

VIMS Study Highlights Link Between Biodiversity and Ecosystem Function

As human activities continue to reduce the diversity of plant and animal communities around the world, researchers are striving to understand how loss of biodiversity will affect ecosystems and the services they provide.

A recent food-web study by VIMS researchers Emmett Duffy, Elizabeth Canuel, and Paul Richardson shows that reduced biodiversity may affect ecosystems in a much more complicated way than suggested by early experiments with plants only, and that interactions between plants and animals are critically important in determining the ultimate effects of human-induced biodiversity loss.

The research, reported in the June issue of *Ecology Letters*, has been selected by the editors of *Science* magazine as a “highlight of the recent literature.” Lead author Duffy is an Associate Professor of Marine Science in VIMS Department of Biological Sciences.

Ecologists have been focusing on the relationship between biodiversity

loss and ecosystem function for the last decade, spurred on by increasing numbers of disappearing species, several high-profile reports, and the 1992 U.N. Convention on Biological Diversity.

Past work has focused on manipulating the number of plant species in a system and examining consequent changes in biomass and productivity. Such experiments typically show that reducing plant diversity lowers plant production. Duffy and his colleagues added a new layer of realism by adding herbivores to these experiments, and found that decreasing the diversity of these grazing organisms in a seagrass ecosystem actually increased plant diversity and biomass.

“Because grazer-mediated effects on the ecosystem are opposite those associated with plants,” says Duffy, “the effects of plant and herbivore diversity on ecosystem functioning may counteract one another as diversity is lost in nature.” Thus, the *Science* editors note, “food web interactions may be critically important in determin-

ing the ultimate effects on ecosystems of human-induced biodiversity loss.”

When Duffy’s team increased the diversity of the herbivore community, its ability to efficiently use resources and produce biomass increased as well, a finding that may have practical importance for fisheries. “Small crustaceans like the grazers we studied dominate the diet of shallow-water fishes. Thus, our results suggest that high biodiversity at this intermediate trophic level may enhance energy transfer up the food chain, and may help boost fishery yields.”

Duffy’s research is helping to fill a critical gap in scientific understanding. A recent National Research Council report says that a better understanding



Small grazing herbivores like these amphipod crustaceans help maintain the health of seagrass beds.

of biodiversity and ecosystem functioning is one of the “grand” challenges of environmental research for the next generation. The National Research Council, the principal operating arm of the National Academy of Sciences, is a private, non-profit institution that provides scientific and technical advice under a congressional charter. The Council report was sponsored by the National Science Foundation.

To learn more about ecological research at VIMS, visit www.vims.edu/bio/mobee/.

News Briefs

Hudson Stars in Lab Safety Video

VIMS research technician Karen Hudson plays a feature role in a new 14-minute lab safety video designed for high school science classes. The video was filmed at VIMS by Coastal Training Technologies, Corp., a Virginia-Beach-based supplier of safety training videos to academic institutions and companies around the U.S. Coastal Video compensates VIMS for use of its facilities by providing complimentary copies of other training videos to the VIMS Safety office.

VIMS Contributes to Marine Census

Drs. Mike Vecchione and Deborah Steinberg shared their research with colleagues during the first full meeting of the 10-year, \$1 billion Census of Marine Life initiative at the Smithsonian Institution in October. More than 300 scientists from 53 countries are at work on the Census, designed to assess the changing diversity, distribution, and abundance of ocean life. After 3 years of work, Census scientists have catalogued 15,304 species of

marine fish, about 5,400 other animals, and numerous marine plants. CoML scientists estimate that 210,000 marine life forms are currently known, but the final tally could be 10 times higher.

Japanese TV Highlights *ariakensis*

Recent media coverage of VIMS’ research on the non-native oyster *C. ariakensis* included a 5-minute segment produced by TV Tokyo’s Washington Bureau. The segment aired on a nightly Japanese news program that typically reaches 1 million viewers. Dr. Stan Allen’s interview with correspondent Mika Otsuka was subtitled in Japanese. The native range of *C. ariakensis* includes Japan, where its native name “suminoe” means “from the clear water of a big river.”

W&M Recognizes Hurricane Clean Up Crew

Fifty-eight VIMS employees were recognized by the College of William and Mary for “going above and beyond the call of duty” in their response to Hurricane Isabel and its aftermath. W&M president Tim Sullivan granted a

day of leave and complimentary tickets to the W&M/New Hampshire football game to all members of the Facilities Management Department (including grounds, housekeeping, and maintenance personnel), as well as to selected faculty and staff from Accounting, Safety, Security, Vessels, and the Eastern Shore Lab. Hourly employees received a gift certificate to the W&M bookstore. VIMS Maintenance Superintendent RV Carmean was noted as one of the most valuable contributors to the effort. As one faculty member put it, “there are few who fretted as much, worked as hard, and got as little sleep before, during, and after the hurricane as RV.”

Mini-School Explores Ocean’s Role in Climate

Drs. Deborah Bronk, Walker Smith, and Deborah Steinberg helped the public understand the role of marine plankton in climate change during the latest in a continuing series of VIMS “Mini-School of Marine Science” programs. “Global Change and You” attracted more than 300 people of all ages to the Science Museum of Virginia in Richmond

during September. Forty participants added a daylong fieldtrip to VIMS. 65% of participants noted that the mini-school had substantially or significantly increased their knowledge of the subject.

Summer Programs Inform Visitors

VIMS’ weekly public tours, Summer Saturdays, and Bay Exploration Field Trips helped 427 citizens of all ages discover more about VIMS, marine research, and Chesapeake Bay. Public tour participants learned about the aquaria in VIMS’ Visitor Center, spoke with scientists about current research while visiting a laboratory, and gained appreciation for the ecological importance of tidal wetlands on the teaching marsh tour. The Summer Saturdays programs allowed children and adults to speak with aquarists and seine for aquatic animals. The Bay Exploration Filed Trips, hosted by the Chesapeake Bay National Estuarine Reserve, took participants on day-long educational canoe trips focusing on shallow-water habitats. Stay tuned to www.vims.edu for similar opportunities for fun and learning next summer.