BioScience

Published by: American Institute of Biological Sciences

A Global Crisis for Seagrass Ecosystems

ROBERT J. ORTH, TIM J. B. CARRUTHERS, WILLIAM C. DENNISON, CARLOS M. DUARTE, JAMES W. FOURQUREAN, KENNETH L. HECK JR., A. RANDALL HUGHES, GARY A. KENDRICK, W. JUDSON KENWORTHY, SUZANNE OLYARNIK, FREDERICK T. SHORT, MICHELLE WAYCOTT, AND SUSAN L. WILLIAMS

Robert J. Orth (e-mail: jjorth@vims.edu) is a professor in the School of Marine Science, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA 23062.

Tim J. B. Carruthers is a science integrator, for science applications and a professor at the Integration and Application Network, University of Maryland Center for Environmental Science, Cambridge, MD 21613.

William C. Dennison is vice president for science applications and a professor at the Integration and Application Network, University of Maryland Center for Environmental Science, Cambridge, MD 21613.

Carlos M. Duarte is a research professor at the Instituto Mediterráneo de Estudios Avanzados, Consejo Superior de Investigaciones Cientificas/Universidad de las Islas Baleares, Calle Miquel Marqués 21, 07190 Esporles, Islas Baleares, Spain.

James W. Fourqurean is department chair of biological sciences and a member of the Southeast Environmental Research Center, Florida International University, Miami, FL 33199.

Kenneth L. Heck Jr. is a professor and chair of university programs at the Dauphin Island Sea Lab, Dauphin Island, AL 36528.

A. Randall Hughes is a postdoctoral researcher, at the University of California at Davis; Hughes, Olyarnik

Suzanne Olyarnik is a graduate student, at the University of California at Davis; Hughes, Olyarnik

and Susan L. Williams is a professor at the University of California at Davis; Hughes, Olyarnik

Williams are also associated with the Bodega Marine Laboratory, Bodega Bay, CA 94923.

Gary A. Kendrick is a professor in the School of Plant Biology, University of Western Australia, Crawley 6009, Western Australia.

W. Judson Kenworthy is a research biologist at the Center for
Coastal Fisheries and Habitat Research, National Ocean Service, National Oceanic and Atmospheric Administration, Beaufort, NC 28516.

Frederick T. Short is a research professor in the Department of Natural Resources and chair of the Natural Resources and Earth Systems Science PhD program at the University of New Hampshire, Jackson Estuarine Laboratory, Durham, NH 03824.

Michelle Waycott is a senior lecturer in the School of Marine and Tropical Biology, James Cook University, Townsville, 4811 Queensland, Australia.

ABSTRACT

Seagrasses, marine flowering plants, have a long evolutionary history but are now challenged with rapid environmental changes as a result of coastal human population pressures. Seagrasses provide key ecological services, including organic carbon production and export, nutrient cycling, sediment stabilization, enhanced biodiversity, and trophic transfers to adjacent habitats in tropical and temperate regions. They also serve as “coastal canaries,” global biological sentinels of increasing anthropogenic influences in coastal ecosystems, with large-scale losses reported worldwide. Multiple stressors, including sediment and nutrient runoff, physical disturbance, invasive species, disease, commercial fishing practices, aquaculture, overgrazing, algal blooms, and global warming, cause seagrass declines at scales of square meters to hundreds of square kilometers. Reported seagrass losses have led to increased awareness of the need for seagrass protection, monitoring, management, and restoration. However, seagrass science, which has rapidly grown, is disconnected from public awareness of seagrasses, which has lagged behind awareness of other coastal ecosystems. There is a critical need for a targeted global conservation effort that includes a reduction of watershed nutrient and sediment inputs to seagrass habitats and a targeted educational program informing regulators and the public of the value of seagrass meadows.

Keywords: seagrass, decline, sentinels, ecological services, monitoring

References cited


Modelling 169:39–60. CrossRef


Duarte, C. M. and C. L. Chiscano. 1999. Seagrass biomass and


**Cited by**


Abstract & References : Full Text : PDF (707 KB)

