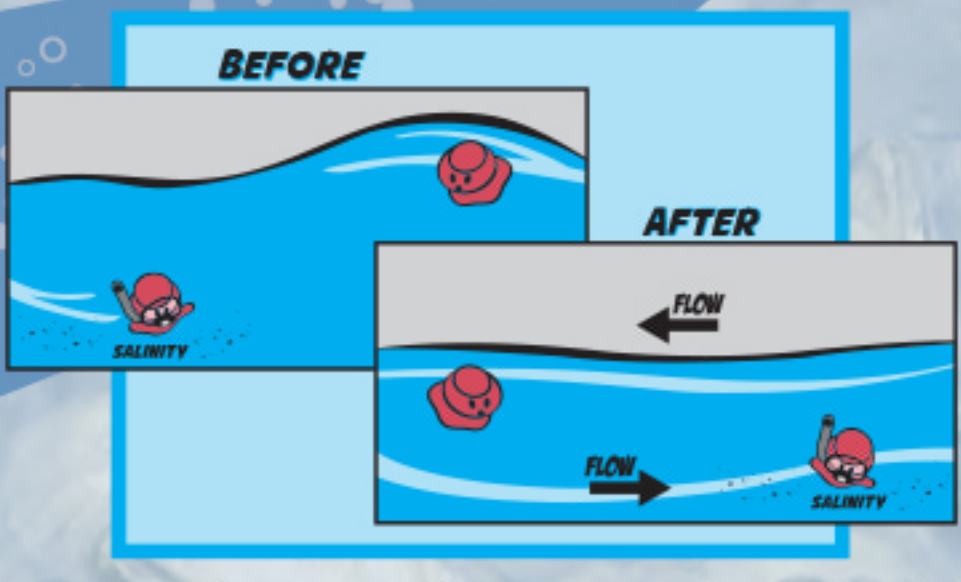
We can use a physical model of water to understand how water will flow in the estuary. A physical model, in this case, uses a computer to solve a system of equations to simulate physical processes. This model is used to explain, rather than predict, allowing us to make sense of the complex currents in an estuary.

Salinity measures how much salt is in the water. Salt water is heavier than fresh water and these different types of water separate into layers that don't mix together very easily. In fact, the separate layers *flow* over each other sometimes in different directions.

Flow measures the speed that water moves. Friction slows down water at boundaries, like shore lines, or near the bottom of the estuary.

Tides occur when the water level rises in one area, causing water to flow away from that place. At low tide the places that are higher elevation may even be dry.

Go visit the LOBO exhibit to learn more about how data is collected in Yaquina Bay and the estuary.



By the laws of physics, water will flow away from where the level is higher and light water will flow over denser salty water. This model uses the equations of physics on a computer to calculate flows like this at a lot of places at once to make a map of the currents in the estuary.

Oyster Biological Model

Taking what we learned about the flow, we can now make a biological model to tell where the larvae go. You can think of it like hop scotch: the currents that we know from each point in the physical model tell us where an oyster larvae at that point will move to.

Yaquina Estuary Model