**California Estuary Questions**

**What are estuaries?**

**What is the San Francisco Estuary?**

**What is the status of SF Estuary health?**

**What are trends in in SF Estuary health?**

**What is being done to make estuary better?**

**What is an Estuary?**

An estuary is a partially enclosed body of water along the coast where freshwater from rivers and streams meet and mix with salt water from the ocean. Estuaries and the lands surrounding them are places of transition from land to sea, and although influenced by the tides, they are protected from the full force of ocean waves, winds, and storms by such landforms as barrier islands or peninsulas.

Estuaries are often known as bays, lagoons, harbors, inlets, or sounds, (note though that not all water bodies by those names are necessarily estuaries; the defining feature of an estuary is the mixing of fresh and salt water, not the name.) Some familiar examples of estuaries include San Francisco Bay, Puget Sound, Chesapeake Bay, and the New York/New Jersey Harbor.

Estuarine environments are among the most productive on earth, creating more organic matter each year than comparably sized areas of forest, grassland, or agricultural land. The tidal, sheltered waters of estuaries also support unique communities of plants and animals, specially adapted for life at the margin of the sea. Many different habitat types are found in and around estuaries, including shallow open waters, freshwater and salt marshes, swamps, sandy beaches, mud and sand flats, rocky shores, oyster reefs, mangrove forests, river deltas, tidal pools, and sea grasses.

The productivity and variety of estuarine habitats foster a wonderful abundance and diversity of wildlife. Shore birds, fish, crabs and lobsters, marine mammals, clams and other shellfish, marine worms, sea birds, and reptiles are just some of the animals that make their homes in and around estuaries. These animals are linked to one another, and to an assortment of specialized plants and microscopic organisms, through complex food webs and other interactions.

Estuaries are places where rivers meet the sea. They are fascinating and highly productive ecosystems distinct from all other places on earth. However, most estuaries are at risk due to human activities, both past and present.

Thousands of species of birds, mammals, fish, and other wildlife depend on estuarine habitats as places to live, feed, and reproduce. And many marine organisms, including most commercially important species of fish, depend on estuaries at some point during their development. Because of their biological productivity estuaries provide ideal areas for migratory birds to rest and refuel during their long journeys. Because of the many species of fish and wildlife that rely on the sheltered waters of estuaries as protected places to spawn, estuaries are often called the “nurseries of the sea.”

## Why are Estuaries Important?

Besides serving as important habitat for wildlife, wetlands that fringe many estuaries also perform other valuable services. Water draining from the uplands carries sediments, nutrients, and other pollutants. As the water flows through wetlands such as swamps and salt marshes, much of the sediments and pollutants are filtered out. This filtration process creates cleaner and clearer water, which benefits both people and marine life. Wetland plants and soils also act as a natural buffer between the land and ocean, absorbing flood waters and dissipating storm surges. This protects upland habitats as well as valuable real estate from storm and flood damage. Salt marsh grasses and other estuarine plants also help prevent erosion and stabilize the shoreline.

Among the cultural benefits of estuaries are recreation, scientific studies, education, and aesthetic values. Boating, fishing, swimming, surfing, and bird watching are just a few of the numerous recreational activities people enjoy in estuaries. Estuaries are often the cultural centers of coastal communities, serving as the focal points for local commerce, recreation, celebrations, customs, and traditions (2). As transition zones between land and water, estuaries are invaluable laboratories for scientists and students, providing countless lessons in biology, geology, chemistry, physics, history, and social issues. Estuaries also provide a great deal of aesthetic enjoyment for the people who live, work, or recreate in and around them.

Finally, the tangible and direct economic benefits of estuaries should not be overlooked. Tourism, fisheries, and other commercial activities thrive on the wealth of natural resources that estuaries supply. The protected coastal waters of estuaries also support important public infrastructure, serving as harbors and ports vital for shipping, transportation, and industry. Some attempts have been made to measure certain aspects of the economic activity that depends on America's estuaries and other coastal waters, for example:

* Estuaries provide habitat for more than 75% of America's commercial fish catch, and for 80-90% of the recreational fish catch. Estuarine-dependent fisheries are among the most valuable across the nation, estimated to be worth billions of dollars.
* Nationwide, commercial and recreational fishing, boating, tourism, and other coastal industries provide more than 30 million jobs. Commercial shipping alone employs tens of thousands of people.
* There are 25,500 recreational facilities along the U.S. coasts and almost 44,000 square miles of outdoor public recreational areas. The average American spends 10 recreational days on the coast each year and nearly 70% of the U.S. population visit the coast during the year. Coastal recreation and tourism alone generate tens of billions of dollars of revenue for local communities.
* In one estuarine system in the Northeast that was studied some years ago it was found that commercial and recreational fishing generate about $240 million per year. In that same estuary, tourism and beach-going generate $1.5 billion per year, and shipping and marinas generate $1.86 billion per year.

In short, estuaries provide us with a whole suite of resources, benefits, and services. Some of these can be measured in dollars and cents, others can not. Estuaries are an irreplaceable natural resource that must be managed carefully for the mutual benefit of all who enjoy and depend on them.

**What is the San Francisco Estuary?**

The San Francisco Bay-Delta Estuary…

* Is one of the largest estuaries on the West Coast
* Is a vital resource for the state’s human and wildlife populations
* Encompasses roughly 1,600 square miles
* Drains over 40 percent of the state (60,000 square miles).  
  [View a map of the Estuary watershed.](http://sfestuary.org/pages/map.php" \t "_self)
* Provides drinking water to 22 million Californians
* Irrigates 4.5 million acres of farmland
* Supports important economic activities including commercial and sport fishing,  
  shipping, industry, agriculture, recreation and tourism.

The Delta plays a major role in the state’s prosperity by providing at least a portion of the drinking water for 24 million Californians, fueling a $31 billion agricultural industry and serving as an important habitat to more than 750 animal and plant species and many non-native species, including waterfowl, birds of prey, sport fish and species listed as threatened or endangered: Delta smelt, Chinook salmon and steelhead. The 1,000 square-mile estuary supports 80 percent of California’s commercial salmon fisheries and its 1,100 miles of levees protect farms, cities, schools and people.

More than half-a-million people call the Delta home, living in 14 towns and villages in five counties. Five highways pass through the Delta, as do three railroads, two deep-water shipping channels, hundreds of natural gas lines and five high-voltage transmission lines. Water flowing through the Delta diverts directly through six canals and/or pipelines and to more than 1,800 agricultural users, the latter of which grows half the nation’s fruits and vegetables and one-quarter of its dairy products.