

COASTLINES

New York Sea Grant Institute

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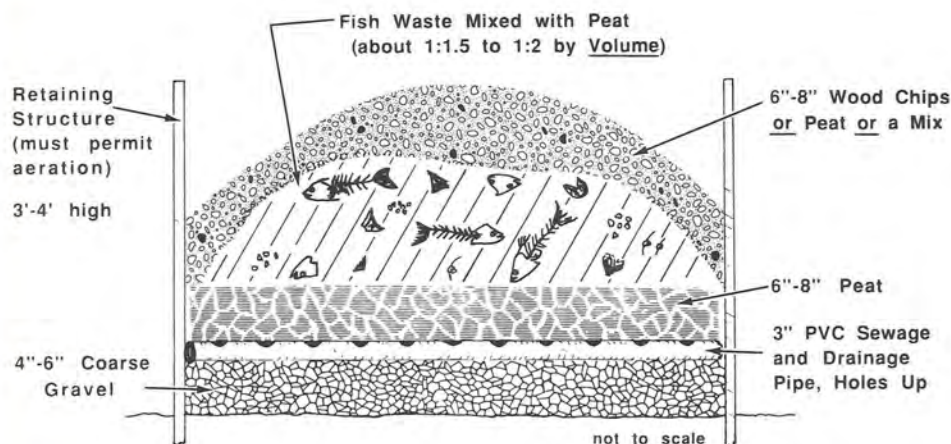
EUREKA!

SEA GRANT COMPOST HITS PAYDIRT!

In what must be viewed as a stunning success, the Sea Grant Extension pilot project of turning fish waste into marketable compost has resulted in a potentially valuable secondary source of income to people involved with sport and commercial fishing.

Because much of the fish waste in the upstate region contains traces of the contaminants PCB and Mirex, the use of this compost will be limited to horticultural purposes such as growing shrubs or evergreens for Christmas trees, which fall under the state's regulations for Class II compost (see inset, p. 2).

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About 29,000 lbs of fish waste was turned into marketable compost to grow Christmas trees and shrubs using this method. *Photo by Mitzi Eisel MSRC Graphics.*

SEA GRANT COMPOST PROJECT CONTINUED . . .



RULES TO COMPOST BY

The following are regulations set down by the New York State Department of Environmental Conservation under part 360 Solid Waste Management Facilities Regulations: Applicability and exemptions.

(a) Applicability. The Subpart regulates the construction and operation of composting facilities for sewage sludge, septage, yard waste, and other solid waste.

(b) Exemptions. The following solid waste management facilities and operations are exempt from this Part: (1) the composting of less than 3,000 cubic yards of waste per year, provided the process follows acceptable methods of composting; and (2) a composting facility at which only food processing (this process has been so classified) waste and/or animal manure are processed, if the following conditions are satisfied: (i) the facility is developed, operated, and maintained in a safe, nuisance free manner; (ii) the process follows acceptable methods of composting that minimize odors and produces a useful, stable end product; (iii) prior to the commencement of operation, written notice is provided to the office of the department in the region in which the facility is located, stating the location of the composting facility, a description of the operation of the facility, and the intended end use for the compost; (iv) the facility complies with the requirements of subdivision 360-4.4(d) of this Part; and (v) the waste contains no domestic sewage, sewage sludge, or septage.

Section 360-5.3

(2) Class II compost: (i) must not have contaminant concentrations greater than the levels identified in subdivision 360-4.4(a) of this Part; (ii) must not exceed 25 millimeter (0.98 inch) particle size. Particle size greater than 10 millimeters (0.39 inch) will be restricted to landfill cover and similar uses approved by the department on a case specific basis; (iii) must be produced from a composting process with a minimum detention time (including active composting and curing) of 50 days; and (iv) must be restricted to use on non-food chain crops.



Nonetheless, with more than two million pounds of fish waste to handle annually, the Great Lakes region has been looking for alternative ways to deal with this problem. "Sportfishing is an important part of the economy around here," explained Dave White, Sea Grant's Great Lakes extension coordinator. "And until now there have been few cost-effective disposal options opened to the folks providing fish cleaning services at small marinas and sports stores."

Under New York State law it is illegal to discard any fish carcass into the freshwaters of the state within 100 feet of shore. The regulations for waste affected by PCB and Mirex contamination are even more severe.

The only legally viable methods of fish waste disposal are landfilling, land spreading and treatment in a sewage treatment plant. But even these methods are not without their problems.

Waste treatment in most lakefront communities is typically geared to handling residential waste. Landfilling capacity is currently under careful scrutiny for its ability to meet demand, and land spreading is being done only on a limited basis because of questionable cost/benefit ratios.

It was because of these limitations that the pilot project was developed by Dave White in cooperation with Dr. Joe Regenstein, Cornell University Department of Avian Sciences, and Thomas Richard, senior research support specialist, Department of Agriculture and Biological Engineering, also at Cornell. The project was supported by a small grant made available to Sea Grant by the College of Agriculture and Life Sciences at Cornell.

With the cooperation of a private marina and a sports store operator, two piles were constructed in each location using different confinement structures and compost mixtures (see *Coastlines*, Vol. 19, No. 1). The structures were 4 feet high, 5 feet wide, and 16 feet long and were made from wood or 1/2 inch wire fencing (see diagram, p. 1).

Each structure had a 6-inch base of gravel and eight 5-foot drainage pipes laid widthwise to provide bottom aeration during the composting process. A 6-inch layer of peat moss was then put down as a base for the compost pile. The peat moss used throughout the pile proved helpful in eliminating odor and rodents.

An alternating layered approach was used in setting up the compost piles,

building 6 inches of fish waste, then 6 inches of peat moss. To speed the composting process, a commercial compost starter was added, along with water, to each layer of waste. The completed piles each contained about 5,000 pounds of fish waste and cost \$510 to produce.

To reduce costs, one of the piles was constructed using a combination of wood chips and peat moss. This also proved successful but was \$200 cheaper. Despite the cost saving, the most recent SG draft report suggests the use of peat moss exclusively, because it better controls odor and rodents.

AND ON LONG ISLAND . . .

Using an approach similar to the one used in the pilot project upstate, Ken Gall, one of Sea Grant's marine district extension specialists, has been working to demonstrate new techniques with Dr. Joe Regenstein from Cornell and Dr. Susan Goldhor from the Center for Applied Regional Studies in Cambridge, Massachusetts, to develop compost and liquid fertilizers from fish waste products.

At a workshop this fall, members of the seafood processing industry were given the opportunity to inspect a completed compost pile, examine its construction and learn about the benefits of composting their fish waste products.

As it is free from the problems of contamination that exist upstate, the composted fish waste in the marine district could likely be used as fertilizer in food gardens and for general agricultural use, allowing for more widespread market potential.

Just how receptive members from the seafood processing industry are to composting is not clear, but it seems likely that the idea of additional revenue from fish waste may prove to be a real inducement.

If anyone would like further information about composting, please contact either Dave White, Great Lakes coordinator, Sea Grant Extension Program, 52 Swetman Hall, SUNY College, Oswego, NY 13126, (315) 341-3042, or Ken Gall, extension specialist, Sea Grant Extension Program, Community Programs Center, 300 Park Avenue, Deer Park, NY 11729, (516) 243-5093.

A LITTLE MUSSEL WITH A LOT OF CLOUT

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The zebra mussel (*Dreissena polymorpha*) is on the move through the Great Lakes, devouring algae in huge quantities, clogging water intake systems in municipal and industrial facilities, and littering area beaches with its razor-sharp shell.

According to Chuck O'Neill, a Sea Grant extension specialist in Brockport, the zebra mussel, a small bivalve from Europe and the eastern Soviet Union, has spread from the waters of Lake Erie into Lake Ontario since its 1988 discovery in Lake St. Clair.

Until three years ago this species of mussel, which is distinguished by its dark color and white stripes and grows to lengths of between one and three inches, was virtually nonexistent in the Great Lakes. However, it has plagued major freshwater ports in Europe for over 100 years.

It probably got here by way of ship ballast tanks. "When the ships discharge the water in their ballast, once they reach their destination, some of the plant and animal life within the six million gallons of water in their holding tanks becomes part of our waters," explained Dave MacNeill, a Sea Grant extension specialist in Great Lakes fisheries.

According to researchers in Lake Erie, there are portions of the lake with zebra mussel densities exceeding 30,000 to 40,000 mussels per square meter. With the large removal of algae from the lake's food web and heavy mussel colonization on the lake bottom



Zebra mussels by the thousands out for a joyride decide to take up housekeeping in this car recently fished out of Lake Erie. Compliments of the Ontario Ministry of Environment.

walleye populations could be severely reduced, which in turn could create economic hardships for the region.

An international conference sponsored by NY Sea Grant on the zebra mussel took place at the end of November. A report of that meeting should appear in the next issue of *Coastlines*.

Anyone who would like further information can contact Dave MacNeill or Chuck O'Neill at the Sea Grant Extension Program, 405 Administration Building, State University College, Brockport, NY 14420, (716) 395-2638.

PERSONNEL COMINGS AND GOINGS

CHAD DAWSON LEAVES SG EXTENSION



This summer Dr. Chad Dawson left his position as extension specialist with

New York Sea Grant, to join the faculty of the SUNY College of Environmental Science and Forestry in Syracuse. He was with the Sea Grant program as extension specialist and tourism/small business team leader since 1985.

In his new position as an Assistant Professor, Dawson will spend half of his time teaching graduate and undergraduate courses on commercial recreation, tourism planning, and related topics. The remainder of his time will be spent engaged in research on recreation and tourism issues relating to New York state's natural resources.

Both Dawson and Dr. Mike Voiland,

Sea Grant's associate director and extension leader, are pleased that Sea Grant extension will continue to benefit from Dawson's work. "Fortunately, my duties will include providing research and program support for SG during the next two years," Dawson explains.

"While we are sorry to lose Dr. Dawson's talents and expertise on a day-to-day basis," Voiland says, "We are nonetheless delighted that he will continue to provide the program with invaluable research and consultation for the next couple of years, and thank him for his years of effort on behalf of the Sea Grant extension program."

GOVERNOR SIGNS FOUR BILLS TO PROTECT NY'S COASTAL RESOURCES

Governor Mario Cuomo's signing of four bills to protect New York State's coastal environment this summer was not just a good opportunity for New York Sea Granters to meet the State's highest elected official at Jones Beach, LI, but also provided the backdrop to a successful Sea Grant effort that helped a new industry group to get started.

In his welcoming introduction, Paul Houghton, the president of the Seafood Retailers of New York, told the governor that his organization was "especially pleased to have been included in this event as representatives of the New York State fish and seafood industry."

The reason for his elation is easy to understand. Until last year this trade group did not exist. At a time when the seafood industry was being adversely impacted by the floatable waste scare throughout the region, the need for such an industry trade group was clear. With the support and guidance of Ken Gall, a New York Sea Grant extension specialist, along with the cooperation of interested people from the industry, Seafood Retailers of New York has made rapid headway in its effort to attract new members and develop a program to educate the seafood consumer about the freshness, nutrition and safety of seafood.

Along with the governor at the signing ceremonies was the new chairman of the New York Senate Environmental Conservation Committee, Sen. Owen Johnson, who praised Gov. Cuomo for signing the four coastal protection bills.

The bills are:

- the clean oceans fund, which will enable municipalities to develop reliable and environmentally safe alternatives to ocean dumping of sewage sludge. The bill will ensure that any federal penalties assessed against NY municipalities for failing to meet the 1992 deadline to end ocean dumping of sewage sludge will be returned to the state to assist in developing alternative land-based disposal systems.

- A state water pollution control revolving fund that will provide more than \$4 billion in low-interest loans through the end of the century to assist localities in improving and upgrading sewage treatment facilities.



TOP LEFT: Mario Cuomo, New York state governor, signed four bills to protect the state's coastal environment.

TOP RIGHT: Owen Johnson, Chairman of the State Senate Environmental Conservation Committee.



BOTTOM LEFT: Paul Houghton, President of the Seafood Retailers of New York, introducing Governor Cuomo.

- A medical waste program that exceeds federal standards for the handling, transport and disposal of medical wastes.

- A tidal wetlands program with strengthened enforcement tools, including increased fines and a new schedule of permit fees dedicated to improving marine resources.

Editor's Note: Anyone who would like further information about the Seafood Retailers of New York should contact Ken Gall, NY Sea Grant Extension Program, Community Programs Center, 300 Park Avenue, Deer Park, NY 11729, (516) 243-5093.

NEW MARINE DISTRICT COORDINATOR

Robert Kent was appointed the marine district coordinator for the New York Sea Grant Extension program this past August. He will be responsible for



coordinating program activities of 5 specialists who deal with the downstate marine coastline resource.

Kent brings with him 10 years of field extension experience as a 4-H program agent in natural resources and marine education for Suffolk County, NY. He replaces Bruce DeYoung, who assumed a program leadership position at Oregon State University.

"We are pleased to have someone of Bob's background and experience take over this position," said Mike Voiland, Sea Grant's associate director and extension leader. "And I know he will help us to have a greater impact in the marine district."

REMEMBERING DR. BOUDEWIJN H. BRINKHUIS (1946–1989): A STUDENT'S PERSPECTIVE By Frances T. Costa



DR. BOUDEWIJN H. BRINKHUIS

I have very fond memories of my graduate advisor, Dr. Boudewijk ("Bud") Brinkhuis. A phycologist and scuba diver, he was known as the "algae man" of Stony Brook University's Marine Sciences Research Center.

He had two loves in his academic life, seaweeds and students, and he combined the two throughout his career. Dr. Brinkhuis enjoyed researching macroalgae and advising graduate students on their thesis projects. There's a lot to be said about a professor who will spend unlimited hours discussing and exchanging ideas. In his 13 years at SUNY Stony Brook, this particular professor always found time in his busy schedule for his students. He sponsored students who completed 16 master's degrees and 3 Ph.D. programs. Dr. Brinkhuis possessed a

very relaxed, down-to-earth manner that made students feel at ease. Students under his supervision strived to succeed; he brought out their strong points and best qualities.

Dr. Brinkhuis' other interests included traveling, international affairs and aquaculture. He was invited to universities in China and Korea many times to study seaweed aquaculture. He also helped establish a research facility in Ensenada, Mexico, and started a foreign student exchange program.

His scientific research has covered a broad range. He initially studied the primary productivity of salt marsh plants and heavy metal cycling of eelgrass. Through the Marine Biomass Program, which was sponsored by New York Sea Grant Institute, New York State Energy Research and Development Authority, and the Gas Research Institute (Chicago), he studied the potential for seaweed as a source of energy. He was also a New York Sea Grant Professor for three years. More recently, he studied the physiology of seaweeds, particularly *Laminaria saccharina*. He was also interested in the genetics and morphology of macroalgae.

Dr. Brinkhuis has made a tremendous impact on my life as well as the lives of many others. He introduced me to the dynamic microscopic world of *Laminaria saccharina*. He also restored my faith in student-professor relationships at a very delicate time in my education. He will be missed by his students, colleagues, family and friends.

The following is a partial list of Dr. Brinkhuis' recent publications resulting from work that was funded by the New York Sea Grant Institute.

Brinkhuis, B. H., P. F. Egan, Z. Garcia-Ezquivel, and C. Yarish. 1989. Physiological basis for *Laminaria* selection protocols in Long Island Sound mariculture. In: C. Yarish, C. Penniman, and P. Van Patten (eds.), Economically Important Marine Plants of the Atlantic: Their Biology and Cultivation. Connecticut Sea Grant Program Symposium Proceedings (in press).

Zertuche-Gonzalez, J. A. and B. H. Brinkhuis. 1989. Aquaculture of commercially important red seaweeds from Baja California. Proceedings of the 13th International Seaweed Symposium (in press; invited paper).

Lee, J. A. and B. H. Brinkhuis. 1988. Seasonal light and temperature interaction effects on development of *Laminaria saccharina* (Phaeophyta) gametophytes and juvenile sporophytes. *J. Phycol.*, 24(2):181-191.

Zertuche-Gonzalez, J. A., C. G. Schlenk, and B. H. Brinkhuis. 1988. Open-water culture of *Gracilaria tikvahiae* (McLachlan) (Rhodophyta Gigartinales). *Ciencias Marinas*, 14(1):15-29.

Brinkhuis, B. H., H. G. Levine, C. G. Schlenk, and S. Tobin. 1987. *Laminaria* cultivation in the Far East and North America, pp. 107-146. In: K. T. Bird and P. H. Benson (eds.), Seaweed Cultivation for Renewable Resources. Elsevier Science Publishers, B.V., Amsterdam.

Chung, I. K. and B. H. Brinkhuis. 1987. Uptake and efflux kinetics of cadmium in the kelp, *Laminaria saccharina*. *Proc. 6th International Conf. Heavy Metals in the Environment* (in press).

Hwang, S.-P. L., S. L. Williams, and B. H. Brinkhuis. 1987. Changes in internal dissolved nitrogen pools as related to nitrate uptake and assimilation in *Gracilaria tikvahiae* McLachlan (Rhodophyta). *Botanica Marina*, 30:11-19.

Dr. Bud Brinkhuis died unexpectedly this past July.

Fran Costa was a graduate student at Stony Brook's Marine Sciences Research Center from 1987-1989. She is currently working for Cosper Environmental Services, where she is doing research on the red seaweed *Champia parvula*. Bud's memory will remain with us.



Photos courtesy MSRC

The Algae Man—our man down under.



A rough day at the office.

NEW PUBLICATIONS AVAILABLE FROM NEW YORK SEA GRANT INSTITUTE

New York Sea Grant has recently received the following publications. They are available upon request at the address below. Single reprints are free in the United States (unless otherwise indicated); multiple copies are available for \$1.00 each. For overseas delivery, add \$1.00 to your order total. Please include the NYSGI no. when ordering, and make checks or money orders payable to New York Sea Grant. Send requests to: New York Sea Grant Institute, Dutchess Hall, SUNY at Stony Brook, Stony Brook, NY 11794-5001.

Bleaching of β -carotene by trout gill lipoxygenase in the presence of polyunsaturated fatty acid substrates. Richard A. Stone and John E. Kinsella, 1989. Reprinted from *Journal of Agricultural and Food Chemistry*, 37:866-868, 1989. 3 pp. NYSGI-R-89-007

Culture of fingerling walleye in earthen ponds. J. K. Buttner, 1989. Reprinted from *Aquaculture Magazine*, March/April 1989, pp. 37-46. 9 pp. NYSGI-R-89-001

The Economic Value of Long Island Saltwater Recreational Fishing. James R. Kahn, 1989. 17 pp. NYSGI-T-89-001

Effects of dietary n-3 polyunsaturated fatty acids on phospholipid composition and calcium transport in mouse cardiac sarcoplasmic reticulum. M. Croset, J. M. Black, J. E. Swanson, and J. E. Kinsella, 1989. Reprinted from *Lipids*, 24(4):278-285, 1989. 8 pp. NYSGI-R-89-009

Effects of flow velocity, food concentration and particle flux on growth rates of juvenile bay scallops *Argopecten irradians*. Jennifer A. Cahalan, Scott E. Siddall, and Mark W. Luckenbach, 1989. Reprinted from *Journal of Experimental Marine Biology and Ecology*, 129:45-60, 1989. 16 pp. NYSGI-R-89-010

A finite element model for wave refraction, diffraction, reflection and dissipation. T.-K. Tsay, W. Zhu, and P. L.-F. Liu, 1989. Reprinted from *Applied Ocean Research*, 11(1):33-38. 6 pp. NYSGI-R-89-006

Lipoxygenase generation of specific volatile flavor carbonyl compounds in fish tissues. R. J. Hsieh and J. E. Kinsella, 1989. Reprinted from *Journal of Agricultural and Food Chemistry*, 37:279-286, 1989. 8 pp. NYSGI-R-89-002

A note on long waves induced by short-wave groups over a shelf. Philip L.-F. Liu, 1989. Reprinted from *Journal of Fluid Mechanics*, 205:163-170, 1989. 8 pp. NYSGI-R-89-011

The suppression of eicosanoid synthesis by peritoneal macrophages is influenced by the ratio of dietary docosahexaenoic acid to linoleic acid. Belur R. Lokesh, J. Mark Black, and John E. Kinsella, 1989. Reprinted from *Lipids*, 24(7):589-593, 1989. 5 pp. NYSGI-R-89-008

The following publications are available from New York Sea Grant Extension offices. The names and

addresses of the extension specialists to contact for ordering information are provided for your convenience. Please note that there is a fee for many of these publications and that the prices vary; address all requests for information to the appropriate specialist.

Ordering information for Long Island Sound Study publications can be obtained from Melissa Beristain (Sea Grant Extension Program, Dutchess Hall, SUNY Stony Brook, Stony Brook, NY 11794-5001). Eight fact sheets describing various issues and research areas, a poster, and the LISS annual reports for 1986-1988 are available.

Ordering information for the following publications can be obtained from Charles O'Neill (Sea Grant

Continued on Page 7

SG LAUDS SUPPORT OF SUNY COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY



Mike Voiland (left), Sea Grant's associate director, presents William D. Tully, ESF's provost and VP for academic affairs, with plaque acknowledging the 18 years of support ESF has provided the NY Sea Grant Program.

The inscription reads: "In Special Recognition of the administration and faculty of the State University of New York College of Environmental Science and Forestry at Syracuse for continuous support of the New York Sea Grant Institute and the New York Sea Grant Extension Program."

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SG PUBS CONTINUED:

Extension Program, 405 Administration Building, State University College, Brockport, NY 14420):

Dreissena polymorpha: an unwelcome new Great Lakes inhabitant. O'Neill, Charles R. and David B. MacNeill, November 1989. Fact Sheet, Cornell Cooperative Extension, New York Sea Grant Extension Program, SUC Brockport, 8 pp.

The New York State Coastal Erosion Hazard Act. O'Neill, Charles R., April 1989. Fact Sheet, Cornell Cooperative Extension, New York Sea Grant Extension Program, SUC Brockport, 6 pp.

Predicting when Lake Ontario's thermal bar disappears?? MacNeill, David B., June 1989. Fact Sheet, Cornell Cooperative Extension, New York Sea Grant Extension Program, SUC Brockport, 5 pp.

Ordering information for the following publications can be obtained from Dave White (Sea Grant

Extension Program, 52 Swetman Hall, SUC Oswego, Oswego, NY 13126):

Great Lakes boat launch design considerations. White, David G., November 1988. Cornell Cooperative Extension, New York Sea Grant Extension Program, SUC Oswego, 4 pp.

Lake Ontario boating and facility needs. Dawson, Chad P., Bill Siemer, and Tommy L. Brown, August 1989. Fact Sheet, Cornell Cooperative Extension, New York Sea Grant Extension Program, SUC Oswego, 4 pp.

Ordering information for the following publication is available from Distribution Center C, Cornell University, 7 Research Park, Ithaca, NY 14850:

Managing risk at your waterfront facility. Greene, H. David, July 1989. Fact Sheet, Cornell Cooperative Extension, Cornell University, 4 pp.



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