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ANIMAL SUBSTRATE RELATIONSHIPS AND PRODUCTIVITY OF INVERTEBRATE--ETC(U)
DEC 81 J D LUNZ, H L HORSTMANN

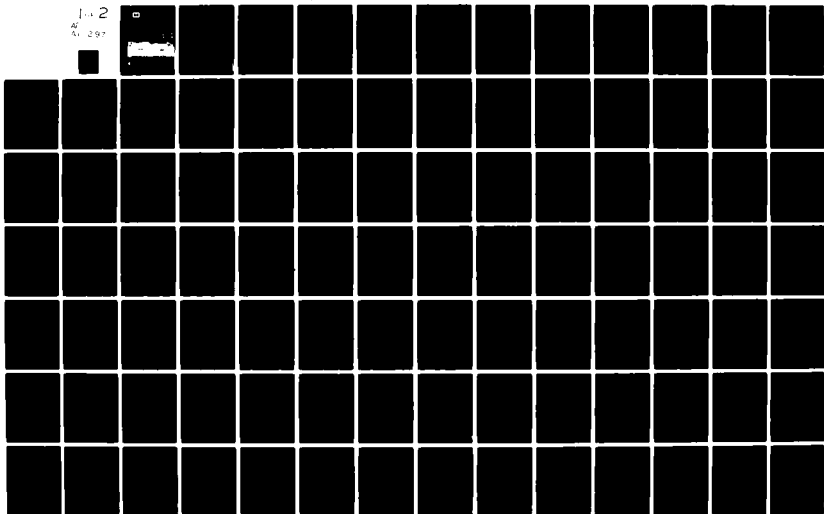
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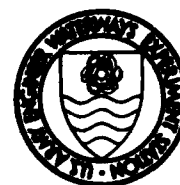
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MISCELLANEOUS PAPER EL-81-12

**ANIMAL SUBSTRATE RELATIONSHIPS AND
PRODUCTIVITY OF INVERTEBRATE
MACROBENTHOS OF MISSISSIPPI SOUND AND
ADJACENT COASTAL AREAS; A BIBLIOGRAPHY
WITH ABSTRACTS**

by

John D. Lunz, Harry L. Horstmann

Environmental Laboratory

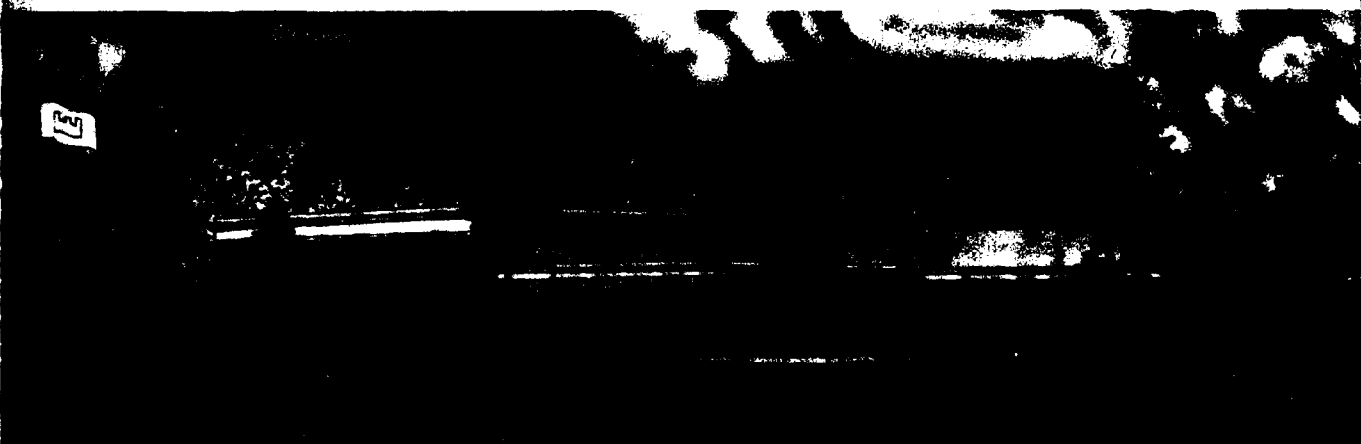
U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180

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Final Report

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This document presents bibliographic material relevant to macrobenthic communities of the Mississippi Sound and adjacent areas. This bibliography is comprised of 140 references with abstracts or annotations and contains information on animal-substrate interaction and benthic invertebrate secondary production.		

PREFACE

This document was prepared for the Mississippi Sound and Adjacent Areas Study conducted in part by the U. S. Army Engineer Waterways Experiment Station (WES) for the U. S. Army Engineer District, Mobile. WES activities in the project were authorized by Intra-Army Order for Reimbursable Services No. FC-81-0020 dated 25 November 1980.

This bibliographic document together with a companion bibliography comprise the preliminary products of an investigation to describe the ecological role of the invertebrate macrobenthos of the sound and adjacent coastal habitats. The results of this study will be used for planning, dredging, and dredged material disposal operations in Mobile District.

This document was prepared by Messrs. John D. Lunz and Harry L. Horstmann, Environmental Systems Division (ESD), Environmental Laboratory (EL), WES. Dr. Andrew C. Miller, ESD, assisted with computer software development. Work progressed under the general supervision of Dr. Thomas D. Wright, Chief, Waterways Habitat and Monitoring Group, ESD, EL; Mr. Bob O. Benn, Chief, ESD; and Dr. John Harrison, Chief, EL.

COL Tilford C. Creel, CE, was Commander and Director of WES during the conduct of this work. Technical Director was Mr. Fred R. Brown.

This report should be cited as follows:

Lunz, J. D., and Horstmann, H. L. 1981. "Animal Substrate Relationships and Productivity of Invertebrate Macrobenthos of Mississippi Sound and Adjacent Coastal Areas; A Bibliography with Abstracts," Miscellaneous Paper EL-81-12, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

ANIMAL SUBSTRATE RELATIONSHIPS AND
PRODUCTIVITY OF INVERTEBRATE MACROBENTHOS
OF MISSISSIPPI SOUND AND ADJACENT COASTAL AREAS;
A BIBLIOGRAPHY WITH ABSTRACTS

1. This bibliography and a companion bibliography on the feeding habits of fishes of the Mississippi Sound and Mississippi-Alabama Gulf Coast are the preliminary products of a U. S. Army Engineer Waterways Experiment Station (WES) study analyzing the trophic support potential of macrobenthic infauna to demersal bottom-feeding fishes. The macrobenthic fauna, particularly the infauna, of the Mississippi and Alabama estuarine-marine complex have not been well described by the technical literature. For this reason, the bibliography contains many references to conditions outside the study areas but judged to be relevant to the analysis and interpretation of faunal data within these areas. One hundred and forty papers were selected for their methodological or conceptual information content. The majority deal with animal-substrate interactions or benthic invertebrate secondary production. Additional subjects include: (a) benthic community pattern classification, (b) the short- and long-term temporal dynamics of benthic faunal communities, (c) benthic pelagic coupling in terms of water quality and pelagic productivity, and (d) benthic responses to stress. Sublittoral soft-bottom habitats have been emphasized, but informative references to benthic faunal observations in hard-bottom habitats as well as both unvegetated and vegetated littoral habitats are also included.

2. Most citations are accompanied by the complete author abstracts. Where the length of the abstract exceeded the capacity of the computerized information handling and printing system used to produce this document, abstracts were truncated. This occurred with fewer than 10 percent of the abstracts. Papers which contained no abstracts were annotated.

3. Literature represented by these abstracts and annotations was compiled by the WES as part of its efforts to analyze infaunal predation by demersal fishes. This analysis perceives the predator-prey relationship in two ways. The first perceives the relationship as a function of

the morphological characteristics of bottom-feeding fishes that predispose them to exploit particular macrobenthos; the second concerns the characteristics of invertebrate organisms that influence their value as fish food. This particular bibliography also serves a broader purpose by assisting literature study by persons with responsibilities for analyzing and interpreting macrobenthic infaunal data and managing these benthic sources.

4. Other significant efforts contributing to the project analysis include a comprehensive benthic macroinfaunal survey of the Mississippi Sound and Mississippi-Alabama Gulf Coast being conducted by Barry A. Vittor and Associates, Inc., Mobile, Ala., and a field and laboratory examination of the feeding morphologies and diets of selected demersal fish species by the WES.

5. The study will conclude during 1982 with a final report describing the trophic support potential of the areas different benthic communities to various benthic feeding fishes including: Urophycis floridanus, (Southern hake); Menticirrhus americanus, (Southern kingfish); Leiostomus xanthurus, (Spot); Urophycis regius, (Spotted hake); and Ariopsis felis, (Sea catfish).



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ALLER, R.C. AND R.E. DODGE
1974. NO. 34
ANIMAL-SEDIMENT RELATIONS IN A TROPICAL LAGOON DISCOVERY BAY,
JAMAICA
J MAR RES 32(2): 209-232.

THE DISTRIBUTION OF MANY MACROBENTHIC SPECIES IN THE BACK-REEF LAGOON OF DISCOVERY BAY, JAMAICA CAN BE RELATED TO A GRADIENT IN BOTTOM STABILITY. THIS GRADIENT IS DEFINED BY INCREASING RATES OF BIOGENIC REMWORKING & SEDIMENT RESUSPENSION IN THE WESTERN PART OF THE LAGOON. INFAUNAL DIVERSITY & CORAL GROWTH DECREASE IN THE WESTERN, UNSTABLE AREAS. THE INFAUNA OF THE CARBONATE SAND CONSIST MAINLY OF DEPOSIT FEEDERS. IN THE WESTERN LAGOON, THE FEEDING ACTIVITIES OF THIS GROUP RESULT IN HIGH BIOGENIC REMWORKING RATES (UP TO 6-7 CM/WEEK) PRODUCING LOOSE SURFACE SEDIMENT EASILY RESUSPENDED BY WAVES. A MAXIMUM, MEAN RESUSPENSION RATE OF 19 MG/CM/DAY WAS MEASURED. INSTABILITY OF THE LAGOON FLOOR, RESULTING IN HIGH WATER TURBIDITY, INHIBITS INFAUNAL DIVERSITY & CORAL GROWTH. SUSPENSION FEEDERS & REDUCES INFAUNAL DIVERSITY & CORAL GROWTH. BECAUSE STABILITY OF THE SOFT-BOTTOM IS SIGNIFICANTLY INFLUENCED BY DEPOSIT FEEDERS, OUR OBSERVATIONS REPRESENT AN EXTENSION OF THE TROPHIC GROUP AMENSALISM PRINCIPLE TO TROPICAL NEARSHORE ENVIRONMENTS.

ALLER, R.C. AND J.Y. YINGST
 1978. BIOGEOCHEMISTRY OF TUBE DWELLINGS A STUDY OF THE SEDENTARY
 POLYCHAETE AMPHITRITE ORNATA
 J MAR RES 36(2): 201-254

MOST STUDIES OF NEAR INTERFACE SEDIMENTS ASSUME THAT CHEMICALLY & BIOLOGICALLY IMPORTANT PATTERNS REFLECT THIS ASSUMPTION & LITTLE ATTENTION HAS BEEN PAID TO THREE-DIMENSIONAL HETEROGENEITY. IN THIS STUDY THE EFFECTS OF BURROW STRUCTURES FORMED BY AMPHITRITE ORNATA ON THE DISTRIBUTION OF PHYSICAL, CHEMICAL, & BIOLOGICAL CHARACTERISTICS OF A DEPOSIT ARE INVESTIGATED. A. ORNATA IS A SURFACE DEPOSIT-FEEDING TEREBELLID POLYCHAETE COMMON IN INTERTIDAL AREAS. IT CONSTRUCTS A PERMANENT, MULTI-LAYERED, U-SHAPED TUBE FROM PARTICLES OBTAINED AT THE INTERFACE. A. ORNATA TRANSPORTS PARTICLES DURING FEEDING AT A RATE OF APPROX. 4.5 G/D (T=22C) & BASED ON LABORATORY STUDIES, IRRIGATES ITS TUBE AT 91 CC/HR (T=22C). FIELD MEASUREMENTS OF BURROW WATER PROPERTIES SHOW THAT IN THE ABSENCE OF IRRIGATION, BURROW WATER RAPIDLY INCREASES IN NH_4^+ , HPO_4^{2-} , Fe^{++} , & POSSIBLY Mn^{++} & ATP CONCENTRATIONS. THE BURROW WALL IS A SITE OF INTENSE DECOMPOSITION RELATIVE TO SURROUNDING SEDIMENT. PORE WATER GRADIENTS AWAY FROM THE WALL SHOW A DECREASE IN ALKALINITY, NH_4^+ , Fe^{++} , & Mn^{++} . HIGHEST CONCENTRATIONS ARE FOUND IN THE BURROW WALL. ATP, MEIOFAUNAL ABUNDANCE, & DHA (DEHYDROGENASE ACTIVITY) DETERMINATIONS SHOW THAT MICROBIAL POPULATIONS ARE HIGHEST IN THE INNERMOST BURROW WALL & THAT MUCH OF THE METABOLIC ACTIVITY IN THE OUTER WALL IS ANAEROBIC. DISTRIBUTION OF SOLID PHASE SULFIDES, IN THE THREE-DIMENSIONAL DISTRIBUTION OF SOLID PHASE SULFIDES, FES (ACID VOLATILE) & FES₂S, DEMONSTRATES HIGHER CONCENTRATIONS OF THESE COMPOUNDS & RATES OF SO_4 =REDUCTION IN THE BURROW WALL THAN IN SURROUNDING SEDIMENT. DIFFUSION-REACTION & STOICHIOMETRIC MODELS OF PORE WATER GRADIENTS AROUND THE BURROW INDICATE THAT SO_4 =REDUCTION RATES ARE APPROX. 80-250 MMOL/1/YR (T=22C) & THAT N/P & C/N RATIOS OF ORGANIC MATTER BROKEN DOWN IN THE WALL ARE LOW, INDICATIVE OF EARLY, RAPID DECOMPOSITION. AS A RESULT OF THE INTENSE DECOMPOSITION, PROCESSES IN THE BURROW WALL FE, MN, & ZN ARE MOBILIZED, & THESE METALS ARE CONCENTRATED ALONG THE INNER BURROW-SURFACE. IRRIGATION WATER

ANSELL, A.D. ETAL NO. 14
1972. ECOLOGY OF TWO SANDY BEACHES IN SOUTHWEST INDIA. III.
OBSERVATIONS ON THE POP. OF DONAX INCARNATUS, D. SPICULUM
MAR BIOL 17: 318-332.

THE BIOLOGY OF TWO SPECIES OF DONAX, D. INCARNATUS Gmelin & D. SPICULUM Reeve ON TWO BEACHES IN SOUTH WEST INDIA IS DESCRIBED. TWO YEAR GROUPS OF D. INCARNATUS WERE PRESENT ON BOTH BEACHES, FROM SETTLEMENTS DURING THE MONSOON PERIOD IN 1967 & 1968. AT SHERTALLAI, BOTH GROUPS WERE STUDIED THROUGH THE YEAR, & DATA ON GROWTH, MORTALITY & PRODUCTION ARE PRESENTED. AT COCHIN, THE RATE OF GROWTH WAS SLOWER & THE MAXIMUM SIZE ATTAINED SMALLER, BUT MORTALITY DURING THE EARLY MONSOON PRECLUDED STUDY OF D. INCARNATUS THROUGH A FULL YEAR. D. SPICULUM OCCURRED AT COCHIN MAINLY DURING THE PRE-MONSOON PERIOD, & AT SHERTALLAI DURING THE POST-MONSOON. THE SPECIES HAS A SHORTER LIFE-SPAN THAN D. INCARNATUS, BUT ITS IRREGULAR OCCURRENCE DID NOT ALLOW DETAILED PRODUCTION ESTIMATES.

ARNTZ, W.
1979. NO. 11
PREDATION BY DEMERSAL FISH AND ITS IMPACT ON THE DYNAMICS OF
MACROBENTHOS
IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C. PRESS: 121-149

SINCE 1968, INVESTIGATIONS HAVE BEEN CARRIED OUT IN THE WESTERN
BALTIC ON INTER-RELATIONSHIPS OF THE DYNAMICS OF MACROBENTHOS &
DEMERSAL FISH. THESE STUDIES HAVE INVOLVED: 1) INVESTIGATIONS OF
OVER 5,000 STOMACH & GUT ANALYSES TO QUANTIFY THE FOOD (INCLUDING
SEASONAL CHANGES) OF COD, WHITING, DAB, PLAICE, FLOUNDER & SOME
LESS IMPORTANT FISH SPECIES; 2) SURVEY OF INFAUNAL MACROBENTHOS
OVER EIGHT YEARS (1968-1971 & 1975-1978); & 3) A THREE-YEAR AT THE
EXPERIMENTAL STUDY ON DYNAMICS & PRODUCTION OF MACROBENTHOS AT THE
"BENTHOSGARTEN" STATION. THIS PAPER ALSO INCLUDES FISH DATA
PUBLISHED ANNUALLY BY THE INTERNATIONAL COUNCIL FOR THE
EXPLORATION OF THE SEA & FROM OTHER STUDIES CARRIED OUT IN KIEL
BAY. THE INTERACTION OF MACROBENTHOS & DEMERSAL FISH IS DISCUSSED,
PARTICULARLY REGARDING THE EFFECTS OF SELECTIVE PREDATION.
DIFFERENCES IN PREDATION INTENSITY FROM YEAR TO YEAR, RESULTING IN
REDUCED POPULATION LEVELS OF MACROBENTHOS, WERE OBSERVED, BUT THE
LONG-TERM DYNAMICS OF THE MORE IMPORTANT BENTHIC FOOD SPECIES IN
THE WESTERN BALTIC WERE SEEMINGLY NOT INFLUENCED BY THE YEAR-CLASS
STRENGTH OF DEMERSAL FISH. LIKEWISE, THE YEAR-CLASS STRENGTH OF
BENTHOS IN DIFFERENT YEARS DID NOT AFFECT THE SIZE & PRODUCTION OF
THE DEMERSAL FISH STOCKS IN THE AREA. A NUMBER OF POSSIBLE REASONS
FOR THIS APPARENT LACK OF CORRELATION ARE DISCUSSED.

BANSE, K.

NO. 29

ON WEIGHT DEPENDENCE OF NET GROWTH EFFICIENCY AND SPECIFIC
RESPIRATION RATES AMONG FIELD POPULATIONS OF INVERTEBRATES
OECOLOGIA (BERL.). 38: 111-126.

ANNUAL NET GROWTH EFFICIENCY (NGE) IS APPROXIMATED HERE BY $100 \text{ PA}/(\text{PA}+\text{RA})$, PA & RA BEING THE ANNUAL PRODUCTION & RESPIRATION RATES OF POPULATIONS PER UNIT AREA. PUBLISHED NGE VALUES FOR 15 TEMPERATE INVERTEBRATE POPULATIONS RANGE FROM 13 TO 55% CONTRARY TO THE LITERATURE ON NGE AMONG SPECIES, THE DEPENDENCE OF NGE ON SPECIES SIZE (AS BODY WEIGHT AT THE ONSET OF SEXUAL MATURITY, WS) IS NOT YET DETERMINED ALTHOUGH THE RANGES OF PA & RA DIVIDED BY THE MEAN BIOMASS (B), APPROACH TWO ORDERS OF MAGNITUDE. THE RA/B RATES OF 13 OF THESE POPULATIONS DECLINE WITH A -0.35 POWER OF WS RATHER THAN THE -0.25 POWER OF COMPARATIVE PHYSIOLOGY. A POSSIBLE REASON MAY BE A TREND TOWARDS LARGER SPECIMENS (RELATIVE TO WS OR FULL SIZE) IN POPULATIONS OF LARGER SPECIES. AMONG SPECIES, A SIGNIFICANT DEPENDENCE OF NGE ON WX (OR FULL SIZE) IS NOT DEMONSTRABLE FOR LABORATORY POPULATIONS OF UNICELLULAR ORGANISMS & FIELD POPULATIONS OF MAMMALS SO THAT THE COST PER UNIT OF PRODUCTION MIGHT GENERALLY BE INDEPENDENT OF THE RATE OF PRODUCTION BY THE POPULATION.

BARNES, R.S.K. ETAL 41
1976. NO. 41
INTERSTITIAL FAUNA ASSOCIATED WITH DIFFERENT
STAGES OF SALT-MARSH DEVELOPMENT
ESTUARINE COASTAL MAR SCI 4: 497-511.

SOME PHYSICAL & BIOLOGICAL PROPERTIES OF SANDS ASSOCIATED WITH
DIFFERENT STAGES IN SALT-MARSH FORMATION ON SCOT HEAD ISLAND
(NORFOLK, U.K.) WERE INVESTIGATED. THE TRENDS WHICH ONE MIGHT
EXPECT IN SUCH A SERIES FROM EXPOSED, WAVE-WASHED SAND TO
SHELTERED, CREEK-BED SEDIMENT WERE OBSERVED, ALTHOUGH IN A SOME
WHAT POORLY MARKED FORM, IN (A) ORGANIC CARBON IN THE SEDIMENT,
(B) COVERAGE OF SAND GRAINS BY 'STAINING MATTER', & ATTACHED
PHOTOSYNTHETIC ORGANISMS, & (C) INVOLVEMENT OF SILTS IN THE
SEDIMENT. PERMEABILITY RESULTS, HOWEVER, WERE EQUIVOCAL & DID NOT
FOLLOW THE EXPECTED TREND. THE ABUNDANCE & DIVERSITY OF CILIATE
PROTOZOANS WERE GREATEST AT THE MOST SHELTERED & ORGANICALLY-RICH
SITE, WHEREAS THE NEMATODE FAUNA WAS MOST DIVERSE AT A LESS
'MATURE' STATION. IN GENERAL, THE PHYSICAL PROPERTIES OF THE
VARIOUS STATIONS DIFFERED MUCH LESS THAN THE BIOLOGICAL ONES, &
NO CLEAR RELATIONSHIP BETWEEN THE TWO EMERGED.

BENKE, A. C. NO. 5
A MODIFICATION OF THE HYNES METHOD FOR ESTIMATING SECONDARY
PRODUCTION WITH PARTICULAR SIGNIFICANCE FOR MULTIVOLTINE POPS.
LIMNOL OCEANOGR 24(1): 168-170.

THE ACCEPTED PROCEDURE FOR DETERMINING PRODUCTION OF MULTIVOLTINE
INVERTEBRATES BY USE OF THE HYNES METHOD IS TO MULTIPLY THE HYNES
VALUE BY THE NUMBER OF GENERATIONS PER YEAR. FOR AQUATIC INSECTS,
IF PUPAL, ADULT, OR EGG STAGES COMPRISE A SIGNIFICANT PORTION
OF TOTAL GENERATION TIME, THIS PROCEDURE WILL UNDERESTIMATE
PRODUCTION. FOR CRUSTACEANS, IF REPRODUCTION OCCURS BEFORE
ATTAINING THE FINAL SIZE CLASS, THE PROCEDURE, USING GENERATION
TIME, WILL OVERESTIMATE PRODUCTION. IT IS NECESSARY TO MULTIPLY
THE HYNES VALUE BY 365/CPI, WHERE CPI IS THE COHORT PRODUCTION
INTERVAL (IN DAYS) FROM HATCHING TO THE ATTAINMENT OF THE LARGEST
AQUATIC SIZE CLASS.

BLUEWEISS, L. ETAL
1978. NO. 17
RELATIONSHIPS BETWEEN BODY SIZE AND SOME LIFE HISTORY PARAMETERS
OECOLOGIA (BERL.) 37: 257-272.

SUMMARY. PATTERNS IN LIFE HISTORY PHENOMENA MAY BE DEMONSTRATED BY EXAMINING WIDE RANGES OF BODY WEIGHT. POSITIVE RELATIONSHIPS EXIST BETWEEN ADULT BODY SIZE & THE CLUTCH SIZE OF POIKILOtherms, LITTER WEIGHT, NEONATE WEIGHT LIFE SPAN, MATURATION TIME & FOR HOMEOTHERMS AT LEAST, BROOD OR GESTATION TIME. THE COMPLEX OF THESE FACTORS REDUCES RMAX IN LARGER ANIMALS OR, IN MORE PHYSIOLOGICAL TERMS, RMAX IS SET BY INDIVIDUAL GROWTH RATE. COMPARISONS OF NEONATAL PRODUCTION WITH INGESTION & ASSIMILATION SUGGESTS THAT LARGER MAMMALS PUT PROPORTIONATELY LESS EFFORT INTO REPRODUCTION. DECLINING PARENTAL INVESTMENT & LONGER DEVELOPMENT TO TIMES WOULD RESULT IF NEONATAL WEIGHT IS SCALED ALLOMETRICALLY TO ADULT WEIGHT & NEONATAL GROWTH RATE TO NEONATAL WEIGHT. BODY SIZE RELATIONS REPRESENT GENERAL ECOLOGICAL THEORIES & THEREFORE HOLD CONSIDERABLE PROMISE IN THE DEVELOPMENT OF PREDICTIVE ECOLOGY.

BOESCH, D.F. NO. 45
 1973 CLASSIFICATION AND COMMUNITY STRUCTURE OF MACROBENTHOS IN THE
 HAMPTON ROADS AREA, VIRGINIA
 MAR BIOL 21: 226-244.

BENTHIC MACROFAUNA WAS SAMPLED BY GRAB AT 16 STATIONS IN HAMPTON
 ROADS & THE ADJACENT ELIZABETH RIVER, VIRGINIA, USA. SAMPLES WERE
 TAKEN IN FEBRUARY, MAY & AUGUST. SAMPLING SITES & SPECIES WERE
 GROUPED BY A CLASSIFICATION STRATEGY WHICH BASICALLY CONSISTED
 OF THE CANBERRA METRIC DISSIMILARITY-MEASURE & FLEXIBLE & GROUP
 AVERAGE CLUSTERING. FOLLOWING REALLOCATIONS, 8 SITE GROUPS & 16
 SPECIES GROUPS INSTRUCTIVELY CLASSIFIED THE 47 SITES & 93 SPECIES
 CONSIDERED IN THE ANALYSIS. THE SITES WERE GROUPED INTO "ASSOCIA-
 TIONS" ON MUD, MUDDY-SAND & SAND-BOTTOMS, & THOSE IN THE ELIZABETH
 RIVER. SPECIES GROUPINGS DISTINGUISHED A FEW SPECIES IN MOST
 FREQUENT AT ELIZABETH RIVER OR MUD & MUDDY-SAND SITES, LARGER TO
 SAND SITES, UBIQUITOUS SPECIES, EPIFAUNAL SPECIES WHICH WERE
 MICROHABITAT-RESTRICTED, & SEASONAL SPECIES. AN ANALYSIS OF
 NUMERICALLY DOMINANT SPECIES IN THE DIFFERENT ASSOCIATIONS
 INDICATED THE RELATIVE IMPORTANCE OF UBIQUITOUS SPECIES &
 SEASONALLY ABUNDANT SPECIES. COMMUNITY-STRUCTURE STATISTICS
 (SPECIES DIVERSITY, PATTERNS, RICHNESS & EVENNESS) SHOWED DEFINITE
 SPATIAL & TEMPORAL PATTERNS. DIVERSITY WAS HIGH AT SAND & MUDDY-
 SAND SITES & LOW AT MUD & ELIZABETH RIVER SITES. THIS SPATIAL
 PATTERN WAS PREDOMINANTLY ONE OF SPECIES RICHNESS. AT ELIZABETH
 RIVER & MUD STATIONS, DIVERSITY INCREASED FROM FEBRUARY TO AUGUST
 BECAUSE OF INCREASED EVENNESS, WHILE AT SAND & MUDDY-SAND STATIONS
 DIVERSITY PEAKED IN MAY IN RESPONSE TO BOTH HIGH SPECIES RICHNESS
 & HIGH EVENNESS. THE APPLICABILITY OF "COMMUNITY CONCEPTS", THE
 CAUSES OF SUBSTRATE SPECIFICITY, SEASONALITY & SPECIES DIVERSITY,
 & THE EFFECTS OF POLLUTION ON COMMUNITY STRUCTURE ARE DISCUSSED.

BOESCH, D. F. NO. 20
1977. A NEW LOOK AT THE ZONATION OF BENTHOS ALONG THE ESTUARINE GRADIENT
COULL, B. C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 245-280

THE ZONATION OF MACROBENTHOS ALONG A HOMIOHALINE ESTUARINE GRADIENT IN THE CHESAPEAKE BAY & A SEASONALLY POIKILOHALINE ESTUARINE GRADIENT IN THE BRISBANE RIVER ESTUARY, AUSTRALIA, WAS INVESTIGATED BY ASSESSING THE ASSEMBLAGE SIMILARITY & PATTERNS OF SPECIES DISTRIBUTIONS. THE FAUNAL CHANGE ALONG THE HOMIOHALINE GRADIENT IS GRADUAL & RELATIVELY UNIFORM, WITH ZONES OF ACCELERATED CHANGE BROADLY OCCURRING AROUND THE BOUNDARIES OF THE VERTICAL SYSTEMS OF SALINITY ZONES. THE MORE ABRUPT CHANGES ALONG POIKILOHALINE GRADIENTS ARE GOVERNED BY LOW SALINITY CONDITIONS. THESE PATTERNS OF DISTRIBUTION & ABUNDANCE OF STENOHALINE MARINE, EURYHALINE MARINE, EURYHALINE & OPPORTUNISTIC, ESTUARINE ENDEMIC & FRESHWATER SPECIES.

BOROWSKY, B. NO. 73
1980. REPRODUCTIVE PATTERNS OF THREE INTERTIDAL SALT-MARSH GAMMARIDEAN
AMPHIPODS
MAR BIOL 55: 327-334.

AMONG THREE SYMPATRIC SPECIES OF EPIBENTHIC AMPHIPODS FOUND AT DIFFERENT TIDE MARKS AT JAMICA BAY, NEW YORK (USA), THE LENGTH OF TIME JUVENILES SPEND WITH THE MOTHER INCREASES & THE NUMBER OF JUVENILES PER BROOD DECREASES AS TIDAL HEIGHT INCREASES. EACH BROOD HAS TWO DEVELOPMENTAL PERIODS: (1) THE EMBRYONIC PERIOD, FROM OVULATION TO HATCHING; (2) THE JUVENILE PERIOD, FROM HATCHING TO EMERGENCE FROM THE MARSUPIUM. GAMMARUS PALUSTRIS, FOUND AT THE HIGH-TIDE MARK, HAS A MEAN JUVENILE PERIOD OF 1.7 DAYS & A MEAN BROOD SIZE OF 12.4 OFFSPRING; G. MUCRONATUS, FOUND AT MEAN-TIDE MARK, HAS A MEAN JUVENILE PERIOD OF 0.8 DAYS & A MEAN BROOD SIZE OF 27.4 OFFSPRING; MELITA NITIDA, FOUND AT LOW-TIDE MARK, HAS A MEAN JUVENILE PERIOD OF 0.5 DAYS & A MEAN BROOD SIZE OF 30.0 OFFSPRING. FURTHER, THE RANGE OF DAYS THAT A JUVENILE MAY EMERGE IS WIDEST FOR G. PALUSTRIS (0 TO 8 DAYS AFTER HATCHING) & NARROWEST FOR M. NITIDA (0 TO 2 DAYS).

BROUSSEAU, D. J. NO. 93
 1978. POPULATION DYNAMICS OF THE SOFT-SHELL CLAM MYA ARENARIA
 MAR BIOL 50: 63-71.

A LIFE TABLE WAS CONSTRUCTED FOR MYA ARENARIA FROM GLOUCESTER, MASSACHUSETTS, USA, BASED ON SCHEDULES OF AGE-SPECIFIC FECUNDITY & MORTALITY DETERMINED UNDER NATURAL CONDITIONS. MORTALITY RATES DECREASE WITH SIZE & AGE IN THIS SPECIES, WITH THE PERIOD OF MAXIMUM MORTALITY OCCURRING DURING THE SUMMER MONTHS. MORTALITY RATES TO THE INACTIVITY OF NATURAL PREDATORS. THE SURVIVORSHIP CURVE FOR M. ARENARIA APPROXIMATES THE TYPE 3 CURVE OF DEEVEY (1947). WHEN MEAN LIFE EXPECTANCY IS LOW IN RECENTLY SETTLED CLAMS, PEAKS WHEN THE INDIVIDUAL REACHES 30.0 REMAIN UNDER 1 YEAR OF AGE, INTRINSIC RATE OF NATURAL INCREASE (RMAX) IS VERY HIGH: 4.74. THIS ENORMOUS RATE OF POTENTIAL INCREASE IS OFFSET BY HIGH RATES OF LARVAL MORTALITY IN THE PLANKTON. UNLIKE THE REPRODUCTIVE VALUES OF MOST ANIMALS STUDIED, THOSE IN M. ARENARIA PEAK LATE IN LIFE, WELL AFTER THE KNOWN AGE OF FIRST REPRODUCTION. THIS IS PROBABLY THE RESULT OF INCREASED FECUNDITY WITH AGE. THE IMPLICATIONS OF THIS WORK IN THE AREA OF RESOURCE MANAGEMENT ARE DISCUSSED.

BUCHANAN, J.B., P.F. KINGSTON, AND M. SHEADER
 1974. NO. 4
 LONG-TERM POPULATION TRENDS OF THE BENTHIC MACROFAUNA IN THE
 OFFSHORE MUD OF THE NORTHUMBERLAND COAST
 J MAR BIOL ASSO U K 54:785-795.

THE CHANGES IN THE NUMBER OF SPECIES, THE NUMBER OF INDIVIDUALS & THE PRODUCTION OF A BENTHIC MUD ASSOCIATION HAVE BEEN STUDIED FOR A 4-YEAR PERIOD. THE NUMBERS OF SPECIES & THE TOTAL ESTIMATED PRODUCTION APPEAR TO HAVE REMAINED SUBSTANTIALLY STABLE, BUT THE NUMBER OF INDIVIDUALS HAS MORE THAN DOUBLED OVER THE PERIOD. WHEN CONSIDERING THE HIGH RANKING PRODUCERS, IT IS CLEAR THAT NOT ALL OF THESE HAVE CONTRIBUTED TO THE GENERAL RISE IN NUMBERS OF INDIVIDUALS. TWO SPECIES, AMMOTRYPANE AULOGASTER & ABRA NITIDA HAVE SHOWN AN ABRUPT FALL IN POPULATION NUMBERS & BIOMASS. AT THE BEGINNING OF THE INVESTIGATION IN 1971, THESE SPECIES FIGURED IMPORTANTLY IN THE PRODUCTION ESTIMATES WITH 20 & 6% RESPECTIVELY OF THE TOTAL PRODUCTION. AFTER 1971, BOTH WERE EFFECTIVELY ELIMINATED FROM THE PRODUCTION OF THE ASSOCIATION. A SECOND GROUP OF SPECIES, FROM AMONG THE PRODUCTION DOMINANTS, RAPIDLY INCREASED IN NUMBERS, BIOMASS & PRODUCTION SO AS TO COMPENSATE ALMOST EXACTLY FOR THE PRODUCTION LOST BY THE ELIMINATION OF AMMOTRYPANE & ABRA. THESE SPECIES INCLUDED HETEROMASTUS FILIFORMIS, PRIONOSPION CIRRIFERA, PARANIS GRACILIS & GLYCERA ROUXI. A THIRD GROUP OF HIGH RANKING PRODUCERS SHOWED NO RESPONSE & REMAINED STABLE IN BOTH NUMBERS & BIOMASS FOR THE PERIOD OF THE INVESTIGATION. THESE INCLUDED CALOCARIS MACANDREAE, LUMBRINERIS FRAGILIS, SPIOPHANES KROYERI & CHAETOZOE SETOSA. THE TEMPORAL VARIATION IN THE NUMBER OF INDIVIDUALS HAS BEEN REFLECTED IN A CONSIDERABLE FLUCTUATION IN DIVERSITY MEASUREMENTS, DUE ALMOST ENTIRELY TO THE REDISTRIBUTION OF THE PROPORTIONS OF A NUMBER OF HIGH RANKING SPECIES.

BURKE, M.V. AND K.H. MANN

1974. NO. 20

ACTIVITY AND PRODUCTION: BIOMASS RATIOS OF BIVALVE AND
GASTROPOD POPULATIONS IN AN EASTERN CANADIAN ESTUARY
J FISH RES BOARD CAN 31: 167-177.

IN A NARROW, SHALLOW ESTUARY ON THE EAST COAST OF CANADA, THE
DOMINANT INTERTIDAL INVERTEBRATES WERE BIVALVE & GASTROPOD
MOLLUSCS. ON A SAND FLAT MYA ARENARIA PRODUCED 11.6 G.M-2. YR-1
FLESH DRY WEIGHT WITH A PRODUCTION: BIOMASS RATIO OF 2.54, WHEREAS
MACOMA BALTHICA PRODUCED 1.93 G.M-2. YR-1 WITH A P:B RATIO OF 1.53.
ON A SPARTINA MARSH, LITTORINA SAXATILIS PRODUCED 3.25 G.M-2. YR-1
WITH A P:B RATIO OF 4.11. APPROXIMATE P:B RATIOS WERE APPLIED TO
BIOMASS FIGURES FOR FOUR OTHER SPECIES TO GIVE THE FOLLOWING
ESTIMATES OF PRODUCTIVITY: MYTILUS EDULIS ON ZOSTERA BEDS 19.7 G.M
-2. YR-1 FLESH DRY WEIGHT; M. EDULIS ON SPARTINA BEDS 3.5 G.M-2. YR-
1; NASSARIUS OBSOLETUS 1.15 G.M-2. YR-1; MELAMPUS LINEATUS 1.1
G.M-2. YR-1; LACUNA VINCIA 0.06 G.M-2. YR-1. A TOTAL PRODUCTION OF
THE MOLLUSCS IN THE ESTUARY IS ESTIMATED AT 4.7% OF THE PRODUCTION
OF SPARTINA & ZOSTERA (ALL MEASURED IN KCAL). IT IS POSTULATED
THAT MOLLUSCS ARE THE CHIEF PRIMARY CONSUMERS IN THE INLET.

CAIN, T. D.

NO. 57

REPRODUCTION AND RECRUITMENT OF THE BRACKISH WATER CLAM RANGIA
CUNEATA IN THE JAMES RIVER, VIRGINIA
FISH BULL 73(2): 412-430.

REPRODUCTION & RECRUITMENT OF THE BRACKISH WATER CLAM RANGIA CUNEATA WERE INVESTIGATED IN THE JAMES RIVER, VA., FROM FEBRUARY 1970 TO JANUARY 1972. HISTOLOGICAL EXAMINATIONS OF GONADS WERE MADE, NEWLY SET CLAMS WERE COLLECTED, & TEMPERATURE & SALINITY MEASUREMENTS WERE TAKEN FROM THREE POPULATIONS LIVING IN DIFFERENT SALINITY REGIMES. GAMETOGENESIS BEGAN IN APRIL & RIPE GONADS WERE FOUND FROM MAY TO LATE NOVEMBER WITH NO INACTIVE PERIOD. FROM DETERMINED: ONE IN EARLY THROUGH MIDSUMMER, COINCIDING WITH THE BEGINNING OF SPawning AS DETERMINED FROM GONADAL EXAMINATIONS; & A SECOND & LONGER PERIOD IN LATE FALL & EARLY WINTER, WITH AN INCREASED PERCENTAGE OF PARTIALLY SPAWNED & SPENT CLAMS. GAMETOGENESIS CEASED IN DECEMBER THROUGH MARCH AS RESIDUAL GAMETES WERE CYTOLYZED. SEX WAS NOT DETECTED DURING THIS LAST PHASE. MORE FEMALES THAN MALES WERE FOUND IN THE UPSTREAM (LOWER SALINITY) POPULATIONS. TEMPERATURE WAS IMPORTANT IN INITIATING GAMETOGENESIS IN THE SPRING & MIDSUMMER. SPawning CORRELATED BEST WITH CHANGES IN SALINITY TO APPROXIMATELY 5‰ OVER ITS ESTUARINE RANGE, SALINITY HAS A CONTROLLING EFFECT ON RANGIA SPawning & RECRUITMENT SEASONAL REDUCTION IN INPUT OF FRESHWATER (INCREASED SEAWATER INTRUSION) IS NEEDED TO INDUCE SPawning & RECRUITMENT IN UPSTREAM POPULATIONS. BEST RECRUITMENT OCCURRED TO THE MIDDLE OF THE HABITAT RANGE WHICH HAS AN ANNUAL SALINITY CHANGE FROM FRESH TO 5‰

CAMMEN, L. M. NO. 97
 1976. MACROINVERTEBRATE COLONIZATION OF SPARTINA MARSHES ARTIFICIALLY
 ESTABLISHED ON DREDGE SPOIL
 ESTUARINE COASTAL MAR SCI 4: 357-372

CORE SAMPLES WERE TAKEN FROM DREDGE SPOIL PLANTED WITH SPARTINA
 ALTERNIFLORA, SPOIL LEFT BARE & NEARBY NATURAL MARSH IN TWO
 LOCATIONS IN ORDER TO DETERMINE THE FACTORS INFLUENCING THE
 DEVELOPMENT OF THE SPOIL FAUNA & TO INVESTIGATE THE RELATIONSHIP
 OF THE SPOIL FAUNA WITH THE NATURAL MARSH FAUNA. BASED ON CALCU-
 LATION OF TOTAL NUMBERS, TOTAL BIOMASS, SAMPLE DIVERSITY & SPECIES
 RICHNESS, & FAUNAL AFFINITY BETWEEN PLOTS, THE DIFFERENCE IN
 ELEVATION BETWEEN THE BARE & PLANTED SPOIL PLOTS APPEARED TO BE
 THE MAJOR FACTOR DETERMINING THE DEGREE OF SIMILARITY IN THEIR
 FAUNA. FIVE FACTORS ARE SUGGESTED TO CONTROL THE DEVELOPMENT OF
 THE PLANTED SPOIL FAUNA: THE SIMILARITY OF THE SPOIL TO NATURAL
 MARSH IN ELEVATION & SEDIMENT PARTICLE SIZE, THE NATURAL SEDIMENT
 ACCUMULATION RATE IN THE AREA, THE PROXIMITY OF THE SPOIL TO NATURAL
 MARSH & THE RELATIVE MATURITY OF THE NATURAL MARSH FAUNAL
 COMMUNITY.

CHAMBERS, M.R. AND H. MILNE
1975. NO. 63
LIFE CYCLE AND PRODUCTION OF NEREIS DIVERSICOLOR O.F. MULLER IN THE
YTHAN ESTUARY, SCOTLAND
ESTUARINE COASTAL MAR SCI 3: 133-144.

NEREIS DIVERSICOLOR IS AN IMPORTANT FOOD SPECIES FOR VERTEBRATE
PREDATORS IN THE YTHAN ESTUARY, SCOTLAND. IT OCCURS FROM LOW WATER
TO HIGH WATER BUT THOSE IN THE LOWER HALF OF THE SHORE ARE MORE
NUMEROUS, HEAVIER FOR A GIVEN SIZE & REPRODUCE EARLIER IN THE
SEASON THAN ANIMALS IN THE TOP HALF OF THE SHORE. BETWEEN APRIL
1973 & MARCH 1974 THERE WERE TWO SPAWNING SEASONS - ONE FROM JUNE TO
AUGUST & A SECOND FROM JANUARY TO MARCH, WITH THE ANIMALS BREEDING
BETWEEN THE AGES OF ABOUT 18 & 24 MONTHS. THE MEAN ANNUAL BIOMASS
WAS 4.22 G OF DRY WT/M², ANNUAL PRODUCTION 12.78 G OF DRY WT/M² &
THE PRODUCTION : BIOMASS RATIO 3 : 1. ABOUT 40% OF THE TOTAL
PRODUCTION WAS IN THE FORM OF GAMETES, BUT IT IS NOT POSSIBLE TO
SAY HOW MUCH OF THE TOTAL PRODUCTION WAS UTILIZED BY PREDATORS.

CHRISTIE, N.D. NO. 35
RELATIONSHIP BETWEEN SEDIMENT TEXTURE, SPECIES RICHNESS AND
VOLUME OF SEDIMENT SAMPLED BY A GRAB
MAR BIOL 30: 89-96.

THIS PAPER DISCUSSES THE PROBLEMS INVOLVED IN OBTAINING GRAB SAMPLES FOR DIRECT COMPARISON OF THE RESPECTIVE BENTHIC FAUNA, USING INFORMATION FROM A SURVEY CONDUCTED ACROSS THE SOUTH AFRICAN CONTINENTAL SHELF BELOW THE BENIGUELA CURRENT. MANY FACTORS INFLUENCE THE DEPTH OF GRAB PENETRATION INTO THE SEDIMENT & HENCE THE GRAB SAMPLE VOLUME. ONE OF THE MOST IMPORTANT OF THESE FACTORS IS SEDIMENT TEXTURE. WHILE THIS FACT HAS BEEN LONG RECOGNISED, MOST WORKERS HAVE ATTACHED LITTLE SIGNIFICANCE TO IT. IT IS SHOWN HERE THAT AN EXPONENTIAL RELATIONSHIP EXISTS BETWEEN THE GRAB SAMPLE VOLUME & SEDIMENT TEXTURE, UNTIL THE MINIMUM PERCENTAGE OF SILT PLUS CLAY THAT WILL GIVE A MAXIMUM GRAB SAMPLE VOLUME IS REACHED. THIS RELATIONSHIP ONLY EXTENDS TO A CERTAIN DEPTH, IN THIS CASE TO 280 M. THERE ARE MORE SPECIES PER UNIT NUMBER OF SPECIMENS ("SPECIES RICHNESS") IN ASSOCIATION WITH SAND OR MUDDY-SAND THAN WITH MUD. A LINEAR RELATIONSHIP IS GIVEN BETWEEN THE GRAB SAMPLE VOLUME & SPECIES RICHNESS BETWEEN THE DEPTHS OF 280 & 440 M, INCLUSIVE.

CLARKE, G. L. NO. 24
1946. DYNAMICS OF PRODUCTION IN A MARINE AREA
ECOL MONOGR 16(4): 322-335.

A CONSIDERATION OF THE PRODUCTIVITY OF A NATURAL AREA SHOULD INVOLVE THE CONCEPTS OF (1) STANDING CROP, (2) MATERIAL REMOVED, INCLUDING THE YIELD TO MAN, & (3) THE PRODUCTION RATE. THE PRODUCTION RATE OF THE ORGANISMS AT DIFFERENT TROPHIC LEVELS SHOULD BE CONSIDERED SEPARATELY & DISTINCTION MADE BETWEEN GROSS PRODUCTION (ASSIMILATION), NET PRODUCTION (GROWTH), & NET INCREASE IN THE STANDING CROP PER UNIT TIME. DIAGRAMS ARE PRESENTED ILLUSTRATING THE INTERRELATIONS BETWEEN THE PROCESSES OF PRODUCTION, CONSUMPTION, & DECOMPOSITION AT THE VARIOUS LEVELS IN THE ECOLOGICAL COMPLEX. THE APPLICATION OF THE FOREGOING CONCEPTS TO A MARINE AREA IS ILLUSTRATED USING DATA FROM GEORGES BANK. THE NATURE OF THE FUNDAMENTAL FACTORS UNDERLYING THE PRODUCTIVITY OF THE BANK IS POINTED OUT WITH A CONSIDERING MEASUREMENTS PERMIT. VALUES RELATIONSHIPS INsofar AS FOR THE NET PRODUCTION OF THE PHYTOPLANKTON & THE ZOOPLANKTON ARE PRESENTED WITH A DISCUSSION OF THE CONTROLLING INFLUENCE OF THE REDUCTION OF LIGHT IN THE WATER & OF THE DISLOCATIONS DUE TO CURRENTS. VALUES FOR THE YIELD OF THE COMMERCIAL CATCH OF FISH FROM THE BANK ARE COMPARED WITH YIELDS OBTAINED FROM FRESH-WATER & TERRESTRIAL AREAS.

COOPER, W.E. NO. 38
1965. DYNAMICS AND PRODUCTION OF A NATURAL POPULATION OF A FRESH WATER
AMPHIPOD, HYALELLA AZTECA
ECOL MONOGR 35(4):377-394

THE PAPER IS A QUANTITATIVE STATEMENT ON THE DYNAMICS OF A
POPULATION OF THE FRESHWATER AMPHIPOD HYALELLA AZTECA IN A
MICHIGAN LAKE. THE PAPER PROVIDES INFORMATION ON RATES OF SIZE-
SPECIFIC MORTALITIES, PRODUCTIVITY AND TURNOVER RATE.

CRUMB, S.E.

NO. 81

1977. BENTHOS OF THE TIDAL DELAWARE RIVER BETWEEN TRENTON AND
BURLINGTON, NEW JERSEY
CHESAPEAKE SCI 18(3): 253-265.

A STUDY OF THE MACROBENTHOS OF THE TIDAL DELAWARE RIVER BETWEEN
BURLINGTON & TRENTON, NEW JERSEY, INCLUDED MEASUREMENTS OF DENSITY
& BIOMASS FOR COMMON SPECIES. TUBIFICIDAE (LIMNODRILUS) WERE
DOMINANT, COMPRISING OVER 90% OF ALL ORGANISMS TAKEN IN THE 3-YEAR
STUDY PERIOD. DENSITY SEEMED TO BE A FUNCTION OF WATER TEMPERATURE
(20-25 C, OPTIMAL) & WAS GREATEST IN LATE SPRING & EARLY SUMMER.
OTHER COMMON SPECIES WERE LARVAL PROCLADIUS CULICIFORMIS
(CHIRONOMIDAE) & CORBICULA MANILENSIS (ASIATIC CLAM). PROCLADIUS
WAS MOST ABUNDANT IN LATE SUMMER JUST PRIOR TO & DURING EMERGENCE.
THE ASIATIC CLAM WAS IN THE PROCESS OF COLONIZING THE AREA &
GROWTH DATA HAVE BEEN CALCULATED. POTENTIAL RELATIONSHIPS BETWEEN
NUMBERS & STANDING CROP OF THE COMMON ORGANISMS WITH SEDIMENT TYPE
& SEASONAL CHANGES WERE EXPLORED.

DAUER, D.M. ETAL NO. 82
 1979. EFFECTS OF NON-POINT POLLUTION ON BENTHIC INVERTEBRATES IN THE
 LYNNHAVEN RIVER SYSTEM
 BULLETIN, VIRGINIA WATER RESOUR RES CTR: NO 117, BLACKSBURG, VA.

INCREASED URBANIZATION & NON-POINT SOURCES OF POLLUTION IN THE
 AREA OF VIRGINIA'S LYNNHAVEN RIVER COMPLEX HAVE SUBSTANTIALLY
 INCREASED THE NUTRIENT CONTENT OF THE ADJACENT WATERS. WITH
 POSSIBLE ENRICHMENT EFFECTS. THIS RESEARCH COLLECTED TWO TYPES OF
 DATA TO ASSESS THE BIOLOGICAL EFFECTS OF THESE NON-POINT DISCHARGE
 ON ESTUARINE MACROINVERTEBRATES IN THE WESTERN & EASTERN BRANCHES
 OF THE RIVER. FIRST, INDIVIDUAL OYSTERS IN THE LYNNHAVEN WERE
 MONITORED FOR GROWTH IN AREAS OF DIFFERENT NUTRIENT ENRICHMENT
 ENHANCED OR IMPEDED GROWTH IN AREAS OF DIFFERENT WATER QUALITY. IN
 ADDITION, 10 PERMANENT SITES LOCATED IN THE RIVER'S INTERTIDAL
 ZONE FROM THE INLET AT THE MOUTH TO THE HEADWATERS OF BOTH
 BRANCHES WERE USED TO SAMPLE BENTHIC INFAUNAL MACROINVERTEBRATE
 COMMUNITIES. SUCH BIOLOGICAL PARAMETERS AS SPECIES NUMBERS,
 COMMUNITY DENSITY, & COMMUNITY BIOMASS WERE STUDIED AT EACH SITE
 BY COLLECTING BIMONTHLY SAMPLES FROM AUGUST 1976 THROUGH JUNE 1977
 AS A COMPARISON, BENTHIC INVERTEBRATE SAMPLES WERE COLLECTED FROM
 OLD PLANTATION CREEK IN VIRGINIA'S EASTERN SHORE. THESE DATA
 CLEARLY INDICATE THAT NO SIGNIFICANT DETEIORATION OF WATER
 QUALITY HAS OCCURRED IN THE STUDY AREAS OF THE LYNNHAVEN'S WESTERN
 & EASTERN BRANCHES. RESULTS OF THE RESEARCH SHOW THAT BENTHIC
 INFAUNAL MACROINVERTEBRATE COMMUNITIES OF THE LYNNHAVEN ARE
 DOMINATED BY A GROUP OF AQUATIC ANIMALS THAT ARE NATURALLY ADAPTED
 TO WITHSTAND ENVIRONMENTAL STRESSES. COMPARING THE SPATIAL &
 TEMPORAL DISTRIBUTION PATTERNS FOR EACH INDIVIDUAL SPECIES IN THE
 LYNNHAVEN'S BRANCHES WITH SAMPLES COLLECTED IN OLD PLANTATION
 CREEK INDICATES THAT THE AMOUNT OF STRESS PLACED UPON THE LYNN
 HAVEN'S ENVIRONMENT BY NON-POINT SOURCES OF POLLUTION PROBABLY HAS
 LITTLE OR NO INFLUENCE UPON THE NATURAL BENTHIC INVERTEBRATE
 POPULATIONS.

DAVIS, N. AND G. R. VANBLARICOM
1978. SPATIAL AND TEMPORAL HETEROGENEITY IN A SAND BOTTOM EPIFAUNAL
COMMUNITY OF INVERTEBRATES IN SHALLOW WATER
LIMNOL OCEANOGR 23(3): 417-427.

TEMPORAL & SPATIAL PATTERNS OF ABUNDANCE IN A COMMUNITY OF
EPIFAUNAL INVERTEBRATES ON THE SHALLOW SUBTIDAL SAND PLAIN AT LA
JOLLA, CALIFORNIA, WERE STUDIED FROM MARCH 1974 THROUGH SEPTEMBER
1975. IN SIMILAR WORK BY FAGER IN THE SAME LOCATION FROM 1957
TO 1963, DENSITIES OF THE PRINCIPAL SPECIES WERE REMARKABLY
NONVARIANT, BOTH IN TIME & SPACE. THE MORE RECENT WORK SHOWED BOTH
LONG & SHORT TERM FLUCTUATIONS IN THE ABUNDANCES OF MANY OF THESE
SPECIES AS WELL AS PHYSICAL & BIOLOGICAL SPATIAL HETEROGENEITY.
THESE DIFFERENCES FROM FAGER'S RESULTS AS WELL AS EVIDENCE OF
TEMPORAL FLUCTUATIONS IN POPULATIONS OF ABUNDANT SPECIES ON
PORTIONS OF THE SAND HABITAT ADJOINING THE PRIMARY STUDY AREAS
SUGGEST THAT THE SHALLOW SAND COMMUNITY LACKS LONG TERM NUMERICAL
STABILITY.

DAYTON, P. AND J. OLIVER
1980. EVALUATION OF EXPERIMENTAL ANALYSES OF POPULATION AND
COMMUNITY PATTERNS IN BENTHIC MARINE ENVIRONMENTS
IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C. PRESS: 93-120

A BASIC OBJECTIVE OF SCIENCE IS TO DESCRIBE & UNDERSTAND THE MECHANISMS BY WHICH VARIOUS NATURAL PATTERNS ARE PRODUCED & MAINTAINED. IN RECENT YEARS EXPERIMENTAL APPROACHES HAVE BEEN USED WITH VARYING DEGREES OF SUCCESS IN EFFORTS TO UNDERSTAND THE MECHANISTIC RELATIONSHIPS STRUCTURING ECOLOGICAL COMMUNITIES. THIS ESSAY: 1) AFFIRMS OUR CONVICTION THAT CRITICAL TESTING OF SPECIFIC HYPOTHESES IS A VITAL COMPONENT OF SCIENCE & THAT PROPERLY CONTROLLED EXPERIMENTS OFFER THE CLEANEST & MOST POWERFUL TESTS OF HYPOTHESES, & 2) DISCUSSES PROBLEMS THAT WE PERCEIVE TO EXIST WITH EXPERIMENTATION IN ECOLOGY. WE DISCUSS CURRENTLY ACTIVE PARADIGMS & DELINEATE PROBLEMS SUCH AS ARTIFACTS THAT OCCUR IN POPULAR EXPERIMENTAL DESIGNS, ALTERNATE HYPOTHESES THAT ARE COMMONLY IGNORED, & MISINTERPRETATIONS RESULTING FROM NOT PROPERLY APPRECIATING SCALE IN TIME & SPACE. PERHAPS THE MOST DIFFICULT PROBLEM IS THAT PRECONCEPTIONS TEND TO FLAVOR QUESTIONS, DETERMINE RESEARCH DESIGNS, & BIAS INTERPRETATION OF THE DATA. THE PRECONCEPTIONS COMMONLY RESULT IN AN EMPHASIS ON VERIFICATION RATHER THAN FALSIFICATION OF HYPOTHESES, A PROCESS WHEREBY COUNTER-EXAMPLES ARE IGNORED, ALTERNATE HYPOTHESES BRUSHED ASIDE, & EXISTING PARADIGMS MANICURED. THE ESCAPE FROM THIS TRAP IS VIGOROUS CONFRONTING OF THE PRECONCEPTIONS & PARADIGMS.

DEXTER, D. M. NO. 80
1978. THE INFAUNA OF A SUBTIDAL, SANDY-BOTTOM COMMUNITY AT IMPERIAL,
CALIFORNIA
CALF FISH GAME 64(4): 268-279.

THE INFAUNA CHARACTERISTIC OF SHALLOW SUBTIDAL SAND BOTTOMS WAS
SURVEYED SEASONALLY DURING 1976 AT IMPERIAL BEACH, CALIFORNIA. A
TOTAL OF 5,916 INDIVIDUALS WAS COLLECTED & 131 SPECIES WERE
REPRESENTED. AMONG THE MOST IMPORTANT CONTRIBUTORS TO THE DENSITY
WERE THE AMPHIPODS, ECHAUSTORIUS WASHINGTONIUS & PARAPHOXUS
EPISTOMUS, THE ISOPOD, ANCINUS GRANULATUS, THE GASTROPOD, OLIVELLA
BAETICA, & THE SAND DOLLAR, DENDRASTIER EXCENTRICUS. COMPARISON OF
CURRENT COMMUNITY COMPOSITION WITH THAT OF A PREVIOUS STUDY
INDICATES CONSIDERABLE STABILITY OR PERSISTENCE OF THE FAUNA.

DORGES, J. NO. 15
1977. MARINE MACROBENTHIC COMMUNITIES OF THE SAPELO ISLAND, GEORGIA
REGION
COULL, B. C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 399-421
THE PRESENT STUDY DEALS WITH THE OCCURRENCE, DISTRIBUTION,
ZONATION, DIVERSITY, & ABUNDANCE OF MACROBENTHIC ORGANISMS OF
DIFFERENT MARINE COMMUNITIES AROUND SAPELO ISLAND, GEORGIA. THE
PAPER SUMMARIZES & COMPARES DATA COLLECTED SINCE 1969 ON SALT
MARSHES, BEACHES, SHELF AREAS, ESTUARIES, SHOALS, TIDAL FLATS, &
POINT BARS.

ECKMAN, J.E.

NO. 54

SMALL-SCALE PATTERNS AND PROCESSES IN A SOFT-SUBSTRATUM,
INTERTIDAL COMMUNITY

J MAR RES 37(3): 437-457.

EXPERIMENTAL MANIPULATIONS & DIRECT OBSERVATIONS WERE COMBINED TO STUDY SMALL-SCALE DISPERSION PATTERNS & THEIR CAUSES IN AN INTER TIDAL SAND-FLAT COMMUNITY NUMERICALLY DOMINATED BY SESSILE & SEDENTARY TUBE DWELLERS. INDIVIDUALS OF SEVERAL SPECIES EXHIBITED GREGARIOUSNESS AT SCALES AS SMALL AS ONE CENTIMETER. EXPERIMENTS IN WHICH NEEDLES WERE PLACED IN SEDIMENTS TO SIMULATE ANIMAL TUBES SUGGESTED THAT ORGANISMS ARE AFFECTED BY PATTERNS OF FLOW WHICH CHANGE OVER DISTANCES OF SEVERAL MILLIMETERS TO A CENTIMETER. AT MOST SAMPLING TIMES, IN A SINGLE TRANSECT OF CONTIGUOUS-CORE SAMPLES TWO OR MORE SPECIES EXHIBITED A COMMON, LARGER-SCALE (=10 CM) PERIODICITY IN ABUNDANCES, WHICH COULD NOT BE ATTRIBUTED TO DIRECT BIOLOGICAL INTERACTIONS. AN ALTERNATIVE MECHANISM AFFECTING COMMUNITY DISPERSION PATTERNS IS HYPOTHESIZED A POSTERIORI: ORGANISMS MAY BE AFFECTED BY LOCALLY VARYING HYDRO DYNAMIC ENVIRONMENTS PRODUCED BY BED RIPPLES. THE RESULTING PERIODIC DISPERSION PATTERNS APPARENTLY PERSIST AFTER RIPPLES HAVE DISAPPEARED. THESE RESULTS SUGGEST POTENTIAL PROBLEMS WITH COMMONLY USED SAMPLE SIZES & MANIPULATION TECHNIQUES. SCALES OF ENVIRONMENTAL HETEROGENEITY RELEVANT TO AN INDIVIDUAL MAY BE TOO SMALL TO BE RESOLVED USING TRADITIONAL BENTHIC SAMPLING METHODS. STUDIES IN WHICH DATA ARE COLLECTED AT ARBITRARY SCALE HOMOGENIZE SPATIAL PATTERNS THAT REFLECT SMALL-SCALE INTERACTIONS, PROCESSES & RESPONSES, & COULD SERIOUSLY AFFECT BETWEEN-SAMPLE VARIABILITY, THEREBY LEADING TO SPURIOUS CONCLUSIONS REGARDING THE PATTERN & CONTROL OF COMMUNITY STRUCTURE.

EDWARDS, D.C. AND J.D. HUEBNER
 1977. NO. 56
 FEEDING AND GROWTH RATES OF POLINICES DUPLICATUS PREYING ON MYA
 ARENARIA AT BARNSTABLE HARBOR, MASSACHUSETTS
 ECOLOGY. 58: 1218-1236.

THE COMPLETE YEAR-ROUND FEEDING & GROWTH OF THE MARINE SNAIL
 POLINICES DUPLICATUS EATING THE CLAM MYA ARENARIA WERE DIRECTLY
 MONITORED UNDER FIELD CONDITIONS. THE MAJOR FACTORS AFFECTING
 FEEDING RATES WERE FOOD SUPPLY, TEMPERATURE, PREDATOR SIZE OR
 WEIGHT, & RECENT FEEDING EXPERIENCE. SIZE OR AGE OF PREY OF
 DIFFERING SIZES, POLINICES OF EACH SIZE OR AGE ATE SIMILAR NUMBERS
 OF PREY PER TIME ($X = 95.5$ MYA PER SNAIL PER YR). FEEDING PER DAY IN
 DIRECTLY WITH TEMPERATURE, PEAKING AT 0.6 MYA PER SNAIL PER DAY IN
 THE WARMEST MONTHS, BUT CEASING (AT 5C) FOR 4 MO IN WINTER.
 ENERGY EQUIVALENTS FOR POLINICES & SIZE-WEIGHT RELATIONS FOR MYA
 VARIED SEASONALLY. ONLY 80% OF THE TISSUE WEIGHT OR ENERGY
 CONTENT OF A PREY WAS ACTUALLY INGESTED. BECAUSE LARGER PREDATORS
 CONSISTENTLY ATE LARGER PREY, THEY INGESTED MORE (=218 KJ/YR
 YR FOR A 4TH-YEAR SNAIL) THAN SMALLER, YOUNGER ONES (=385 KJ/YR &
 FOR 2ND-YEAR SNAILS). WITH A SPECIFIED FOOD SUPPLY, TEMPERATURE &
 PREDATOR WEIGHT TOGETHER ACCOUNTED FOR MOST OF THE VARIABILITY IN
 INGESTION (MILLIGRAMS OR KILOJOULES) OF MYA BY EXPERIENCED
 PREDATORS. ON A YEAR-ROUND BASIS, INGESTION RATES OF POLINICES
 WERE ONLY 1% OF THEIR OWN WEIGHT PER DAY. GROWTH RATES, UNLIKE
 FEEDING RATES, WERE CORRELATED MORE WITH A SNAIL'S AGE THAN ITS
 SIZE OR WEIGHT: 2ND-YEAR POLINICES GREW NEARLY 3-FOLD IN DIAMETER
 OR 105 KJ/YR VS. 1.2-FOLD OR 63 KILOJOULES FOR A 4TH-YEAR SNAIL.
 GROWTH CEASED DURING THE 5 COLDEST MONTHS (<10C). IT WAS ALSO
 REDUCED WHEN SNAILS COULD INTERACT WITHOUT MOLLUSCAN PREY,
 POLINICES FAILED TO GROW ON A MYA DIET, GROSS GROWTH EFFICIENCIES
 WERE HIGH (48%-16% FOR YEAR-CLASSES 2 TO 4). ENERGY FLOW THROUGH
 POLINICES WAS COMPARABLE TO OTHER MARINE INVERTEBRATE PREDATORS:
 ANNUAL INGESTION & PRODUCTION PER SQUARE METRE WERE ESTIMATED AT
 UP TO 151 & 71 KILOJOULES, RESPECTIVELY.

EDWARDS, R.R.C. NO. 22
1973. PRODUCTION ECOLOGY OF TWO CARIBBEAN MARINE ECOSYSTEMS I. PHYSICAL
ENVIRONMENT AND FAUNA
ESTUARINE COASTAL MAR SCI 1: 303-318.

A QUANTITATIVE STUDY WAS MADE OF THE INVERTEBRATE MACROFAUNA & FISH FAUNA OF TWO SHALLOW WATER ECOSYSTEMS. ONE WAS IN AN INLET ON A CLEAN SAND BOTTOM (1) WHILE THE OTHER WAS ON A MUDDY BOTTOM (2) NEAR A DISCHARGE POINT FOR DOMESTIC EFFLUENT. THE LARGEST AVERAGE BIOMASS OF LITTORAL INFAUNA OF 2.894 G/M² DRY FLESH WEIGHT WAS FOUND AT (2) WHILE THE LARGEST AVERAGE BIOMASS OF SUBLITTORAL INFAUNA OF 5.839 G/M³ WAS FOUND AT (1). FISH BIOMASS WAS 5.048 G/M² AT (1) & 1.200 G/M² AT (2) SUGGESTING AN AVOIDANCE REACTION TO THE CONTAMINATED WATER AT THE LATTER LOCALITY. DIETS OF DEMERSAL FISH WERE PREDOMINANTLY BENTHIC INFAUNA AT (1) & EPIFAUNA AT (2). THE LATTER BEING RELATED TO THE PRESENCE OF A PROLIFIC WEED FAUNA IN THE SUBLITTORAL.

EDWARDS, R. R. C. NO. 26
1973. PRODUCTION ECOLOGY OF TWO CARIBBEAN MARINE ECOSYSTEMS II.
METABOLISM AND ENERGY FLOW
ESTUARINE COASTAL MAR SCI 1: 319-333.

PRIMARY PRODUCTION & RESPIRATION OF TWO MARINE ECOSYSTEMS WERE STUDIED BY MEASURING CHANGES IN DISSOLVED OXYGEN LEVELS. IN ONE OF THE ECOSYSTEMS, ON A CLEAN SAND BOTTOM, ENERGY INPUT FROM BENTHIC PRIMARY PRODUCTION & PLANKTONIC SEDIMENTATION WAS FULLY UTILIZED BY THE BENTHIC COMMUNITIES, THE FORMER CONTRIBUTING 62% & THE LATTER 38% OF INPUT. IN THE OTHER ECOSYSTEM, WHICH RECEIVED DOMESTIC EFFLUENT FROM A CITY, TOTAL ENERGY INPUT TO THE BOTTOM WAS HIGHER DUE TO INCREASED SEDIMENTATION & PRODUCTION OF BENTHIC MACROALGAE. ABOUT HALF OF THE INPUT TO THIS SYSTEM WAS UTILIZED IN AEROBIC RESPIRATION, WHILE THE REMAINDER ENTERED THE ANAEROBIC SYSTEM WHERE DEPOSITION OCCURRED. GROWTH, RESPIRATION & TURNOVER RATES ARE DISCUSSED TOGETHER WITH ESTIMATES OF ECOLOGICAL EFFICIENCIES.

FEDRA, K, ETAL NO. 00
ON THE ECOLOGY OF A NORTH ADRIATIC BENTHIC COMMUNITY, DISTRIBUTION
STANDING CROP AND COMPOSITION OF THE MACROBENTHOS
MAR BIOL 38: 129-145

THE BOUNDARIES AS WELL AS THE MACRO-EPIBENTHIC BIOMASS DISTRI-
BUTION & COMPOSITION OF A NORTH ADRIATIC BENTHIC COMMUNITY,
DOMINATED BY THE BRITTLE STAR OPHIOTHRIX QUINQUEMACULATA (D.CH.),
THE SPONGES RENIERA SSP., & THE ASCIDIANS MICROCOSMUS SSP. WERE
DETERMINED. TRANSECTS TOTALLING MORE THAN 80 KM (I.E., A RECORDED
AREA OF APPROXIMATELY 150 000 M²) WERE TAKEN BY MEANS OF A
COMBINED TV- & PHOTOCAMERA SLED. THE OBSERVATIONS, TV-RECORDINGS,
& PHOTOS, TOGETHER WITH 392 DIVER-COLLECTED QUANTITATIVE
SAMPLES WERE EVALUATED. THE BIOMASS VALUES WERE USED TO
ESTABLISH ISOBENTHS. WITHIN THE COMMUNITY, THE MEAN BIOMASS,
MEASURED AS WET WEIGHT, AMOUNTED TO 370 (+ - 73) G/M² WITH MAXIMA
OF MORE THAN 1000 G/M². 64% OF THE BIOMASS WAS DUE TO THE
DESIGNATING GROUP OPHIOTHRIX-RENIERA-MICROCOSMUS, 87.5% WERE
REPRESENTED BY FILTER- & SUSPENSION-FEEDING SPECIES ALONE. THE
MEAN BIOMASS IN THE PERIPHERAL AREAS WAS EVALUATED AT 166 (+ - 62)
G/M². BIOMASS DISTRIBUTION & COMPOSITION IS EXAMINED, & THE
ECOLOGICAL FUNCTION & MEANING OF THE OBSERVED PATTERNS IS
DISCUSSED.

FENCHEL, T., L. H. KOFOED AND A. LAPPALAINEN

NO. 49

1975
PARTICLE SIZE-SELECTION OF TWO DEPOSIT FEEDERS: THE AMPHIPOD
COROPHIUM VOLUTATOR AND THE PROSOBRANCH HYDROBIA ULVAE
MAR BIOL 30: 119-128.

THE FEEDING BIOLOGY OF THE DEPOSIT-FEEDING AMPHIPOD COROPHIUM VOLUTATOR IS COMPARED TO THAT OF THE COEXISTING, DEPOSIT-FEEDING PROSOBRANCH HYDROBIA ULVAE. REGARDING INGESTION OF PARTICLES, BOTH FORMS SHOW SIZE SELECTION WHICH ALONE CAN EXPLAIN THEIR COEXISTENCE. PARTICLE SIZE-SELECTION ALSO EXPLAINS SOME QUALITATIVE DIFFERENCES IN THE COMPOSITION OF THE FOOD OF THE TWO FORMS; THUS, DIATOMS PLAY A RELATIVELY LARGER ROLE IN THE DIET OF H. ULVAE, THAN IN THE DIET OF C. VOLUTATOR, WHEREAS BACTERIA ARE PROBABLY RELATIVELY MORE IMPORTANT FOR THE LATTER. RESULTS OF EXPERIMENTS WITH FEEDING OF C-14 LABELLED MICROORGANISMS ARE IN ACCORDANCE WITH THE FINDINGS ON PARTICLE SIZE-DISTRIBUTION OF THE GUT CONTENTS, & SHOW THAT (1) C. VOLUTATOR CAN ONLY UTILIZE BACTERIA ABSORBED TO PARTICLES WITHIN THE SIZE RANGE 4 TO 63 CM (THIS IS WHY THE PRESENCE OF CLAY & SILT PARTICLES IN THE SEDIMENT ARE NECESSARY FOR EFFICIENT FEEDING OF THIS AMPHIPOD); (2) C. VOLUTATOR CAN UTILIZE BACTERIA SUSPENDED IN THE WATER; PUMPED THROUGH ITS BURROW FOR RESPIRATION IF SILT & CLAY PARTICLES ARE PRESENT IN THE SEDIMENT. (3) H. ULVAE CAN UTILIZE LARGE PARTICLES, & ALSO BROWSES ON SURFACES, & SOME EVIDENCE IS BROUGHT FORWARD THAT IT ALSO UTILIZES MUCUS FOR TRAPPING MICROORGANISMS. THE COEXISTENCE OF DEPOSIT-FEEDING ANIMALS IS DISCUSSED. IT IS CONCLUDED THAT THE NUMBER OF COEXISTING, CLOSELY RELATED SPECIES IS USUALLY SMALL, & THAT THEIR RESOURCE PARTITIONING IS PROBABLY MAINLY BASED ON PARTICLE-SIZE SELECTIVITY. IN THE CASE OF UNRELATED FORMS (E.G. H. ULVAE & C. VOLUTATOR, A NUMBER OF BEHAVIOURAL, PHYSIOLOGICAL & MORPHOLOGICAL DIFFERENCES, & ALSO THE WIDESPREAD ABILITY OF DEPOSIT FEEDERS TO UTILIZE ALTERNATIVE FEEDING MECHANISMS MAY ALSO LEAD TO RESOURCE PARTITIONING. THUS, THERE ARE OFTEN SEVERAL NICHE DIMENSIONS RELATED TO FEEDING, ALLOWING A CERTAIN DIVERSITY OF COEXISTING DEPOSIT FEEDERS.

FRAME, A. B.
1980. NO. 71
TWO NEW SPECIES OF SAND BURROWING AMPHIPOD CRUSTACEANS FROM LONG
ISLAND SOUND AND THE N.Y. BIGHT.
ESTUARIES. 3(2): 75-83.

ACANTHOHAUSTORIUS BOUSFIELDI N. SP. & A. SIMILIS N. SP.
(AMPHIPODA: HAUSTORIIDAE) ARE DESCRIBED FROM THE OFFSHORE BOTTOM
SANDS OF THE NEW YORK BIGHT & LONG ISLAND SOUND REGIONS.

FRANKENBERG, D. AND A. LEIPER
1977. NO. 17
SEASONAL CYCLES IN BENTHIC COMMUNITIES OF THE GEORGIA CONTINENTAL
SHELF
COULL, B. C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 383-397

A COMPARISON OF BENTHIC FAUNAL ASSEMBLAGES ON THE CONTINENTAL SHELF OFF GEORGIA IN 1964 & 1970 SHOWS THAT DENSITY OF BENTHIC POPULATIONS MAY FLUCTUATE GREATLY FROM SEASON TO SEASON, YEAR TO YEAR, & PLACE TO PLACE. THE DENSITY OF ANIMALS STUDIED OFTEN VARIED BY 1 OR MORE ORDERS OF MAGNITUDE WITHIN SHORT RANGES OF SPACE &/OR TIME; THE DENSITY OF A NUMERICALLY DOMINANT MEMBER OF THE NEARSHORE FINE SAND ASSEMBLAGE, SPIOPHANES BOMBYX, VARIED BY MORE THAN 4 ORDERS OF MAGNITUDE WITHIN THE COLLECTIONS REPORTED. THE IMPLICATIONS OF THIS VARIABILITY TO THE COMMUNITY CONCEPT, THE CONCEPT OF COMMUNITY STABILITY & THE UTILIZATION OF QUANTITATIVE BENTHIC INFORMATION IN POLLUTION IMPACT STUDIES ARE DISCUSSED.

GAGE, J. AND G. COGHILL
1977. NO. 16
STUDIES ON THE DISPERSION PATTERNS OF SCOTTISH SEA LOCH BENTHOS
FROM CONTIGUOUS CORE TRANSECTS
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 319-337

MOTILE BENTHIC SPECIES CONTRIBUTED A DISPROPORTIONATE SHARE OF OVERALL COMMUNITY CLUSTERING IN CONTIGUOUS CORE SAMPLES TAKEN ALONG A LINE TRANSECT FROM TWO POSITIONS, MUDDY SAND AND SOFT MUD IN LOCH CRERAN AND ONE POSITION, SOFT MUD IN LOCH ETIVE ON THE WEST COAST OF SCOTLAND. DISPERSION OF MOTILE SPECIES CHIEFLY ACCOUNTED FOR CLUSTERING PEAKS OCCURRING AT BLOCK SIZES CORRESPONDING TO LINEAR SCALES FROM ABOUT 1 TO 3.5M IN CRERAN MUDDY SAND AND ETIVE SOFT MUD. CORE SAMPLES OF THE BENTHOS WERE TAKEN BY MEANS OF SCUBA AND ABUNDANT SPECIES THEREIN WERE ANALYZED BY GREIG-SMITH'S METHOD OF BLOCK-SIZE ANALYSIS OF SPATIAL DISPERSION. CONFIDENCE LIMITS INDICATIVE OF THE RANDOM EXPECTATION WERE GENERATED BY METHODS INCLUDING A MONTE CARLO PROCEDURE EMPLOYING POISSON VARIATES DERIVED FROM PSEUDORANDOM NUMBERS. INTENSITY AND PREDOMINATING SCALE OF OVERALL COMMUNITY CLUSTERING AT DIFFERENT SAMPLING POSITIONS WERE COMPARED ON THE BASIS OF MEAN DEVIATION FROM THE UPPER POISSON BOUND.

GIERE, O. NO. 40
1975. LITTORAL STRUCTURE, FOOD RELATIONS AND ECOLOGICAL ROLE OF MARINE
OLIGOCHAETES, WITH SPECIAL REFERENCE TO MEIOBENTHIC SPECIES
MAR BIOL 31: 139-156.

DATA ON ABUNDANCE, BIOMASS & BIOVOLUME DEMONSTRATE THE SIGNI-
FICANT ECOLOGICAL ROLE OF OLIGOCHAETES IN THE LITTORAL MARINE
BENTHOS. THEIR NUMERICAL & PRODUCTIVE IMPORTANCE IS COMPARABLE
TO THAT OF MANY OTHER COMMON MEIO- & MACROFAUNA GROUPS FROM
VARIOUS LITTORAL AREAS. OLIGOCHAETES OFTEN EXHIBIT NUTRITIONAL OR
SPECIALIZING (E.G. BACTERIA OR DIATOMS ATTACHED TO THEIR
SAND GRAIN) STRUCTURE & DISTRIBUTION. FEW OLIGOCHAETES ARE,
APPARENTLY, CONSUMED BY PREDATORS. HENCE, ONLY A SMALL PORTION
OF THEIR BIOMASS IS TRANSFERRED TO HIGHER TROPHIC LEVELS, WHILE
THE MAIN PART IS DECOMPOSED DIRECTLY. MOST OLIGOCHAETES, ECOLOGICALLY,
REPRESENT FINAL LINKS OF RATHER SHORT FOOD CHAINS. ECOLOGICALLY,
MARINE OLIGOCHAETES ATTAIN MAJOR IMPORTANCE ONLY IN LITTORAL
AREAS.

GLEMAREC, M. AND A. MENESGUEN
 1979. NO. 12
 FUNCTIONING OF A MUDDY SAND ECOSYSTEM: SEASONAL FLUC. OF DIFFERENT
 TROPHIC LEVELS AND DIFFICULTIES ESTIM. PRODUC. DOM. MACROFAUNA
 IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C. PRESS: 49-68

IN TEMPERATE ENVIRONMENTS THERE ARE IMPORTANT SEASONAL FLUCTUATION
 AT DIFFERENT TROPHIC LEVELS OF THE BENTHOS. THIS HAS BEEN STUDIED
 IN A MUDDY-SAND COMMUNITY IN THE BAY OF CONCARNEAU (SOUTH
 BRITTANY). AFTER A SPRING MICROPHYTOBENTHIC MAXIMUM, DIFFICULT TO
 ESTIMATE IN 1978 BECAUSE OF SEVERE CLIMATIC CONDITIONS, NEMATODES
 APPEARED IN GREAT NUMBERS ONE MONTH LATER. THE SAME SITUATION
 OCCURRED IN AUTUMN FOLLOWING A MAXIMUM OF PHAEOPHYTIN A & A PERIOD
 OF OPTIMAL SEDIMENTARY STABILITY. INTERPRETATION OF TROPHIC
 RELATIONSHIPS BETWEEN MICROPHYTOBENTHOS & MEIOBENTHOS IS DIFFICULT
 THE MACROFAUNA BIOMASS OSCILLATED BETWEEN 10 & 30 G/M² DURING ONE
 YEAR. IN ORDER TO ILLUSTRATE THE MACROBENTHIC VARIATIONS, THREE
 POPULATIONS HAVE BEEN STUDIED IN DETAIL WITH THE HELP OF
 AUTOMATIZED HISTOGRAM ANALYSIS: ABRA ALBA (BIVALVIA), AMPELISCA
 SPINIPES (AMPHIPODA) & AMPHIURA FILIFORMIS (AMPHIURIID). TWO
 DIFFERENT DEMOGRAPHIC STRATEGIES APPEARED THAT CORRESPOND TO
 OF THE SUCCESSIVE COHORTS MAY BE VERY DIFFERENT FROM YEAR TO YEAR.
 FLUCTUATIONS IN THE DENSITIES OF AMPHIURA FILIFORMIS STUDIED OVER
 SEVEN YEARS SHOW THAT CHANGES IN RECRUITMENT ARE DIFFICULT TO LINK
 WITH ANY ABIOTIC FACTOR, BUT THAT INTRASPECIFIC COMPETITION
 EXISTS. THIS APPROACH EMPHASIZES THE DIFFICULTIES IN ESTIMATING
 SECONDARY PRODUCTION. PRODUCTION ESTIMATES ARE MADE FOR THE THREE
 SPECIES.

GOLDHABER, M.B., ETAL 01
 1977. NO.
 SULFATE REDUCTION, DIFFUSION, AND BIOTURBATION IN LONG ISLAND SOUND
 SEDIMENTS, REPORT OF THE FOAM GROUP
 AM J SCI 277: 193-237

SEDIMENT GRAVITY & BOX CORES WERE TAKEN OVER THE COURSE OF A 10-MONTH PERIOD AT A SINGLE STATION IN LONG ISLAND SOUND. A RANGE OF PORE WATER PROFILES & SOLID PHASE CONSTITUENTS WERE MEASURED. SUMMER PORE WATER PROFILES EXHIBIT AN UPPER ZONE FROM 1 TO 8 CM IN WHICH CONCENTRATIONS OF CONSTITUENTS, SUCH AS SULFATE & ALKALINITY, DO NOT CHANGE MARKEDLY WITH DEPTH. THE ACTUAL CONCENTRATION LEVELS, HOWEVER, ARE SIGNIFICANTLY ALTERED FROM BOTTOM WATER VALUES WITHIN THE TOP 1 TO 2 CM. THE PORE WATER ZONE IS UNDERLAIN BY A MUCH THICKER ONE IN WHICH PORE WATER PROFILES SHOW TRENDS INDICATIVE OF PROGRESSIVE DIAGENESIS INVOLVING BACTERIAL SULFATE REDUCTION (FOR EXAMPLE, SULFATE DECREASE). WINTER PORE WATER PROFILES DO NOT SHOW AN UPPER ZONE OF CONSTANT PORE WATER CONCENTRATION. AS AN AID TO INTERPRETING THE PORE WATER DATA, DIRECT MEASUREMENTS WERE MADE OF SULFATE REDUCTION RATES BY INCUBATING SEDIMENT ALIQUOTS UNDER ANAEROBIC CONDITIONS & FOLLOWING SULFATE DEPLETION WITH TIME. THESE RATES FALL IN THE RANGE 2 TO 77 MM SULFATE/1 PORE WATER/YR & SHOW A STRIKING DECREASE WITH DEPTH IN THE SEDIMENT COLUMN. IT IS ARGUED THAT THE DEPTH INDEPENDENT PORE WATER PROFILES IN THE UPPER 8 CM OF SUMMER SEDIMENT ARISE FROM IRRIGATION OR PARTICLE MIXING OF SEDIMENT BY MACROINFAUNAL ORGANISMS (THAT IS, BIOTURBATION) RATHER THAN BY LACK OF SULFATE REDUCTION. THIS CONCLUSION IS BASED ON HIGH MEASURED RATES OF SULFATE REDUCTION IN THE UPPER 8 CM. FREQUENT RECOVERY DURING CORING OF THE DEPOSIT-FEEDING POLYCHAETE WORM NEPHYS INCISA & ALSO SUPPORT OF ABUNDANT IRON-SULFIDE MINERALS IN THE UPPER 8 CM ALSO SUPPORT THIS CONCLUSION. THE VERTICAL TRANSPORT OF PORE WATER CONSTITUENTS ARISING FROM BIOTURBATION DURING THE SUMMER IS AT LEAST FIVE TIMES MORE RAPID THAN BY IONIC DIFFUSION. SUCH TRANSPORT DOES NOT SWAMP OUT ALL EFFECTS OF BACTERIAL METABOLISM, AS THE LATTER PROCESS IS SO RAPID IN THE UPPER 1 CM AS TO MODIFY THE CHEMISTRY OF SOLUTIONS PASSING THROUGH THIS INTERVAL. DURING WINTER THE BIOTURBATING ACTIVITY OF INFAUNA DECREASES; HENCE PORE WATER

GRASSLE, J. F. AND J. P. GRASSLE
 1974. NO. 79
 OPPORTUNISTIC LIFE HISTORIES AND GENETIC SYSTEMS IN MARINE BENTHIC
 POLYCHAETES
 J MAR RES 32(2): 253-284.

THE DECLINE IN BENTHIC MARINE FAUNA-FOLLOWING AN OIL SPILL IN WEST
 FALMOUTH, MASSACHUSETTS, PERMITTED US TO FOLLOW THE RESPONSES OF A
 NUMBER OF POLYCHAETES & OTHER INVERTEBRATE SPECIES TO AN UNUSUAL
 ENVIRONMENTAL DISTURBANCE. SPECIES WITH THE MOST OPPORTUNISTIC
 LIFE HISTORIES INCREASED & DECLINED AT THE TWO STATIONS WITH THE
 GREATEST REDUCTION IN SPECIES DIVERSITY. THE STATIONS WITH ANES OF
 INTERMEDIATE REDUCTION IN DIVERSITY SHOWED INCREASES & DECLINES OF
 SOMEWHAT LESS OPPORTUNISTIC SPECIES. ELECTROPHORETIC STUDIES OF
 THE MALATE DEHYDRATASE LOCI OF THE MOST OPPORTUNISTIC SPECIES,
 CAPITELLA CAPITATA, INDICATED SHORT-TERM SELECTION FOR A SINGLE
 GENOTYPE IN THE LARGE POPULATIONS OF THE MOST OPPORTUNISTIC
 SPECIES IN THE OIL SPILL. THE LIFE HISTORIES OF THE MOST OPPORTUNISTIC
 SPECIES ARE SUMMARIZED. INITIAL RESPONSE TO DISTURBED CONDITIONS,
 ABILITY TO INCREASE RAPIDLY, LARGE POPULATION SIZE, EARLY
 MATURATION, & HIGH MORTALITY ARE ALL FEATURES OF OPPORTUNISTIC
 SPECIES. USING THESE CRITERIA, THE SPECIES ARE RANKED IN ORDER OF
 DECREASING DEGREE OF OPPORTUNISM AS: 1. CAPITELLA CAPITATA, 2.
 POLYDORA LIGNI, 3. SYLLIDES VERRILLI, 4. MICROPHTHALMUS ABERRANS,
 5. STREBLOSPIRO BENEDICTI, 6. MEDIOASTATUS AMBISSETA. WE PROPOSE
 OPPORTUNISM AS THE BEST SINGLE MEASURE OF DEGREE OF THE
 OPPORTUNISM. A DEFINITION BASED ON MORTALITY EMPHASIZES THE SHORT-TERM
 PORTION OF THE LIFE CYCLE INVOLVED IN ADAPTATION THROUGH SHORT-TERM
 SELECTION. TWO TYPES OF MARINE BENTHIC OPPORTUNISTS ARE DESCRIBED:
 1. A MIXED STRATEGY VARIETY WITH OBLIGATE PLANKTONIC DISPERSAL
 WHERE SELECTION WITHIN LOCAL SUBPOPULATIONS OCCURS IN A SINGLE
 GENERATION, 2. A RESPONSE-TO-SELECTION TYPE WITH DIRECT
 DEVELOPMENT OR SETTLEMENT SHORTLY AFTER RELEASE FROM BROOD
 STRUCTURES ALLOWING SELECTION WITHIN LOCAL POPULATIONS THROUGH
 MORE THAN ONE GENERATION.

GRUSSENDORF, M. J. NO. 12
 0000. USING AVERAGE AND MAXIMUM ANNUAL BIOMASS TO ESTIMATE SECONDARY
 PRODUCTION IN SHALLOW MARINE ZOOBENTHIC INVERTEBRATE POPULATIONS
 INST. OCEAN., OLD DOMINION UNIVERSITY, NORFOLK, VIRGINIA, 16.PP.

A LITERATURE REVIEW WAS CONDUCTED TO ACQUIRE VALUES OF SECONDARY
 PRODUCTION, AVERAGE ANNUAL BIOMASS, & MAXIMUM ANNUAL BIOMASS IN
 SHALLOW MARINE ZOOBENTHIC INVERTEBRATES. CORRELATION ANALYSIS,
 BOTH PARAMETRIC & NONPARAMETRIC, PRODUCED A VERY HIGHLY SIGNI-
 FICANT POSITIVE RELATIONSHIP BETWEEN SECONDARY PRODUCTION & ANNUAL
 BIOMASS (AVERAGE & MAXIMUM). THROUGH LINEAR REGRESSION ANALYSIS,
 TWO EQUATIONS WERE FORMULATED TO ALLOW THE ESTIMATE OF SECONDARY
 PRODUCTION IF EITHER FORM OF BIOMASS (AVERAGE OR MAXIMUM) IS
 KNOWN. EFFICIENT USE OF AVERAGE OR MAXIMUM ANNUAL BIOMASS AS
 ESTIMATORS DEPENDS ON FINANCIAL RESOURCES, FIELD RESEARCH TIME, &
 THE QUANTITY & QUALITY OF A PRIORI KNOWLEDGE AVAILABLE ON THE
 SPECIES POPULATION DYNAMICS.

HAMILTON, A.L. NO. 28
ON ESTIMATING ANNUAL PRODUCTION
LIMNOL OCEANOGR: 771-781.

THE METHOD OF HYNES & COLEMAN IS MODIFIED TO MAKE IT MORE ADAPTABLE & MORE CONSISTENT WITH THEIR UNDERLYING ASSUMPTIONS. IF MOST ORGANISMS COMPRISING A COMMUNITY ARE UNIVOLUNTINE & HAVE APPROXIMATELY THE SAME MAXIMUM SIZE, THE AVERAGE STANDING CROP CAN BE USED TO OBTAIN A REALISTIC ESTIMATE OF ANNUAL PRODUCTION. THE SIZE FREQUENCY DISTRIBUTION CAN BE REGARDED AS A FIRST ESTIMATE OF AN "AVERAGE COHORT" WHEN THE NUMBER OF "AVERAGE COHORTS" EQUALS THE NUMBER OF SIZE CLASSES THROUGH WHICH THE ORGANISMS GROW. IF GROWTH, IN TERMS OF DIFFERENCES IN ADJACENT SIZE CLASSES, CAN BE ATTRIBUTED TO MORTALITY WHEN ALL SIZE CLASSES ARE CONSIDERED TOGETHER, THE EFFECT OF NONLINEAR GROWTH ON THE ESTIMATE OF ANNUAL PRODUCTION IS NOT LARGE. IN CONTRAST, A SERIOUS ERROR IS INTRODUCED IF THE ORGANISMS ARE NOT UNIVOLUNTINE. WHEN GROWTH PATTERN & GENERATION TIME ARE KNOWN, IT IS RELATIVELY SIMPLE TO MODIFY THE AVERAGE SIZE FREQUENCY DISTRIBUTION TO IMPROVE THE ESTIMATE OF THE "AVERAGE COHORT" & HENCE IMPROVE THE ESTIMATE OF ANNUAL PRODUCTION. A REPLY TO THE CRITICISMS OF FAGER IS INCLUDED.

HAMILTON, P.V. NO. 92
1978. TIDAL DISTRIBUTION AND LONG TERM MOVEMENT OF LITTORINA
IRRORATA
MAR BIOL 46: 49-58

THE DISTRIBUTION OF LITTORINA IRRORATA SAY ON A LOW-ENERGY BARRIER BEACH ON THE NORTHERN GULF OF MEXICO IS DESCRIBED, & CORRELATED WITH THE PRESENCE OF SPARTINA ALTERNIFLORA & OTHER PLANTS IN THE UPPER INTERTIDAL ZONE. THE MOVEMENTS OF 66 INDIVIDUALLY TAGGED SNAILS WERE FOLLOWED IN THE S. ALTERNIFLORA ZONE FOR AN AVERAGE OF 226 DAYS, DURING WHICH TIME AN AVERAGE OF 10.6 POSITIONS WERE RECORDED PER SNAIL. THE SNAILS TRAVELED AN AVERAGE TOTAL PATH DISTANCE OF AT LEAST 995 CM, BUT DUE TO CONVOLUTED PATHS, ENDED UP AN AVERAGE RESULTANT DISTANCE OF ONLY 399 CM AWAY FROM THEIR ORIGINAL POSITIONS. THEY MOVED AN ESTIMATED RESULTANT DISTANCE OF APPROXIMATELY 20 TO 25 CM PER ACTIVITY PERIOD. DESPITE A SLIGHT OFFSHORE MOVEMENT DURING THE FALL & WINTER, THE SNAILS MOVED MORE PARALLEL TO THE SHORELINE THAN PERPENDICULAR TO IT.

HECK, K. L. JR. ND. 87
1977. COMPARATIVE SPECIES RICHNESS, COMPOSITION, AND ABUNDANCE OF
INVERTEBRATES IN CARIBBEAN SEAGRASS MEADOWS
MAR BIOL 41: 335-348

THE RESULTS OF A YEAR-LONG STUDY IN WHICH EPIBENTHIC INVERTEBRATES WERE COLLECTED MONTHLY FROM SEAGRASS (THALASSIA TESTUDINUM) MEADOWS ALONG THE CARIBBEAN COAST OF PANAMA & THE PANAMA CANAL ZONE ARE DESCRIBED IN THIS PAPER. DIFFERENCES IN SPECIES COMPOSITION & ABUNDANCE AMONG SITES WERE PRIMARILY DUE TO THE PROXIMITY OF SURROUNDING HABITATS, ESPECIALLY CORAL REEFS, WHICH CONTAIN A NUMBER OF SPECIES THAT UTILIZE THE SEAGRASS MEADOWS. IN CONTRAST TO MANY PREVIOUS CHARACTERIZATIONS OF TROPICAL MARINE HABITATS, IMPORTANT SEASONAL FLUCTUATIONS IN BOTH SPECIES NUMBER & ABUNDANCE TOOK PLACE AT EACH OF THE SITES. DATA ON BREEDING ACTIVITY AMONG SEVERAL SPECIES OF DECAPOD CRUSTACEANS INDICATE YEAR-ROUND REPRODUCTION, ALTHOUGH CONSIDERABLE SEASONAL DIFFERENCES OCCUR IN THE PERCENTAGE OF OVIGEROUS FEMALES. THESE INTERSPECIFIC DIFFERENCES IN OBSERVED REPRODUCTIVE OUTPUT MAY BE EXPLAINED BY DIFFERENCES IN LIFE-CYCLE LENGTH, A FACTOR NOT OFTEN CONSIDERED IN DISCUSSIONS OF SEASONAL BREEDING PATTERNS IN TROPICAL MARINE INVERTEBRATES. OVERALL SPECIES COMPARABLE STUDIES OF TROPICAL & SUBTROPICAL SEAGRASS MEADOWS ELSEWHERE, ALTHOUGH CARIDEAN SHRIMP & XANTHID CRAB SPECIES WERE REDUCED IN NUMBER & TOTAL ABUNDANCE WERE MUCH LOWER THAN IN PREVIOUS STUDIES.

HIBBERT, C.J. NO. 33
 BIOMASS AND PRODUCTION OF A BIVALVE COMMUNITY ON AN INTERTIDAL
 MUD-FLAT
 J EXP MAR BIOL ECOL 25: 249-261.

SURVEYS OF AN INTERTIDAL MUDFLAT IN SOUTHAMPTON WATER IN TWO
 SUCCESSIVE WINTERS (1972 & 1973) YIELDED A TOTAL OF 12 BIVALVE
 SPECIES, OF WHICH 5 CONTRIBUTED >99% OF THE BIOMASS. THE BIVALVE
 COMMUNITY IS DOMINATED BY CERASTODERMA EDULE (L.) (BIOMASS,
 $B = 17.66 \text{ G ASH-FREE DRY WT M-2}$; PRODUCTION, $P = 20.71 \text{ G M-2 YR-1}$)
 & MERCENARIA MERCENARIA (L.) ($B = 8.50 \text{ G M-2}$; $P = 4.14 \text{ G M-2 YR-1}$)
 ALTHOUGH MYTILUS EDULIS L. ($B = 4.5 \text{ G M-2}$), VENERUPIS DECUSSATA
 (L.) ($B = 0.4-2 \text{ G M-2}$) & VENERUPIS AUREA (GMELIN) ($B = 0.6-1 \text{ G M-2}$)
 ARE LOCALLY COMMON. TOTAL MACROFAUNAL BIOMASS (190 G M-2) &
 PRODUCTION (220 G M-2 YR-1) AT HAMBLE APPEAR TO BE HIGHER THAN
 OTHER COMPARABLE SITES, ALTHOUGH SIMILAR TO MUSSEL BEDS. THE
 ESTIMATED TRANSFER OF BIVALVE BIOMASS TO PREDATORS (10.7 TONNES YR-1) &
 SCAVENGERS/DECOMPOSERS (18.2 TONNES YR-1) SHOWS THE
 IMPORTANCE OF THE BIVALVE COMMUNITY TO OTHER TROPHIC LEVELS.

HIBBERT, C.J. NO. 99
1977 GROWTH AND SURVIVORSHIP IN A TIDAL FLAT POPULATION OF THE BIVALVE
MERCENARIA MERCENARIA FROM SOUTHAMPTON WATER
MAR BIOL 44: 71-76

A MONTHLY SAMPLING PROGRAMME WAS CONDUCTED TO INVESTIGATE ASPECTS OF THE BIOLOGY OF A POPULATION OF MERCENARIA MERCENARIA (L.). SMOOTH GROWTH CURVES WERE CONSTRUCTED FOR EACH YEAR CLASS, & THE FACTORS AFFECTING GROWTH RATE WERE CONSIDERED. SEASONAL CYCLES IN FLESH WEIGHT & CALORIFIC CONTENT APPEAR TO BE RELATED TO GONAD PROLIFERATION & SUBSEQUENT SPAWNING. RECRUITMENT IS SPORADIC & PROBABLY DEPENDS ON THE SPAWNING OF UPSTREAM POPULATIONS, WHERE CONDITIONS ARE MORE FAVORABLE FOR LARVAL DEVELOPMENT. SURVIVORSHIP CURVES WERE CONSTRUCTED FOR EACH YEAR CLASS; PREDATION BY CRABS & GULLS APPEARS TO ACCOUNT FOR A LARGE PROPORTION OF THE OBSERVED MORTALITY.

HOLLAND, A.F., AND J.M. DEAN
1977. THE BIOLOGY OF THE STOUT RAZOR CLAM, TAGELUS PLEBEIUS, ANIMAL
SEDIMENT RELATIONSHIP, FEEDING MECH & COMMUNITY BIOLOGY
CHESAPEAKE SCI 18(1): 58-66

SIX INTERTIDAL POPULATIONS OF TAGELUS PLEBEIUS, THE STOUT RAZOR CLAM, & ASSOCIATED MACROINVERTEBRATES WERE SAMPLED IN THE NORTH INLET ESTUARY, NEAR GEORGETOWN, SOUTH CAROLINA. T. PLEBEIUS INHABITED ONLY STABLE SEDIMENTS, COMPOSED OF GREATER THAN 2.0% SILTS & CLAYS & WHICH WERE COVERED BY A VISIBLE SURFACE FILM OF BENTHIC MICROALGAE. GUT CONTENTS, GILL MORPHOLOGY, & BEHAVIOR ALL INDICATED THAT THIS CLAM FUNCTIONED AS A SUSPENSION FEEDER OBTAINING ITS NUTRITION BY FILTERING SUSPENDED PARTICLES FROM THE WATER COLUMN. MAINTENANCE OF THE SIPHON TUBES & BURROWS WAS IMPORTANT TO THE SURVIVAL OF THIS ORGANISM. T. PLEBEIUS WAS QUANTITATIVELY AN IMPORTANT MEMBER OF THE INFAUNA WITHIN ITS HABITAT, COMPOSING 93.0% OF THE BIOMASS, BUT ONLY 3.2% OF THE TOTAL NUMBER OF INDIVIDUALS. SEDIMENT STABILITY, IN ADDITION TO AFFECTING THE DISTRIBUTION OF T. PLEBEIUS, ALSO HAD A SIGNIFICANT ROLE IN DETERMINING THE STRUCTURE OF INVERTEBRATE COMMUNITIES INHABITING THE INTERTIDAL SANDBARS SAMPLED. THE STABLE MUDDY-SAND SEDIMENTS OF LAGOON AREAS SUPPORTED A MORE DIVERSE FAUNAL ASSEMBLAGE THAN DID THE LESS STABLE SANDY SEDIMENTS OF FRINGE AREAS OF THE SAME SANDBAR.

HOLLAND, A.F., AND J.M. DEAN
1977. NO. 75
THE BIOLOGY OF THE STOUT RAZOR CLAM, TAGELUS PLEBEIUS, ASPECTS
OF THE POPULATION DYNAMICS
CHESAPEAKE SCI 18(2): 188-196

THE POPULATION DYNAMICS OF THE STOUT RAZOR CLAM, TAGELUS PLEBEIUS, WERE INVESTIGATED FOR THREE YEARS. DENSITY, YEAR-CLASS STRUCTURE, & RECRUITMENT VARIED WITH ELEVATION ABOVE MEAN LOW WATER, AMONG SAMPLE AREAS, & AMONG YEARS. RECRUITMENT WAS UNIMODEL & RESTRICTED TO THE LATE SPRING. OVER 80% OF THE JUVENILE RECRUITED IN THE SPRING WERE ABSENT FROM THE SAMPLE AREAS BY THE FOLLOWING FALL. GROWTH RATES OF T. PLEBEIUS VARIED WITH SEASON, AGE, & ELEVATION ABOVE MLLW, BUT DID NOT VARY AMONG SAMPLE AREAS OR YEARS. T. PLEBEIUS GREW FASTER & REACHED A LARGER FINAL LENGTH IN LOW INTERTIDAL AREAS. THE AMERICAN OYSTERCATCHER, HAEMATOPUS PALLIATUS, & THE STINGRAYS, DASYATIS SABENA & DASYATIS AMERICANA, WERE THE MAJOR CLAM PREDATORS IDENTIFIED.

HOLLAND, A.F., N. MOUNTFORD AND J. MIHURSKY
1977. NO. 08
TEMPORAL VARIATION IN UPPER BAY MESOHALINE BENTHIC COMMUNITIES:
I. THE 9-M MUD HABITAT.
CHESAPEAKE SCI 18: 370-378.

YEARLY & SEASONAL CHANGES IN THE STRUCTURE OF THE MACROBENTHIC (> 1.0 MM) COMMUNITY OCCURRING IN THE 9-M MUD HABITAT OF THE CALVERT CLIFFS REGION OF THE CHESAPEAKE BAY WERE EXAMINED FOR THREE YEARS. SEASONAL CHANGES IN THE NUMERICALLY DOMINANT SPECIES RESULTED IN VARYING COMMUNITY STRUCTURE & WAS CHARACTERIZED BY A NEAR TOTAL FAUNAL DEPLETION DURING SUMMER, INITIAL RECOLONIZATION DURING EARLY FALL, SECONDARY RECOLONIZATION DURING LATE FALL, & GROWTH & STRUCTURAL DEVELOPMENT DURING WINTER & SPRING. THE FAUNAL DEPLETION THAT OCCURRED EACH SUMMER CAUSED THE CYCLE TO REPEAT ON AN ANNUAL BASIS. THE STRUCTURE OF THE COMMUNITY WAS SIMILAR EACH YEAR DURING INITIAL RECOLONIZATION (FALL), BUT VARIED DURING SECONDARY RECOLONIZATION (WINTER & SPRING), REFLECTING THE RECRUITMENT SUCCESS OF SPECIES THAT REPRODUCE IN THE FALL (I.E., MACOMA BALTHICA, MULLINIA LATERALIS, NEREIS SUCCINEA, & IMPLICATIONS PARAPRIONOSPION PINNATA). THESE FINDINGS HAVE PROFOUND IMPLICATIONS FOR THE DESIGN & INTERPRETATION OF POWER PLANT PREOPERATIONAL POSTOPERATIONAL IMPACT STUDIES.

HOLM, R. F.

NO. 77

COMMUNITY STRUCTURE OF A TROPICAL MARINE LAGOON
ESTUARINE COASTAL MAR SCI 7: 329-345

THE STRUCTURE OF THE BENTHIC COMMUNITY IN A NEARSHORE TROPICAL MARINE LAGOON, IN THE UPPER FLORIDA KEYS, WAS EXAMINED IN EARLY SPRING & MID-SUMMER IN 1973 & 1974. EIGHT ENVIRONMENTAL PARAMETERS (WATER DEPTH, TIDAL RANGE, CURRENT FLOW, WATER TEMPERATURE, SALINITY, PH, SEDIMENT DEPTH & PARTICLE SIZE) WERE MONITORED. THE BIOTA WAS COMPARED ALONG AN INTERTIDAL-SUBTIDAL ENVIRONMENTAL GRADIENT. THE AMOUNT OF VEGETATION PRESENT & THE STABILITY OF THE SEDIMENT MODIFIED THE ABUNDANCE & DIVERSITY OF THE BENTHIC MACROFAUNA. THE RESULTS OF THIS STUDY ARE COMPARED WITH THOSE FROM OTHER AREAS IN THE TROPICAL WESTERN ATLANTIC OCEAN. THE UNIQUENESS OF THE LAGUNAR ENVIRONMENT MADE IT POSSIBLE TO EXAMINE THE CHANGES IN SPECIES ABUNDANCE & DIVERSITY AS A DETRITUS-BASED FOOD WEB GRADED INTO A PHYTOPLANKTON BASED-FOOD WEB.

HOOKS, T.A., K.L. HECK AND R.J. LIVINGSTON
1976. NO. 91
AN INSHORE MARINE INVERTEBRATE COMMUNITY: STRUCTURE AND HABITAT
ASSOCIATIONS IN THE NORTHEASTERN GULF OF MEXICO
BULL MAR SCI 26(1): 99-109

EPIBENTHIC MACROINVERTEBRATES OF FOUR PHYLA--ARTHROPODA, MOLLUSCA, ANNELIDA, & ECHINODERMATA--FROM UNPOLLUTED & POLLUTED ESTUARINE WATERS IN THE NORTHEASTERN GULF OF MEXICO WERE COLLECTED BY OTTER TRAWL & EXAMINED OVER AN 18-MONTH STUDY PERIOD. THE NUMBER OF SPECIES FOUND IN EACH SYSTEM WAS NOT SIGNIFICANTLY DIFFERENT, ALTHOUGH OVER TWO & ONE-HALF TIMES THE NUMBER OF INDIVIDUALS WERE COLLECTED FROM THE UNPOLLUTED AREA (ECONFINA ESTUARY) THAN FROM THE POLLUTED AREA (FENHOLLOWAY ESTUARY). THE MOST ABUNDANT SPECIES WERE RELATIVELY MORE ABUNDANT IN THE UNPOLLUTED AREA. AT LEAST FOUR DIFFERENT HABITATS AVAILABLE TO THE ORGANISMS OCCUR IN THE STUDY AREA; ASSOCIATED WITH EACH IS A DISTINCT SPECIES GROUP. THE FOUR GROUPS INCLUDE THOSE SPECIES ASSOCIATED WITH (1) GRASSBEDS, (2) OYSTER BARS, (3) MUD FLATS, & (4) BENTHIC RED ALGAE.

HULBERG, L.W. AND J.S. OLIVER
 NO. 32
 1980.
 CAGING MANIPULATIONS IN MARINE SOFT-BOTTOM COMMUNITIES: IMPORTANCE
 OF ANIMAL INTERACTIONS OR SEDIMENTARY HABITAT MODIFICATIONS
 CAN J FISH AQUAT SCI 37: 1130-1139.

CAGING MANIPULATIONS WERE PERFORMED IN TWO MARINE SOFT-BOTTOM
 COMMUNITIES TO TEST TWO NONEXCLUSIVE HYPOTHESES: (1) POLYCHAETE
 ABUNDANCE CHANGES IN CAGES ARE CAUSED BY THE PRESENCE OR ABSENCE
 OF PARTICULAR PREDATORS & COMPETITORS; (2) POLYCHAETE CHANGES IN
 CAGES ARE CAUSED BY ANIMALS RESPONDING TO CAGE-INDUCED HABITAT
 MODIFICATIONS, ESPECIALLY SEDIMENT DEPOSITION & EROSION. THE SIGNI
 FICANT CHANGES, IN THE POLYCHAETE COMMUNITY BENEATH A VARIETY OF
 CAGES INSTALLED ON A HIGHLY WAVE-EXPOSED SAND BOTTOM COULD NOT BE
 EXPLAINED BY THE PRESENCE OR ABSENCE OF PREDATION OF FISH WHICH
 THIS RESULT WAS OBTAINED DESPITE THE EXCLUSION OF FISH WHICH
 NORMALLY CONSUME LARGE NUMBERS OF INFAUNAL POLYCHAETES. A CAGING
 EXPERIMENT SIMILAR TO WOODIN'S (1974) WAS & SIMILAR EXPOSURE
 OF ELKHORN SLOUGH USING COMPARABLE CAGES & A SEDIMENTARY TUBE
 PERIOD. IN WOODIN'S EXPERIMENTS, THE EXCLUSION OF A SEDIMENTARY TUBE
 BUILDER WAS ACCOMPANIED BY AN INCREASE IN A MOBILE DEPOSIT FEEDER.
 THIS WAS INTERPRETED AS A COMPETITIVE RELEASE. IN OUR EXPERIMENT,
 NO SEDIMENTARY INHABITED THE CHANNEL & NONE WERE EXCLUDED;
 NEVERTHELESS, THIS SAME OF POTENTIAL PREDATORS & COMPETITORS WAS
 ALTHOUGH THE IMPORTANCE OF POTENTIAL PREDATORS & COMPETITORS WAS
 NOT DOCUMENTED IN THE CAGING EXPERIMENTS, ALL OF THE SAND-FLAT &
 SLOUGH CAGING RESULTS ARE CONSISTENT WITH THE HYPOTHESIS THAT BY
 ANIMALS RESPOND TO SEDIMENTARY HABITAT MODIFICATIONS CREATED BY
 CAGES. THIS HYPOTHESIS IS NOT CONSIDERED IN MOST CAGING EXPERI
 MENTS IN MARINE SOFT-BOTTOM COMMUNITIES.

HYNES, H. B. N. AND M. J. COLEMAN.
1968. NO. 27
A SIMPLE METHOD OF ASSESSING THE ANNUAL PRODUCTION OF STREAM
BENTHOS
LIMNOL OCEANOGR 13(4):569-573.

IT IS POSSIBLE TO CALCULATE THE ANNUAL PRODUCTION OF STREAM
BENTHIC ANIMALS FROM DATA OBTAINED FROM A SERIES OF GOOD
QUANTITATIVE SAMPLES COLLECTED AT INTERVALS DURING THE YEAR. THE
METHOD IS EXPLAINED AND ITS LIMITATIONS AND SHORTCOMINGS ARE
DISCUSSED. THIS SEEMS AT PRESENT TO BE THE ONLY SIMPLE AND DIRECT
METHOD OF ESTIMATING PRODUCTION.

IVLEV, V. S.

NO. 7

THE BIOLOGICAL PRODUCTIVITY OF WATERS
J FISH RES BOARD CAN 23(11): 1727-1758.

THE CONCEPT OF BIOLOGICAL PRODUCTION IS BEST APPROACHED FROM THE POINT OF VIEW OF A PRODUCT, DEFINED AS A GROUP OF ORGANISMS (NOT NECESSARILY ALL BELONGING TO THE SAME SPECIES) WHICH HAVE SIMILAR FOOD HABITS, & WHICH ARE USEFUL TO MAN OR ARE OF SPECIAL INTEREST FOR SOME OTHER REASON. PRODUCTION IS DEFINED AS THE SUM OF ALL ORGANIC MATTER ADDED TO THE STOCK OF A PRODUCT (OR OTHER DEFINED ORGANIC UNIT) IN A UNIT OF TIME, REGARDLESS OF WHETHER OR NOT IT REMAINS ALIVE (I.E. PART OF THE STOCK) AT THE END OF THAT TIME. MASS PRODUCTION MAY BE EXPRESSED IN VARIOUS UNITS, PARTICULARLY BIOMASS (WET OR DRY WEIGHT), NITROGEN CONTENT, OR CALORIC CONTENT, BUT THE LAST OF THESE IS TO BE PREFERRED. IN ORDER TO TRACE THE FLOW OF ENERGY IN A BODY OF WATER FROM SOLAR RADIATION UP TO A GIVEN PRODUCT, FOUR TYPES OF STUDY ARE NEEDED. THE FIRST IS A QUANTITATIVE DETECTION OF SOLAR ENERGY BY PLANKTON & MACROPHYTES. FOR PLANKTON THIS IS ESTIMATED FROM THE OXYGEN PRODUCED (USUALLY IN LIGHT & DARK-BOTTLE EXPERIMENTS); FOR MACROPHYTES, DIRECT MEASUREMENTS OF THE GROWTH OF THE PLANT BODY HAVE BEEN USED. SECONDLY, THE PATHS OF ENERGY TRANSFORMATION THAT LEAD TO THE CHOSEN PRODUCT MUST BE IDENTIFIED. ALTHOUGH A COMPLETE ANALYSIS FOR EVEN ONE PRODUCT CAN BE GREATLY REDUCED BY CONCENTRATING ON THE PREDOMINANT FOODS OF EACH ORGANISM & IGNORING SECOND-GRADE COMPONENTS. THIRDLY, THE ECOTROPIC COEFFICIENT MUST BE DETERMINED FOR EACH STEP IN THE FOOD PYRAMID THAT LEADS FROM PRIMARY ORGANIC MATTER UP TO THE PRODUCT. THE TERM ECOTROPIC COEFFICIENT IS DEFINED BY IVLEV IN TWO DIFFERENT WAYS. IN DISCUSSING THE FLOW OF ENERGY THROUGH AN ECOSYSTEM, WHAT IS INVOLVED IS THE "DYNAMIC" ECOTROPIC COEFFICIENT, THE RATIO OF A CONSUMER'S INTAKE OF A PARTICULAR FOOD TO THE ORGANISM - USUALLY A YEAR. THE ENERGY CONTENT OF THE PRODUCTION INTERVAL - USUALLY A YEAR. THE ENERGY CORRESPONDING DYNAMIC ECOTROPIC COEFFICIENT, MULTIPLIED BY THE ENERGY OF THAT TYPE INGESTED BY THE CONSUMING ORGANISM DURING THE TIME UNIT CHOSEN; & THE SUM OF

JOHNSON, M.G. NO. 52
1971. ANIMAL-SEDIMENT RELATIONS IN SHALLOW WATER BENTHIC COMMUNITIES
MAR GEOL 11: 93-104.

NINETY BENTHIC SAMPLES WERE USED TO STUDY ANIMAL-SEDIMENT RELATIONS IN TOMALES BAY, CALIFORNIA. WHILE MOST OF THE BENTHIC SPECIES STUDIED WERE FOUND MORE OFTEN IN A PARTICULAR TYPE OF SUBSTRATE, INDIVIDUALS OF SUCH SPECIES WERE OCCASIONALLY FOUND IN OTHER SUBSTRATES. THERE IS A STRIKING TENDENCY FOR SPECIES OCCURRING OUTSIDE OF THEIR CHARACTERISTIC ENVIRONMENT TO BE ASSOCIATED WITH THE MOST DIVERSE ASSEMBLAGES OF THE FOREIGN SUBSTRATE. SPECIES FOUND IN THE ORDER OF SUCCESSION ARE THOSE PHENOMENA ARE EXPLAINED IN TERMS OF ENVIRONMENTAL STABILITY. THE CONCEPTS INVOLVED SUGGEST A MEANS OF PREDICTING THE SEQUENCE OF FAUNAL CHANGES FOLLOWING THE ALTERATION OF THE SUBSTRATE. A COMMONLY USED INDEX OF DIVERSITY (BRILLOUIN'S EQUATION) WAS FOUND TO BE VERY SENSITIVE TO THE OCCURRENCE OF TWO UBIQUITOUS SPECIES. A HIGH CORRELATION WAS OBTAINED BETWEEN THE NUMBER OF SPECIES & THE INDEX OF DIVERSITY WHEN THE TWO UBIQUITOUS SPECIES WERE NOT CONSIDERED. THE BENTHIC ENVIRONMENT OF TOMALES BAY IS GRADATIONAL & FAUNAL VARIATION IS CORRESPONDINGLY CONTINUOUS. UNDER SUCH CIRCUMSTANCES, THE ANIMAL-SEDIMENT & DIVERSITY RELATIONS DESCRIBED ARE PROBABLY MORE APPARENT IN AREAS WHERE THE SLOPE OF THE ENVIRONMENTAL GRADIENT IS GREATER. SIMILAR RELATIONS WOULD BE EXPECTED, HOWEVER, IN THE DEEP SEA & IN CONTINUOUS STRATIGRAPHIC SEQUENCES IN THE GEOLOGIC RECORD.

JOHNSON, M.G. AND R.O. BRINKHURST
1971. BENTHIC COMMUNITY METABOLISM IN BAY OF QUINTE AND LAKE ONTARIO
J FISH RES BOARD CAN 28: 1715-1725.

RATES OF SEDIMENTATION OF ORGANIC MATTER TO THE BOTTOM SEDIMENTS AT FOUR STATIONS (IN ORDER FROM THE INNER BAY OF QUINTE TO OPEN LAKE ONTARIO) AVERAGED 1.91, 0.42, 0.36, & 0.21 GM-2 DAY-1. RESPECTIVE RESPIRATION RATES OF SEDIMENT CORES AVERAGED 0.35, 0.25, 0.22, & 0.15 G O2 M-2 DAY-1. APPROXIMATELY 90% OF IMPORTED ENERGY (IM) WAS USED BY THE BENTHIC COMMUNITIES AT THE THREE LAKEWARD STATIONS & 23% AT THE INNER BAY STATION. LOW UTILIZATION IN THE INNER BAY WAS SUBSTANTIATED BY THE HIGH ONTARIO SEDIMENTS (28%) IN SEDIMENTS THERE, IN CONTRAST WITH THE HIGHER ONTARIO SEDIMENTS (3-4%). LOW UTILIZATION OF ALLOCHTHONOUS IMPORT. ONLY 2% OF IMPORTED ENERGY WAS ASSIMILATED BY MACROINVERTEBRATES IN THE INNER BAY, IN CONTRAST WITH ABOUT 30% AT THE LAKEWARD STATIONS. A CONCISE MODEL OF MACROINVERTEBRATE PRODUCTION, $P = C(A \cdot B \cdot IM)$ (WHERE C IS THE PROPORTION OF GROWTH TO RESPIRED & EXPORTED ENERTEBRATES, A IS FROM THE AVERAGE GROWTH EFFICIENCY OF MACROINVERTEBRATES, A IS PROPORTION OF IMPORTED ENERGY USED BY THE TOTAL BENTHIC COMMUNITY, & B IS PROPORTION OF THE LATTER USED BY MACROINVERTEBRATES), WAS USED TO DEDUCE THE RELATION BETWEEN PRODUCTION & IMPORT. ALL OF THE PARAMETERS A, B, & C PRESUMABLY DECREASE WITH INCREASING IMPORT, ALTHOUGH C MAY BE LOW INITIALLY AT LOW IMPORT & SPARSE FOOD SUPPLY.

JOHNSON, M.G. AND R.O. BRINKHURST
 1971. NO. 6
 PRODUCTION OF BENTHIC MACROINVERTEBRATES OF BAY OF QUINTE AND LAKE
 ONTARIO
 J FISH RES BOARD CAN 28(11): 1699-1714.

PRODUCTION RATES (P) BY BENTHIC MACROINVERTEBRATES, OBTAINED FROM DATA ON INSTANTANEOUS GROWTH RATE & BIOMASS (B), RANGED FROM 0.26 KCAL M⁻² DAY⁻¹ AT THE INNER BAY STATION TO 0.80 IN THE OUTER BAY, 0.19 AT THE BAY MOUTH, 0.16 OUTSIDE THE BAY OF QUINTE, & 0.04 IN THE MAIN BASIN OF LAKE, ONTARIO. RESPIRATION RATES (R) OF THE COMMON SPECIES WERE FITTED TO THE GENERAL MODEL $R = AIT + A2 \text{ LOGEW}$, WHERE T IS TEMPERATURE & W IS ANIMAL WEIGHT. Q10'S AVERAGED 3.5 & EXPONENTS OF ANIMAL WEIGHT AVERAGED 0.74. GROWTH EFFICIENCIES (PRODUCTION AS A PROPORTION OF ASSIMILATION) DECLINED PROGRESSIVELY FROM ABOUT 0.65 AT THE INNER BAY STATION TO 0.35 AT THE LAKE ONTARIO STATION. ANNUAL TURNOVER RATIOS (P:B RATIOS) DECLINED FROM 13 IN THE INNER BAY TO ABOUT 1 IN THE DEEP SEDIMENTS OF LAKE ONTARIO. TURNOVER RATIO (TR) WAS CORRELATED WITH MEAN ANNUAL BOTTOM TEMPERATURE (T), $TR = T2/10$, & PRODUCTION WAS PREDICTED BY $P = B \ T2/10$.

JOHNSON, R. G.

NO. 50

1974. PARTICULATE MATTER AT THE SEDIMENT-WATER INTERFACE IN COASTAL

ENVIRONMENTS

J MAR RES 32(2): 313-330.

A MICROSCOPIC STUDY WAS MADE OF MARINE SEDIMENTS TO IDENTIFY THE KINDS OF MATERIALS PRESENT AT THE SEDIMENT-WATER INTERFACE & TO DESCRIBE THESE MATERIALS FROM A BIOLOGICAL POINT OF VIEW. FIFTY-TWO SAMPLES WERE COLLECTED AT 16 STATIONS IN THE VICINITY OF WOODS HOLE, MASSACHUSETTS. A TOTAL OF 41 PARTICLE SPECIES WAS RECOGNIZED. UP TO 69% OF THE PARTICLES WERE ENCRUSTED WITH MINERAL MATTER. ALL OF THE SAMPLES CONTAINED FLOCCULENT ORGANIC-ABUNDANCE. NEARLY ALL OF THE CLAY & SILT SIZE PARTICLES WERE AGGREGATES INCORPORATED IN AN ORGANIC MATRIX. RECYCLING OF ORGANIC MATTER BY PROBABLY FEEDERS. AN AVERAGE OF SIXTY-ONE PERCENT OF THE PARTICLES EXAMINED IN SAMPLES OF SURFICIAL SEDIMENTS WERE POTENTIAL FOOD PARTICLES. THE STANDARD METHODS OF DESCRIBING SEDIMENTS ARE GEOLOGICAL PROCESSES. FOR UNDERSTANDING ANIMAL SEDIMENT RELATIONS & GEOLOGICAL PROCESSES. ENCRUSTED PARTICLES & ORGANIC-MINERAL AGGREGATES MUST HAVE DIFFERENT SEDIMENTOLOGICAL PROPERTIES THAN CLEAN OR FREE MINERAL PARTICLES. THUS, WHILE THE BULK ANALYSIS OF A SEDIMENT MAY REVEAL ONLY A FEW PERCENT ORGANIC MATTER, THAT MAY BE ONE OF ITS MOST IMPORTANT PROPERTIES.

JOHNSON, R.G. NO. 51
1977. VERTICAL VARIATION IN PARTICULATE MATTER IN THE UPPER TWENTY
CENTIMETERS OF MARINE SEDIMENTS
J MAR RES 35(2): 273-282.

A MICROSCOPIC EXAMINATION WAS MADE OF THE VERTICAL DISTRIBUTION & ABUNDANCE OF PARTICULATE MATTER IN SIX DISSIMILAR CORES OF MARINE SEDIMENT. TWO OF THE CORES WERE TAKEN IN THE INTERTIDAL & TWO IN THE SHALLOW SUBTIDAL AT STATIONS IN THE VICINITY OF WOODS HOLE, MASSACHUSETTS. ONE CORE WAS TAKEN IN THE HUDSON CANYON & ANOTHER AT ABYSSAL DEPTHS. BIOLOGICAL STAINS WERE USED TO IDENTIFY POTENTIAL FOOD PARTICLES AT THE SEDIMENT-WATER INTERFACE, AT TWO CM BELOW THE INTERFACE & AT FIVE CM INTERVALS TO A MAXIMUM DEPTH OF 20 CM. IN ALL THE CORES, THE UPPER TWO CM WERE SLIGHTLY HIGHER IN NUMBER OF POTENTIAL FOOD PARTICLES. BELOW 2 CM, TO A DEPTH OF AT LEAST 20 CM, THE SEDIMENT WAS RELATIVELY HOMOGENEOUS WITH REGARD TO PARTICLE SPECIES NUMBER, PARTICLE MORPHOLOGY, & ORGANIC CONTENT. THIS HOMOGENEITY IS INTERPRETED AS THE RESULT OF THE RECYCLING OF THE SEDIMENTS BY BENTHIC ANIMALS & RAPID RECOLONIZATION OF THE PARTICULATE MATTER BY MICROBES.

JUMARS, P.A. AND K. FAUCHALD
1977. NO. 14

BETWEEN-COMMUNITY CONTRASTS IN SUCCESSFUL POLYCHAETE FEEDING
STRATEGIES

COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 1-20

BENTHIC MARINE POLYCHAETES ARE HEREIN CLASSIFIED ON THE BASIS OF SEVERAL FEEDING STRATEGY PARAMETERS, NOTABLY DEGREE OF MOTILITY & FEEDING STRATUM (SUSPENSION, SURFACE DEPOSIT, SUBSURFACE DEPOSIT). ALONG A CENTRAL TRANSPECT FROM THE SOUTHERN CALIFORNIA COAST (2.4 M) TO THE CENTRAL NORTH PACIFIC (5600 M), THE RELATIVE ABUNDANCE OF sessile individuals increases ($P < 0.00001$) WITH DEPTH TO AT LEAST 400 M & THEN DECREASES AT GREATER BATHYAL & ABYSSAL DEPTHS. THE INCREASE IS POSTULATED TO BE A RESPONSE TO INCREASING SEDIMENT STABILITY, WHILE THE SUBSEQUENT DECREASE MAY BE ATTRIBUTABLE TO RELATION BETWEEN OPTIMAL FORAGING AREA & FOOD AVAILABILITY. VARIATION IN SEDIMENT MOBILITY & FOOD INPUT MIGHT SIMILARLY ACCOUNT FOR MANY OTHER BIOGEOGRAPHIC PATTERNS.

KAPLAN, E. H., ET AL
 1975. FACTORS AFFECTING THE COLONIZATION OF A DREDGED CHANNEL
 MAR BIOL 32: 193-204.

STANDING CROP, POPULATION SIZE, & SPECIES DIVERSITY OF THE MACRO-BENTHIC ORGANISMS IN AN ESTUARINE CHANNEL WERE STUDIED BEFORE & AFTER DREDGING. A NEW SUCTION-CORER WHICH SAMPLED AN AREA 0.1 M² TO A DEPTH OF 30 CM WAS USED IN ORDER TO INSURE THE INCLUSION OF LARGE, DEEP-DWELLING ANIMALS. ELEVEN MONTHS AFTER DREDGING, TO PRE-BIOMASS & NUMBERS OF SPECIES. SPECIMENS HAD NOT RECOVERED TO PRE-DREDGING LEVELS. COLONIZATION BEGAN WITH RELATIVELY LARGE, SWIFTLY MOVING FORMS SUCH AS THE ERRANT POLYCHAETE NEREIS SUCCINEA & THE CRAB NEOPANOPE TEXANA SAYI. STATIONS IN SILT & MUD REGIONS RECOVERED MORE SLOWLY THAN THOSE IN SANDIER SEDIMENTS. MOST OF THE DOMINANT & SUBDOMINANT SPECIES HAD NOT RECOVERED 11 MONTHS AFTER DREDGING, & THE PREVIOUSLY ABUNDANT POLYCHAETES NOTOMASTUS LATERICEUS & CLYMENELLA TORQUATA HAD VIRTUALLY DISAPPEARED. ONLY RELATIVELY UNCOMMON LAMELLIBRANCHS SUCH AS TELLINA AGILIS, LYONSIA HYALINA & MULINIA LATERALIS INCREASED AFTER DREDGING. DISTRIBUTION OF SEDIMENT TYPES CHANGED AS THE RESULT OF MODIFIED TIDAL VELOCITIES IN THE CHANNEL. MUD & SILT WERE REMOVED BY THE DREDGE, EXPOSING THE SAND UNDERNEATH, & SANDY STATIONS BECAME MUDDIER AS THE RESULT OF LOWERED CURRENT, VELOCITIES. MARKED CHANGES IN SPECIES COMPOSITION REFLECTED THIS CHANGE IN SEDIMENT CHARACTER. ELEVEN MONTHS AFTER DREDGING NO EVIDENCE OF SUCCESSION WAS FOUND, BUT COLONIZATION HAD BEGUN. VALUES OF ALL THREE PARAMETERS STUDIED WERE REDUCED TO SMALL FRACTIONS OF PRE-DREDGING LEVELS, ALTHOUGH SPECIES DIVERSITY IN SANDY SEDIMENTS EXCEEDED PRE-DREDGING LEVELS.

KRAVITZ, M. J. AND H. R. JONES
NO. 60

SYSTEMATICS AND ECOLOGY OF BENTHIC PHYLLODOCIDAE (ANNELIDA:
POLYCHAETA) OFF THE COLUMBIA RIVER, U.S.A.
BULL. SOUTH CALIF. ACAD. SCI. 78(1): 1-19.

THE BENTHIC PHYLLODOCID POLYCHAETE FAUNA OF THE CONTINENTAL SHELF
OFF THE COLUMBIA RIVER, NORTHERN OREGON, & SOUTHERN WASHINGTON, AT
DEPTHS OF 11 TO 97 M, IS REPORTED. THREE SPECIES OF ETEONE & ONE
SPECIES OF ANATIDES ARE NEWLY DESCRIBED. ETEONE (MYSTAC) BARBATA
IS NEWLY REPORTED IN THE NORTHEAST PACIFIC OCEAN. RANGES ARE
EXTENDED FOR ETEONE LONGA, ANATIDES HARTMANAE & ANATIDES
LONGIPES, THE LATTER TWO SPECIES NEW TO OREGON & WASHINGTON: E.
LONGA IS NEW TO OREGON. NEW RECORDS ARE GIVEN FOR ETEONE
CALIFORNICA & EULALIA LEVINCOURTA. THE LOCAL DISTRIBUTION,
INCLUDING DEPTHS & SEDIMENT TYPES(S), OF EACH SPECIES IS SUMMARIZED
THE DISTRIBUTIONS OF ALL SPECIES IN THE GENUS ANATIDES OVERLAPPED
WHILE THOSE OF SOME SPECIES IN ETEONE WERE RELATIVELY SEGREGATED.
THE OCCURRENCE OF E. LONGA FOLLOWING THE DUMPING OF DREDGED
SEDIMENTS FROM THE COLUMBIA RIVER MOUTH IS DISCUSSED.

LACAZE, J. AND O. DE NAIDE
1977. NO. 15
EFFECT OF ORGANIC EXCRETION BY BENTHIC ANNELIDA ON THE
PRODUCTIVITY OF PHYTOPLANKTON
INT. REVUE GES. HYDROBIOL 62(1): 153-155.

THE INCORPORATION OF AN ORGANIC CHELATING AGENT (E.D.T.A.) IN
WATER CONTAINING THE BENTHIC POLYCHAETE SABELLA PAVONIA FOR 16
HOURS CAUSES AN INCREASE OF 25% IN PRIMARY PRODUCTION.

LARSEN, P. F. NO. 47
1979. SHALLOW-WATER MACROBENTHOS OF A NORTHERN NEW ENGLAND ESTUARY
MAR BIOL 55: 69-78.

IN NOVEMBER 1973 THE BENTHIC MACROFAUNA OF TWO SHALLOW-WATER AREAS IN THE LOWER SHEEPSKOT RIVER ESTUARY (NEW ENGLAND, THE USA) WAS QUANTITATIVELY SAMPLED. NUMERICAL CLASSIFICATION OF THE DATA, IN BOTH THE NORMAL & INVERSE MODES, PRODUCED 4 SITE-GROUPS & 7 SPECIES-GROUPS. EACH SITE-GROUP WAS CHARACTERIZED BY AT LEAST ONE OF THE SPECIES-GROUPS. THE FAUNA OF THE SITE-GROUPS DIFFERED IN SEVERAL COMMUNITY PARAMETERS, PARTICULARLY THE PATTERNS OF DOMINANCE, BUT IT WAS NOT POSSIBLE TO CORRELATE THESE DIFFERENCES WITH ANY OF THE SEVERAL EXTRINSIC FACTORS MEASURED. A FACTOR, OR FACTORS, RELATED TO WATER-COLUMN STABILITY IS THE PROBABLE OVERRIDING ECOLOGICAL DETERMINANT OF THE OBSERVED COMMUNITY PATTERNS. COMPARISONS WITH AN EARLIER INVESTIGATION IN 1955 DEMONSTRATE DRAMATIC CHANGES IN DENSITY, DOMINANCE & SPECIES COMPOSITION.

LAYBOURN, J. NO. 9
 1979. EFFECTS OF TEMPERATURE ON THE RESPIRATION AND PRODUCTION
 OF THE FRESHWATER NEMATODE ANONCHUS SP.
 OECOLOGIA (BERL.). 41: 329-337.

GROWTH & RESPIRATION WERE MEASURED IN A SPECIES OF ANONCHUS
 (NEMATODA: PLECTIDAE) AT 5 C, 10 C, 15 C, 20 C & 25 C. AT 5 C NO
 GROWTH WAS MEASURABLE BUT THE ORGANISMS REMAINED ACTIVE. MAXIMUM
 PRODUCTION OCCURRED AT 15 C, BUT THE HIGHEST RATE OF GROWTH
 OCCURRED AT 20 C. THUS, ADULT SIZE ATTAINED IS DEPENDENT ON THE
 TEMPERATURE OF GROWTH. RESPIRATORY ENERGY LOSSES DERIVED FROM THE
 CARTESIAN DIVER MICRORESPIROMETRY, INCREASED WITH TEMPERATURE UP
 TO 25 C. REGRESSION COEFFICIENTS (B VALUES) DERIVED FROM A LOG LOG
 LOG LINEAR REGRESSION OF WEIGHT AGAINST OXYGEN CONSUMPTION VARIED
 BETWEEN 0.574-1.793, THE LOWEST VALUE BEING ATTAINED AT 5 C, THE
 HIGHEST AT 20 C. BASED ON Q10, PRODUCTION & RESPIRATORY ENERGY
 LOSSES THE OPTIMUM TEMPERATURES FOR ANONCHUS APPEARS TO LIE
 BETWEEN 10 C-15 C.

LIE, U. AND J.C. KELLEY
 1970. BENTHIC INFAUNA COMMUNITIES OFF THE COAST OF WASHINGTON AND IN
 PUGET SOUND: IDENTIFICATION AND DISTRIBUTION OF COMMUNITIES
 J FISH RES BOARD CAN 27: 621-651

BENTHIC INFAUNA WAS COLLECTED AT 37 STATIONS IN PUGET SOUND, IN
 JUAN DE FUCA STRAIT, & OFF THE NORTHWESTERN COAST OF WASHINGTON
 DURING THE SUMMER OF 1967, & AT 18 ADDITIONAL STATIONS OFF THE
 SOUTHWESTERN COAST OF WASH., & IN THE SUMMER OF 1968. THE
 CRUSTACEANS, LAMELLIBRANCHS, & ECHINODERMS WERE IDENTIFIED &
 COUNTED, & THE DATA WERE SUBJECTED TO AN ANALYSIS OF AFFINITY
 AMONG STATIONS. TO FAGER'S RECURRENT GROUP ANALYSIS, & TO FACTOR
 ANALYSIS FOR IDENTIFICATION OF THE BENTHIC COMMUNITIES, & THE DIA-
 GRAMS OF INDICES OF AFFINITY AMONG THE STATIONS, BASED ON THE
 PRESENCE OR ABSENCE OF SPECIES, INDICATED FOUR RATHERLY DISTINCT
 GROUPS OF STATIONS WITH SPECIFIC GEOGRAPHIC DISTRIBUTIONS OR
 RELATIONS TO CERTAIN SEDIMENT TYPES. FAGER'S RECURRENT GROUP
 ANALYSIS FOR THE 36 MOST FREQUENTLY OCCURRING SPECIES RESULTED IN
 EIGHT GROUPS & FIVE SPECIES THAT WERE STRONGLY ASSOCIATED WITH ONE
 OR MORE OF THE RECURRENT GROUPS. MOST TESTS OF INTERSPECIFIC
 RELATIONS AMONG THE SPECIES WITH ANALYSIS WAS ONLY SIGNIFICANT
 & IT WAS CONCLUDED THAT THE ANALYSIS WAS ONLY PARTLY USEFUL FOR
 DELIMITING SPECIES GROUPS WITH ECOLOGICAL SIGNIFICANCE. THE Q-MODE
 OF THE FACTOR ANALYSIS RESULTED IN THREE GROUPS OF STATIONS DISTRI-
 BUTED IN BANDS PARALLEL TO THE COAST, & EACH GROUP OF STATIONS OR
 (COMMUNITY) COULD BE RECOGNIZED BY ITS DISTINCT SEDIMENT TYPES OR
 DEPTH DISTRIBUTION. THE R-MODE OF THE FACTOR ANALYSIS GAVE SIX
 GROUPS OF SPECIES WITH SPECIFIC PREFERENCES OF DEPTHS, SEDIMENT
 TYPES, OR GEOGRAPHIC DISTRIBUTION. THE RESULTS OF THE VARIOUS TECH-
 NIQUES WERE COMPARED, & THEIR APPLICATION IN BENTHIC SYNECOLOGY
 WAS DISCUSSED.

LITTLE, C. AND W. NIX
1976. NO. 84
THE BURROWING AND FLOATING BEHAVIOUR OF THE GASTROPOD HYDROBIA
ULVAE
ESTUARINE COASTAL MAR SCI 4: 537-544.

THE BEHAVIOUR OF HYDROBIA ULVAE HAS BEEN INVESTIGATED AT SEVERAL
LOCALITIES ON THE BRITISH COAST. NO EVIDENCE OF RHYTHMIC BEHAVIOUR
PATTERNS, PREVIOUSLY POSTULATED FROM LABORATORY STUDIES, HAS BEEN
FOUND. FLOATING APPEARS TO BE AN ACCIDENTAL PHENOMENON, BROUGHT
ABOUT BY A VARIETY OF MECHANISMS. IT MAY AID SPECIES DISPERSAL.

LIVDAHL, T. P. NO. 36
1979. ENVIRONMENTAL UNCERTAINTY AND SELECTION FOR LIFE CYCLE DELAYS IN
OPPORTUNISTIC SPECIES
AM NAT 113(6):835-842

A MODEL IS PRESENTED WHICH CONSIDERS GENETIC VARIATION IN THE DURATION OF EGG DORMANCY IN POPULATIONS OCCUPYING LARVAL HABITATS THAT OCCASIONALLY BECOME ENTIRELY UNSUITABLE. THE PROBABILITY OF SUCH A CATASTROPHE & THE NET REPRODUCTIVE RATE IN THE ABSENCE OF CATASTROPHES (& IN DENSITY INDEPENDENT CONDITIONS) DETERMINE THE CONDITIONS REQUIRED FOR FIXATION OF EITHER THE EARLY-OR LATE-HATCHING ALLELE. THE MODEL SHOWS THAT A MORE CATASTROPHIC ENVIRONMENT WILL FAVOR THE LATE-HATCHING ALLELE, SE PRESENTING THE POSSIBILITY FOR A DECLINE IN RM WITH AN INCREASE IN ENVIRONMENTAL UNCERTAINTY. THE IMPLICATIONS OF THIS RESULT TO THE CONCEPT OF R-SELECTION ARE DISCUSSED, & EXAMPLES OF SYSTEMS WHERE THE MODEL COULD APPLY ARE PRESENTED.

LIVINGSTON, R. J. NO. 06
 DIURNAL AND SEASONAL FLUCTUATIONS OF ORGANISMS IN A NORTH
 FLORIDA ESTUARY
 ESTUARINE COASTAL MAR SCI 4: 373-400

MONTHLY SAMPLES OF DEMERSAL FISHES & INVERTEBRATES WERE TAKEN IN AN UNPOLLUTED, RIVER-DOMINATED ESTUARY IN NORTH FLORIDA (APALACHICOLA BAY) FOR A 2-YEAR PERIOD. TRAWLING METHODS WERE EXAMINED. SMALL (2-MIN) REPETITIVE SAMPLES YIELDED SUBSTANTIALLY HIGHER NUMBERS OF INDIVIDUALS & SPECIES THAN SINGLE (14-MIN) TRAWL-TOWS. VARIOUS METHODS OF ANALYSIS WERE USED TO DETERMINE ADEQUATE SAMPLE SIZE FOR COMPARATIVE ANALYSIS OF THE RESULTS. SEVERAL SPECIES RICHNESS & DIVERSITY INDICES WERE COMPARED. REGULAR DIURNAL (24-H) & SEASONAL VARIATIONS OF SUCH PARAMETERS WERE RELATED TO COMPLEX INTERACTIONS WHICH INCLUDED RIVER FLOW, SALINITY VARIATIONS & TEMPERATURE CHANGES. THE VARIOUS SPECIES DIVERSITY INDICES WERE HIGHLY CORRELATED IN SPITE OF THEORETICAL DISTINCTIONS. THERE WERE VARYING RELATIONSHIPS & THESE WITH THEIR RICHNESS & EQUIVABILITY COMPONENTS & THESE RELATIONSHIPS WERE NOT ALWAYS THE SAME FOR FISHES & INVERTEBRATES. THERE WERE BASIC DIFFERENCES IN SPECIES COMPOSITION & NUMBERS OF INDIVIDUALS OF INVERTEBRATES TAKEN THROUGHOUT A 24-H PERIOD. FOR FISHES, SUCH VARIATION OF COMMUNITY STRUCTURE & SEASONAL PEAKS OF SHORT-TERM ALTERATION OF NUMBERS & FALL PERIODS. ALTHOUGH THERE WERE USUALLY OCCURRED DURING SUMMER & FALL PERIODS. ALTHOUGH THERE WERE SOME VARIATIONS, A GENERAL PATTERN OF AN ANNUAL DOUBLED PEAK OF FISH & INVERTEBRATE RICHNESS & DIVERSITY WAS NOTED. NOCTURNAL PATTERNS WERE MORE CLEARLY DEFINED THAN DIURNAL ONES. RELATIVE DOMINANCE REMAINED HIGH, WITH A SEASONAL SUCCESSION OF DOMINANT FISH & INVERTEBRATE SPECIES. IT WAS POSTULATED THAT THERE WAS A CONSTANTLY CHANGING SERIES OF INTERACTIONS OF THE VARIOUS COMMUNITY COMPONENTS THAT PRECLUDED A SINGLE MECHANISM FOR THE OBSERVED PHENOMENA. APALACHICOLA BAY WAS SEEN AS AN UNPOLLUTED SYSTEM THAT UNDERWENT CONSIDERABLE SEASONAL FLUCTUATIONS OF RICHNESS & DIVERSITY IN RESPONSE TO EXTREME VARIATIONS OF NATURAL (PHYSICAL) FUNCTION. SUCH CHANGES WERE STABLE OVER TIME, & THIS FORM OF VARIATION WAS SEEN AS A CONSIDERABLE LIMITATION TO THE GENERAL USE OF SPECIES DIVERSITY AS AN INDICATOR OF POLLUTION &

LIVINGSTON, R. J. ET AL.
1976. NO. 62
LONG-TERM FLUCTUATIONS OF EPIBENTHIC FISH AND INVERTEBRATE
POPULATIONS IN APALACHICOLA BAY, FLORIDA
FISH BULL 74(2): 311-321.

A 3-YR STUDY WAS MADE CONCERNING SEASONAL CHANGES IN THE BIOTA OF APALACHICOLA BAY. THE APALACHICOLA RIVER CAUSES A TEMPORAL PROGRESSION OF CHANGES OF VARIOUS ENVIRONMENTAL PARAMETERS IN THE BAY SUCH AS SALINITY, TURBIDITY, NUTRIENTS, & DETRITUS LEVELS. FISHES WERE MORE WIDESPREAD IN THEIR DISTRIBUTION THROUGHOUT THE BAY THAN INVERTEBRATES. THIS WAS THOUGHT TO BE RELATED TO TROPHIC RESPONSE & HABITAT PREFERENCE. HIGH LEVELS OF RELATIVE DOMINANCE PREVAILED FOR BOTH GROUPS WITH THE TOP THREE SPECIES OF EACH GROUP ACCOUNTING FOR MORE THAN 80% OF THE TOTAL NUMBER OF INDIVIDUALS TAKEN. PEAK LEVELS OF MONTHLY ABUNDANCE OF VARIOUS DOMINANT FISH SPECIES TENDED NOT TO OVERLAP THROUGH A GIVEN 12-MO PERIOD. INVERTEBRATE SPECIES ABUNDANCE USUALLY REACHED & MAINTAINED DURING SUMMER & FALL PERIODS. THE SEASONAL APPEARANCE & DISTRIBUTION OF ORGANISMS IN THE APALACHICOLA BAY SYSTEM WAS COMPARABLE TO THAT FOUND IN OTHER ESTUARIES IN THE NORTHERN GULF OF MEXICO. THE TEMPORAL & SPATIAL DISTRIBUTION OF ESUTARINE FISHES & INVERTEBRATES WAS ASSOCIATED WITH SPECIES-SPECIFIC REPRODUCTIVE CYCLES, TROPHIC RELATIONSHIPS, & HABITAT PREFERENCES. THE APALACHICOLA ESTUARY WAS VIEWED AS A SEASONALLY STABLE SYSTEM, WITH REGULAR TEMPORAL FLUCTUATIONS OF THE BIOTA THROUGH EACH ANNUAL CYCLE.

LUBCHENCO, J. AND B.A. MENGE

1978, NO. 67

COMMUNITY DEVELOPMENT AND PERSISTENCE IN A LOW ROCKY INTERTIDAL ZONE

ECOL MONOGR 59: 67-94.

THIS PAPER ANALYZES THE FACTORS CONTROLLING THE DEVELOPMENT & PERSISTENCE OF PATTERNS OF DISTRIBUTION, ABUNDANCE, & DIVERSITY OF SPACE USERS IN THE LOW ROCKY INTERTIDAL ZONE OF NEW ENGLAND. THE SPATIAL STRUCTURE OF THIS COMMUNITY CHANGES ALONG A WAVE EXPOSURE GRADIENT. MUSSELS (MYTILUS EDULIS) DOMINATE AT HEADLANDS EXPOSED TO WAVE SHOCK, THE ALGA CHONDRUS CRISPUS (IRISH MOSS) DOMINATES AT SITES PROTECTED FROM WAVE SHOCK, & BOTH ARE ABUNDANT AT AREAS INTERMEDIATE IN EXPOSURE TO WAVES. USING A COMBINATION OF EXPERIMENTAL (ENCLOSURES, REMOVALS) & OBSERVATIONS, WE EVALUATED THE EFFECTS OF SEVERAL FACTORS ON THIS SYSTEM. INCLUDING (1) PREDATION, (2) HERBIVORY, (3) PLANT-PLANT COMPETITION, (4) PLANT-ANIMAL COMPETITION, & (5) PHYSICAL DISTURBANCE FROM HIGH-ENERGY WAVES. THE INTERACTION HAVING THE GREATEST EFFECT ON THE STRUCTURE OF THIS LOW ZONE ASSOCIATION WAS PREDATION. AT PROTECTED SITES, THE STARFISH PREY HEAVILY ON MYTILUS, WHICH IS THE SNAIL, THAIS LAPILLUS, & ASTERIAS FORBESI, ASTERIAS VULGARIS, & THE SECONDARY SUCCESSION IS INITIATED BY THE REMOVAL OF ALL ERECT ANIMALS & PLANTS. COMMUNITY DEVELOPMENT RESULTS IN COMPETITIVE ELIMINATION OF BOTH THE BARNACLE BALANUS BALANOIDES & CHONDRUS BY MYTILUS. A SIMILAR RESULT OCCURS IF PREDATORS ARE EXCLUDED FROM UNALTERED STANDS OF CHONDRUS. USUALLY EITHER DEVELOPED TO, OR REMAINED AS STANDS OF CHONDRUS. AT INTERMEDIATE SITES, PATCHES OF MYTILUS OCCASIONALLY ESCAPED FROM PREDATION, SUGGESTING PREDATION IS A BY-PRODUCT OF THE ACTIVITIES OF PREDATORS AT PROTECTED SITES. AT EXPOSED SITES, PREDATORS DO NOT CONTROL THE MUSSELS. AS A CONSEQUENCE, MYTILUS OUTCOMPETES CHONDRUS & BALANUS FOR SPACE & ABUNDANCE INCREASES WITH SEASONALITY OF EPHEMERAL ALGAE INCREASE DURING BOTH PRIMARY & SECONDARY SUCCESSION INDICATE THAT LITTORINA LITTOREA, THE ONLY LARGE.

MACKEY, A. P. NO. 3
 1977. GROWTH AND DEVELOPMENT OF LARVAL CHIRONOMIDAE
 OIKOS. 28: 270-275.

DEVELOPMENT RATES, LENGTH-AGE GROWTH RATES & LENGTH-WEIGHT CHIRO
 RELATIONSHIPS WERE MEASURED FOR TWELVE SPECIES OF LARVAL THESE DATA
 FROM THE RIVER THAMES, UK. AT 10, 15 & 20 C. FROMSHIP BETWEEN
 MIDT-AGE GROWTH RATES WERE CALCULATED. THE RELATIONSHIP BETWEEN
 WEIGHT-AGE GROWTH & ITS LENGTH (L) WAS DESCRIBED AS AN
 THE WEIGHT (W) OF A LARVA & ITS LENGTH (L) WAS FOUND TO DEPEND ON THE
 POWER FUNCTION: $W = ALB$. THE EXPONENT B WAS FOUND TO DEPEND ON THE
 THE SIZE OF THE LARVA AT MATURITY. GREATLY EFFECTED GROWTH &
 LARVA OF ABLES MYIA MONILIS L. CRICOTOPUS BICINCTUS (MEIG.)
 DEVELOPMENT TO AN INCREASE OF TEMPERATURE FROM 15 TO 20 C. BY AN
 INCREASE IN DEVELOPMENT RATE BUT NOT OF GROWTH RATE, WHILST THE
 OTHER SPECIES STUDIED RESPONDED BY AN INCREASE IN BOTH.

MACKEY, A. P. NO. 21
 1977. QUANTITATIVE STUDIES ON THE CHIRONOMIDAE (DIPTERA) OF THE RIVERS
 THAMES AND KENNET. IV. PRODUCTION
 ARCHEOL HYDROBIOL. 80(3): 327-348.

THE PRODUCTION OF LARVAL CHIRONOMIDS IN THE RIVERS THAMES & KENNET
 AT READING, ENGLAND, WAS CALCULATED AS 19.4 KCAL/M² RIVER SURFACE/
 YEAR & 7.6 KCAL/M² RIVER SURFACE/YEAR RESPECTIVELY. DUE TO ITS
 LARGE SURFACE AREA THE THAMES FLINT ZONE WAS FOUND TO CONTRIBUTE
 MOST TO THE TOTAL PRODUCTION IN THIS RIVER BUT INTENSITY OF
 PRODUCTION WAS GREATEST IN THE ACORUS & NUPHAR ZONES. THESE
 PRODUCTION ESTIMATES ARE DISCUSSED IN RELATION TO PREVIOUSLY
 PUBLISHED ENERGY FLOW DIAGRAMS OF THE THAMES.

MASSE, H.
1972. NO. 1
QUANTITATIVE INVESTIGATIONS OF SAND-BOTTOM MACROFAUNA ALONG THE
MEDITERRANEAN NORTH-WEST COAST
MAR BIOL 15: 209-220.

CONSIDERATION OF THE RANGE OF QUANTITATIVE DATA COLLECTED IN A 4
YEAR SURVEY OF MACROBENTHIC FAUNA IN SUBLITTORAL FINE SAND ON THE
NORTH-WEST MEDITERRANEAN COAST ALLOWS SOME FARREACHING COMMENTS.
AS A DIVER-OPERATED SUCTION SAMPLER WAS EMPLOYED, DENSITY &
BIOMASS VALUES OBTAINED MUST BE CONSIDERED AS THE MOST ACCURATE
ONES FOR SUCH HARD GROUND. THE WIDE RANGE OF VALUES OBSERVED
FROM BAY TO BAY & FROM YEAR TO YEAR SUGGESTS DIFFERENT CONTROLLING
FACTORS. AMONG ENVIRONMENTAL FACTORS, INFLUENCE OF EXPOSURE IS
CLEARLY SHOWN, & TROPHIC CONDITIONS OFFERED TO FILTER & SUSPENSION
FEEDERS BY THE WATER COLUMN IN CONTROLLING HIGH BIOMASS VALUES
IS EMPHASIZED. AMONG BIOLOGICAL FACTORS, HIGH GROWTH & GENERATION
REPLACEMENT RATES FOR MAIN SPECIES TOGETHER WITH A HIGH PREDA
TION-RATE EXPLAIN CHANGES & INSTABILITY IN FAUNA-ASSEMBLAGE
STRUCTURES OF MEDITERRANEAN FINE-SAND MACROFAUNA. COMPARISON OF
THESE BIOLOGICAL DATA WITH THOSE FROM NORTH-WEST EUROPEAN
SHALLOW-SAND ASSOCIATIONS REVEALS SOME IMPORTANT DIFFERENCES
WHICH SUGGEST SOME RESTRICTIONS TO THE PARALLEL LEVEL-BOTTOM
COMMUNITY CONCEPT.

MATHEWS, C.P. NO. 13
1970. ESTIMATES OF PRODUCTION WITH REFERENCE TO GENERAL SURVEYS
OIKOS. 21: 129-133.

1. THE RATIO OF PRODUCTION TO BIOMASS IS BY DEFINITION EQUAL TO THE INSTANTANEOUS GROWTH RATE IN THE USUAL ALGEBRAIC METHOD FOR PRODUCTION CALCULATION. 2. THE PRODUCTION: BIOMASS RATIO & INSTANTANEOUS GROWTH RATE WERE INDEPENDENTLY DETERMINED FOR FIVE FISH POPULATIONS, & WERE COMPARABLE. 3. PRODUCTION MAY BE DETERMINED ESTIMATED FROM BIOMASS & THE PRODUCTION: BIOMASS RATIO DETERMINED FROM GROWTH DATA ONLY. RESULTS USING THIS METHOD ARE QUITE COMPARABLE TO THOSE OBTAINED IN A MORE CONVENTIONAL WAY. 4. THIS METHOD MAY BE PREFERABLE WHERE THERE ARE IRREGULAR SIZE/FREQUENCY CURVES, WHERE A BRIEF SURVEY IS REQUIRED, OR WHERE MANY LOW DENSITY SPECIES ARE INVOLVED.

MCCALL, P.L. NO. 38
 1979. THE EFFECTS OF DEPOSIT FEEDING OLIGOCHAETES ON PARTICLE SIZE AND
 SETTLING VELOCITY OF LAKE ERIE SEDIMENTS
 J SEDIMENT PETROL 49(3): 0813-0818.

SEDIMENT COLLECTED FROM THE WESTERN BASIN OF LAKE ERIE HAS A
 MEDIAN PARTICLE SIZE OF 1.5 PM & A MEDIAN SETTLING VELOCITY OF
 0.0002 CM SEC-1 MEASURED BY STANDARD SETTLING TUBE ANALYSIS.
 MICROSCOPIC EXAMINATION OF THIS SEDIMENT SHOWS THAT MOST OF THE
 PARTICLES ARE BOUND INTO LARGER CYLINDRICAL AGGREGATES BY THE
 FEEDING ACTIVITIES OF TUBIFICID OLIGOCHAETES (AVERAGE PELLET SIZE
 = 280 PM LENGTH X 70 PM DIAMETER). STANDARD SETTLING TUBE ANALYSES
 DESTROY OLIGOCHAETE FECAL PELLETS & MAINTAIN PARTICLES IN AN
 UNNATURAL DISAGGREGATED STATE. LABORATORY EXPERIMENTS & FIELD
 OBSERVATIONS INDICATE THAT IS PELLETIZED. LESS DESTRUCTIVE SETTLING
 OF WESTERN BASIN SEDIMENTS OF SURFACE SEDIMENTS YIELD MEDIAN VALUES OF
 VELOCITY MEASUREMENTS OF TUBIFICID FECAL PELLETS, 0.06 CM SEC-1 FOR THE TOP
 -1 CM OF WESTERN BASIN SEDIMENT, & 0.03 CM SEC-1 FOR DEGRADED FECAL
 PELLETS. NO REALISTS OF SEDIMENT MEASUREMENT EROSION & TRANSPORT, OR OF
 LAKE ERIE SEDIMENTS, OF WATER SOLUTES CAN BE MADE WITHOUT UNDER-
 DIFFUSION RATES OF PORE SEDIMENT EROSION & TRANSPORT, OR OF
 STANDING THE BIOLOGICAL PROCESSES ACTIVE IN FINE GRAINED SEDIMENT.

MCINTYRE, A.D. NO. 18
1977. EFFECTS OF POLLUTION ON INSHORE BENTHOS
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 301-318

THE COASTAL REGION IS PARTICULARLY SUBJECT TO POLLUTANTS, BUT THEIR EFFECTS ON INSHORE BENTHOS ARE DIFFICULT TO ASSESS, BECAUSE OF THE COMPLEX NATURE OF THAT ENVIRONMENT & THE PROBLEM OF DISTINGUISHING BETWEEN NATURAL & POLLUTION-INDUCED EVENTS. THIS PROBLEM WAS APPROACHED BY A PROGRAM OF LONG-TERM EXPERIMENTS, INVOLVING BIOLOGICAL ASSAYS & FIELD OBSERVATIONS. SOME EXPERIMENTS INVOLVED A THREE-STAGE FOOD CHAIN OVER PERIODS OF SEVERAL MONTHS INDICATED THAT LOW LEVELS OF POLLUTANTS, SOMETIMES TWO ORDERS OF MAGNITUDE LESS THAN THE LC50 VALUE, CAN HAVE SIGNIFICANT ADVERSE EFFECTS AT ALL TROPHIC LEVELS STUDIED. OTHER EXPERIMENTS SHOWED THAT SEA WATER FROM AN INDUSTRIALIZED REGION COULD BE LESS FAVORABLE THAN CLEAN COASTAL WATER FOR GROWTH & DEVELOPMENT OF ORGANISMS. THESE CONCLUSIONS ARE DISCUSSED IN THE LIGHT OF FIELD OBSERVATIONS ON BENTHIC COMMUNITIES, & AN ATTEMPT IS MADE TO ESTIMATE THE LEVEL OF ORGANIC INPUT WHICH WILL PRODUCE CHANGES IN SUCH COMMUNITIES.

MCNULTY, J. K., R. C. WORK AND H. B. MOORE
1962. NO. 26
SOME RELATIONSHIPS BETW. THE INFAUNA OF THE LEVEL BOTTOM AND THE
SEDIMENT IN SOUTH FLORIDA
MAR SCI GULF CARIBBEAN BULL 12(3):322-332.

A STUDY OF THE LEVEL BOTTOM COMMUNITIES OF SOUTH FLORIDA IN
RELATION TO THE COARSENESS OF THE SEDIMENT HAS LED TO CERTAIN
GENERALIZATIONS. DETRITUS FEEDERS PREDOMINATE IN THE FINEST
SEDIMENTS, AND DEPOSIT AND FILTER AT INTERMEDIATE GRADES,
BUT THE LATTER ARE MOST ABUNDANT AT A CONSIDERABLY GREATER
PARTICLE SIZE THAN THAT FOUND BY SANDERS IN BUZZARDS BAY. FROM A
COMPARISON OF A NUMBER OF SELECTED COMMUNITIES, THERE IS A VERY
CLOSE CORRELATION BETWEEN THE BODY SIZE OF THE DEPOSIT FEEDERS AND
THE PARTICLE SIZE, REGARDLESS OF THE TYPE OF ANIMAL CONCERNED.

MILLS, E. L. NO. 74 THE STRUCTURE OF MARINE ECOSYSTEMS
 1975. BENTHIC ORGANISMS AND 32(9): 1654-1663
 J FISH RES BOARD CAN

THE CONTRIBUTION OF BENTHIC ECOLOGY TO BIOLOGICAL OCEANOGRAPHY
 HAS BEEN RELATIVELY SLIGHT, EVEN THOUGH THE BENTHOS MAY BE
 CRUCIAL IN UNDERSTANDING THE DYNAMICS OF MARINE ECOSYSTEMS, AS
 J. H. STEEL'S MODEL OF THE NORTH SEA INDICATES. BEFORE THE
 BENTHOS MAY BE ACCURATELY ASSIGNED A ROLE IN SUCH MODELS, WE
 NEED TO KNOW AT LEAST 1) WHAT FOOD ITEMS ARE CONSUMED &
 ASSIMILATED, 2) WHAT THE ROLE OF BACTERIA & MEIOBENTHOS MAY BE, &
 3) IF THERE ARE DIFFERENT LEVELS OF DEMERSAL FISH PRODUCTION TO BE
 FROM DIFFERENTLY STRUCTURED BENTHIC COMMUNITIES. THERE SEEM TO BE
 NO SHORTCUTS TO THE KIND OF INFORMATION ABOUT BENTHIC ANIMALS
 USEFUL IN PERMITTING ASSESSMENT OF FISHERIES PRODUCTION IN A
 REALISTIC BIOLOGICAL FRAMEWORK.

MILLS, E. L. NO. 24
 1979. STRUCTURE AND DYNAMICS OF SHELF AND SLOPE ECOSYSTEMS
 OFF THE NORTHEAST COAST OF NORTH AMERICA
 IN TENORE, K. & B. COULL (EDS). MAR. BEN. DYNAMICS, UNIV. S.C. PRESS: 25-47

TWO MARINE ECOSYSTEMS OFF THE COAST OF NOVA SCOTIA, CANADA ARE USED TO ILLUSTRATE THE DIFFERENCES THAT MAY RESULT FROM SPATIAL VARIATIONS IN PRIMARY PRODUCTION AND DEPTH. DEMERSAL FISH ARE THE MAIN PRODUCT OF A SHELF ECOSYSTEM CENTERED AT 90 M, WHILE PELAGIC FISH ARE PRODUCED IN A SYSTEM CENTERED AT ABOUT 320 M WHERE PRIMARY PRODUCTION IS INCREASED DUE TO STABILIZATION AND NUTRIENT ENRICHMENT AT AN OCEANIC FRONT. IN COMPARISON WITH THE NORTH SEA, PRIMARY PRODUCTION IS HIGHER IN THE NOVA SCOTIAN SYSTEMS BUT ZOOPLANKTON AND FISH PRODUCTION ARE CONSIDERABLY LOWER. A MAJOR DIFFICULTY IN DELINEATING PLAUSIBLE QUANTITATIVE FOOD WEBS OFF NOVA SCOTIA IS THE PROBLEM OF PROVIDING SUFFICIENT ENERGY TO THE PELAGIC COMPONENTS IF THE BENTHIC COMPONENTS HAVE REALISTIC VALUES. THIS IS THE RESULT OF A SERIES OF UNCERTAINTIES ABOUT THE AMOUNT OF PRIMARY PRODUCTION, THE IMPORTANCE OF MICROZOOPLANKTON AND GELATINOUS HERBIVORES, THE TURNOVER OF MACROZOOPLANKTON, THE FOOD REQUIREMENTS OF THE FISH, AND THE PROPER TRANSFER EFFICIENCIES. ON THE BENTHIC READING, THERE ARE PROBLEMS IN ESTIMATING THE AMOUNT AND KIND OF FOOD REACHING THE BOTTOM; IN ASSESSING THE IMPORTANCE OF BACTERIA AS FOOD, IN DETERMINING RELATIONSHIPS OF MACROFAUNA, MEIOFAUNA, NONBACTERIAL MICROFAUNA, AND BACTERIA; AND IN ASSIGNING TURNOVER RATES TO ALL COMPONENTS. COMPARING THE NOVA SCOTIAN FISH PRODUCTION SYSTEMS TO THOSE OFF THE EAST COAST OF THE UNITED STATES, THERE ARE INDICATIONS THAT LESS PRIMARY PRODUCTION IS AVAILABLE TO THE NON-FISH ELEMENTS OF THE NOVA SCOTIAN SYSTEMS THAN FARTHER SOUTH. IF SO, FOOD WEBS ARE LIKELY TO BE LESS COMPLEX OFF NOVA SCOTIA THAN IN THE MORE SOUTHERN ECOSYSTEMS, OR TRANSFER EFFICIENCIES MAY BE HIGHER.

MOORE, D. M.

NO. 86

SEASONAL CHANGES IN DISTRIBUTION OF INTERTIDAL MACROFAUNA IN THE
LOWER MERSEY ESTUARY, U.K.
ESTUARINE COASTAL MAR SCI 7: 117-125

THE DISTRIBUTION OF INTERTIDAL MACROFAUNA ON THE EAST SHORE OF THE
MERSEY ESTUARY CHANGES FROM SEASON TO SEASON. PRINCIPAL COMPONENTS
ANALYSIS IDENTIFIED A FAUNAL GRADIENT IN WINTER WHICH IS ORIENTED
PARTLY LONG-SHORE & PARTLY DOWN-SHORE. THIS PATTERN IS SIMPLIFIED
IN SPRING & SUMMER WHEN DISTRIBUTION IS GRADED EVERYWHERE
PERPENDICULAR TO THE SHORE BUT THIS BREAKS DOWN IN AUTUMN WITH THE
RETURN OF A LONG-SHORE GRADIENT. THE CONTINUAL RE-ADJUSTMENT OF
THE INTERTIDAL COMMUNITY IS RELATED TO THE SEASONAL CHANGES IN THE
PROPORTION OF VERY FINE SAND & MUD. THE PHYSICAL PROPERTIES OF THE
ESTUARY WHICH DETERMINE TURBIDITY & SEDIMENTATION ON THE EAST
SHORE ARE DISCUSSED WITH REGARD PARTICULARLY TO ORGANIC POLLUTION
ASSOCIATED WITH THE SEDIMENTS.

MOUNTFORD, N.K., A.F. HOLLAND AND J.A. MIHURSKY
1977. NO. 05
IDENTIFICATION AND DESCRIPTION OF MACROBENTHIC COMMUNITIES IN THE
CALVERT CLIFFS REGION OF THE CHESAPEAKE BAY
CHESAPEAKE SCI 18(4): 360-369

THE MACROBENTHOS (>1.0 MM) IN THE CALVERT CLIFFS REGION OF THE
CHESAPEAKE BAY WERE SAMPLED OVER A THREE YEAR PERIOD (1971-1974)
FOUR DISTINCT COMMUNITIES (SHELL, 3 M SAND, 6 M MUDDY-SAND, 9
M MUD) WERE IDENTIFIED & DESCRIBED USING SINGLE-LINKAGE CLUSTER
& DISCRIMINANT ANALYSES. SUBSTRATE CHARACTERISTICS WERE THE MAJOR
ENVIRONMENTAL FACTOR CONTROLLING THE SPATIAL DISTRIBUTION OF
MACROBENTHIC COMMUNITIES WITHIN THE STUDY AREA, & WITHIN A
HABITAT COMMUNITIES WERE RELATIVELY HOMOGENEOUS, THROUGHOUT THE
REGION. THE STRUCTURE OF THE 6 M MUDDY-SAND COMMUNITY VARIOUSLY
RESEMBLED THE 3-M SAND OR THE 9-M MUD COMMUNITY DEPENDING UPON
SEASON & YEAR.

MYERS, A.C. NO. 42
 1977. SEDIMENT PROCESSING IN A MARINE SUBTIDAL SANDY BOTTOM COMMUNITY:
 I. PHYSICAL ASPECTS
 J. MAR. RES. 35(3): 609-647.

SEDIMENT PROCESSING BY ANIMALS MAY INCLUDE BURROWING, INGESTION/DEFECATION, TUBE-BUILDING, & BIODEPOSITION. IN A BENTHIC COMMUNITY COMBINATIONS OF THESE PROCESSES WILL OCCUR, THEIR PROPORTIONS & RELATIVE IMPORTANCE DEPENDING ON THE COMPOSITION OF THE FAUNA & THE SEDIMENTARY ENVIRONMENT. ALTHOUGH THE VARIOUS KINDS OF SEDIMENT PROCESSING & THE EFFECTS OF EACH HAVE BEEN STUDIED, THERE HAVE BEEN NO STUDIES OF TOTAL SEDIMENT PROCESSING BY ALL THE VARIOUS MEMBERS OF A COMMUNITY: WHAT EACH CONTRIBUTES & HOW THE SEPARATE PROCESSES INTEGRATE. YET AN UNDERSTANDING OF BIOLOGICALLY-MEDIATED SEDIMENT-WATER INTERACTIONS MUST INCLUDE AN UNDERSTANDING OF DAILY, SEASONAL, OR GEOLOGICAL ASPECTS OF TOTAL SEDIMENT PROCESSING. FIELD STUDIES, INCLUDING WEEKLY QUANTITATIVE SAMPLES OF THE INFAUNA, SEDIMENTS, TEMPERATURE, & SALINITY, WERE MADE AT A SINGLE SITE IN THE WEST BASIN OF CHARLESTOWN POND, A RHODE ISLAND COASTAL LAGOON, BETWEEN JULY, 1969, & AUGUST, 1970. LABORATORY EXPERIMENTS DETERMINED THE MODE OF BURROWING, FORM OF BURROW, & SEDIMENT REMOVING CHARACTERISTICS OF THE HOLOTHURIAN LEPTOSYNAPTA TENUIIS & THE POLYCHAETE SCOLOPLOS ROBUSTUS. THE EFFECTS EACH OF THESE ANIMALS HAD ON THE COMPACTNESS OF THE SEDIMENT WERE MEASURED WITH A ROTATIONAL VISCOMETER. TUBE-BUILDING BURROWING, & BIODEPOSITION BY THE OTHER SPECIES AT THE STUDY SITE WERE ALSO EXAMINED. OBSERVATIONS RESULTED IN A SEDIMENT PROCESSING BUDGET. INGESTION/DEFECATION BY THE HOLOTHURIAN LEPTOSYNAPTA TENUIIS DOMINATED SEDIMENT PROCESSING AT THE STUDY SITE, FOLLOWED BY BURROWING & TUBE-BUILDING. BIODEPOSITION WAS QUANTITATIVELY INSIGNIFICANT. TUBE-BUILDING DOMINATED THE SEDIMENT SURFACE FOR A SHORT PERIOD DURING THE SUMMER WHEN THE TUBICOLOUS AMPHIPOD COROPHIUM INSIDIOSUM INVADED THE STUDY AREA. THIS WAS ACCOMPANIED BY A TEMPORARY INCREASE IN NEAR-SURFACE BURROWING ACTIVITY BY SMALL ANIMALS TAKING ADVANTAGE OF THE TUBE-ROUGHENED SEDIMENT SURFACE. REMOVING & DEEP-BURROWING BOTH EXTENDED OF THE SURFACE OXIDIZED SEDIMENT LAYER & CREATE OXIDIZED MICROENVIRONMENTS BELOW THE OXIDIZED ZONE IN THE IMMEDIATE VICINITY OF BURROWS.

NELSON, W.G.

NO. 43

AN ANALYSIS OF STRUCTURAL PATTERN IN AN EELGRASS (ZOSTERA

MARINA L.) AMPHIPOD COMMUNITY

J EXP MAR BIOL ECOL 39: 231-264.

THE AMPHIPODS OF EELGRASS (ZOSTERA MARINA L.) HABITATS NEAR BEAUFORT, N.C., WERE STUDIED WITH THE AIMS OF 1) DETERMINING THE SEASONAL & SPATIAL PATTERNS OF ABUNDANCE & DIVERSITY OF AMPHIPODS, 2) EVALUATING THE HYPOTHESIS THAT PREDATION IS GENERATION OBSERVED PATTERNS, & 3) EXAMINING THE HYPOTHESIS THAT COMPETITION AMONG AMPHIPODS IN EELGRASS SYSTEMS SHOULD BE RELATIVELY UNIMPORTANT. FOUR MEASURES OF AMPHIPOD COMMUNITY STRUCTURE EXAMINED - DENSITY, NUMBER OF SPECIES PER SAMPLE, DIVERSITY (H'), & EVENNESS (J) - SHOWED BASICALLY SIMILAR SEASONAL PATTERNS. THESE MEASURES ARE AT THEIR HIGHEST VALUES DURING THE LATE WINTER & DECREASE SHARPLY DURING THE SPRING MONTHS TO SUMMER LOWS. THERE ARE INCREASES IN ALL OF THEM IN THE FALL. SEASONAL PATTERNS ARE GENERALLY SIMILAR FROM YEAR TO YEAR & ARE SOMEWHAT SIMILAR WITHIN A SINGLE YEAR AT TWO STUDY SITES LOCATED IN DIFFERENT AREAS OF THE ESTUARINE LAGODON SYSTEM. PREDATOR INCLUSION EXPERIMENTS USING THE PINFISH LAGODON RHOMBOIDES (L.) WERE SUCCESSFUL IN GENERATING SIGNIFICANT REDUCTIONS IN AMPHIPOD ABUNDANCES FOLLOWING THE TWO-WEEK DURATION OF THE EXPERIMENT. ON THE OTHER HAND, FISH EXCLUSION EXPERIMENTS WERE MOSTLY UNSUCCESSFUL AT GENERATING SIGNIFICANT INCREASES IN AMPHIPOD DENSITY & SPECIES DIVERSITY AS COMPARED WITH UNCAGED CONTROLS, DUE TO AN INCREASED ACTIVITY OF DECAPOD PREDATORS. THREE WAYS: 1) THE MATRIX OF PRODUCT-MOMENT CORRELATION COEFFICIENTS WAS GENERATED FOR ALL COMMON SPECIES NEGATIVE FROM ALL AVAILABLE SAMPLE DATA & WAS EXAMINED FOR SIGNIFICANT NEGATIVE VALUES, 2) GUT CONTENTS OF FIVE COMMON SPECIES WERE EXAMINED FOR FOOD OVERLAP, & 3) LABORATORY COMPETITION EXPERIMENTS WERE CARRIED OUT WITH THREE OF THE MORE COMMON AMPHIPOD ASSEMBLAGE STUDIED; THERE IS NO COMPETITIVE DOMINANT WHICH MONOPOLIZES FOOD OR SPACE AT HIGH LEVEL DENSITIES. INCREASED PREDATION PRESSURE RESULTS IN A PATTERN OF MONOTONIC DECREASE IN ABUNDANCE & DIVERSITY. REMOVAL OF ONE LEVEL OF PREDATOR (FISH) IN THIS SYSTEM APPEARS TO RESULT IN INCREASES IN OTHER PREDATORY LEVELS (DECAPOD CRUSTACEANS), THUS CONTINUING

NESTLER, J.M. NO. 30
 1980. NICHE RELATIONSHIPS OF THE ANISOPTERA NYMPHS OF LAKE ISAQUEENA
 PHD DISSERTATION. CLEMSON UNIVERSITY. 150 PP.

THE PURPOSE OF THIS WORK IS TO INVESTIGATE SEVERAL COMMUNITIES
 & TO ELUCIDATE POSSIBLE STRUCTURING MECHANISMS WITH THE GOAL OF
 ABSTRACTING GENERAL PROPERTIES THAT CAN BE APPLIED TO BETTER
 UNDERSTAND NATURAL COMMUNITIES. I INFER ECOLOGICAL RELATIONSHIPS
 ON THE BASIS OF EXTERNAL MORPHOLOGY FOR 18 SPECIES OF ANISOPTERA
 (ODONATA) NYMPHS DISTRIBUTED ACROSS FIVE DIFFERENT COMMUNITIES.
 THE STUDY DISTILLS INTO TWO PORTIONS. THE FIRST INVOLVES
 SUBSTANTIATING POSTULATED CORRELATIONS BETWEEN MORPHOLOGY &
 FUNCTION THROUGH OBSERVATION, LITERATURE CITATION & EXPERIMENTA
 TION. I THEN FORMULATE INDICES FROM MORPHOLOGICAL FEATURES WHICH
 ESTIMATE NICHE & HABITAT PARAMETERS, CREATING SPECIES "PROFILES"
 WHICH DESCRIBE BOTH RELATIONSHIPS BETWEEN SPECIES & WITH THE
 ABIOTIC ENVIRONMENT. I REACH THE FOLLOWING CONCLUSIONS. FIRST,
 THE TROPHIC POSITION OF DRAGONFLY NYMPHS IN DIFFERENT COMMUNITIES
 IS EXTREMELY VARIABLE. SECOND, DRAGONFLY ASSEMBLAGES ARE
 STRUCTURED ON THE BASIS OF ENVIRONMENTAL FLUCTUATIONS & GUILD
 MEMBERSHIP. THIRD, COMMUNITY RELATIONSHIPS, AT LEAST IN THIS
 CASE, ARE NOT ELUCIDATED BY SPLITTING NICHE AXES BUT RATHER BY
 COLLAPSING & SIMPLIFYING THE NICHE & HABITAT AXES OF THE COMPO
 NENT SPECIES.

NICHOLS, F. H.

NO. 03

DYNAMICS AND ENERGETICS OF THREE DEPOSIT FEEDING BENTHIC
INVERTEBRATE POPULATIONS IN PUGET SOUND WASHINGTON
ECOL MONOGR 45: 57-82

1975.

THE DYNAMICS & ENERGETICS OF SUBPOPULATIONS OF A NUMERICALLY
DOMINANT DEPOSIT-FEEDING POLYCHAETE SPECIES, PECTINARIA
CALIFORNIENSIS HARTMAN, WERE STUDIED & COMPARED WITH CRUDE
DETERMINATIONS OF THE SAME FEEDING MODE, THE HEART URCHIN BRISASTER
SPECIES OF THE SAME FEEDING MODE, THE SEA CUCUMBER AMPHIPARUS
LATIFRONS (AGASSIZ) & THE SEA CUCUMBER AMPHIPARUS
(LUDWIG). MONTHLY SAMPLES, TAKEN FOR 1 YR AT FIVE STATIONS IN
PUGET SOUND REPRESENTING DIFFERENT HABITATS, WERE USED IN ASSES-
CONJUNCTION WITH LABORATORY MEASUREMENTS OF RESPIRATION TO ASSES-
THE EFFECTS OF SEASONAL & SPATIAL VARIATION IN GROWTH, MORTALITY, &
RESPIRATION. PECTINARIA LARVAL SETTLEMENT (2,900-24,000 ANIMALS/M²)
POPULATIONS OCCURRED AT ALL LOCATIONS IN JUNE 1970. TWO TO THREE AGE CLASSES
) OF COHORTS WERE PRESENT SIMULTANEOUSLY. PECTINARIA REPRESENTS AT THE
-26% OF MACROFAUNAL (> 1 MM) BIOMASS, & 9%-47% OF NUMBERS. AT
FIVE LOCATIONS, BASED ON THE MEAN OF FOUR SEASONAL ESTIMATES. AT
THE TWO STATIONS WHERE BRISASTER & MOLPADIA COEXISTED WITH
PECTINARIA THEY CONTRIBUTED, RESPECTIVELY, 79% & 4% OF MACROFAUNAL
BIOMASS AT ONE STATION & 13% & 63% AT THE OTHER. RECRUITMENT
& GROWTH OF THE TWO ECHINODERMS APPEARED NEGLIGIBLE, AS NEITHER
NUMBERS NOR MEAN SIZE CHANGED DURING THE STUDY PERIOD. ANNUAL
PRODUCTION OF PECTINARIA, NOT INCLUDING EXCRETION OR MUCUS
PRODUCTION, VARIED 1.4-4.8 G C/M².YR (14-49 KCAL/M².YR). THE
RATIO OF ANNUAL PRODUCTION TO MEAN ANNUAL BIOMASS, VARYING IN
THE STUDY AREA 3.3-5.5, PROVIDED A BETTER ESTIMATE OF TURNOVER
THAN THE MORE COMMONLY USED RATIO BASED ON THE LIFETIME OF A
COHORT BECAUSE OF THE DIFFICULTY OF DETERMINING LIFESPAN. A
PROBLEM WITH MOST LONG-LIVED ORGANISMS. PECTINARIA CONTRIBUTED
14%-42% OF MACROFAUNAL RESPIRATION IN THE AREA STUDIED. BUT
THESE NUMBERS WERE SHOWN TO BE AFFECTED BY THE FAILURE TO
REPRODUCE IN THE LABORATORY IN-SITU OXYGEN-TENSION CONDITIONS.
SUCH OVERESTIMATES OF POPULATION RESPIRATION FROM LABORATORY
MEASUREMENTS WERE MOST MARKED FOR BRISASTER & MOLPADIA. THESE
LATTER ESTIMATES, WHILE REFLECTING BIOMASS DATA, UNREALISTICALLY

OSMAN, R. W.

NO. 89

ESTABLISHMENT AND DEVELOPMENT OF A MARINE EPIFAUNAL COMMUNITY

ECOL MONOGR 47: 37-63

BECAUSE OF THE NATURE OF THEIR SUBSTRATUM, THE SESSILE INVERT
EBRATE SPECIES OF THE MARINE EPIFAUNAL COMMUNITY LIVING ON ROCKS
OCCUR IN DISCRETE PATTERNS OF DISTRIBUTION. THE ROCKS ARE FINITE
PATCHES OR HABITAT ISLANDS WITH A LIMITED SPACE FOR COLONIZATION &
GROWTH. SUCH A SYSTEM IS IDEAL FOR STUDYING THE PARAMETERS
AFFECTING THE DISTRIBUTION OF SPECIES WITHIN A COMMUNITY. ALSO,
BECAUSE OF THE SMALL SIZE & IMMOBILITY OF THE ADULTS, THE SYSTEM
IS ALSO IDEAL FOR STUDYING THE PATTERN OF CHANGE IN SPECIES
COMPOSITION & DIVERSITY WITHIN A COMMUNITY. THIS STUDY USED
MULTIPLE SERIES OF MANIPULATED EXPERIMENTAL PLATES, WHICH BOTH
DUPLICATED NATURAL ROCK SURFACES & COULD BE COMPARED WITH SAMPLES
OF THE ROCKS, TO INVESTIGATE THE DEVELOPMENTAL & DISTRIBUTIONAL
PROCESSES OF THIS COMMUNITY. FIVE MAJOR FACTORS WERE FOUND TO BE
IMPORTANT TO BOTH THE DEVELOPMENT OF THE COMMUNITY & ITS
DISTRIBUTION ON THE ROCKS: (1) THE SELECTIVITY OF THE METAMOR
PHOSING LARVAE AS TO SITE OF ATTACHMENT; (2) THE SEASONAL
FLUCTUATION IN LARVAL ABUNDANCES; (3) THE BIOLOGICAL INTERACTIONS
WITHIN & BETWEEN SPECIES; (4) THE SIZE OF ROCK SUBSTRATA; & (5)
THE PHYSICAL DISTURBANCE OF THE SUBSTRATA (ROCK TURNOVER).
INITIALLY, THE DEVELOPMENTAL PROCESS CAN BE UNCOUPLED FROM THE
EFFECTS OF SUBSTRATE SIZE & DISTURBANCE. PREDATION IS RELATIVELY
UNIMPORTANT AS A BIOLOGICAL INTERACTION WITHIN THIS COMMUNITY, BUT
THE SPECIES CAN BE RANKED ACCORDING TO THEIR ABILITY TO COMPETE
FOR THE AVAILABLE SPACE ON A SUBSTRATUM. THIS RANKING IMPLIES A
TYPE OF SUCCESSIONAL SEQUENCE IN THE DEVELOPMENT OF THE COMMUNITY:
HOWEVER, THE SEQUENCE IS GREATLY AFFECTED BY HISTORICAL COMPONENTS
THE COLONIZATION OF A SUBSTRATUM IS DIRECTLY DEPENDENT UPON THE
ABUNDANCE OF SETTLING LARVAE, WHICH IN TURN IS A FUNCTION OF
SEASONALITY & SELECTIVITY. THE EVENTUAL COMPETITIVE OUTCOME &
DEVELOPMENT OF THE COMMUNITY WILL DEPEND UPON WHICH SPECIES HAVE
IMMIGRATED ONTO THE SUBSTRATUM & IS THUS DEPENDENT UPON HISTORY.
THE PROCESS IS, THEREFORE, OPEN ENDED: COLONIZATION WILL BE
HIGHLY VARIABLE & CHANGE SEASONALLY & ALTHOUGH ONE SPECIES MAY
EVENTUALLY DOMINATE THE SUBSTRATUM, IT MAY BE ONE OF NINE

PETERSON, C.H. AND N.M. PETERSON
1979. NO. 31
THE ECOLOGY OF INTERTIDAL FLATS OF NORTH CAROLINA: A COMMUNITY
PROFILE
BIOLOGICAL SERVICES PROGRAM, NOVEMBER, U.S.F.W.S., DEPT. INTERIOR.

OUR TEXT IS ORGANIZED ON A TAXONOMIC & A FUNCTIONAL BASIS. AFTER AN INTRODUCTORY DESCRIPTION OF THE PHYSICAL ENVIRONMENT OF THE INTERTIDAL SOFT-SEDIMENT HABITAT (CHAPTER 1), WE DESCRIBE THE PLANTS, THE PRIMARY PRODUCERS OF MOST MARINE SYSTEMS (CHAPTER 2). IN SUCCEEDING CHAPTERS WE DISCUSS THE BENTHIC INFAUNA & THE MOBILE EPIBENTHIC INVERTEBRATES (CHAPTER 3), THE FISHES (CHAPTER 4), & THE BIRDS (CHAPTER 5). THIS PROGRESSION IS CLEARLY TAXONOMIC, BUT TO A GREAT EXTENT IT IS ALSO FUNCTIONAL, REFLECTING THE MAJOR PATHWAYS OF ENERGY FLOW THROUGH THE INTERTIDAL FLAT SYSTEM. THE BENTHIC INFAUNA ARE LARGELY HERBIVOROUS OR DETRITIVOROUS & FORM THE PREY OF THE MOBILE EPIBENTHIC INVERTEBRATES. BOTTOM-FEEDING FISHES & SHOREBIRDS FEED EXTENSIVELY ON THESE MOBILE INVERTEBRATES AS WELL AS ON THE BENTHIC INFAUNA. SOME OF THE FISHES FALL VICTIM TO WADING OR DIVING BIRDS. CONSEQUENTLY, OUR PROGRESSION OF CHAIN OF A COASTAL FLAT. IN OUR FINAL CHAPTER (6), WE ADDRESS SOME SPECIFIC APPLIED PROBLEMS THAT EMERGE IN MANAGING MAN'S ACTIVITIES IN THE VICINITY OF INTERTIDAL FLATS.

PFANNKUCHE, O. NO. 10
 1979. ABUNDANCE AND LIFE CYCLE OF LITTORAL MARINE AND BRACKISH-WATER
 TUBIFICIDAE AND NAIDIDAE (OLIGOCHAETA)
 CYCLIC PHENOMENA IN MAR. PLANTS, ANIMALS, PERGAMON PRESS, OXFORD, N.Y.

MARINE OLIGOCHAETA OCCUR FROM THE SUPRALITTORAL DOWN TO ABYSSAL
 DEPTHS. ESPECIALLY IN THE HIGHLY EUTROPHIC & PRODUCTIVE LITTORAL
 ZONE, OLIGOCHAETES CAN BE DOMINANT BOTH IN ABUNDANCE & BIOMASS. IN
 THIS PAPER, DATA ARE SUBMITTED ON THE ABUNDANCE, LIFE CYCLES FROM
 REPRODUCTIVE BEHAVIOUR OF THE MOST COMMON TUBIFICID SPECIES FROM
 EUROPEAN BOREAL SHORES, TUBIFEX COSTATUS, TUBIFEX PSEUDOGASTER &
 PELOSCOLEX BENEDENI & OF THE NAIDIDS PARANAI LITTORALIS & AMPHI
 CHAETA SANNIO. ABUNDANCE OF THE TUBIFICID POPULATIONS REMAINS
 RELATIVELY CONSTANT DURING THE YEAR. THEY REPRODUCE BY CONSIDERABLE
 YEARS OF LIFE NAIDID POPULATIONS ARE CHARACTERIZED BY ASEXUAL REPRODUC
 ANNUAL FLUCTUATIONS IN ABUNDANCE. COMPARED WITH A MINOR ROLE. P.
 TION (PARATOMIC), SEXUAL REPRODUCTION IN SUMMER. A. SANNIO DEVELOPS
 LITTORALIS ATTAINS HIGHEST ABUNDANCE IN EARLY SPRING & AUTUMN WHICH CAN BE
 MAXIMA OF ABUNDANCE IN SUPPLY.
 CORRELATED TO FOOD SUPPLY.

PORTER, R.G. NO. 53
REPRODUCTIVE CYCLE OF THE SOFT-SHELL CLAM, MYA ARENARIA, AT SKAGIT
BAY, WASHINGTON
FISH BULL 72(3): 648-656.

THE ANNUAL REPRODUCTIVE CYCLE OF THE SOFT-SHELL CLAM, MYA ARENARIA
L. WAS STUDIED AT SKAGIT BAY IN NORTHERN PUGET SOUND, WASH. 1971 &
SPAWNING OCCURRED FROM LATE MAY TO EARLY SEPTEMBER IN BOTH CLAMS
1972 WITH PEAK SPAWNING IN JULY & JUNE RESPECTIVELY. SMALL CLAMS
(LESS THAN 60 MM IN LENGTH) HAD A SPAWNING PEAK THAT COINCIDED
WITH OTHER SIZE CLASSES ALTHOUGH THE SPAWNING PERIOD WAS SHORTER
IN DURATION. THE SINGLE YEARLY SPAWNING PERIOD AT SKAGIT BAY
CORRESPONDS WITH EAST COAST POPULATIONS IN CANADA & MAINE.

RACHOR, E. NO. 8
 1976. STRUCTURE, DYNAMICS AND PRODUCTIVITY OF A POPULATION OF NUCULA
 NITIDOSA (BIVALVIA, PROTOBRANCHIATA) IN THE GERMAN BIGHT
 BER DT WISS KOMM MEERESFORSCH 24: 296-331.

A POPULATION OF THE BIVALVE NUCULA NITIDOSA OF A SUBLITTORAL MUDDY
 AREA IN THE GERMAN BIGHT WAS STUDIED FROM 1969 TO 1974. N.
 NITIDOSA LIVE BENEATH THE SEDIMENT SURFACE & IS DISPERSED PATCHILY
 SPAWNING OCCURS FROM LATE SUMMER TO SPRING; GROWTH IN LENGTH OF
 YOUNG ANIMALS IS MORE THAN 3.5 MM PER YEAR & LESS THAN 1 MM IN
 OLDER SPECIMENS. ABUNDANCE DECREASED DURING THE INVESTIGATION
 PERIOD FROM ABOUT 1000 IND. PER M² TO RELATIVELY STABLE FIGURES OF
 ABOUT 200 IND. PER M². ANNUAL TURNOVER RATE IN TERMS OF DRY MASS
 WAS ABOUT 1.4 AT A MEAN STANDING STOCK BIOMASS OF 1.3 G PER M²
 WITH THE SHARE OF GONAD OUTPUT BEING VERY HIGH (66% IN TERMS OF
 PRODUCED ENERGY). THE POPULATION STUDIED IS SUPPOSED TO LIVE UNDER
 SUB-OPTIMAL CONDITIONS.

ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/G 8/1
ANIMAL SUBSTRATE RELATIONSHIPS AND PRODUCTIVITY OF INVERTEBRATE--ETC(U)
DEC 81 J D LUNZ, H L HORSTMANN
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RACHOR, E. AND H. SALZWEDEL
1975. NO. 95
STUDIES ON POPULATION DYNAMICS AND PRODUCTIVITY OF SOME BIVALVES
IN THE GERMAN BIGHT
10TH EUROPEAN SYMP. MARINE BIOL OSTEND, BELGIUM, 2: 575-588

IN THE COURSE OF LONG-TERM INVESTIGATIONS ON VARIATIONS & PRODUCTIVITY OF SUBLITTORAL BENTHIC MACROFAUNA IN THE GERMAN BIGHT SEVERAL BIVALVE SPECIES HAVE BEEN INVESTIGATED SINCE 1969. REPORT IS GIVEN ABOUT ANNUAL VARIATIONS & ABOUT THE LONG-TERM DEVELOPMENT IN NUMERICAL ABUNDANCE. THE SPECIES NUCULA NITIDOSA, TELLINA FABULA & CULTELLUS PELLUCIDUS HAVE BEEN STUDIED MORE INTENSIVELY. C. PELLUCIDUS & T. FABULA WERE FOUND TO BREED IN SUMMER WITH THE BREEDING SEASON OF THE LATTER SPECIES BEING MORE PROLONGED. THE REPRODUCTION OF N. NITIDOSA STARTS IN LATE SUMMER LASTING TILL SPRING. LARGE ANIMALS OF C. PELLUCIDUS (30 MM LENGTH) & T. FABULA (20 MM) ARE SUPPOSED TO BE 2-3 YRS OLD, WHEREAS NUCULA SPECIMENS OF 9 MM LENGTH ARE ABOUT 5 YEARS OLD. DATA ON GROWTH ARE PRESENTED THE PRODUCTIVITY OF N. NITIDOSA WAS CALCULATED WITH THE ANNUAL P:B RATIO (TURNOVER-RATE) BEING ABOUT 1.5 AT A STANDING STOCK BIOMASS OF 1.3 G DRY TISSUE WT/M².

READING, C.J. AND S. MCGRORTY
NO. 10
1978. SEASONAL VARIATIONS IN THE BURYING DEPTH OF MACOMA BALTHICA AND
ITS ACCESSIBILITY TO WADING BIRDS
ESTUARINE COASTAL MAR SCI 6: 135-144

THE SEASONAL RELATIONSHIP BETWEEN SHELL LENGTH & DEPTH BURIED IN
MACOMA BALTHICA (L.) WAS STUDIED ON AN AREA OF INTERTIDAL FLAT IN
THE WASH. ALTHOUGH FEW OF THE LARGER ANIMALS BURIED DEEPER THAN THE
SMALLER ONES VERY FEW (0.28%) OCCURRED BELOW A DEPTH OF 7.5 CM.
THE STUDY SHOWED THAT M. BALTHICA MIGRATED WITHIN THE SUBSTRATUM
APPARENTLY IN RESPONSE TO DAY LENGTH, SO THAT THEY WERE NEAREST
THE SURFACE IN JUNE & BURIED DEEPEST IN DECEMBER. TO BE
DEPTH BURIED, IN DECEMBER, BY AN ANIMAL WAS FOUND. DURING DECEMBER
PROPORTIONAL TO THE LENGTH OF ITS INHALENT SIPHON. (CALIDRIS CANUTUS (L.))
THE ACCESSIBILITY OF M. BALTHICA TO KNOT WAS REDUCED TO 4% OF THE TOTAL BIOMASS.

REES, C. P. ND. 83
1975. LIFE CYCLE OF THE AMPHIPOD GAMMARUS PALUSTRIS BOUSFIELD
ESTUARINE COASTAL MAR SCI 3: 413-419.

TO ELUCIDATE THE LIFE CYCLE OF THE AMPHIPOD GAMMARUS PALUSTRIS BOUSFIELD, A SECTION OF THE INTERTIDAL ZONE OF A SALT MARSH ALONG THE LOWER PATUXENT RIVER, MARYLAND, WAS SAMPLED FROM JANUARY 1972 TO DECEMBER 1973. MONTHLY COLLECTIONS REVEALED A GRADUAL (IF FLUCTUATING) INCREASE IN ABUNDANCE FROM MARCH TO OCTOBER, AFTER THE WHICH NUMBERS DECLINED REACHING A LOW IN THE MIDWINTER MONTHS. THE BREEDING SEASON EXTENDED FROM FEBRUARY & AUGUST-SEPTEMBER. WHEREAS PEAKS OF ACTIVITY OCCURRED IN MARCH & AUGUST-SEPTEMBER. WHEREAS THE SPRING PEAK WAS PRODUCED BY THE OVER-WINTER GENERATION, THE LATE SUMMER PEAK WAS A PRODUCT OF THE SUMMER GENERATION. THE OVER-WINTER GENERATION FIRST REVEALED EGG PRODUCTION IN FEBRUARY & THE FIRST YOUNG APPEARED IN MARCH. THESE YOUNG MATURED DURING LATE MAY TO LATE JUNE. THE OVER-WINTERING GENERATION BEGAN TO DIE-OUT IN APRIL, DISAPPEARING COMPLETELY BY EARLY JULY, WHILE THE SUMMER GENERATION CONTINUED REPRODUCING THROUGH JULY, AUGUST & SEPTEMBER. FINALLY, IT IS SURMISED THAT THE INITIAL BROOD(S) OF THE EARLIEST SUMMER GENERATION FEMALES HAVE SUFFICIENT TIME TO MATURE & REPRODUCE BEFORE THE END OF THE SUMMER.

REINECK, H.E., AND I.B. SINGH
1973. NO. 39
DEPOSITIONAL SEDIMENTARY ENVIRONMENTS, WITH REFERENCE TO
TERRIGENOUS CLASTICS.
SPRINGER-VERLAG, NEW YORK, HEIDELBERG, BERLIN: 114-133

THIS PUBLICATION DEFINES SEDIMENT GRAIN PARAMETERS AND DISCUSSES
THE NONBIOLOGICAL CONDITIONS OF THE DEPOSITION OF ENVIRONMENT
AFFECTING THOSE PARAMETERS.

REISE, K. NO. 07
 1979. SPACIAL CONFIGURATIONS GENERATED BY MOTILE BENTHIC POLYCHAETES
 HELGOLANDER WISS MEERESUNTERS. 32: 55-72.

MICRO-SPATIAL PATTERNS OF FIVE INFAUNAL POLYCHAETE SPECIES WERE
 INVESTIGATED ON TIDAL FLATS IN THE WADDEN SEA (ISLAND OF SYLT, AT
 NORTH SEA). SEDIMENT SAMPLES WERE TAKEN WITHIN PLOTS OF 4 M² AT
 REGULAR DISTANCES OR WITH A MULTIPLE-CELL CORER COMPOSED OF 144
 CONTIGUOUS UNITS. MOST OF THE CONFIGURATIONS OBSERVED CAN BE
 RELATED TO THE MODE OF FEEDING. INDIVIDUALS OF THE PREDATORY
 POLYCHAETE ETEONE LONGA DO NOT GENERATE DISCERNIBLE SPATIAL
 STRUCTURES. ANATIDES MUCOSA, A CARNIVOROUS SCAVANGER, OCCURS IN
 MARKED PATCHES. JUVENILES OF SCOLOPLOS ARMIGER, A BURNING
 DEPOSIT FEEDER, LIVE IN SMALL AGGREGATES WHICH IN TURN IN LARGER
 CONGLOMERATE TO LARGER ONES. ADULTS ARE SCATTERED WITHIN LARGER
 CLUSTERS. HIGH DENSITY AREAS OF JUVENILES & ADULTS DO OVERLAP.
 ANOTHER BURROWING DEPOSIT FEEDER, CAUSE CAPITELLA CAPITATA, IS EVEN MORE
 AGGREGATED. LOCAL ATTRACTIVITY IS EXHIBITED BY THE TUBE-DWELLING
 INTENSITY. TERRITORY IS EXHIBITED BY THE TUBE-DWELLING ARE
 SURFACE DEPOSIT FEEDING HERE IS DIVERSICOLOR. THE JUVENILES ARE
 RESTRICTED TO INTERSPACES LEFT BY THE ADULTS.

REISE, K. AND P. AX
1979. NO. 64
A MEIOFAUNAL "THIOBIOS" LIMITED TO THE ANAEROBIC SULFIDE SYSTEM OF
MARINE SAND DOES NOT EXIST
MAR BIOL: 225-237.

THE SPATIAL RELATIONSHIP OF INTERSTITIAL METAZOANS TO SOURCES OF
OXYGEN HAS BEEN STUDIED ON A TIDAL FLAT IN THE WADDEN SEA NEAR
SYLT (EASTERN PART OF THE NORTH SEA). CONSISTENTLY, MEIOFAUNA
REMAINS IN CLOSE PROXIMITY TO OXYGENATED LAYERS OR POCKET AREAS
WITHIN THE SEDIMENT. THIS IS EXEMPLIFIED BY THE PATTERN OF
MEIOFAUNAL ABUNDANCE & SPECIES COMPOSITION ALONGSIDE OXIC BURROWS
OF THE LUGWORM ARENICOLA MARINA L. A SPECIFIC MEIOFAUNA CONFINED
TO OXYGEN-DEFICIENT HORIZONS OF THE SEDIMENT DOES NOT EXIST.

RHODES, D. C. NO. 30
1974. ORGANISM-SEDIMENT RELATIONS ON THE MUDDY SEA FLOOR
OCEANOGRAPH MAR BIOL ANN REV 12:263-300

THIS REVIEW PAPER IDENTIFIES AND DESCRIBES BIOLOGICAL ACTIVITIES OF MACROFAUNA WHICH INFLUENCE THE PHYS.-CHEM. PROPERTIES OF THE MUDDY SEA FLOOR AND THE ECOLOGICAL FEEDBACK OF THESE BIOGENIC CHANGES. ORGANISMS POPULATING A MUD BOTTOM AND FEEDING ON SUSPENDED OR DEPOSITED PARTICULATE MATTER WILL MODIFY 1) THE GRAIN-SIZE DISTRIBUTION, GRAIN SHAPES AND SPATIAL SEGREGATION OF GRAIN SIZES 2) SEDIMENT MASS PROPERTIES INCLUDING SEDIMENT POROSITY, WATER CONTENT, COHESION AND COMPACTION 3) THE PHYSICAL STABILITY OF MUD RELATED TO MASS PROPERTIES OF THE BOTTOM AND 4) THE CHEMICAL PROPERTIES OF THE SEDIMENT SURFACE TO 30 CM IN DEPTH, DEPENDING ON THE SPECIES PRESENT. THE PHYSICAL AND CHEMICAL CHANGES IN THE PROPERTIES OF THE SEAFLOOR EFFECTED BY THE BENTHOS CONTROL VARIOUS ASPECTS OF BENTHIC ECOLOGY INCLUDING 1) DIVERSITY OF TAXA AND BENTHIC FEEDING TYPES 2) NUTRIENT CYCLING AND 3) PRIMARY PRODUCTION.

RHOADS, D., R. ALLER AND M. GOLDHABER
 1977. NO. 22
 THE INFLUENCE OF COLONIZING BENTHOS ON PHYSICAL PROPERTIES AND
 CHEMICAL DIAGNOSIS OF THE ESTUARINE SEAFLOOR
 COULL, B. C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 113-138

DIVER-TAKEN BOX CORES FROM A DREDGE-SPOIL DUMP & CONTROL STATION WERE USED TO DOCUMENT CHANGES IN: BENTHOS, SEAFLOOR STABILITY, SEDIMENTARY STRUCTURES, REDOX DEPTH, WATER CONTENT, & PORE WATER PROFILES. THE COLONIZATION OF THE DUMP SURFACE MAY BE DIVIDED INTO THREE STAGES: STAGE I (JUNE-JULY) REPRESENTED INITIAL RECRUITMENT OF SHALLOW BURROWING SURFACE DEPOSIT FEEDERS, SUSPENSION FEEDERS, & MEIOFAUNA. STAGE II (AUGUST-NOVEMBER) WAS A PHASE OF EXPONENTIAL RECRUITMENT OF STAGE I POPULATIONS & NEW RECRUITMENT OF DEEPER-FEEDING INFAUNA. STAGE III (DECEMBER-APRIL) WAS A PERIOD OF LEVELING OFF IN POPULATION DENSITIES. THE CONTROL STATION SHOWED RELATIVELY CONSTANT STANDING CROPS OF DEEP-FEEDING DEPOSIT FEEDERS OVER THE SAMPLING PERIOD. LATE STAGE II & STAGE III ABUNDANCES & DIVERSITIES ON THE DUMP EXCEEDED THOSE AT THE CONTROL STATION. HABIT MODIFICATION RELATED TO THE THREE COLONIZATION STAGES ARE: STAGE I (SUMMER)--FECAL PELLET PRODUCTION STARTS & THE REDOX POTENTIAL DISCONTINUITY (RPD) IS DERESSED TO ABOUT ONE CM BY BIOTURBATION & RESPIRATION ACTIVITIES. STAGE II (FALL)--THE SURFICIAL LAYER OF PELLETS EXPERIENCES SOME DESTRUCTION BY MEIOFAUNAL GRAZING (). THE RPD IS DERESSED TO 2-3 CM & PORE WATER PROFILES IN SO=4 NH+4 APPROACH CONSTANT VALUES TO A DEPTH OF 3-6 CM. THE SEAFLOOR IS BOUND BY MICROBIAL EXUDATES (). STAGE III (WINTER)--THE PELLETS SURFACE DECAYS, THE RPD REBOUNDS TO A DEPTH OF 1-2 CM. PORE WATER PROFILES BECOME PREDOMINATELY DIFFUSION CONTROLLED. MICROBIAL BINDING DECREASES. SEVERAL HYPOTHESES ARE STATED REGARDING THE POTENTIAL IMPORTANCE OF THESE HABITAT MODIFICATIONS TO THE COLONIZATION SEQUENCE.

RHOADS, D.C., P.L. MCCALL AND J.Y. YINGST
1978. NO. 37
DISTURBANCE AND PRODUCTION ON THE ESTUARINE SEAFLOOR
AM SCI 66:577-586
BENTHIC INVERTEBRATE SECONDARY PRODUCTIVITY OF ESTUARINE BOTTOMS
MAY BE MANIPULATED & OPTIMIZED USING DREDGED MATERIAL DISPOSAL
AS A CONTROLLED SOURCE OF DISTURBANCE.

RICHARDS, S.W. AND G.A. RILEY
 1967. NO. 11
 THE BENTHIC EPIFAUNA OF LONG ISLAND SOUND
 BULL BINGHAM OCEANOGR COLLECT 19:90-135.

A MODIFIED OYSTER DREDGE WAS USED TO OBTAIN 48 COLLECTIONS FROM STATION 1 (SAND-SHELL SUBSTRATE, 9M) & STATION 3A (MUD, 16-17M) IN LONG ISLAND SOUND DURING THE PERIOD BETWEEN JUNE 1960 & JUNE 1961. THE STANDING CROP OF BENTHIC INVERTEBRATES WAS DETERMINED & THEIR PRODUCTIVITY WAS ESTIMATED; THE MATERIAL WAS EXAMINED WITH PARTICULAR EMPHASIS ON THE SPECIES THAT WERE NOT ONLY IMPORTANT AS FISH FOOD, BUT ALSO HAD NOT BEEN COLLECTED ADEQUATELY BY GEAR OF THE TYPE USED IN PREVIOUS SURVEYS. THE GREATER DIVERSITY OF SPECIES ENVIRONMENT AT ST. 1 RESULTED IN A GREATER DIVERSITY OF SPECIES THERE, PARTICULARLY EPIFAUNA, THAN AT ST. 3A. OF THE TOTAL OF 144 SPECIES, 127 OCCURRED AT ST. 1, 76 AT ST. 3A, & 59 WERE COLLECTED AT BOTH LOCALITIES. MEAN NUMERICAL STANDING CROP WAS 77.00/M², 76.67/M² AT ST. 1, 77.96/M² AT ST. 3A. MEAN BIOMASS WAS 1.098 G/M² 1.345 G/M² AT ST. 1 & 0.376 G/M² AT ST. 3A. THE EPIFAUNA STANDING CROP FROM ST. 1 WAS 10 TIMES BY NUMBER & 7 TIMES BY WEIGHT THAT FROM ST. 3A, WHILE THE NUMERICAL ABUNDANCE OF INFAUNA FROM ST. 1 WAS ONE HALF, & ITS BIOMASS WAS 1/14TH THAT FROM ST. 3A. AT ST. 1 THE DOMINANT SPECIES WERE CRANGON SEPTEMPINOSA, ASTERIAS FORBESI, HYDROIDS, PAGURUS LONGICARPUS, NEOMYSIS AMERICANA, AMPELISCA VADORUM, & AMPHARETE ACUTIFRONS. OTHERS OF IMPORTANCE WERE NASSARIUS TRIVITTATUS, CANCER IRRORATUS, NEOPANOE TEXANA SAYI, COROPHIUM SP., & THE CAPRELLIDS. THE NEPTHSINCSA-YOLDIALIMATULA-NUCULA PROXIMA COMMUNITY AT ST. 3A INCLUDED ASTERIAS FORBESI, NEOMYSIS AMERICANA, CRANGON SEPTEMPINOSA, RETUSA CANALICULATA, NASSARIUS TRIVITTATUS, CISTENIDES GOULDII, & GEMMA GEMMA, LISTED IN ORDER OF THEIR IMPORTANCE IN ANALYSES OF THE BIOLOGICAL ASSOCIATIONS. STANDING CROPS FROM PREVIOUS SURVEYS MADE WITH AN ANCHOR DREDGE WERE SEVERAL ORDERS OF MAGNITUDE GREATER THAN THOSE WITH THE OYSTER DREDGE. THE DISCREPANCIES RESULTED CHIEFLY FROM THE OPERATIONS OF THE TWO TYPES OF GEAR. THE ANCHOR DREDGE DUG DEEP & ALSO TOOK A LARGE PERCENTAGE OF ORGANISMS OF SMALL SIZE, WHILE THE OYSTER DREDGE MADE A SHALLOW CUT, & ALSO CAUGHT A GREATER PERCENTAGE OF ORGANISMS OF LARGE SIZE. IN ADDITION, THE CATCHING EFFICIENCY OF AN OYSTER DREDGE IS LOW. CORRECTION FOR A MEAN

RICKER, W. E. NO. 40
1978. ON COMPUTING PRODUCTION
LIMNOL OCEANOGR 23: 379-380

THIS BRIEF COMMENT PRESENTS A POSSIBLE SOLUTION TO THE PROBLEM
OF ESTIMATING THE CONTRIBUTIONS TO SECONDARY PRODUCTION MADE BY
ANIMALS WHICH HAVE DIED DURING THE TIME INTERIM BETWEEN
POPULATION OBSERVATIONS.

ROBERTSON, A. NO. 16
1979. THE RELATIONSHIP BETWEEN ANNUAL PRODUCTION: BIOMASS RATIOS
AND LIFESPANS FOR MARINE MACROBENTHOS
OECOLOGIA: 193-202.

SUMMARY. RECENT LITERATURE ON STUDIES OF PRODUCTION IN MARINE
MACROBENTHOS IS REVIEWED, & A SIGNIFICANT CORRELATION BETWEEN
ANNUAL P/B RATIOS & LIFESPAN IS SHOWN FOR SPECIES FROM A VARIETY
OF PHyla & HABITATS. A REGRESSION EQUATION WAS FITTED TO THE POOL
DATA. THIS EQUATION MAY BE USED, IN CONJUNCTION WITH DATA ON MEAN
ANNUAL BIOMASS, TO GIVE PRODUCTION ESTIMATES FOR POPULATIONS OF
MARINE MACROBENTHIC SPECIES, IF SAMPLING IS NOT SIZE OR AGE
SELECTIVE, & THE LIFESPANS OF THE POPULATIONS CAN BE DETERMINED

ROSENBERG, R. NO. 2
 1977. BENTHIC MACROFAUNAL DYNAMICS, PRODUCTION, AND DISPERSION IN AN
 OXYGEN-DEFICIENT ESTUARY OF WEST SWEDEN
 J EXP MAR BIOL ECOL 26: 107-133.

THE SALINITY ABOVE THE HALOCLINE (13-15 MM) IN THE BYFJORD ESTUARY
 IS 23-30‰. BELOW THE HALOCLINE THE OXYGEN CONCENTRATION
 DIMINISHES ABRUPTLY & BELOW 15-20 M THE WATER IS ANOXIC. THE
 BENTHIC MACROFAUNAL COMMUNITIES WERE STUDIED DURING 1971-1973
 FROM 5M DOWN TO THE ANOXIC & ANAEROBIC BOTTOMS. NUMBER OF SPECIES,
 ABUNDANCE, & BIOMASS WERE ESTIMATED IN DIFFERENT STRATA IN THE
 SEDIMENTS (0-5, 5-10 CM) & THE SEASONAL VARIATION WAS STUDIED.
 THE BENTHIC FAUNAL STRUCTURE AT DIFFERENT LOCALITIES HAS BEEN
 COMPARED BY MEANS OF A PERCENTAGE SIMILARITY INDEX & A NUMBER OF
 DIVERSITY INDICES. DISPERSION WAS ASSESSED BY THE VARIANCE/MEAN
 RATIO FOR DIFFERENT BLOCK SIZES & THE PRODUCTION OVER ONE YEAR
 WAS ESTIMATED.

ROME, G.T., P.T. POLLONI AND S.G. HORNER
 1974. BENTHIC BIOMASS ESTIMATES FROM THE NORTHWESTERN ATLANTIC OCEAN
 AND THE NORTHERN GULF OF MEXICO
 DEEP-SEA RES 21: 641-650.

ESTIMATES HAVE BEEN MADE OF THE BIOMASS & ABUNDANCE OF MACROBENTHIC INVERTEBRATES OFF THE GULF OF MEXICO & ATLANTIC COASTS OF THE UNITED STATES. BASED ON THESE ESTIMATES, IT IS CONCLUDED THAT DEEP-SEA LIFE IS MORE ABUNDANT IN THE ATLANTIC THAN IN THE GULF. REGRESSIONS OF THE LOGARITHM (BASE 10) OF BIOMASS & ANIMAL DENSITY AGAINST DEPTH INDICATE THAT THE ABUNDANCE OF LIFE FOLLOWED AN EXPONENTIAL DECLINE WITH DEPTH, $Y = AE-BX$, WHERE Y IS EITHER DENSITY OF INDIVIDUALS OR BIOMASS, X IS DEPTH & A IS PROPORTIONAL TO AVERAGE SURFACE-WATER PHYTOPLANKTON PRODUCTION. THE RATE OF DECLINE (B) CAN BE RELATED TO THE RATE OF DECREASE IN PHYTOPLANKTON PRODUCTION IN AN OFFSHORE DIRECTION & THE EFFICIENCY OF WATER-COLUMN HETEROTROPHS AT UTILIZING SINKING ORGANIC MATTER. THE REGRESSIONS ALSO INDICATE, THROUGH COMPARISON WITH THE LITERATURE, THAT BOTH BENTHOS & ZOOPLANKTON FOLLOW SIMILAR EXPONENTIAL DECAYS IN QUANTITIES OF LIFE WITH DEPTH. THE CONSTANTS (A) BOTH APPEAR TO BE FUNCTIONS OF SURFACE PRODUCTIVITY & IT CAN BE INFERRED THAT THE SOURCES OF FOOD FOR ZOOPLANKTON & BENTHOS IN THE DEEP SEA ARE THE SAME. THE SEEMINGLY CONSERVATIVE NATURE OF ORGANIC MATTER OVER DEPTH RANGES WHERE THERE IS AN EXPONENTIAL DECREASE IN LIFE CAN PROBABLY BE ATTRIBUTED TO THE INCREASE IN THE RELATIVE ABUNDANCE OF THE REFRACTORY ORGANIC COMPOUNDS WITH DEPTH.

ROWE, G. AND K. SMITH JR.
1977. BENTHIC-PELAGIC COUPLING IN THE MID-ATLANTIC BIGHT
IN COULL, B. C. (ED). MAR BENTHOS, UNIV S. CAROLINA PRESS: 55-66
THE HYPOTHESIS THAT THE CONTINENTAL SHELF IS AN IMPORTANT SITE OF
NUTRIENT REGENERATION IS SUPPORTED BY HYDROGRAPHIC DATA COLLECTED
IN MID-ATLANTIC BIGHT & A THEORETICAL RELATIONSHIP BETWEEN BOTTOM
OXYGEN DEMAND & THE BREAKDOWN OF SEDIMENT ORGANIC MATTER. NUTRIENT
FLUX OUT OF THE BOTTOM IS ESTIMATED FROM NEAR-BOTTOM AMMONIA
GRADIENTS IN A FINITE DIFFERENCE EQUATION.

SALEMAA, H. NO. 18
1979. ECOLOGY OF IDOTEA SPP. (ISOPODA) IN THE NORTHERN BALTIC
OPHELIA. 18(1): 133-150.

THE POPULATION DYNAMICS & BREEDING BIOLOGY OF IDOTEA BALTICA, I. CHELIPES & I. GRANULOSA WERE STUDIED IN THE LITTORAL BELTS OF TWO NORTHERN BALTIC ROCKY SHORE HABITATS. POPULATION SIZES ARE LARGEST IN THE AUTUMN, AFTER OCCUPATION OF THE FUCUS BELT BY A NEW IDOTEA GENERATION FROM THE BELT OF FILAMENTOUS ALGAE. TWO PERIODS OF DECREASE IN THE POPULATION DENSITY, ONE IN LATE AUTUMN & ANOTHER AFTER THE BREEDING PERIOD IN THE FOLLOWING SUMMER WERE OBSERVED. ADULT MALES ARE ELIMINATED FROM THE POPULATIONS BEFORE FEMALES. MOST INDIVIDUALS IN EACH SPECIES BREED SIMULTANEOUSLY IN EARLY SUMMER. BROOD NUMBERS ARE RELATED TO FEMALE SIZE, BUT GREAT MARSUPIAL MORTALITY OCCURS DURING INCUBATION. IDOTEA JUVENILES GROW EXPONENTIALLY IN LATE SUMMER, BUT DURING WINTER THE GROWTH IS DELAYED. ANOTHER I. BALTICA IS THE DOMINANT SPECIES IN BOTH BEFORE BREEDING. I. CHELIPES & I. GRANULOSA WERE FOUND NOT TO COEXIST. THE ROLES OF DIFFERENT FACTORS AFFECTING THE DISTRIBUTION & GEOGRAPHICAL VARIATION IN IDOTEA ARE DISCUSSED.

SANDERS, H.L. NO. 33
 1956. BIOGEOGRAPHY OF LONG ISLAND SOUND, 1952-1954. X. THE BIOLOGY OF
 MARINE BOTTOM COMMUNITIES
 BULL BINGHAM OCEANOGRAPHIC COLLECT, YALE UNIV 15:345-414

THE RESULTS OF A BOTTOM SURVEY CARRIED OUT FROM AUGUST 1953 TO
 SEPTEMBER 1954 REVEALED THAT LONG ISLAND SOUND, IN CONTRAST TO
 OTHER AREAS, SUPPORTS EXTREMELY LARGE POPULATIONS OF BENTHIC
 ANIMALS. THE MEAN NUMBER AT EACH STATION VARIED FROM 5,563 TO
 46,398, WHILE THE MEAN WEIGHT OF ANIMALS LESS THAN 0.2 G DRY
 WEIGHT RANGED FROM 4.54 TO 36.38 G/M². THE INFAUNA OF EACH STATION
 WAS CHARACTERIZED BY A NARROW RANGE OF BIOMASS VALUES WHICH WERE
 LARGELY DEPENDENT ON SEDIMENT COMPOSITION. THE GREATEST BIOMASSES
 WERE FOUND WHEN THE SEDIMENT CONTAINED FROM 13-25% SILT AND CLAY.
 THIS APPEARED TO BE AN OPTIMAL CONCENTRATION, SINCE BOTH INCREASES
 AND DECREASES OF THE SILT-CLAY FRACTION GAVE PROGRESSIVELY SMALLER
 BIOMASS VALUES. THE BIOLOGY OF SOME OF THE DOMINANT ANIMALS IS
 DISCUSSED. THE GENUS *AMPELISCA* WAS PARTICULARLY INTERESTING IN
 THAT IT COULD BE DIVIDED INTO TWO DISTINCT GROUPS WITH RESPECT TO
 SIZE AND DISTRIBUTION ALTHOUGH THE GROUPS COULD NOT BE SEPARATED
 ON THE BASIS OF TAXONOMIC CHARACTERS. FORM A WAS CONFINED TO
 COARSER SEDIMENTS AND WAS 3-4 TIMES AS HEAVY AS ITS COUNTERPART,
 FORM B, WHICH WAS FOUND ONLY IN THE SOFTER SEDIMENTS. IN BOTH
 SPECIES, THE FEMALES APPEARED TO BE ABOUT 15 TIMES MORE ABUNDANT
 THAN THE MALES. HOWEVER, ON CLOSER EXAMINATION, IT WAS APPARENT
 THAT APPROXIMATELY HALF OF THE FEMALES WERE GYNOMORPHIC MALES.
 VALUES FOR ORGANIC PRODUCTION WERE OBTAINED FOR FOUR OF THE
 DOMINANT SPECIES. ON THE BASIS OF THESE FIGURES, THE ANNUAL
 PRODUCTIVITY (2.44 X LARGER THAN THAT OF THE MEAN STANDING CROP) WAS
 DETERMINED FOR THE INFAUNA. THE RELATIONSHIP BETWEEN PRIMARY
 FEEDING TYPES AND SEDIMENT COMPOSITION WAS INVESTIGATED. IN COARSER
 SUSPENSION FEEDERS WERE CLEARLY THE MAJOR FEEDING TYPES. IN COARSER
 SEDIMENTS, WHILE SELECTIVE AND NONSELECTIVE DEPOSIT FEEDERS, THE
 DOMINATED THE FINER SEDIMENTS. A NEW ASSOCIATION OF ANIMALS, THE
 NEPTHYD INCISALYDIA, WAS DESCRIBED. THIS SOFT
 BOTTOM COMMUNITY IS LIMITED TO SEDIMENTS CONTAINING MORE THAN 25%
 SILT-CLAY AND IS FOUND AT DEPTHS OF FROM 4 TO AT LEAST 30 M.

SANDERS, H. L. NO. 28
1958. BENTHIC STUDIES IN BUZZARDS BAY. I. ANIMAL-SEDIMENT RELATIONSHIPS
LIMNOL OCEANOGR 3(3):245-258.

DURING OCTOBER AND NOVEMBER 1955 A BOTTOM FAUNAL STUDY WAS UNDERTAKEN AT 19 LOCALITIES IN BUZZARDS BAY, MASSACHUSETTS. THE NUMBER OF ANIMALS RANGED FROM 1,064 TO 12,576/M² WITH A MEAN NUMBER OF 4,430. IN COMPARISON WITH CERTAIN OTHER AREAS THESE NUMBERS APPEARED SMALL AND SEEMED TO BE DUE TO THE RELATIVELY LOW CONCENTRATIONS OF CHEMICAL NUTRIENTS AND MODEST PRIZED PRODUCTION OF THE REGION. TWO FAUNAL ASSEMBLAGES WERE RECOGNIZED: ONE, PRESENT IN THE MUDDY SEDIMENTS AND DOMINATED BY THE LAMELLIBRANCH NUCULA PROXIMA AND THE POLYCHAETE NEPHTHYS INCISA WAS ESSENTIALLY THE SAME COMMUNITY DESCRIBED FROM LONG ISLAND SOUND; THE OTHER, RESTRICTED TO THE SANDIER SEDIMENTS AND CHARACTERIZED BY SPECIES OF THE AMPHIPOD GENUS AMPELISCA. THE TWO PRIMARY FEEDING TYPES, THE FILTER-FEEDERS AND THE DEPOSIT-FEEDERS, NUMERICALLY DOMINATED IN THE SAND AND MUD SEDIMENTS, RESPECTIVELY. THE DISTRIBUTION OF CERTAIN DOMINANT DEPOSIT-FEEDERS IN LONG ISLAND SOUND AND BUZZARDS BAY WAS POORLY CORRELATED WITH THE SILT-CLAY FRACTION OF THE SEDIMENT. HOWEVER, WHEN CLAY ALONE WAS USED, A MUCH BETTER AGREEMENT WAS OBTAINED. IT WAS SUGGESTED THAT CLAY IS PROBABLY THE MOST VALID CRITERION FOR THE DISTRIBUTION OF DEPOSIT-FEEDERS. THE DISTRIBUTION OF INFAUNAL FILTER-FEEDERS SEEMED RELATED TO THE DEGREE OF SORTING AND THE MEDIAN GRAIN SIZE OF THE SEDIMENT, WITH LARGEST POPULATIONS PRESENT IN WELL-SORTED FINE SAND. THE HYDRODYNAMIC IMPLICATIONS OF THIS DISTRIBUTION ARE DISCUSSED.

SARNTHEIN, M. AND W. RICHTER

1974. SUBMARINE EXPERIMENTS ON BENTHIC COLONIZATION OF SEDIMENTS IN THE WESTERN BALTIC SEA. I. TECHNICAL LAYOUT

MAR BIOL 28: 159-164.

SUBMARINE SEDIMENTARY SUBSTRATES HAVE BEEN EXPOSED IN A NEW-STYLE SPECIAL ARRANGEMENT FOR BENTHIC COLONIZATION. THE EXPERIMENT HAS BEEN RUNNING FOR 2 YEARS & IS PLANNED TO CONTINUE AS A LONG-TERM TEST FOR SEVERAL MORE YEARS, WITH THE PURPOSE OF STUDYING FACTORS AS INDEPENDENTLY AS THE EFFECTS OF HYDROGRAPHIC & BIOTIC FACTORS AS WELL AS THOSE OF SUBSTRATE TYPE. THIS IS ACCOMPLISHED BY 3 FLOATING PLATFORMS. EACH CARRIES 3 OPEN CONTAINERS FILLED WITH FINE MUD, SAND, & GRAVEL (70 CM DIAMETER, 25 CM DEEP). THE PLATFORMS ARE ANCHORED CLOSE TOGETHER AT 11, 15 & 19 M WATER DEPTHS. THEIR DISTANCES FROM THE SEA FLOOR VARY BETWEEN 5.5 & 2.0 M. THE SEDIMENTS WERE OBTAINED FROM SAND PITS ON LAND. SUBSTRATE SAMPLES ARE CONTINUOUSLY TAKEN BY DIVERS. HYDROGRAPHIC DATA ARE AVAILABLE BY DIRECT MEASUREMENTS FROM A SHIP & AUTOMATIC SENSORS. THE CHARACTERISTIC SOURCES OF ERROR OF THE EXPERIMENT SEEM TO EXERT NO DECISIVE INFLUENCE ON THE BENTHIC PRODUCTION DATA.

SEAPY, R.R. AND C.L. KITTING

1978. SPACIAL STRUCTURE OF AN INTERTIDAL MOLLUSCAN ASSEMBLAGE ON A SHELTERED SANDY BEACH
MAR BIOL 46: 137-145.

THE INTERTIDAL MOLLUSCAN FAUNA ON A SANDY-MUD BEACH IN NEWPORT BAY CALIFORNIA, USA, IS DIVISIBLE INTO TWO VERTICALLY DISTINCT SPECIES ASSEMBLAGES, WHICH CORRESPOND TO THE MIDLITTORAL ZONE & SUBLITTORAL FRINGE OBSERVED ON ROCKY COASTLINES & EXPOSED SANDY BEACHES. THE SPECIES ASSEMBLAGE COMPRISING THE MIDLITTORAL ZONE IS UNUSUAL, HOWEVER, IN THAT THE NUMERICALLY DOMINANT SPECIES ARE NOT CONFINED TO THIS ZONE BUT RANGE DOWNWARD THROUGH THE SUBLITTORAL FRINGE. THE TWO SPECIES ASSEMBLAGES ARE VERTICALLY SEPARATED AT +0.5 TO +1.0 FT (+0.15 TO +0.30 M; RELATIVE TO 0.0 TIDAL DATUM AT MEAN LOWER LOW WATER), WHICH IS HIGHER THAN PREVIOUSLY OBSERVED FOR THE ON ROCKY SHORES & EXPOSED SANDY BEACHES. THE SPECIES COMPOSITION OF SOME OF THE SAMPLES AT +0.5 & +1.0 FT (+0.15 & +0.30 M) WAS INTERMEDIATE BETWEEN SAMPLES HIGHER & LOWER ON THE BEACH, WHILE SEVERAL SAMPLES WERE DEVOID OF MOLLUSCS ALTOGETHER. ADDITIONALLY, THE SURFACE SEDIMENTARY ENVIRONMENT CHANGES IN TERMS OF AN INCREASED PERCENT SILT-CLAY FRACTION & HIGHER SORTING COEFFICIENTS BELOW +0.5 FT (+0.15 M). SINCE INFAUNAL ZONATION IS CORRELATED WITH TIDAL HEIGHT AT THE SUBSTRATE SURFACE, ENVIRONMENTAL FACTORS OPERATIVE AT THE SURFACE ARE PROBABLY MOST IMPORTANT IN INFLUENCING THE ZONATION ON THIS BEACH.

SHEPARD, F. P. NO. 46
1954. NOMENCLATURE BASED ON SAND-SILT-CLAY RATIOS
J SEDIMENT PETROL 24(3): 151-158.

FOLLOWING A CANVASSING OF SEDIMENTATIONISTS AN ATTEMPT IS MADE TO STANDARDIZE NOMENCLATURE OF SEDIMENT TYPES RELATIVE TO SAND, SILT, AND CLAY CONTENT. A TRIANGLE DIAGRAM WITH BOUNDARIES BETWEEN TYPES, WHICH MET WITH GENERAL APPROVAL, IS SUBMITTED & COMPARED WITH OTHER SYSTEMS WHICH HAVE BEEN USED FOR THE PURPOSE. THE NEW SYSTEM USES OLD WELL ESTABLISHED NAMES & HAS A SIMPLICITY & SYMMETRY WHICH MAKE IT EASILY REMEMBERED. THE BOUNDARIES APPEAR TO BE WELL LOCATED FOR DESCRIPTION OF SEDIMENTS SUCH AS THOSE OF THE NORTHERN GULF OF MEXICO (API PROJECT 51), BUT IT IS INADEQUATE IN DESCRIBING WELL SORTED SEDIMENTS WITH MEDIAN DIAMETERS NEAR THE BOUNDARIES OF SAND & SILT OR SILT & CLAY. THE NOMENCLATURE SUGGESTED APPLIES ONLY TO SEDIMENT GRADE SIZES SO THAT OTHER NAMES SHOULD BE USED DEPENDING ON OTHER CHARACTERISTICS OF THE SEDIMENTS. FURTHERMORE, THE NOMENCLATURE SHOULD NOT BE APPLIED TO SEDIMENTS CONTAINING LARGE PERCENTAGES OF GRAVEL.

SHERMAN, K.M. AND B.C. COULL
 1980. THE RESPONSE OF MEIOFAUNA TO SEDIMENT DISTURBANCE
 J EXP MAR BIOL ECOL 46(1): 59-71.

THE MEIOBENTHOS INHABITING AN INTERIDAL MUD BAR WERE DISTURBED BY HAND-TURNING THE SEDIMENT OF A 9-M² AREA WITH A SHOVEL & IMMEDIATE MONITORING THE SUBSEQUENT RECOLONIZATION PROCESS. THE MEIOBENTHOS IMPACT OF THE DISTURBANCE ON THIS COMMUNITY DOMINATED BY NEMATODA (91%), COPEPODA (4%) & FORAMINIFERA (4%) WAS TO REMOVE MORE THAN 70% OF THE MEIOBENTHOS. HOWEVER, AFTER ONLY ONE TIDAL CYCLE, TOTAL NUMBERS OF MEIOFAUNA, COPEPODS, FORAMINIFERANS & OTHER MEIOFAUNA TAXA WERE AT PRE-DISTURBANCE LEVELS. CONTROL (SIMILAR 9-M² SITE ON THE SAME FLAT) DENSITY VALUES, NEMATODE SPECIES ASSEMBLAGES RAPIDLY ADAPTED TO THE DISTURBANCE & CHANGED LITTLE OVER TIME. FORAMINIFERA SHOWED INSIGNIFICANT MORTALITY, & INCREASED IN ABUNDANCE 10 DAYS AFTER THE INITIAL DISTURBANCE. TRANSPORT WITHIN THE FLUIDIZED MEIOBENTHOS FLOCCULAR MECHANISM IN THIS COMMUNITY, & FORAMINIFERANS SEEM TO BE THE LEAST ABLE TO USE THIS MECHANISM. THE MEIOBENTHOS OF THIS HABITAT IS DESCRIBED AS A WELL-DISPersed & DYNAMIC COMMUNITY ABLE TO RAPIDLY ADJUST TO SMALL-SCALE DISTURBANCES. HOWEVER, THE MEIOBENTHOS MAY NOT RECOVER FROM ALL DISTURBANCES, BECAUSE RESILIENCE WAS ONLY DETERMINED FOR A LIMITED PHYSICAL DISTURBANCE.

SIMON, J. AND D. DAUER
1977. NO. 21

REESTABLISHMENT OF A BENTHIC COMMUNITY FOLLOWING NATURAL
DEFAUNATION

COULL, B. C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 139-154

DURING SUMMER 1971, A MASSIVE OUTBREAK OF RED TIDE RESULTED IN THE DEFAUNATION OF A SANDY, INTERTIDAL HABITAT IN UPPER OLD TAMPA BAY, TAMPA, FLORIDA. COLONIZATION OF THE HABITAT WAS STUDIED FROM AUGUST 1971 TO JULY 1973. A TRANSECT COMPOSED OF 4 STATIONS RUNNING FROM JUST BELOW MEAN HIGH WATER TO JUST BELOW MEAN LOW WATER WAS QUANTITATIVELY SAMPLED EACH MONTH FOR SPECIES COMPOSITION, DENSITIES OF INDIVIDUAL POPULATIONS, & DISTRIBUTION OF AGE CLASSES. DURING THE 24 MONTHS OF SAMPLING, 153 SPECIES OF BENTHIC INFAUNAL INVERTEBRATES WERE IDENTIFIED. SPECIES COLONIZATION & ABUNDANCE PATTERNS OVER TIME WERE STUDIED FOR THE ENTIRE MACROFAUNA. IN ADDITION, FIVE MAJOR TAXONOMIC CATEGORIES WERE EXAMINED SEPARATELY: POLYCHAETES, MOLLUSCS, AMPHIPODS, OTHER CRUSTACEANS (ISOPODS, CUMACEANS, SHRIMPS, CRABS, ETC.) & MISCELLANEOUS PHyla (AMPHIOXUS, PHORONIDS, BRACHIOPODS, RHYNCHOCOELS, CHAETOGNATHS, OLIGOCHAETES, PLATYHELMINTHS, & ANEMONES). THE FAUNA MADE A RAPID RECOVERY IN TERMS OF SPECIES NUMBERS & COMPOSITION, RETURNING TO MUCH THE SAME ASSEMBLAGE AS PRIOR TO THE RED TIDE. POLYCHAETES WERE THE MOST RAPID COLONISTS BOTH IN TERMS OF THE NUMBER OF SPECIES & NUMBER & ALSO WERE SIGNIFICANTLY AFFECTED BY SEASONAL PATTERNS OF REPRODUCTION, & THUS DISPERSAL. ONLY THE POLYCHAETES, OTHER CRUSTACEA, & THE TOTAL FAUNA SHOWED SPECIES COLONIZATION PATTERNS WHICH INDICATED AN APPROACH TO AN VARIETY OF EQUILIBRIUM VALUE. SPECIES ABUNDANCE PATTERNS SHOWED A VARIETY OF RESPONSES FROM STRONG SEASONAL INFLUENCES (MOLLUSCS & AMPHIPODS) TO A CONTINUOUSLY INCREASING PATTERN (TOTAL FAUNA). THE DEMONSTRATION OF DIFFERENT COLONIZING ABILITIES AMONG MAJOR TAXA LEADS TO THE CONCLUSION THAT CARE SHOULD BE USED WHEN INTERPRETING ENVIRONMENTAL PERTURBATION STUDIES WHERE ONLY A SINGLE TAXON HAS BEEN EXAMINED.

SIMPSON, R.D. NO. 58
1977. THE REPRODUCTION OF SOME LITTORAL MOLLUSCS FROM MACQUARIE ISLAND
(SUB-ANTARCTIC)
MAR BIOL 44: 125-142.

THE REPRODUCTION OF 9 SPECIES OF LITTORAL MOLLUSCS FROM THE SUB-ANTARCTIC MACQUARIE ISLAND WAS EXAMINED. THE MODE OF LARVAL DEVELOPMENT IS REPORTED FOR ALL SPECIES, & THE REPRODUCTIVE PATTERNS FOR 7 ARE DESCRIBED FROM COLLECTIONS TAKEN MONTHLY OVER A PERIOD OF 1 YEAR. TWO SPECIES RELEASE GAMETES FOR EXTERNAL FERTILIZATION, WHEREAS THE OTHER 7 HAVE NON-PELAGIC DEVELOPMENT VIA BROODING OR THE LAYING OF EGG CASES; SOME OF THESE FINDINGS WERE DEDUCTED FROM EXAMINATION OF GONADS, RATHER THAN BY DIRECT OBSERVATION. FEATURES OF REPRODUCTION IMPORTANT IN ANY CORRELATION BETWEEN A LITTORAL ANIMAL'S REPRODUCTION & ITS HABITAT ARE DISCUSSED, & RELATIONSHIPS BETWEEN PELAGIC & NON-PELAGIC DEVELOPMENT OF THE MACQUARIE MOLLUSCS & (A) DISTRIBUTION IN THE LOCAL ENVIRONMENT & (B) HABITAT ARE DRAWN. THE WIDELY RECOGNISED CORRELATION BETWEEN SPECIES HAVING A NON-PELAGIC DEVELOPMENT & SMALL NUMBER & LARGE SIZE OF EGGS IS CONSIDERED AS A METHOD FOR PREDICTING THE TYPE OF LARVAL DEVELOPMENT (IN TERMS OF PELAGIC VERSUS NON-PELAGIC) FROM AN EXAMINATION OF THE OVARY. IT IS SUGGESTED THAT FURTHER DATA ON MODES OF DEVELOPMENT COULD BE OBTAINED FROM SPECIMENS OF MARINE INVERTEBRATES COLLECTED THROUGHOUT SOUTHERN LATITUDES & THAT SUCH DATA WOULD ENHANCE ZOOGEOGRAPHICAL INTERPRETATIONS.

SOKOLOVA, M.N. NO. 88
1972.
TROPHIC STRUCTURE OF DEEP SEA MACROBENTHOS
MAR BIOL 16: 1-12

THE EFFECT OF THE TROPHIC FACTOR ON LARGE-SCALE DISTRIBUTIONAL PATTERNS OF DEEP-SEA MACROBENTHOS INHABITING THE FLOOR OF THE WORLD OCEAN HAS BEEN STUDIED. TWO HUNDRED & TWENTY-EIGHT BOTTOM TRAWL SAMPLES COLLECTED BY SOVIET RESEARCH VESSELS IN THE PACIFIC & INDIAN OCEANS AT DEPTHS RANGING FROM 3000 TO 6000 M WERE ANALYZED. FOR EACH SAMPLE, THE WEIGHT OF ANIMALS WITH A SIMILAR MODE OF FEEDING WAS DETERMINED TO FIND THE WEIGHT RATIO OF REPRESENTATIVES OF THREE MAIN TROPHIC GROUPS, I.E., DEPOSIT-FEEDER SUSPENSION-FEEDERS & CARNIVORES. THESE DATA, INDICATING PREDOMINANCE OF ALTERNATE GROUPS AS WELL AS DATA ON THEIR GEOGRAPHIC DISTRIBUTION, WERE RELATED TO FEEDING CONDITIONS WHICH DEPEND ON: (1) RATES OF SEDIMENTATION, (2) NATURE OF SEDIMENTS, (3) CONTENT OF ORGANIC CARBON, (4) DEGREE OF TRANSFORMATION OF ORGANIC MATTER ON & WITHIN SEDIMENTS, & WHEN AVAILABLE, (5) DATA ON REDOX POTENTIAL, BIOCHEMICAL, OXYGEN CONSUMPTION, & STATE OF HETEROTROPHIC MICROFLORA IN THE SEDIMENTS. IN DEALING WITH THE FEEDING CONDITIONS OF DEEP-SEA MACROBENTHOS IN THE ATLANTIC OCEAN, BIOLOGICAL CHARACTERISTICS WERE DEDUCED FROM LITERATURE DATA ON THE COMPOSITION OF SEDIMENTS, THEIR REDOX POTENTIAL & ORGANIC CARBON CONTENT. AS A RESULT OF THIS RESEARCH, EUTROPHIC & OLIGOTROPHIC REGIONS ON THE FLOOR OF THE WORLD OCEAN HAVE BEEN DISTINGUISHED & THEIR BOUNDARIES DEFINED. EUTROPHIC REGIONS LIE WITHIN AREAS WITH HIGH BIOLOGICAL PRODUCTIVITY OF SURFACE-WATER LAYERS, & COVER THE PERIPHERAL & EQUATORIAL PARTS OF THE OCEANS; THEY ARE CHARACTERIZED BY QUANTITIES WHICH ARE SUFFICIENT FOR DEPOSIT-ORGANIC MATTER WITHIN SEDIMENTS WHICH ARE SUFFICIENT FOR DEPOSIT-FEEDERS TO PREDOMINATE IN EUTROPHIC REGIONS EVERYWHERE, EXCEPT ON CONSIDERABLE BOTTOM ELEVATIONS. OLIGOTROPHIC REGIONS ARE CONFINED TO OPEN AREAS OF THE OCEANS LYING BEYOND THE EQUATORIAL BELT; THEY ARE CHARACTERIZED BY VERY LOW RATES OF SEDIMENTATION & ARE CONSEQUENTLY, BY SCARCE QUANTITIES OF DEPOSITED ORGANIC MATTER. HERE, SUSPENSION, ION-FEEDERS PREDOMINATE, ALTHOUGH THEIR POPULATION DENSITY IS VERY LOW.

STONER, A.W.

NO. 69

THE ROLE OF SEAGRASS BIOMASS IN THE ORGANIZATION OF BENTHIC
MACROFAUNAL ASSEMBLAGES
BULL MAR SCI 30(3): 537-551.

A ONE YEAR SURVEY OF BENTHIC MACROFAUNA WAS CONDUCTED OVER A SERIES OF SUBTIDAL SITES CHARACTERIZED BY DIFFERENT STANDING CROPS OF BENTHIC MACROPHYTES. SINCE THE STATIONS HAD SIMILAR GRAULOMETRIC PROPERTIES, THE ROLE OF SEAGRASS BIOMASS IN REGULATING COMMUNITY ORGANIZATION OF BENTHIC MACROFAUNA COULD BE TESTED INDEPENDENTLY, UNLIKE EARLIER STUDIES. THE DENSITY OF MACROBENTHIC ANIMALS (N/M^2) WAS DIRECTLY RELATED TO MEAN MACROFLORAL BIOMASS AS WAS THE NUMBER OF SPECIES TAKEN OVER THE SAMPLING PERIOD. THE UNVEGETATED SITE WAS CHARACTERIZED BY THE HIGHEST DEGREE OF FAUNAL DOMINANCE & A SPECIES COMPOSITION DISTINCT FROM THAT FOUND AT VEGETATED SITES. THE RELATIVE ABUNDANCES OF EPIFAUNAL AMPHYPODS & EPIFAUNAL POLYCHAETES WERE DIRECTLY RELATED TO MACROPHYTE BIOMASS. ABUNDANCE OF DEPOSIT FEEDING & OMNIVOROUS POLYCHAETES DECREASED AS A FUNCTION OF MACROPHYTE STANDING CROP, WHEREAS SUSPENSION FEEDING & CARNIVOROUS POLYCHAETES INCREASED WITH VEGETATION. BIOMASS OF BENTHIC MACROPHYTES, INDEPENDENT OF SEDIMENT GRANULOMETRY & HYDRODYNAMIC EFFECTS, WAS AN IMPORTANT REGULATOR OF SPECIES ABUNDANCES, DOMINANCE, DIVERSITY, & TROPHIC ORGANIZATION IN MACROFAUNAL ASSEMBLAGES.

SUBRAHMANYAM, C.B. AND W.L. KRUCZYNSKI
1979. NO. 48

COLONIZATION OF POLYCHAETOUS ANNELIDS IN THE INTERTIDAL ZONE OF A
DREDGED MATERIAL ISLAND IN NORTH FLORIDA
ECOL DIV. THEORY AND PRACTICE, INT'L. CO-OP. PUB. HOUSE, MARYLAND.

A STUDY WAS CONDUCTED TO UNDERSTAND THE SEQUENCE OF COLONIZATION
& COMMUNITY FORMATION ON A MAN-MADE ISLAND WITH DREDGE SPOIL IN
DICKERSON'S BAY, NORTH FLORIDA, IN RELATION TO SUBSTRATE & TIDE
LEVELS. TRIPPLICATE MONTHLY SAMPLES WERE OBTAINED WITH A 0.0625 M2
& 10 CM DEEP METAL CORER FROM FOUR STATIONS ALONG A TRANSECT, M2
& THE SUBSTRATE WAS SCREENED TO 0.5 MM. THOUGH DENSITIES PER M2
DISPLAYED PRONOUNCED SEASONAL VARIATIONS, THE MEAN DENSITIES OF
STATIONS WERE COMPARABLE. NO DEFINITE CORRELATION BETWEEN
SUBSTRATE & TROPIC TYPES WAS DETECTED. A TOTAL OF 29 SPECIES
COLONIZED THE ISLAND, SEASONAL SPECIES SUCCESSION & HABITAT
EXPANSION WITHIN THE INTERTIDAL ZONE OCCURRED, & A PETERSEN-TYPE
COMMUNITY WITH VISIBLE DOMINANCE BECAME ESTABLISHED. THERE WERE
SLIGHT DIFFERENCES IN DOMINANCE HIERARCHY BETWEEN STATIONS.
SEASONAL PATTERNS OF VARIATIONS OF SPECIES DIVERSITY (H') &
SPECIES RICHNESS (D) INDICATED THAT IMMIGRATION OF NEW SPECIES
GOVERNED THE DIVERSITY. THE SPECIES OVERLAP (C) BETWEEN STATIONS
WAS CONSIDERABLE INDICATING THAT THE WHOLE POLYCHAETE ASSEMBLAGE
WAS ONE COMMUNITY. SPECIES EQUILIBRIUM WITHIN THE YEAR WAS NOT
OBSERVED

SUTHERLAND, J.P. AND R.H. KARLSON
 1977. NO. 68
 DEVELOPMENT AND STABILITY OF THE FOULING COMMUNITY AT BEAUFORT,
 NORTH CAROLINA
 ECOL MONOGR 47: 425-446.

COMMUNITY DEVELOPMENT WAS FOLLOWED FOR 21 1/2 TO 31 1/2 YEARS ON
 UNGLAZED CERAMIC TILE PLATES (232 CM²), SUSPENDED HORIZONTALLY
 BENEATH THE DUKE UNIVERSITY MARINE LABORATORY DOCK, IN BEAUFORT,
 NORTH CAROLINA. SERIES OF 3 OR 4 PLATES WERE SUBMERGED AT
 APPROXIMATELY THE 1ST OF EACH MONTH FROM MAY-NOVEMBERS 1971 & FROM
 APRIL-NOVEMBER 1972. PERCENTAGE COVER FOR EACH SPECIES THAT
 SETTLED & GREW ON THE LOWER SURFACE WAS ESTIMATED AT 6-TO 8-WEEK
 INTERVALS, USING 75 POINTS RANDOMLY POSITIONED OVER AT THE PLATE AREA
 SAMPLES WERE NONDESTRUCTIVE; PLATES WERE RESUBMERGED AFTER EACH
 CENSUS. LARVAL RECRUITMENT WAS ESTIMATED AT 1-TO 3-WEEK INTERVALS
 ON NEWLY SUBMERGED PLATES. TEMPERATURE & SALINITY WERE ALSO
 MEASURED. INITIAL COMMUNITY DEVELOPMENT WAS RELATIVELY
 UNPREDICTABLE. LARVAL RECRUITMENT PATTERNS VARIED MARKEDLY FROM
 YEAR TO YEAR & AS A RESULT, DIFFERENT PATH WITHIN & BETWEEN
 COMMUNITY DEVELOPMENT WERE OBSERVED BOTH WITHIN & BETWEEN RESIDENT
 ADULTS OF PREPARING THE WAY FOR SUBSEQUENT & GROWTH OF OTHER
 SPECIES. SPECIES INHIBITED IN THEIR ABILITY TO RESIST SUBSEQUENT
 INVASION AS ADULTS & IN THEIR ABILITY TO INVADE OCCUPIED SUBSTRATE
 AS LARVAE. AFTER AN UNPREDICTABLE INITIAL DEVELOPMENTAL PHASE, THE
 SUBSEQUENT CHANGES IN SPECIES COMPOSITION DEPENDED IN PART ON THE
 DEGREE TO WHICH LARVAE WERE ABLE TO INVADE EXISTING ADULT
 ASSEMBLAGES. THIS IN TURN DEPENDED ON THE IDENTITY OF THE RESIDENT
 ADULTS & THE IDENTITY OF THE INVADING LARVAE. AS A RESULT, THE
 DIRECTION & RATE OF COMMUNITY DEVELOPMENT, DEPENDENT ON THE ORDER
 OF INITIAL INVASION & SUBSEQUENT RECRUITMENT, WERE DIFFICULT TO
 PREDICT ALTHOUGH AN EQUILIBRIUM NUMBER OF 8-10 SPECIES/PLATE WAS
 OFTEN OBSERVED. ADULT RESIDENCE TIME WAS GENERALLY <1 YEAR & THE
 MORTALITY &/OR DISAPPEARANCE OF THESE ADULTS PRODUCED 20-60%
 FREE SPACE ON AN APPROXIMATELY ANNUAL BASIS. THIS FREE SPACE WAS
 USUALLY OCCUPIED BY THE RECRUITS OF A DIFFERENT SPECIES THAN THE
 ORIGINAL OCCUPANT. THE COMBINED ADDITION OF SPECIES THROUGH LARVAL
 RECRUITMENT & SUBTRACTION OF SPECIES AS A RESULT OF ADULT
 MORTALITY PRODUCED DRAMATIC CHANGES IN COMMUNITY STRUCTURE EACH

TEAL, J. M.

NO. 34

COMMUNITY METABOLISM IN A TEMPERATE COLD SPRING
ECOL MONOGR 27(3):283-302

THE RESULTS OF A COMMUNITY METABOLISM STUDY CONDUCTED IN 1953-54
IN A TEMPERATE COLD SPRING ARE PRESENTED. THE EMPHASIS IS ON THE
ACCURATE PRESENTATION OF ENERGY FLOW THROUGH ALL THE POPULATIONS
OF THE COMMUNITY. THE PAPER PROVIDES INFORMATION ON RATES OF
RESPIRATION, ENERGY ASSIMILATION, CONVERSION, PREDATORY AND
NON-PREDATORY MORTALITIES AND OTHER SOURCES OF ENERGY LOSS WITHIN
THE COMMUNITY.

TENORE, K.R. NO. 44
 1977. UTILIZATION OF AGED DETRITUS DERIVED FROM DIFFERENT SOURCES BY THE
 POLYCHAETE CAPITELLA CAPITATA
 MAR BIOL 44: 51-55.

BECAUSE THE RATE OF MICROBIAL DEGRADATION DIFFERS FOR THE VARIOUS SOURCES CONTRIBUTING TO THE DETRITAL POOL IN MARINE SYSTEMS, THEIR AVAILABILITY TO DETRITIVORES MIGHT ALSO VARY. CARBON-14 TRACER & EXPERIMENTS WERE USED TO COMPARE DIFFERENCES IN THE OXIDATION & NET INCORPORATION BY THE POLYCHAETE CAPITELLA CAPITATA OF A NITROGEN-RICH, EASILY-DECOMPOSABLE DETRITUS DERIVED FROM THE RED MACROPHYTIC ALGAE GRACILARIA SP. VERSUS A NITROGEN-POOR, DECAY-RESISTANT DETRITUS DERIVED FROM THE EELGRASS ZOSTERA MARINA. THE NET INCORPORATION OF GRACILARIA SP. DETRITUS BY C. CAPITATA REACHED A MAXIMUM (91 UG DRY WEIGHT OF DETRITUS/MG DRY WEIGHT OF WORM/DAY) AFTER ONLY 14 DAYS OF DECOMPOSITION, WHEREAS THAT OF Z. MARINA DETRITUS EQUALED THIS LEVEL AFTER 30 DAYS OF AGING, BUT CONTINUED TO INCREASE TO 375 UG AT 180 DAYS. THE OXIDATION RATE OF GRACILARIA SP. DETRITUS WAS CONSISTENTLY HIGHER (PEAK OF 61 MG DRY WEIGHT OF DETRITUS/DAY AT 30 DAY-AGING) THAN Z. MARINA DETRITUS, WHICH REACHED THIS LEVEL ONLY AFTER 180 DAYS OF AGING. THE PRESENCE OF ABSENCE OF C. CAPITATA DID NOT SIGNIFICANTLY ALTER THE OXIDATION RATE. THE ABOVE DIFFERENCE MIGHT BE ATTRIBUTED TO A RAPID EXPLOITATION & MINERALIZATION BY BACTERIA OF THE MORE AVAILABLE GRACILARIA SP. DETRITUS, BUT A SLOW, "CONTROLLED" UTILIZATION BY THE MICROBES OF THE LESS AVAILABLE Z. MARINA DETRITUS, ESPECIALLY DURING THE EARLY STAGE OF DECOMPOSITION. THIS WOULD ALLOW MAXIMUM EXPLOITATION OF THE SUBSTRATE BY MACRO CONSUMERS, RESULTING IN MORE OF THE DETRITAL RESOURCE BEING TIED UP IN DETRITIVORE BIOMASS RATHER THAN BEING RAPIDLY MINERALIZED TO CO₂. DIFFERENCES IN THE LENGTH OF AGING AT WHICH VARIOUS DETRITAL SOURCES BECOME AVAILABLE TO DETRITIVORES COULD RESULT IN A TEMPORAL PARTITIONING OF FOOD RESOURCES & SHOULD BE CONSIDERED IN ATTEMPTING TO UNDERSTAND THE DYNAMICS OF DETRITAL-BASED FOOD CHAINS.

THORSON, G. NO. 32
 1966. FACTORS INFLUENCING THE RECRUITMENT AND ESTABLISHMENT OF
 SOME BENTHIC COMMUNITIES
 MARINE BENTHIC COMMUNITIES
 NETHERLANDS J RES 3(2):267-293.

THE "PARALLEL" COMMUNITIES CONCEPT STATES THAT THE SAME TYPE OF
 SEDIMENT SUBSTRATUM AT ABOUT THE SAME DEPTH WHETHER IN COLD,
 TEMPERATE OR WARMER REGIONS, WOULD BE INHABITED BY A SERIES OF
 MACROFAUNA-COMMUNITIES, IN WHICH THE QUANTITATIVELY PREDOMINATING
 ANIMALS WILL BELONG TO THE SAME GENERA BUT TO DIFFERENT SPECIES.
 SUPPORT FOR THE PARALLEL COMMUNITY CONCEPT INCREASED FROM 1957
 TO 1965 WITH THE IDENTIFICATION OF 21 AND 37 PARALLEL COMMUNITIES,
 RESPECTIVELY. TWO IDENTIFICATIONS ARE SITED AS HAVING SPECIAL IMPORTANCE
 TO THE ULTIMATE RECRUITMENT OF A SUBSTRATUM BE MET BY THE
 SPECIES. 1) THERE ARE MANY BARRIERS THAT MUST BE MET BY THE
 PLANKTONIC LARVAE OF THE MACROBENTHOS (2) AFTER METAMORPHOSIS AND
 SETTLING, SPECIES MUST PASS A NEW SET OF BARRIERS ON THE MEIOFAUNA
 AS WELL AS THE MACROFAUNA LEVEL. AND PASS A HEAVY "SURVIVAL-OF-THE-
 FITTEST FIGHT," IN WHICH NOT ONLY THE TRADITIONAL PREDATOR (E.G. CRAB
 GASTROPODS, SEA-STARS), BUT ANIMALS FROM MANY GRPS. USUALLY REGARDED
 AS FULLY OR REL. HARMLESS, TAKE THEIR HEAVY TAX.

WARWICK, R. M. NO. 09
1979. POPULATION DYNAMICS AND SECONDARY PRODUCTION OF BENTHOS
IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C. PRESS; 1-24
THE CONTRASTING POPULATION DYNAMICS OF MACROFAUNA & MEIOFAUNA ARE
DISCUSSED IN RELATION TO THEIR REPRODUCTIVE BIOLOGY & TO THE
PROBLEMS INVOLVED IN CALCULATING THEIR PRODUCTION.

WARNICK, R.M., C.L. GEORGE AND J.R. DAVIES
 1978. NO. 96
 ANNUAL MACROFAUNA PRODUCTION IN A VENUS COMMUNITY
 ESTUARINE COASTAL MAR SCI 7: 215-241.

A STATION REPRESENTATIVE OF THE VENUS COMMUNITY IN CARMARTHEN BAY, S. WALES, HAS BEEN SAMPLED REGULARLY BETWEEN FEBRUARY 1974 & MARCH 1975 WITH A KNUDSEN SAMPLER, DAY GRAB & NATURALIST'S DREDGE. ESTIMATES OF ANNUAL PRODUCTION OF THE 15 MOST IMPORTANT MACROFAUNA SPECIES IN THE COMMUNITY HAVE BEEN MADE USING THE TECHNIQUES OF COHORT GROWTH ANALYSIS. ANNUAL PRODUCTION, MEAN ANNUAL BIOMASS (G ASH-FREE DRY WT./M²) & THE P/B RATIO FOR EACH SPECIES WERE AS FOLLOWS: PHARUS LEGUMEN; P = 16.119, B = 28.816, P/B = 0.56. SPIOPHANES BOMBYX; P = 3.345, B = 0.688, P/B = 4.86. ENSIS SILIQUA P = 1.372, B = 5.100, P/B = 0.27. NEPHTYS HOMBERGI; P = 0.935, B = 0.492, P/B = 1.90. DONAX VITTATUS; P = 0.721, B = 0.344, P/B = 2.10. MAGELONA PAPILLICORNIS; P = 0.685, B = 0.625, P/B = 1.10. VENUS STRIATULA; P = 0.616, B = 1.496, P/B = 0.41. OPHIURA TEXTURATA; P = 0.458, B = 0.672, P/B = 0.68. TELLINA FABULA; P = 0.292, B = 0.325, P/B = 0.90. GLYCERA ALBA; P = 0.281, B = 0.291, P/B = 0.97. SIGALION MATHILDAE; P = 0.165, B = 0.376, P/B = 0.44. LUMBRINERIS LATREILLI; P = 0.120, B = 0.092, P/B = 1.30. THARYX MARIONI; P = 0.015, B = 0.018, P/B = 0.79. ASTROPECTEN IRREGULARIS P = 0.0004, B = 0.073, P/B = 0.005. ECHINOCARDIUM CORDATUM; P = 0.012, B = 5.138, P/B = -0.02. THE TOTAL ANNUAL PRODUCTION WAS 25.815 G M⁻² YEAR⁻¹ & THE MEAN BIOMASS 45.793 G M⁻², GIVING AN OVERALL P/B FOR THE COMMUNITY OF 0.56. THESE VALUES ARE DISCUSSED IN RELATION TO OTHER COMMUNITIES FOR WHICH COMPARABLE DATA ARE AVAILABLE.

WATERS, T.F. NO. 23
 1969. THE TURNOVER RATIO IN PRODUCTION ECOLOGY OF FRESHWATER
 INVERTEBRATES
 AM NAT 103(930): 173-185.

THE TURNOVER RATIO OF FRESHWATER BENTHIC INVERTEBRATES, EXPRESSED AS THE RATIO OF A COHORT'S PRODUCTION TO THE MEAN STANDING CROP, HAS BEEN OBSERVED TO BE RELATIVELY CONSTANT, ABOUT 2.5 TO 5, WITH A MODE OF ABOUT 3.5. TURNOVER RATIOS WERE COMPUTED FROM ALLEN GROWTH-SURVIVORSHIP CURVES UNDER VARIOUS COMBINATIONS OF HYPOTHETICAL CONDITIONS TO DETERMINE THE THEORETICAL RANGE. THE EFFECTS OF VARYING CURVE SHAPE, INITIAL INDIVIDUAL WEIGHT RELATIVE TO MAXIMUM, FINAL POPULATION SIZE IN NUMBERS RELATIVE TO INITIAL POPULATION, & GROWTH PATTERN WERE TESTED WITH SEVERAL SERIES OF ALLEN CURVES. WITH MODERATE VARIATION IN THESE FACTORS AROUND THE MOST PROBABLE CONDITIONS, THE THEORETICAL TURNOVER RATIO VARIED FROM ABOUT 3 TO 4 FOR AQUATIC INSECTS, BUT IT IS PROBABLE SOMEWHAT LARGER FOR CRUSTACEANS. TURNOVER RATIOS WERE ALSO CONSIDERED AS EQUAL TO INSTANTANEOUS GROWTH RATES COMPUTED OVER AN ENTIRE SINGLE LIFE CYCLE FOR SEVERAL INVERTEBRATE SPECIES. THESE WERE SIMILAR TO THOSE OBTAINED WITH THE ALLEN CURVES, ALTHOUGH ABOUT 1 UNIT LARGER ON THE AVERAGE.

WATERS, T. F. NO. 31
 1977. SECONDARY PRODUCTIONS IN INLAND WATERS
 SCIENTIFIC JOURNAL SERIES, MINN AGRIC EXPR STATION, NO. 9959

MEASUREMENT OF PRODUCTION IS BEING EMPLOYED AS AN INDICATOR OF THE HEALTH OF AN ECOSYS., ASSESSING THE EFF'T OF ENV. POLLUTION OR OTHER DISTURBANCE. FISH PRODUCT'N HAS BEEN USED SEV. TIMES TO EVALUATE SPORT FISH. MANAG'T PROGRAMS FOR PURPOSES OF INCREASED YIELD TO ANGLERS. THERE APPEARS LITTLE QUANTIFICATION OF THE RELATION BETW'N FISH-FOOD PRODUCT'N AND SCHOOL FISH YIELD, AT LEAST IN THE MOST READILY AVAILABLE LIT., BUT IT'S CLEAR IN MANY ENG. SUMMARIES THAT THE RUSSIANS PLACE GT. SIGNIF. ON SUCH INVESTIGAT'NS. ACCUMULATION OF EMPIRICALLY-BASED P/B RATIOS CONTINUES, ALTHO IT'S CLEAR NOW THAT, EXCEPT IN UNUS. CIRCUM., THE ANN. P/B RATIO IS A FUNC'N OF VOLTINISM AND MAY BE ASSUMED W/FAIRLY GD. PRECIS. PROVIDING VOLT'N IS KNOWN. FACTORS HAVING AN IMPOR. INFL'CE ON THE EST'N OF SECONDARY PRODUCT'N INCL: 1) FIELD SAMPL'G PROCED. AND THEIR REL'PS TO SAMPL'G ERROR 2) SYSTEMIC ERRORS E.G. SERIOUS UNDEREST'ES OF GROWTH RATES CAUSED BY CONTINUOUS HATCH'G OF YOUNG AND SIZE DIFF'L PREPARED OR L'GER INDIV. 3) REPRESENTATIVE SAMPL'G OF THE TOTAL POP. THRU TIME AND SPACE 4) ESTIMATES OF THE IMPOR'CE OF GAMETE PRODUCTION RATES AS A PROPOR'N OF TOTAL PRODUCT'N. IT APPEARS THAT MAXIMUM PRODUCTION RATES MAY EASILY REACH LEVELS OF 1000-2000 KG/HA/YR (WET WEIGHT) FOR EACH OF ZOOPLANKTON, BENTHOS AND HERBIVOROUS-DETRITIVOROUS FISHES, PROBABLY OF SEVERAL TIMES THESE LEVELS IN THE STREAMS, WHERE THE BIOTA OCCUPYING A SMALL AQUATIC AREA MAY PROFIT FROM HIGH RATES OF ALLOCHTHONOUS IMPORT FROM A RELATIVELY LARGE TERRESTRIAL AREA. ANNUAL PRODUCTION AT EFFICIENCIES SECONDARY CONSUMERS (PREDATORS) HAVE BEEN ESTIMATED AT CONSIDERABLY LOWER RATES; TROPHIC LEVEL PRODUCTION RESEARCH, BETWEEN TROPHIC LEVELS REMAINS A FERTILE FIELD FOR RESEARCH, NECESSARILY REQUIRING QUANTITIES OF PRODUCTION DATA THAT HAVE ALREADY ADMITTEDLY ARE EXPENSIVE TO ACCUMULATE, ALTHOUGH SOME HAVE ALREADY BEEN ROUGHED OUT. A FRUITFUL GOAL OF RESOURCE MANAGEMENT WOULD APPEAR TO BE TO IMPROVE THESE EFFICIENCIES, EMPLOYING PRODUCTION DATA FOR EVALUATION.

WATERS, T. F. NO. 59
INFLUENCE OF BENTHOS LIFE HISTORY UPON THE ESTIMATION OF SECONDARY
PRODUCTION J FISH RES BOARD CAN 36: 1425-1430.

SYNCHRONY OF COHORTS IS ONE OF THE LIFE HISTORY FEATURES HAVING
MOST IMPORTANT EFFECTS UPON THE ESTIMATION OF BENTHIC SECONDARY
PRODUCTION, BECAUSE MOST METHODS DEPEND HEAVILY UPON RECOGNITION
OF DISCRETE COHORTS. THE HYNES METHOD, INTENDED TO CIRCUMVENT THE
NECESSITY OF COHORT DISTINCTION, STILL DEPENDS UPON DETERMINATION
OF TROPHIC LEVEL, VOLUNTINISM, MINIMUM & MAXIMUM SIZES, & LENGTH OF
AQUATIC LIFE. KNOWLEDGE OF PRECISE HABITAT, DISTRIBUTION, & USE OF
BEHAVIOR ARE ESSENTIAL FOR ACCURATE PRODUCTION ESTIMATES. USE OF
THE PRODUCTION: MEAN P/B OF BENTHIC INVERTEBRATES) TO APPROXIMATE
ABOUT 5 FOR COHORT P/B OF BENTHIC INVERTEBRATES) TO APPROXIMATE
PRODUCTION FROM STANDING STOCK DATA. ALSO MUST ACCOUNT FOR TROPHIC
LEVEL, VOLUNTINISM, & LENGTH OF AQUATIC LIFE. VARIOUS LIFE HISTORY
FEATURES ARE COMPARED AS TO THEIR PROBABLE EFFECT ON PRODUCTION
ESTIMATION; IN ADDITION, THEY ARE COMPARED TO THE EFFECT OF
SAMPLING ERRORS.

WATERS, T.F. AND G.W. CRAWFORD
 1973. NO. 27
 ANNUAL PRODUCTION OF A STREAM MAYFLY POPULATION: A COMPARISON
 OF METHODS
 LIMNOL OCEANOGR 18(2): 286-296.

THE ANNUAL PRODUCTION OF THE MAYFLY EPHEMERELLA SUBVARIA
 MCDUNNOUGH IN A SMALL CENTRAL MINNESOTA STREAM, LUXEMBURG CREEK,
 WAS ESTIMATED BY FOUR METHODS: A REMOVAL-SUMMATION METHOD, THE
 INSTANTANEOUS GROWTH METHOD, THE ALLEN CURVE, & THE HYNES METHOD.
 BASIC DATA ON STANDING CROP & GROWTH RATES WERE OBTAINED FROM A
 SERIES OF BOTTOM SAMPLES COVERING THE LIFE CYCLE OF THE MAYFLY.
 THE LIFE HISTORY OF E. SUBVARIA WAS CLEAR & SIMPLE, & THE DATA
 WERE PARTICULARLY AMENABLE TO PRODUCTION ESTIMATION BY ALL FOUR
 METHODS. THE FIRST THREE YIELDED ESTIMATES OF ANNUAL PRODUCTION
 THAT GENERALLY AGREED, RANGING FROM 26.4 TO 28.9 G M⁻². THE
 HYNES METHOD YIELDED AN ESTIMATE 15.2 TO 26.1% HIGHER, OR 33.3 G M⁻².
 COHORT TURNOVER RATIOS FOR THE FIRST THREE METHODS RANGED
 FROM 4.2 TO 4.6 (NOT CALCULABLE FOR THE HYNES METHOD); THE ANNUAL
 TURNOVER RATIO FOR THE FIRST THREE METHODS RANGED FROM 5.8 TO 6.3
 & WAS 7.2 FOR THE HYNES METHOD.

WEINBERG, S. NO. 61
 1978. THE MINIMAL AREA PROBLEM IN INVERTEBRATE COMMUNITIES OF
 THE MEDITERRANEAN ROCKY SUBSTRATA
 MAR BIOL 49: 33-40.

DIFFERENT WAYS OF OBTAINING INFORMATION ABOUT MINIMAL AREA ARE STUDIED. THE CLASSICAL SPECIES-AREA CURVE LACKS OBJECTIVITY. CURVES BASED ON SIMILARITY INDICES ARE OBJECTIVE, IN SO FAR THAT A CRITICAL THRESHOLD CAN BE DEFINED, WHERE ONE ADMITS THAT THE MINIMAL AREA IS REACHED. COMPARISON IS MADE BETWEEN SORESEN'S QUALITATIVE SIMILARITY INDEX (BASED ON PRESENCE-ABSENCE) & KULCZYNSKI'S QUANTITATIVE SIMILARITY INDEX (BASED ON NUMBERS OF INDIVIDUALS &/OR PERCENT COVER). IN THE SHALLOW WATER ROCKY HABITATS STUDIED, TWO TYPES OF COMMUNITY WERE DISTINGUISHED. THE FIRST, MINIATURIZED COMMUNITIES ARE FOUND IN DARK CAVES. THEIR MINIMAL AREA IS ABOUT 4,000 CM². THE SECOND, COARSER, COMMUNITIES OCCUR ON OPEN ROCKS, EITHER HORIZONTAL, SLOPING OR VERTICAL. THEIR MINIMAL AREA IS 20,000 CM². CALCULATIONS WERE BASED MAINLY ON OCTOCORALLIA (COELENTERATA) WHICH ARE ASSUMED TO BE CHARACTERISTIC OF THE COMMUNITY AS A WHOLE.

WELSH, B. L. NO. 78
 1975. THE ROLE OF GRASS SHRIMP, PALAEMONETES PUGIO, IN A TIDAL
 MARSH ECOSYSTEM
 ECOLOGY VOL 56, P 513-530

THE GRASS SHRIMP, PALAEMONETES PUGIO, IS A DOMINANT SPECIES UNIQUELY ADAPTED TO A HIGHLY STRESSED TIDAL MARSH EMBAYMENT. MONTHLY SAMPLING OF LENGTH & DRY WEIGHT REVEALED THAT ITS LIFE CYCLE WAS A SINGLE YEAR, WITH SPAWNING IN MAY, JUNE & JULY & MOST RAPID GROWTH IN LATE SUMMER & FALL. MARK & RECAPTURE ESTIMATES INDICATED THAT SHRIMP WERE PRESENT THROUGHOUT THE YEAR & THAT DENSITY PEAKED IN THE FALL (OVER 1.2 MILLION IN 0.01 KM² IN OCTOBER). PRODUCTION OF BIOMASS (GROWTH) EQUALED LOSS TO PREDATION (INCLUDING DECOMPOSITION) OVER THE ANNUAL CYCLE, AVERAGING 0.2 KCAL.M⁻². DAY⁻¹. RESPIRATION AVERAGED 1.1 KCAL.M⁻². DAY⁻¹. AVERAGE DAILY PRODUCTION PER SQUARE METER OF "TOTAL CONSUMABLE" (FECAL PELLETS = 0.2 KCAL) WAS 60% OF TOTAL INGESTION (DOM) = 0.7 KCAL. BIOMASS = 0.2 KCAL. DOM THUS OUTWEIGHED BIOMASS (2.9 KCAL); PRODUCTION OF FECES & DOM OBSERVATIONS BY SCANNING ELECTRON MICROSCOPE REVEALED THAT SHRIMP MACERATED DETRITUS INTO A HETEROGENEOUS ASSORTMENT OF UNEATEN PARTICLES BY PLUCKING AWAY THE CELLULAR MATRIX FROM SURFACES OF LARGE DETRITAL FRAGMENTS. THIS ACTION PROVIDED CAVITIES THAT BECAME HEAVILY INVADED BY PENNATE DIATOMS, & PARTICLES THAT BECAME SUSPENDED IN THE WATER COLUMN & POPULATED BY BACTERIA. NUTRIENT ANALYSES INDICATED WHICH SHRIMP EXCRETED BY LARGE QUANTITIES OF AMMONIA & PHOSPHATE WHICH TOGETHER WITH DOM RELEASE WAS PRESUMABLY RESPONSIBLE FOR HEAVY GROWTH OF MICROFLORA & INCREASED PROTEIN FRACTION IN BOTH FECES & LARGE & SMALL UNEATEN DETRITAL FRAGMENTS. PALAEMONETES PUGIO, WHILE SUPPORTING ITS OWN TROPHIC REQUIREMENTS, ACCELERATED BREAKDOWN OF DETRITUS, PREVENTING BLOCKAGES OR ACCUMULATIONS THAT MIGHT HAVE OCCURRED FROM PULSES OF EMERGING GRASS & MACROALGAL DETRITUS IN THE EMBAYMENT. THIS REPACKAGING INTO FECES, HETEROGENEOUS FRAGMENTS, DOM, SHRIMP BIOMASS MADE DETRITAL ENERGY AVAILABLE AT A VARIETY OF TROPHIC LEVELS, SMOOTHING OUT ORGANIC PULSES OVER TIME & SPACE, & RAISING

WHITTAKER, R. AND D. GOODMAN.

1979. NO. 35

CLASSIFYING SPECIES ACCORDING TO THEIR DEMOGRAPHIC STRATEGY. I.
POPULATION FLUCTUATIONS AND ENVIRONMENTAL HETEROGENEITY
AM NAT 113(2):185-200

THE EFFECTS OF ENVIRONMENTAL FLUCTUATION ON POPULATION GROWTH ARE MODELED AS ACTING THROUGH AN INTERACTION BETWEEN MICROHABITAT HETEROGENEITY & FLUCTUATIONS IN A REGIONALLY IMPORTANT VARIABLE. THE RESULTS ARE RICHER IN BIOLOGICALLY IMPORTANT DETAIL THAN ARE THE RESULTS OF INTRODUCING A SIMPLE NOISE TERM TO MODIFY A VARIABLE IN A MODEL, SUCH AS THE LOGISTIC. IN PARTICULAR, THE VALUE OF A PARAMETER DESCRIBING THE MEAN VALUE OF A RANDOM ENVIRONMENTAL VARIABLE AFFECTS BOTH THE VARIANCE & THE SKEW OF THE FREQUENCY DISTRIBUTION OF REGIONAL CARRYING CAPACITY FOR THE SPECIES, WHICH IN TURN WILL CONTRIBUTE TO DETERMINING THE SPECIES MANNER OF POPULATION FLUCTUATION.

PATTERNS OF FLUCT. CARRYING CAPAC. ARE BROADLY CLASSIFIED

ACCORDING TO SKEW. THREE BASIC PATTERNS EMERGE THAT CAN BE NAMED & RELATED TO THE SELEC. CIRCUMSTANCES THAT THEY ENGENDER. THEY INVOLVE, RESPECTIVELY, SURVIVAL IN A PREDOMINANTLY UNFAVORABLE ENVIRONMENT (ADVERSITY SELECTION), UTILIZATION OF AN UNPREDICTABLE & INTERMITTENTLY FAVORABLE ENVIRONMENT (EXPLOITATION SELECTION), & COMPETITION IN A PREDOMINANTLY FAVORABLE & FULLY OCCUPIED ENVIRONMENT (SATURATION SELECTION). USING THESE PATTERNS OF FLUCTUATION IN CONJUNCTION WITH TWO MODELS OF POPULATION GROWTH, POPULATION SIMULATIONS CAN BE OBTAINED WHICH SUGGEST DEMOGRAPHIC STRATEGIES APPROPRIATE IN EACH CONTEXT. THE REGIMES ARE NOT READILY CATEGORIZED AS TO THE INTENSITY OF R-SELECTION VERSUS K-SELECTION, WHICH SUGGESTS THAT THE R-K CLASSIFICATION IS OVERSIMPLIFIED. THE NATURE OF THE FLUCTUATIONS IN GROWTH PARAMETERS EXPERIENCED BY A GIVEN SPECIES ARE SUFFICIENTLY SENSITIVE TO PROPERTIES OF THE SPECIES ITSELF THAT MANY DIFFERENT ADAPTIVE DEMOGRAPHIES MAY BE REPRESENTED IN A COMMUNITY OCCUPYING A SINGLE ENVIRONMENT.

WIDDOWS, J., P. FIETH AND C.M. MORRALL
 1979. NO. 04
 RELATIONSHIPS BETWEEN SESTON, AVAILABLE FOOD AND FEEDING ACTIVITY
 IN THE COMMON MUSSEL MYTILUS EDULIS
 MAR BIOL 50: 195-207

THE FEEDING & METABOLIC RATES OF MYTILUS EDULIS L. OF DIFFERENT
 BODY SIZES WERE MEASURED IN RESPONSE TO CHANGES IN PARTICLE
 CONCENTRATIONS RANGING FROM 2 TO 350 MG 1-1. RATES OF OXYGEN
 CONSUMPTION WERE NOT SIGNIFICANTLY AFFECTED BY CHANGES IN
 SESTON CONCENTRATION, WHEREAS CLEARANCE RATES GRADUALLY
 DECLINED WITH INCREASING PARTICLE CONCENTRATION. PSEUDOFaecES
 PRODUCTION WAS INITIATED AT RELATIVELY LOW SESTON CONCENTRATIONS
 (<5 MG 1-1). MARKED SEASONAL CHANGES WERE RECORDED IN THE
 COMPOSITION OF SUSPENDED PARTICULATES (SESTON) IN AN ESTUARY
 IN SOUTH-WEST ENGLAND. TOTAL SESTON WAS SAMPLED AT FREQUENT
 INTERVALS THROUGHOUT AN ANNUAL CYCLE & ANALYSED IN TERMS OF:
 PARTICLE SIZE-FREQUENCY DISTRIBUTIONS, TOTAL DRY WEIGHT (MG 1-1),
 INORGANIC CONTENT, CHLOROPHYLL A, CARBOHYDRATE, PROTEIN & LIPID.
 THE PARTICULATE CARBOHYDRATE, PROTEIN & LIPID CONTENT PROVIDED
 AN ESTIMATE OF THE FOOD CONTENT OF THE SESTON. THE RESULTS ARE
 DISCUSSED IN TERMS OF THE "FOOD AVAILABLE" TO A NONSELECTIVE
 SUSPENSION FEEDER, SUCH AS M. EDULIS, DURING A SEASONAL CYCLE.
 THE EFFECT OF INORGANIC SILT IN SUSPENSION WAS MAINLY TO LIMIT
 BY "DILUTION" THE AMOUNT OF FOOD MATERIAL INGESTED RATHER THAN
 TO REDUCE THE AMOUNT OF MATERIAL FILTERED BY THE MUSSEL. IN
 WINTER, THE FOOD CONTENT OF THE MATERIAL INGESTED WAS 5%, & THIS
 INCREASED TO 25% DURING THE SPRING & SUMMER.

WILLIAMS, R. AND D. ROBINS

NO. 25

1979. CALORIFIC ASH, CARBON AND NITROGEN CONTENT IN RELATION TO LENGTH
AND DRY WEIGHT OF PARATHERMISTO GAUDICHAUDI IN NE ATLANTIC OCEAN
MAR BIOL 52: 247-252.

THE CALORIFIC, ASH, CARBON & NITROGEN CONTENT, LENGTH & DRY WEIGHT
WERE DETERMINED FOR THE HYPERIID PARATHERMISTO GAUDICHAUDI
(GUERIN). REGRESSION EQUATIONS FOR ALL THESE VARIABLES WERE
DETERMINED SO THAT THEY CAN BE ESTIMATED BY CALCULATION FROM
MEASUREMENTS OF LENGTH OF THE HYPERIID. MEAN VALUES FOR TOTAL DRY
NITROGEN & CARBON WERE $7.79 \pm 0.85\%$ & $36.80 \pm 4.18\%$ OF THE DRY
WEIGHT, RESPECTIVELY. THE CARBON TO CALORIFIC EQUIV FOR P.
GAUDICHAUDI WAS $10.37 \text{ KCAL G}^{-1}$ CARBON (9.13 KCAL G⁻¹ WHEN ADULT
CORRECTED FOR NITROGEN). THE CARBON TO CALORIFIC EQUIV FOR ASH-FREE ADULT
P. GAUDICHAUDI WAS $5.178 \text{ KCAL G}^{-1} \pm 1.309$ (4.510 KCAL G⁻¹
WHEN CORRECTED FOR NITROGEN). THIS LARGE VARIATION IN THE
CALORIFIC CONTENT (COEFFICIENT OF VARIATION OF 25.84%) CAN BE
ACCOUNTED FOR LARGELY BY VARIATION IN THE ASH CONTENT (COEFFICIENT
OF VARIATION OF 21.84%). THE CALORIFIC VALUE DETERMINED FOR P.
GAUDICHAUDI IS SIMILAR TO THAT MEASURED FOR OTHER CARNIVOROUS
CRUSTACEANS & ADDS SUPPORT TO THE HYPOTHESIS THAT ANIMALS WITH
HIGH CALORIFIC CONTENT HAVE A LOW FECUNDITY & AN ENERGY-RICH
STORE WHICH CAN BE USED AS A BUFFER DURING UNFAVORABLE PERIODS
IN THEIR LIFE.

WINBERG, G. G. (ED.). NO. 29
METHODS FOR THE ESTIMATION OF PRODUCTION OF AQUATIC ANIMALS
ACADEMIC PRESS, NEW YORK. 175P.
THIS IS A COMPREHENSIVE DISCUSSION OF THE PARAMETERS IMPORTANT
IN ESTIMATIONS OF SECONDARY PRODUCTION AND METHODS FOR
ESTIMATING SECONDARY PRODUCTION.

WITHERS, R.G. NO. 36
 1977. SHORE MACROBENTHOS ALONG THE SOUTH-WEST COAST OF WALES
 ESTUARINE COASTAL MAR SCI 5: 467-484.

THE DISTRIBUTION, ZONATION & ABUNDANCE OF SAND-DWELLING MACROFAUNA HAS BEEN EXAMINED ON 16 BEACHES BETWEEN MILFORD HAVEN & SWANSEA BAY & 116 SPECIES HAVE BEEN IDENTIFIED. RATHER GRAVELLY, COARSE TO MEDIUM SANDS PREDOMINATED ON THE BEACHES IN MILFORD HAVEN & AROUND THE ANGLE PENINSULA &, EXCEPTING THE MUDDY SHORE AT KILPAISON (ANGLE BAY) WHERE BOTH CARDIUM (CERASTODERMA) EDULE (L.) & ARENICOLO MARINA (L.) WERE COMMON. SPECIES DIVERSITY & BIOMASS WERE GENERALLY LOW. AROUND CARMARTHEN BAY THE BEACHES WERE LARGELY COMPOSED OF WELL-SORTED MEDIUM TO FINE SANDS &, DESPITE THEIR OFTEN CONSIDERABLE EXPOSURE, THEY CONTAINED A RICH & DIVERSE FAUNA. A CONSIDERABLE NUMBER OF SPECIES WERE ALSO RECORDED FOR SHELTERED SHORES ON THE SOUTH COAST OF THE GOWER PENINSULA BUT THE FAUNA OF MORE EXPOSED SHORES IN THIS REGION COMPARED UNFAVOURABLY WITH EQUIVALENT BEACHES IN CARMARTHEN BAY. OVERALL, SPECIES DIVERSITY WAS GREATEST ON SHELTERED TO SEMI-EXPOSED BEACHES COMPOSED OF FINE, BUT FAIRLY CLEAN, SAND. MEAN BIOMASS VALUES FOR EACH SHORE RANGED FROM 0.25 G DRY WT M-2 TO 13.7 G DRY WT M-2 & ALTHOUGH VALUES UP TO 25.7 G DRY WT M-2 WERE RECORDED LOCALLY ON A NUMBER OF SHELTERED BEACHES, THIS USUALLY RESULTED FROM AN ABUNDANCE OF ONE OR TWO RELATIVELY LARGE SPECIES. VERTICAL ZONATION WAS MOST APPARENT AMONG CRUSTACEANS, ESPECIALLY HAUSTORIID AMPHIPODS, & SOME POLYCHAETES. SETTLEMENT & GROWTH RATE DATA ARE GIVEN FOR TELLINA TENUIIS DA COSTA, T. FABULA GMELIN & ECHINOCARDIUM CORDATUM (PENNANT).

WOLFF, W. J. NO. 19
 A BENTHIC FOOD BUDGET FOR THE GREVELINGEN ESTUARY, THE NETHERLANDS
 AND A CONSID. OF THE MECH. CAUSING HI BENT. SEC. PRODUC. IN ESTUARIES
 COULL, B. C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 267-280

AN ANNUAL FOOD BUDGET FOR THE ZOOBENTHOS OF A TIDAL ESTUARY OF
 140 KM² IN THE NETHERLANDS IS CONSTRUCTED. ALTHOUGH THIS BUDGET IS
 PARTLY BASED ON SEVERAL QUESTIONABLE ASSUMPTIONS, THE FOLLOWING
 OBSERVATIONS SEEM RELIABLE. PRIMARY PRODUCTION IN SITU & IMPORT OF
 ORGANIC DETRITUS FROM THE COASTAL SEA APPEAR TO BE THE MOST
 IMPORTANT FOOD SOURCES. DETRITUS IMPORTED FROM SALT MARSHES OR
 OTHER TERRESTRIAL SYSTEMS IS RELATIVELY UNIMPORTANT. THIS TYPE OF
 FOOD BUDGET, WHICH ALSO HAS BEEN FOUND IN THE DUTCH WADDEN SEA, IS
 VERY DIFFERENT FROM THE BENTHIC FOOD BUDGETS OF AMERICAN ESTUARIES
 WHERE THE BENTHOS DEPEND PRIMARILY ON SALT MARSH OR MANGROVE
 DETRITUS & PRIMARY PRODUCTION IN SITU. THE MECHANISMS CAUSING HIGH
 BENTHIC SECONDARY PRODUCTION IN ESTUARIES ARE REVIEWED & SUPPLY OF
 CATEGORIZED INTO THREE TYPES (1) THOSE IN WHICH THE SUPPLY OF
 DISSOLVED NUTRIENTS FROM VARIOUS SOURCES CAUSES HIGH PRIMARY
 PRODUCTION; (2) THOSE WITH SUPPLY OF PARTICULATE ORGANIC MATTER THE
 FROM VARIOUS SOURCES TO ESTUARY WATERS; & (3) THOSE OF PARTICULATE
 SHALLOW NATURE OF THE ESTUARY CAUSES RAPID SINKING OF PARTICULATE
 ORGANIC MATTER, AS WELL AS RAPID TRANSPORT OF PARTICULATE ORGANIC
 MATTER BY TURBULENT DIFFUSION.

WOODIN, S. A. NO. 25
 1974. POLYCHAETE ABUNDANCE PATTERNS IN A MARINE SOFT-SEDIMENT
 ENVIRONMENT: THE IMPORTANCE OF BIOLOGICAL INTERACTIONS
 ECOL MONOGR 44:171-187.

SAMPLES OF INFAUNA AND MEASUREMENTS OF TEMPERATURE, OXYGEN, SALINITY, AND ALGAL COVER WERE TAKEN FROM JANUARY 1969 TO DECEMBER 1970 AT -1.2-FT TIDAL ELEVATION IN A MUD FLAT DOMINATED BY POLYCHAETES IN MITCHELL BAY, SAN JUAN ISLAND, WASHINGTON. SETTLEMENT SUCCESS OF ADULTS AFTER SPawning AND VARIABLE LARVAL SETTLEMENT NUMBERS OF THE FOUR LARGE AND NUMERICALLY IMPORTANT POLYCHAETE SPECIES, LUMBRINEIS INFILATA, AXIOTHELLA RUBROCINCTA, PLATYNEREIS BICANALICULATA & ARMANDIA BREVIS. NO CORRELATIONS WERE FOUND BETWEEN THE ABUNDANCES OF NUMERICALLY IMPORTANT SPECIES & PHYSICAL FACTORS. ENCLOSURES CONSTRUCTED OF 3-MM MESH PLASTIC SCREENING PLACED ON THE FLAT BECAME COVERED WITH DIATOMS. SETTLING JUVE NILES OF TUBE-BUILDING SPECIES, SUCH AS P. BICANALICULATA, AXIOTHELLA RUBROCINCTA, & L. INFILATA, BUILT TUBES IN THIS LAYER OF DIATOMS & THUS DID NOT REACH THE SPECIES, ARMANDIA BREVIS, SETTLING JUVENILES OF A BURROWING SPECIES, ARMANDIA BREVIS, BURROWED THROUGH THE DIATOM LAYER & REACHED THE SEDIMENT. THUS, CLEANING THE CAGE SURFACES OR REMOVING SPECIES WITHOUT DISTURBING REDUCED ABUNDANCES OF TUBE-BUILDING SPECIES. THE MANIPULATION OF TUBE-BUILDER ABUNDANCES SHOWED THAT THE BURROWING SPECIES RESPONDED TO SPACE VACATED BY TUBE BUILDERS BY INCREASED SETTLEMENT SUCCESS. RESULTS FROM BREVIS NUMBERS PER UNIT VOLUME EXPERIMENTAL VARIATION OF A. BREVIS DATA FROM UNMANIPULATED OF SEDIMENT IN THE LABORATORY & THE PRESENCE OF INTERSPECIFIC NATURAL AREAS ALSO DEMONSTRATED THE PRESENCE OF INTERSPECIFIC & INTRASPECIFIC COMPETITION FOR SPACE. CHANGES IN PHYSICAL FACTORS DUE TO ALGAL COVER HAD SOME IMPACT ON POPULATION LEVELS BUT THE COMPETITIVE INTERACTIONS & BEHAVIOR PATTERNS REVEALED ONLY BY OBSERVATIONS ON THE BEHAVIOR OF LIVING ORGANISMS & MANIPULATION OF THE INFAUNA, DEMONSTRATED THE IMPORTANCE OF BIOLOGICAL INTERACTIONS TO THE DETERMINATION OF SPECIES ABUNDANCE PATTERNS IN A SOFT-SEDIMENT ENVIRONMENT.

WOODIN, S. A. NO. 98
1977. GARDENING BEHAVIOR BY NEREID POLYCHAETES, EFFECTS ON SOFT
BOTTOM COMMUNITY STRUCTURE
MAR BIOL 44: 39-42

NEREID POLYCHAETES (NEREIS VEXILLOSA & PLATYNEREIS BICANALICULATA) ATTACH PIECES OF DRIFT ALGAE TO THEIR TUBE SURFACES. THE PRESENCE OF PERMANENT ALGAL COVER INCREASES THE PREDICTABILITY OF THE FOOD SUPPLY FOR AT LEAST THE HERBIVORES (INCLUDING THE NEREIDS) & THE DEPOSIT FEEDERS, & MODULATES THE TEMPERATURE & SALINITY STRESSES OF THE MARINE INTERTIDAL SOFT-BOTTOM ENVIRONMENT. HOWEVER, IT MAY AFFECT THE ACCESS OF ORGANISMS TO THE OXYGENATED WATER LAYERS ABOVE THE SEDIMENT SURFACE. THIS IS TRUE FOR POLYCHAETES THAT LIVE HEAD DOWNWARD IN VERTICAL TUBES. IT IS SUGGESTED THAT THE ATTACHMENT BEHAVIOR OF THE NEREID POLYCHAETES INCREASES THE ABILITY OF THE PLANT TO COLONIZE HABITATS BOTH TEMPORALLY & SPATIALLY.

YOUNG, D.K. AND D.C. RHOADS
1971. ANIMAL-SEDIMENT RELATIONS IN CAPE COD BAY, MASSACHUSETTS I. A
TRANSECT STUDY
MAR BIOL 11: 242-254.

BENTHIC MACROFAUNA & BOTTOM SEDIMENTS WERE SAMPLED AT 7 STATIONS ALONG A 24 KM LONG ONSHORE-OFFSHORE TRANSECT RANGING IN DEPTH FROM 12 TO 42 M IN CAPE COD BAY, MASSACHUSETTS, USA. HIGH FAUNAL DENSITY, BIOMASS & SPECIES DIVERSITY WERE RECORDED AT STATIONS DENSELY POPULATED BY TUBICULOUS POLYCHAETES. THESE TUBE MATS BIND & STABILIZE THE SUBSTRATUM, PROVIDING SOLID SURFACES FOR ATTACHMENT OF EPIZOANS. THREE SUSPENSION-FEEDING SPECIES, EUCHOME INCOLOR (POLYCHAETE), THYASIRA GOULDI (BIVALVE) & AEGINA LONGICORNIS (AMPHIPOD), CO-OCCUR WITH DEPOSIT-FEEDING SPECIES ON MUDS RESUSPENDED BY TIDAL CURRENTS. HYDROGRAPHIC PROFILES OF TEMPERATURE, SALINITY & TURBIDITY INDICATE THAT RESUSPENDED SILT-CLAY PARTICLES ARE ENTRAPPED IN DENSE WATER BELOW THE SUMMER THERMOCLINE, WHICH PERSISTS FROM MID-APRIL TO MID-OCTOBER. THE ZONE OF INTERSECTION OF THE THERMOCLINE WITH THE SEA FLOOR IN ABOUT 22 M OF WATER DEFINES A MAJOR BIOFACIES-LITHOFACIES TRANSITION. THIS OCOTONE IS CHARACTERIZED BY HIGH FAUNAL DENSITY, BIOMASS, & CAPE COD SPECIES DIVERSITY. BENTHIC POPULATIONS OF MACROFAUNA FROM CAPE COD BAY ARE LARGER THAN THOSE FROM BUZZARDS BAY, MASSACHUSETTS, & HAVE A WIDELY DIFFERENT TAXONOMIC & TROPHIC COMPOSITION.

YOUNG, D.K. AND M.W. YOUNG

NO. 66

REGULATION OF SPECIES DENSITY OF SEAGRASS-ASSOCIATED MACROBENTHOS:
EVIDENCE FROM FIELD EXPERIMENTS IN THE INDIAN RIVER ESTUARY, FLA.
J MAR RES 36(4): 569-593.

IN ORDER TO PROVIDE INSIGHT INTO THE REGULATION OF SPECIES DENSITIES OF SEAGRASS-ASSOCIATED MACROBENTHOS, FIELD EXPERIMENTS IN THE INDIAN RIVER ESTUARY, FLORIDA WERE INITIATED. IN THE SEAGRASS HALODILE WRIGHTI TO TEST EFFECTS OF (1) EXCLUDING PREDATORS BY CAGING, (2) ENCLOSING PREDATORS INSIDE CAGES, (3) ADDING DENSE POPULATIONS OF SUSPENSION FEEDERS, (4) PROVIDING ORGANIC ENRICHMENT, (5) REMOVING SEAGRASS, BLADES, & (6) ERECTING CAGES AT DIFFERENT TIMES. THE 11 MOST ABUNDANT SPECIES WERE SELECTED FOR STATISTICAL TESTING OF RESPONSES TO THE EXPERIMENTAL TREATMENTS. ANALYSES SHOWED THAT MACROBENTHIC SPECIES DIFFERED TREEDLY IN THEIR RESPONSES TO THE VARIOUS TREATMENTS OVER A PERIOD OF ONE YEAR. SEVERAL SPECIES HAD INCREASED DENSITIES WITH ORGANIC ENRICHMENT & ONE SPECIES HAD INCREASED DENSITIES WHEN A CAGE WAS ERECTED. SOME SPECIES HAD INCREASED DENSITIES WHEN SEAGRASS BLADES WERE CLIPPED WHILE OTHERS SHOWED DECREASED DENSITIES WHEN BLADES WERE REMOVED. CERTAIN SPECIES OCCURRED IN HIGH DENSITIES ONLY INSIDE PREDATOR EXCLUSION CAGES. THESE VARIATIONS IN RESPONSE DID NOT CONSISTENTLY CORRESPOND TO TAXONOMIC GROUPINGS OR FEEDING TYPES. THESE FIELD EXPERIMENTS MAY ENCOURAGE CAUTION BY MARINE ECOLOGISTS FISHING TO GENERALIZE FROM ONE SPECIES OR GROUP OF SPECIES TO THE COMMUNITY LEVEL OF ORGANIZATION.

YOUNG, P. C. AND V. A. WADLEY
 1979. NO. 72
 DISTRIBUTION OF SHALLOW-WATER EPIBENTHIC MACROFAUNA IN MORETON
 BAY, QUEENSLAND, AUSTRALIA
 MAR BIOL 53: 83-97.

THE DISTRIBUTION OF EPIBENTHIC PENAEID PRAWN POSTLARVAE HAS PREVIOUSLY BEEN SHOWN TO RELATE TO THE DEGREE OF MARINE INFLUENCES IN THE FLORA, SEDIMENT & WATER CONDITIONS IN LITTORAL & INFRA LITTORAL HABITATS IN MORETON BAY. THE POSTLARVAE ARE PART OF A COMPLEX FAUNAL ASSEMBLAGE OF APPROXIMATELY 400 MOBILE EPIBENTHIC SPECIES. SAMPLES OF THE ASSEMBLAGE FROM STATIONARY SITUATIONS THROUGHOUT MORETON BAY WERE ANALYSED BY MULTIVARIATE METHODS, TO DETECT WHETHER THE ENVIRONMENTAL INFLUENCES RELATED TO THE DISTRIBUTION OF PENAEID PRAWNS, WERE RELATED TO THE FAUNA AS A WHOLE. THIS WAS FOUND TO BE SO. THE FAUNA OCCURRED IN TWO GROUPS IN AREAS OF EITHER LESS MARINE OR MORE MARINE INFLUENCES. ANIMALS IN THE FIRST GROUP WERE LESS DIVERSE, WITH DISTRIBUTIONS UNRELATED TO DEPTH OR PRESENCE OF SEAGRASSES, BUT RELATED TO THE LEVEL OF MARINE INFLUENCES BETWEEN GEOGRAPHICAL AREAS SAMPLED. ANIMALS IN THE SECOND GROUP WERE CLOSELY RELATED TO DEPTH & PRESENCE OF SEAGRASSES, BUT NO OVERALL DIFFERENCES WERE ATTRIBUTABLE TO MARINE INFLUENCES APART FROM THOSE ATTRIBUTABLE TO DEPTH. TEMPORAL CHANGES IN SPECIES COMPOSITION WERE SMALLER THAN SPATIAL CHANGES, & CHANGES IN RELATIVE ABUNDANCE WERE, IN BOTH GROUPS, RELATED TO DIFFERENCES BETWEEN (I) SUMMER & WINTER, & (II) SPRING & THE REST OF THE YEAR.

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Lunz, John D.

Animal substrate relationships and productivity of invertebrate macrobenthos of Mississippi Sound and adjacent coastal areas; a bibliography with abstracts / by John D. Lunz, Harry L. Horstmann (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, 1981.

143 p. ; 27 cm. -- (Miscellaneous paper ; EL-81-12)

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1. Coastal ecology. 2. Fishes. 3. Invertebrates. 4. Mississippi Sound. I. Horstmann, Harry L. II. United States. Army. Corps of Engineers. Mobile District. III. U.S. Army Engineer Waterways Experiment Station. Environmental Laboratory. IV. Title V. Series:

Lunz, John D.

Animal substrate relationships and productivity : ... 1981.
(Card 2)

Miscellaneous paper (U.S. Army Engineer Waterways Experiment Station) ; EL-81-12.
TA7.W34m no.EL-81-12