# PLANKTON AND ZOOPLANKTON DYNAMICS IN THE SALTON SEA

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The plankton of a lake ecosystem is very important to its functioning. Photosynthetic algae in the plankton form the base of the food web, directly providing food to the zooplankton and planktivorous fish such as the tilapia. Algae also produce dissolved organic matter (DOM). Bacteria and heterotrophic flagellates use the DOM and then are fed upon by planktonic ciliates which in turn can be fed upon by larger zooplankters and fish.

The concentration of chlorophyll in the water provides a good index of phytoplankton abundance. Chlorophyll concentration was highest in late winter, declined to a minimum in late summer, and then increased throughout the fall mixing period. Phytoplankton decline during the warm season probably is a consequence of reduced nutrient levels in surface waters. This would be caused by the limited mixing of bottom and surface waters as a result of the thermal stratification present during most of this season. In early fall when the lake first starts to cool and mix from top to bottom daily, the nutrients nitrogen and phosphorus are brought up from below and stimulate the winter blooms of dinoflagellates that color the water dark brown. Chlorophyll levels were usually highest in the surface water stratum, reflecting the ability of some phytoplankters to swim toward the light. Secchi disk readings ranging mostly from 0.5 to 1.5 m suggest self-shading may often limit growth of phytoplankton.

The dominant species present in the phytoplankton have changed since the 1950s, but most of the major groups (dinoflagellates, diatoms, chlorophytes, euglenoids, and cryptomonads) are the same. One exception is an alga in the raphidophyte group, which may be toxic to fish and has not been reported previously from the lake (see poster on *Chattonella marina*). The prominent dinoflagellates in the 1950s were *Prorocentrum* spp. and *Heterocapsa niei*. Now *Gyrodinium uncatenum*, several *Gymnodinium* spp., and a *Scrippsiella* sp. dominate, along with the *Heterocapsa*. The dominant diatoms in the 1950s were *Cylindrotheca closterium* and an unidentified *Cyclotella*. We now find *Thalassionema nitzschioides*, *Pleurosigma ambrosianum* and a very small *Cyclotella* to be the dominant ones (see the diatom poster).

Summer has the highest total zooplankton density, mainly due to the high numbers of the copepod, *Apocyclops dengizicus*, and a rotifer, *Brachionus rotundiformis*. In late summer, there are sometimes abrupt decreases in zooplankton populations. In 1998 an especially dramatic decline in zooplankton occurred when hydrogen sulfide was found throughout the water column and oxygen levels fell to almost zero following a mixing event. This simultaneous scarcity of phytoplankton and zooplankton in late summer, together with low oxygen availability, may represent a time of serious stress to fish. Zooplankton species now dominant are the same as or similar to those found in the 1950s. Three species of rotifers alternate dominance during the year. These feed mostly on algae and other small organisms. One of them, *Brachionus rotundiformis*, may have been present in 1955. Two species of *Synchaeta*, a genus of rotifer not previously been reported from the Sea, are now very common in the winter. Larvae of the benthic barnacle (*Balanus amphitrite*) and polychaete worm (*Neanthes succinea*) are also found in the zooplankton. These larvae were scarcest in summer. This possibly was due to 1) summertime reduction of adult barnacles by a drop in lake level that left many 'high and dry' and 2) anoxia that rendered most of the lake bottom uninhabitable by adult polychaetes.