DID A MODEL SAVE THE BAY?

One of the world's oldest and most famous sports competitions was held in the San Francisco Bay in September 2013. The America's Cup sailing competition draws the third largest number of spectators for a sporting event – nearly 2.5 million people! Only the Olympics and the World Cup draw larger crowds. However, many of these fans will arrive in super-sized yachts, and San Francisco needs a place for them to dock. In order to be ready, a small part of the San Francisco Bay will need to be dredged to make room for these large vessels. Every time the bay is altered for human use, the ecological system of one of the world's most diverse estuaries is affected.

In order to understand the relationship between human activity and the San Francisco Bay, a large model of the bay was built in 1957 by the U.S. Army Corps of Engineers. The Bay Model is housed in a large building near San Francisco and spreads over 1.5 acres. This massive model includes a working water system that simulates water flow from rivers into the bay, as well as the tides and currents of the ocean. The model was originally made to see if a plan to create freshwater lakes for farming and human consumption would work. The plan included building dams to capture the fresh water from the rivers so that it would not mix with the salt water from the ocean. These new freshwater lakes would replace part of the existing bay, which is a mixture of salt water and fresh water.

By using the Bay Model to test this plan, scientists discovered that the San Francisco Bay is too shallow for the plan to succeed. The water that would have sat in these new reservoirs would have evaporated before it could have been used. Without the Bay Model to test this plan, billions of taxpayer dollars would have been spent on a useless project. This same model has been used to predict the impact of oil spills and many other changes to the bay, such as dredging shipping lanes so that large cargo ships can pass through the shallow waters.

Today, the Bay Model has been replaced by computer models that continue to simulate the impact of both man-made and natural changes to the San Francisco Bay. The Bay Model is still open to the public and is a popular tourist destination. Schools visit the Bay Model so students can learn from the educational diagrams that represent complicated scientific problems.

What are some large projects in your town, city, or state? How can models be used to make sure these projects do not have unexpected problems?

Mini-Glossary

U.S. Army Corps (pronounced "core") of Engineers – a part of the government that is responsible for studying potential problems, like floods, and constructing projects to keep the country safe and productive

Estuary – a body of water connected to an ocean into which rivers and streams flow. This body of water will have a mixture of both salt water and fresh water, which creates a diverse habitat for fish, plants, and other wildlife.