

References Cited

- Ackerman, J.D. 1983. Current flow around *Zostera marina* plants and flowers: implications for submarine pollination. *Biol. Bull.* 165:504.
- Adams, S.M. 1976. The ecology of eelgrass, *Zostera marina* fish communities. Part II: Functional analysis. *J. Exp. Mar. Biol. Ecol.* 22:269-291.
- Alber, M.L. 1987. Shellfish in Buzzards Bay: A resource assessment in press. EPA Technical Report, Boston, MA, 75pp.
- Allee, W.C. 1919. Note on animal distribution following a hard winter. *Biol. Bull.* 36:96-104.
- Allee, W.C. 1923a. The effect of temperature in limiting the geographic range of invertebrates of the Woods Hole *Littora*. *Ecology* 4:341-354.
- Allee, W.C. 1923b. Studies in marine ecology. III. Some physical factors related to the distribution of littoral invertebrates. *Biol. Bull.* 44:167-191.
- Araski, M. 1980. Studies on the ecology of *Zostera marina* and *Zostera nana* II. *Bull. Jap. Soc. Sci. Fisheries* 16:70-76.
- Aubrey, D.G. and P.E. Speer. 1984. Updrift migration of tidal inlets. *J. Geol.* 92:531-545.
- Biebel, R. and C.P. McRoy. 1971. Plasmatic resistance and rate of respiration and photosynthesis of *Zostera marina* at different salinities and temperatures. *Mar. Biol.* 8:48-56.

- Birch, W.R. and M. Birch. 1984. Succession and pattern of tropical intertidal seagrasses in Cockle Bay, Queensland, Australia: A decade of observations. *Aquat. Bot.* 19:343-367.
- Boorman, J.M. Pizzey and R.J. Waters. 1974. *Zostera* transplants in Norfolk and Suffolk, Great Britain. *Aquaculture* 4:185-198.
- Borum, J. 1985. Development of epiphytic communities on eelgrass (*Zostera marina*) along a nutrient gradient in a Danish estuary. *Mar. Biol.* 87:211-218.
- Borum, J. and S. Wium-anderson 1980. Biomass and production of epiphytes on eelgrass (*Zostera marina* L.) in the Oresund, Denmark. *Ophelia, Suppl.* 1:57-61.
- Borum, J. 1985. Development of epiphytic communities on eelgrass (*Zostera marina*) along a nutrient gradient in a Danish estuary. *Mar. Biol.* 87:211-218.
- Bowden, K. P. 1967. Circulation and diffusion. In Lauff, G.H. (ed.), *Estuaries*, Publication No. 83, AAAS, Washington,
- Brauner, J.F. 1973. Seasonality of epiphytic algae on *Zostera marina* in the vicinity of Beaufort, North Carolina. M.A. Thesis. Duke University, Durham, N.C. 137 pp.
- Brauner, J.F. 1975. Seasonality of epiphytic algae on *Zostera marina* at Beaufort, North Carolina. *Nova Hedwigia* 26:125-133.
- Brix, H., J.E. Lyngby, and H.-H. Schierup. 1983. Eelgrass (*Zostera marina* L.) as an indicator organism of trace metals in the Limfjord, Denmark. *Mar. Environ. Res.* 8:165-181.

- Brouns, J.J.W.M. 1985. The plastochrone interval method for the study of the productivity of seagrasses: Possibilities and limitations. *Aquat. Bot.* 21:71-88.
- Brush, G.S. 1984. Stratigraphic evidence of eutrophication in an estuary. *Water Res. Res.* 20:531-541.
- Brush, G.S., and F.W. Davis 1984. Strategic evidence of human disturbance in an estuary. *Quatern. Res.* 22:91-108.
- Buchsbaum, R. 1985. Feeding ecology of geese: The effect of plant chemistry on feeding selection and digestion of salt marsh plants. Ph.D. Thesis, Boston University, Boston, MA, 214 pp.
- Bulthuis, D.A. 1987. Effects of temperature on photosynthesis and growth of seagrasses. *Aquat. Bot.* 27:27-40.
- Bulthuis, D.A. and W.J.Woerkerling 1983. Biomass accumulation and shading effects of epiphytes on leaves of the seagrass, *Heterozostera tasmanica*, in Victoria, Australia. *Aquat. Bot.* 16:137-148.
- Bumpus, D. 1957. Surface water temperatures along Atlantic and Gulf Coasts of the United States. SSR No. 214 U.S. Fish and Wildlife Service, 120 pp.
- Burrell, D.C. and J.R. Schubel. 1977. Seagrass ecosystem oceanography. In: C.P. McRoy and C. Helfferich (eds.), *Seagrass Ecosystems*, Marcel Dekker, New York, pp. 196-232.
- Cambridge, M.L. 1979. Seagrass Studies. In Cockburn Sound Environmental Study, Department of Conservation and Environment, Australia Report No. 2.

- Cambridge, M.L. and A.J. McComb. 1984. The loss of seagrass in Cockburn Sound, Western Australia. I. The time course and magnitude of seagrass decline in relation to industrial development. *Aquat. Bot.* 20:229-243.
- Carlton, J.T. and J.A. Scanlon. 1985. Progression and dispersal of an introduced alga: *Codium fragile* ssp. *tomentosoides* (Chlorophyta) on the Atlantic coast of North America. *Bot. Mar.* 28:155-165.
- Churchill, A. C., A.E. Cok, and M.I. Rinner. 1978. Stabilization of subtidal marine sediments by the transplantation of the seagrass *Zostera marina* L. N.Y. Sea Grant Rep. NYSSGP-RS-78-15. 48pp.
- Costa, J. E. 1987. Eelgrass (*Zostera marina* L.) in Buzzards Bay: Distribution, production, and historical changes in abundance. EPA Technical Report, 230 pp.
- Costa, J.E. 1982. The effects of oil contaminated sediments on the growth of eelgrass (*Zostera marina* L.). *Biol. Bull.* 163:147.
- Costa, J.E. 1988. Distribution, production, and historical changes in abundance of eelgrass (*Zostera marina* L.) in southeastern Massachusetts. Ph.D. Thesis. Boston University, 354 pp.
- Cottam, C. 1933. Dissapearence of eelgrass along the Atlantic Coast. *Plant Dis. Report.* 17:46-53.
- Cottam, C. 1934. Past periods of eelgrass scarcity. *Rhodora* 36:261-264.
- Cottam, C. and D.A. Munro. 1954. Eelgrass status and environmental relations. *J. Wild. Manag.* 18:449-460.

- Davis, B.M. 1913a. General characteristics of the algal vegetation of Buzzards Bay and Vineyard Sound in the vicinity of Woods Hole. *Fishery Bull. U.S. Fish. Wildlife Ser.* 31:443-544.
- Davis, B.M. 1913b. A catalog of the marine flora of Woods Hole and vicinity. *Fishery Bull. U.S. Fish. Wildlife Ser.* 31:795-833.
- Davis, F.W. 1985. Historical changes in submerged macrophyte communities of upper Chesapeake Bay. *Ecology* 66:981-993.
- den Hartog, C. 1977. Structure, function, and classification in seagrass communities. In C.P. McRoy and C. Helfferich (eds.), *Seagrass Ecosystems*, pp. 89-122.
- den Hartog, C. 1987. "Wasting disease" and other dynamic phenomena in *Zostera* beds. *Aquat. Bot.* 27:3-14.
- Dennison, W. C., R. C. Aller, and R. S. Alberte. 1987. Sediment ammonium availability and eelgrass (*Zostera marina*) growth. *Mar. Biol.* 94:469-477.
- Dennison, W.C. 1987. Effects of light on seagrass photosynthesis, growth and depth distribution. *Aquat. Bot.* 27:15-26.
- Dennison, W.C. and R.S. Alberte. 1982. Photosynthetic responses of *Zostera marina* L. (eelgrass) to in situ manipulations of light intensity. *Oecologia* 55:137-144.
- Dennison, W.C. and R.S. Alberte. 1985. Role of daily light period in depth distribution of *Zostera marina* L. (eelgrass). *Mar. Ecol. Prog. Ser.* 25:51-61.
- Dennison, W.C. and R.S. Alberte. 1986. Photoadaptation and growth of *Zostera marina* L. (eelgrass) transplants along a depth gradient. *J. Exp. Mar. Biol. Ecol.* 98:265-282.

- Diaz, H. F. and R. G. Quayle. 1978. The 1976-77 winter in the contiguous united states in comparison with past records. Month. Weather Rev. 106:1393-1425.
- Dodd, C.A. 1966. Epiphytic diatoms of *Zostera marina* in Great South Bay. M.S. Thesis. Adelphi Univ., Adelphi, N.Y. 208 pp.
- Doddema, H. and M. Howari 1983. In vivo nitrate reductase activity in the seagrass *Halophila stipulacea* from the Gulf of Aqaba (Jordan). Bot. Mar. 26:307-312.
- Durso, V., S. Sass, J. Sparrow, J. Williams, S. Youngblood. 1979. Town of Fairhaven. An inventory of quahogs and soft-shell clams available to the recreational fisherman. Northeast Marine Environmental Institution Report.
- Dykhouse, J.D. 1976. Seasonal dynamics of dominant epiphytic invertebrates on eelgrass (*Zostera marina* L.) in South Humboldt Bay. M.A. Thesis. Humboldt State Univ., Arcatia, Calif. 45 pp.
- Emery, K.O. 1980. Relative sea levels from tide-gauge records. Proc. Nat. Acad. Sci. 77:6968-6972.
- Fairchild, G. W., R. L. Lowe, and W.B.Richardson. 1985. Algal periphyton growth on nutrient-diffusing substrates: An in situ bioassay. Ecology 66:465-472.
- Ferguson, R.L., G.W. Thayer, and T.R. Rice. 1980. Marine primary producers. In: Functional Adaptations of Marine Organisms. Academic Press Inc.
- Fish, G. 1987. Masters Thesis, Boston University, Boston MA

Fiske, J.D., J.R. Curley, and R.P. Lawton. 1968. Study of the marine resources of the Westport River. Mass. Dept. Natur. Res. Mono. Ser., No. 7., 52 pp.

Fonseca, M.S., W.J. Kenworthy, J. Homziak, and G.W. Thayer. 1979. Transplanting of eelgrass and shoalgrass as a potential means of economically mitigating a recent loss of habitat. Pp 279-326 in D.P. Cole, ed. Proceedings of the Sixth Annual Conference on Restoration and Creation of Wetlands. Hillsborough Community College, Tampa, Fla.

Fonseca, M. S., W. J. Kenworthy and R. C. Phillips. 1982a. A cost-evaluation technique for restoration of seagrass and other plant communities. Environ. Conserv. 9:237-241.

Fonseca, M.S., W.J. Kenworthy, and G.W. Thayer. 1982b. A Low-cost planting technique for eelgrass (*Zostera marina* L.). Coastal Engineering Technical Aid No. 82-6. U.S. Army Corps of Engineers.

Fonseca, M.S., J.J. Fisher, J.C. Zieman, and G.W. Thayer. 1982c. Influence of the seagrass, *Zostera marina* L., on current flow. Estuar. Coastal Shelf Sci. 15:351-364.

Fonseca, M.S., J.C. Zieman, G.W. Thayer, and J.S. Fisher. 1983. The role of current velocity in structuring eelgrass (*Zostera marina* L.) meadows. Estuar. Coast. Shelf Sci. 17:367-380.

Fonseca, M.S., G-W. Thayer, A. J. Chester, and C. Foltz. 1984. Impact of scallop harvesting on eelgrass (*Zostera marina*) meadows: Implications for management. N. Amer. J. Fish. Manag. 4:286-293.

- Fonseca, M.S., W.J. Kenworthy, G.W. Thayer, D.Y. Heller and K.M. Cheap. 1985. Transplanting of the seagrasses *Zostera marina* and *Halodule wrightii* for sediment stabilization and habitat development on the East Coast of the United States. Tech. Rep. EL-85-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 63 pp.
- Fonseca, M.S. and W.J. Kenworthy. 1987. Effects of current on photosynthesis and distribution of seagrasses. Aquat. Bot. 27:59-78..
- Fry, B., S.A. Macko, and J.C. Zieman. 1987. Review of stable isotopic investigations of food webs in seagrass meadows. In. M.J. Durako, R.C. Phillips, and R.R. Lewis III (eds.), Proceedings of the symposium on subtropical seagrasses of the southeastern United States. Florida Mar. Res. Publ. 42, pp 189-209.
- Fujita, R. 1985. The role of nitrogen supply and variability in regulating nitrogen uptake by macroalgae and in structuring a macroalgal community. Ph.D. Thesis, Boston University, 141 pp.
- Gagnon, P.S., R.L. Vadas, D.B. Burdick, and B. May. 1980. Genetic identity of annual and perennial forms of *Zostera marina* L. Aquat. Bot. 8:157-162.
- Gaines, A.G. 1985. Lagoon pond study: an assessment of environmental issues and observations on the estuarine systems. Final Report prepared for the Boards of Selectmen, Town of Oak Bluffs, Town of Tisbury, Martha's Vineyard, MA.
- Giblin, A.E, J.M. Teal, and A.G. Gaines. 1983. A nitrogen budget for Town Cove. In J.M. Teal (ed.), The coastal impact of groundwater discharge: an assessment of anthropogenic nitrogen loading in Town

- Cove, Orleans, MA. Final Report. Woods Hole Oceanographic Institution, Woods Hole, MA, 143-159.
- Goforth, H.W. and T.J. Peeling. 1979. Intertidal and subtidal eelgrass (*Zostera marina* L.) transplant studies in San Diego Bay, California. In: D.P. Cole (ed.), Proceedings of the sixth annual conference on the restoration and creation of wetland. Hillsborough Community College, Tampa, pp 324-356.
- Hankin, A.L., C. Lucille, and S. Bliven. 1985. Barrier beach, salt marshes and tidal flats: An inventory of the coastal resources of the Commonwealth of Massachusetts. Lloyd Center/Coastal Zone Management. CMP13899-27-600-1-85, 27pp.
- Haramis, G. M. and V. Carter. 1983. Distribution of submersed aquatic macrophytes in the tidal Potomac River. *Aquat. Bot.* 15:65-79.
- Harlin, M.M. 1975. Epiphyte-host relations in seagrass communities. *Aquat. Bot.* 1:125-131.
- Harlin, M.M. 1980. Seagrass epiphytes, In R.C. Phillips and C.P. McRoy (eds.). *Handbook of seagrass biology, an ecosystem perspective.* Garland STMP Press, New York, pp. 117-151.
- Harlin, M.M. and B. Thorne-Miller. 1981. Nutrient enrichment of seagrass beds in a Rhode Island coastal lagoon. *Mar. Biol.* 65:221-229.
- Harlin, M.M., B. Thorne-Miller and J.C. Boothroyd. 1982. Seagrass-sediment dynamics of a flood-tidal delta in Rhode Island (U.S.A.). *Aquat. Bot.* 14:127-138.

- Harrison, P.G. and A.T. Chan 1980. Inhibition of growth of microalgae and bacteria by extracts of eelgrass (*Zostera marina*) leaves. Mar. Biol. 61:21-26.
- Harrison, P.G. and K.H. Mann. 1975. Chemical changes during the seasonal cycle of growth and decay in eelgrass (*Zostera marina*) on the Atlantic Coast of Canada. J. Fish. Res. Bd. Canada 32:615-621.
- Heck, K.L., Jr. and R.J. Orth 1980b. Structural components of eelgrass (*Zostera marina*) meadows in the lower Chesapeake Bay - Decapod Crustacea. Estuaries 3:289-295.
- Heck, K.L., Jr. and R.J. Orth. 1980a. Seagrass habitats: The roles of habitat complexity, competition and predation in structuring associated fish and motile macroinvertebrate assemblages. Pages 449-464 in V.S. Kennedy, ed. Estuarine perspectives. Academic Press, New York.
- Heufelder, G. 1987. Bacteriological monitoring in Buttermilk Bay. Barnstable County Health and Environmental Dept., Barnstable, MA. 77 pp.
- Hickman, M. and F.E. Round. 1970. Primary production and standing crops of episammic and epipelagic algae. Br. Phycol. J. 5:247-255.
- Jacobs, R.P.W.M. 1979. Distribution and aspects of production and biomass of eelgrass, *Zostera marina* L., at Roscoff, France. Aquat. Bot. 7:151-172.
- Jacobs, R.P.W.M., C. Den Hartog, B.F. Braster, and F.C. Carriere. 1981. Grazing of the seagrass *Zostera noltii* by birds at Terschelling (Dutch Wadden Sea). Aquat. Bot. 10:241-259.

Kenworthy, W. J. and M. Fonseca. 1977. Reciprocal transplant of seagrass *Zostera marina* L. Effect of substrate on growth. Aquaculture 12,197-213.

Kenworthy, W.J. and G.W. Thayer. 1984. Aspects of the production and decomposition of the roots and rhizomes of seagrasses, *Zostera marina* and *Thalassia testudinum*, in temperate and subtropical marine ecosystems. Bull. Mar. Sci. 35:364-379.

Kenworthy, W.J., J.C. Zieman and G.W. Thayer 1982. Evidence for the influence of seagrass on the benthic nitrogen cycle in a coastal plain estuary near Beaufort, North Carolina (USA). Oecologia 54:152-158.

Kenworthy, W.J., M.S. Fonseca, and G.W. Thayer. 1987. Aspects of the population biology of eelgrass, *Zostera marina* L.

Kenworthy, W.J., M.S. Fonseca, J. Homziak, and G.W. Thayer. 1980. Development of a transplanted seagrass (*Zostera marina* L.) meadow in Back Sound, Carteret County, North Carolina. In: D.P. Cole, (ed.) Proceedings of the Seventh Annual Conference on the Restoration and Creation of Wetlands. Hillsborough Community College, Tampa, Fla. Pp 175-193.

Kikuchi, T. 1980. Faunal relationships in temperate seagrass beds. In: R.C. Phillips and C.P. McRoy (eds.), Handbook of Seagrass Biology, Garland Press, New York, pp. 153-172.

Kindig, A.C. and M.M. Littler. 1980. Growth and primary production of marine macrophytes exposed to domestic sewage effluent. Mar. Environ. Res 3:81-100.

- Kirkman, H. 1978. Decline of seagrass in northern areas of Moreton Bay, Queensland. *Aquat. Bot.* 5:63-76.
- Lee, V., and S. Olsen 1985. Eutrophication and management initiatives for the control of nutrient inputs to Rhode Island coastal lagoons. *Estuaries* 8:191-202.
- Lewis, H.F. 1931. The relation of Canada Geese and Brant to commercial gathering of eelgrass in the St. Lawrence estuary. *Can. Field Nat.* 45:57-62.
- Lewis, I.F., and W.R. Taylor. 1933. Notes from the Woods Hole Laboratory-1932. *Rhodora* 35:147-154.
- Mann, K.H. 1972. Macrophyte production and detritus food chains in coastal waters. *Mem. Ist. Ital. Idrobiol. (Suppl.)* 29:353-383.
- Marcus, M.D. 1980. Periphytic community response to chronic nutrient enrichment by a reservoir discharge. *Ecology*. 61:387-399.
- Marshall, N., and K. Lukas. 1970. Preliminary observations on the properties of bottom sediments with and without eelgrass, *Zostera marina* cover. *Proc. Natl. Shellfish. Assoc.* 60:107-112.
- Marshall, N., D.A. Skauen, H.C. Lampe, and C.A. Oviatt. 1971. Productivity of the benthic microflora of shoal estuarine environments in southern New England. *Int. Rev. Gesamten. Hydrobiol.* 56:947-956.
- Mazzella, L., R.S. Alberte. 1986. Light adaptation and the role of autotrophic epiphytes in primary production of the temperate seagrass, *Zostera marina* L.
- McRoy, C.P. and R.J. Barsdate. 1970. Phosphate absorption in eelgrass. *Limnol. Oceanogr.* 15:6-13.

- McRoy, C.P. and C. McMillan. 1977. Production ecology and physiology of seagrasses. In: C.P. McRoy and C. Helferrich (eds.), Seagrass ecosystems: A scientific perspective. Dekker, N.Y., pp 53-68.
- McRoy, C.P. and J.J. Goering 1974. Nutrient transfer between the seagrass *Zostera marina* and its epiphytes. *Nature* 248:173-174.
- Milne, L.J. and M.J. Milne, 1951. The eelgrass catastrophe. *Sci. Am.* 184:52-55.
- Mock, S.J. and W.D. Hibler. 1976. The 20-y oscillation in eastern North American temperature records. *Nature* 261:484-486.
- Monbet, Y., F. Manaud, P. Gentien, M. Pommeuy, G.P. Aallen, J.C. Salomon, and J. L'Yavanc. 1981. The use of nutrients, salinity, and water circulation data as a tool for coastal planning. In B.J. Neilson and L.E. Cronin (eds.), *Estuaries and Nutrients*. Humana Press, Clifton, NJ, 343-372.
- Moog, P.L. 1987. The hydrogeology and freshwater influx of Buttermilk Bay, Massachusetts, with regard to the circulation of coliforms and pollutants: a model study and development of methods for general application. M.S. Thesis, Boston University, Boston, MA, 166 p.
- Moss, B. 1976. The effects of fertilization and fish on community structure and biomass of aquatic macrophytes and epiphytic algal populations: an ecosystem experiment. *J. Ecol.* 64:313-347.
- Mulligan, H.F., A. Baranowski, and R. Johnson. 1976. Nitrogen and phosphorus fertilization of aquatic vascular plants and algae in replicate ponds. I. Initial response to fertilization. *Hydrobiologia* 48:109-116.

- Neilson, B.J., and L.E. Cronin (eds.). 1981. Estuaries and Nutrients. Humana Press. Clifton, NJ.
- Nienhuis, P.H. 1983. Temporal and spatial patterns of eelgrass (*Zostera marina* L.) in a former estuary in the Netherlands, dominated by human activities. Mar. Tech. Soc. J. 17:69-77.
- Nienhuis, P.H. and E.T. Van Ireland. 1978. Consumption of eelgrass, *Zostera marina*, by birds and invertebrates during the growing season in Lake Grevelingen (SW Ne.) Nether. J. Sea Res. 12:180-194.
- Nienhuis, P.H., and A.M. Groenendijk. 1986. Consumption of Eelgrass (*Zostera marina* L.) by birds and invertebrates: An annual budget. Mar. Ecol. Prog. Ser. 29:29-35.
- Nixon, S. 1986. Nutrient dynamics and the productivity of marine coastal waters. In R. Halwazy, D. Clayton, and M. Behbehani (eds.), Marine Environment and Pollution. Alden Press, 93-115.
- Nixon, S., and M. Pilson. 1983. Nitrogen in estuarine and coastal marine ecosystems, In E.J. Carpenter and D.G. Capone (eds.), Nitrogen in the Marine Environment. Academic Press, NY, 565-648.
- Nixon, S.W. 1980. Between coastal marshes and coastal waters - A review of twenty years of speculation and research on the role of salt marshes in estuarine productivity and water chemistry. In P. Hamilton and K.B. MacDonald, (eds.), Estuarine and Wetland Processes, Plenum Press, NY pp 437-525.
- Nixon, S.W. 1983. Estuarine ecology - A comparative and experimental analysis using 14 estuaries and the MERL microcosms. EPA Chesapeake Bay Program. 59 pp.

- Nixon, S.W. 1983. Estuarine ecology - A comparative and experimental analysis using 14 estuaries and the MERL microcosms. EPA Chesapeake Bay Program. 59 pp.
- Nixon, S.W., C.A. Oviatt, J. Frithsen, and B. Sullivan. 1986. Nutrients and the productivity of estuarine and coastal marine ecosystems. *J. Limnol. Soc. South Afr.* 12:43-71.
- NOAA. 1973. Surface water temperature, Atlantic Coast, North and South America. NOS publication 31-1, 150 pp.
- Noble, J.C., A.D. Bell, and J.L. Harper. 1979. The population biology of plants with clonal growth. I. The morphology and structural demography of *Carex arenaria*. *J. Ecol.* 67:983-1008.
- Nowicki, B.L. and S. Nixon. 1985. Benthic nutrient remineralization in a coastal lagoon ecosystem. *Estuaries* 8:182-190.
- Orth, R.J. 1973. Benthic infauna of eelgrass, *Zostera marina* beds. Chesapeake. *Sci.* 14:258-269.
- Orth, R.J. 1975. Destruction of eelgrass, *Zostera marina* by the cownose ray, *Rhinoptera bonasus*, in the Chesapeake Bay. *Chesapeake Sci.* 16:205-208.
- Orth, R.J. 1977. Effect of nutrient enrichment on the growth of eelgrass *Zostera marina* in Chesapeake Bay, Virginia USA. *Mar. Biol.* 44:187-194.
- Orth, R.J. 1977. The importance of sediment stability in seagrass communities. In B.C. Coull (ed.) *Ecology of the marine benthos*. Univ. So. Car. Press, Columbia, SC pp281-300.

- Orth, R.J. and J. Van Montfrans. 1984. Epiphyte-seagrass relationships with an emphasis on the role of micrograzing: A review. *Aquat. Bot.* 18:43-69.
- Orth, R.J. and K.A. Heck, Jr. 1980. Structural components of eelgrass (*Zostera marina*) meadows in the lower Chesapeake Bay - Fishes. *Estuaries* 3:278-288.
- Orth, R.J. and K.A. Moore. 1983a. Submerged vascular plants: Techniques for analyzing their distribution and abundance. *Mar. Tech. Soc. J.* 17:38-52.
- Orth, R.J. and K.A. Moore. 1983b. Chesapeake Bay: An unprecedented decline in submerged aquatic vegetation. *Science* 222:51-53.
- Paine, R.T. and S.A. Levin. 1981. Intertidal landscapes: Disturbance and dynamics of pattern. *Ecol. Monogr.* 51:145-178.
- Parsons, T.R., Y. Maita, and C.M. Lalli, 1984. A Manual of Chemical and Biological Methods for Seawater Analysis. Pergamon Press. Oxford. 173 p.
- Penhale, P.A. 1977. Macrophyte epiphyte biomass and productivity in an eelgrass (*Zostera marina* L.) community. *J. Exp. Mar. Biol. Ecol.* 26:211-224.
- Penhale, P.A. and G.W. Thayer 1980. Uptake and transfer of carbon and phosphorus by eelgrass (*Zostera marina* L.) and its epiphytes. *J. Exp. Mar. Biol. Ecol.* 42:113-123.
- Penhale, P.A. and W.O. Smith, Jr. 1977. Excretion of dissolved organic carbon by eelgrass (*Zostera marina*) and its epiphytes. *Limnol. Oceanogr.* 22:400-407.

- Phillips, G.L., D. Eminson, and B. Moss. 1978. A mechanism to account for macrophyte decline in progressively eutrophicated freshwaters. *Aquat. Bot.* 4:103-126.
- Phillips, R.C. 1974. Transplantation of seagrasses with special emphasis on eelgrass, *Zostera marina L.* *Aquaculture* 4:161-176.
- Phillips, R.C., C. McMillan, and K. W. Bridges. 1983. Phenology of eelgrass, *Zostera marina L.*, along latitudinal gradients of North America. *Aquat. Bot.* 15:145-156.
- Phillips, R.C., W.S. Grant, and C.P. McRoy. 1983. Reproductive strategies of eelgrass (*Zostera marina L.*). *Aquat. Bot.* 16:1-20.
- Pickett, S.T.A. and P.S. White (eds.). 1985. The ecology of natural disturbance and patch dynamics. Academic Press, New York. 472 pp.
- Pregnall, A.M. 1983. Release of dissolved organic carbon from the estuarine intertidal macroalga *Enteromorpha prolifera*. *Mar. Biol.* 73:37-42.
- Pregnall, A.M., R.D. Smith, T.A. Kursar, and R.S. Alberte. 1984. Metabolic adaptation of *Zostera marina* (eelgrass) to diurnal periods of root anoxia. *Mar. Biol.* 83:141-147.
- Ranwell, D.S., D.W. Wyer, L.A. Boorman, J.M. Pizzey and R.J. Waters 1978. *Zostera* transplants in Norfolk and Suffolk, Great Britain. *Aquat. Bot.* 4:185-198
- Rasmussen, E. 1977. The wasting disease of eelgrass (*Zostera marina*) and its effects on environmental factors and fauna. In: C.P. McRoy and C. Helfferich (eds.). *Seagrass Ecosystems*, Marcel Dekker, pp. 1-52.

- Redfield, A.C. 1972. Development of a New England salt marsh. *Ecol. Monogr.* 42:201-37.
- Robertson, A.I and K.H. Mann. 1984. Disturbance by ice and life-history adaptations of the seagrass *Zostera marina*. *Mar. Biol.* 80:131-142.
- Robilliard, G.A. and P.E. Porter. 1976. Transplantation of eelgrass (*Zostera marina*) in San Diego Bay. Consultation for U. S. Defense Naval Undersea Center, NUC TN 1701. 36 p.
- Roman, M.R. and K.R. Tenore. 1978. Tidal resuspension in Buzzards Bay, Massachusetts, USA, Part 1. Seasonal changes in the resuspension of organic carbon and chlorophyll a. *Est. Coast. Mar. Sci.* 11:9-16.
- Ryther, J.H., and W.M. Dunstan. 1971. Nitrogen, phosphorus, and eutrophication in the coastal marine environment. *Science* 171:1008-1031.
- Sand-Jensen, K. 1975. Biomass, net production and growth dynamics in an eelgrass (*Zostera marina* L.) population in Vellerup Vig, Denmark. *Ophelia* 14:185-201.
- Sand-Jensen, K. 1977. Effects of epiphytes on eelgrass photosynthesis. *Aquat. Bot.*, 3:55-63
- Sand-Jensen, K. and J. Borum. 1983. Regulation of Growth in eelgrass (*Zostera marina* L.) communities in Danish coastal waters. *Mar. Tech. Soc. J.* 17:15-21.

- Sand-Jensen, K. and M. Sondergaard. 1981. Phytoplankton and epiphyte development and their shading effect on submerged macrophytes in lakes of different nutrient status. *Int. Revue Ges. Hydrobiol.* 66:529-552.
- Sand-Jensen, K. and N. P. Revsbech. 1987. Photosynthesis and light adaptation in epiphyte-macrophyte associations measured by oxygen microelectrodes. *Limnol. Oceanogr.* 32:452-457.
- Sanders, H.L., J. F. Grassle, G.R. Hampson, L.S. Morse, S. Garner-Price, and C.C. Jones. 1980. Anatomy of an oil spill: Long-term effects from the grounding of the barge Florida off West Falmouth, MA. *J. Mar. Res.* 38:265-380.
- Schubel, J.R. 1973. Some comments on seagrasses and sedimentary processes. *Chesapeake Bay Inst., Special Report 33*, Johns Hopkins Univ., 32 pp.
- Sharpe, D. M. and D. E. Fields. 1982. Integrating the effects of climate and seed fall velocities on seed dispersal by wind: a model and application. *Ecol. Mod.* 17:297-310.
- Short, F.T. 1983. The response of interstitial ammonium in eelgrass (*Zostera marina* L.) beds to environmental perturbations. *J. Exp. Mar. Biol. Ecol.* 68:195-208.
- Short, F.T. 1983. The seagrass *Zostera marina* L.: Plant morphology and bed structure in relation to sediment ammonium in Izembek Lagoon, Alaska. *Aquat. Bot.* 16:149-161.
- Short, F.T., A.C. Mathieson, and J.I. Nelson. 1986. Recurrence of the eelgrass wasting disease at the border of New Hampshire and Maine, U.S.A. *Mar. Ecol. Prog. Ser.* 29:89-92.

- Signell, R. 1987. Tide and wind-forced currents in Buzzards Bay, Massachusetts. Woods Hole Oceanographic Institution, Technical Report. WHOI-87-15, 86pp.
- Silberhorn, G.M., R.J. Orth and K.A. Moore. 1983. Anthesis and seed production in *Zostera marina* L. (Eelgrass) from the Chesapeake Bay. Aquat. Bot. 15:133-144.
- Smith, W.O. and P.A. Penhale. 1980. The heterotrophic uptake of dissolved organic carbon by eelgrass (*Zostera marina* L.) and its epiphytes. J. Exp. Mar. Biol. Ecol. 48:233-242.
- Stauffer, R. C. 1937. Changes in the invertebrate community of a lagoon after the disappearance of the eel grass. Ecology 18:427-431.
- Stevens, N.E. 1935. Notes on *Zostera marina* in upper Buzzards Bay, Massachusetts. Plant Dis. Rep. 19:232-233.
- Stevens, N.E. 1936. Notes on the condition of *Zostera marina* in Buttermilk Bay, Massachusetts. Plant Dis. Rep. 20:279-281.
- Stevens, N.E. 1939. Environmental factors and the wasting disease of eelgrass. Rhodora 41:260-262.
- Stevens, N.E., H.R. Ellis, and R. B. Stevens. 1950. Wasting and recovery of *Zostera marina* on the Atlantic coast of the United States. Plant Dis. Rep. 34:357-62.
- Taylor, A.R.A. 1957a. Studies of the Development of *Zostera marina* L. II. Germination and Seedling Development. Can. J. Bot. 35:681-695.
- Taylor, A.R.A. 1957b. Studies on the Development of *Zostera marina* L. I. The Embryo and the Seed. Can. J. Botany 35:477-499.

- Taylor, W.R. 1957. Marine algae of the northeastern coast of North America. Univ. of Michigan Press, Ann Arbor, 509 pp.
- Thayer, G.W. and H. Stuart. 1974. The bay scallop makes its bed of seagrass. Mar. Fish. Rev. 37:27-30.
- Thayer, G.W., D.A. Wolfe, and R.B. Williams. 1975. The impact of man on seagrass systems. Amer. Sci. 63:288-296.
- Thayer, G.W., D.W. Engel, and M.W. LaCroix. 1977. Seasonal distribution and changes in the nutritive quality of living, dead, and detrital fractions of *Zostera marina* L. J. Exp. Mar. Biol. Ecol. 30:109-127.
- Thayer, G.W., W.J. Kenworthy and M.S. Fonseca. 1984. The ecology of eelgrass meadows of the Atlantic Coast: A community profile. U.S. Dept. Int. FWS/OBS-84/02. 147 pp.
- Thorne-Miller, B., M.M. Harlin, G.B. Thursby, M.M. Brady-campbell and B.A. Dworetzky. 1983. Variations in the distribution and biomass of submerged macrophytes in five coastal lagoons in Rhode Island, U.S.A.. Bot. Mar. 26:231-242.
- Thursby, G.B. and M.M. Harlin. 1982. Leaf-root interaction in the uptake of ammonia by *Zostera marina*. Mar. Biol 72:109-112.
- Tomlinson, P.B. 1974. Vegetative morphology and meristem dependence-the foundation of productivity in seagrasses. Aquaculture 4:107-130.
- Tomlinson, P.B. 1980. Leaf morphology and anatomy in seagrasses. In: R.C. Phillips and C.P. McRoy (eds.) Handbook of Seagrass Biology, Garland Press, pp. 7-28.

- Twilley, R.R., W.M. Kemp, K.W. Staver, J.C. Stevenson, and W.R. Boynton. 1985. Nutrient enrichment of estuarine submersed vascular plant communities. 1. Algal growth and effects on production of plants and associated communities. Mar. Ecol. Prog. Ser. 23:179-191.
- Valiela, I. 1984. Marine Ecological Processes. Springer-Verlag, New York, NY.
- Valiela, I. and J. Costa. (in press) Eutrophication of Buttermilk Bay, a Cape Cod coastal embayment: Concentrations of nutrients and watershed nutrient budgets. Environ. Manag.
- Valiela, I. and J. M. Teal. 1979. The nitrogen budget of a salt marsh ecosystem. Nature 280:652-56.
- Valiela, I., J.M. Teal, W.J. Sass. 1975. Production and dynamics of salt marsh vegetation and the effects of experimental treatment with sewage sludge. J. Appl. Ecol. 12:973-982.
- Van Montfrans, J., R.J. Orth and S.A. Vay 1982. Preliminary studies of grazing by *Bittium varium* on eelgrass periphyton. Aquat. Bot. 14:75-89.
- Wassman, E.R., and J. Ramus. 1973. Primary Production Measurements for the Green Seaweed *Codium fragile* in Long Island Sound. Mar. Biol. 21:289-297.
- Weller, D. 1987. Self-thinning exponent correlated with allometric measure of plant growth. Ecology 68:813-821.
- Wetzel, R.G. and P.A. Penhale 1979. Transport of carbon and excretion of dissolved organic carbon by leaves and roots/rhizomes in seagrasses and their epiphytes. Aquat. Bot. 6:149-158.

- Wetzel, R.L. and P.A. Penhale 1983. Production ecology of seagrass communities in the lower Chesapeake Bay. *Mar. Technol. Soc. J.* 17:22-31.
- Wheeler, C. L. 1986. A record of air and surface water temperatures in Great Harbor, Woods Hole, Massachusetts 1962-1981. National Marine Fisheries Service, Northeast Fisheries Center, Woods Hole Laboratory Reference Document No. 86-02, 26 pp.
- White, J., and J.L. Harper. 1970. Correlated changes in plant size and number in plant populations. *J. Ecol.* 58:467-485.
- Wolfram, S. 1984. Cellular automata as models of complexity. *Nature* 311:419-426.
- Zeeb, P.J. 1985. Beach Dynamics and historical coastline change, Falmouth, Massachusetts. B.A. Thesis, Williams College.
- Zieman, J.C. and R.G. Wetzel. 1980. Productivity in seagrasses: Methods and rates. In: R.C. Phillips and C.P. McRoy (eds.). *Handbook of Seagrass Biology*, Garland Press, New York, pp. 87-116.
- Zimmermann, C.F. and J.R. Montgomery 1984. Effects of a Decomposing Drift Algal Mat on Sediment Pore Water Nutrient Concentrations in a Florida Seagrass Bed. *Mar. Ecol. Prog. Ser.* 19:299-302.

Vita

Joseph Edward Costa was born in New Bedford, MA on 29 June 1958. He grew up one block from shore, and one block from what he would later realize was a major PCB polluter in Buzzards Bay. In part because of his many exploratory hikes along the shores of New Bedford, and especially because of his attendance at the New Bedford Oceanography School, Sea Lab, during summers between the 6th and 9th grades, he decided at a early age to become a marine biologist. After graduating from New Bedford High School in 1976, he went off to college in California to pursue his dream, and have a little fun.

He spent his freshman year at the University of Southern California, decided this move was a great mistake, and transferred to the University of California, Berkeley. There he thrived and grew in an environment of innovation, brilliant thinkers, and diverse ideas and values. After he graduated in 1980, he returned to Massachusetts and the glamor of Woods Hole as part of the BUMP program. After a few false starts, he finally settled on a thesis that satisfied his needs (and go back to his roots?) to accomplish both basic and applied research. He finished his degree after 7 1/2 years of hard work and mostly independent funding and research.

Today Joe Costa is happily married to Maureen. They have a wonderful dog named Skee, and they look forward to their future life, many fishing trips, and family additions.