



Cabrillo  
Marine  
Aquarium

# Virginia Reid Moore

## Marine Research Library

### @ the Cabrillo Marine Aquarium

## LIBRARY PATHFINDER

### THE VAST FRONTIER: TALES FROM THE DARKSIDE

The Earth's oceans cover about 70% of its surface. The average depth of the oceans is 2.7 miles deep. Many sea creatures live in these depths, including the amphipod *Phronima sedentaria*. Living in the deep sea, they endure freezing temperatures, darkness and intense underwater pressure.

The swiftest, largest, fastest-growing and most migratory fishes on Earth live in the open ocean. They range from tiny drift fish to plankton-straining whale sharks and to streamlined predators such as tuna and marlin.

All ocean animals are threatened by ocean acidification. Since the Industrial Revolution, concentrations of carbon dioxide (CO<sub>2</sub>) in the atmosphere have increased primarily due to the burning of fossil fuels. The ocean absorbs about 30% of the CO<sub>2</sub> that is released into the air. As levels of atmospheric CO<sub>2</sub> increase, so do the CO<sub>2</sub> levels in the ocean, causing the seawater to become more acidic.

High acidic seawater increases hydrogen ions and reduces carbonate ions. Oysters, clams, coral and some plankton species need carbonate ions to build and maintain shells and calcium. Various fish are unable to detect predators in highly acidic waters. Ocean acidification can put the entire food web at risk on land as well as in the open ocean, as many populations of the world rely on seafood as their primary source of protein.

## BOOKS

**Creatures of the Deep** / Erich Hoyt. 2<sup>nd</sup> ed, Updated and expanded.  
Firefly Books, 2014. QL122 .H68 2014

**Discoveries of the Census of Marine Life: Making Ocean Life Count** / Paul V.R. Snelgrove. (*Chapter 8 : Into the Deep*, pp. 175-210, with bibliography). QH91.8 .B6 S64 2010

**Fishes of the Open Ocean: A Natural History and Illustrated Guide** / Julian Pepperell.  
Univ. of Chicago Press, 2010. QL620 .P46 2010.

**Marine Biodiversity, Climatic Variability and Global Change** / Grelgory Beaugrand.  
Routledge, 2015. QH91.8 .B6 B427 2015

**World Ocean Census: A Global Survey of Marine Life** / Darlene T. Crist.  
**Census of Marine Life, 2009.** QH91.17 .C757 2009

## *Children's Books*

**Sea Monsters** / Mary Pope Osborne. Fact Tracker, Nonfiction companion to **Magic Tree House**  
#39. QL122.2 .O83 2011

**Deep Sea Creatures** / Kids Explore! QL122.2 .K42 DSC 2014

## PERIODICAL / JOURNAL ARTICLES

“Deep-Sea Secrets” / Brian Switek. *Discover*, September 2013, pp. 58-59.

“Monsters of the Deep”. *Science Illustrated*, May/June 2009, pp. 30-37.

“Nocturnal Nautica”. / Ernie Mastroianni. *Discover*, November 2015, pp. 38-43.

“Observations on the Anatomy and Behavior of *Phronima sedentaria* (Forskål)  
(Amphipoda: Hyperiidea). / Carol Diebel. *Journal of Crustacean Biology* 8(1), pp. 79-90, 1988.

“Rapid Progression of Ocean Acidification in the California Current System” /  
Nicolas Gruber et al. *Science* 337, 220, (2012).

“Rising Acidity Brings an Ocean of Trouble” / Robert F. Service. *Science* 337,146 (2012).

“Sea Butterflies’ are a Canary for Ocean Acidification” / Eli Kintisch. *Science* 344, 569 (2014).

## FEATURED WEBSITES

**Jellies Zone** [www.jellieszone.com](http://www.jellieszone.com)

Beautiful website of all things Jelly, including Pacific Coast gelatinous zooplankton!

Jellies classification and identification, references, FAQs, links to additional jellies sites and a discussion on photographing jellies are included on this site.

**Jelly Watch** [www.jellywatch.org](http://www.jellywatch.org)

Jelly Watch allows ‘jellywatchers’ to record and submit their jellies sightings. There are 2 free apps offered, one Android and one iOS that enable users to take pictures of their sightings and send them to Jelly Watch!

**Ocean Portal – Census of Marine Life** <http://ocean.si.edu/census-marine-life>

Magnificent photography and numerous links to the categories researched by the Census of Marine Life, including the Census of Diversity of Abyssal Marine Life.

*Cabrillo Marine Aquarium is a facility of the City of Los Angeles, Recreation and Parks Department with support from FRIENDS of CMA.*