Zooplankton are a major component of the diet of many marine and estuarine fishes and birds, and are therefore an essential link between the base of the food web (primary producers) and higher level consumers. Recent introductions of non-indigenous species (NIS), however, have disrupted and possibly negatively impacted the food web of San Francisco Bay. Our long-term goal is to develop and establish a zooplankton monitoring system that can be replicated and adapted to other areas in California. Our short-term goal is to monitor the abundance and species composition (especially native vs. NIS taxa) of zooplankton in San Francisco Bay. Such data should be useful to a wide range of scientists and natural resource managers concerned with environmental quality, fishing, shipping, and recreational uses of California coastal and estuarine waters.

The monitoring system is to be established in San Francisco Bay at the Romberg Tiburon Center for Environmental Studies (RTCES) on a specially designed and constructed finger pier. We will be using two primary methods for the monitoring of zooplankton. First, we will perform weekly, duplicate vertical hauls with a 73-micron, 0.5-m diameter plankton net. These plankton samples will be size fractionated into 73-150 and > 150-micron size-fractions. Each size-fraction will be subsampled with a Stemple pipette and analyzed under a dissecting microscope until at least 300 individuals are enumerated and identified to lowest practicable taxonomic level.

Second, we will be using a Laser Optical Plankton Counter (LOPC), manufactured by Brooke Ocean Technology [http://www.brooke-ocean.com/lopc.html], to continuously survey the plankton at a fixed distance above the bottom. Briefly, the LOPC enumerates and sizes particles from 100 µm to 35mm in size by sensing a distortion or break in a laser plane scan. In addition to measuring size and number of particles, it can also generalize the outline of a zooplankter over 1.5mm such that broad taxonomic characteristics can be applied. Using the LOPC, we can gather highly temporally resolved data that span many different time scales, including tidal, diel (night/day), seasonal, and inter-annual scales. The combination of plankton net data, which provides the best possible taxonomic detail, and the LOPC data, which provides the best possible temporal resolution, will be an extremely powerful tool for monitoring zooplankton.

These zooplankton data will be collected in conjunction with continuous observations of abiotic (e.g., salinity, temperature, light, turbidity and wind) and other biotic conditions (species composition and abundance of phytoplankton), as described elsewhere on this web page.

These data will be readily available to the public via the Internet. The zooplankton net haul data (species composition and abundance) will be presented in a comma-delimited
flat file array and/or a Microsoft Access database that can be downloaded and queried by the user. Graphical presentation and preliminary interpretations of the data will be updated each week. The LOPC data will also be available as a downloadable, comma-delimited file. Select LOPC data (e.g., biovolume, mean particle size ± SD, and particle density) will also be presented as time series plots along with the accompanying environmental data on a live web updated page.

This suite of zooplankton and related environmental data will allow us to evaluate the current status and possible future changes in the zooplankton community, including and especially any new introductions of non-indigenous species (NIS). Such data and interpretations will in turn be an important part of any broader assessments of water quality and marine resources (e.g., fishes and birds) in the San Francisco Bay Estuary.