RINEHART COASTAL RESEARCH CENTER
WOODS HOLE OCEANOGRAPHIC INSTITUTION

COASTAL RESEARCH

Volume 2, Number 1
June 1998

Food Web Studies Strive to Understand the Cause of Brown Tide

Since 1985 the estuarine and coastal waters of Long Island, New York have experienced recurrent harmful algal blooms called brown tides. The causative agent of these events is a minute (2-3 microns) alga named *Aureococcus anophagefferens.* This Latin moniker loosely translates into 'golden cell that causes feeding to stop', a good description of its effect on many benthic organisms such as bivalve molluscs.

Massive outbreaks of this alga during the past 12 years have had devastating effects on some shellfish populations within these ecosystems, and also resulted in habitat loss by causing reductions in the size of eel grass beds. Scallop populations, and the sizable fishery that this species has supported in the past, have been particularly hard hit.

The underlying environmental and biological conditions that lead to brown tides have been enigmatic, but an important role for food web interactions has been implicated for the brown tides alga. Because of its small size, potential grazers for this alga are predominantly single-celled, microbial predators that compose the first few trophic levels of pelagic food webs.

Tom Kleindinst

Mausmi Mehta, Mark Dennett and Dave Caron examine a brown tide culture.

David Caron is investigating the role of these predators in Long Island embayments habitually afflicted by brown tides. Funding from RCRC, New York Sea Grant and the Seaver Institute has enabled Caron and his colleagues to combine experimental and modeling studies to unravel the food web interactions that lead to massive outbreaks of this alga. These studies entail a variety of experiments designed to investigate the structure of the microbial food web prior to, during, and following these algal blooms. The goal is to understand the changes that food webs undergo at the time of bloom initiation, and how they recover when these brown tides eventually wane.

One aspect of this work supported by RCRC funds has been the development of a mathematical model (see Figure, page 3) that incorporates information provided by Caron's food web experiments into a description of trophic dynamics in these coastal bays. This model will provide a means of testing hypotheses in-

Brown Tide– page 3

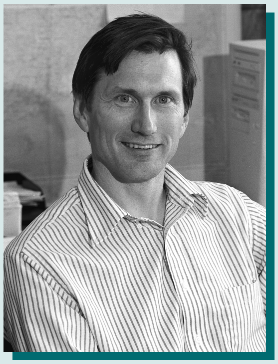
RCRC Open House

The Rinehart Coastal Research Center invites you to an open house at the Coastal Research Laboratory Highbay from 3:00 – 6:00 p.m. on Friday, June 12th. There will be a poster session featuring work supported by the RCRC, and some of the laboratory flumes will be operating. Refreshments will be served.

Come catch up on center activities and help kick off the 1998 summer season.

Shelley Lauzon

A Message from the Director:



Someone recently asked me why an estuarine oceanographer like me would go to WHOI, since there are no estuaries of any significance near Woods Hole. I told him that when I'm trying to decide which estuary to study, I have the whole world to choose from, unlike some more unfortunate colleagues who feel compelled to return to the same gunk hole year after year.

WHOI's coastal research can take place close to home—in Buzzards Bay, Waquoit Bay and Massachusetts Bay. WHOI scientists are sensitive to local environmental management needs and the research opportunities they provide, such as the investigations of the ecology of Massachusetts Bay in connection with Boston's new sewage outfall.

WHOI's coast, however, extends far beyond the horizon, as illustrated in the map on pages six and seven of this issue. WHOI's coastal research activities are indeed global in scope, ranging from Antarctica to the Barents Sea, and from Papua New Guinea to Kazikstan. Sometimes the venue for the research is determined by environmental problems, such as nuclear contamination in Siberian estuaries or red-tide outbreaks in Japan. In other studies, the scientific questions determine the location by the unique or favorable conditions required for investigating a particular phenomenon.

A broad view of the coastal environment benefits both the quality of WHOI's research and our perspective on environmental problems at local, regional and global scales. The waves lapping up on the beach in Tasmania may not do much to Cape Cod's shoreline, but the knowledge gained by studies around the world's coasts has tremendous impact on our understanding and contributions to the intelligent management of coastal resources.

Rocky Geyer
Director

RCRC Calendar for 1998-1999

The following schedule lists events which will be sponsored by the Rinehart Coastal Research Center during the coming year.

JUNE 12 ———————————————— Open House
SEPTEMBER '98 ——————Coastweeks Seminars
SEPTEMBER '98 ——— William D. Grant Symposium
FALL '98 —————— B. H. Ketchum Award Seminar
JANUARY '99 ———— Coastal Traineeship Seminars
APRIL '99 ————— Annual RCRC proposal deadline

1998 FUNDING AWARDED

The Rinehart Coastal Research Center is pleased to announce that the following projects have been selected for funding by the 1998 Proposal Committee.

Demographic Models for the North Atlantic Right Whale
—Hal Caswell

Larvae Accumulation and Transport by Internal Bores: An Experimental Study
—Jesús Pineda and Karl Helfrich

Investigating Submarine Groundwater Discharge to Coastal Waters Using Radium Isotopes
—Ken Buesseler and Matt Charette

Chemical and Molecular Biological Characterization of Dissolved Organic Nitrogen in the Coastal Zone
—Daniel Repeta

Surface Exposure Dating in the Coastal Zone
—Mark Kurz and Neal Driscoll

Nearshore Scientists Joining WHOI

Steve Elgar and Britt Raubenheimer, two outstanding researchers in beach and nearshore processes, have decided to join WHOI's scientific staff. Steve comes from Washington State University, and Britt is finishing a post-doc at Scripps.

Elgar and Raubenheimer study the hydrodynamics of the surf zone and its influence on nearshore transport and shoreline evolution. Their innovative measurement techniques and scientific insights will add an exciting new dimension to coastal research at WHOI.

Right and Blue Whale Blubber Acoustics

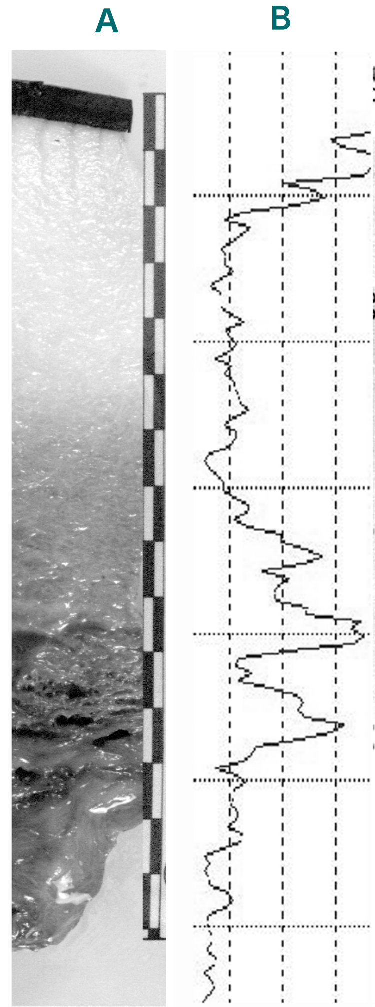
Massachusetts Environmental Trust and the Rinehart Coastal Research Center are supporting Michael Moore and colleagues to assess the health of northern right whales using acoustic probes. Moore developed a system to lay an ultrasound probe on the backs of these whales at sea, working in Cape Cod Bay in March 1997 and the Bay of Fundy in August 1997. The major advance was the development of the mechanical engineering necessary to appose these probes to the whales' backs in a routine manner and to acquire a preliminary data set.

The team spent this winter improving the system. A more sophisticated ultrasound instrument was acquired which allows greater control of acoustic parameters and intact waveform data display, and custom software was written to allow real time data acquisition on a laptop computer. Improvements were also made to the mechanical aspects of the probe.

The improved system was deployed in Cape Cod Bay this February, supported by the Massachusetts Environmental Trust. Although important data were obtained, researchers found it more difficult to make contact with the whales in Cape Cod Bay than they had in the Bay of Fundy. The whales were not deep diving, and therefore surfaced briefly between dives. In the Bay of Fundy, however, they spend longer periods of time at the surface between deep dives, and are then easier to approach successfully.

Moore recently profiled the entire blubber coat of a blue whale necropsied in March. This was a fortunate opportunity as he will possibly use his system on live blue whales in the Gulf of St. Lawrence this summer, with colleague Richard Sears of the Mingan Island Cetacean Study.

This article was contributed by Dr. Michael Moore, a Research Specialist in the Biology Department at the Woods Hole Oceanographic Institution.



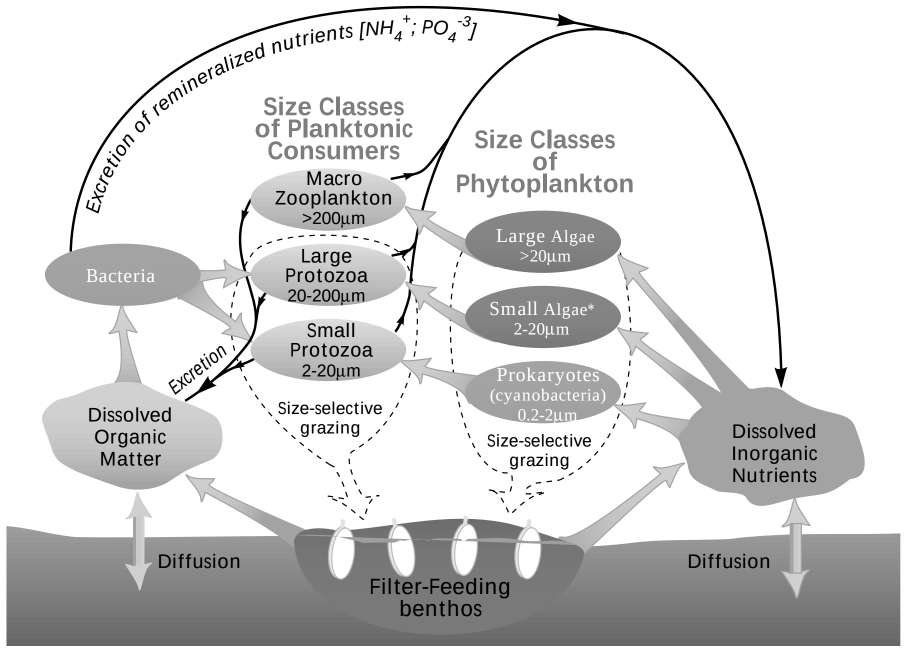
Michael Moore

A photograph (A) and the corresponding Panametric ultrasonograph (B) of a slice of skin, blubber and muscle from a right whale stranded at Wellfleet, MA.

Brown Tide – from page 1

volving food web structure and trophic relationships, and how they relate to blooms of this harmful alga.

This article was contributed by Dr. David Caron, a Senior Scientist in the Biology Department at the Woods Hole Oceanographic Institution.



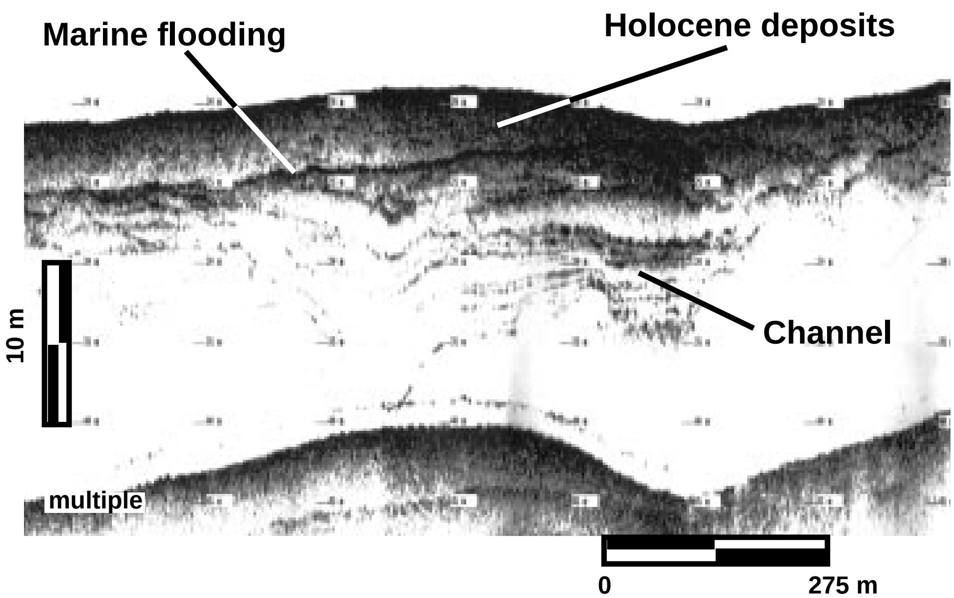
Fritz Heide

Conceptual framework for a food web model to examine bloom dynamics of the brown tides alga. The model assumes size-dependent predation within the pelagic food web. The ovals depict major groups of plankton. Trophic relationships among these populations, and nutrient cycling pathways, are shown by the arrows.

New Geophysical Tools for Imaging Shallow Water Environments

The littoral zone and inner continental shelf act as gateways through which sediment must pass on its journey from land to the sea. Sedimentary processes (i.e., transport, erosion, and deposition) in these dynamic regions, however, are not well understood because of the difficulty of working in the high energy, nearshore environment. Shallow water sonar technology has also been inadequate.

Obtaining detailed images of the sedimentary record in these regions is critical to determining the dynamics that link fast-acting, localized physical processes ("event" stratigraphy) to the formation of the longer-term stratigraphic record. These relationships must be understood before realistic models of stratigraphic evolution can be developed. The models would have practical applications to offshore cables and pipelines, geohazard assessment, erosion mitigation, disposal of dredge spoils, marine navigation channels, and Navy littoral operations.



High resolution sonar data were collected across Cape Cod valleys for the first time, clearly imaging glacial channels from the Holocene to the present.

Neal Driscoll, Wayne Spencer, and Dave Aubrey, together with Florida Atlantic University and Edgetech, are developing a new tool for imaging the nearshore environment, combining seismic reflection and side-scan systems to image both the seafloor and subbottom sedimentary layers in shallow water environments. Funding for the system was provided by the Office of Naval Research and the Woods Hole Oceanographic Institution.

The subbottom Chirp seismic reflection system sweeps across two different frequency bands (0.5–7 kHz and 2–16 kHz), which are digitally-recorded on separate channels. Seismic systems operating at different frequencies reveal different reflection patterns, both because higher-frequency systems have greater resolution and also because reflections are often caused by complex interference patterns between closely-spaced stratigraphic horizons and outgoing signals. Understanding the frequency dependence of seismic reflectors is a critical first step toward determining the origin of seismic reflectors, quantifying reflection coefficients, and assessing the spatial variability of reflectors. A dual frequency (100 & 500 kHz) Edgetech DF1000 side-scane sonar is also attached.

The new system is easily mobilized for use on nearshore research vessels. Turn-key operations enable researchers to acquire high-resolution seismic images with advanced user-friendly software for automated data analysis. The towing frame, winch, and deployment system are designed for small research vessels and operation in high energy environments.

To overcome the operational obstacles of acquiring high resolution seismic data in the high energy surf zone, the system will incorporate a towed frame assembly that can be deployed from the beach. The tow frame will be designed to be stable on the bottom while being towed slowly across the surf zone out to mid-shelf water depths. Outside the surf zone the vehicle and the towed frame will be flown in a traditional configuration while maintaining a constant depth above the seafloor.

This system will be operated as a community research tool.

This article was contributed by Neal Driscoll.

Dr. Neal Driscoll is an Assistant Scientist, Dr. Dave Aubrey is a Senior Scientist and Wayne Spencer is a Research Associate with the Geology and Geophysics Department at the Woods Hole Oceanographic Institution.

Observing Air-Sea Gas Fluxes Over Coastal Waters

One of the central problems of oceanography is quantifying the rate of gas flux across the air-water interface, a critical component in estimating greenhouse gas inventories and ocean-atmosphere budgets. Understanding the budgets and cycles of gases in coastal regions is particularly important, as these fluxes are usually greater than open-ocean rates.

Gas exchange processes are interdisciplinary by nature. Air-sea gas flux is the result of a dynamic interplay between the wind, waves, near-surface flows, and biogeochemical processes, and is therefore difficult to quantify. Biogeochemical processes, for example, can cause gas concentrations to differ between the surface ocean and the atmosphere. Although these gas concentrations can usually be measured accurately, the kinetics of the transfer remain elusive. The differences in gas concentration drive gas transfer at a rate controlled by the physics of the surface film, which is only 0.1mm thick at the water's surface.

Despite the importance of air-sea flux, direct measurements of gas flux are limited. For this reason virtually all current estimates of flux between the ocean and atmosphere depend on a wind speed relationship that is largely parameterized by indirect methods or laboratory wavetank experiments. To overcome this problem, Wade McGillis, Jim Edson and John Dacey are using carbon dioxide (CO_2) and dimethylsulfide (DMS) as tracers to investigate air-water gas exchange processes. The behavior of these gases are also of specific interest because of their potential effects on the climate.

CO_2 flux can be estimated using an eddy correlation method. While this method of estimating the flux works well in terrestrial systems, it has previously been less effective for sea-based experiments, since the ship's movements complicate the measurement of wind velocity and the CO_2 signals are small. Modern rapid sensing technologies can accurately measure concentrations of CO_2 quickly enough to detect the different concentrations carried by updrafts and downdrafts of air while correcting for the ship's motion. Gas flux can then be calculated from the measured CO_2 fluctuations and simultaneous air velocity, allowing the first accurate *in situ* measurements of marine CO_2 flux.

Tom Kleindinst

An instrumentation package mounted to the mast of R/V Asterias *measures CO_2 concentrations and air velocity. This system has been used successfully to determine CO_2 flux near Martha's Vineyard.*

CO_2 flux over the water is often too low to measure accurately, so research has turned towards finding an alternate gas whose flux is both measurable and consistently strong under most biogeochemical conditions. Dimethylsulfide (DMS) is always highly concentrated in seawater relative to the atmosphere; however, it cannot be measured quickly enough for researchers to use the eddy correlation method. A prototype DMS system instead relies on a profile technique. Since the same turbulence that underlies the eddy correlation method also generates a predictable shape for the profile of a gas in the atmosphere above the air-water interface, the DMS profile can be used to infer the CO_2 flux. Initial testing has confirmed the feasibility of this technique through comparisons of simultaneously measured CO_2 and DMS flux.

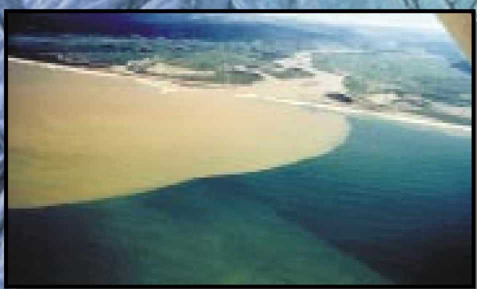
The *in situ* and simultaneous measurements of the flux of two gases is a first in oceanography. This study is also the first to investigate the characteristics of gas exchange in the nearshore zone, where gas transfer may be less dependent on wind speed and more dependent on the characteristics of shoaling and breaking waves. Initial results have been promising, and further tests are planned in June aboard R/V *Ron Brown* in collaboration with NOAA scientists.

This article was contributed by Dr. Wade McGillis.

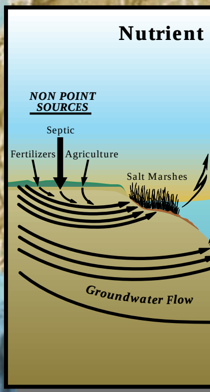
Dr. Wade McGillis is an Assistant Scientist, and Dr. James Edson is an Associate Scientist in the Applied Ocean Physics and Engineering Department. Dr. John Dacey is an Associate Scientist in the Biology Department at the Woods Hole Oceanographic Institution

WHOI's GLOBAL COAST

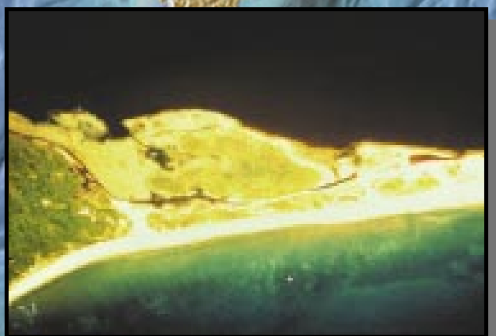
WHOI's coastal research activities circle the globe, from the coastal ponds of Falmouth to the Caspian Sea, and from the icy edge of the Southern Ocean to the Arctic. Curiosity-driven research takes WHOI scientists to all corners of the world.



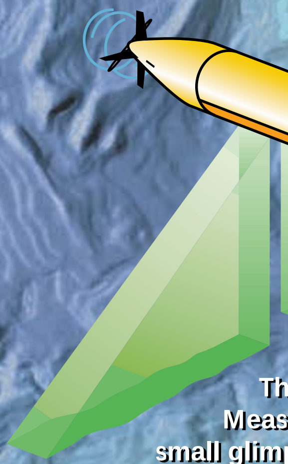
The Eel River in California is a major source of sediment, making it an ideal environment to study the delivery of sediment and formation of sedimentary deposits (see article, this issue).



Human impacts
threat to coastal
and other WHOI
effects on water



The inky color of the water in Peconic Bay, Long Island is caused by an outbreak of brown tide. WHOI Biologist Dave Caron has recently been granted RCRC funding to study the effects of the micro-organism *Aureococcus anophagefferens*, one example of a harmful algal bloom that wreaks havoc on coastal ecosystems and marine resources (see article, this issue).



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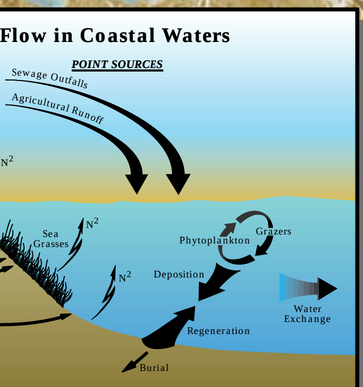
The GLOBEC (Global Ocean Ecosystems Dynamics) study results may explain the effects of the physical environment on population dynamics of key species, such as cod, on Georges Bank (see article, this issue).



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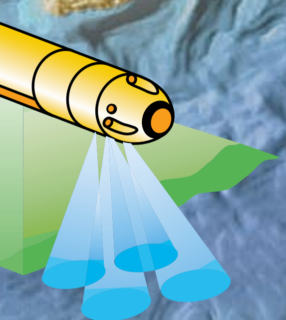

is REMUS (Remote Environmental
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JS has been successfully deployed
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g in Massachusetts Bay.

Michael Moore is being funded by the RCRC to study the fecundity of right whales in both Cape Cod Bay and the Bay of Fundy (see article, this issue).

● RCRC supported research*
● Other WHOI coastal research

*includes cost share with other sponsors.

Real-Time Geology on the Eel River Shelf

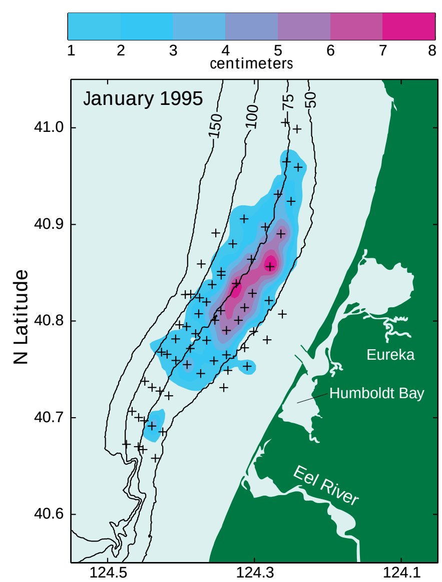
Although El Niño brought misery to many of California's flood-soaked residents, it provided a bonanza for scientists involved in STRATAFORM, an ONR-funded program that investigates the ongoing formation of sedimentary deposits on the continental shelf near the Eel River in Northern California. Both the heavy rains which fell during the El Niño winter of 1998 and monster storms in 1995 and 1997 have provided STRATAFORM scientists with a first-hand look at how sediment layers develop.

The program involves scientists from a number of universities and laboratories across the U.S. and Canada. It covers a broad range of processes and time-scales, penetrating twenty million years into the sedimentary record. WHOI participants in the study are focused on the linkage between the major sedimentary transport events of the last several years and the long-term preservation of sedimentary strata.

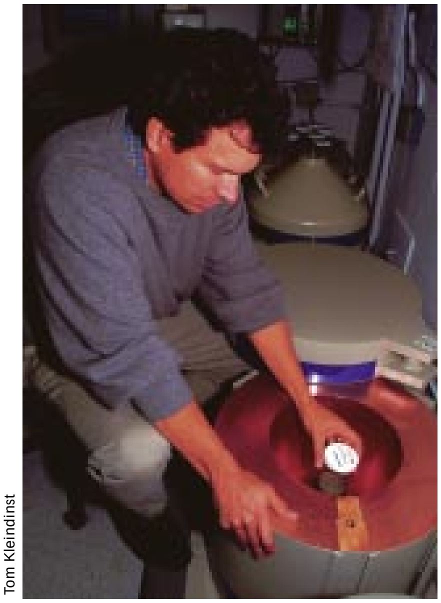
Rob Wheatcroft identified a 10-cm thick, 30-km long flood deposit during a cruise in early 1995. Using a gamma ray counter in the Coastal Research Laboratory, he found that this flood deposit contained high concentrations of beryllium-7 (half-life 53 days), which confirmed that this layer of sediment had just been laid down during the large flood in January, 1995. Wheatcroft has returned repeatedly to the deposit site to monitor the development of the sediment layer.

RCRC Director Rocky Geyer joined the field effort in 1997, just in time for an even bigger flood event. Geyer and other members of the "Rapid Response Team" are studying the mechanisms responsible for dispersing the sediment carried into the ocean by the flooding river. They sampled the sediment-laden river plume from Coast Guard helicopters during the 1997 flood and a series of smaller floods during the El Niño rains of 1998. Geyer's measurements indicate that Wheatcroft's flood deposits do not result from direct deposition from the plume; rather, the sediment takes a more circuitous route, perhaps involving hyperpycnal transport down the continental shelf as dense suspensions.

Tripod measurements are being conducted by Jim Lynch, Jim Irish and Peter Traykovski. These data are providing acoustic and optical measurements of the sediment transport within the bottom boundary layer, to determine whether the transport fits the conventional paradigm, or whether the high sediment loads on the Eel shelf produce more exotic mechansims of offshore sediment transport such as hyperpycnal plumes.



A map of the location and thickness of sediment deposited by the flood of January 1995.



Tom Kleindinst

Wheatcroft places a sediment sample into the Coastal Research Laboratory gamma ray detector to measure the distribution of thorium 234.

Chris Sommerfield is looking at the flood deposits at longer timescales with piston cores, using lead-210 and carbon-14 to date older flood layers. He has detected a distinct change in the pattern of deposition roughly 50 years into the core (based on lead-210 and cesium-137 dating) that may reflect changes in land-use patterns (i.e., increased logging activity) or may indicate a natural change in deposition conditions due to long-term oceanographic or hydrologic variability.

Neil Driscoll is looking yet deeper into the sedimentary record, relating the present depositional regime to the formation of the longer-term stratigraphic record, to understand the importance of tectonics, sea

Eel River – page 9

Seminar Series Focused on Coastal Modeling

During the month of January, the Rinehart Coastal Research Center joined the WHOI Education Department in co-sponsoring the IAP Seminars in Ocean Coastal Processes for National Science Foundation Graduate Research Trainees. This year's theme was coastal modeling.

The lecture series began with Dave Chapman from the Physical Oceanography Department describing the use of process-oriented models in studying coastal circulation. Professor Eileen Hofmann of Old Dominion University presented two seminars on interdisciplinary models of the coastal ocean. In her first lecture, Prof. Hofmann reviewed the status of predictive coupled physical-biological models, pointing out that this field is still in its infancy. Her second lecture was a detailed look at the use of coupled models in the study and the physical-biological interactions controlling larval transport, with interesting examples concerning oysters and krill. The series concluded with a talk by Hal Caswell of the Biology Department describing his recent work using population dynamics models to assess stocks of harbor porpoise and right whales in the waters off New England.

The seminar series was well-attended not only by the NSF Coastal Trainees for which it was designed, but also individuals from the various research institutions in Woods Hole. The turnout highlights the scientific community's interest in the synthesis of models and observations to understand coastal processes, and a desire to contribute to the development of a rational basis for management.

Eel River – from page 8

level change, and climate in strata formation.

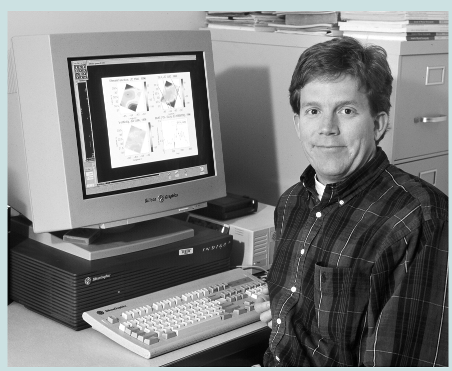
The extreme weather in Northern California over the last several years has provided a rare opportunity for scientists to take full advantage of the broad scientific scope of this project to observe the formation and preservation of sedimentary deposits—in real time.

This article was contributed by Dr. Rocky Geyer.

Dr. Robert Wheatcroft and Dr. Rocky Geyer are both Associate Scientists, Dr. James Lynch is a Senior Scientist, Dr. James Irish is a Research Specialist, Dr. Christopher Sommerfield is a Post-doctoral Scholar, and Mr. Peter Trayovski is a doctoral candidate with the Applied Ocean Physics and Engineering Department. Dr. Neal Driscoll is an Assistant Scientist with the Geology and Geophysics Department at the Woods Hole Oceanographic Institution.

WHOI Scientists Receive Prestigious ONR Awards

The RCRC congratulates Dennis McGillicuddy and John Colosi (both in the AOP&E department) for winning two of the nineteen Young Investigator grants awarded this year by the Office of Naval Research. Young investigators are selected on the basis of professional achievement, the submission of a creative proposal, and evidence of strong support by their respective institutions.



Tom Kleindinst

Dennis McGillicuddy with his coastal circulation model.

McGillicuddy proposes to incorporate planktonic ecosystems into realistic coastal circulation models. These models will clarify coastal circulation mechanisms, which govern the dynamics of coastal planktonic production. He credits the RCRC for providing initial funding through its annual call for proposals, which allowed him to develop the rationale and approach for this project.

Colosi will study the effects of ocean internal waves on basin scale acoustic propagation in the North Pacific. Using observed acoustic fluctuations, he will measure range-average internal-wave energies over specific transmission paths as a function of depth and time. Measurements like these are important to identifying the sources and sinks of internal wave energy.

The Coastal Mixing and Optics Experiment

The Office of Naval Research began the Coastal Mixing and Optics (CMO) research initiative to improve understanding of mixing processes in the coastal ocean and their influence on ocean optics. The CMO effort is unique: It addresses the entire water column, from surface boundary layer to bottom boundary layer, and in cooperating with other observational programs that are focusing on the shelfbreak front and the shallow water internal wave climate.

From July 1996 to August 1997, the CMO field study sampled surface forcing, hydrographic properties, optical properties, and vertical mixing using dropped, towed, and moored instrumentation, along with underway sampling from ships. This ambitious effort involved over 35 investigators from 15 different institutions, 20 moorings, 5 ships, and hundreds of instruments.

The experimental site, about 100 kilometers south of Martha's Vineyard, is a region of the New England shelf with a smooth bottom about 70 meters deep. Shipping lanes which cut across the site and active fishing and lobstering in the region proved a challenge to efficient scientific operations. Hurricane Edouard passed almost directly overhead, and along with several other strong storm events, provided an ample range of surface forcing conditions.

WHOI scientists (see list below) contributed to the CMO Experiment by observing surface forcing, water column hydrographic and optical properties, surface and bottom boundary layer evolution, and pycnocline mixing processes.

A moored array was deployed to evaluate the heat and momentum budgets and determine which processes influence the evolution of stratification. Particular emphasis was placed on obtaining a complete description of the surface forcing and monitoring changes in the surface and bottom boundary layers. The surface buoys contained sensors for the measurement of meteorological variables (from which the fluxes of heat and momentum were determined) and surface waves. The mooring lines were heavily instrumented to observe temperature, salinity, and currents throughout the water column. The ten-month deployment spanned the breakdown of stratification in the fall and its re-establishment in the spring. Stratification was most dramatic during several strong storm events, when both surface and bottom boundary layers showed significant variability.

M. Levine

Jeff Stolp (left) and Will Ostrom (right) coordinate the deployment of a CMO surface mooring from R/V Oceanus.

Special-purpose instrumentation deployed on tripods were used to obtain high-resolution, time-series readings of velocity, temperature and salinity within the bottom seven meters of the water. These measurements were used to estimate turbulent heat and momentum fluxes within the bottom boundary layer. Preliminary results indicate that the scale turbulent eddies are influenced by stratification and by boundary layer thickness, as well as height above the bottom.

Dye injection and sampling measured stirring and mixing in the density-stratified portion of the water column. The dye's vertical spreading was used to determine the rate of diapycnal (across surfaces of constant density) diffusion. Lateral dispersion was assessed by measuring the lateral spreading of the dye. Five injections each released a streak of fluorescent dye about 1 kilometer long. Researchers tracked the tracers for 2 to 5 days, using drogue drifters and current observations from the ship. Towed microscale conductivity measurements were used to evaluate turbulence in the vicinity of the dye injection patches. Vertical diffusivity inferred from the towed measurements was generally in good agreement with that determined from vertical spreading of the dye patch.

Spectral absorption and the scattering properties of particulate and dissolved material were determined using a combination of *in situ* measurements and the shipboard analysis of water samples through filtration, chemical analysis, and flow cytometry. Various classes of material (e.g. particulate vs. dis-

Optics Experiment – page 11

Optics Experiment – from page 10

solved) were found to contribute to the optical properties of the water. Vertical and temporal variability in optical characteristics were also assessed in Fall 1996 and Spring 1997. The results are being used to interpret changes in overall water column optics and to clarify the relationship between optical properties, and local physical properties such as vertical mixing and horizontal transport. Significant vertical variability was observed, but temporal variability in response to storms was even more pronounced. Not surprisingly, the largest temporal changes were associated with hurricane Edouard.

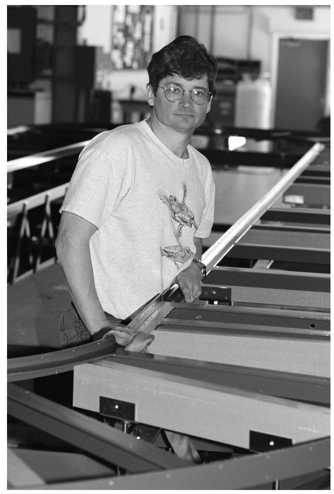
This article was contributed by Dr. Al Plueddemann.

Dr. Steve Anderson, Dr. Steve Lentz and Dr. Al Plueddemann are with the Physical Oceanography Department, Dr. Tim Duda, Dr. James Edson, Dr. James Ledwell, Dr. Chris Rehmann, Dr. John Trowbridge, Dr. George Voulgaris and Dr. Albert Williams, III are with the Applied Ocean Physics and Engineering Department, Dr. Robert Olson and Dr. Heidi Sosik are with the Biology Department at the Woods Hole Oceanographic Institution.

Construction of New CRL Flume

The new 'racetrack' flume is taking shape in the Highbay. The flume has been funded by an NSF Major Research Instrumentation award to Cheryl Ann Butman, Rob Wheatcroft and Wade McGillis. It will be used for studies in biology, sediment transport and hydrodynamics.

The project is being coordinated by Jay Sisson. "The WHOI machine shop personnel have been great," he says, crediting their abilities and hard work with enabling him to keep most tasks internal to WHOI, and on schedule.



Tom Kleindinst

Jay Sisson checks the new flume's metal structure.

The metal fabrication of the flume tank support frame, trusses and drive assembly is mostly complete. The next phase involves plastics fabrication and machining to create the tank, and should be completed in October.

Electronic instrumentation will be purchased, and will include a 2-axis fiber optic backscatter laser-Doppler velocimeter, a fiber optic backscatter sensor array, and an automated process control and data acquisition system. These systems will facilitate the testing and calibration of the new flume during the project's second year. A commercial grade heating and cooling system for temperature regulation is also planned.

The new instrumentation and temperature control system will benefit not only the new racetrack flume, but also the existing 17 meter flume and environmental chamber.

Dr. Cheryl Ann Butman is a Senior Scientist, Dr. Robert Wheatcroft is an Associate Scientist, Dr. Wade McGillis is an Assistant Scientist and Mr. Jay Sisson is a Senior Research Assistant in the Applied Ocean Physics and Engineering Department at WHOI.

RCRC Contributes to Telemetry Project in Mass Bay

The National Ocean Partner ship Program (NOPP) has awarded USGS and WHOI scientists and engineers a grant for $145,000 yearly to develop "Low Cost Modular Telemetry for Coastal Time-Series Data''. The RCRC will provide $25,000 per year for this project. WHOI's partners in this program, USGS, RD Instruments, the US Coast Guard, and the Massachussetts Water Resources Authority, are providing substantial additional support.

The project will develop an inexpensive and efficient way of providing real-time access to coastal measurement systems; it was conceived by Brad Butman of USGS and Dan Frye of WHOI . The USGS has been monitoring conditions in Massachusetts Bay for nearly a decade as part of the environmental assessment for the new sewage outfall, scheduled to be operational at the end of 1998.

This telemetry program allows this data stream to become available in real-time, as a resource for scientists and a responsive tool for management. The telemetry modules adapt to a broad range of coastal instrumentation systems, including acoustic links between the instruments and the water surface, and radio links back to shore, connecting to the World-Wide Web. .

Dr. Bradford Butman works with USGS, Mr. Daniel Frye is a Senior Research Specialist with the Applied Ocean Physics and Engineering Department at the Woods Hole Oceanographic Institution.

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THE RINEHART COASTAL RESEARCH CENTER is committed to the support and enrichment of coastal research activities within the WHOI community, particularly those research activities that directly affect the protection and enhancement of coastal resources. This mission is accomplished through facilitating research and education, providing facilities and equipment, and promoting interdisciplinary communication.

RESEARCH: Annual call for proposals • Special Topics • Rapid response and other mini-grants

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