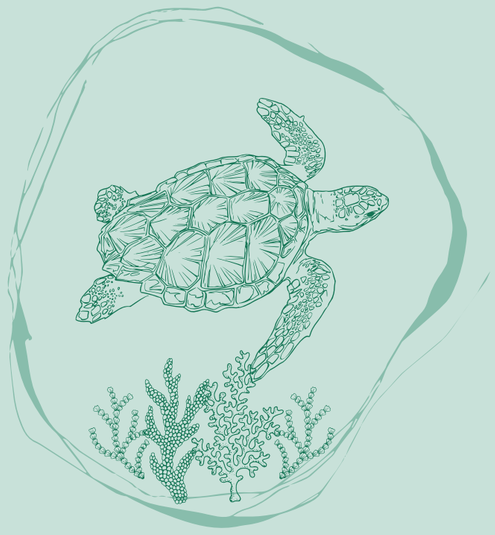
Microbes in Aquatic Systems

Describing marine microbial community structures, the role of microorganisms in response to changes in the ocean, and the role viruses play in shaping marine microbial communities.

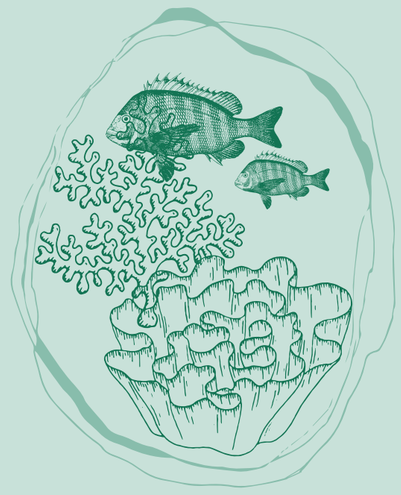
Division of Study

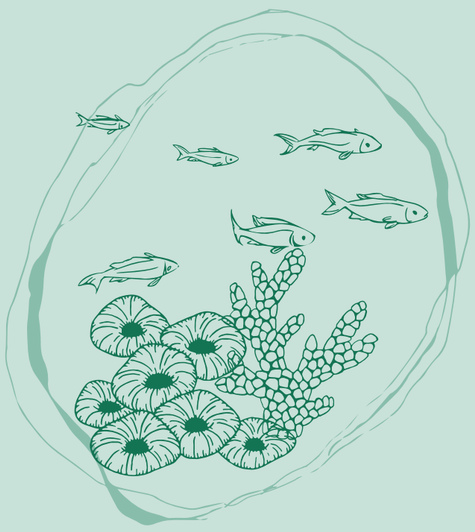
There are two major divisions in the study of aquatic ecosystems: Oceanography and Limnology.



Time Distributions

Concentrations of oxygen, light, and nutrients can be measured on a scale of time in hours, days, months, seasons, and inter-annual which can help predict how microbial communities function.





Community Structures

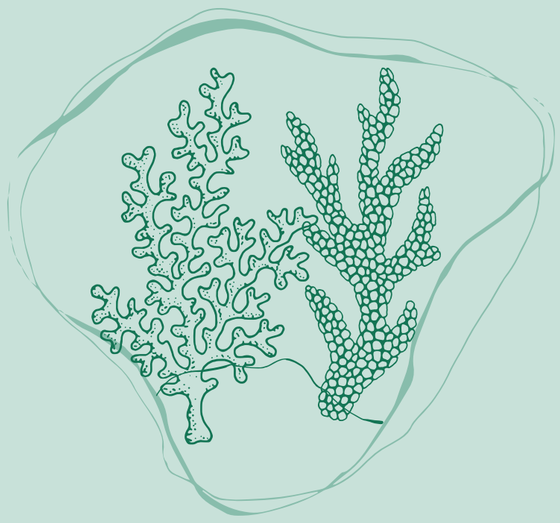
Major principles that govern marine microbial community structures include the marine food web, oxygen and light availability, and time distributions.

Algal Blooms

When concentrations of oxygen, light, and nutrients increase on these time scales, algal blooms can occur. These can be naturally occurring or be caused by human interference.

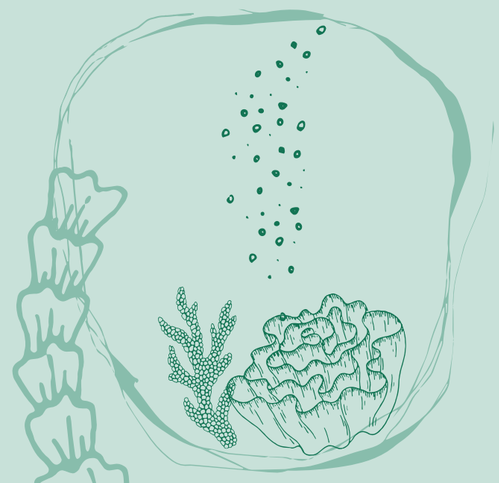
Marine Microbial Food web

The marine microbial food web is relatively complex, and largely driven by the primary producers (Algae and bacterial phototrophs).



Microbial Response to Changes in the ocean

Changes in the ocean, such as acidification, are also happening due to human interaction. When the ocean becomes too acidic and the coral become stressed, algae leave the coral which leaves the coral bleached and vulnerable.



The Role of Viruses in shaping community

Marine viruses form part of the microbial food web and help control the abundance and diversity of bacteria and algae.

Oxygen and Light Availability

In the ocean, there is a water column called the pelagic zone, which divided into distinct regions based on depth that allow for more or less oxygen and light to reach microbial marine environments.

Source: Fuhrman, J., Cram, J. & Needham, D. Marine microbial community dynamics and their ecological interpretation. Nat Rev Microbiol 13, 133–146 2015). https://doi.org/10.1038/nrmicro3417