ANIMAL SUBSTRATE RELATIONSHIPS AND PRODUCTIVITY OF INVERTEBRATE--ETC(U)

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

by

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18. **ABSTRACT**

   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.

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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).
ALLER, R.C. AND R.E. DODGE
1974. NO. 34
ANIMAL-SEDIMENT RELATIONS IN A TROPICAL LAGOON DISCOVERY BAY,
JAMAICA

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 REWORKING & 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 REWORKING 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 SETTLEMENT & GROWTH OF MOST 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 AMENALISM PRINCIPLE TO TROPICAL NEARSHORE ENVIRONMENTS.
ALLER, R.C. AND J.Y. YINGST
1978. NO. 02
BIOGEOCHEMISTRY OF TUBE DWELLINGS A STUDY OF THE SEDENTARY
POLYCHAETE AMPHITRITE ORNATA
J M AR RES 36(2): 201-254

MOST STUDIES OF NEAR INTERFACE SEDIMENTS ASSUME THAT CHEMICALLY &
BIOLOGICALLY IMPORTANT PROPERTIES ARE STRATIFIED VERTICALLY IN
A DEPOSIT. SAMPLING PATTERNS REFLECT THIS ASSUMPTION & LITTLE
ATTENTION HAS BEEN PAIRED 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 TERECELLID POLYCHAETE COMMON IN INTERTIDAL
AREAS. IT CONSTRUCTS A PERMANENT, MULTI-LAYERS, 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 NH4+, HP4-, Fe++, & POSSIBLY Mn++ & ATP
CONCENTRATIONS. THE BURROW WALL IS A SITE OF INTESTE DECOM
POSITION RELATIVE TO SURROUNDING SEDIMENT. PORE WATER GRADIENTS
AWAY FROM THE WALL SHOW A DECREASE IN ALKALINITY, NH4+, Fe++,
& Mn++. HIGHEST CONCENTRATIONS ARE FOUND IN THE BURROW WALL.
ATP, MEIOFAUNAL ABUNDANCE, & DNA (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.
THE THREE-DIMENSIONAL DISTRIBUTION OF SOLID PHASE SULFIDES,
FeS (ACID VOLATILE) & FeS2+S, DEMONSTRATES HIGHER
CONCENTRATIONS OF THESE COMPOUNDS & RATES OF SO4-REDUCTION IN
THE BURROW WALL THAN IN SURROUNDING SEDIMENT. DIFFUSION-REACTION
& STOICHIOMETRIC MODELS OF PORE WATER GRADIENTS AROUND THE BURROW
INDICATE THAT SO4-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. ET AL
1972. NO. 14
THE 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. 41
PREDATION BY DEMERSAL FISH AND ITS IMPACT ON THE DYNAMICS OF MACROBENTHOS
IN TENERE, K. & B. COULL (EDS). MAR BENT DYNAMICS, UNIV S. C. PRESS: 121-149

BANSE, K.
1979. NO. 29
ON WEIGHT DEPENDENCE OF NET GROWTH EFFICIENCY AND SPECIFIC RESPIRATION RATES AMONG FIELD POPULATIONS OF INVERTEBRATES.

ANNUAL NET GROWTH EFFICIENCY (NGE) IS APPROXIMATED HERE BY 100 PA/(PA+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 DECREASE WITH A -0.35 POWER OF WS RATHER THAN THE -0.25 POWER OF COMPARE PHYSIOLOGY. A POSSIBLE REASON MAY BE A TENDENCY 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. ET AL
1976 NO. 41
INTERTIDAL SANDS AND 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 SCOLT 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 TRENDS. THE ABUNDANCE & DIVERSITY OF CILIATE PROTOZOA 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.
1979.
NO. 5
A MODIFICATION OF THE HYNES METHOD FOR ESTIMATING SECONDARY
PRODUCTION WITH PARTICULAR SIGNIFICANCE FOR MULTIVOLTINE POPS.

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 COMPRISÉ 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 POIKILOOTHERMS,
LITTER WEIGHT, NEONATE WEIGHT LIFE SPAN, MATURATION TIME &. FOR
HOMEOTHERMS AT LEAST, BROOD OR GESTATION TIME. THE COMPLEX OF
THES FACTORS REDUCES RM/X IN LARGER ANIMALS OR, IN MORE
PHYSIOLOGICAL TERMS, RM/X IS SET BY INDIVIDUAL GROWTH RATE.
COMPARISON OF NEONATAL PRODUCTION WITH INGESTION & ASSIMILATION
SUGGESTS THAT LARGER MAMMALS PUT PROPORTIONATELY LESS EFFORT INTO
REPRODUCTION. DECLINING PARENTAL INVESTMENT & LONGER DEVELOPMENT
TIMES WOULD RESULT IF NEONATAL WEIGHT IS SCALLED 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.

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 "ASSOCIATIONS" ON MUD, MUDDY-SAND & SAND-BOTTOMS, & THOSE IN THE ELIZABETH RIVER. SPECIES GROUPINGS DISTINGUISHED A FEW SPECIES MOST FREQUENT AT ELIZABETH RIVER OR MUD & MUDDY-SAND SITES, LARGER NUMBERS OF SPECIES RESTRICTED TO MUDDY-SAND & SAND OR SOLELY TO SAND SITES, UBQUITOUS SPECIES, EPIFAUNAL SPECIES WHICH WERE MICROHABITAT-RESTRICTED, & SEASONAL SPECIES. AN ANALYSIS OF NUMERICALLY DOMINANT SPECIES IN THE DIFFERENT ASSOCIATIONS INDICATED THE RELATIVE IMPORTANCE OF UBQUITOUS SPECIES & SEASONALLY ABUNDANT SPECIES. COMMUNITY-STRUCTURE STATISTICS (SPECIES DIVERSITY, SPECIES 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.
1977, NO. 20
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 ESTUA-
RINE GRADIENT IN THE BRISBANE RIVER ESTUARY, AUSTRALIA, WAS INVEST-
igated by assessing 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 venice system
SALINITY ZONES. the more abrupt change along poikiohaline gradients
is governed by low salinity conditions. these patterns of
ESTUARINE ZONATION can be explained in terms of the distribution
& abundance of STENOHALINE MARINE, EURYHALINE MARINE, EURYHALINE
OPPORTUNISTIC, ESTUARINE ENDEMIC & FRESHWATER SPECIES.
BOROWSKY, B.
1980.
NO. 73
REPRODUCTIVE PATTERNS OF THREE INTERTIDAL SALT-MARSH GAMMARIDEAN AMPHIPODS
MAR BIIOL 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.
1978. NO. 93
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 DURING THE FALL & WINTER WERE CONSIDERABLY LOWER, PERHAPS
DUE TO THE INACTIVITY OF NATURAL PREDATORS. THE SURVIVORSHIP CURVE
APPROXIMATES THE TYPE 3 CURVE OF DEEVEY (1947).

MEAN LIFE EXPECTANCY IS LOW IN RECENTLY-SETTLED CLAMS; PEAKS WHEN
THE INDIVIDUAL REACHES 30.0 TO 34.9 CM (1 YEAR OF AGE), & REMAINS
FAIRLY HIGH FOR MOST OF THE REMAINDER OF LIFE. THE INTRINSIC RATE
OF NATURAL INCREASE (RMX) 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
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

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, PRIONOSPIO
CIRRIFERA, PARADIS GRACILIS & GLYCERA ROUXI. A THIRD GROUP OF
HIGH RANKING PRODUCERS SHOWN NO RESPONSE & REMAINED STABLE IN
BOTH NUMBERS & BIOMASS FOR THE PERIOD OF THE INVESTIGATION.
THESE INCLUDED CALOCARIS MACANDREAE, LUMBRINERIS FRAGILIS,
SPIOPHANES KROVERI & CHAETOZONE 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
PRODUCTIVITY 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
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 VINCTA 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.
1975. 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
OBSERVATIONS OF SET ABUNDANCE, TWO PERIODS OF SPANNING WERE DETER
MINED: ONE IN EARLY THROUGH MIDSUMMER, COINCIDING WITH THE
BEGINNING OF SPANNING AS DETERMINED FROM GONADAL EXAMINATIONS; & A
SECOND & LONGER PERIOD IN LATE FALL & EARLY WINTER, WITH AN
INCREASED PERCENTAGE OF PARTIALLY SPANNED & SPENT CLAMS. GAMETO
GENESIS CEASED IN DECEMBER THROUGH MARCH AS RESIDUAL GEMETES 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. SPANNING CORRELATED BEST WITH CHANGES
IN SALINITY TO APPROXIMATELY 5%. OVER ITS ESTUARINE RANGE,
SALINITY HAS A CONTROLLING EFFECT ON RANGIA SPANNING & RECRUITMENT
SEASONAL REDUCTION IN INPUT OF FRESHWATER (INCREASED SEAWATER
INTRUSION) IS NEEDED TO INDUCE SPANNING & 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.  
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 CALCULATION 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 SEDIMENTATION 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.
1975.
RELATIONSHIP BETWEEN SEDIMENT TEXTURE, SPECIES RICHNESS AND VOLUME OF SEDIMENT SAMPLED BY A GRAB
MAR B IOL 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 BENQUELA 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.
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 consideration of the quantitative relationships insofar as the existing measurements permit. Values for the standing crop & 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.
1965
NO. 38
DYNAMICS AND PRODUCTION OF A NATURAL POPULATION OF A FRESH WATER
AMPHIPOD, HYALELLA AZTECA
ECOL MONOG 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.
1977. NO. 81
MACROBENTHOS 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. ET AL.
1979. NO. 82
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 TO DETERMINE WHETHER 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 DETERIORATION 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. NO. 55
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.
AN EVALUATION OF EXPERIMENTAL ANALYSES OF POPULATION AND
COMMUNITY PATTERNS IN BENTHIC MARINE ENVIRONMENTS
IN TEMORE, K. & B. COWELL (EDS). MAR BIODYNAMICS, UNIV S.C. PRESS: 93-120

A BASIC OBJECTIVE OF SCIENCE IS TO DESCRIBE & UNDERSTAND THE
MECHANISMS BY WHICH VARIOUS NATURAL PATTERNS ARE PRODUCED & MAIN-
TAIRED. IN RECENT YEARS EXPERIMENTAL APPROACHES HAVE BEEN USED
WITH VARYING DEGREES OF SUCCESS IN EFFORTS TO UNDERSTAND THE MECH-
ANISTIC 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
APPRCIATING 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 PRECON-
CEPTIONS 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.
1978.
NO. 80
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, OHAUSTORIUS WASHINGTONIANUS & PARAPHOXUS
EPISTOMUS, THE ISOPOD, ANCINUS GRANULATUS; THE GASTROPOD, OLIVELLA
BAETICA, & THE SAND DOLLAR, DENDRASER EXCENTRICUS. COMPARISON OF
CURRENT COMMUNITY COMPOSITION WITH THAT OF A PREVIOUS STUDY
INDICATES CONSIDERABLE STABILITY OR PERSISTENCE OF THE FAUNA.
DORGES, J.
1977. NO. 15
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
MARESHES, BEACHES, SHELF AREAS, ESTUARIES, SHOALS, TIDAL FLATS, &
POINT BARS.
ECKMAN, J.E.
1979. No. 54
SMALL-SCALE PATTERNS AND PROCESSES IN A SOFT-SUBSTRATUM,
INTERTIDAL COMMUNITY

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 HYPOTHESES A
POSTERIORI: ORGANISMS MAY BE AFFECTED BY LOCALLY VARYING HYDRO
DYNAMIC ENVIRONMENTS PRODUCED BY BED RIPPLES. THE RESULTING
PERIODIC DISPERSION PATTERN APPARENTLY PERSISTS AFTER RIPPLES HAVE
DISAPPEARED. THESE RESULTS SUGGEST POTENTIAL PROBLEMS WITH
COMMONLY USED SAMPLE SIZES & MANIPULATIVE 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
ECOLGY. 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. PROVIDED WITH EXCESS 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 VARIED
DIRECTLY WITH TEMPERATURE, PEAKING AT 0.6 MYA PER SNAIL PER DAY IN
THE WARMEST MONTHS, BUT CEASING (AT = 5'C) 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 (385 KILOJOULES/
YR FOR A 4TH-YEAR SNAIL) THAN SMALLER, YOUNGER ONES (-218 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 (<10'C). IT WAS ALSO
REDUCED WHEN SNAILS COULD INTERACT. WITHOUT MOLLUSCAN PREY,
POLINICES FAILED TO GROW ON A MYA DIET. GROSS GROWTH EFFICIENCIES
WERE HIGH (-8%-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.
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 2.89 G/M² DRY FLESH WEIGHT WAS
FOUND AT (2) WHILE THE LARGEST AVERAGE BIOMASS OF SUBLITTORAL
INFAUNA OF 5.83 G/M³ WAS FOUND AT (1). FISH BIOMASS WAS 5.04 G/M²
AT (1) & 1.20 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.
1973
NO. 26
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., ET AL
1976.
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 distribution & composition of a north Adriatic benthic community, dominated by the brittle star Ophiomastix quinquemaculata (D.C.H.), 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 isobenthic 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 Ophiomastix-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 are examined, & the ecological function & meaning of the observed patterns is discussed.
PARTICLE SIZE SELECTION OF TWO DEPOSIT FEEDERS: THE AMPHIPOD COROPHINIUM VOLUTATOR AND THE PROBOSCIMID HYDROBIAS ULAE

THE FEEDING BIOLOGY COMPARISON AMONG AMPHIPOD COROPHINIUM VOLUTATOR AND THE PROBOSCIMID HYDROBIAS ULAE

SELECTED DEPOSIT FEEDERS IN THE MAR SH substitution. This study was conducted to investigate the feeding behavior and ecological role of these amphipods. The feeding success of Corophium volutator was compared to that of Hydrobioas ulae in a laboratory experiment. The results showed that C. volutator was more selective in particle size than H. ulae, indicating a higher ability to process smaller particles. This selectivity may be related to the habitat characteristics and the availability of food resources in each environment. The findings contribute to our understanding of the role of amphipods in the benthic food web and their potential impact on biogeochemical cycles in marsh ecosystems.
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): 73-83.

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, SPIOPHASES 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. COGHLI
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

MOBILE 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 CREGAN AND ONE POSITION, SOFT MUD IN LOCH ETIVE ON THE WEST COAST OF SCOTLAND. DISPERSION OF MOBILE SPECIES CHIEFLY ACCOUNTED FOR CLUSTERING PEAKS OCCURRING AT BLOCK SIZES CORRESPONDING TO LINEAR SCALES FROM ABOUT 1 TO 3.5 M IN CREGAN MUDDY 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. 1975. NO. 40
POPULATION STRUCTURE, FOOD RELATIONS AND ECOLOGICAL ROLE OF MARINE
OLIGOCHAETES, WITH SPECIAL REFERENCE TO MEIOBENTHIC SPECIES
MAR Btol 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
SPECIALIZATION (E.G. BACTERIA OR DIATOMS ATTACHED TO DETRITUS OR
SAND GRAINS). CONSEQUENTLY, FOOD SUPPLY CAN CONTROL THEIR
POPULATION STRUCTURE & DISTRIBUTION. FEW OLIGOCHAETES ARE,
APARENTLY, 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 SEEM TO
REPRESENT FINAL LINKS OF RATHER SHORT FOOD CHAINS. ECOLOGICALLY,
MARINE OLIGOCHAETES ATTAIN MAJOR IMPORTANCE ONLY IN LITTORAL
AREAS.
GLEMAREC, M. AND A. MENESQUEN
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 BRITANNY). 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 (AMPHIURID). TWO DIFFERENT DEMOGRAPHIC STRATEGIES APPEARED THAT CORRESPOND TO DIFFERENT BEHAVIOR DURING SETTLEMENT IN A NEW AREA. THE EVOLUTION 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.
GOLDSCHMIDT, M.B., ET AL.
1978. NO. 01
SULFATE REDUCTION, DIFFUSION, AND BIODIVERSITY IN LONG ISLAND SOUND SEDIMENTS, REPORT OF THE FDAM 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 & 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 WITH THE TRANSITION BETWEEN BOTTOM WATER &
PORE WATER OCCURRING WITHIN THE TOP 1 TO 2 CM. THE UPPER 8 CM
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 INTER-
PRETING 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, BIODIVERSITY) 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 POLYCHAETA WORM NEPHYS INCISA. & PRESENCE
OF ABUNDANT IRON-SULFIDE MINERALS IN THE UPPER 8 CM ALSO SUPPORT
THIS CONCLUSION. THE VERTICAL TRANSPORT OF PORE WATER CONSTITUENTS
ARISING FROM BIODIVERSITY 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
BIODIVERSITY 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

GRUSSENDORF, M. J.

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 SIGNIFICANT 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.
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 univoltine & 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 the size units used, is assumed to be linear, then numerical 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 univoltine. When the 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.  
1978. NO. 92  
INTERTIDAL 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 CONTORTED 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.
1977.
COMPARATIVE SPECIES RICHNESS, COMPOSITION, AND ABUNDANCE OF
INVERTEBRATES IN CARIBBEAN SEAGRASS MEADOWS
MAR BIIOL 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 SUR
ROUNDING 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 COMPOSITION WAS QUALITATIVELY
SIMILAR TO THAT REPORTED IN COMPAREABLE STUDIES OF TROPICAL & SUB
TROPICAL 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.
1976. NO. 33
BIOMASS AND PRODUCTION OF A BIVALVE COMMUNITY ON AN INTERTIDAL
MUD-FLAT

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 G ASH-FREE DRY WT M-2; PRODUCTION, P = 20-71 G M-2 YR-1)
& MERCENARIA MERCENARIA (L.) (B = 8-50 G M-2; P = 4-14 G M-2 YR-1)
ALTHOUGH MYTILUS EDULIS L. (B = 4-5 G M-2), VENERUPIS DECUSATA
(L.) (B = 0.4-2 G M-2) & VENERUPIS AUREA (Gmelin) (B = 0.6-1 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.
1977. NO. 99
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 PRO
LIFERATION & SUBSEQUENT SPawning. RECRUITMENT IS SPORADIC &
PROBABLY DEPENDS ON THE SPAWNING OF UPSTREAM POPULATIONS, WHERE
CONDITIONS ARE MORE FAVORABLE FOR LARVAL DEVELOPMENT. SURVIVOR
SHIP 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. NO. 76
THE BIOLOGY OF THE STOUT RAZOR CLAM, TEGELUS PLEBEIUS, ANIMAL
SEDIMENT RELATIONSHIP, FEEDING MECH & COMMUNITY BIOLOGY
CHESAPEAKE SCI 18(1): 58-66

SIX INTERTIDAL POPULATIONS OF TEGELUS PLEBEIUS, THE STOUT RAZOR
CLAM, & ASSOCIATED MACROINVERTEBRATES WERE SAMPLLED 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
P. 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 MLW. 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,
HAEMOTOPUS 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, MULINIA LATERALIS, NEREIS SUCINEA, &
PARAEPIONOSPI O PINNATA). THESE FINDINGS HAVE PROFOUND IMPLICATIONS
FOR THE DESIGN & INTERPRETATION OF POWER PLANT PREOPERATIONAL
POSTOPERATIONAL IMPACT STUDIES.
HOLM, R.F.
1978. 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,
ANHELIDA, & 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 (CONFINA 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
1980
NO. 32
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 PREDATORY DEMERSAL FISHES.
THIS RESULT WAS OBTAINED DESPITE THE EXCLUSION OF FISH WHICH
NORMALLY CONSUME LARGE NUMBERS OF INFANAL POLYCHAETES. A CAGING
EXPERIMENT SIMILAR TO WOODIN'S (1974) WAS PERFORMED IN THE CHANNEL
OF ELKHORN SLOUGH USING COMPARABLE CAGES & SIMILAR EXPOSURE
PERIOD. IN WOODIN'S EXPERIMENTS, THE EXCLUSION OF A SEDENTARY TUBE
BUILDER WAS ACCOMPANIED BY AN INCREASE IN A MOBILE DEPOSIT FEEDER.
THIS WAS INTERPRETED AS A COMPETITIVE RELEASE. IN OUR EXPERIMENT,
NO SEDENTARY SPECIES INHABITED THE CHANNEL & NONE WERE EXCLUDED;
NEVERTHELESS, THIS SAME MOBILE SPECIES INCREASED INSIDE THE CAGES.
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
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.
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.
PRODUCTION MAY BE EXPRESSED IN VARIOUS UNITS, PARTICULARLY BIOMASS
(MET OR DRY WEIGHT), NITROGEN CONTENT, OR CALORIFIC 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 QUANTIT-
ATIVE DETERMINATION OF THE FORMATION OF PRIMARY ORGANIC MATTER —
THE FIXATION OF SOLAR ENERGY BY PLANKTON & MACROPHYTES. FOR PLANK
TON 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
WOULD USUALLY BE EXTREMELY COMPLEX & TEDIOUS, THE COMPLEXITY CAN
BE GREATLY REDUCED BY CONCENTRATING ON THE PREDOMINANT FOODS OF
EACH ORGANISM & IGNORING SECOND-ORDER COMPONENTS. THIRDLY, THE
ECOTROPHIC COEFFICIENT MUST BE DETERMINED FOR EACH STEP IN THE
FOOD PYRAMID THAT LEADS FROM PRIMARY ORGANIC MATTER UP TO THE
PRODUCT. THE TERM ECOTROPHIC COEFFICIENT IS DEFINED BY IVLEV IN
TWO DIFFERENT WAYS. IN DISCUSSING THE FLOW OF ENERGY THROUGH AN
ECOSYSTEM, WHAT IS INVOLVED IS THE "DYNAMIC" ECOTROPHIC COEFFI-
CIENT, THE RATIO OF A CONSUMER'S INTAKE OF A PARTICULAR FOOD
ORGANISM TO THE LATTER'S PRODUCTION DURING SOME RATHER SHORT
TIME INTERVAL — USUALLY A YEAR. THE ENERGY CONTENT OF THE PRODUCTION OF
EACH FOOD PRESENT, MULTIPLIED BY THE CORRESPONDING DYNAMIC
ECOTROPHIC COEFFICIENT, GIVES THE ENERGY OF THAT TYPE INGESTED BY
THE CONSUMING ORGANISM DURING THE TIME UNIT CHOSEN; & THE SUM OF
JOHNSON, M.G.  
1971  NO. 52  
ANIMAL-SEDIMENT RELATIONS IN SHALLOW WATER BENTHIC COMMUNITIES  
MAR GEOl 11: 93-104.

NINTY 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 LOW IN THE ORDER OF SUCCESSION ARE THOSE SPECIES THAT ARE FOUND MORE FREQUENTLY ON OTHER SUBSTRATES. THESE 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 (BRILLOIN'S EQUATION) WAS FOUND TO BE VERY SENSITIVE TO THE OCCURRENCE OF TWO UBQUITOUS SPECIES. A HIGH CORRELATION WAS OBTAINED BETWEEN THE NUMBER OF SPECIES & THE INDEX OF DIVERSITY WHEN THE TWO UBQUITOUS 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 THAN IN AREAS WHERE THE SLOPE OF THE ENVIRONMENTAL GRADIENT IS GREATER. SIMILAR RELATIONS WOULD BE EXPECTED, HOWEVER, IN THE DEEP OCEA & IN CONTINUOUS STRATIGRAPHIC SEQUENCES IN THE GEOLOGIC RECORD.
JOHNSON, M.G. AND R.O. BRINKHURST
1971. NO. 19
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 ORGANIC MATTER (28%) IN
SEDIMENTS THERE, IN CONTRAST WITH LAKE ONTARIO SEDIMENTS (3-4%).
LOW UTILIZATION WAS ATTRIBUTED TO THE RELATIVELY GREATER
PROPORTION 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.B IM) (WHERE C IS THE
PROPORTION OF GROWTH TO RESPIRED & EXPORTED ENERGY & IS DERIVED
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

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 Loge R =
A1T + A2 Loge W, 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 = 8 T2/10.
JOHNSON, R.G. 

1974. NO. 50

PARTICULATE MATTER AT THE SEDIMENT-WATER INTERFACE IN COASTAL ENVIRONMENTS


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 QUARTZ PARTICLES WERE ENCRUSTED WITH ORGANIC MATTER. ALL OF THE SAMPLES CONTAINED FLORESCENT ORGANIC-MINERAL AGGREGATES IN AMOUNTS VARYING FROM 11 TO 71% PARTICLE ABUNDANCE. NEARLY ALL OF THE CLAY & SILT SIZE PARTICLES WERE INCORPORATED IN AN ORGANIC MATRIX. THE ORGANIC MINERAL AGGREGATES PROBABLY ARE THE PRODUCTS OF THE RECYCLING OF ORGANIC MATTER BY DEPOSIT 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 INADEQUATE 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.  
1977. NO. 51  
VERTICAL VARIATION IN PARTICULATE MATTER IN THE UPPER TWENTY  
CENTIMETERS OF MARINE SEDIMENTS  

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 PARTICLE SPECIES. 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 RECOLO  
ORIZATION 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 DEPTH TRANSECT 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.
NO. 37
SOME FACTORS AFFECTING THE COLONIZATION OF A DREDGED CHANNEL
MAR BIOD 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,
BIOMASS & NUMBER 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 & CLYMEMELLA TORQUATA HAD VIRTUALLY DISAPPEARED. ONLY
RELATIVELY UNCOMMON LAMELLIBRANCHS SUCH AS TELLINA AGILIS, LYONIA
HYALINA & MULINIA LATERALIS INCREASED AFTER DREDGING. DISTRIBUTION
OF SEDIMENT TYPES CHANGED AS A RESULT OF MODIFIED TIDAL
VELOCITIES IN THE CHANNEL. MUD & SILT WERE REMOVED BY THE DREDGE,
EXPOSING THE SAND UNDERNEATH, & SANDY STATIONS BECAME MUDIER 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
1979. NO. 60
SYSTEMATICS AND ECOLOGY OF BENTHIC PHYLLODOCIDAE (ANNELIDA:
POLYCHAETA) OFF THE COLUMBIA RIVER, U.S.A.

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 ANAITIDES ARE NEWLY DESCRIBED. ETEONE (MYSTA) BARBATA
IS NEWLY REPORTED IN THE NORTHEAST PACIFIC OCEAN. RANGES ARE
EXTENDED FOR ETEONE LONGA, ANAITIDES HARTMANAE & ANAITIDES
LONGIPES, THE LATTER TWO SPECIES NEW TO OREGON & WASHINGTON: E.
LONGA IS NEW TO OREGON. NEW RECORDS ARE GIVEN FOR ETEONE
CALIFORNICA & EULALIA LEVICORNUTA. THE LOCAL DISTRIBUTION,
INCLUDING DEPTHS & SEDIMENT TYPE(S), OF EACH SPECIES IS SUMMARIZED
THE DISTRIBUTIONS OF ALL SPECIES IN THE GENUS ANAITIDES 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

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. 1979. NO. 47
THE SHALLOW-WATER MACROBENTHOS OF A NORTHERN NEW ENGLAND ESTUARY
MAR B IOL 55: 69-78.

IN NOVEMBER 1973 THE BENTHIC MACROFAUNA OF TWO SHALLOW-WATER
AREAS IN THE LOWER SHEEPSCOT RIVER ESTUARY (NEW ENGLAND, 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 OVER-
RIDING ECOLOGICAL DETERMINANT OF THE OBSERVED COMMUNITY PATTERNS.
COMPARISONS WITH AN EARLIER INVESTIGATION IN 1955 DEMONSTRATE
DRAMATIC CHANGES IN DENSITY, DOMINANCE & SPECIES COMPOSITION.
THE 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 CARTESIAN DIVER MICRORESPIROMETRY, INCREASED WITH TEMPERATURE UP TO 25 C. REGRESSION COEFFICIENTS (B VALUES) DERIVED FROM A 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 NO. 90
BENTHIC INFANNA COMMUNITIES OFF THE COAST OF WASHINGTON AND IN
PUGET SOUND: IDENTIFICATION AND DISTRIBUTION OF COMMUNITIES
J. FISH RES. BOARD CAN. 27: 621-651

BENTHIC INFANNA 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 WASHINGTON DURING 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
GROUPINGS OF BENTHIC SPECIES IN THE INVESTIGATED AREA. TRELLIS-DIA
GRAMS OF INDICES OF AFFINITY AMONG THE STATIONS, BASED ON THE
PRESENCE OR ABSENCE OF SPECIES, INDICATED FOUR RATHER 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 WITHIN THE GROUPS WERE NOT SIGNIFICANT
& IT WAS CONCLUDED THAT THE ANALYSIS WAS ONLY PARTLY USEFUL FOR
DELMITING SPECIES GROUPS WITH ECOLOGICAL SIGNIFICANCE. THE Q-MODE
OF THE FACTOR ANALYSIS RESULTED IN THREE GROUPS OF STATIONS DISTRI-
BUITED IN BANDS PARALLEL TO THE COAST, & EACH GROUP OF STATIONS
(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 SYNCECOLOGY
WAS DISCUSSED.
LITTLE, C. AND W. NIX
1976, NO. 84
THE BURROWING AND FLOATING BEHAVIOUR OF THE GASTROPOD HYDROBIA ULVÆ
ESTUARINE COASTAL MAR SCI 4: 537-544.

THE BEHAVIOUR OF HYDROBIA ULVÆ 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.
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 PRO
BABILITY 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,
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.
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 SUBSTANTIALY HIGHER NUMBERS OF INDIVIDUALS & SPECIES THAN SINGLE (14-MIN) TRAWL-TONS. 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 OF SUCH PARAMETERS WITH THEIR RICHNESS & EQUITABILITY 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 VARIATIONS WERE PRIMARILY QUANTITATIVE WITH SOME SHORT-TERM ALTERATION OF COMMUNITY STRUCTURE. SEASONAL PEAKS OF NUMBERS OF INDIVIDUALS, NUMBERS OF SPECIES & SPECIES DIVERSITY USUALLY OCCURRED DURING SUMMER & FALL PERIODS. ALTHOUGH THERE WERE SOME VARIATIONS, A GENERAL PATTERN OF AN ANNUAL DOUBLE 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 & FUNCTIONAL) CHANGE. 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 PEAK LEVELS
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 ESTUARINE 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.
Luchcnco, J. and B.A. Menge
1978. COMMUNITY DEVELOPMENT AND PERSISTANCE 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 experiments (enclosures, 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 Asterias forbesi, Asterias vulgaris, & the snail Thais lapillus prey heavily on Mytilus, which is the functionally dominant competitor in the low (& mid) zone(s). When secondary succession is initiated by removal of all erect animals & plants, community development in the absence of these predators (predator exclusion) 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. Controls in these experiments (i.e., with predators present) usually either developed to, or remained as stands of Chondrus. At intermediate sites, patches of Mytilus occasionally escaped from predation, suggesting predation intensity is patchy in space & time. Persistence of Chondrus is thus 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 & achieves structural dominance. Periwinkle abundance decreases, & abundance & seasonality of ephemeral algae increase with increasing wave shock results of manipulations during both primary & secondary succession indicate that Littorina littorea, the only large
DEVELOPMENT RATES, LENGTH-AGE GROWTH RATES & LENGTH-WEIGHT RELATIONSHIPS WERE MEASURED FOR TWELVE SPECIES OF LARVAL CHIRONOMID FROM THE RIVER THAMES, UK, AT 10, 15 & 20 C. FROM THESE DATA WEIGHT-AGE GROWTH RATES WERE CALCULATED. THE RELATIONSHIP BETWEEN THE WEIGHT (W) OF A LARVA & ITS LENGTH (L) WAS DESCRIBED AS A POWER FUNCTION: W = ALB. THE EXponent B WAS FOUND TO DEPEND ON THE SIZE OF THE LARVA AT MATURATION, THE TYPE OF FOOD FED TO THE LARVA OF ABLABESMYIA MONILIS L. GREATLY EFFECTED GROWTH & DEVELOPMENT RATES. LARVAE OF CRICOTOPUS BICINCTUS (MEIG.) RESPONDED 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.
MACKENZIE, A.P.
1977. NO. 21
QUANTITATIVE STUDIES ON THE CHIRONOMIDAE (DIPTERA) OF THE RIVERS
THAMES AND KENNET. IV. PRODUCTION
ARCHEROL HYDROBIOI 80(3): 327-346.

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 FINESAND 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.

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 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.  
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 FOR MOST OF THE YEAR THE TOP 0.5-1 CM OF WESTERN BASIN SEDIMENT IS PELLETIZED. LESS DESTRUCTIVE SETTLING VELOCITY MEASUREMENTS OF SURFACE SEDIMENTS YIELD MEDIAN VALUES OF -1 CM SEC-2 FOR 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 REALISTIC MEASUREMENT OF THE PHYSICAL PROPERTIES OF LAKE ERIE SEDIMENTS, OF SEDIMENT EROSION & TRANSPORT, OR OF DIFUSION RATES OF PORE WATER SOLUTES CAN BE MADE WITHOUT UNDERSTANDING THE BIOLOGICAL PROCESSES ACTIVE IN FINE GRAINED SEDIMENT.
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, BIOLOGICAL ASSAYS & FIELD OBSERVATIONS. SOME EXPERIMENTS INVOLVING 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 FEEDERS AT INTERMEDIATE GRADERS,
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.  
1975: NO. 76  
BENTHIC ORGANISMS AND THE STRUCTURE OF MARINE ECOSYSTEMS  
J. FISH RES. BOARD CAN. 32(9): 1654-1663

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 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.
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 MACROZOOPLANKTON AND GELATINOUS HERBIVORES, THE TURNOVER OF MACROZOOPLANKTON, THE FOOD REQUIREMENTS OF THE FISH, AND THE PROPER TRANSFER EFFICIENCIES. ON THE BENTHIC SIDE 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.
1978.
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 CONTINUOUS RE-ADJUSTMENT OF
THE INTERTIDAL COMMUNITY IS RELATED TO THE SEASONAL CHANGE 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.
SEDIMENT PROCESSING IN A MARINE SUBTIDAL SANDY BOTTOM COMMUNITY: I. PHYSICAL ASPECTS.
J. MAR. RES. 35(3): 609-647.

NELSON, W.G.
1979.
AN ANALYSIS OF STRUCTURAL PATTERN IN AN EELGRASS (ZOSTERA MARINA L.) AMPHIPOD COMMUNITY

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 GENERATING 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 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 UNGATED CONTROLS, DUE TO AN INCREASED ACTIVITY OF DECAPOD PREDATORS.

THE IMPORTANCE OF COMPETITIVE INTERACTIONS WAS EVALUATED IN THREE WAYS: 1) THE MATRIX OF PRODUCT-MOMENT CORRELATION COEFFICIENTS WAS GENERATED FOR ALL COMMON SPECIES 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 SPECIES WERE CARRIED OUT WITH THREE OF THE MORE COMMON AMPHIPOD SPECIES. EVIDENCE FOR COMPETITION WAS SLIGHT. IN THE AMPHIPOD ASSEMBLAGE STUDIED, THERE IS NO COMPETITIVE DOMINANT WHICH MONOPOLIZES FOOD OR SPACE AT HIGH 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.
1980. NO. 30
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 NICHE "PROFILES"
WHICH DESCRIBES 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.
1975.
Dynamics and energetics of three deposit feeding benthic
invertebrate populations in Puget Sound, Washington
Ecol Monogr 45: 57-82

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 for the larger but rarer coexisting
species of the same feeding mode, the heart urchin Brisaster
Latifrons (Agassiz) & the sea cucumber Molpadia intermedia
(Ludwig). Monthly samples, taken for 1 yr at five stations in
Puget Sound representing different habitats, were used in
conjunction with laboratory measurements of respiration to assess
the effects of seasonal & spatial variation in growth, mortality, &
respiration on estimates of energy flow through these species
populations. Pectinaria larval settlement (2,900-24,000 animals/m2)
occurred at all locations in June 1970. Two to three age classes
of cohorts were present simultaneously. Pectinaria represented 4%
-26% of macrofaunal (> 1 mm) biomass, & 9%-47% of numbers at the
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 1.4-9.8 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 reproduction.
Such overestimates of population respiration from laboratory
measurements were most marked for Brisaster & Molpadia. These
latter estimates, while reflecting biomass data, unrealistically

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 directly depends on. 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 mine.
PETERTON, C.H. AND N.M. PETERTON
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 PATH
WAYS 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
CHAPTERS ROUGHLY CORRESPONDS TO THE FLOW OF ENERGY UP THE FOOD
CHAIN OF A COASTAL FLAT. IN OUR FINAL CHAPTER (6), WE ADDRES SOME
SPECIFIC APPLIED PROBLEMS THAT EMERGE IN MANAGING MAN'S ACTIVITIES
IN THE VICINITY OF INTERTIDAL FLATS.
PFAUNKUHME, O.
1979. NO. 10
ABUNDANCE AND LIFECYCLE 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, lifecycles &
reproductive behaviour of the most common tubificid species from
European boreal shores, Tubifex costatus, Tubifex pseudogaster &
Peloscolex Beneden & of the Naiadids Paranais litoralis & Amphi
chaeta Sannio. Abundance of the tubificid populations remains
relatively constant during the year. They reproduce after two
years of life Naiadid populations are characterized by considerable
annual fluctuations in abundance. Compared with asexual reproduc-
tion (paratomy), sexual reproduction plays a minor role. P.

Litoralis attains highest abundance in summer. A. Sannio develops
maxima of abundance in early spring & autumn which can be
correlated to food supply.
PORTER, R. G.
1976. 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.
Spawning occurred from late May to early September in both 1971 &
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.
1976.
NO. 8
STRUCTURE, DYNAMICS AND PRODUCTIVITY OF A POPULATION OF NUCULA
NITIDOSA (BIVALVIA, PROTOBRANCHIATA) IN THE GERMAN BIGHT
BER DT WISS KOMMN 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 LIVES 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.
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
1978. NO. 10
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 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
APARENTLY IN RESPONSE TO DAY LENGTH, SO THAT THEY WERE NEAREST
THE SURFACE IN JUNE & BURIED DEEPEST IN DECEMBER. THE MAXIMUM
DEPTH BURIED IN DECEMBER, BY AN ANIMAL WAS FOUND TO BE
PROPORTIONAL TO THE LENGTH OF ITS INHALENT SIPHON. DURING DECEMBER
THE ACCESSIBILITY OF M. BALTHICA TO KNOT (CALIDRIS CANUTUS (L.))
WAS REDUCED TO 4% OF THE TOTAL BIOMASS.
REES, C.P.
1975.
NO. 83
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
which numbers declined reaching a low in the midwinter months. The
breeding season extended from February to October, with major
peaks of activity occurring in March & August-September. Whereas
the spring peak was produced by the over-wintering generation, the
late summer peak was a product of the summer generation. The over
wintering 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.
1979. NO. 07.
SPACIAL CONFIGURATIONS GENERATED BY MOTILE BENTHIC POLYCHAETES.
HELGOLÄNDER 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,
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. ANAITIDES MUCOSA, A CARNIVOROUS SCAVANGER, OCCURS IN
MARKED PATCHES. JUVENILES OF SCOLOPIOS ARMIGER, A BURROWING
DEPOSIT FEEDER, LIVE IN SMALL AGGREGATES WHICH IN TURN
CONGLOMERATE TO LARGER ONES. ADULTS ARE SCATTERED WITHIN LARGER
CLUSTERS. HIGH DENSITY AREAS OF JUVENILES & ADULTS DO OVERLAP.
ANOTHER BURROWING DEPOSIT FEEDER, CAPITELLA CAPITATA, IS EVEN MORE
AGGREGATED. LOCAL ATTRACTORS MAY CAUSE CLUSTERS OF EXCEPTIONAL
INTENSITY. TERRITORIALITY IS EXHIBITED BY THE TUBE-DWELLING
SURFACE DEPOSIT FEEDING NEREIS 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
SVLT (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.
RHOADS, D.C.   NO. 30
1974. ORGANISM-SEDIMENT RELATIONS ON THE MUDDY SEA FLOOR
OCEANOGR 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 MUDDY 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 MUDD
RELATED TO MASS PROPERTIES OF THE BOTTOM AND 4) THE CHEMICAL
PROPERTIES OF THE SEDIMENT SURFACE TO 30CM 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 DIAGENESIS OF THE ESTUARINE SEAFLOOR
COULI 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 (RDP) is depressed to about one cm by
bioturbation & respiration activities. STAGE II (FALL)— THE
surficial layer of pellets experiences some destruction by
meiofaunal grazing (). The RDP is depressed to 2-3 cm & pore
water profiles in SO 4-4 NH 4-4 approach constant values to a depth of
3-6 cm. The seafloor is bound by microbial exudates (). STAGE III
(WINTER)— The pelletal surface decays, the RDP 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.
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
THE STANDING CROP OF BENTHIC INVERTEBRATES WAS DETERMINED & THEIR
PRODUCTIVITY WAS ESTIMATED; THE MATERIAL WAS EXAMINED WITH PARTI-
CULAR EMPHASIS ON THE SPECIES THAT WERE NOT ONLY IMPORTANT FISH
FOOD, BUT ALSO HAD NOT BEEN COLLECTED ADEQUATELY BY GEAR OF THE
TYPE USED IN PREVIOUS SURVEYS. THE GREATER DIVERSITY OF
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 INFANNA FROM ST. 1
WAS ONE HALF, & ITS BIOMASS WAS 1/16TH THAT FROM ST. 3A. AT ST. 1
THE DOMINANT SPECIES WERE CRANGON SEPTEMSPINOSA, ASTERIAS FORBESI,
HYDROIDS, PAGURUS LONGICARPUS, NEOMYSTIS AMERICANA, AMPHISA
VADORUM, & AMPHARETE ACUTIFRONS. OTHERS OF IMPORTANCE WERE
NASSARIUS TRIVITTATUS, CANCER IRORATUS, NEOANOPE TEXANA SAYI,
CORPHIUM SP., & TETRAEPHELIDAE. THE NEPTHSINCISAYOSSIDALMATULA-
NUCULA PROXIMA COMMUNITY AT ST. 3A INCLUDED ASTERIAS FORBESI,
NEOMYSTIS AMERICANA, CRANGON SEPTEMSPINOSA, RETUSA CANALICULATA,
NASSARIUS TRIVITTATUS, CISTENIDES GOULDII, & GEMMA GEMMA. LISTED
IN ORDER OF THEIR IMPORTANCE IN ANALYSES OF THE BIOLOGICAL ASSOCI-
ATIONS. 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 PER
CENTAGE OF ORGANISMS OF LARGE SIZE. IN ADDITION, THE CATCHING
EFFICIENCY OF AN OYSTER DREDGE IS LOW. CORRECTION FOR A MEAN
RICKER, W.E.
1978.
NO. 40
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. 1979. NO. 16
THE RELATIONSHIP BETWEEN ANNUAL PRODUCTION: BIOMASS RATIOS
AND LIFESPANS FOR MARINE MACROBENTHOS

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.
1977.
BENTHIC MACROFAUNAL DYNAMICS, PRODUCTION, AND DISPERSION IN AN
OXGEN-DEFICIENT ESTUARY OF WEST SWEDEN
J EXP MAR B IOL 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 & afaunal 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.

106
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 HETEROPTROPHS AT UTILIZING SINKING ORGANIC MATTER.
THE REGRESSIONS ALSO INDICATE, THROUGH COMPARISON WITH THE
LITERATURE, THAT BOTH BENTHOS & ZOOPLANKTON FOLLOW SIMILAR
EXPONENTIAL DECAYS IN QUANTITY 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.
NO. 23
BENTHIC-PELAGIC COUPLING IN THE MID-ATLANTIC BIGHT
IN COULL, B.C. (ED.). ECOL 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.
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 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 PERIOD OF INTENSIVE GROWTH OCCURS IN SPRING
BEFORE BREEDING. I. BALTICA IS THE DOMINANT SPECIES IN BOTH
HABITATS EXAMINED. 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.  
1956.  
OCEANOGRAPHY OF LONG ISLAND SOUND, 1952-1954. X. THE BIOLOGY OF MARINE BOTTOM COMMUNITIES  
Bull Bingham Oceanogr 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 5.38 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 Amelisca 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. Suspension feeders were clearly the major feeding types in coarser sediments, while selective and nonselective deposit feeders dominated the finer sediments. A new association of animals, the Nephtyus incisa-yoldia lipitula community is 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.
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 primary 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 M. RICHTER
1974. NO. 94
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
INDEPENDENTLY BOTH 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
CLAYEY MUD, SAND, & GRAVEL (70 CM DIAMETER, 25 CM DEEP). THE PLAT-
FORMS 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.
NO. 85
SPATIAL STRUCTURE OF AN INTERTIDAL MOLLUSCAN ASSEMBLAGE ON A
SHELTERED SANDY BEACH
MAR BIOL 46: 131-145.

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 SEPARATION BETWEEN THE MIDLITTORAL ZONE & SUBLITTORAL FRINGE 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.
1954.
NO. 46
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 THAT HAVE BEEN ANALYZED IN LARGE VOLUME FROM THE INVESTIGATIONS 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.
NO. 70.
THE RESPONSE OF MEIOFAUNA TO SEDIMENT DISTURBANCE

THE MEIOBENTHOS INHABITING AN INTERDIAL MUD BAR WERE DISTURBED BY
HAND-TURNING THE SEDIMENT OF A 9-M2 AREA WITH A SHOVEL &
MONITORING THE SUBSEQUENT RECOLONIZATION PROCESS. THE IMMEDIATE
IMPACT OF THE DISTURBANCE ON THIS COMMUNITY DOMINATED BY NEMATODA
(91%), COPEPODA(4%) & FORAMINIFERA(4%), WAS TO REMOVE MORE THAN 70%
MEIOFAUNA. HOWEVER, AFTER ONLY ONE TIDAL CYCLE, TOTAL NUMBERS OF
NEMATODES, COPEPODS, FORAMINIFERANS & OTHER MEIOFAUNA TAXA WERE
AT PREDISTURBANCE & 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
FLOCCULENT UPPER LAYER OF SEDIMENT WAS PROBABLY THE MAJOR
DISPERAL 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 COM-
POSITION, 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 (AMPHIPOXUS, PHORONIDS, BRACHIOPODS, RHYNCHOCOELOS,
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 OF INDIVIDUALS. MOLLUSCS & AMPHIPODS
WERE SLOWER IN APPEARANCE & ALSO WERE SIGNIFICANTLY AFFECTED BY
SEASONAL PATTERNS OF REPRODUCTION, & THUS DISPARSAL. ONLY THE
POLYCHAETES, OTHER CRUSTACEA, & THE TOTAL FAUNA SHOWED SPECIES
COLONIZATION PATTERNS WHICH INDICATED AN APPROACH TO AN
EQUILIBRIUM VALUE. SPECIES ABUNDANCE PATTERNS SHOWED A VARIETY OF
RESPONSES FROM STRONG SEASONAL INFLUENCES (MOLLUSCS & AMPHIPODS)
TO A CONTINUOUSLY INCREASING PATTERN (TOTAL FAUNA). THE DEMON
STRATION 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.  
1977, NO. 58  
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  
PATTERN 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 DEDUCED 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 THROUGH  
OUT SOUTHERN LATITUDES & THAT SUCH DATA WOULD ENHANCE  
ZOOGEOGRAPHICAL INTERPRETATIONS.
SOKOLOVA, M.N.
1972, NO. 88
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 PREDOM-
INANCE 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 HETERO-
TROPHIC MICROFLORA IN THE SEDIMENTS. IN DEALING WITH THE FEEDING
CONDITIONS OF DEEP-SEA MACROBENTHOS IN THE ATLANTIC OCEAN,
BIOLICAL CHARACTERISTICS WERE DEDUCED FROM LITERATURE DATA ON
THE COMPOSITION OF SEDIMENTS, THEIR REDOX POTENTIAL & ORGANIC
CARBON CONTENT. AS A RESULT OF THIS RESEARCH, EUTROPHIC & OLIGO-
TROPHIC 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 OF LABILE (DIGESTIBLE)
ORGANIC MATTER WITHIN SEDIMENTS WHICH ARE SUFFICIENT FOR DEPOSIT-
FEEDERS, 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 &
CONSEQUENTLY, BY SCARSE QUANTITIES OF DEPOSITED ORGANIC MATTER.
HERE, SUSPENSION-FEEDERS PREDOMINATE, ALTHOUGH THEIR POPULATION
DENSITY IS VERY LOW.
STONER, A.W. 1980  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 
GRANULOMETRIC 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/M2) 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 AMPHIPODS & 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.
SUBRAHMANIAM, 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. TRIPlicate MONTHLY SAMPLES WERE OBTAINED WITH A 0.0625 M2
& 10 CM DEEP METAL CORER FROM FOUR STATIONS ALONG A TRANSect,
& 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 & TROPHIC 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 DOMINANTS BECAME ESTABLISHED. THERE WERE
SLIGHT DIFFERENCES IN DOMINANCE HEIRARCHY 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, INNO. 68
DEVELOPMENT AND STABILITY OF THE FOULING COMMUNITY AT BEAUFORT,
NORTH CAROLINA
ECOL MONOG 47: 425-446.

COMMUNITY DEVELOPMENT WAS FOLLOWED FOR 21/2 TO 31/2 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-NOVEMBER 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 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 PATTERNS OF INITIAL
COMMUNITY DEVELOPMENT WERE OBSERVED BOTH WITHIN & BETWEEN YEARS.
RATHER OF PREPARING THE WAY FOR SUBSEQUENT ARRIVALS, MOST RESIDENT
ADULTS STRONGLY INHIBITED THE RECRUITMENT & GROWTH OF OTHER
SPECIES. SPECIES VARIED IN THEIR ABILITY TO RESIST SUBSEQUENT
INVASION AS ADULTS & IN THEIR ABILITY TO INVADE OCCUPIED SUBSTRATE
AS LARVAE. AFTER AN UNPREDICTABLE INITIAL DEVELOPMENTAL PHASE,
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 INVASING 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 RECRUITS OF A DIFFERENT SPECIES THAN THE
ORIGINALLY OCCUPANT. THE COMBINED ADDITION OF SPECIES & HIGH LARVAL
RECRUITMENT & SUBTRACTION OF SPECIES AS A RESULT OF ADULT
MORTALITY PRODUCED DRAMATIC CHANGES IN COMMUNITY STRUCTURE EACH
TEAL, J. M.
1957 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.
1977. NO. 44
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/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. DIFFERENCE 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.
1966. NO. 32
SOME FACTORS INFLUENCING THE RECRUITMENT AND ESTABLISHMENT OF
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 COMMUNITIES CONCEPT INCREASED FROM 1957
TO 1965 WITH THE IDENTIFICATION OF 21 AND 37 PARALLEL COMMUNITIES,
RESPECTIVELY. TWO CONDITIONS ARE SITED AS HAVING SPECIAL IMPORTANCE
TO THE ULTIMATE RECRUITMENT OF A SUBSTRATUM BY A MACROFAUNAL
SPECIES. 1) THERE ARE MANY BARRIERS THAT MUST BE MET BY THE
PLANKTIC LARVAE OF THE MACROBENTHOS) 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 PREDITOR (E.G. CRAB
GASTROPODS, SEA-STARS), BUT ANIMALS FROM MANY GROUPS, USUALLY REGARDED
AS FULLY OR REL. HARMLESS, TAKE THEIR HEAVY TAX.
WARWICK, R.M.
1979.
NO. 09
POPULATION DYNAMICS AND SECONDARY PRODUCTION OF BENTHOS
IN TENORE, K. & B. COULL (EDS). MAR BENTHOS 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.
WARWICK, R.M., C.L. GEORGE AND J.R. DAVIES
1978.
NO. 96
ANNUAL MACROFAUNA PRODUCTION IN A VENUS COMMUNITY

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 = 1.09.
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 = 0.201, B = 0.291,
P/B = 0.71. SIGALON MATHILDAE; P = 0.165, B = 0.376, P/B = 0.44.
LUMBRICERIS LATERELLI; 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 = 0.0094, B = 0.073, P/B = 0.05. ECHINOCARDIUM CORDATUM; P =
-0.012, B = 5.120, P/B = -0.02. THE TOTAL ANNUAL PRODUCTION WAS
25.815 G M-8 YEAR-1 & THE MEAN BIOMASS 65.793 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.
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.
MEASUREMENT OF PRODUCTION IS BEING EMPLOYED AS AN INDICATOR OF THE
HEALTH OF AN ECOSYSTEM, ASSESSING THE EFFECT OF ENVIRONMENTAL POLLUTION OR OTHER
DISTURBANCES. FISH PRODUCTION HAS BEEN USED SEVERAL TIMES TO EVALUATE
SPORT FISH MANAG'MENT PROGRAMS FOR PURPOSES OF INCREASED YIELD TO
ANGELERS. THERE APPEARS LITTLE QUANTIFICATION OF THE RELATION BETWEEN
FISH-FOOD PRODUCTION AND SCHOOL FISH YIELD, AT LEAST IN THE MOST
READILY AVAILABLE LIT. BUT IT'S CLEAR NOW THAT, EXCEPT IN UNUSUAL CIRCUMSTANCES, THE ANNUAL PRODUCTION RATIO IS A FUNCTION OF VOLTINISM
AND MAY BE ASSUMED WITH FAIRLY GO PRECISELY PROVIDING VOLTINISM IS KNOWN.
FACTORS HAVING AN IMPORTANT INFLUENCE ON THE ESTIMATE OF SECONDARY PRODUCTION INCLUDE:
1. FIELD SAMPLING PROCEDURE AND THEIR RELATION TO SAMPLING ERROR.
2. SYSTEMATIC ERRORS OF GROWTH RATES CAUSED BY CONINUOUS HATCH, DRIFT OF YOUNG AND SIZE DIFFERENTIATION.
3. REPRESENTATIVE SAMPLING OF THE TOTAL POPULATION THROUGH TIME AND SPACE.
4. ESTIMATES OF THE IMPORTANCE OF GAMETIC PRODUCTION AS A PROPORTION OF TOTAL PRODUCTION.
IT APPEARS THAT MAXIMUM PRODUCTION RATES MAY EASILY REACH LEVELS OF 1000-2000 KG/H/yr (wet weight) FOR EACH OF ZOOPLANKTON, BENTHOS AND HERBIVOROUS-DETRITIVOROUS FISHES, PROBABLY SEVERAL TIMES THESE LEVELS IN THE TROPICS, OR WHERE SPECIAL AREAS OF CONCENTRATION OCCUR, OR IN 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 RATES FOR SECONDARY CONSUMERS (PREDATORS) HAVE BEEN ESTIMATED AT CONSIDERABLY LOWER RATES THAN TROPICAL LEVEL PRODUCTION EFFICIENCIES BETWEEN TROPHIC LEVELS REMAIN A FERTILE FIELD FOR RESEARCH, NECESSITATING REQUIRING QUANTITIES OF PRODUCTION DATA THAT ADMITTEDLY ARE EXPENSIVE TO ACCUMULATE, ALTHOUGH SOME HAVE ALREADY BEEN ROUGHED OUT IN A FRUITFUL GOAL OF RESOURCE MANAGEMENT WOULD APPEAR TO BE TO IMPROVE THESE EFFICIENCIES, EMPLOYING PRODUCTION DATA FOR EVALUATION.
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, VOLTINISM, MINIMUM & MAXIMUM SIZES, & LENGTH OF
AQUATIC LIFE. KNOWLEDGE OF PREFERRED HABITAT, DISTRIBUTION, &
USE OF BEHAVIOR ARE ESSENTIAL FOR ACCURATE PRODUCTION ESTIMATES. USE OF
THE PRODUCTION:MEAN STANDING STOCK (P/B) RATIO (FAIRLY CONSTANT AT
ABOUT 5 FOR COHORT P/B OF BENTHIC INVERTEBRATES) TO APPROXIMATE
FROM STANDING STOCK DATA, ALSO MUST ACCOUNT FOR TROPHIC
LEVEL, VOLTINISM, & 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. 1978.
THE MINIMAL AREA PROBLEM IN INVERTEBRATE COMMUNITIES OF
MEDITERRANEAN ROCKY SUBSTRATA

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 SORENSEN'S
QUALITATIVE SIMILARITY INDEX (BASED ON PRESENCE-ABSENCE) &
KULCZYNSKI'S QUANTITATIVE SIMILARITY INDEX (BASED ON NUMBERS OF
INDIVIDUALS &/OR PERCENT COVER). IN THE SHALLOWWATER 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
OCUR 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. 1975. NO. 78
THE ROLE OF GRASS SHRIMP, PALAEMONETES PUGIO, IN A TIDAL MARSH ECOSYSTEM
ECOLOGY VOL 56, P513-530

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 SPANNING IN MAY, JUNE & JULY & MOST RAPID GROWTH IN LATE SUMMER & FALL. MARK & RECAPTURE ESTIMATES CONDUCTED QUARTERLY & QUADRAT NET ESTIMATES CALCULATED MONTHLY INDICATED THAT SHRIMP WERE PRESENT THROUGHOUT THE YEAR & THAT DENSITIES 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 CONSUMABLES" (F2CAL PELLETS = 0.8 KCAL DISSOLVED ORGANIC MATTER (DOM) = 0.7 KCAL BIOMASS = 0.2 KCAL) WAS 60% OF TOTAL INGESTION (2.9 KCAL); PRODUCTION OF FECES & DOM THUS OUTFLOWED BIOMASS PRODUCTION 15:2. MICROECOSM STUDIES & 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 THE SHRIMP EXCRETED 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 EMERGENT 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 REGIONAL ENVIRONMENTAL VARIABLE.
THE RESULTS ARE RICHER IN BIOLOGICALLY IMPORTANT DETAIL THAN ARE
THE RESULTS OF INTRODUCING A SIMPLE NOISE TERM TO MODIFY A VARI
ABLE 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 FLUCTUATING CARRYING CAPACITY ARE BROADLY CLASSIFIED
ACCORDING
TO SKEW, THREE BASIC PATTERNS EMERGE THAT CAN BE NAMED & RELATED
TO THE SELECTION CIRCUMSTANCES THAT THEY ENGENDER. THEY INVOLVE,
RESPECTIVELY, SURVIVAL IN A PREDOMINANTLY UNFAVORABLE ENVIRONMENT
(ADVERSITY SELECTION), UTILIZATION OF AN UNPREDICTABLE & INTER
MITTE NTLY FAVORABLE ENVIRONMENT (EXPLOITATION SELECTION), & COMPETITION IN A PREDOMINANTLY FAVORABLE & FULLY OCCUPIED ENVIRON
MENT (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
ABLES AS TO THE INTENSITY OF R-SELECTION VERUS 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 ENVIRON
MENT.
WIDDOWS, J., P. FIELTH AND C. M. WORRALL
1979. MAR. BIOL. 50: 195-207

RELATIONSHIPS BETWEEN SESTON, AVAILABLE FOOD AND FEEDING ACTIVITY IN THE COMMON MUSSEL MYTILUS EDULIS

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 L-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 L-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 AND ANALYSED IN TERMS OF:

- PARTICLE SIZE-FREQUENCY DISTRIBUTIONS,
- TOTAL DRY WEIGHT (MG L-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.
THE CALORIFIC, ASH, CARBON & NITROGEN CONTENT, LENGTH & DRY WEIGHT WERE DETERMINED FOR THE HYPERIID PARATHEMISTO 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 NITROGEN & CARBON WERE 7.79 ± 0.85% & 36.80 ± 4.18% OF THE DRY WEIGHT, RESPECTIVELY. THE CARBON TO CALORIFIC EQUIVALENT FOR P. GAUDICHAUDI WAS 10.37 KCAL G⁻¹ CARBON (9.13 KCAL G⁻¹ WHEN CORRECTED FOR NITROGEN). THE CALORIFIC VALUE FOR ASH-FREE ADULT P. GAUDICHAUDI WAS 5.178 KCAL G⁻¹ ± 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.), 1971, No. 29
METHODS FOR THE ESTIMATION OF PRODUCTION OF AQUATIC ANIMALS
ACADEMIC PRESS, NEW YORK, 175 P.

THIS IS A COMPREHENSIVE DISCUSSION OF THE PARAMETERS IMPORTANT
IN ESTIMATIONS OF SECONDARY PRODUCTION AND METHODS FOR
ESTIMATING SECONDARY PRODUCTION.
WITHERS, R.G.  1977.  NO. 36
SOFT-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.) &
ARENICOLA 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 AMPHIOPODS, & SOME POLYCHAETES. SETTLEMENT & GROWTH RATE
DATA ARE GIVEN FOR TELLINA TENUIS DA COSTA, T. FABULA GHELIN &
ECHINOCARDIUM CORDATUM (PENNANT).
WOLFF, W.J.
1977. 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 MIDDEN 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 &
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
FROM VARIOUS SOURCES TO ESTUARINE WATERS; & (3) THOSE IN WHICH THE
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.  
1974.  NO. 25  
POLYCHAETA ABUNDANCE PATTERNS IN A MARINE SOFT-SEDIMENT ENVIRONMENT: THE IMPORTANCE OF BIOLOGICAL INTERACTIONS  
ECOL MONOG 44:171-187.

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

NEREID POLYCHAETES (NEREIS VEXILLLOSA & 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 DOWNWARDS 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. NO. 39
ANIMAL-SEDIMENT RELATIONS IN CAPE COD BAY, MASSACHUSETTS I. A
TRANSECT STUDY.
MAR BOL 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 62 M IN CAPE COD BAY, MASSACHUSETTS, USA. HIGH FAUNAL
DENSITY, BIOMASS & SPECIES DIVERSITY WERE RECORDED AT STATIONS
DENSELY POPULATED BY TUBICOLOUS POLYCHAETES. THESE TUBE MATS BIND
& STABILIZE THE SUBSTRATUM, PROVIDING SOLID SURFACES FOR ATTACH-
MENT OF EPIZOAIS. THREE SUSPENSION-FEEDING SPECIES, EUCONE
INCOLOR (POLYCHAETEA), THYASIRA GOULDI (BIVALVE) & AEGININA LONGI-
CORNIS (AMPHIPOD), CO-OCUR WITH DEPOSIT-FeEDING SPECIES ON MUDS
RESUSPENDED BY TIDAL CURRENTS. HYDROGRAPHIC PROFILES OF TEMPER-
ATURE, SALINITY & TURBIDITY INDICATE THAT RESUSPENDED Silt-CLAY
PARTICLES ARE ENTRAPPED IN DENSE WATER BELOW THE SUMMER THERMO-
CLINE, 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 BIOFACES-LITHOFACIES TRANSITION. THIS
OCOTONE IS CHARACTERIZED BY HIGH FAUNAL DENSITY, BIOMASS, &
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
1978. 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
H ALODULE 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 MARKEDLY IN
THEIR RESPONSES TO THE VARIOUS TREATMENTS OVER A PERIOD OF ONE
YEAR. SEVERAL SPECIES HAD INCREASED DENSITIES WITH ORGANIC
ENRICHMENT & ONE INCREASED DEPENDING ON THE TIME 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 WISHING 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 STATIONS SITUATED THROUGHOUT MORETON BAY WERE ANALYSED BY MULTIVARIABLE METHODS, TO DETECT WHETHER THE ENVIRONMENTAL INFLUENCES RELATED TO THE DISTRIBUTION OF PENAEID PRANNS, 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)
Cover title.
"December 1981."
Final report.
"Prepared for U.S. Army Engineer District, Mobile."
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.W34e no.EL-81-12