

Phase Shifts, Alternative Stable States,
and the Loss of Ecosystem Function in Southern California Lagoons
Lecture, Jan 21, 2009

Glossary

Alternative Stable State: an idea originating in the 1960's that states that a community can have more than one configuration that is stable. There are two ways in which this is said to happen. The first assumes a constant environment with changes in variables such as population density and the second assumes it is the underlying environmental parameters that change.

Bay: an area of water bordered by land on three sides.

Bottom Up Forcing: the idea that a community is regulated or heavily influenced by organisms or nutrients that are lower on the food chain. An example of bottom up forcing in a community is one where large inputs of nutrients positively affect the growth of plants/algae, which in turn affect the consumers further up the food chain.

Community: an assemblage of interacting populations in an area or habitat.

Cyanobacteria: a phylum of bacteria that obtain their energy through photosynthesis. They are found both in marine and freshwater systems and are an important component of the nitrogen cycle. They are NOT algae, as the misnomer "blue-green algae" would imply.

Ecosystem: a community and its abiotic environment.

Ecosystem Functions/Ecosystem Services: all the processes through which natural ecosystems and the species they contain help sustain human life on earth.

Enteromorpha intestinalis/ Ulva intestinalis: a green algae, it is pale green in color, with shoots that grow from a common root that are tubular, often gas filled, intestine-like and devoid of branching. They grow on gravel and rocky bottoms and are common in rock pools. *Enteromorpha* and *Ulva* genuses were merged.

Estuary: a semi-enclosed coastal body of water with one or more rivers or streams flowing into it and a free connection to the open sea.

Eutrophication: a process whereby a body of water (such as a lake or estuary) or slow-moving stream receives an excess amount of nutrients that stimulate excessive plant growth (i.e. algae). These resultant algal blooms reduce dissolved oxygen in the water when the dead plant material decomposes and can cause other organisms to die. These nutrients can come from a number of sources, such as fertilizers, erosion of soil containing nutrients, and sewage treatment plant discharges.

Infauna: bottom dwelling organisms that live in the substrate of a body of water, especially in a soft sea bottom. They usually construct tubes or burrows and are commonly found in deeper and subtidal waters.

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Lagoon: a body of comparatively shallow salt or brackish water separated from the deeper sea by a shallow or exposed sandbank, coral reef or similar feature.

Macroalgae: algae which can be seen without using a microscope. Also, sometimes referred to as seaweeds.

Nutrients: food or chemicals that an organism needs in order to live and grow; a substance used in an organism's metabolism which must be taken in from its environment.

Phase Shift: a shift in a community from one state to another, such as when a coral reef shifts to one dominated by algae (rather than corals).

Phytoplankton: the autotrophic component of the plankton community.

Plankton: any of the drifting organisms that inhabit the pelagic zone of the ocean or fresh water.

Population: is all the individuals of one species in a given area.

Positive Feedback: in an ecosystem where the output or response affects the input in a way that results in the amplification, growth, or perpetuation of the output.

Stable State/Stable Equilibrium: the idea that a community can recover from a disturbance. If a community is able to recover from small, temporary disturbances, it is said to be locally stable. If a community is able to recover from large disturbances, it is said to be globally stable.

Top Down Forcing: the idea that a community is regulated or heavily influenced by factors/organisms that are higher on the food chain. A community where top level consumers/predators affect the consumers and primary producers further down the food chain can be said to be under the influence of top down forcing.

Wetlands: an environment at the transition from terrestrial ecosystems to aquatic systems; an area of land consisting of soil that is saturated with moisture; wetlands often host considerable biodiversity and endemism.