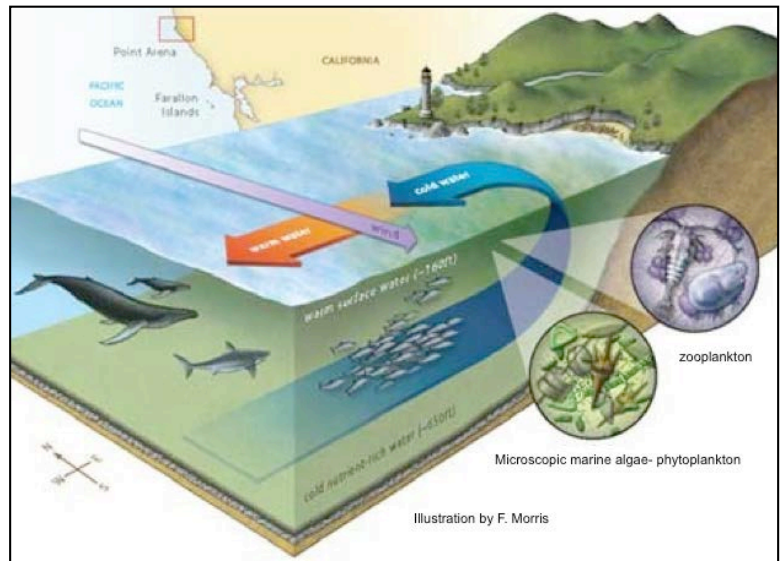


California Coastal Upwelling Ecosystems and Ocean Observing Systems

- **California coastal upwelling:**

- Occurs within coastal regions of the western United States, mainly from central California north to Oregon.
- Arises, most often during spring and summer, when strong winds force deep, cold, high nutrient water to move to the surface.
- Waters flow through the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries. California coastal upwelling supports rich sea life within these Sanctuaries.



- **Why is coastal upwelling important?**

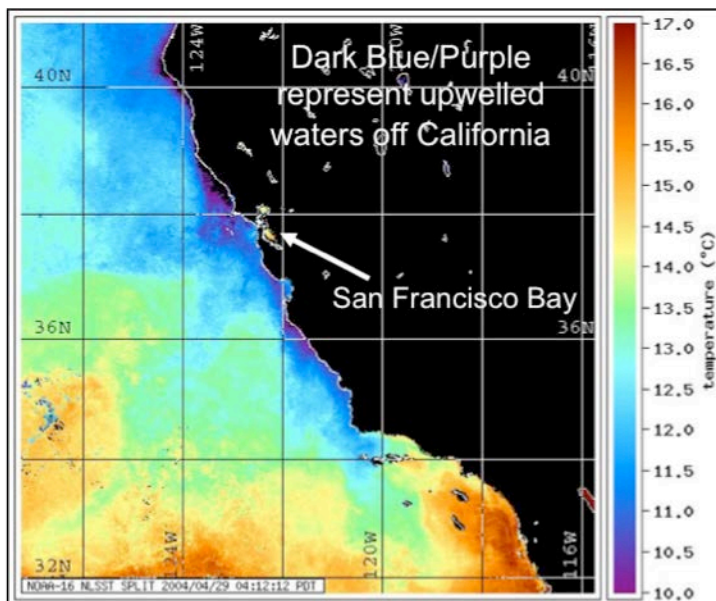
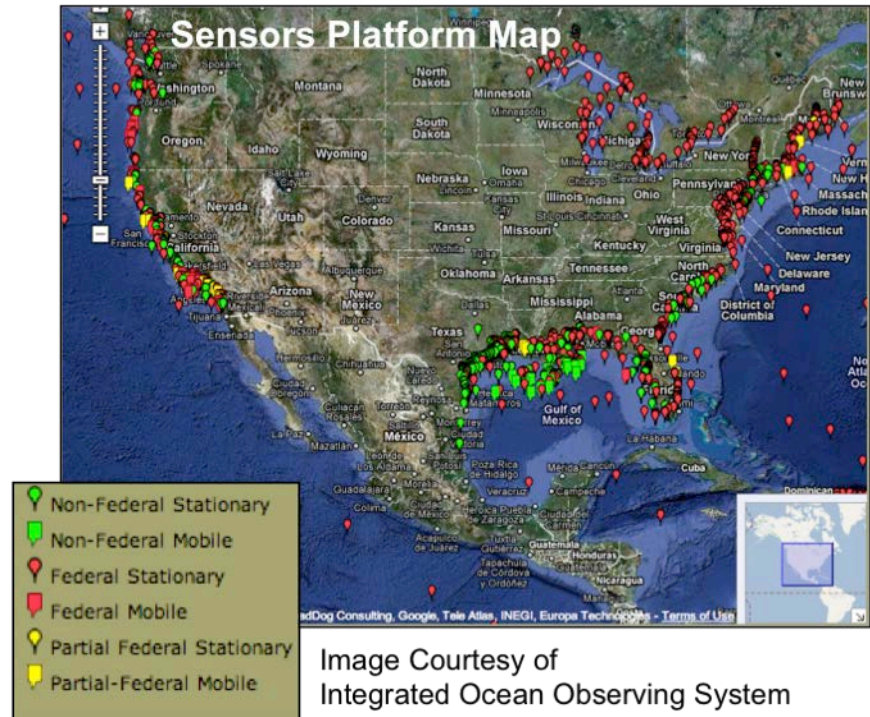


Image Courtesy of NOAA

- The deep, welled up waters provide high levels of nutrients to surface waters.
- High nutrient levels increase production throughout the food web.
- Upwelling regions are known for their large populations of predatory fish, seabirds, and marine mammals.
- The California coastal upwelling region is one of only four such systems on earth.

- **Ocean Observing Systems:**

- Use a wide variety of sensors and platforms to study and monitor physical, chemical, and biological oceanographic properties.
- Exist at the local, regional, national, and global scales.



- **Why are Ocean Observing Systems (OOS) important?**

- Provide information on the health of ecosystems.
- Generate future models predicting ecosystem health and impacts of climate change.
- Measurements used for a wide range of scientific studies.
- Real-time ocean conditions available for fishermen and recreational activities.
- Provided the scientific rationale for expanding the boundaries of the National Marine Sanctuaries in California to include important oceanographic boundaries, thereby protecting food sources for sea life in the Sanctuaries.

- **Funding for Ocean Observing Systems**

- Provided by more than 17 Federal agencies, including NOAA, NSF, NASA, and ONR.

For further information contact:

Rachel Fontana

PhD Candidate & NSF Graduate K-12 Fellow

Bodega Marine Laboratory, University California, Davis

refontana@ucdavis.edu

707.875.1972

<http://www.bml.ucdavis.edu/boon/index.html>