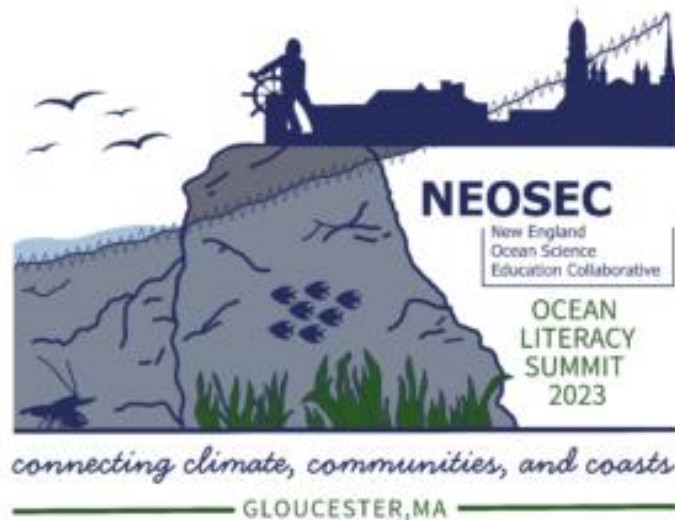


## 2023 NEOSEC Ocean Literacy Summit: Connecting Climate, Communities, and Coasts



At the Summit, we will address coastal issues in New England communities that arise from climate change and how the Ocean Literacy principles help us understand them. Below are the Essential Principles that presentations will address along with the Fundamental Concepts that pertain to what you will hear.

Ocean Literacy is an understanding of the ocean's influence on you and your influence on the ocean.

Connections to the [Ocean Literacy Essential Principles and Fundamental Concepts](#)

### **Ocean Literacy Principle 1: Earth has one big ocean with many features.**

- d. Sea level is the average height of the ocean relative to the land, taking into account the differences caused by tides. Sea level changes as plate tectonics cause the volume of ocean basins and the height of the land to change. It changes as ice caps on land melt or grow. It also changes as sea water expands and contracts when ocean water warms and cools.
- g. The ocean is connected to major lakes, watersheds, and waterways because all major watersheds on Earth drain to the ocean. Rivers and streams transport nutrients, salts, sediments, and pollutants from watersheds to estuaries and to the ocean.



Summit illustration by Kasey Commander, New England Science and Sailing Foundation.

Ocean Literacy illustrations by Kaleigh Ballantine, Oregon State University for NOAA Education.

### **Ocean Literacy Principle 3: The ocean is a major influence on weather and climate.**

- a. The interaction of oceanic and atmospheric processes controls weather and climate by dominating Earth's energy, water and carbon systems.
- b. The ocean moderates global weather and climate by absorbing most of the solar radiation reaching Earth. Heat exchange between the ocean and atmosphere drives the water cycle and oceanic and atmospheric circulation.
- c. Heat exchange between the ocean and atmosphere can result in dramatic global and regional water phenomena, impacting patterns of rain and drought. Significant examples include the El Niño Southern Oscillation and La Niña, which causes important changes in global weather patterns because they alter the sea surface temperature patterns in the Pacific.
- d. Condensation of water that evaporated from warm seas provides the energy for hurricanes and cyclones. Most rain that falls on land originally evaporated from the tropical ocean.
- e. The ocean dominates Earth's carbon cycle. Half the primary productivity on Earth takes place in the sunlit layers of the ocean and the ocean absorbs roughly half of all carbon dioxide added to the atmosphere.
- f. The ocean has had, and will continue to have, a significant influence on climate change by absorbing, storing, and moving heat, carbon and water. Changes in the ocean's circulation have produced large, abrupt changes in climate during the last 50,000 years.
- g. Changes in the ocean-atmosphere system can result in changes to the climate that in turn, cause further changes to the ocean and atmosphere. These interactions have dramatic physical, chemical, biological, economic, and social consequences.



### **Ocean Literacy Principle 5: The ocean supports a great diversity of life and ecosystems.**

- a. Ocean life ranges in size from the smallest living things, microbes, to the largest animal that has lived on Earth, blue whales.
- b. Most of the organisms and biomass in the ocean are microbes, which are the basis of all ocean food webs. Microbes are the most important primary producers in the ocean. They have extremely fast growth rates and life cycles and produce a huge amount of the carbon and oxygen on Earth.
- g. There are deep ocean ecosystems that are independent of energy from sunlight and photosynthetic organisms. Hydrothermal vents, submarine hot springs, and methane cold seeps rely only on chemical energy and chemosynthetic organisms to support life.
- i. Estuaries provide important and productive nursery areas for many marine and aquatic species.



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## **Ocean Literacy Principle 6: The ocean and humans are inextricably interconnected.**

- a. The ocean affects every human life. It supplies freshwater (most rain comes from the ocean) and nearly all Earth's oxygen. The ocean moderates Earth's climate, influences our weather, and affects human health.
- b. The ocean provides foods, medicines, and mineral and energy resources. It supports jobs and national economies, serves as a highway for transportation of goods and people, and plays a role in national security.
- c. The ocean is a source of inspiration, recreation, rejuvenation and discovery. It is also an important element in the heritage of many cultures.
- d. Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (point source, non-point source, and noise pollution), changes to ocean chemistry (ocean acidification) and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.
- e. Changes in ocean temperature and pH due to human activities can affect the survival of some organisms and impact biological diversity (coral bleaching due to increased temperature and inhibition of shell formation due to ocean acidification).
- f. Much of the world's population lives in coastal areas. Coastal regions are susceptible to natural hazards (tsunamis, hurricanes, cyclones, sea level change, and storm surges).
- g. Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

