

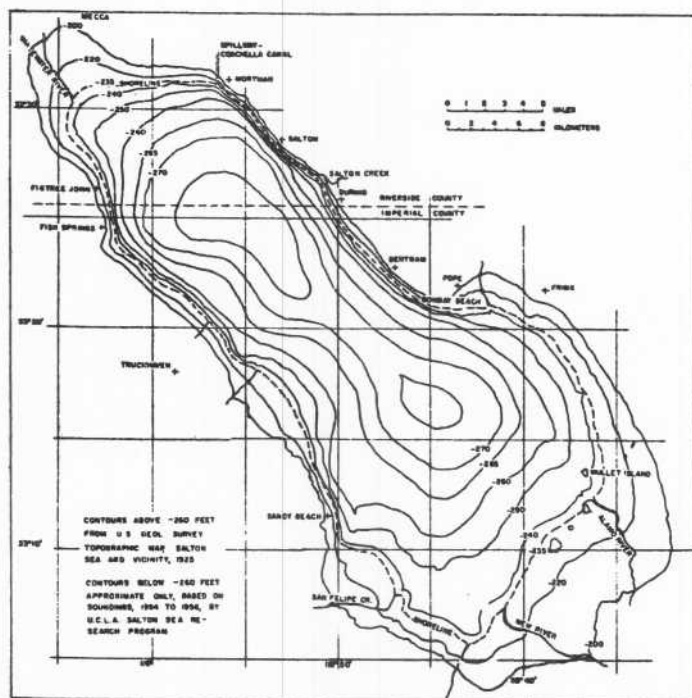
Chapter C-3

LANDLOCKED SEA WATERS

When waters are cut off from the sea or lakes develop salts similar to sea water, marine organisms may participate in ecosystems of the inland sea being physiologically adapted. However, such waters differ in major ways from the other estuarine systems. They do not have: appreciable tide, population pressure from more open waters, coupling to the seasonal pulse-migration-nursery pattern. Landlocked waters may be outside the scope of a coastal classification system, but proposals to cut off sea waters to form salty impoundments make these systems of interest.

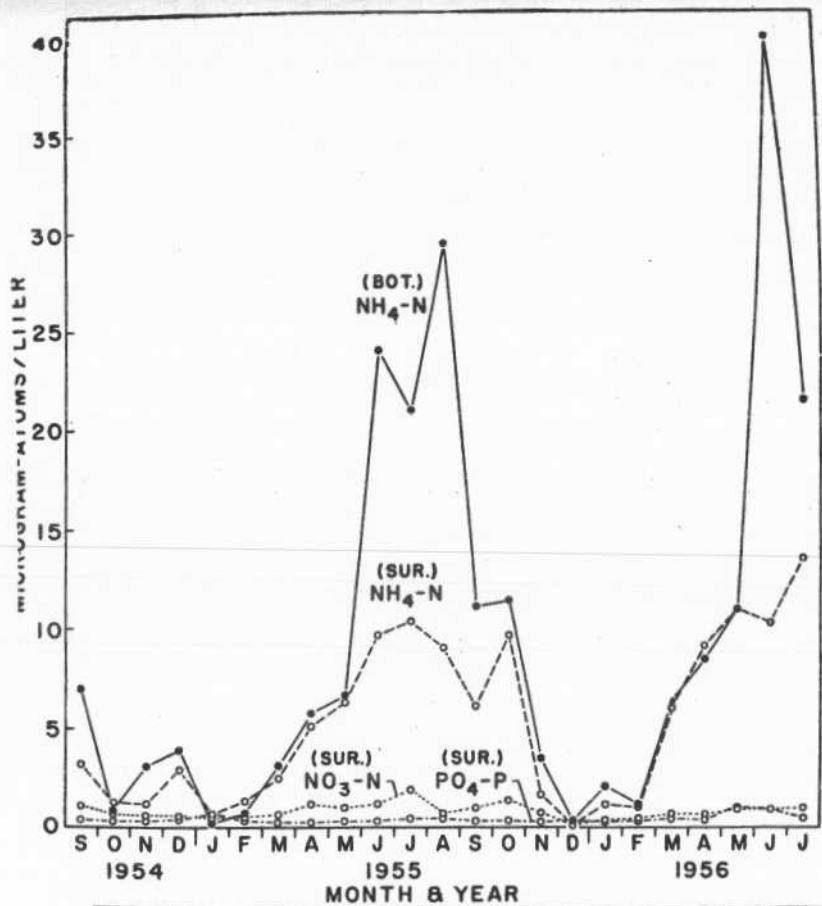
Examples

The Salton Sea in southern California (Fig. 1) refilling after a nearly dry period developed salinities like the sea with developing biological components many of which were stocked. The Caspian Sea is another often cited case which has marine species in landlocked pattern. The Salton Sea, California is shown in Fig. 1 and a few of the patterns of annual cycle given by Walker(1961) are given in Figs. 2 and 3. That entirely new kinds of ecological systems can develop under partial management opens the door into a new promising era of ecological engineering.



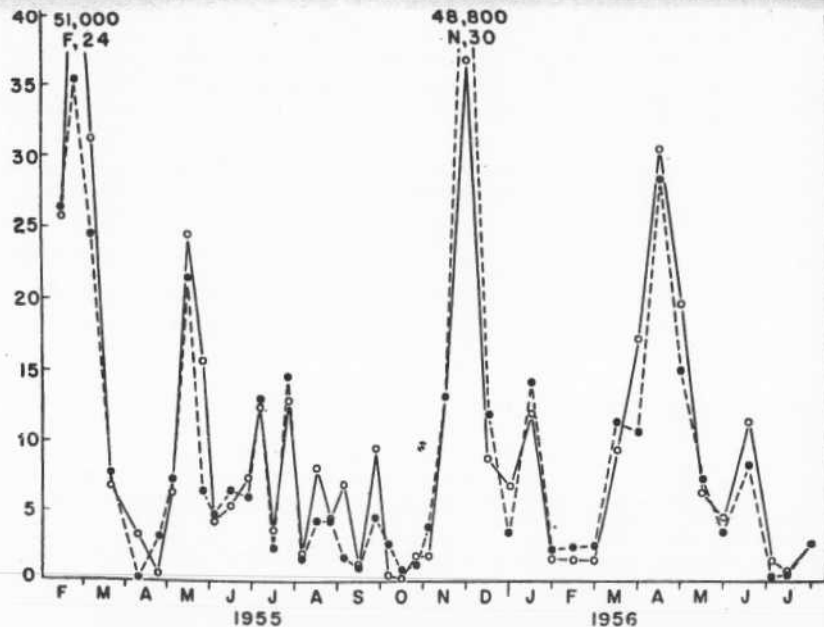
Depth contours of Salton Sea. Contours above -260 feet from U. S. Geological Survey, 1925. Contours below -260 feet are approximate only, based on soundings by U.C.L.A. Salton Sea Laboratory, 1954-1956.

Fig. 1. Landlocked sea waters of Salton Sea, California (Walker, 1961).

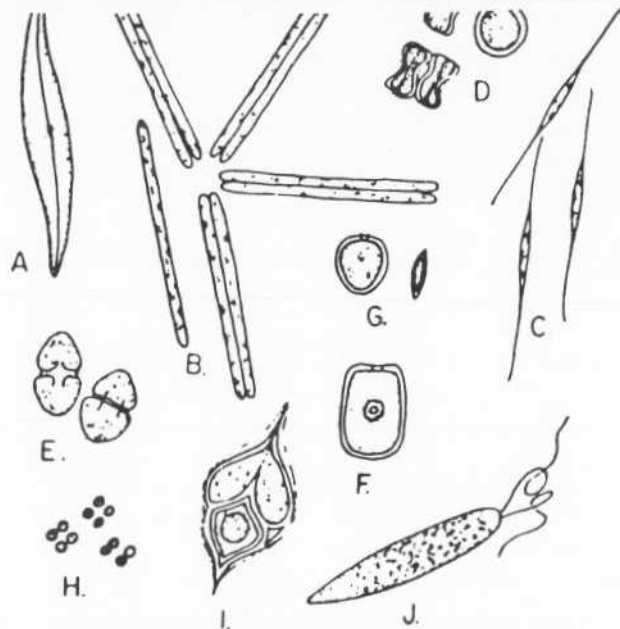


Ammonia-N, Nitrate-N, and Phosphate-P three miles off Fish Springs, Salton Sea.

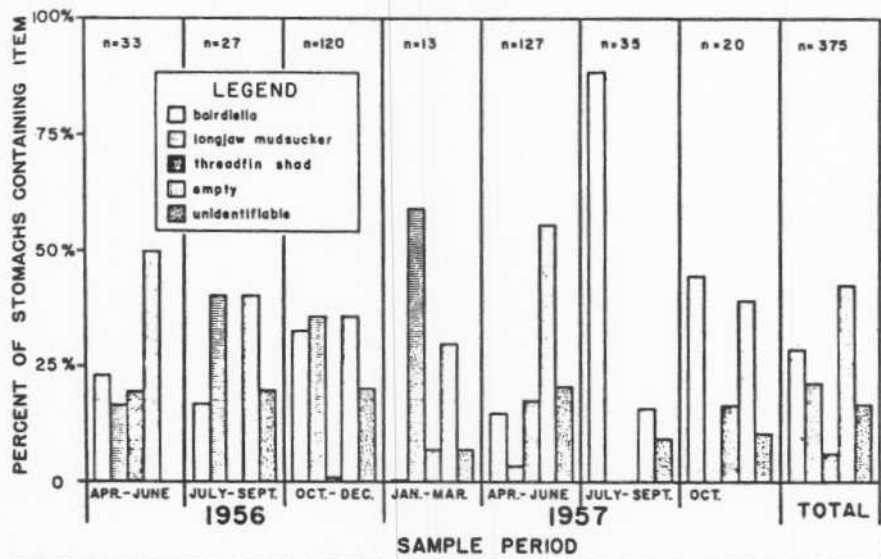
Fig. 2. Nutrients and phytoplankton producers in Salton Sea (Walker, 1961).



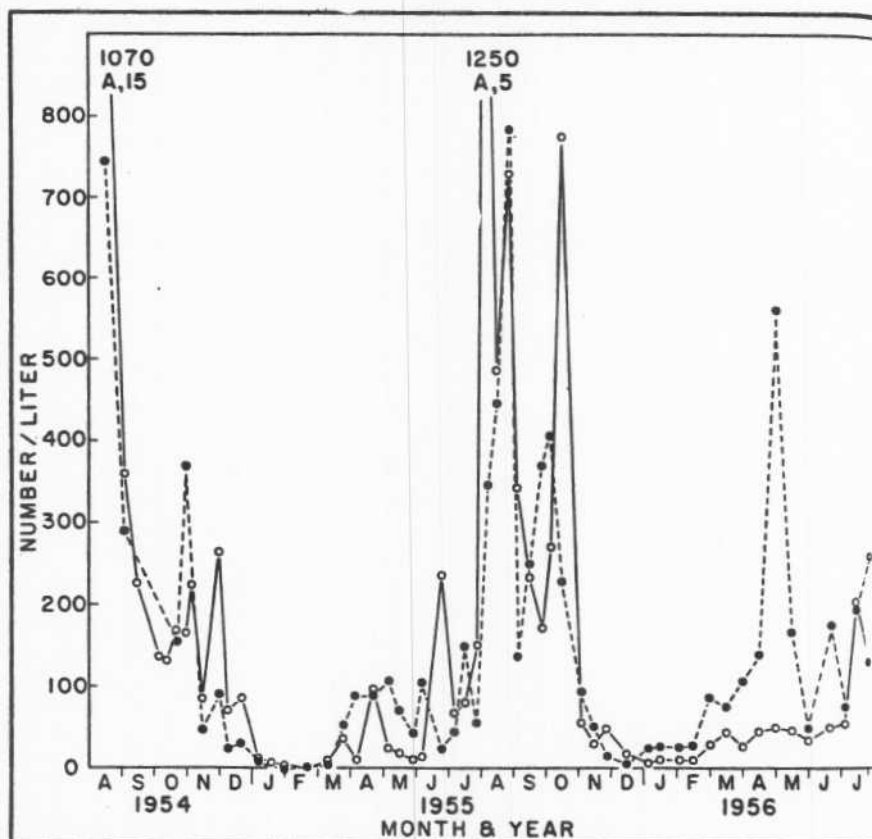
Total numbers of diatoms in individual collections, Salton Sea. Solid line = 3 miles offshore; dashed line = near shore.



Representative phytoplankton organisms of the Salton Sea. A. *Pleuromma* sp., B. *Thalassionema nitzschoides*, C. *Nitzschia longissima*, D. *Cyclotella caspia*, E. *Glenodinium* sp. F. *Exuviella marina*, G. *Exuviella compressa*, H. *Westriobotryoides* (?), I. *Dictyocha* sp. (?), J. *Eutreptia lanowii*. Drawing by W. J. Baldwin



Relative percentages of various forage fishes in the stomachs of orange-mouth corvina from the Salton Sea. Since more than one species may have been present, the bars in some cases add to more than 100 percent. The high percentage of empty stomachs and unidentified fish remains were mainly due to the fact that the nets were usually set for 24 hours.



Total zooplankton in the Salton Sea, 1954-1956. Three miles offshore (solid line) and 100 yards from shore (dotted line). Offshore collections show average numbers for surface, mid-depth (six meters) and near bottom (12 meters). The near-shore stations show average numbers for surface and three meters.

Fig. 3. Zooplankton and food chain among fishes in Salton Sea (Walker, 1961).