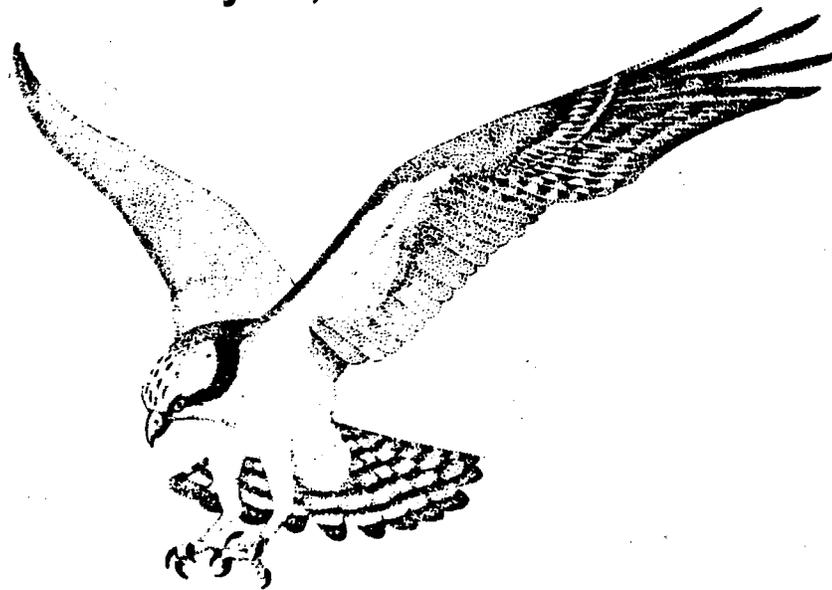


**ABSTRACTS OF PAPERS PRESENTED
AT
A JOINT MEETING OF THE
SOUTHERN NEW ENGLAND CHAPTER,
AMERICAN FISHERIES SOCIETY
AND THE
NEW ENGLAND ESTUARINE
RESEARCH SOCIETY**

**June 1-3, 1989
East Lyme, Connecticut**



**Northeast Utilities Environmental Laboratory,
Millstone Nuclear Power Station**

Suzanne G. Ayvazian, University of Massachusetts, Amherst, Ma, L. Deegan, Ecosystems Center, MBL, Woods Hole, Ma, J. T. Finn, Univ. of Massachusetts, Amherst, Ma.
COMPARISON OF NEKTON USE OF ESTUARIES BETWEEN TWO BIOGEOGRAPHIC REGIONS: WELLS, MAINE AND WAQUOIT BAY, MASSACHUSETTS.

Comparison of information from Wells, Maine, and Waquoit Bay, Massachusetts, two physiographically similar estuaries in close geographic vicinity but in different biogeographic zones, will provide a perspective on the variation in importance of different habitats to fisheries production. We wanted to determine if the patterns of use seen Mid-Atlantic and the Gulf of Mexico applied to fish in more Northern areas. Species diversity and abundance were dramatically lower in Wells. Fish were completely missing from shallow habitats in Wells by mid-December, while the same species were present in Waquoit year-round.

Brousseau, D.J., Dept. of Biology, Fairfield University, Fairfield, CT, 06605, 254-4000. SEASONAL ASPECTS OF SARCOMATOUS NEOPLASIA IN *Mya arenaria* FROM LONG ISLAND SOUND

Mya arenaria were collected monthly for 2.5 years from three populations in Long Island Sound. Histopathological examination revealed that 6.1% of the clams from Stonington, 12.9% of the clams from the Saugatuck River, Westport and 12.7% of those from Old Mill Beach, Westport, CT had sarcomatous neoplasms. Peak prevalences of 45, 59 and 60% respectively, were found in the clams from the three study sites. The prevalence of neoplasms in clams collected from three epizootic areas showed a pronounced seasonal pattern, with the highest incidences occurring in the late fall-winter of each year studied.

Buchsbaum, R.N., Massachusetts Audubon Society, Gloucester, MA 01930, 508-283-0598.
PREDATION BY MUMMICHOGS, FUNDULUS HETEROCLITUS, ON MOSQUITO LARVA IN THREE DIFFERENT SALT MARSH PLOTS IN IPSWICH, MA.

Open marsh water management (OMWM) presumably controls salt marsh mosquitoes by allowing predatory fish access to mosquito breeding areas. I compared adjacent OMWM, grid-ditched, and control salt marshes for mosquito and mummichog (Fundulus heteroclitus) numbers using pitfall traps placed along transects during spring high tides. Virtually no mosquito larva emerged from OMWM and grid-ditched marshes. In the OMWM marsh, hatching of mosquito larva occurred, but larva disappeared within a few days. No larva were detected at any time in the grid-ditched marsh. The grid-ditched marsh contained significantly more mummichogs than the other treatments. The numbers of mosquitoes and fish in the control plot varied, depending on relative tidal inundation of transects.

Abstracts of the AFS/NEERS Spring 1989 Meeting

Dadswell, M. J., Dept. of Biology, Acadia University, Wolfville, Nova Scotia, BOP 1x0 902-542-2201

IMPACT OF TIDAL POWER DEVELOPMENT ON ESTUARINE FISHES.

Development and construction of hydroelectric tidal power plants is taking place worldwide. Recent research in the Bay of Fundy indicates there are serious implications for fishes which exploit estuaries during a portion of their life cycle. Natal fishes experience mortality during passage through turbines, the type and degree related to life stage. Non-natal, migratory populations, which exhibit interestuarine annual migration behavior, may be effected over a wide portion of the continental coastline.

Davis, R.W., Chas. T. Main, Inc., Prudential Center, Boston, MA 02199 617/859-2560 BIOLOGICAL EVALUATION OF BRAYTON POINT STATION UNIT 4 ANGLED SCREEN INTAKE

An 18-month study sponsored by New England Power Company was conducted between 1984-1986 at the Unit 4 angled screen intake located on Lee River/Mount Hope Bay, MA. The objectives of the testing program were to determine (1) the numbers, species, and initial and extended survival of fish impinged on the modified screens or diverted from the intake; and (2) the diversion efficiency. The angled screen intake was found to be effective, i.e. exhibited high diversion in mitigating fish impingement. Initial and extended survival varied by species, but in general there was a "sensitive" group composed of a few numerically dominant taxa (mostly bay anchovy and Atlantic silver-side) with calculated survival below 25% and a "hardy" group (mixed taxa dominated by winter flounder and northern pipefish) with survival values greater than 65%.

Research conducted under auspices of Lawler, Matusky & Skelly Engineers, Pearl River,

Desbonnet, A. Dept. Marine Sciences, Univ. Conn., Groton, CT. 06340. Ph: 445-3463.

TEMPERATURE, HUMIDITY, AND THE TERRESTRIAL DISTRIBUTION OF THREE SPECIES OF AMPHIPOD CRUSTACEAN.

Subtidal, intertidal, and semi-terrestrial species of amphipod were exposed to various temperature-humidity combinations. The effect of temperature is most significant for the subtidal species, and is suggested to be the limiting factor in landward inhabitation. Humidity is most significant to intertidal and semi-terrestrial species. Differences in cuticle porosity can explain observed differences and ability to colonize terrestrial habitats. Behavioral rather than physiological changes appear to limit exploitation of terrestrial habitat.

Dettmann, E.H., USEPA-ERLN, South Ferry Road, Narragansett, RI 02882, (401) 782-3039; F.A. Godshall, Computer Sciences Corp., c/o USEPA-ERLN; and G.A. Tracey, Science Applications International Corp., c/o USEPA-ERLN.
PHYSICAL FACTORS INFLUENCING THE DISTRIBUTION OF DISSOLVED OXYGEN IN THE PROVIDENCE RIVER, NARRAGANSETT BAY, RHODE ISLAND.

Dissolved oxygen (D.O.), salinity, temperature and turbidity were surveyed during a modeling study of D.O. in the Providence River, a relatively shallow estuary with a deep shipping channel. In August, D.O. minima occurred near the pycnocline, 2 - 4 m below the surface. Bathymetry strongly influences estuary hydraulics and vertical distribution of water quality parameters. Tidal forcing is important to vertical mixing.

Duerring, Christine, Dept. of Environmental Quality Engineering, DWPC, Lyman School, Westboro, Massachusetts, 01581, (508) 366-9181.

A Pilot biomonitoring study using caged mussels (Mytilus edulis) was conducted in Clarks Cove, New Bedford, MA from October 1987 - September 1988. The bioaccumulation of As, Cd, Cr, Cu, Ni, Pb, Hg, Zn, and PCBs was assessed for five separate 60 day exposure periods. The mussels were used as a means of biologically concentrating the metals and PCBs present in the water column at three stations. Clarks Cove receives discharge from several combined sewer overflows from the City of New Bedford's wastewater collection system. The metals data show large variability within the station replicates. Consistent between station differences in metals concentration are not evident because of this variability. Results from PCB analysis show highest nearshore tissue concentrations and lower tissue concentrations at the off-shore stations. This method may be better suited for monitoring PCB trends than metal

Fell, P.E., B.H. Burnham, and J.H. Williams, Dept. of Zoology, Connecticut College, New London, CT, 06320, (203)447-1911 Ext. 7354. DISTRIBUTION OF MELAMPUS BIDENTATUS AND SUCCINEA WILSONI IN CONNECTICUT TIDAL MARSHES.

A survey was made of the tidal marshes along the Pataguanset Estuary in eastern Connecticut to determine the distribution of Melampus bidentatus in relation to salinity. Melampus was distributed from the head of the estuary to its mouth; but toward the upstream end, its population density sharply declined. In the brackish marshes, Succinea wilsoni occurred together with Melampus. In one brackish marsh, Melampus and Succinea occurred together in 21 of the 55 quadrats that were examined; however, in only one were both species present in large numbers. Melampus was found predominantly in the higher salinity regions of the marsh and Succinea was more abundant in less saline regions.

Foreman, K.F. Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA, 02543,

(508) 548-3705.

REGULATION OF PRIMARY PRODUCTIVITY AND CHLOROPHYLL STANDING STOCKS IN SALT MARSH CREEK BOTTOM ECOSYSTEMS.

Benthic microalgae in salt marsh creeks displayed a seasonal cycle marked by a spring bloom peaking in May-June which is followed by a steep crash during mid-summer. Caging experiments showed that this crash is due to grazing by epibenthic fish, shrimp and crabs. Minimum standing stocks occur in Sept: Oct. Benthic algal populations recovered during the following winter and spring when grazing activity is low. Microalgal abundance and productivity was clearly stimulated by nutrient additions in the winter and spring. Accumulation of chlorophyll $_{li}$ in creek bottoms could be predicted based on dissolved inorganic nitrogen concentrations in sediment porewater using a modified Monod equation. Nitrogen is one factor limiting benthic algal production during winter and spring while grazing appears to control benthic algae in summer.

French, Deborah, Applied Science Associates, 70 Dean Knauss Drive, Narragansett, RI, 02882, 401-789-6224.

RECOVERY OF MUMFORD COVE FOLLOWING ELIMINATION OF SEWAGE LOADING

From 1974 to 1987 the town of Groton, CT discharged increasing amounts of sewage effluent into Fort Hill Brook, the major tributary to Mumford Cove. In response, *Ulva lactuca* increased in abundance throughout those years to the point where it choked the cove and created water quality problems.

In October, 1987 the effluent was diverted from the cove. Monitoring of dissolved oxygen, nutrients, *Ulva* biomass, and benthic communities in Mumford Cove before and in the first year after diversion has shown that (1) the water quality recovered, (2) *Viva* abundance returned to pre-discharge levels, and (3) benthic invertebrate numbers increased but that diversity was still low. Eelgrass is present in the outer cove but has not yet recolonized the inner cove. Monitoring will continue in 1989.

Hruby, T., Camp Dresser & McKee, Inc. One Center Plaza, Boston, MA 02108, (617) 742-5151.

FIELD STUDIES OF DISCHARGES FROM COMBINED SEWER OVERFLOWS IN NEW BEDFORD, MA.

Studies using continuous and batch injection of dye were done at six combined sewer overflows in New Bedford to track the discharges during storm events. A preliminary analysis of the results indicates that wind is the critical factor in determining the dispersion of the plume, and that very little vertical mixing occurs. The freshwater lens created by the discharge remains unmixed for at least 6 hours, and is often no more than 30cm deep. The loadings of conventional and priority pollutants in the overflows were also monitoring. These data were used to predict the levels of pollutants reaching the benthic communities in the area, specifically commercially important clam beds.

Kaiser, S.C. and C.T. Roman. Center for Coastal and Environmental Studies, Rutgers University, New Brunswick, N.J. 08903. (201)932-3738

ABOVEGROUND GROWTH RESPONSES OF EELGRASS ZOSTERA MARINA, TO THE REDUCTION OF EPIPHYTIC FOULING BY LITTORINE GRAZING IN A NEW ENGLAND ESTUARY.

A field experiment was conducted in summer, 1987, in the Nauset Marsh estuary (Cape Cod, MA) to examine the aboveground growth and morphology of Zostera marina in the presence and absence of epiphyte grazers, Littorina littorea. Grazed treatments supported significantly less epiphytic fouling and showed significantly greater live aboveground biomass, shoot density and lateral shoot production than did non-grazed treatments. Grazed eelgrass shoots tended to decrease in length and to produce and export leaves more rapidly than non-grazed shoots. The influences of epiphyte reduction on eelgrass growth dynamics will be discussed.

Keay¹, Kenneth E. and E.D. Gallagher². 1) MWRA Harbor Studies Department, Charlestown Navy Yard, Boston, MA 02129. (617)242-6000. 2) Environmental Sciences Program, U/Mass Boston, Boston, MA 02125 (617)929-8255.

ASSESSMENT OF THE Savin Hill Cove & FOX POINT BENTHIC COMMUNITY STRUCTURE PRIOR TO MODIFICATION OF THE FOX POINT CSO.

Planned improvements to the Fox Point Combined Sewer Overflow (CSO) prompted a Mass. DEQE/DWPC funded multidisciplinary study of the adjacent areas. The infaunal assessment reported here involved 3-season (May, July, October) sampling of 10 random stations each in three areas, the Fox Point subtidal basin into which the CSO discharges, the adjacent Savin Hill Cove intertidal mudflat, and a "less polluted" reference area off of Thompson's Island. Concurrent sampling for sediment toxics occurred during July 1987.

Infaunal abundances were highest in the intertidal mudflat in all seasons, averaging from 230,000 to 430,000 per meter squared. In contrast, abundances in both subtidal regions were less than 20,000 per meter squared in May, and were less in July and October. Diversity estimates show that the intertidal was significantly more diverse than the Fox Point subtidal in all seasons, as was the Thompson's Island site.

This study documented the severe degradation of the benthic infaunal communities surrounding the Fox Point CSO. When complete, results of the sediment toxics studies will be incorporated with this data to give a more comprehensive view of the conditions around the Fox Point CSO prior to improvements.

Jacobson, S., P. Kent, and L. Osborn, Coop. Extension, U.Mass. Marine Station, Lanesville, Gloucester, MA 01930, (508) 777-8720.

SOFT CLAM (MYA ARENARIA) CULTURE USING HATCHERY STOCK

In cooperation with the Town of Ipswich, hatchery-produced clams 12 mm long were planted under 1/4 inch mesh in April, 1988. Clams at higher densities grew more slowly, for example those at 150/m averaged 40 mm by Sept., those at 1000/m only 35 mm. Densities reflected both recruitment into the beds and differential survival. These and other data show that methods used for other clam species can be successfully adapted to culture soft-shell clams to legal size (51 mm) or greater in 22-26 months.

Kinzev, D. H., University of Massachusetts, Amherst, MA, and L. Deegan, Ecosystems Center, MBL, Woods Hole, MA. FISH COMMUNITY INFORMATION AS A HABITAT DISCRIMINATOR IN ESTUARINE ECOSYSTEMS.

Distinct assemblages of fish species are found in different habitats within an estuary. We examined the ability of fish community data to distinguish ecological habitat types in the Cape Cod region. Community attributes such as total biomass and statistical distribution pattern varied less within a habitat type than population attributes. Methods for distinguishing habitats that explicitly use species comparisons are contrasted with those using more general features of distribution and variability. This work has implications for use of fish community data as a biological monitor of environmental quality.

Loomis, S.H., Dept. of Zoology, Connecticut College, New London, CT, 06320, (203)447-1911, Ext. 7489. COLD TOLERANCE OF MELAMPUS BIDENTATUS, SAY

During the winter in southern New England, organisms living in the intertidal zone maybe exposed to air temperatures as low as -20°C. The pulmonate gastropod, Melampus bidentatus can survive under these conditions by overwintering under the surface of salt marshes, under rocks or logs or in the burrows of fiddler crabs. The lower lethal temperature (LT₅₀) of Melampus varies seasonally and in the winter is -13°C. The snails switch from being freeze-susceptible to being freeze-tolerant in the late fall. They are able to survive the presence of ice in their extracellular fluids by producing cryoprotectants which include end products of anaerobic metabolism and by producing hemolymph ice nucleators. These ice nucleators insure that ice forms in the extracellular fluids and not within the cells.

Malatesta, Richard J., Dept. Ecology & Evolutionary Biology, Univ. of CT, Marine Sciences Inst., Groton, CT 06340.

CONSEQUENCES OF LOCAL INTERACTIONS ON THE SPATIAL DYNAMICS OF SESSILE ANIMALS

Sessile marine invertebrates with pelagic larvae represent a problem for population ecologists. The open nature of recruitment and the highly local nature of adult-adult interactions make traditional demographic analyses difficult to do. Analytical models which attempt to describe 'spatial dynamics are forced to assume average "population" parameters and cannot account for highly variable local differences within a group. Using a computer simulation, local population parameters such as growth rate, settlement rate and mortality were incorporated into a model of spatial dynamics. This simulation will be contrasted with an analytical model to demonstrate how highly local interactions (between neighboring individuals) can alter the predictions of a purely population-level analytical model.

Meise-Munns, Carol, J. Green, M. Ingham^p and D. Mountain² NMFS Narragansett RI 02882, 401-782-3258 (2) NMFS Woods Hole MA 02543

INTERANNUAL VARIABILITY IN THE COPEPOD POPULATIONS OF GEORGES BANK AND GULF OF MAINE

Seasonal patterns of *Calanus finmarchicus*, *Centropages typicus* and total copepods were investigated and characterized for populations found on Georges Bank and the western Gulf of Maine for 1977-1984. We found an apparent decrease in abundance and decay in the seasonal pattern for these animals in the early 1980's. We also investigated the relationship between this decrease and chosen environmental variables.

Miller, D.C., D.E. Body, and J.C. Sinnett, U.S. EPA; S. Poucher and J. Sewall, SAIC, Narragansett, RI 02882, (401) 782-3090. DESIGN AND PERFORMANCE OF A SALTWATER LOW DISSOLVED OXYGEN TEST SYSTEM

A system has been designed and constructed for flow-through acute and chronic tests to develop data for marine D.O. water quality criteria. Specifications include the capability to select five reduced D.O. treatments over the range of ≤ 0.5 mg/l to saturation with control to $+0.1$ mg/l, a total flow rate of 4 gal./min., and operational stability for at least 30 days. The system is comprised of a vacuum degassing unit, reservoirs for saturated or low D.O. water, and an electronic proportioning system which mixes water from these reservoirs to provide the five reduced D.O. treatments plus a saturated control. System performance and results of acute tests will be reported.

Robertson, J., and T.M. Bradley, Dept. of Fisheries, Animal and Veterinary Sciences, East Farm, Building 14, Univ. of Rhode Island, Kingston, RI, 02881, 401-792-2114
HEPATIC ULTRASTRUCTURE OF ATLANTIC SALMON (*SALMO SALAR*) DURING PARR-SMOLT TRANSFORMATION

Changes in liver ultrastructure of Atlantic salmon during smoltification were examined using light and electron microscopy. Groups of fish maintained under simulated natural and 8 month advanced photoperiods were sampled monthly August through June. Smoltification status of fish was monitored via morphological indicators, gill Na + / K + ATPase activity, and seawater tolerance. Natural photoperiod fish underwent smoltification during spring, peaking in May, while advance photoperiod fish exhibited smolt changes in October extending through January. Hepatocytes of smolts were smaller, with less glycogen and larger mitochondria compared to non-smolts. No changes were seen in the bile transport system, nuclear size or chromatin state.

Orson, R.A.* R.S. Warren and W.A. Niering. *Center for Coastal and Environmental Studies, Rutgers University, New Brunswick, N.J. 08903 and Department of Botany, Connecticut College, New London, Ct. 06320. TIDAL MARSH DEVELOPMENT IN THE PATAGUANSET RIVER ESTUARY, NIAN TIC, CONNECTICUT.

Tidal marsh development in the Pataguanset River Estuary began approximately 3500 years B.P. At that time tidal marshes were sedge dominated and limited to areas along stream and river channels. By about 3000 years B.P. the tidal marshes of the lower estuary were dominated by *Spartina alterniflora* and *Distichlis spicata*. The barrier beach became continuous between 2300 and 2000 years B.P. changing the system hydrology. At this depth, *Distichlis* once again increases significantly suggesting that it may be playing a greater role in tidal marsh development than previously thought. *Juncus gerardi*, at present a common upper border marsh species, first appears in the sediments within the top half-meter of peat (last few hundred years) whereas *Phragmites australis* enters the record approximately 3000 years B.P.

Pregnall, A. M., C. M. Maier and N. C. Roth, Biology Department, Vassar College, Poughkeepsie, NY 12601, 914/437-7416.

ZOSTERA MARINA LEAF NITROGEN CONTENT AND SEASONAL NITRATE REDUCTASE ACTIVITY.

Eelgrass (*Zostera marina*) leaf nitrogen content increases during winter despite extremely low sediment ammonium assimilation potential by roots. Leaves of plants growing immediately adjacent to some shorelines exhibit high nitrate reductase (NR) activities in summer, owing to localized inputs of groundwater nitrate that has induced activity, while plants growing a small distance further offshore have very low NR activity. Leaf NR activities increase in eelgrass plants growing at depth from fall through spring, reaching high levels equivalent to those present in shallow edge plants during summer. The increased assimilation of nitrate by eelgrass leaves during winter compensates for decreased assimilation of sediment ammonium by roots, resulting in elevated leaf nitrogen content. High spring growth rates dilute out the nitrogen until summer root ammonium assimilation increases.

Tom Frank Rusek, Dept. of Biology, Grad. Student, Southeastern Massachusetts University, No. Dartmouth, MA, 02747, (508) 994-8264. POLYCHLORINATED BIPHENYLS IN STRIPED BASS, *MORONE SAXATILIS* (WALBAUM) OF BUZZARDS BAY AND THE ACUSHNET RIVER.

PCB's were measured in edible muscle fillets of 123 striped bass acquired from three localities in southeastern Massachusetts waters. Samples taken from the Acushnet River contained a mean PCB concentration of 22.3 µg/g. Concentrations were correlated with distance from the Acushnet River. PCB levels were not normally distributed but skewed to the right and leptokurtotic. Seasonal effects of PCB concentrations in striped bass were examined. Sex-ratio data along with correlations between sex and PCB concentrations were examined.

Saucerman, S. E., Dept. of Forestry and Wildlife Mgt., Univ. of Mass., 204 Holdsworth Hall, Amherst, MA, 01003. DISTRIBUTION AND PRODUCTIVITY OF JUVENILE WINTER FLOUNDER (Pseudopleuronectes americanus) IN WAQUOIT BAY, MA.

Estuaries are essential nursery areas to winter flounder. However, distribution and growth of juveniles varies among habitats. Age 0+ flounder were sampled in different habitats of Waquoit Bay along with habitat classification parameters. Significant differences were found in abundance, mean length, and length-weight relationships. Habitats adjacent to eelgrass beds had as much as twice the abundance, and mean lengths of up to 1 cm larger than juveniles from other areas. I suggest that particular habitats are more important to the recruitment and growth of juvenile winter flounder in estuarine systems.

Scott, K.J. and J.F. Paul, SAIC and USEPA, Narragansett, RI, 02882, (401)782-3017.
AN ECOLOGICAL STATUS AND TRENDS PROGRAM; NEAR COASTAL COMPONENT

The USEPA is initiating an Environmental Monitoring and Assessment Program (EMAP) to monitor the condition of the Nations ecosystems. The objective of this program is to systematically identify, collect and analyze information on the status of the Nation's ecosystems and to periodically report findings on the status, changes, and trends in the conditions of those ecosystems to the Administrator and the public. This presentation will briefly describe the component that will be addressing near coastal ecosystems of the continental United States. Initial efforts in this component will:

- (1) identify existing monitoring problems/sources of data for potential integration into EMAP,
- (2) standardize indicators of ecological condition,
- (3) provide regionalization/classification schemes for sampling design and data analysis,
- (4) optimize the study design to integrate findings with other components of EMAP, and
- (5) optimize QA/QC efforts and data base management.

Short, F.T., Jackson Estuarine Laboratory, UNH, Durham, NH 03824, (603) 862-217S and B. Peterson, Norwich, CT. SCALLOP MOVEMENTS IN AN EELGRASS TRANSPLANT SITE.

Eelgrass in the Niantic River is threatened by pollution and disease, which together have vastly diminished eelgrass populations in the river. Since eelgrass filters estuarine waters, stabilizes sediments, and provides habitat for scallops and other marine organisms, its condition is a concern to those seeking to protect or restore the health of a tidal river such as the Niantic. Eelgrass declined dramatically in the Niantic River in the 1980s, particularly from 1986 to 1988. The eelgrass loss was followed by a drastic drop in the scallop population in the river. To test the value of reestablishing eelgrass habitat, a 5 by 55 meter eelgrass bed was created in the Niantic River by transplanting eelgrass shoots from Niantic Bay on 1/2 meter centers. Approximately 60% of the plants survived after three months, an excellent transplant survival rate. Scallops were found to associate with eelgrass and to concentrate in the eelgrass bed over time. Scallop concentrations measured within the transplanted eelgrass bed were consistently greater than scallop concentrations outside the bed, measured on bare mud bottom or on macroalgae.

Taylor, S.L., N. Brodeur, and M. Villalard, Dept. of Botany, Connecticut College, New London, CT 06320, (203)447-1911, Ext. 7700.

PRODUCTIVITY OF ENTEROMORPHA IN THE PATAGUANSET ESTUARY, NIANTIC, CT.

Biomass and surface area of extensive floating masses of E. kylinii were determined during the summer of 1982. Rapid growth occurred by early June, peaked in July, and by August 1 the mats had dispersed. At peak₂ total mat area measured 1522 m²; biomass measured as dry weight in g/m ranged from 210 in the lower estuary to 110 in the upper estuary. Salinity in the lower estuary averaged 27 ppt as compared to 16.5 in the upper estuary.

Townsend, David W., Bigelow Laboratory for Ocean Sciences, McKown Point, West Boothbay Harbor, ME 04575, (207) 633-2173.

IMPLICATIONS OF ESTUARINE-LIKE CIRCULATION IN THE GULF OF MAINE.

The baroclinic circulation in the Gulf of Maine is strongly influenced by the contrast between lighter surface and coastal waters and the dense Slope Water that rests in the deep basin*. The nutrient-rich Slope Water enters the Gulf at depth through the Northeast Channel, spilling first into Georges Basin, then Jordan and Wilkinson Basins, with most going to Jordan. The result is a topographic low over each basin that induces an anticlockwise gyre. One result (or cause) of the baroclinicity is the upward doming of the dense Slope Water which mixes with the surface waters thus supplying nutrients for primary production. The intrusions of Slope Water into the Gulf appear to be both seasonal and episodic, and may be related to the proximity of Gulf Stream rings to the mouth of the Northeast Channel. The internal circulation in the Gulf is enhanced during times of greater transport rates of Slope Water into the Gulf, often inducing secondary upwelling events and redirecting Slope Water-derived nutrients from the western Gulf to the eastern Gulf.

Tracey, G.A., SAIC, c/o U.S. EPA-ERL, South Ferry Rd., Narragansett, RI 02882 (401) 782-3143
BIOMONITORING OF 'BROWN TIDE' ALGAL BLOOMS IN LONG ISLAND EMBAYMENTS

Peconic and Great South Bays of Long Island, New York have had repeated "brown tide" bloom events since 1985, with devastating impacts on shellfish and eel grass populations. Two biomonitoring methods using the blue mussel, Mytilus edulis, are evaluated for their utility in assessment of bloom development. Clearance (feeding) rate responses of mussels exposed to natural particulates from 4 bay stations were suppressed when the brown tide organism, Aureococcus anophagefferens, was present in sufficient densities. In transplant experiments, growth and physiological performance of mussels deployed at inshore stations were reduced relative to an outer-bay station. Comparison of responses observed in the Peconics, Great South Bay and in the laboratory indicate dramatic differences in effects which may relate to localized environmental conditions.

Tucker, J., G.T. Banta, A.E. Giblin, J.E. Hobbie, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA 02543, 508-548-3705.

A Novel Technique to Study the Effects of Organic Matter Quality on Aerobic and Anaerobic Decomposition

The effects of chemical composition, or quality, of organic detritus on decomposition rates were studied under oxic and anoxic conditions using a novel technique. Small sediment cores (2.5 cm i.d. X 4 cm) from Buzzards Bay, MA, were continuously flushed at a low flow rate with oxic or anoxic seawater to maintain either completely aerobic or anaerobic conditions. The cores were injected with one of three types of ¹⁴C-labeled plant detritus: a diatom, Skeletonema costatum (expected to be the most labile); a cyanobacterium, Synechococcus sp. (expected to be of intermediate quality); or a vascular plant, Spartina alterniflora (expected to be the most refractory). Radiolabeled CO₂ was collected as the measure of decomposition. After 75 days, differences in decomposition due to quality were evident in the aerobic cores, with Skeletonema decomposing the most quickly. Data from the anaerobic treatments have not yet been analyzed.

Visel, T.C.¹ and H.M. Crawford², 1 Connecticut Sea Grant Marine Advisory Program, Avery Point, Groton, CT 06340, (203)-445-8664. 2 43 Williams St. New London, CT, 06320.

AN EXAMINATION OF HISTORICAL AND PRESENT-DAY OYSTER POPULATIONS IN THE PATTAGANSETT RIVER ESTUARY

The Pattagansett River estuary has a historical record of commercial oyster production. Declines in productivity led to the abandoning of the industry in 1930. The present-day population of oysters in the Pattagansett River is limited to a small bed (under two acres) in an area of high currents south of a road causeway. Today this area is closed to shellfish harvesting due to high levels of bacterial pollution. Efforts to restore the oyster population in the river and the use of a condition index to compare different oyster populations will be discussed.

Warren, R. S., and W. A. Niering, Department of Botany, Connecticut College, New London, CT 06320, (203) 447-1911.

VEGETATION PATTERNS ON THE PATTAGANSETT RIVER TIDAL MARSHES

The tidal wetlands bordering the Pataguansett River are dominated by high marsh. Near the river's mouth they are relatively wet complexes of *Spartina alterniflora*. The low marsh fringe of *S. alterniflora* is narrow and in many areas discontinuous due to steeply eroded peat banks. Further up-river the high marsh mosaic is dominated by extensive *S. patens* meadows while the low marsh border becomes wider and essentially continuous. As the estuary becomes increasingly brackish *Spartinas* give way first to *Scirpus* spp. and finally to *Typha angustifolia* marshland. *Phragmites australis* forms the upper border along disturbed upland edges from the mouth to the head of the river. This grass also occurs as occasional isinads in the upper *patens* and *Scirpus* meadows. These areas of *Phragmites* monocultures have enlarged steadily over the past decade.

Waterman, E.R., Dept. of Earth Sciences, University of New Hampshire, Durham, NH 03824 (603) 862-1542.

A COMPARISON OF NUTRIENT FLUXES IN THREE NEW HAMPSHIRE SALT MARSH SYSTEMS

The detailed mechanisms of salt marsh degradation in response to alteration of tidal hydrology are not well understood. Presented here are the results of spring and neap tidal cycle sampling of NO_3+NO_2 , NH_4 , PO_4 , TN & TP from a flooding enhanced, a flooding restricted, and a healthy salt marsh system. The results show how the hydrologic condition of each of these marshes influences the nutrient fluxes of these marshes.