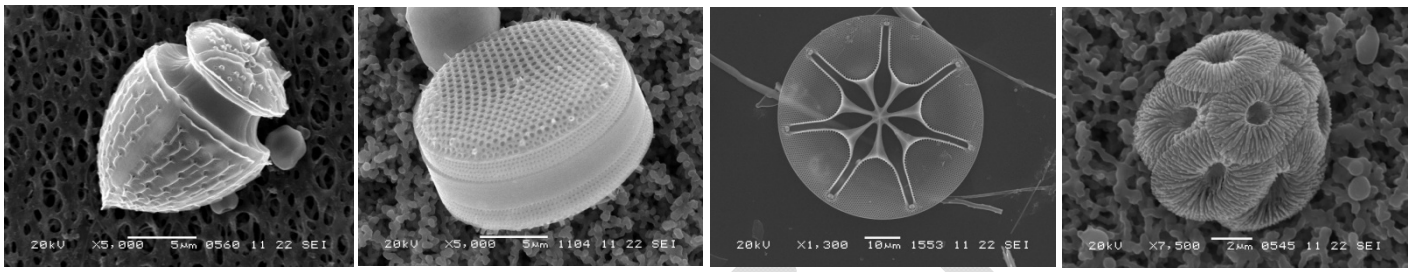
Tiny Drifters: Plankton

In the Gulf of Mexico

A Deep-C Consortium Fact Sheet

Dinoflagellates, diatoms, and coccolithophores, oh my!



Images by Dr. James Nienow

What are plankton?

Plankton are primarily microscopic plants and animals that live in the water and cannot swim against major currents. These drifting creatures *go with the flow*. Most plankton can only swim vertically in the water column. There are two major types of plankton: zooplankton and phytoplankton. Zooplankton, or animal plankton, are consumers that eat phytoplankton or other zooplankton. Both types of plankton are a food source for many other aquatic animals. Some critters, such as crabs, only spend part of their lives as plankton (meroplankton) when in the larval stage. Others, such as copepods, spend their entire lives as plankton (holoplankton).

Did you know… that every time you swallow seawater, you could be consuming plankton! There could be over a million tiny critters in one teaspoon of seawater!

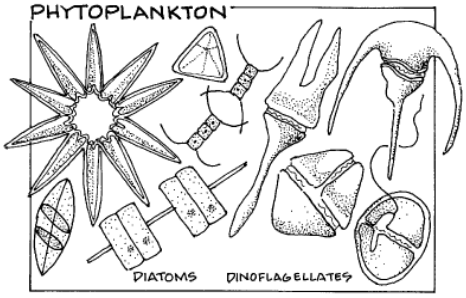
Phytoplankton: Primary Producers

Phytoplankton, or plant plankton, live near the surface of the ocean because they need sunlight to make food. This process not only adds oxygen back into the water, but is also responsible for a high percentage (about 50 to 70%) of the atmospheric oxygen on Earth.

The two most common types of phytoplankton are **diatoms** and **dinoflagellates**. Diatoms are surrounded by a cell wall made of silica; these organisms actually live in a glass house. They can be found in diatomaceous earth, which is the source of abrasives in certain brands of toothpaste. Dinoflagellates have some characteristics of both plants and animals. They have a tail-like flagellum to move around. They are most commonly known as the source of a dangerous toxin, which is the cause of "Red Tide." This, however, is only when certain species form an algal bloom.

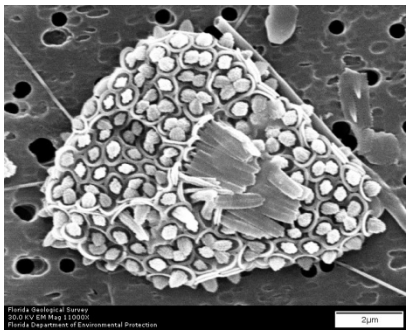
Why is plankton so important?

Plankton is the base of the food chain. They also tell us a lot about changes in our ocean. These organisms serve as indicator species and can demonstrate how marine environmental changes might affect larger organisms such as birds, fish, and sharks.



Deep-C Consortium's Research Findings on Phytoplankton

Rare Discovery in the Gulf of Mexico



Navilithus altivelum is a rare species of phytoplankton that is found in the deep-photic zone of 75-200m. It has been recorded only once in literature by Jeremy Young from samples he took off the coast of Java in the Indian Ocean. So it was quite a surprise for Deep-C scientists working in the Gulf of Mexico to come across the same rare species in their samples collected during a 2013 research cruise. These Deep-C scientists are measuring the abundance and building a census of plankton communities in the Gulf.

"This find is particularly interesting because it brings to light how rare and diverse some of these oligotrophic[1] species are," says Jarrett Cruz, a graduate student working with Dr. Sherwood Wise, professor and marine geologist at Florida State University. "This is the first recorded observation of this species in the Western hemisphere!"

Deep-C Scientist Profile: Dr. James A. Nienow

Dr. Nienow, biology professor at Valdosta State University, is trying to identify the impact of the 2010 Deepwater Horizon oil spill on the food chain.

Nienow grew up on the beaches of San Diego, a few minutes' walk from tidepools. The hours he spent exploring the diversity of life in the tidepools led to a strong interest in biology, especially the structure aquatic ecosystems. This, in turn, led to an interest in phytoplankton, the amazing creatures at the base of aquatic food chains. After a brief venture into mathematics, he returned to the study of phytoplankton at San Diego State University and Florida State University. At Florida State, he was introduced to the tremendous range of physiologies exhibited by microalgae, including the ability of some to survive and even thrive in extreme environments.

Oil Spill Affect on Phytoplankton

According to Dr. Nienow, it is probable that the oil spill caused a major disruption in the structure of the planktonic association, potentially impacting the entire pelagic food-web. The extent of this disruption is not clear. However, dramatic fluctuations in the structure of the plankton association in northwestern Florida were observed as late as May 2011, eight months after the closure of the well. Additional analyses of the data are currently being conducted to determine whether the spill or other environmental factors were responsible for these fluctuations. At this point, the system seems to have returned to its normal state.

"Suppose you fill up a one-liter water bottle with seawater from just about anywhere along the coast. If you look at it, the water appears clear. However, when you look at it more closely, you find that it contains thousands of diatoms and other types of microalgae, many similar to the forms illustrated. These microorganisms, virtually invisible to the naked eye, in aggregate are responsible for about half of the world's oxygen production, roughly equivalent to all of the terrestrial forests and grasslands we are so familiar with." – Dr. James Nienow

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