Morro Bay Volunteer Monitoring Program

Eelgrass Monitoring

Winter 2009

Eelgrass beds are some of the most productive habitats in the marine environment. Most seaweeds (kelp or rockweeds) are actually varieties of algae, and must rely on nutrients suspended in the water column. Eelgrass is a flowering plant that has true roots and is able to draw nutrients from the sediment. Many marine species depend on the productive eelgrass beds, even if they do not feed directly on eelgrass. Broken decaying leaves provide important food to decomposers, and many other species take shelter in dense eelgrass beds.

The Morro Bay National Estuary Program (MBNEP) eelgrass monitoring effort has three main components: bay-wide eelgrass mapping, biomass calculations, and transect measurements.

For the mapping effort, a flight is conducted to collect aerial imagery at an extreme low tide in the fall. Digital analysis software is used to identify the unique 'signature reflection' of eelgrass, and this information is used to create a map. Due to the prohibitive cost, this effort is not conducted each year. A map was created in 2007 and the next planned map creation is scheduled for 2009.

Four permanent transects were established throughout the bay in the spring of 2005. At each transect, shoots were collected for biomass measurements, and the density of shoots were counted. These transects were selected to represent different zones within the bay and to capture differences between these zones. Monitoring transects were created over several years as field conditions forced the abandonment of some sites and slight relocations at others.

Where We Monitor

The Coleman, Tidelands, Chorro and Pasadena transects were monitored in 2008.

Monitoring at the Mitchell transect was suspended in 2007 due to safety concerns and the sensitivity of the remaining eelgrass in that area. The Coleman transect was established in 2006 to increase the spatial scope of monitoring in Morro Bay.

How We Measure Eelgrass

An MBNEP staff member and volunteers are ferried to most monitoring sites by boat. The extreme low tides allow monitoring to be conducted on foot and give monitors a unique glimpse of the wildlife that inhabits Morro Bay. The wildlife pictured throughout this report were photographed during the transect monitoring efforts.

Transect fieldwork is conducted during extreme low tide conditions during the fall, when eelgrass is at its peak. Ideal tide height for transect monitoring is -1.5' or lower. These tides do not occur frequently and leave only a small window of time for monitoring. In 2008, monitoring took place on November 13, 14 and 15 during the afternoon low tides.

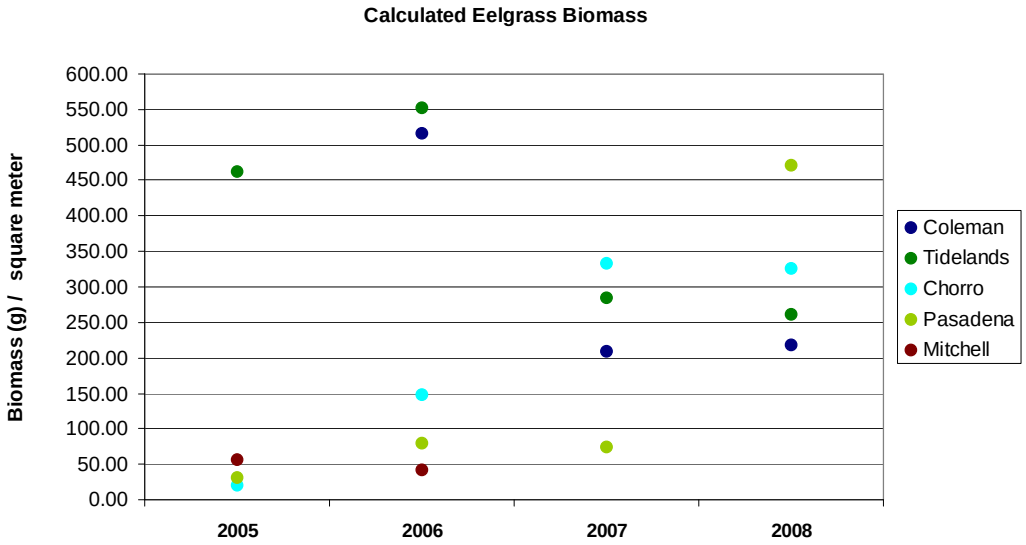
Each 50 meter transect is marked with PVC stakes. During monitoring, a measuring tape is laid out along the transect, and measurements are taken every 2.5 meters inside a 0.25 m^2 square PVC quadrat frame. All measurements are taken within the PVC frame so that the measurement area stays consistent across the transect and between sites. Measurements include eelgrass shoot density and percent coverage of eelgrass, algae and bare substrate.

The monitoring program conducts biomass measurements on shoots from each site. Biomass is the total weight of the dried tissue of an organism. These dry weights indicate the amount of production at each transect location.

At each transect, 30 to 40 shoots of eelgrass were collected for biomass measurements. Shoots were randomly collected throughout the area parallel to each transect that has not been disturbed by shoot density counts. Shoots are broken off at the node closest to the surface of the mud and transported to the lab in zippered plastic bags.

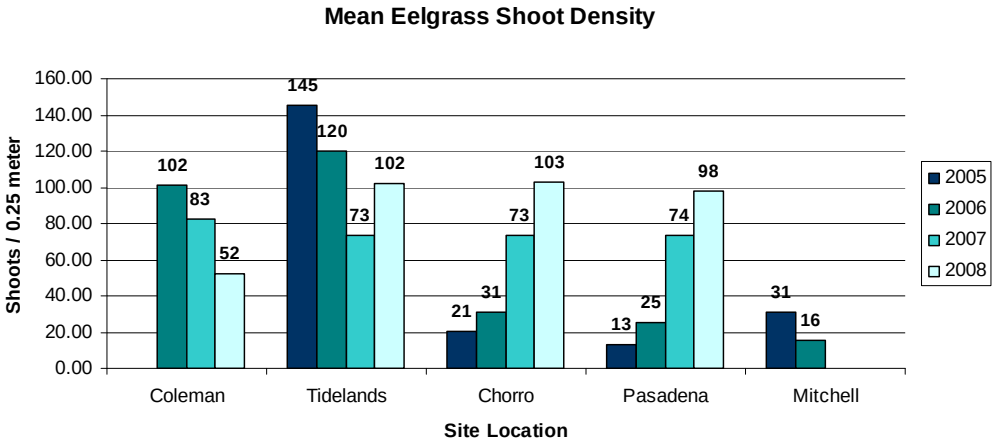
At the lab, shoots are carefully cleaned to remove all mud and debris. Shoots are wrapped in preweighed foil and dried in an oven for several days. Once fully dried, the shoots are weighed again to determine their mass. At each site the average mass for a single eelgrass shoot is calculated. This average weight can be multiplied by the number of shoots counted in a quadrat to determine the amount of eelgrass in a square meter.

Biomass amounts have varied widely between sites and over a period of four years. In 2008, both back bay sites (Pasadena and Chorro) yielded greater biomass than the front bay sites. Although Pasadena demonstrated a dramatic increase in biomass between 2007 and 2008, biomass at the three other transect sites remained relatively stable.



Changing Eelgrass Beds

Monitoring over a four-year period has helped characterize habitat trends in different regions of Morro Bay. The data collected from each of these transects provides an indication of the health of eelgrass beds in the surrounding area. While shoot densities have declined in some areas, they have risen in others.

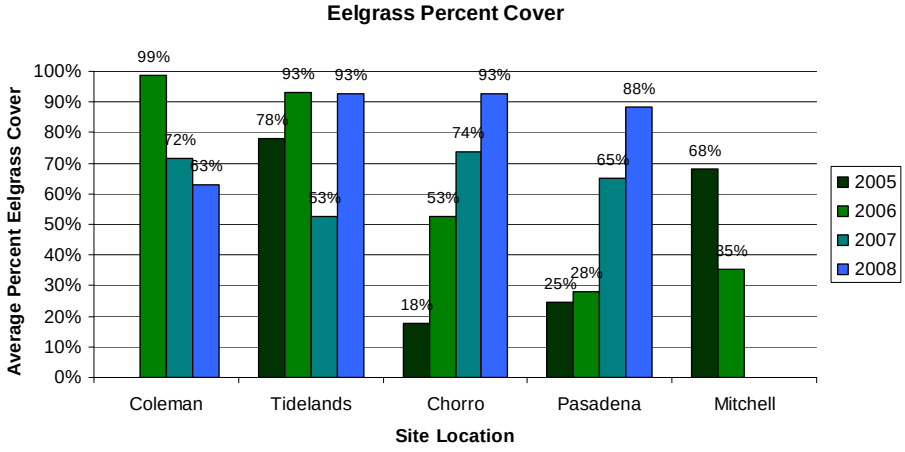


The data collected from each of the 20 quadrats is combined to calculate an average shoot density and percent cover of eelgrass for each transect.

Shoot densities have consistently increased at the Pasadena and Chorro transects over the last four years. The mean percent cover of eelgrass has also increased significantly at both of these sites. Mapping from aerial photographs has confirmed these findings and indicated that eelgrass beds are increasing in size in this area of the bay.

The Tidelands transect demonstrated a slight recovery in 2008 following two years of declining densities, and a dramatic decline in percent coverage in 2007. In most cases, a decline in coverage is matched by a decline in shoot density. The data collected from the Tidelands transect in 2006 is an exception to this trend. This may be the result of very large shoots, which provide more coverage than a high density of shorter shoots with few leaves.

Shoot densities have consistently increased at the Pasadena and Chorro transects over the last four years. The mean percent cover of eelgrass has also increased significantly at both of these sites. Mapping from aerial photographs has confirmed these findings and indicated that eelgrass beds are increasing in size in this area of the bay.



The northernmost transect in Morro Bay (at Coleman Beach) has shown declines in both eelgrass shoot density and percent cover. The eelgrass at this beach is subjected to the most recreational and industrial impact of the four transects. Year-round traffic from beachgoers and the proximity of urban and commercial activities may be contributing to the decline of shoot density and coverage.

Want To Get Involved?

Volunteers will be needed to assist with monitoring and mapping efforts during the fall and early winter of 2009.

Transect and biomass monitoring will likely take place during the third week of November. Training and monitoring generally take place over a three-day period, regardless of weather conditions. (The tide waits for no one!) All training, equipment, and transport to sites are arranged by the MBNEP.

In addition to transect monitoring, volunteers can assist with efforts throughout the fall and winter to 'ground truth' the map created through aerial imagery. Ground truthing confirms the presence or absence of eelgrass and other vegetation throughout the bay. The data is incorporated into the mapping process to check the accuracy of the map. This is a great excuse to get out on the water or explore areas of Morro Bay that may be new to you!

Thank You, 2008 Volunteers!

This data could not have been collected without the help of several dedicated program volunteers:

Karine Tokatlian
Marina Michel
B.K. Richard
Melinda Elster
Neal Maloney

Thanks also to the following MBNEP staff:

Annie Gillespie
Anna Halligan
Shari Sullivan
Mike Weddige