MARYLAND

Research, Education, Outreach *Volume 18, Number 2*

MARINE NOTES

SPOTLIGHT ON SCIENCE

Dredging the Chesapeake

The Role of Science in a Heated Debate

BY JACK GREER

Few would deny that the Port of Baltimore serves as a major economic engine for the region — providing some 127,000 jobs and nearly $1.8 billion worth of estimated economic benefit. There are also few who would deny that the Chesapeake Bay is a rich natural treasure, a defining feature of the region and an economic engine in its own right. But when the issue of placing dredged sediments in the Bay came to a head last year, many Marylanders found themselves lining up on either side of a great divide that pitted the improvement of shipping channels against environmental concerns.

At issue was a four-mile deep water channel just north of the Chesapeake Bay bridge, used for the dumping of dredged material until 1975 and labeled on NOAA charts as a "Discontinued Dumping Ground." The Army Corps of Engineers calls this area Site 104.

As with most highly polarized issues, the debate rapidly became acrimonious, with statements often falling into a camp of "pro" or "con." Arguments flared over the facts of the issue, and the degree to which dumping dredged material would harm the Bay's ecosystem.

Given the highly charged nature of the debate, Bay scientists faced a difficult choice — to keep their distance, or to try to contribute to a deeper scientific understanding of the issue.

"We had to ask ourselves," says Don Boesch, President of the University of Maryland Center for Environmental Science, "whether to stay on the sidelines, or to offer our knowledge and expertise."

Boesch and several of his colleagues decided to try to pull together information from a number of scientists who had worked on issues relevant to the dredging question. They began assembling an assessment team, drawing on the research and insights of some sixteen scientists who had worked extensively in the Chesapeake Bay over a period of many years.

"The report was entirely unsolicited," Boesch says. "We didn't even tell the state agencies or others that we were doing it, because we wanted to reach our conclusions independently."

The results of their effort, collected in a report entitled *Science and Site 104*, brought a new level of science to

Dredging, continued

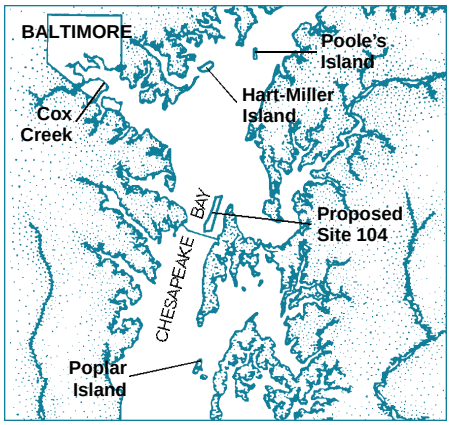
the debate, but it also raised more complicated questions about the role of science and the difficulty of contributing scientific perspectives in the midst of a highly politicized controversy.

The Dredging Debate

In a shallow estuary like the Chesapeake Bay, only repeated dredging can keep channels clear for big ships. Currently, according to the Maryland Port Administration, there are a number of sites that receive sediments dredged from shipping channels — such as Hart-Miller Island, Pooles Island and now Poplar Island — as well as proposed areas, such as Cox Creek. Based on the Port Administration's projections for the next five years, and given current disposal sites, they still need to find a place for some 18 million cubic yards of dredged sediment.

The proposal to deepen and widen channels into Baltimore and to dispose a portion of the dredged material in Site 104 — the deep trench between Sandy Point and Kent Island — has sharpened disagreements between differing interests. On the one hand, the Maryland Port Administration has cited the need to improve the safety of shipping in the northern Bay, including improvements to the 35-foot-deep C & D Canal. On the other, environmental groups like the Chesapeake Bay Foundation, apprehensive about possible environmental impacts, strongly oppose dumping dredged sediment in the Bay's deeper waters. Many Bay-area citizens have joined in an effort to halt the reopening of Site 104 and voiced strong opposition to "open water" disposal. They ague that dumping dredged material will release stored-up nutrients and contaminants into Bay waters and cover bottom-dwelling organisms.

It is fair to say that since Site 104 was last used as a dumping ground, public perceptions have shifted and sharpened. At least by the 1970s, for example, large stretches of underwater Bay grasses began to disappear, a trend most likely made worse when



Tropical Storm Agnes unleashed a torrent of sediment and nutrients into the Bay in 1972. Since then, scientists have blamed a lack of light — due to suspended sediments and to an overabundance of nutrients — as the primary culprit in the dramatic die-off of underwater grasses.

For two decades many who live in Chesapeake Bay country have worked to keep sediments and nutrients out of the estuary. Many farmers have instituted Best Management Practices, including no till farming, buffer strips and cover crops. To help slow runoff, construction sites are now ringed by sediment fences and hay bales. And to help protect sensitive shorelines, laws such as the Critical Area Act curtail the activities of builders and citizens along the border of the Bay and its tributaries.

After years of educational efforts and policies aimed at keeping silt out of the Bay, citizens appeared outraged at the idea of dumping dredged material into open waters. Columnist Eric Smith, of the Annapolis *Capital*, argued that citizens would be heavily fined for dumping even a small amount of dirt into the Bay, while large economic powers might be allowed to dump millions of cubic yards of dredged material in the middle of the estuary.

To many, the idea of taking dredged sediment from one part of the Bay and dumping it in another seemed just plain wrong.

The Role of Science

Science, including marine science, is no stranger to controversy, but debates such as this one always place scientists in a difficult position. Most marine scientists, after all, entered their fields because of an intense interest in, and a deep concern for, the marine environment. But because they are scientists, they must place the scientific method and objective data above all else — otherwise, the term "science" becomes meaningless.

In bringing university researchers together, says Boesch, his aim was to address the scientific understanding of key issues that were being raised as part of the debate. These included the effects of moving dredged material on the Bay's nutrient dynamics, the movement and impact of dredged material that did not settle into the deep trough, the effects of newly dredged material on sediments in the trough itself, and the effects of dredged material on fish and shellfish. They also considered the issue of alternative placement.

Boesch met with colleagues and began to assemble a draft, which he then circulated among a wider scientific team. Through numerous discussions — in person, over the telephone, by fax and e-mail — they came to consensus on a number of points. The result was their synthesis report: *Science and Site 104*, released during the fall of 1999. The report does not present a comprehensive study of the disposal site per se, but rather draws on research done by scientists in the recent past on sedimentation rates, nutrient dynamics and ecological response to change. Rather than advocate a particular action, the report's objective, according to Boesch, was to provide useful insights at a time when the Army Corps was beginning to improve the environmental impact statement that they had withdrawn during the summer of 1999.

Because there will always be uncertainty, some level of risk in scientific prediction, it was important says Boesch to give some measure of confidence to their best scientific knowledge. Accounting for these varying degrees of uncertainty, the researchers came up with the following judgments:

Effects on Nutrient Loading

► Dumping dredged material from the shipping channel at Site 104 would add a small fraction of phosphorus and a more substantial portion of nitrogen to the already overenriched upper Bay. The addition, however, would equal less than one percent of nitrogen inputs from land and atmosphere during a 5-year period. *High degree of certainty.*

► The effects of this movement and injection of nutrients in dredged sediments would stimulate algal blooms locally and only for a few weeks; they would not affect algal biomass or reductions in oxygen (hypoxia) in a perceptible way in the upper Bay. *High degree of certainty.*

A Flood of Sediment

Researchers estimate that more that 90% of the sediment that normally comes down the Susquehanna River is deposited in the area of the Bay north of Baltimore Harbor. Given this on-going process of sedimentation, some experts estimate that keeping Bay shipping channels open will mean removing 4.5 million cubic yards from the Bay each year — an amount of silt roughly equal to that which rivers annually carry into the estuary from cities, farm fields and construction sites.

Estimated Yearly Sediment Input into the Chesapeake

Source	Amount of Sediment
Rivers	4.3 million cubic yards
Shoreline Erosion	4.7 million cubic yards

Skip Brown

Transport and Fate of Dredged Sediments

► The physical characteristics of the silt and clay bottom of the deep trench would not change dramatically. *High-to-moderate degree of certainty.*

► Small plumes of sediment would drift off Site 104 during dumping, settling out in a matter of hours, with few effects. *High degree of certainty.*

► A substantial majority of the sediments would permanently remain within the site 104 trench — models predict 6-12 percent would escape. *Moderate degree of certainty.*

► Sediments eroded by tidal currents would mostly be redeposited along the deep channels of the Bay and not settle on sensitive shallow-water habitats. *High-to-moderate degree of certainty.*

Effects of Sediment Contaminants

► Because contaminant levels in the dredged sediments are similar to background levels in the Bay's silt and clay bottom, and because potentially toxic compounds are generally bound to silt and clay particles, the threat of toxic effects from the dumping appears quite small. *High degree of certainty.*

► After placement of dredged sediments, concentrations of chemical contaminants in the surface sediments at Site 104 will be similar to those present now, although contaminants could be taken up by organisms for a short period following placement. *Moderate degree of certainty.*

Effects on Fish Habitat

► Though information is sparse on habitat use by specific species, the report notes that Site 104 is located in the narrowest reaches of the Bay and contains deep water that is generally warmer than surrounding bottom areas in winter. These two features (depth and temperature) suggest that the Site 104 area may be of unusual importance both as a corridor for migrating fish moving to complete their life cycles, and as a thermal refuge during cold winter periods. *Low degree of certainty.*

This last point, although made with less certainty due to a lack of long-term scientific observation, raises a concern about impacts to some species of fish, among them sturgeon, that might use these deeper trenches as a refuge. This might be especially important in winter, when deep waters remain warmer than rapidly cooling surface waters, and when these lower layers of the Bay contain more oxygen than in summer.

Since [1975 when] Site 104 was last used as a dumping ground, public perceptions have shifted and sharpened.

Finally, the report notes that "all options for placement of dredged sediment have some potentially deleterious environmental consequences; without careful comparative analysis it cannot be concluded that placement of dredged sediments at Site 104 is inherently more deleterious than the alternatives."

Given the charged atmosphere surrounding the issue, how has the report *Science and Site 104* been received?

The Difficult Middle Ground

Says Frank Hammons, Manager of Harbor Development for the Maryland Port Administration, "We were very happy with the scientific report that came out [from UMCES]. It seemed very balanced, accurate and fair." Hammons adds, "We can't afford to cause a problem in the Bay. We try to take a very balanced approach."

"It's a good paper," says John Gill of the U.S. Fish and Wildlife Service about the UMCES report, adding that he found it "very interesting." Gill says that he agreed with many of the assertions in the paper, but disagreed with others. He thought, for example, that the report underplayed the effect of nutrient releases from the dredged material. As far as public reaction, Gill says that the timing of the report's release — in the midst of a difficult debate — "didn't help." Many tended to gauge whatever information was put forward in a political context.

When asked about the same report, Michael Hirschfield, senior scientist for the Chesapeake Bay Foundation (CBF), preferred not to discuss it. "The issue is still too politically charged," he says.

Skip Brown

"Science has a particular and specific role to play, and it should not be used to take the place of making hard choices."

In its public communications, such as the quarterly newsletter, *Save the Bay*, CBF has hit the Army Corps' assessment hard. In the fall issue, the newsletter stated: "CBF scientists assessed the Corps' original environmental impact statement and found significant flaws and inconsistencies, particularly with regard to nutrient releases and impacts to crab and fish habitat."

According to Gill, the Fish and Wildlife Service also found inadequacies in the original environmental impact statement, in the assessment of alternatives to Site 104, for example.

"People were already polarized," says Tom Miller of the UMCES Chesapeake Biological Laboratory and one of the scientists who contributed to the report. "It would have been better to put this kind of holistic synthesis up front," he says, "earlier in the process." Nevertheless, says Miller, even though it faced some difficult challenges the effort was "important to do."

In addition to the difficult timing of its release, Miller says that the researchers also faced the difficulty of applying their overall observations to a "particular place at a particular time," where data may be scarce. It would be better, he says, to have considered the dynamics of the entire upper Bay, and not just this small defined area (Site 104), before making decisions that may affect the ecosystem. "We came up with answers that are limited in scope, because the approach was limited," says Miller.

Miller feels strongly that additional research is needed to characterize the behavior of fish in the deep trenches, during winter, for example, or during migration. According to Miller, a fellow UMCES researcher at the Chesapeake Biological Laboratory, David Secor, was one of the first to call attention to the possible value of the deep trenches as wintering grounds for sturgeon. "This could affect a wide range of organisms," says Miller. "We just don't know."

In fact, says Miller, being clear about what we don't know is often just as important as stating what we do know. And while we have considerable information about fish behavior and population dynamics in the Chesapeake Bay, he says, our understanding of the role of winter habitat for particular species in specific parts of the Bay remains murky.

For Walter Boynton, a researcher who has worked for years on Chesapeake Bay issues, the report was "hard to do." But, he adds, "It is the kind of effort UMCES ought to do." In fact, he says, researchers should try to provide this kind of scientific synthesis more often, but demands on their time — such as teaching, data collection and running research programs — make this difficult.

For Boynton, the involvement of scientists in such synthesis efforts is critical. In order to fully treat a subject, he says, "the tendency among scientists is to write something that is 300 pages long, But if it's going to be shortened, it's better for the scientists to try to do it, since they have the knowledge and experience that's needed."

Of course, he points out, it's not easy getting agreement inside the scientific community either. But then it is precisely that process of contentious scientific checks and balances that gives such work credibility, he says.

In terms of public reception, the report saw a mixed reaction — "a total rainbow spectrum," says Boynton. "Those who oppose the dumping plan didn't take kindly to it, while some managers mainly had a positive reaction."

Evidently the management community was not completely satisfied either, he notes. "I attended a meeting with the Port Administration and Army Corps of Engineers [along with other scientists]," Boynton says. "They were a bit hot about the last section, where we said that they needed to look 'more thoroughly' at other options. They were upset about the 'more thoroughly' part, since they had looked at a large number of potential sites, and felt they didn't get credit." Boynton says that the scientists advised the Corps that the public largely doesn't know about the amount of preparation that went into choosing this site. (According to the Maryland Port Administration's web site, "over 500 options were considered, dating back to the mid-1980s.")

Is Boynton bothered by the criticism from both sides of the dredging issue?

"It used to bother me but not so much any more," he says. "I've been on different sides of many fences by now. The truth is we have serious problems with coastal waters like the Chesapeake Bay — and I'm much in favor of [environmental] groups like CBF. I'm a member of CBF. I send them money. I'm glad they're there. It's just that personally, I think there are much more important and much bigger fish to fry [than the Site 104 issue]."

"But," he adds, "this debate may lead to better ways of handling

Science and Human Choices

BY JACK GREER

Skip Brown

Philosophers like Mark Sagoff of the University of Maryland School of Public Affairs point out that tough environmental decisions require more than scientific knowledge. They also require an understanding of the historical, the ethical, the aesthetic. Sagoff, for example, argues that science is often not helpful in determining how we should understand the importance of a place. In a debate such as the one surrounding the dis posal of dredged material in the Chesapeake Bay, Sagoff holds that the final decision will be made by "those who care."

While researchers such as Walter Boynton and Tom Miller of the University of Maryland Center for Environmental Science are not likely to go as far as Sagoff, they do agree that science alone cannot shape decisionmaking, nor do they feel that science should be used to avoid tough societal choices.

Consider, for example, a simple allegory. Imagine that visitors to Walden Pond received a questionnaire asking whether or not they supported the dumping of some unknown substance into the pond. Suppose, further, that the questionnaire included a paragraph assuring that the material in question had been tested by a panel of distinguished scientists and that it was proven to be perfectly safe.

Chances are that many of these hypothetical visitors would say, "No" to the dumping.

Why? Because they mistrust the science? Or because other forces are at play? Walden Pond was, of course, the residence of Henry David Thoreau. It evokes a sense of American history and literature. Perhaps these imaginary visitors would oppose dumping anything into Walden Pond because the place means something to them, because it stands for something they care about. Perhaps the answers they give are not based on science at all because they do not see the question as a scientific one.

Although this simple analogy cannot compare with the complexity of the dredging issue facing the Chesapeake Bay, could there be similar forces at play? If so, public criticisms of scientific input may be misplaced, and challenges to scientific accuracy misdirected. It may not be the science that concerns those who have vehemently opposed the open water dumping of dredge material, for example, but rather some judgment based on aesthetics or even ethics. Perhaps they feel an estuary that has already received so many environmental insults, so many tons of sediment and nutrients, should be kept free of any additional dumping, and that sediments removed and placed on land are simply being returned to their place of origin — where the clearing of the landscape likely encouraged their eroding into the Bay in the first place. Of course upland disposal has its own problems, and may be more costly. The societal question then would be, "Who pays?"

Regardless of the motivations that guide public perception, ignorance will be no excuse for poor decisionmaking. Intelligent choices will continue to require the best science and most probing analyses we can bring to bear. As E. O. Wilson writes in *Consilience: The Unity of Knowledge*, biology must be joined with ethics if we are to shape wise environmental policies. This does not mean a softening of the sciences. Wilson reminds us that "no intellectual vision is more important and daunting than that of objective truth based on scientific understanding."

But while we work hard to gather objective truth, we must take account of other social, ethic and aesthetic truths as well. Wise environmental policy may ultimately depend not so much on an "us versus them" debate as on our ability to have a conversation with all these voices at the table.

dredged material. Frankly, I would be worried if people weren't objecting."

Frank Hammons, of the Port Administration, agrees that the debate is important. "I have no problem with the discussion," he says. "This is a part of democracy."

Hearing the Voice of Science

Given how polarized many debates can be among environmental, political and economic interests — whether the issue is dredging, or the connection between poultry wastes and *Pfiesteria* outbreaks, or managing oysters and blue crabs — how can a scientific synthesis like *Science and Site 104* best be of use?

According to Boynton, they must be seen as part of a larger process. "Dealing with these issues is like baking a cake," he says. "There are lots of ingredients. We are one part of the recipe — only one part. We are not putting out the Ten Commandments here."

Science has a particular and specific role to play, says Tom Miller, and it should not be used to take the place of making hard choices.

"In our culture anything viewed as 'scientific' is considered by many to be 'irrefutable,'" Miller says. "It therefore moves the debate out of the political arena — where more 'subjective' elements need to be balanced — and becomes 'truth' and is therefore not debatable. People try to take the scientific high ground."

In the environmental sciences, however, Miller points out, issues are rarely "black and white," and in many cases, he adds, "there is not much scientific high ground to claim — maybe only a low hillock."

Rather than a scientific issue, it is really a political issue of burden of proof, Miller says. "Should those who want to use Site 104 have the burden to show that dumping is not harmful; or should those who oppose the dumping have the burden to prove that it is?" asks Miller.

Such decisions, he points out, are not the purview of science.

Both Boynton and Miller feel that university researchers have a special role to play, and a valuable perspective. Boynton points out, for example, that "there are many things in the University system to keep us objective." University scientists do not have the same relationship to a client as a

Dredging, continued

Skip Brown

consultant may have, he says. "We have no reason to put a spin on it," he notes. And given the way academic science works, if there is a "spin," it is generally ferreted out very quickly through the academic process of peer review and debate.

The aim of science, then, is to contribute a clearer understanding of the potential outcomes of an action — though that understanding can only be based on the best available data, research results and scientific experience. There will always be scientific uncertainty and there will always be risks. In the case of Site 104 as a place to put dredged sediment, UMCES researchers have addressed major environmental concerns and given their best predictions on what to expect, including how certain or uncertain they are about those predictions.

While some stakeholders may reject the report's observations out of hand, others may find the scientific summary a useful guide to strategic actions. For example, while nutrients and contaminants — well-known threats to the Bay — may not appear particularly troublesome in the case of Site 104, the altering of habitat that is potentially important for certain species at certain times of the year may prove a cause for concern.

Ultimately how the citizens of Maryland choose to act on this and other information will depend not only on the ranking of risks and uncertainties but also on ethical, aesthetic, economic and other considerations.

"We want to make decisions informed by science," says Boesch, "but the decision making process should not be left for science to dictate." Such decisions, he says, must be made based on numbers of social and political factors, since they have to do with human choices. And this is, he says, as it should be.

Kramer Named Sea Grant Director

The Chancellor of the University System of Maryland has announced the appointment of Jonathan G. Kramer as the Director of the Maryland Sea Grant College. The appointment was made following a national search by Sea Grant's Governance Board, consisting of the Chancellor of the University System of Maryland and the Presidents of the University of Maryland Center for Environmental Science and the University of Maryland, College Park.

"We are delighted that the Maryland Sea Grant College will move forward under the direction of Jon Kramer, not only because of his diverse scientific expertise, but also because he is a proven leader and bridge-builder among our institutions," said USM Chancellor Donald N. Langenberg.

Kramer came to Maryland Sea Grant from the Center of Marine Biotechnology, part of the University of Maryland Biotechnology Institute. He served first as Assistant Director for Research at Sea Grant, and then as Interim Director.

Kramer began his graduate studies at SUNY Stony Brook, and completed his doctorate at the University of Maryland, conducting his research at the University of Maryland Center for Environmental Science, Horn Point Laboratory. His expertise lies in the area of marine biology and microbiology, where he has employed molecular technologies to study the effects of nutrients and contaminants on marine microorganisms. He brings a strong research and science background to his position as science administrator.

According to Donald F. Boesch, president of the University of Maryland Center for Environmental Science, "Dr. Kramer is ideal for the job because Sea Grant is all about partnerships — with the National Oceanic and Atmospheric Administration,

the program's principal federal sponsor, as well as with the State and among academic and research institutions. Jon is the kind of partner anyone would like to have, knowledgeable, understanding, cooperative and reliable."

"Maryland Sea Grant has the opportunity to play a very important role as a catalyst for responsive science," Kramer says, adding that Sea Grant should serve both as a source of high quality scientific information and as a translator of that information for a variety of different users.

During the past year Kramer has worked hard to strengthen the network that links the region's marine research and education programs.

Founded in 1977, Maryland Sea Grant supports marine research and education throughout the state, with a special emphasis on the Chesapeake Bay. A systemwide program, Maryland Sea Grant is located on the University of Maryland's College Park campus and is administered by the University of Maryland Center for Environmental Science.

Additional information about Maryland Sea Grant can be found on the worldwide web at: www.mdsg.umd.edu.

Policy Fellowships

The Knauss Marine Policy Fellowship Program, begun in 1979 and coordinated by NOAA's National Sea Grant Office, provides graduate students across the nation with an opportunity to spend a year working with policy and science experts in Washington.

Over the years, fellows have worked in the legislative and executive branches of the federal government in locations such as the offices of U.S. Senators and Representatives, on Congressional subcommittees and at agencies such as the National Science Foundation and NOAA. Fellowships run from February 1 to January 31, and pay a stipend of $32,000. The application deadline for year 2001 fellowships is September 26, 2000.

Any student who is enrolled as of September 1, 2000 in a graduate or professional degree program in a marine-related field at an accredited institution in the United States may apply through the director of his or her state Sea Grant program. To apply, students and residents of the state of Maryland should contact Susan Leet, Maryland Sea Grant College, 0112 Skinner Hall, College Park, Maryland 20742; phone (301) 405-6375; e-mail, leet@mdsg.umd.edu.

Open House at Environmental Lab

Explore the world of marine science at the University of Maryland Center for Environmental Science's Horn Point Laboratory open house on Saturday, May 20 from 10:00 a.m. to 2:00 p.m. The laboratory, located on the banks of the Choptank River near Cambridge, will open its doors to the public for self-guided tours, exhibits, presentations, and hands-on activities. This year's theme is "The Land-Water Connection."

The open house provides people of all ages with a chance to take a close look at coastal environmental research. UMCES scientists, students and staff will highlight current environmental changes — from local Eastern Shore issues to global challenges. Visitors can talk with experts about ongoing efforts to understand the Choptank River.

Kids can enjoy special activities and projects throughout the campus, including a touch tank filled with Bay animals. In addition to visiting the lab, visitors can participate in the activities listed below. For information on the open house, call (410) 221-8399.

7:00 a.m. — Bird watch walk led by UMCES Vice President Wayne Bell. Meet at the campus entrance off Horns Point Road. Wear comfortable walking shoes and bring binoculars. If the weather is inclement, the walk will be cancelled.

11:00 a.m. and 1:00 p.m. — One hour skipjack cruises aboard the *Nathan* of Dorchester departing from the Horn Point marina. Advance tickets available at the Dorchester Office of Tourism, (410) 228-1000, or at the boat on Saturday.

All day — Antique Aircraft Fly-In, featuring numerous antique aircraft on display at the Horn Point airstrip. Free.

Looking for Reedville

In the last issue of *Maryland Marine Notes*, January-February 2000, there was an error on the map accompanying the spotlight article, "Menhaden Chanteymen." The map incorrectly showed Reedville, Virginia's location as being on the Rappahannock River. It is actually located on Cockrell Creek, just off the Great Wicomico River. We regret the error.

Marine Trades Directory Available

The marine trades industry needs skilled employees, but few are able to find or keep many of them. Recently, the Lousiana Sea Grant College Program and the Maine Maritime Academy published a directory to improve that situation. *Training for the Marine Trades* lists educational resources for instruction in boat building, engine repair, fiberglass, fishing, management, marine technology, seamanship, systems and welding.

The first edition includes 73 training programs in 27 states and Canada. The listings are organized by category of instruction.The project emerged from discussions among marina operators, trade group representatives, consultants and university Sea Grant researchers and outreach specialists about the difficulties of finding skilled labor pools or of improving employee skills in the marine trades.

A limited number of print copies is available from the communications office of Louisiana Sea Grant College Program, phone (225) 388-6448 or e-mail bducote@lsu.edu.

UM Scientists Grow Sea Bream Indoors

University of Maryland scientists have figured out how to make commercially valuable fish spawn and grow to market size in a closed system, a discovery that could lead to a flourishing inner-city aquaculture industry.

A team from the University's Center of Marine Biotechnology at the Columbus Center in Baltimore's Inner Harbor successfully raised gilthead sea bream, a popular Mediterranean fish, in tanks filled with treated tap water in a Fells Point warehouse.

The principles they used can be applied to mass produce other fish species, helping to take fishing pressure off those in the wild, says Yonathan Zohar, the center's director.

End Notes

Better Backyards

The Chesapeake Bay Program has issued a new publication titled *Better Backyard: A Citi - zen's Guide to Benefi - cial Landscaping and Habitat Restoration in the Chesapeake Bay Watershed*. The Bay Program is joining with the State of Virginia and the U.S. Postal Service to promote BayScaping, citizen participation and partnerships. The Postal Service has a new BayScapes poster and brochure on display at over a thousand Post Offices around the Chesapeake Bay watershed. Copies of *Better Backyard* are available by calling (800) YOUR BAY or from the Chesapeake Bay Program website at www.chesapeakebay.net, under News & Info.

Shellfish Conference

Abstracts for oral and poster presentations are sought for the Fourth International Conference on Shellfish Restoration (ICSR '00), to be held at Hilton Head, South Carolina on November 15-19, 2000. The conference will focus on the restoration of molluscan shellfish and their habitat, with a theme of "Enhancing Partnerships." It will provide an opportunity for government officials, resource managers and users to discuss approaches to restoring coastal ecosystems through habitat quality assessment and restoration; stock enhancement, management and restoration; and habitat remediation through watereshed management.

The conference will consist of invited and contributed oral and poster presentations and workshops. There will also be a session organized by the Oyster Disease Research Program. Mornings will feature internationally recognized plenary speakers and afternoons will feature concurrent sessions organized around theme areas. Those interested in participating should request more information from Elaine Knight by e-mail knightel@musc.edu, voice mail, (843) 727-6406 or fax, (843) 727-2080. For information on submitting an abstract, contact Rick DeVoe: e-mail devoemr@musc.edu, phone (843) 727-2078, fax (843) 727-2080.

Maryland Marine Notes
Volume 18, Number 2
March-April 2000

Maryland Marine Notes is published six times a year by the Maryland Sea Grant College for and about the marine research, education and outreach community around the state.

This newsletter is produced and funded by the Maryland Sea Grant College Program, which receives support from the National Oceanic and Atmospheric Administration. Managing Editor, Sandy Rodgers; Contributing Editors, Jack Greer and Merrill Leffler. Send items for the newsletter to:

Maryland Marine Notes
Maryland Sea Grant College
0112 Skinner Hall
University of Maryland
College Park, Maryland 20742
(301) 405-6376, fax (301) 314-9581
e-mail: mdsg@mdsg.umd.edu

For more information about Maryland Sea Grant, visit our web site:
www.mdsg.umd.edu/MDSG

***Maryland Marine Notes* (current and back issues since 1995) is also available on the web at www.mdsg.umd.edu/MarineNotes**

Recycled Paper

PRINTED WITH SOY INK

Maryland Sea Grant College
0112 Skinner Hall
University of Maryland
College Park, Maryland 20742

Address Service Requested

Non-Profit Org.
U.S.Postage
PAID
Permit No. 10
College Park, MD