# OUR CHANGING ESTUARIES

**NEWSLETTER OF THE ESTUARIES SECTION**
**THE AMERICAN FISHERIES SOCIETY**

Spring 1996 Volume 1 Issue 3


## Section Officers

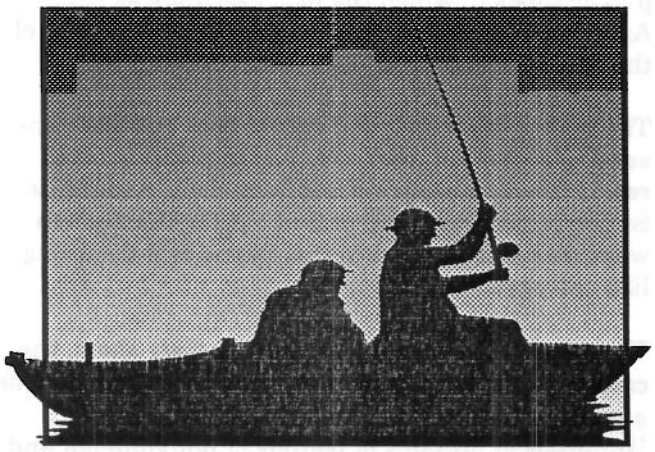
President: Stephen M. Waste, Tel: 301-713-2325, Fax: 301-713-1043, Internet:swaste@ccgate.ssp.nmfs.gov

Vice President: Deborah Ann New, Tel: 202-452-7753, Fax: 202-452-7702, Internet:dnew@wo00ee.wp.wo.blm.gov

Secretary/Treasurer: Bruce M. Kahn, Tel: 202-833-8748, Fax: 202-833-8775, Internet:Bruce@esa.org

New officer: Bruce Kahn is a Program Manager for the Sustainable Biosphere Initiative of the Ecological Society of America. His address is 2010 Massachusetts Ave, NW Suite 400, Washington, D.C. 20036

Please feel free to contact any of these individuals at any time if you have suggestions, questions or concerns about the Estuaries Section.



## Symposium Highlights

**Annual Meeting: Sustainable Fisheries: Economics, Ecology, and Ethics August 26-29, 1996, Dearborn, Michigan**

**Title:** Economics, Ecology, and Ethics: Estuaries as Nexus

Morning Session: Societal and Institutional Aspects of Estuarine Management
Afternoon Session: Problems, Techniques, Ecological Implications

**Co-Chairs**
Stephen M. Waste, Deborah Ann New

**Moderator:** Prof. Kai N. Lee, Williams College

**Changes in Elevation and Vegetation Over Time in a Restored Wetland as Measured with a Total Station Geographical Positioning System (GPS).** Blake Feisty and Charles A. Simenstad, University of Washington.

**Contaminant Effects on Estuarine Macrobenthos.** Donna D. Turgeon Bioeffects Assessment Branch, Ocean Resources Conservation and Assessment, NOS/NOAA

**inside...**

# Symposium Highlights, cont.

**Identifying Organic Matter Sources that Support Fishes of Southern California Estuaries Using Stable Isotopes and Implications for Restoration.** Thomas J. Kwak, Arkansas Cooperative Fish and Wildlife Research Unit, Univ. ofArk. Joy B. Zedler, Pacific Estuarine Research Laboratory.

**A habitat at risk: productivity of coastal salt marshes for fishery species and potential impacts of oil spills.** Thomas J. Minelloand and Lawrence P. Rozas, NMFS

**The NMFS Office of Habitat Conservation: Implemeting Strategic Plan.** Thomas Bigford National Marine Fisheries Service.

**Legal Issues of Fisheries Allocation: Alaska Board of Fisheries**
Stephen M. Waste, NMFS, NOAA

**The Copper River Dleta Project: Putting the theory of Sustainable Development to Work.** Riki Ott, Alaska Clean Water Alliance

**Reversal of Fortune? Lessons for estuarine Management from the Decline of Salmon in New England, Claifornia, and the Pacific Northwest.** Michael Black, San Francisco, CA.

**Interaction of Science, Engineering and Policy in California's Sacramento-SanJoaquin Estuary**, Bruce Herbold, USEPA, San Franciso, CA

**Habitat Preference of Fish in mid-Atlantic estuarine/Coastal Systems.** Mark E. Monaco, NOAA, Stephen B. Weisberg, VERSAR, and Tony A. Lowery, NOAA.

**Trophic Impacts of Introduced Invertebrates on Estuarine-Dependent Fishes.** Gonzalo C. Castillo, John W. Chapman, , Hiram W. Li, Oregon Cooperative Fishery Unit, Oregon State University, and Todd W. Miller, Humboldt Stae University.

**Ethics and Estuaries: Tough Choices for Professional Biologists.** Bruce M. Kahn, SBI/ESA, Deborah A. New, BLM, and Stephen M. Waste, NMFS, NOAA.

## AVOIDING ANOTHER SILENT SPRING

The Global Citizen, March 7, 1996
Donella H. Meadows, P.O. Box 58,Plainfield NH

In late 1987 Dr. Ana Soto walked into her lab at Tufts University Medical School and found her tissue culture plates overrun with breast cancer cells. In years of research, she had never seen anything like it.

Soto and her colleague Dr. Carlos Sonnenschein were trying to isolate the inhibiting factor in blood that normally keeps cells from multiplying wildly into cancer. They grew various kinds of cells in the presence of different fractions of blood serum. If inhibitor was present in the fraction, the cells didn't grow. If it was absent, they did. Or so it had always worked, until that day in 1987.

Most of the cells in the lab were behaving properly; only the breast cancer cells were going wild. Soto knew that those cells are sensitive to the hormone estrogen. Their walls contain receptor sites that bind estrogen, which then blocks the growth inhibitor. The rampant growth Soto was seeing had to be a result of estrogen contamination.

It took the researchers four months to figure out where the estrogen was coming from. They checked their procedures, their cell lines, their chemicals, the way they washed their hands, their equipment. They locked the lab, fearing they might be targets of some kind of sabotage. They changed labs in case the air was somehow imbued with estrogen. The estrogen-sensitive cell lines kept growing lustily.

Finally they ordered from a different supplier the plastic tubes in which the blood serum was kept. And once again the inhibitor stopped the growth of the breast cancer cells, as it was supposed to.

The maker of the original tubes, Soto and Sonnenschein discovered, had switched to a new plastic resin. The company refused to reveal its contents. So the researchers had to find out for themselves what was leaching out of the plastic and behaving like estrogen.

To make a long chemical detective story short, the culprit was p-nonylphenol, an antioxidant sometimes added to plastics to make them less breakable. Hundreds of millions of pounds of nonylphenol and related compounds are used annually in packaging (including food packaging), other plastic products, and cleaning agents.

# Avoiding Another Silent Spring, Cont.

To make a long chemical detective story short, the culprit was p-nonylphenol, an antioxidant sometimes added to plastics to make them less breakable. Hundreds of millions of pounds of nonylphenol and related compounds are used annually in packaging (including food packaging), other plastic products, and cleaning agents.

In 1993 endocrinologists at Stanford University identified another estrogen mimic that lurks in plastic. Called bisphenol-A, it is added to polycarbonate, which is used in many kinds of packages, including drinking water bottles and the linings of food cans.

This story of estrogen mimics in plastics comes from Chapter 8 of the new book, "Our Stolen Future" by Dr. Theo Colborn, Dr. J.P. Myers, and Dianne Dumanowski.

The book pulls together an astounding number of research findings about industrial chemicals that act like hormones. Called "endocrine disrupters," they can `either block or falsely stimulate cell-wall receptors, turning secretion, metabolism or replication on or off. The evidence suggests that endocrine disrupters are the cause of falling human sperm counts, female birds that act like males, male alligators with shrunken penises, and birth defects or reproductive failures in everything from polar bears to Great Lakes fish.

Another example, from Chapter 9, tells what Pierre Beland of the St. Lawrence National Institute of Ecotoxicology found when he dissected beluga whales to see why their populations are declining: " ... malignant tumors, benign tumors, breast tumors, and abdominal masses. One had bladder cancer, like many of the workers at the aluminum plant on the Saguenay River, a tributary where some of the whales spend a good deal of time.... A large number also suffered from endocrine disorders, including enlargement of and cysts in the thyroid gland." One whale had both male and female reproductive organs. Many had breast malfunctions that prevented nursing.

The bodies of these whales contain high loads of industrial chemicals. One carcass of a young whale had a concentration of PCBs (another endocrine disrupter) ten times higher than it would take to classify the animal underCanadian law as hazardous waste.

"Our Stolen Future" is going to cause a sensation. It will be called another "Silent Spring." (Vice President Al Gore calls it that in his foreword.) It will be interesting to see whether in the 34 years since the first "Silent Spring" we have learned how to react constructively to news that we are poisoning ourselves and our fellow creatures.

If the media have matured in the past three decades, they will not whip us into mindless panic. The findings related in "Our Stolen Future" are deeply sobering, but they do not say that bottled water causes breast cancer or that to save our sperm we must stop using chemicals.

If industry has gained in social responsibility since "Silent Spring," it won't snap into denial, foot-dragging, or personal attacks on the authors.

If the government has learned anything from Superfund, it won't turn out hastily drafted, politically soothing legislation that guarantees endless litigation, chemical by chemical, costing corporations billions of dollars while failing to protect either people or nature.

Perhaps we have all learned enough to come at this problem seriously, with an intent to solve it. If so, we will recognize that it is generic. If we emit massive quantities of untested chemicals into the environment, some of them are bound to end up in places that surprise us, doing things that endanger us. Endocrine disrupters are not the first and won't be the last. The way to end these lethal surprises is not to focus on a single chemical or set of chemicals, but to step back and ask hard questions about all the chemicals we use. Which ones do we really need? Is it necessary to dump them into our life-support systems? Are they worth what we pay for them in money, in health, in environmental damage? How, from their invention to their disposal, should we test and control them for long-term common good in a way that won't stop, but could limit, short-term private gain?

Some suggested answers to those questions next time.

(Donella H. Meadows is an adjunct professor of environmental studies at Dartmouth College.)

# Extension of the Estuarine Index of Biotic Integrity

The Ecosystems Center at the Marine Biological Laboratory in Woods Hole is continuing development of the Estuarine Biotic Integrity Index (EBI). Researchers Linda Deegan and Melissa Weaver are coordinating the EBI study which is funded by the Environmental Protection Agency.

The EBI is intended for evaluation of estuarine water quality and ecosystem condition and is based on the Index of Biotic Integrity that was developed by James Karr (1981, 1991) for streams. The EBI was developed and validated using data from Waquoit Bay and Buttermilk Bay on Cape Cod in the late 1980's (Deegan 1996). This index is composed of metrics derived from the abundance and composition of the fish community. Fish are classified by life history strategy (e.g. resident, diadromous, nursery, or marine), trophy (e.g., filter feeder, invertivore, or piscivore), and zone (pelagic or benthic). Estuarine spawners and nursery fishes and benthic feeders are especially sensitive to loss of eelgrass habitat, anoxia, and other stresses associated with anthropogenic changes in the watershed. Thus, a reduction in the abundance or species richness of these fishes may indicate a degradation in estuarine habitat. These measures are some of the metrics that comprise the EBI.

The purpose of this continued research is to determine if the EBI can be used (1) to monitor changes in habitat quality over time, and (2) to assess habitat quality in biogeographic regions where the community is composed of fish species different from those found on the Cape. Thus, this index must be sensitive enough to note changes in habitat quality due to further eutrophication or restoration yet tractable enough to use in different biogeographic regions.

We resampled the fish and plant communities of Waquoit Bay (part of the National Estuarine Research Reserve) and Buttermilk Bay (at the head of Buzzards Bay) on Cape Cod in July 1995. Changes in the fish composition in
Waquoit Bay, as evidenced by a reduction in species richness and in the abundance of estuarine resident fishes and the calculated EBI, reflect further eutrophication due to nitrogen loading, increased turbidity, and the loss of eelgrass beds. Sampled sites within Waquoit Bay that had been considered only moderately degraded in the late 1980's were classified as severely degraded in 1995. In Buttermilk Bay the extent of eelgrass beds near the head of the bay has in-

To test the ability of the EBI to assess habitat quality in other biogeographic regions we visited the lower Western Shore of the Chesapeake in Virginia in August 1995. We were housed at the Virginia Institute of
Marine Sciences on the York River and collaborated with researches at their Sea Grass Laboratory. To examine the fish community composition we collected fish using a small otter trawl. As a indication of the condition of estuarine habitat, we sampled the eelgrass, epiphytes, and macroalgae using SCUBA diving equipment and also collected water samples for water quality analyses. These data were compared with long-term land use, water quality, nutrient-loading, and turbidity data collected by agencies within the Chesapeake Bay Program. Preliminary analyses of processed samples indicate that the index requires some modification to account for the greater diversity of fishes and the higher abundance of marine fishes in Chesapeake Bay than in Cape Cod bays. These marine fishes are less dependent on estuarine habitat and so their presence or high abundance is not necessarily an indication of good estuarine habitat quality. Other fishes, such as benthic flat fishes and cryptic pipefishes and seahorses, are less abundant in open areas than they are within eelgrass beds so that their absence is associated with habitat degradation and the subsequent loss of eelgrass beds.

Furthermore, we plan to investigate methods for scaling the index from small bays within estuaries to estuarine rivers and even to a much larger area such as the Lower Chesapeake Bay. Our sampling regime at Chesapeake Bay included sites along the York River and sites at the river mouths along the main stem of the Lower Chesapeake Bay. Therefore, we should be able to integrate our local measures of the fish community composition along these spatial gradients weighting these measures by the aerial distribution of the eelgrass beds. The integrated EBI and the component metrics should reflect the Bay-wide health of the fish community.

Melissa J. Weaver, Ph. D., The Ecosystems Center Marine Biological Laboratory, 7 MBL Street,Woods Hole MA 02543, USA .

# **America Overlooks Natural Pollution Filter,** National Oceanic and Atmospheric Administration/National Ocean Service

America's coastline is one of the nation's most diverse, beautiful and productive natural features. In the fight against pollution and erosion along the coast, Americans may be overlooking one of the most coast's most common, productive and self-preserving features: estuaries.

Estuaries occur where salt water from the sea meets and mixes with fresh water from rivers and streams. These "brackish" waters include bays, sounds, inlets, bayous, and sloughs... otherwise known as estuaries role.

Estuaries are among the most productive natural places on earth. The combination of salt and freshwater produces a unique and fertile environment that supports a diversity of plant and animal life - plants and animals that people need to survive.

More than two-thirds of the fish and shellfish commercially harvested spend part or all of their lives in estuaries. Ecologists have found that estuaries produce more food per acre than the best midwestern farmland!

ESTUARY BENEFITS

o filtering pollutants, which means higher water quality
o soaking up storm and flood water that would otherwise devastate communities
o controlling erosion by trapping sand and silt that would otherwise wash into the ocean
o supplying places for recreation, such as boating and fishing

HANGING IN THE BALANCE

These fragile waters - vital to our economy - can be easily destroyed by human activities. Decades of overuse and misuse have led to declining water quality, damaged ecosystems, and a loss of fish and wildlife. Oysters, salmon, Atlantic blue crab, and other important fish are no longer abundant. Consumers feel the impact with unemployment and higher seafood prices.

The need for restoring and protecting estuaries is widely recognized. A survey conducted in 1994 by the Alliance for the Chesapeake Bay, for instance, found that 91% of people in the Bay watershed - even people who lived more than 100 miles from the Bay - thought Bay restoration was the most important pub-

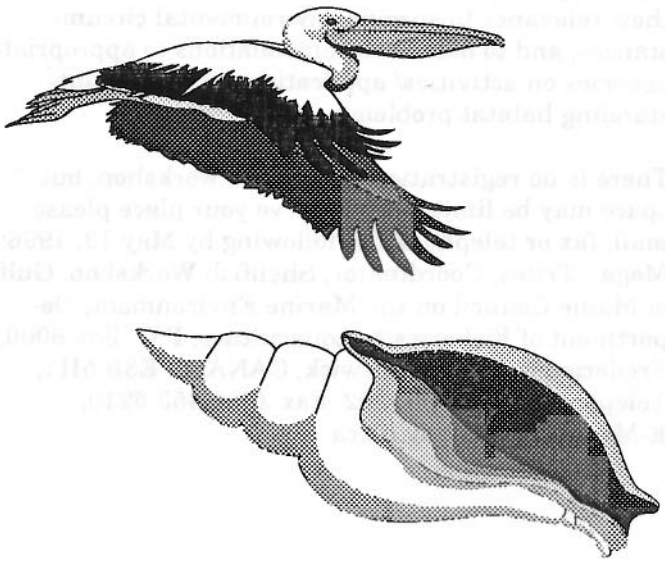
The National Estuarine Research Reserve System

Improving and keeping estuaries healthy requires a clear picture of how estuaries function. For this reason, the 1972 Coastal Zone Management Act established the National Estuarine Research Reserve System. The system now protects 22 estuaries nationwide for research and education.

State goverments manage the reserves through a state-federal partnership.The national system strives to:

o provide the nation with field laboratories for researching natural processes and the impact people have on the environment, as well as for monitoring water quality. About a dozen projects are federally funded each year.
o teach thousands of people each year about these valuable waters through community education projects.
o pass on research conclusions to state governments, so that state leaders can make wise choices when balancing the many conflicting ways people try to use land and estuaries.
o expose tens of thousands of visitors to the beauty of estuaries and explaining the relationship people have to estuaries.

Through state-federal cooperation, the National Estuarine Research Reserve System provides critical information, exposure, and protection for these irreplaceable resources.



# Conference Announcements

The Regional Association for Research on the Gulf of Maine (RARGOM) is convening a Gulf of Maine Scientific Symposium and Workshop in St. Andrews,
New Brunswick, September 16-19 1996. The focus of the meeting will be ecosystem dynamics with invited plenary talks, poster sessions, and working groups addressing recent research advances in six major topics: circulation effects; vertical transport processes; biogeochemical processes and contaminant inputs; human-induced biological effects; fisheries science; and ecosystem modelling. The fisheries component of the meeting will focus on an examination of ecosystem approaches to fisheries science. Abstracts for poster presentations must be received by May 3 at RARGOM, Dartmouth College,
Thayer School of Engineering, Hanover NH 03755. For more information on the meeting and about submitting abstracts, call 603 646-3480 or check out the RARGOM home page at http://fundy.dartmouth.edu/rargom/

"SHELLFISH HABITAT RESTORATION WORKSHOP"
(What Works, What Doesn't, How Do We Fix It?)

to be held June 18-19, 1996 at the Hilton Hotel/Trade and Convention Centre, Saint John, New Brunswick
Workshop Objective: The objective of this workshop is to examine shellfish habitat restoration approaches currently used throughout the Gulf ofMaine and their relevance to specific environmental circumstances, and to make recommendations to appropriate agencies on activities/ applications to resolve outstanding habitat problems.

There is no registration fee for this workshop, but space may be limited. To reserve your place please mail, fax or telephone the following by May 13, 1996: Megan Trites, Coordinator, Shellfish Workshop, Gulf of Maine Council on the Marine Environment, Department of Fisheries & Aquaculture, P.O. Box 6000, Fredericton, New Brunswick, CANADA E3B 5H1, Telephone: (506)444-3292 Fax: (506)453-5210, E-Mail: megant@gov.nb.ca

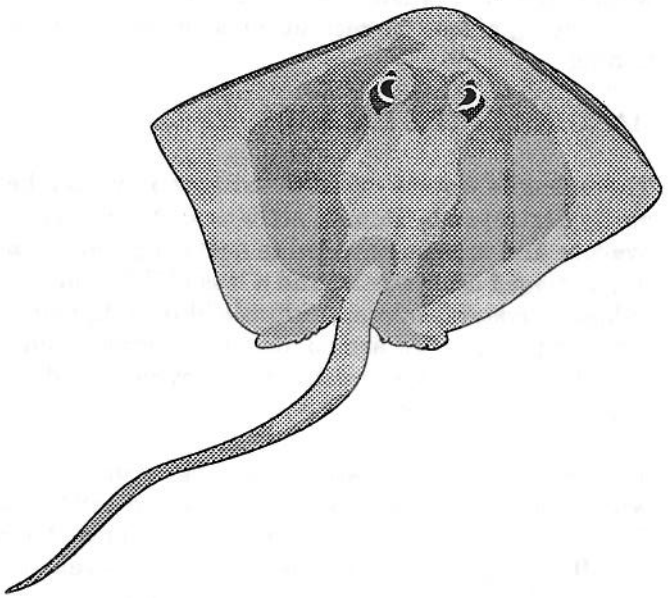
# Internet Window

The EnviroLink Network is proud to announce the creation of Earth Day '96 On-Line, the comprehensive clearinghouse of Earth Day 1996 activities. This site will also be featuring live coverage of Earth Day events throughout the month of April.
The site is available via the World Wide Web at:

http://www.envirolink.org/earthday

The EnviroLink Network, a non-profit organization, is the world's largest environmental network, with over 2.4 million users every month logging in from over 130 countries (source: The ThoughtPort Authority, Inc.). For more information about the EnviroLink Network, please visit the web site: http://www.envirolink.org or call (412) 683-6400.

If you are interested in listing your event on this site at no cost, please send e-mail to: maurice@envirolink.org



# JOB Announcements

University of Idaho
Position Announcement

DIRECTOR
University of Idaho Hagerman Fish Culture Experiment Station Hagerman, Idaho

Administrative (35%), research (25%), service (25%), and teaching (15%) responsibilities include: Manage the activities of the station and use of the facilities; secure funding for and conduct research associated with commercial and conservation fish culture, concentrating primarily on fish nutrition, physiology, and culture; maintain close liaison with industry through technology transfer and dialogue with industry representatives; develop a graduate course in fish nutrition; participate in graduate student seminars and other courses; and advise graduate students.

Requires a Ph.D. in fish nutrition or a related field. Five or more years of administrative experience in station or laboratory administration are preferred. Eligibility for the academic rank of Associate or Full Professor (based on University of Idaho eligibility requirements) is highly desirable.

Send letter of application with curriculum vita and the names and addresses of 3 references to:

Dr. Ernest L. Brannon, Chair
Hagerman Director Search Committee
Aquaculture Research Institute
University of Idaho
Moscow, ID 83844-2260

Closing date for applications is May 15, 1996, or until a sufficient pool of qualified applicants is obtained.

Job Announcement:
Assistant Hatchery Manager. Large scale indoor water recirculation system in Ithaca, NY. BS in engineering or related field. Experience in water recirculation systems and/or tilapia production preferred. Salary is competitive, benefits package, profit sharing. Starting date fall '96.
Send letter of application to Microgen, Inc. 218 Cayuga Heights Road,
Ithaca, NY 14850 or email to MBT3@cornell.edu.

The American Samoa Department of Marine and Wildlife Resources has two openin gs:
1) CONSERVATION OFFICER-III. Supervise and participate in the enforcement of fish and wildlife laws in the Territory of American Samoa.
QUALIFICATIONS: 3 years experience in conservation law enforcement plus a bach elors degree in fisheries management, wildlife management, criminal justice, or other related field.
2) RESEARCH BIOLOGIST-IV (FISHERIES). Oversee and coordinate all aspects of t he monitoring of commercial fisheries in American Samoa including data collection, data analysis, report a nd grant writing. Must be willing to spend multiple (up to 5) days at sea.
QUALIFICATIONS: Masters in Fisheries or closely related field. Experience wit h monitoring pelagic or reef slope bottom fish fisheries highly desired.
SALARY AND BENEFITS: Both are 2 year renewable contract positions, $20,000 to $24,000 per year plus subsidized housing, round trip airfare and moving allowances. Opportunities e xist to conduct research as well.
WHERE TO APPLY: Send enquiries, resume, letter of research interest, and 3 references to Alan Kinsolving or Dan Sua, Department of Marine and Wildlife Resources, PO Box 3730, Pago Pago, American Samoa 96799 U.S.A., (684)-633-4456 Phone, (684)-633-5944 FAX

POSITION ANNOUNCEMENT
DATE: March 18, 1996 POSITION: Summer Research Assistant - Ungraded, Nonexempt. EMPLOYER: Marine Bioloigical Laboratory, Woods Hole, MA.

The Ecosystems Center at the Marine Biological Laboratory is hiring two summer research assistants to investigate the relationship between human-induced eutrophication and fish use of estuarine habitats in Southern New England. A knowledge of fish identification and ecology and general marine biology and ecology is required. SCUBA certification is needed for at least one of the two openings. The duration of employment is approximately three months, beginning early June. Please send resume, transcripts, and names of three references to Human Resources (Summer 1996), Marine Biological Laboratory, 7 MBL St., Woods Hole, MA 02543. Email: resume@mbl.edu

For more information about the position please send inquires to Dr. Melissa J. Weaver, The Ecosystems Center, 7 MBL St., Woods Hole, MA 02543, Email: mweaver@lupine.mbl.edu, MBL's home page at www.mbl.edu.

## Stopping Non-point Source Pollution in the Royal River Watershed

by Peter R. Wagner, Assistant Scientist, University of Maine Cooperative Extension

The Royal River Watershed Project (RRWP), established in the spring of 1993, is an environmental awareness and education program started by the Water Quality Program of the University of Maine Cooperative Extension with a grant from the Extension Service-U.S.D.A. The main project goal is to reduce non-point source pollution within the watershed that ultimately flows into popular Casco Bay. The watershed has both highly populated residential areas and rural agricultural landscapes. Our education efforts have focused on this diverse setting.

The Royal River watershed covers approximately 197 square miles, stretching between 11 towns and two counties in southern Maine. Approximately 55,000 reside in the watershed. The Royal River stretches from Sabbathday Lake in Poland, Maine to Casco Bay where it empties into the Atlantic Ocean. The Royal Rivers meanders approximately 27 miles along which it is charged by several tributaries, run off from bordering landscapes, and by aquifers in the area. As with most river systems, the Royal River is subjected to many pollution stresses such as stream bank erosion, fertilizer and pesticide run-off from agricultural and residential areas, contaminated groundwater, and septic systems failures. Our programs have addressed these concerns.

Currently, the RRWP Provides assistance to a local citizen group called the Friends of the Royal River. A small, but active group, the Friends have concernedthemselves with collecting baseline water quality data from the Royal River. For three years the Friends have taken water samples from the river to determine biological oxygen demand (BOD), temperature, turbidity, and bacteria. The Friends hope to monitor these parameters over the years so that they may identify changes in the water quality of the Royal River.

Today, a pressing concern of the Friends of the Royal River and other residents of the watershed is the presence of a Superfund site located along the banks of the Royal River and one of its tributaries. After more than 20 years of work to clean-up the trichloroethylene (TCE) contaminated site, the Environmental Protection Agency and site trustees have come to the conclusion that current extraction technologies were doing little towards cleansing the contaminated aquifer and bedrock and would cease remediation efforts for the present. The Friends hope to increase their monitoring efforts to incorporate TCE sampling as a part of their regular program. The RRWP hopes to monitor the associated stretch of river for the effects of TCE-contaminated water on benthic macroinvertebrate populations that are used as indicators of water pollution.

The RRWP has integrated its environmental education program with ongoing scientific research. We have been interested in determining the effect of various farming practices have on stream water quality by monitoring the benthic macroinvertebrate populations in the stream. These populations are known to be reliable indicators of variations in water quality. Together with the advanced biology class at the Yarmouth High School and a volunteer dairy farm in Gray, Maine, we were able to design a project to address this question.

In the fall of 1994, we placed a series of rock baskets in Collyer Brook, a tributary of the Royal River, to sample the benthic macroinvertebrates that inhabit the stream. This section of the brook was subjected to high traffic from animals watering in the brook, erosion, and nutrient runoff from pastures. Baskets were placed above, at, and below the cooperating farm. After six weeks, the baskets were collected and invertebrates were sorted

## Stopping Non-point Source Pollution in the Royal River Watershed,cont.

and counted by the Yarmouth High School students. Invertebrate data was analyzed according to protocol recommended by the River Watch Network, Montpelier, Vermont. By comparing total numbers of invertebrates, numbers of families, and the ratios of pollution tolerant species to intolerant species between sites, we were able to estimate water quality in Collyer Brook. It was determined that the above and below locations showed some signs of pollution impacts, and analyses indicated that the middle site was highly impacted by pollution.

We hypothesized that the middle site was most greatly affected by dairy operations. At this site where cows frequently watered in the stream, bank erosion was severe, and manure management was poor, our data made sense. To improve water quality at this site, we convinced the farm to institute some best anagement practices in the summer of 1995. Cows were fenced off from watering in the brook and a am pump (a pump powered by falling water, not electricity or gasoline) was installed for an alternative watering system. Willows and other perennials were planted to shore up the eroded stream bank. A rotational grazing system was established to improve the quality of the pasture land and to better control cow traffic.

Benthic macroinvertebrate monitoring in the fall of 1995 provided some encouraging data. We saw increased overall populations and greater numbers of families in baskets collected from the middle site. Also the ratio of pollution tolerant species to intolerant species increased at the middle site. Populations at the above and below sites remained relatively unchanged. Comparing the two season's data, it looks as if our efforts may be paying off toward improving water quality.

We hope that our third sampling in the fall of 1996 will again indicate increased water quality and allow us to demonstrate how best management practices can improve environmental quality and encourage better use of agricultural resources.

Other on-going programs sponsored by the RRWP include our Safe H2OME Program and Farm*A*Syst. The Safe H2OME Program focuses on rural water use. A series of fact sheets, the program allows homeowners to evaluate their home activities to determine how they may affecting their own well water. The fact sheets include topics such as well construction and maintenance, household hazardous waste, household wastewater, lawn and garden care, and lead in the environment. We have offered free well water testing to determine home water quality correlates to home activities. Our intent is that homeowners will be able to make changes in their activities to positively affect their well water. A similar program, Farm*A*Syst helps farm families evaluate various farming practices for possible impacts on water quality through a series of 11 worksheets. We hope to make this program widely available to farms over the next year with the help of several Americorps volunteers. We also publish a quarterly newsletter called Streamlines, that is mailed to 5,000 homes in the watershed. Streamlines focuses on water quality issues that may affect residents along the Royal River.

The RRWP has been successful in helping people identify their role within a watershed and how their activities can significantly affect water quality. Without these types of programs, most residents would not see themselves as cogs in the environmental wheel. As an organization, Cooperative Extension has found the RRWP to be very rewarding working with a diverse community ranging from students, to homeowners, and to farmers.

# POETRY CORNER

The sloshing Sea roils chaotically
The random Wave shatters on the Shore
The River swirls down to the Ocean
Where its self is lost in tidal bore.
The seeming chaos of Natures progeny
The confusing tangle of the Forest's bows
Make Earth seem like a careless Mother
Whose unruly Creatures know no laws.
But if this be chaos, how can one
Explain the gyrations of the Sun?
How can the Salmon find his home
After years of distant roam?
How does the Sea rebirth the River?
How does the wafted Spore deliver
Life into a rotting Forest where
No human gardener imposes care?
Perhaps the order is very clear.
Perhaps we only need to be
More attentive to what we see
More faithful to our inner ear
More like, perhaps, the perky Crocus
Who doubts not Nature's constant focus.

—Buck Meloy,Flopping Fresh Fish Company
Box 572,Bellingham, WA 98227
(360) 734-7186, fish@nwhouse.com

**Estuaries- Liquid Lands**

Our coastal bays and coastal wetlands, our estuaries
They form a system of liquid-lands with the highest productivities.
What is land today, may, tomorrow, become open water.
The magi is in the wetlands, the stream flow, and the tidal waves is altogether.
The fresh water stream delivers nutrients and deposits sediments in the lower bay.
Where the salt water sneaks up with the tidal waves and wash them away.
This dynamics interplay of heterogenous environments offer something for everyone.

Our estuaries support the national economy through wildlife production, fisheries, or just recreational fun.

—Ann E. Castaldi

From the Westlake Picaynune, Wed. Nov.29, 1995
Selected as semifinalist from more than 2,000 entries in the National Library of Poetry 1995 North America Open Poetry contest. Miss Castaldi is an 8th grader at the Hill Country Middle School in Austin, TX.

Apostrophe to a Desecrated River

-- Robert P. Effler

O River, you're the blood of the Body of earth,

And each day you deserve our defense and esteem.

But, we give to you neither value nor worth,

Although always sustained by your stream.

Instead, we endow you with dregs and debris,

Polluting life's fluid, primevally born sweet.

Our muck amassed where you debouch to the sea,

Is poignant proof of a contempt that's complete.

Fish and fowl sing a sad supplication,

Praying that we'll repent and refrain.

In renascent, ancient, sad adjuration,

They appeal to nature's justice again.

Ere that arbiter can condemn us of sin

And exact the penance becoming our crime,

We need to win wisdom, withal, within,

Lest we deliquesce into the dusts of time.

Let not betide, O Giver of revelation,

Another darkness like the dread K-T.

Kindle in mankind, for Your river, veneration

In Your academy of life - the estuary.

R. P. (Bob) Effler eff@ornl.gov
ORNL Instrumentation and Controls PO Box 2008
Oak Ridge, TN 37831-6072
(423)574-7349 FAX (423)576-2337

**Sustainable Fisheries** By Daniel J. Shepard, Earth Times News Service.

This is the problem that many environmental organizations had hoped to solve by somehow getting governments to cut back their national fishing fleets.** Topic: Progress on overfishing treaty seen unlikely.

Members of environmental groups say they are doubtful that there will be any new global initiative to reduce overfishing coming out of this years Commission for Sustainable Development meeting this April. After a new treaty, the United Nations Fish Stocks Agreement, that would help conserve fish stocks in waters outside of national boundaries was opened for signing last December, many of the countries with the world's largest fishing fleets still have not signed. The treaty deals with waters that contain only 20 percent of the world's fish. And the CSD, which held preliminary discussions on issues concerning oceans in February, hardly touched on the issue of overfishing. According to the Food and Agriculture Organization, the size of the world's fishing fleet doubled in the last 25 years, and many of these vessels continue to pick over fish stocks that have been either fully exploited, overexploited, or depleted. FAO says that the decline of many fisheries has caused the global fishing fleet to grossly underperform, incurring losses of more than $50 million a year. Yet nongovernmental organizations say that governments are a major part of the problem, propping up the industry through a variety of incentives and subsidies to fishing fleets. The World Wildlife Fund says that incentives for overfishing include direct subsidies for fleet construction, price support systems, import restrictions, and other non-tariff barriers to trade in fish.

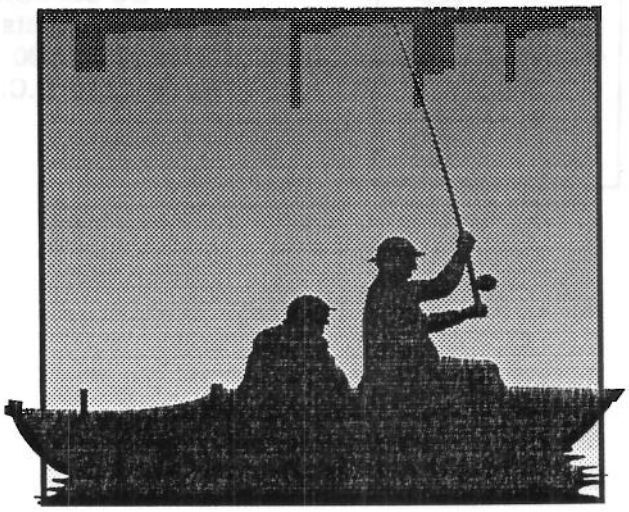
Among the issues that NGOs would like the CSD to address include overcapacity and the question of by-catch, which concerns the million of tons of unwanted fish that are killed. Matthew Gianni of Greenpeace said very little progress on these issues were made at the latest round of CSD talks. "We're not getting too far," he said. "We hope at best to see that countries don't backtrack from previous agreements. Our work here has been damage control." On the Fish Stocks Agreement, Gianni said that Japan had indicated that they supported the agreement, although they have not signed yet. No European Union country has signed the agreement, which is due to considerable disagreement within that group over fishing issues. Spain and Portugal, in particular, have had fishing disputes in the last year with Canada, the United Kingdom, and Morocco.

**1995 U.S. Seafood Imports**

The value of U.S. imports increased to $6.7 billion in 1995, from $6.6 billion in 1994. While this was a 2.3 percent increase in value, import quantity increased only 1.2 percent. Unit value of products increased 1.1 percent. In terms of quantity, Canada (17.6 percent of aggregate U.S. imports), Thailand (13 percent) and China (7.1 percent) remained the largest suppliers to the U.S. Ecuador (7 percent), Taiwan (5.2 percent) and Mexico
(4.5 percent) completed the top six suppliers of seafood products to the U.S. in 1995. In terms of value, the top six suppliers to the U.S. were Thailand
(18.3 percent of the value of all U.S. seafood imports), Canada (16.7 percent), Ecuador (8.3 percent), Mexico (6.7 percent), China (4.6 percent) and Chile (3.5 percent). Approximately 58 percent of the aggregate import value was accounted for by shellfish.

SIGNIFICANT CHANGES: Thailand s exports to the U.S. decreased 15.8 percent in quantity and lost 6 percent in value. The largest increases in exports to the U.S. were from Mexico, up 62.7 percent in quantity and 34.4 percent in value, and Ecuador, up 24.4 percent in quantity and 3.9 percent in value.

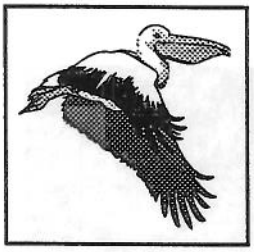
This information and much more can be found in a new 390 page international seafood trade reference text. For more information please contact Jim Anderson, Mark Spatz, Barbara
Gardiner, or Mike Anderson: Phone: 401-783-3930, FAX: 401-783-8883
E-Mail: JLAFISH@aol.com



**Meritorious Service Award:** It is awarded to an individual AFS Member for unserving loyalty, dedication, and meritorious service to the Society over a long period of time; and for excep[tional commitment to the program,ideals, objectives, and long-term goals of AFS. Closing date for submission of nominations is June 15, 1996. Nomination forms are available from Carolyn A. Griswold, Northeast fisheries Science Center, Narragansett Laboratory, 28 Tarzwell Drive, Narragansett, RI 02882-1199 Tel: 401-782-3273.

Announcing: **Restore America's Estuaries**, *Estuary Habitat Restoration Campaign*
RAS is an alliance of 8 regional nonprofit organizations working to protect and restore threatened habitat of estuaries. They have launched a campaign for habitata restoration, developing new incentives and building a resource center to raise public awareness. for more information call 202-797-6545.

***The objective of the Estuaries Section of the American Fisheries Society is to encourage the exchange of information pertinent to the broad scope of multidisciplinary estuarine issues.***



**Estuaries Section/AFS**
**c/o SBI/ESA**
**2010 Massachusetts Ave, NW**
**Suite 400**
**Washington, D.C. 20036**

Bulk Rate
U.S. Postage
PAID
City, ST
Permit No. XXXX

**inside...**