Making Waves

At the Darling Marine Center

Mark Wells Returns to the DMC

Dr. Mark Wells completed is Ph.D. at the University of Maine in 1989, and has recently returned to the University as an Assistant Professor of Chemical Oceanography after spending 10 years on the west coast at Scripps Institution of Oceanography and the University of California Santa Cruz. He is happy to be back at the University of Maine and is thrilled to have lab space at the DMC.

Though based in Orono, Dr. Wells has modest lab space at the DMC dedicated primarily to his work on trace metals. His lab at the DMC offers Mark not only ready access to seawater in the Center's state-of-the-art Flowing Seawater Laboratory, but also gives him a means of staying in contact with colleagues in the School of Marine Sciences, the DMC, and the Bigelow Laboratory for Ocean Sciences in Boothbay Harbor.

Like many researchers, Mark has multiple projects going at any one time. As a chemical oceanographer, he is particularly interested in some of the smallest particles in seawater including dissolved organic matter (DOM) and trace metals. In one of his projects, Mark is studying the colloidal size fraction of (DOM).

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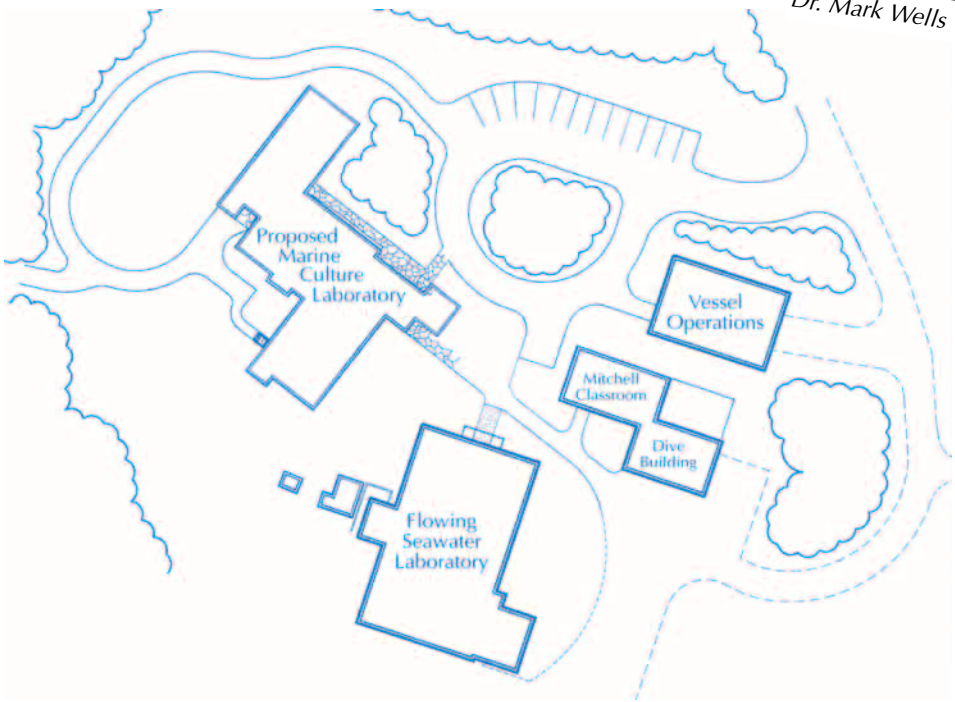
Dr. Mark Wells



DMC waterfront site plan including the proposed Marine Culture Facility as designed by Weinrich and Burt Architects of Damariscotta.

Another Building Spawns at the DMC

This summer, ground will be broken for the new Marine Culture Laboratory (MCL). The MCL will be located a stone's throw away from the existing Flowing Seawater Laboratory (FSL) on the DMC waterfront.

The new two-story, $2 million building will provide the necessary resources, space and equipment, for three new directions of marine research: the study of phytoplankton, the study of genetics and diseases in aquaculture species, and the culture of cold water species. It will also include a much needed 30-student flowing seawater classroom.

Phase one of the construction process will include the shell of the building and the first floor, complete with wet lab, phytoplankton lab and classroom.

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Technician Tina Sohst joined Mark's UMaine research program in December having previously worked for him at the University of California, Santa Cruz. Tina received her Diploma of Chemistry, the German equivalent of a Masters degree, from the Technical University in Clausthal-Zellerfeld, which is closely associated with the University of Kiel.

Mark Wells, con't from page 1

These bits and pieces of non-living material range in size from 1 nanometer (nm) to 1 micrometer (µm) and their abundance varies unpredictably in time and space. Colloids interfere with light propagation in both shallow and deep waters, and complicate the interpretation of remote sensing data. Using a technique called Flow Field Flow Fractionation, Mark is subdividing colloidal material into smaller size fractions and studying the chemical nature of each size range, to better understand the physical cycling of colloids in seawater.

In another project, Mark examines the role of colloids in the biogeochemical cycling and availability of such bioactive trace metals as Fe, Mn, Co, Ni, Cu, Zn and Cd to phytoplankton. Nearshore, these metals are typically found in their pure inorganic state, but offshore they are more often associated with the colloidal fraction of DOM. Mark will measure the abundance of these colloidal metals to determine if colloids act as sinks or sources of bioactive metals to phytoplankton.

Upon occasion, Mark applies his trace metal techniques to fresh water systems. In one Antarctic study, he and his postdoc Maite Maldonato are looking at the role trace metals play in the denitrification process in the ice covered Lake Bonney. Lake Bonney has two large basins; both have denitrifying bacteria, but only one exhibits denitrification. Mark and Maite will determine metal concentrations in the lake and conduct growth experiments to clarify the relationship between bioactive metals and denitrification. By understanding the role of bioactive metals in denitrification, researchers will not only be able to explain the unique processes at work in Lake Bonney, but may also be able to shed new light on paleoclimate reconstruction.

The first half of Pete's lab pulls into the DMC.

New Lab Parked on Upper Campus

In early spring, a double-wide modular home designed and built to accommodate offices and laboratories (rather than a kitchen and living room) pulled into the DMC. It was carefully positioned next to the existing biogeochemistry complex.

The new lab is dedicated to the research of Dr. Pete Jumars, a biological oceanographer. With funding from the Office of Naval Research, Pete's first research project for his new lab examines the acoustical affects of macro faunal emergence behaviors.

Pete aims to substantiate observations which suggest that many soft sediment invertebrates migrate up form the water column for spawning, dispersal, or nocturnal feeding. He believes these events may be capable of causing great volumes of acoustic reverberations. During the course of his three year study, he will identify emergence patterns of target species in the Damariscotta and Sheepscot Rivers, collect acoustic data and combine the acoustical signals with biological patterns to quantify the emergence events.

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Dr. David Shull

Marking Time, Counting Gammas

There are two new pieces of equipment in the biogeochemistry lab—a gamma detector and an alpha detector—and a new postdoc to make them work!

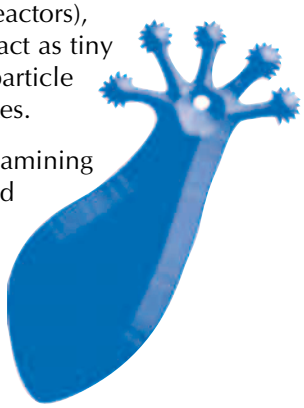
Dr. David Shull joined Dr. Larry Mayer's biogeochemistry lab as a postdoctoral fellow last winter. Dave received his Ph.D. in Environmental, Coastal and Ocean Sciences from the University of Massachusetts, Boston. His research interests of animal/sediment relationships and the effect of pollution on benthic communities are a perfect match for the Mayer lab where he will be working on various projects including gamma and alpha detection in benthic sediments.

Shortly after Dave's arrival at the DMC, the alpha and gamma detectors were delivered. Making way for the gamma detector was quite a chore. The floor of the Mayer lab had to be shored up and reinforced to hold the seemingly small, but heavy instrument. The 4000 pound lead shield that surrounds the gamma detector was delivered in a massive truck and transferred to the lab with a rigging crane!

Dave will put the new detectors to use measuring very low levels of radioactive elements in sea floor sediments. Specifically, he will be looking at the radioactive isotopes of uranium, thorium, radium, radon, lead, and beryllium. These elements, some of which are produced naturally while others enter the oceans as a result of human activity (nuclear bomb testing and leaky nuclear reactors), undergo radioactive decay at known rates and, therefore, act as tiny stopwatches which can be used to determine rates of sedimentation, particle mixing, and the reworking of sediments by deposit feeding invertebrates.

The gamma counter.

Dave's research will parallel the other work done in the Mayer lab examining the effects of deposit-feeding organisms on sediment geochemistry and contaminant transport. He has already begun measuring the concentrations of radioactive elements in deposit-feeding organisms, in the sediments which they inhabit, and in their digestive fluids. These measurements will be used to calculate rates of sediment transport and the extent of chemical changes which occur when sediment passes through the guts of these animals.



The Kelp Farm

Steff Zimsen is a Ph.D. candidate working with Dr. Bob Steneck. Using kelp, *Laminaria saccharina*, as an indicator, she hopes to learn how regional differences in nutrients, light, and temperature influence local primary productivity along the coast of Maine.

Preliminary field studies have shown that kelp grows faster in nutrient-rich waters downeast than in the better-lit waters of the southwest coast. To determine if these growth rates were a result of environmental factors or intrinsic factors, Steff executed a controlled growth experiment in the Flowing Seawater Lab (FSL). She found that under constant light, temperature and nutrient conditions kelp sampled from various regions along the Maine coast grew at the same rate. Thus it appears that that regional oceanography, rather than genetic or developmental differences affects seaweed productivity.

This summer Steff will be fine-tuning her experiments to determine the relative importance of light, temperature and nutrients to seaweed primary productivity. Her research is supported by a Dianne DuPlessus Scholarship.

Steff Zimsen check's her kelp experiments.

Graduate Students


Amanda Leland

Former DMC summer intern, Amanda Leland, returned in January to work on a Master's degree in Marine Biology with Dr. Robert Steneck. Amanda is studying how the interactions between green sea urchins and algae explain their abundance and distribution patterns in the Gulf of Maine. She holds a B.S. in Ecology from Purdue University.

Amanda is a recipient of the Governor's Marine Studies Fellowship. The Governor's Fellowship is a program established with in the Maine Department of Marine Resources to encourage the study of conservation, management, and utilization of marine resources, and to provide research opportunities for students that support the research needs of Maine's aquaculture and fishing industries. **Way to go Amanda!**

Above: Pam Sparks-McConkey with her thesis advisor Dr. Les Watling. Right: Pam proudly displays her diploma.

In March, Pam Sparks-McConkey defended her thesis *Effects on the ecological integrity of a soft-bottom habitat from a trawling disturbance* and was awarded a M.S. in Oceanography.

Working in the laboratory of Dr. Les Watling, Pam's research attempted to quantify the effects of mobile fishing gear on the ocean floor. She studied a relatively undisturbed area in Penobscot Bay; one closed to shrimping for over 20 years. Pam examined the spatial and temporal patterns of species diversity and abundance, as well as several sedimentological perimeters over a 16 month period in both a control site and predetermined trawl site. Immediately after the trawling disturbance, numbers of species, species abundance, and diversity decreased in the trawled area relative to the control area.

Although the experimental trawling disturbance was one of low frequency and intensity compared to commercial operations, Pam concluded that successional processes in this soft-bottom community were altered, at least for a short period, in response to the trawling disturbance.

Pam has moved back to the west coast to join the senior staff of the Washington State Department of Ecology as an environmental specialist. **Congratulations Pam!**


Aimee Phillippi

Ph.D. candidate Aimme Phillippi was recently honored by the University of Massachusetts. She received the President's Distinguished Master's Thesis Award for her dissertation, *Examination of seasonal recruitment patterns of fouling organisms in the Westport River estuary, and the effects of flocking on recruitment.* The award is presented to the best M.S. thesis in Biological and Life Sciences for the past three years of all the UMass campuses. **Well done, Aimee!**

Visit the Darling Marine Center on the web http://server.dmc.maine.edu

Dr. Bob Steneck, Dr. Doug McNaught, Dr. Bob Vadas, Dr. Bob Scheibling and Dr. Kevin Eckelbarger

Introducing...Dr. Doug McNaught! Doug was awarded a Ph.D. in Oceanography for his ecological study of sea urchin habitats along the rocky coast of Maine.

Due to extensive harvesting of the green sea urchin, *Strongylocentrotus droebachiensis*., there has been a shift in community structure of the rocky coast of Maine. The dominant urchin/coralline community has been replaced by a kelp/macroalgal community.

In his dissertation, *The indirect effects of macroalgae and micropredation on the post-settlement success of the green sea urchin in Maine*, Doug presented an explanation for the stabilization of this shift. He suggests that community shift has stabilized, despite continued urchin settlement, because the fleshy macroalgal habitats harbors micro predators, such as juvenile crabs , that prey on newly settled juvenile urchins.

Doug is currently a postdoctoral fellow at Brown University with Dr. Jon Witman.

Ian Voparil

Ph.D. candidate Ian Voparil won best student presentation at the North Atlantic Chapter of the Society for Environmental Toxicology & Chemistry's annual meeting in Newport, RI. His talk was titled entitled *Development of a biomimetic cocktail to measure digestive bioavailability of PAH.*
Congratulations Ian!

Summer Science Seminars

Drawing from local talent and visiting investigators, graduate students Aimee Phillippi, Exequiel Gonzalez, Sarah Gerken, Amanda Leland, and Anne Simpson have put together a great line up of scientific talks for the summer season.

Beat the heat! Join us in the air conditioned Kresge Classroom every Thursday afternoon at 4pm.

June 15 - Gary Wellborn
University of Oklahoma
Ecological speciation in an amphipod species complex.

June 22 - Jim Estes
University of California, Santa Cruz.
Increasing food chain length and the collapse of kelp forest ecosystems in western Alaska.

June 29 - David Shull
DMC, University of Maine
Linking benthic community structure to bioturbation rates.

July 6 - Craig Styan,
University of Melbourne, Australia
Spawning ideas about the reproduction of marine invertebrates.

July 13 - Florence Thomas
Univ. of Southern Florida
Physical processes that effect nutrient transport on coral reefs, seagrasses, etc.

July 20 - Carsten Roat
Kristineberg Marine Research Station, Sweden
Nematocysts of the tentacles and the acontia of Metridium senile: *Effects of morphology and the possible existence of catch tentacles.*

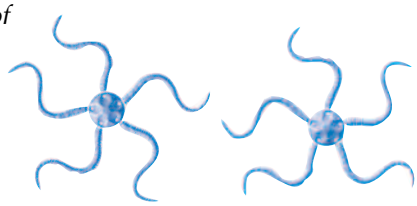
July 27 - TBA

August 3 - Doug Morse
Brown University
Selection for male and female life-history traits by a sit-and-wait predator.

August 10 - Lee Carp-Boss
Oregon State University
Meso-scale processes in the upwelling system off the Oregon coast

Aug.17 - Emmanuel Boss
Oregon State University
Inferring information on the size distribution of oceanic particles from their spectral beam attenuation.

August 24 - Pete Jumars
DMC, University of Maine
Getting up after dusk and to bed before dawn: emergence behaviors of marine benthos.



Dr. Warren Riess, President of the Gulf of Maine Foundation; Mrs. Helen Merriam, and Sarah Crosby, Chair of the GMF Board's Education Committee.

The Gulf of Maine Foundation (GMF) is a non-profit corporation founded in 1986 to foster the growth and development of marine studies at the Darling Marine Center. They provide funds for facilities, equipment, and undergraduate research scholarships. GMF is also developing a program to enrich the exposure of the area's young people to science and the marine environment. Membership material may be obtained by writing:

The Gulf of Maine Foundation, P.O. Box 185, Damariscotta, ME 04543

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Benefactor Honored

At a recent luncheon, the Board of Directors of the Gulf of Maine Foundation (GMF) said thank-you to Mrs. Helen Merriam for the generous financial support she gave to the Foundation's new K-12 education program.

Mrs. Merriam's gift makes it possible for the GMF to hire a half-time marine science education director. With the help of a summer intern, this person will develop activities that will help local school groups take advantage of DMC classrooms during the academic year. The program will include teacher training in the use of basic laboratory instruments and sample lesson plans that encourage young scientists to explore the marine environment.

GMF Docents Give Tours of the Darling Marine Center in July and August

Wednesdays at 1:30pm
Fridays at 10:30am

GMF's Summer Lecture Series

Each summer the Gulf of Maine Foundation hosts a Wednesday evening lecture series at the Darling Marine Center. The weekly event draws on the expertise of scientists, historians, novelists, and photographers and covers a wide variety of marine and maritime issues and events.

Lectures are held at 7:30pm in the Darling Conference Center and are open to the public. Lectures are free to GMF members. A $4 donation is requested for non-members.

July 12 • Shipbuilding in the 21st century in the new facility at Bath Iron Works. Retired Admiral Walter Cantrell, Consultant , Bath Iron Works

July 19 • Winds, currents, and the whereabouts of larval lobsters: How do lobsters settle where they do? Dr. Lewis Incze, Bigelow Laboratory for Ocean Sciences. (This lecture will be held in the Kresge Classroom)

July 26 • Hale Site 307-006: The historical archeology of a shipwright's homestead in Newcastle, Maine 1765-1785. Tim Dinsmore, Archeologist

August 2 • Saving endangered seabirds: Lessons from puffins, terns and petrels. Dr. Stephen Kress, V. P. of Bird Conservation, National Audubon Society.

August 9 • Hidden landscapes: The seasons. Dr. Will Richard, Photographer.

August 16 • The decline of dory fishing in the 1920's by recalling the history of the fishing schooner, L.A. Dunton. Andrew German, Research Fellow for America and the Sea Exhibitions, Mystic Seaport Museum.

August 23 • Journey into Darkness: The peculiar life of deep sea animals as seen by submersible. Dr. Kevin Eckelbarger, Director DMC.

MCL, con't from page 1

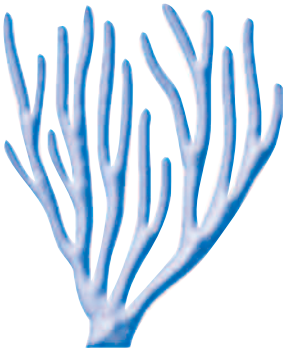
The second floor, which will include four offices and a large, hi-tech genetics/molecular biology laboratory, will be finished when "bricks and mortar" funds are secured.

The flowing seawater system in the new wet lab will have chillers, allowing researchers to maintain cold, deep-water species for observation, culture and experimentation. The chilled seawater system will compliment the existing flowing seawater in which heat exchangers make it possible to maintain summer seawater temperatures year round for aquaculture research. The wet lab area will also include an algal culture room and research bays for visiting scientists, in addition to holding tanks and aquariums.

A wing of the wet lab will be dedicated to Dr. Mary Jane Perry's phytoplankton research. In addition to lab and office space, the Perry lab will include two environmental chambers and an isotope laboratory. It will have shared access to autoclaves and other equipment.

A fully equipped 30-student classroom with flowing seawater, fume hood, microscopes, and internet hook-ups will also spur off the wet lab. The classroom will expand the teaching capabilities at the DMC and double as visitor's lab space when needed.

Funding for the MCL and classroom has been secured from a variety of sources including two National Science Foundation programs: the EPSCoR-Aquaculture Program and the Field Station and Marine Laboratory Program. The Maine Science and Technology Foundation, the University of Maine, and the State of Maine's Research and Development Bond Issue also made important contributions.



Recent Publications

Bock, M. and **L. Mayer**, 2000. Mesodensity organo-clay associations in a nearshore sediment, Marine Geology, 163:65-75.

Chung, W.K. and **G.M. King**. 1999. Potential polyaromatic hydrocarbon degradation and biogeochemical transformations in macrofaunal burrow sediments. Aquat. Microb. Ecol. 19:285-295.

Eckelbarger, K.J. and **C.M. Young**, 1999. Ultrastructure of gametogenesis in a chemosynthetic mytilid bivalve (*Bathymodiolus childressi*) from a bathyal,methane seep environment (northern Gulf of Mexico). Marine Biology 135:635-646.

Gerken, S. and **L. Watling**. 1999. Cumacea (Crustacea) of the Faroe Island Region. Frodskaparrit 47 199-227.

Gerken, S., L. Watling, & **A.B. Klitgaard**. 2000. Contumacious Beasts: A story of two Diastylidae (Cumacea) from Arctic waters. Journal of Crustacean Biology 20 (1) 31-43.

Hughes, T., Szmant, A., **Steneck, R.** Carpenter, R., Miller, S. 1999. Algal blooms on coral reefs: what are the causes? Critique of: "Nutrient Thresholds for Eutrophication and Macroalgal Overgrowth of Coral Reefs in Jamaica and Southeast Florida: by B. E. Lapointe (Limnol. Oceanogr. 42: 119 - 1131). Limnol. and Oceanogr. 44: 1583 - 1586

King, G.M. 1999. Characteristics and significance of atmospheric carbon monoxide consumption by soils. Chemosphere: Global Change Sci. 1:53-63.

King, G.M. 1999. Attributes of atmospheric carbon monoxide oxidation in Maine forest soils. Appl. Environ. Microbiol. 65:5257-5264.

King, G.M. and **M.A. Garey**. 1999. Ferric iron reduction by bacteria associated with the roots of freshwater and marine macrophytes. Appl. Environ. Microbiol. 65:4393-4398.

Mayer, L.M. and E. Druffel (Editors), 1999. Future of Ocean Chemistry in the United States (FOCUS), University Corporation for Atmospheric Research, Boulder CO, 152 pp.

Reid, R.P., Macintyre, I.G. and **Steneck, R.** S. 1999. A microbialite/algal ridge fringing reef complex, Highborne Cay, Bahamas. Atoll Res. Bull. 465: 1 - 18.

Rich, J.J. and **G.M. King.** 1999. Aerobic and anaerobic transformations of carbon monoxide in freshwater peats. FEMS Microbiol. Ecol. 28:215-224.

Voparil, I.M. and **L.M. Mayer.** 2000. Dissolution of Sedimentary Polycyclic Aromatic Hydrocarbons into the Lugworm's (*Arenicola marina*) Digestive Fluids. Environ. Sci. Technol., 34, 1221-1228.

Watling, L. and **S. Gerken**. 1999. Leucon (Crymoleucon) noerrevangi, a new species of leuconid (Cumacea: Crustacea) from the Faroe Islands. Sarsia 84(5) 437-444.

Watling, L. and **S. Gerken**. 1999. Two new cumacean (Crustacea) species from the deep South Atlantic. Zoosystema 21(4) 661-669.

UMaine/SBS Grad Published in Northeastern Naturalist

Andy Wibur, a UMaine graduate and participant in the first Semester-by-the-Sea (SBS) class at the DMC in 1993, has published a paper describing the ability of periwinkles to hide by adopting the colors of sea weeds in which they live. The work is a culmination of an independent study Andy conducted with Dr. Bob Steneck during SBS. In summary, he found that the smooth periwinkle, *Littorina obtusata*, adopted colors similar to those found in the air vesicles on common intertidal sea weed, *Ascophyllum nodosum* upon which they feed.

Wilbur, A.J. and R.S. Steneck. 1999. Polychromatic patterns of Littorina obtusata on Ascophyllum nodosum: are snails hiding in intertidal seaweed? Northeastern Naturalist 6:189-198.

Grad student Exequiel Gonzalez

SMSMS2K School of Marine Sciences Mini-Symposium 2000

The University of Maine's School of Marine Sciences held their annual graduate student Mini-Symposium at the DMC in May. Thirty-eight graduate students and a dozen faculty participated in the two day event.

The mini-symposium grew out of a required seminar class designed to teach graduate students visual and verbal communication skills for presenting their research at scientific meetings and has since become an annual event. Mini-symposium presentations are made in the standard format of scientific meetings, with each student having 15 minutes to present their research and field questions.

The topics covered highlighted the wide range of research being conducted in all three disciplines within SMS: Oceanography, Marine Biology and Marine Resources.

A Friday evening BBQ on the DMC waterfront provided a great opportunity for students and their faculty advisors to kick-back and relax. It was great to see so many Orono faces at the the Center!

Grad students Ryan Carnegie, Jessica Geubtner & Lynn Berndt

Burger flippers Dr. Kevin Eckelbarger, Dr. Dan Belknap & Dr. Mark Wells.

SMS Grad Student Wins Award

This spring, Lynn Berndt (pictured above) received *The Robert Wilce Award* for best student oral presentation at the 39th Annual meeting of the North East Algal Society for her talk entitled *Synchronous gamete release by* Fucus vesiculosus *off the coast of Maine*.

Lynn is studying the environmental conditions and timing of gamete release in *Fucus vesiculosus*, an intertidal brown alga. Sampling the water column off the rocks at Pemaquid Point with a self-made pump-filter device she has determined that adult algae release their gametes just prior to high tide only on calm days. She also found that the sperm:egg ratio at the time of release is extremely high, indicating that sperm are not a limiting factor during fertilization.

Lynn is a graduate of Carleton University in Ottawa, Ontario, Canada, and is pursuing a Master's degree in Marine Biology with Dr. Susan Brawley.

Grad student Deirdre Gilbert & Dr. Jim McCleave

North Sea Scientists Meet at DMC

Dr. Les Watling hosted fifteen scientists from Europe and Canada at the DMC this spring for the annual meeting of the Benthic Ecology Working Group (BEWG), a subset of the International Council for the Exploration of the Sea (ICES).

With headquarters in Copenhagen, Denmark, ICES is one of the oldest marine research organizations. It was founded in Europe almost 125 years ago to address concerns of over fishing in the North Sea, issues not unlike those we face today in the Gulf of Maine. ICES quickly learned that little was known about the marine environment, and set course to study the life histories of the fish and shellfish they were reaping from the sea. The organization currently consists of representatives from all North Atlantic nations, including the United States and Canada, though it is still primarily concerned with the North Sea.

Above: The BEWG on the shores of the Damariscotta River.

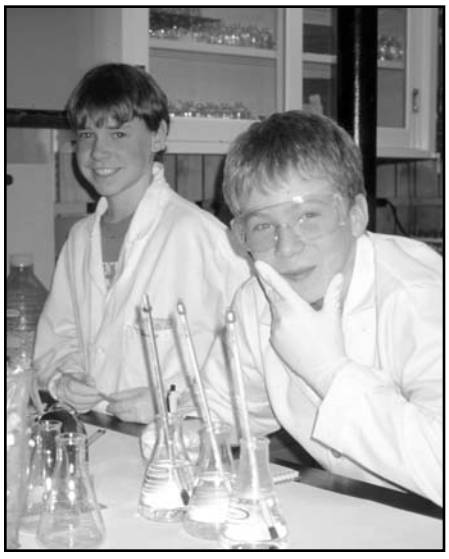
Left: BEWG Chairman Dr. Karel Essink, Netherlands and Dr. Michael Zettler, Germany, enjoy an early season lobster bake.

Among other things, the BEWG spent much time reviewing a new classification system of benthic habitats/communities. They debated the merits of new and different sampling approaches and new sampling devices, with the aim of upgrading existing guidelines.

After four days of solid science, the group let loose for a little fun. As a week's worth of clouds cleared, and at temperatures hovering below 50ºF, they enjoyed one of the earliest outdoor lobster bakes the DMC has ever had. All were impressed by this Maine tradition and many promised to return in warmer weather. The following day the group traveled to Acadia National Park on Mt Dessert Island for hiking and sightseeing.

Budding Scientists

Dr. Gary King and Dr. Larry Mayer were both involved in outreach projects with local school systems this spring. Gary King met weekly with a group of 7th graders from the Nobelboro School. On several occasions the students visited Gary's lab at the DMC for lab experiments. Larry Mayer teamed up with students from the South Bristol Consolidated School who visited the DMC several times to study the chemistry of seawater.



Right: Students from the Nobelboro School in Gary's microbial ecology lab studying the physics of thermal transfer

Above: South Bristol Consolidated School student and Larry Mayer in the DMC's flowing seawater classroom.

Japanese Culture Techniques Tried in Maine Waters

Dana Morse & John Higgins prepare spat collecting bags

Scallops. Everyone loves scallops! In an attempt to maintain and enhance the natural stocks of this delectable bivalve, Dana Morse, DMC boat captain John Higgins, and several partners downeast are trying to adapt Japanese mariculture techniques to Maine waters. Dana is an Extension Agent for Sea Grant and UMaine Cooperative Extension based at the DMC. He traveled to Japan and participated in an aquaculture exchange program 1-1/2 years ago.

In Japan, wild scallop spat is collected in mesh bags filled with either monofilament, or a special plastic mesh material called *Netron*. Scallop larvae settle out of the water column onto the plastic substrate in the bags and begin to grow. The spat are raised in a nursery of lantern nets and pearl nets until they are large enough to fend for themselves. The scallops are then either seeded on the bottom, put into larger nets, or ear drilled (a small hole is drilled near the hinge fastened to a long line) and suspended in the water column.

Scallop spat in collection bag filled with monofilament line.

Last September, Dana, John and collaborating fishermen from the Stonington and Cobscook areas set out onion bags full of monofilament line in an attempt to catch spat from the July scallop spawn. Settlement of larvae was spotty, though some of the Stonington bags collected spat numbering in the thousands. The Damariscotta bags collected roughly 80 spat partly because of late development.

The spat from the Damariscotta and Stonington bags were held in Lowe's Cove and in the DMC's flowing seawater laboratory over the winter and at ten months are now about the size of your fingernail. Come warmer weather, the young shellfish will be placed in 3' square plastic trays which will be secured to a metal frame a few feet off the bottom of the Damariscotta River, just off shore from the DMC.

Dana and John are excited about the project, but admit there are several elements that need to be fine tuned. The timing and the location of spat collection is the first issue that needs to be resolved. This year they are going to set the collectors out about a month earlier, and attempt to collect some mature animals in order to monitor the timing of spawning. Then, as the scallops grow too big for their nursery trays, the group statewide will have to decide how best to get the scallops to market size.

What's Spat?

As adults, most shellfish live on or in bottom sediments. They reproduce by broadcasting their eggs and sperm into the water where they mingle and ultimately develop into planktonic larvae. At approximately 30 days of age the larvae are cued to metamorphose, find an appropriate substrate upon which to take up a benthic existence, and settle out of the water column. The newly settled juveniles are commonly called spat.

NOSB Winners Visit DMC

This spring an exceptionally bright group of Maine students from Biddeford High School visited the DMC. They were the winners of the 2000 Nor'easter Bowl, a regional National Ocean Science Bowl (NOSB) in which more than eighty students representing sixteen schools in Maine and New Hampshire participated.

The all-girl Biddeford team defeated an all-boy team from Convall High, New Hampshire. Their victory was truly impressive considering the Biddeford High School does not have a marine science program. The girls studied and prepared for the competition in their free time after school.

DMC faculty and staff were all impressed by the academic excellence and the motivation of the Biddeford students. After presenting a slide on show on deep-sea research, Dr. Kevin Eckelbarger commented "from the questions they ask, you can tell these students are cream of the crop. They really like to learn."

The whole experience, from Nor'easter Bowl preparation and competition to the weekend at the DMC, captivated and secured team member Krista Keller's interest in marine science. She had been considering the field of medicine, but now plans on a degree in oceanography. The trip to the DMC opened her eyes to a whole new world. As she peered into a tide pool at Kresge Point she said, "This stuff is so cool! Even though I live in Maine, where I live is like a city. I've never seen this before."

Biddeford NOSB team members at the DMC (from left to right): Julie Dumond, Amber Moulton, Krista Keller. Coach Don Berthiaume and son Dave are on the right. Missing from photo: Maureen McDonough & Erin Tremblay.

Julie Dumond and a young crab from a tide pool at Kresge Point.

The 2000 Nor'easter Bowl was held in February at the University of Maine and was organized by Dr. Sara Lindsay. Volunteers from the University's School of Marine Sciences (SMS), Sea Grant, the Darling Marine Center, and the Bigelow Laboratories for Ocean Sciences served as moderators, judges, scorekeepers and coordinators.

The winning team had several prizes from which to choose, including a weekend at the DMC. In addition, winning team members who enrolls in SMS receive a $1000 scholarship.

The Nor'Easter Bowl-NOSB 2001 will be hosted jointly by the University of New England and Bigelow Laboratory for Ocean Sciences. For more information contact Annette deCharon at the Bigelow Labs at adecharon@bigelow.org or 207-633-9600, or Sara Lindsay at 207-581-1434.

The Biddeford Team

Biddeford High School has participated in the NOSB since its inception three years ago thanks to coach Don Berthiaume. The Biddeford team comprised of two seniors: Maureen McDonough, an honors biochemistry student, and Erin Tremblay, class valedictorian; and three juniors: Amber Moulton, a volunteer phytoplankton monitor at Biddeford Pool for the Maine Department of Marine Resources, Julie Dumond who is interested in political science or international economics as well as marine science, and Krista Keller a budding oceanographer.

The Biddeford team traveled to Washington, DC in early May to compete in the National Ocean Science Bowl. Team member Krista Keller described the nationals as a "higher level" of competition.

Dr. Bob Steneck and Dr. Marcia Figueiredo Creed are collaborators on a coralline study.

Collaborative Coralline Research

Dr. Marcia Figueiredo Creed, who works for the Coastal Zone Program at the Botanical Garen of Rio de Janerio, Brazil, visited the DMC in March to extend a collaborative coralline study with Dr. Bob Steneck.

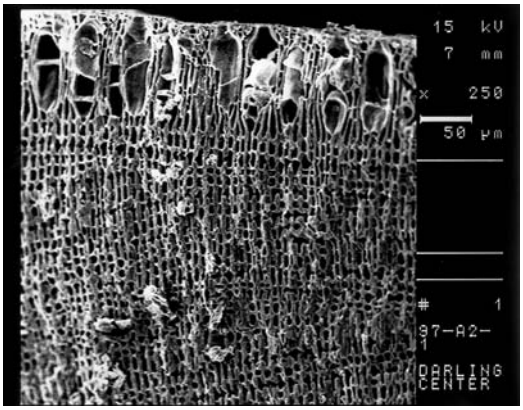
The two researchers teamed up in May of 1997 to survey the reefs of the Abrolhos National Park. This island sanctuary is located approximately 50 miles off the coast of Brazil, at the cusp of the Tropical Western Atlantic and the Caribbean biotic zones, and is known to be rich in endemic species. Marcia and Bob sampled the corallines of the Abrolhos to study their diversity and endemism, their importance in reef construction, and herbivory rates on the reefs.

In a week's time Marcia and Bob found 178 different species and determined that endemism was not as common among the corallines as it was in other families of the flora and fauna of the Abrolhos reef. Rather, the corallines were familiar with those found throughout the Caribbean.

While at the DMC Marcia logged over 30 hours on the Center's scanning electron microscope (SEM). She looked at the anatomical and reproductive features of the corallines to differentiate species.

Marcia was "thrilled to get so much SEM time" at the DMC. She explained that electron microscopes are far and few between in Brazil and that their use is spread thin among many researchers. It would take her "months to accomplish in Brazil what she did here in a week."

Marcia loads a corralline sample in the scanning electron microscope.



Sporolithon episporum *is a commonly found coralline algae in sub-cryptic reef environments. Interestingly, the genus was know in the fossil record before anyone realized it hadn't gone extinct.*

Making Waves
Vol. 9, No. 1 • Summer 2000
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