GROUNDWATER FLOW INTO GREAT SOUTH BAY

Last summer Dr. Henry Bokuniewicz and Mr. Michael Zietlin set out to measure directly the submarine outflow into Great South Bay using a simple method devised by R. F. Lee. The measuring device is the top of an oil drum which is pushed, open end down into the sediments. There is a small hole in the top which is attached to an empty plastic bag. Groundwater flows up through the sediment and into the bag. From the amount of water collected during a known time you can calculate the rate of flow.

With a modest grant from the N.Y. Sea Grant Institute, Mr. Zietlin built two instruments and the first test measurements were made with the help of Mr. Thomas Caruso off Islip. In two tests that day, 40 m³ and 107 m³ were collected in twenty minutes. These represent flow rates of a few liters per day per square meter. During later trials, flows as high as 180 liters per day per square meter were measured. The flow was found to be confined to a narrow band about 100 m wide at the shore with the flow rates decreasing rapidly offshore. The total inflow of groundwater was estimated to be 200 million liters per day or about 15% of the total freshwater inflow.

This work is being continued under grants from the Long Island Regional Planning Board and the New York Sea Grant Institute.
MARINE FOOD CHAINS AND THE EFFECTS OF POLLUTION – DOMINICK NINIVAGGI

Many human activities affect food chains in coastal waters. Food chains in marine waters are composed of microscopic algae (phytoplankton) which use plant nutrients and sunlight to grow, and tiny herbivorous animals (zooplankton), which together with the algae comprise the first two links in the chain. These initial links are critical to the production of species of interest to man, such as fin and shellfish. While the public generally becomes concerned only when organisms higher in the food chain, such as commercial fishes, are affected by deleterious changes in the environment, understanding of events occurring lower in the chain may be essential for truly effective environmental protection. An example of such an event is the consumption of phytoplankton by copepods (very abundant zooplankton), a critical link in food chains leading to finfish. Human-induced changes in the phytoplankton may affect organisms higher in the food chain by altering the availability of the phytoplankton to copepods.

Sewage and toxic materials in coastal waters can cause changes in the phytoplankton. Often, smaller forms of phytoplankton are favored by the presence of pollutants. Herbivores even smaller than copepods, which can better utilize the small phytoplankton, may be favored. These smaller herbivores are less readily converted by the food chain into valuable fish species, and may form links leading to undesirable forms, such as jellyfish. The ability of the larger copepods to effectively consume the available algae may determine the abundance of fish near the top of the food chain.

The ability of copepods to consume phytoplankton is determined by the sieve-like properties of their filtering limbs (see Fig. 1). My advisor, Professor O’Connors, and I have been studying the ability of copepods to consume phytoplankton of various sizes. We have discovered that the filtering limbs of at least one important Long Island Sound copepod do not permit this species to efficiently consume small phytoplankton, which are characteristic of those found in polluted waters. While this research is still in progress, we speculate that, in addition to potentially reducing food resources for finfish, the reduced consumption of small algae by copepods may partially account for reduced amounts of dissolved oxygen (a basic measure of water quality) in Long Island Sound waters, as a result of the decay of uneaten phytoplankton. Our research suggests that the indirect effects of pollution on marine food chains may be worth consideration in coastal zone management.

Mr. Ninivaggi is a graduate student at NSHC. The work described here is part of the research for the M.S. degree.

RECENT PUBLICATIONS


MSRC ASSOCIATES

We welcome as new MSRC Associates

John Burness
Alice Winthrop Dunne
Saul Seiff
Long Island Rail Road
Marine Environmental Council of
Long Island Inc.
Stony Brook Harbor Association

For information about joining the
Associates, please contact Jeri Schoof,
Marine Sciences Research Center, SUNY at
Stony Brook, Long Island, NY 11794;
(516) 246-6543.

AWARDS

The Coal Waste Artificial Reef Project,
described in the December 1978 Newsletter,
received funding for the second half of
the 1978-79 year bringing the total support
to just over one million dollars.

MONICA BRICcLJ has been awarded a one-year
Sea Grant Traineeship for her graduate
work with Dr. ROBERT MALOUF on the relation-
ship of clam growth to the availability and
utilization of food.

Prof. H. H. CARTER was granted additional
support by New York ERDA for refinement
and application of MSRC's thermal effects
model of power plant cooling water.

Prof. AKIRA OKUBO may return to his experi-
mental station in the corn fields of
Minnesota. The NSF has granted a supple-
mental award for his work with Dr. H. C.
Chiang of the University of Minnesota on
insect swarming.

PHILIP ZION, who will be enrolling in
MSRC's graduate program this fall, has been
selected for a Stony Brook Graduate Council
Fellowship.

Profs. IVER DUEDALL and PETER M. J.
WOODHEAD received a grant from the Natural
Resources Division of Maryland to study
the effects of coal wastes in the
Chesapeake Bay.

Profs. H. H. CARTER and D. W. PRITCHARD
were awarded a grant by the Academy of
Natural Sciences of Philadelphia for their
proposed thermal plume study at the Calvert
Cliffs nuclear power plant on the
Chesapeake Bay.

FRANK J. ROETHHEL, Ph.D. candidate, received
a Dissertation Grant-in-Aid from the
Graduate School for his research on
"Interactions of Stabilized Power Plant
Coal Waste with the Marine Environment."

Profs. H. J. BOKUNIEWICZ, H. H. CARTER,
and R. E. WILSON were funded by the New
York Sea Grant Institute to carry out a
12-month physical study of the eastern
portion of Great South Bay. The study
will involve measurements of submarine
inflow and continuous measurements of sea
level changes within eastern GSB.

PEOPLE AND MEETINGS

Profs. H. H. CARTER, R. E. WILSON, and
J. R. SCHUBEI visited the Netherlands
Institute for Sea Research (NIOZ) at Den
Burg, Texel, the Netherlands on 1-4 April
1979 for a meeting with representatives
from NIOZ, the Royal Netherlands Metro-
ological Institute (KNMI), Delft Hydraulics
Laboratory, and the Rijkswaterstaat. The
purpose of the meeting was to discuss and
critique up-coming Eulerian and Lagrangian
diffusion experiments in the North Sea by
the Dutch and off the south shore of Long
Island by MSRC scientists.

MYRNA JACOBSON presented a talk entitled
"Coal Combustion Products--A New Artificial
Substrate for Epibenthic Community
Development" at the Smithsonian Tropical
Research Institute in Panama (March) and
at the Benthic Ecology meetings in New
Hampshire (April). This research was part
of the C-WARP project co-directed by
IVER W. DUEDALL and PETER M. J. WOODHEAD.

Prof. J. L. McHugh was invited to partici-
pate in the Coastal Zone Issues Symposium
at the Yale School of Forestry and
Environmental Studies. The title of his
22 February 1979 lecture was "Is Extended
Jurisdiction Working?"

Prof. AKIRA OKUBO was Visiting Professor
on Kyoto University's Faculty of Science
During this period, he was supported by
the Japan Society for the Promotion of
Science (JSPS) Fellowship. The JSPS was
created by the Japanese Government to pro-
vide public support for scientific
research and to promote international
cooperation in science. During his visit,
Professor Okubo gave two series of lec-
tures on mathematical ecology at Kyoto
University, Lake Biwa Research Institute,
Osaka University, Nagoya University,
Ehime University, Japan Ecological Society,
and Japan Atomic Energy Environment Center.
He tells us that he spent a period of time
in meditation at old temples in Kyoto and
Nara, and studied under a Shinto priest
for conducting a special Shinto ceremony:
exorcism.

Dr. NAKAOKA SHIGESADA, Assistant Professor
of Biophysics, Kyoto University, is
visiting MSRC from April 1979 to April
1980 as part of MSRC's Visiting Scholar
program. She is working with Professor
AKIRA OKUBO on mathematical modelling of
the spatial distribution of plankton.
Her visit was arranged with the assistance
of Professor R. F. JONES, Director of
SUSB's Office of International Programs.

Prof. P. K. WEYD gave an invited seminar
in January to the Dana Club of Yale
University's Department of Geology and
Geophysics. The title of his presentation
was "Micropaleontology and the Ocean
Surface Climate."
MSRC PROFESSOR GORO HONORED

MSRC Adjunct Professor Fritz Goro was honored by the American Society of Magazine Photographers with its Life Achievement Photography Award as the Foremost Scientific Photographer. Since retiring after 34 years on the staff of LIFE magazine, Professor Goro has been a regular contributor to SCIENTIFIC AMERICAN and other journals. He has also taught scientific photography at MSRC.

Mr. Goro's early training was in art at the Bauhaus in Weimar under Gropius, Moholy-Nagy, Feininger, Klee, and Itten. Part of the philosophy of the Bauhaus was the integration of art with science and technology. Probably no one has been as successful at achieving this as Fritz Goro.

Will Faller, editor of PHOTOGRAPHY and professor at NYU, recently pointed out:

"From his art background and his intense sensitivity to life, Fritz has produced the most beautiful and meaningful photographic translations. He has created through his photographs, unique images which are a gift to art, science and photography."

MSRC GRADUATE STUDENT STUDIES IN TROPICS

Robert Richmond, a first year student, spent the early part of 1979 in the tropics. From the end of December, until early March, he served as teaching assistant for a graduate course in Tropical Ecology given in Costa Rica under the auspices of the Organization for Tropical Studies. The course, coordinated by Dr. Barbara Bentley of the SUSS's Department of Ecology and Evolution, included participants from a number of U.S. institutions as well as the Universidad Nacional de Costa Rica.

After the course, Bob went on to the Smithsonian Tropical Research Institute in Panama, where he spent a month doing research as a Smithsonian Short Term Fellow. The research is designed to determine how and why reproduction and recruitment of corals vary along an environmental gradient of terrigenous sedimentation. The project benefited from the advice of Professor Peter Woodhead, and from grants in aid from the MSRC Associates and the International Studies Program directed by Professor R. F. Jones.

MSRC SCIENTISTS INVITED TO ROME

Professors P. K. Weyl and J. R. Schubel and Adjunct Professors R. H. Meade and W. S. Reeburgh were invited to an international meeting on River Inputs into Ocean Systems held in Rome in March. The meeting was sponsored by UNESCO and a variety of other U.N. agencies. Approximately 50 scientists were invited to the meeting to define problems relating to three questions: (1) How do river water and river-borne sediments acquire their chemical qualities in response to climatic, geological and cultural factors? (2) What transformations occur when a river meets the sea? and (3) What is the ultimate flux of constituents to the open oceans via rivers?

Weyl was rapporteur for the session "Man's Influence on RIOS and Comparison of Pathways to the Coastal Zone." Meade, Reeburgh and Schubel presented papers: Meade--"Man's Influence on the Discharge of Fresh Water, Dissolved Material and Sediment by Rivers to the Atlantic Coastal Zone of the U.S."); Reeburgh--"Anaerobic Methane Consumption and Its Effect on Carbon and Sulfur Cycles in Marine Sediments"; Schubel and Hirschberg--"Transportation and Accumulation of Fine-grained Sediments in Estuaries."

MSRC scientists H. H. Carter, W. S. Reeburgh (Adjunct Professor) and R. E. Wilson place their fingers in the dike near Texel (the Netherlands) to hold back the Wadden Sea.