United States
Environmental Protection
Agency

SR-104

EPA

Research and Development

GULF BREEZE LABORATORY

TITLES AND ABSTRACTS

1983 PUBLICATIONS IN PRESS AND IN PREPARATION

Prepared by

Environmental Research
Laboratory
Gulf Breeze FL 32

SEPTEMBER, 31, 1983

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Henry F. Enos
Laboratory Director

BAHNER, LOWELL H., REBEKAH A. RIGBY, AND LINDA A. FAAS. IN PREP. BIOAVAILABILITY OF KEPONE FROM SEDIMENTS TO SEVERAL ESTUARINE SPECIES. (ERL,GB 365).

ACCUMULATION OF KEPONE FROM WATER AND SEDIMENTS BY SIX ESTUARINE GENERA WAS STUDIED IN LABORATORY BIOASSAYS. IN FLOW-THROUGH BIOASSAYS WITH SEAWATER AS THE ONLY SOURCE OF KEPONE, FIDDLER CRABS (UCA PUGILATOR) AND LUGWORMS (ARENICOLA CRISTATA) BIOCONCENTRATED KEPONE FROM CONCENTRATIONS AS LOW AS 0.025 UG/L. BIOCONCENTRATION FACTORS (BCF'S) WERE 440-1060 FOR FIDDLER CRABS AND 2600-2800 FOR LUGWORMS. BOTH LUGWORMS SURVIVED THE INTENDED 28-DAY EXPOSURE TO 0.29 UG/L. DEPURATION OF KEPONE WAS VERY SLOW FROM BOTH FIDDLER CRABS AND LUGWORMS; TISSUE CONCENTRATIONS DECREASED OR 24 DAYS, RESPECTIVELY. ACCUMULATION OF KEPONE FROM JAMES RIVER SEDIMENTS CONTAINING 0.25 UG KEPONE/G WAS MINIMAL IN OYSTERS (CRASSOSTREA VIRGINICA), GRASS SHRIMP (PALAEMONETES PUGIO), BLUE CRABS (CALLINECTES SAPIDUS), AND SPOT (LEIOSTOMUS XANTHURUS) EXPOSED IN FLOW-THROUGH BIOASSAYS. BIOCONCENTRATION FACTORS INDICATE THAT UPTAKE BY GRASS SHRIMP AND SPOT WAS MAINLY FROM WATER, NOT FROM SEDIMENT INGESTION. FIDDLER CRBAS AND LUGWORMS EXPOSED TO JAMES RIVER SEDIMENTS INGESTED THE SEDIMENTS AND ACCUMULATED HIGH BURDENS OF KEPONE. NO LUGWORMS SURVIVED MORE THAN 21 DAYS EXPOSURE TO 0.25 UG KEPONE/G SEDIMENTS.

BIBA, DIANE MARY. 1983. EFFECTS OF AFLATOXIN ON THE BROWN BULLHEAD ICTALURUS NEBULOSIS. M.S. THESIS. AUBURN UNIVERSITY, AUBURN, AL. 53P. (ERL,GB X357).

BROWN BULLHEADS HAD RENAL LESIONS 25 DAYS AFTER A ONE-HOUR EXPOSURE TO 1.0 MGG/LITER AFLATOXIN 3-1 (AFB) DURING THE FIFTH DAY OF EMBRYONIC DEVELOPMENT, INDICATING A SIMILARITY TO THE EFFECTS OF AFB REPORTED FOR RAINBOW TROUT. RENAL LESIONS WERE NOT FOUND IN BROWN BULLHEADS AFTER EMBRYO EXPOSURE TO 0.5 MG/LITER AFB. LIVER HISTOLOGY AND ULTRASTRUCTURE OF CONTROL BROWN BULLHEADS WERE SIMILAR TO CHANNEL CATFISH, ICTALURUS PUNCTATUS. NO LESIONS WERE OBSERVED IN BROWN BULLHEAD LIVERS EXAMINED 25 DAYS TO EIGHT MONTHS AFTER EMBRYO EXPOSURE TO 0.5 MG/LITER OR 1.0 MG/LITER AFB. THE LACK OF LIVER TUMOR INDUCTION EIGHT MONTHS AFTER EMBRYO EXPOSURE TO 0.5 MG/LITER AFB OR 1.0 MG/LITER AFB SUGGESTS THAT LONGER INDUCTION TIMES OR HIGHER DOSAGES OF AFB ARE REQUIRED FOR TUMORIGENICITY IN BROWN BULLHEADS. A BENZO(A)PYRENE (BAP) ASSAY INDICATED NO INDUCTION OF THE MIXED-FUNCTION OXIDASE (MFO) SYSTEM IN BROWN BULLHEAD MICROSOMES EIGHT MONTHS AFTER EMBRYO EXPOSURE TO 0.5 MG/LITER AFB. LESIONS WERE NOT OBERVED IN LIVERS OR TRUNK KIDNEYS OF BROWN BULLHEADS 25 DAYS AFTER A ONE-HOUR EXPOSURE DURING THE FIFTH DAY OF DEVELOPMENT TO AN ORGANIC CONCENTRATE OF EFFLUENT FROM THE SOUTH TUSKEGEE WATER POLLUTION CONTROL PLANT, MACON COUNTY, ALABAMA. AFTER THREE INTERPRITONEAL INJECTIONS OF 1.7 MG/KG AFB AT 10-DAY INTERVALS, LIVERS OF BROWN BULLHEADS EXHIBITED LIMITED INDUCTION OF THE MFO SYSTEM AFTER A BAP METABOLISM ASSAY. THE MFO INDUCTION WAS PROBABLY RESTRICTED BY AFLATOXIN INHIBITION OF PROTEIN SYNTHESIS. INJECTION OF AFB CAUSED ACCUMULATION OF LIPOFUCHSIN AND HEMOSIDERIN WITHIN MACROPHAGE CENTERS IN THE LIVER, AND ULTRASTRUCTURALLY, MITOCHONDRIAL PYKNOSIS AND VESICULATION AND DEGRANULATION OF ROUGH ENDOPLASMIC RETICULUM OF HEPATOCYTES.

BOBBIE, RONALD J., FRED P. FISH, ROBERT L. SETTINE, AND DAVID C. WHITE. IN PRESS. CHARACTERIZATION OF THE FATTY ACID METHYL ESTERS FROM A MARINE BENTHIC SEDIMENT BY CAPILLARY GAS CHROMATOGRAPHY - MASS SPECTROMETRY. APPL. ENVIRON. MICROBIOL. (ERL,GB X008).

THE DIRECT COUPLING OF A GLASS CAPILLARY COLUMN GAS CHROMATOGRAPH TO A QUADRAPOLE MASS SPECTROMETER CAPABLE OF BOTH ELECTRON IMPACT AND CHEMICAL IONIZATION ANALYSES MAKES POSSIBLE THE RAPID IDENTIFICATION OF A GREAT NUMBER OF FATTY ACID METHYL ESTERS DERIVED FROM THE EXTRACTION OF BENTHIC MARINE SEDIMENTS. SINCE THE FATTY ACID COMPOSITION OF THE BENTHIC AND DETRITAL MICROBIOTA IS PROVING TO BE AN EXPEDITIOUS NON-SELECTIVE MEASURE OF THE POPULATION STRUCTURE, THIS COMBINATION OF TECHNIQUES HOLDS GREAT PROMISE OF BECOMING A VERY USEFUL TOOL IN MICROBIAL ECOLOGY.

BORTHWICK, PATRICK W., RICHARD M. MONTGOMERY, JAMES R. CLARK, JAMES M. PATRICK, AND E.M. LORES. IN PREP. FIELD CONFIRMATION OF A LABORATORY-DERIVED HAZARD ASSESSMENT OF THE ACUTE TOXICITY OF FENTHION (BAYTEX) TO PINK SHRIMP, PENAEUS DUORARUM (ABSTRACT). IN: PROCEEDINGS OF THE EIGHTH SYMPOSIUM ON AQUATIC TOXICOLOGY, ASTM. (ERL,GB 494).

FIELD STUDIES WERE CONDUCTED TO DETERMINE IF LABORATORY TOXICITY TEST PROTOCOLS, INCLUDING ASTM STANDARD PRACTICE METHODOLOGIES FOR PESTICIDE HAZARD ASSESSMENT, ACCURATELY PREDICT ENVIRONMENTAL RESPONSES (E.G., SHRIMP MORTALITY) UNDER FIELD CONDITIONS. TO EVALUATE THE APPLICABILITY AND PREDICTIVENESS OF LABORATORY DATA, FENTHION (BAYTEX, A MOSQUITO CONTROL AGENT) WAS APPLIED TO COASTAL JUNCUS MARSHES IN A SERIES OF TRUCK-MOUNTED ULTRA-LOW VOLUME (ULV) ADULTICIDE OPERATIONS AND A DIRECT APPLICATION OF FENTHION TO THE WATER AT THE LARVICIDE RATE. CAGED PINK SHRIMP (PENAEUS DUORARUM) WERE DEPLOYED IN FLOATING, COMPARTMENTED CAGES AT TWO FENTHION-SPRAYED SITES AND A CONTROL SITE. THE ANIMALS WERE OBSERVED FREQUENTLY OVER A 24-H PERIOD FOR POST-SPRAY MORTALITY. PERIODIC WATER SAMPLES WERE COLLECTED, PRESERVED, AND TRANSPORTED TO THE LABORATORY FOR GAS-CHROMATOGRAPHIC QUANTITATION TO CHARACTERIZE THE EXPOSURE CONCENTRATION REGIME AND FATE OF FENTHION AT THE CAGED-SHRIMP SITES. FIELD DATA WERE IN WHICH P. DUORARUM WAS EXPOSED TO FENTHION ACCORDING TO THE ASTM STANDARD PRACTICE FOR CONDUCTING ACUTE TOXICITY TESTS. ALSO, A PULSED-DOSE FLOWING WATER EXPOSURE OF P. DUORARUM, DESIGNED TO SIMULATE THE DIMINISHING POST-SPRAY FENTHION CONCENTRATIONS FOUND IN THE FIELD, PROVIDED ADDITIONAL LABORATORY EXPOSURE ASSESSMENT FOR PREDICITNG FIELD EFFECTS. RESULTS CONFIRMED OUR HYPOTHESIS THAT IF INITIAL FIELD CONCENTRATIONS WERE LOWER THAN THE NO-EFFECT CONCENTRATIONS (NEC) OBSERVED IN THE LABORATORY TESTS, WE WOULD NOT EXPECT FENTHION-INDUCED MORTALITY IN CAGED SHRIMP EXPOSED TO FIELD CONDITIONS. FURTHER, IF INITIAL CONCENTRATIONS IN THE FIELD EXCEEDED THE LABORATORY NEC, CAGED SHRIMP, MORTALITY WOULD OCCUR. A CONSERVATIVE ESTIMATE OF THE FIELD TOXICITY WAS ESTABLISHED USING THE LAORATORY ACUTE FLOW-THROUGH 96-H LC50 (95% CONFIDENCE INTERVAL) = 0.106 (0.092 TO 0.123) UG/L. HOWEVER, A MORE REFINED LABORATORY ESTIMATE OF FIELD EFFECT CONCENTRATIONS WAS OBSTAINED FROM THE PULSE-DOSE TEST IN WHICH FENTHION WAS METERED INTO THE EXPOSURE SYSTEM FOR 2 H TO OBTAIN A SPECIFIED MAXIMUM CONCENTRATION, THEN THE SYSTEM WAS FLUSHED WITH UNCONTAMINATED SEAWATER TO YIELD A 6 TO 8 H EXPOSURE. A NEC OF LESS THAN EQUAL TO 1.0 UG/L WAS ESTABLISHED FOR THIS EXPOSURE REGIME. FROM THIS ARRAY OF LABORATORY TESTS AND FIELD TREATMENTS, WE CONCLUDE THAT LABORATORY TOXICITY TESTS DID PREDICT THE RANGE OF SAFE AND LETHAL EXPOSURE TO FENTHION FOR PINK SHRIMP IN FIELD APPLICATIONS.

BOURQUIN, AL W., AND P.H. PRITCHARD. IN PREP. MICROBIAL DEGRADATION OF POLLUTANTS IN ESTUARINE/MARINE ENVIRONMENTS (ABSTRACT). IN: PROCEEDINGS OF THE CONFERENCE ON GENETIC CONTROL OF ENVIRONMENTAL POLLUTANTS, JULY 31, 1983 THRU AUGUST 3, 1983, BREWSTER ACADEMY, WOLFEBORO, NEW HAMPSHIRE. (ERL,GB 489).

INFORMATION IS PRESENTED ON ORGANIC POLLUTANTS FOUND IN ESTUARINE AND MARINE ENVIRONMENTS AND DIFFERENCES OBSERVED IN BIODEGRADATION CAPABILITIES FOR PESTICIDES AND OTHER TOXIC ORGANICS BETWEEN FRESHWATER, ESTUARINE, AND MARNE ENVIRONMENTS. A DESCRIPTION OF EXPOSURE ASSESSMENT CONCERNS FOR THE RELEASE OF "NEW LIFE" FORMS INTO THE ENVIRONMENT IS PRESENTED. THE ACCUMULATION OF POLCHLORINATED BIPHENYLS, POLYAROMATIC HYDROCARBONS, PESTICIDES, AND SOME PETROLEUM PRODUCTS IN ESTUARINE SEDIMENTS, WATER, AND BIOTA IS DESCRIBED AS POTENTIAL APPLICATIONS FOR GENETICALLY ALTERED MICROORGANISMS FOR THE PURPOSE OF DETOXIFICATION. CERTAIN ORGANIC POLLUTANTS (PHTHALATES) ARE KNOWN TO DEGRADE BIOLOGICALLY WHEN STUDIED IN THE LABORATORY; HOWEVER THEY TEND TO ACCUMULATE IN THE ENVIRONMENT, EVEN WITHIN ECOLOGICAL NICHES WHICH APPEAR TO BE OPTIMAL FOR THE DEGRADATION OF THE POLLUTANT. THE CONSIDERATION OF THE ENVIRONMENT, WHICH INCLUDES THE SUBSTRATE, CONTROLLING THE BIODEGRADATION PROCESS WITH THE MICROORGANISMS AS THE DRIVING FORCE IS DISCUSSED. SEVERAL CASE STUDIES ON SELECTED SYNTHETIC ORGANIC CHEMICALS SUGGEST THAT DEGRADATIVE PROCESSES IN ESTUARINE AND MARINE ENVIRONMENTS MAY DIFFER SIGNIFICANTLY FROM THOSE IN OTHER AQUATIC ENVIRONMENTS. NTA DID NOT DEGRADE IN ESTUARINE WATER SYSTEMS, BUT DID IN FRESHWATER SYSTEMS. FRESHWATER POPULATIONS PRE-EXPOSED TO P-NITROPHENOL (PNP) OR METHYL PARATHION (MP) DEGRADED THE COMPOUND MUCH FASTER THAN DID CONTROLS: NO ADAPTATION WAS SEEN IN ESTUARINE SYSTEMS. STUDIES WITH P-CHLOROPHENOL, PENTACHLOROPHENOL, PNP, AND MP IN FOUR DIFFERENT ENVIRONMENTS SHOWED THAT THE MICROBIAL DEGRADATION RSPONSE VARIED WITH THE ENVIRONMENT, AS WELL AS WITH THE COMPOUND. RISK ASSESSMENTS OF GENETICALLY ALTERED MICROORGANISMS REQUIRE DEVELOPING METHODS AND INFORMATION ON SURVIVAL, PERPETUATION, TRANSPORT, MONITORING, AND CONTROL TECHNIQUES.

BOURQUIN, AL W., P.H. PRITCHARD, AND M.L. FREDRICKSON. IN PREP. SEDIMENT-CORE LABORATORY TEST SYSTEM FOR ASSESSING THE FATE OF CHEMICALS IN THE AQUATIC ENVIRONMENT. APPL. ENVIRON. MICROBIOL. 33P. (ERL,GB 470).

AN AQUATIC BIODEGRADATION TEST SYSTEM, ECO-CORE, USING AN INTACT SEDIMENT-WATER CORE AND ITS ASSOCIATED MICROORGANISMS IN A STATIC LABORATORY SYSTEM IS DESCRIBED. THE EFFECTS OF THE SYSTEM'S DESIGN ON THE FATE OF METHYL PARATHION (MP) WAS STUDIED. SEDIMENT-WATER CORES TAKEN DIRECTLY FROM THE ENVIRONMENT WERE GENERALLY SLOWER TO DEGRADE MP THAN CORES "STRUCTURED" WITH SEDIMENT AND WATER IN THE LABORATORY. DEGRADATION RATES WERE SLOWER WHEN SEDIMENT TO WATER RATIOS WERE INREASED (WATER DECREASED) IN EITHER TYPE CORE. LABORATORY - AGED SYSTEMS WERE LESS MICROBIALLY REACTIVE THAN "FRESH" CORES WHEN 14-CO(SUBSCRIPT 2) AND DEGRADATION PRODUCTS OF 14-C-MP WERE MEASURED. THE TEST SYSTEM CAN BE USED TO MONITOR EFFECTS BY TOXIC POLLUTANTS ON MICROBIOLOGICAL ACTIVITIES. THE INHIBITION OF MP MINERALIZATION BY KEPONE IN NATURALLY AND ARTIFICIALLY CONTAMINATED SEIMENTS IS DESCRIBED. THIS STUDY DESCRIBES A LABORATORY TECHNIQUE FOR OBTAINING FATE OF ORGANIC CHEMICALS IN A SYSTEM WHICH INTEGRATED ALL FATE PROCESSES AND CAN BE USED TO ASSESS THE IMPACT OF TOXIC POLLUTANTS ON THE METABOLIC INTEGRITY OF THE MICROBIOLOGICAL COMMUNITY.

CLARK, JAMES R., DANIEL J. FISHER, AND JOHN P. CONNOLLY. 1983. EXPOSURE-DOSE-EFFECT TESTING WITH ESTUARINE FISHES (ABSTRACT). ESTUARIES. 6(3):330-331. (ERL,GB X459).

A PHARMACOKINETIC MODEL OF CONTAMINANT UPTAKE AND CLEARANCE IS BEING APPLIED TO COMPUTE DOSES FOR FISH EXPOSED TO CONTAMINANTS THROUGH WATER. THE DOSE, COMPUTED AS A FUNCTION OF EXPOSURE CONCENTRATION, DURATION OF EXPOSURE, AND UPTAKE AND CLEARANCE RATES, IS USED TO INTERPRET THE LETHAL RESPONSES OF FISH EXPOSED TO VARIOUS CONTAMINANT CONCENTRATIONS. THE MODEL CAN BE USED TO COMPUTE A WHOLE-BODY BURDEN, A RESIDUE CONCENTRATION IN AN AFFECTED ORGAN OR TISSUE, OR AS A MEASURE OF EFFECT SUCH AS INHIBITION OF ACETYLCHOLINESTERASE ACTIVITY. THIS APPROACH HAS BEEN TESTED WITH EXPOSURE-EFFECT DATA (WHOLE-BODY BURDENS OF ZINC AND ACETYLCHOLINESTERASE INHIBITION BY GUTHION) TAKEN FROM THE LITERATURE, AND IS NOW BEING TESTED WITH OUR TISSUE-SPECIFIC EXPERIMENTAL DATA FROM SPOT (LEIOSTOMUS XANTHURUS) EXPOSED TO ENDRIN. DOSES CALCULATED IN THIS MANNER CAN BE CORRELATED WITH LETHAL RESPONSES FOLLOWING ACUTE EXPOSURES AND APPLIED TO CONTAMINANT EXPOSURE MODELS TO GENERATE AN "EFFECTS MODEL" FOR CHARACTERIZATION OF ACUTE RESPONSES OF FISH TO CONTAMINANT SPILLS, MULTIPLE EXPOSURES OR PULSE DOSE REGIMES, AND IMPLEMENTATION OF WATER QUALITY STANDARDS. RESIDUE DATA OR SPECIFIC DOSE-EFFECT MEASUREMENTS, WHEN CORRELATED WITH LETHAL RESPONSES, CAN BE COMPARED WITH MONITORING DATA TO ASSESS THE POTENTIAL FOR ACUTE EFFECTS OR TO ESTIMATE A RELATIVE MARGIN OF SAFETY.

CLEVELAND, MARY ELIZABETH. 1983. BIOTIC AND ABIOTIC FACTORS AFFECTING SORPTION OF TOXIC COMPOUNDS TO NATURAL SEDIMENTS. M.S. THESIS. UNIVERSITY OF WEST FLORIDA, PENSACOLA, FL. 95P. (ERL,GB 496).

THE SORPTION OF RADIOLABELED KEPONE, OURSBAN, DIMILIN AND METHYL PARATHION (MPS) WAS OBSERVED IN STERILE AND NONSTERILE AQUATIC SEDIMENT SYSTEMS TO ADDRESS THREE ASSUMPTIONS IMPLICIT IN THE USE OF PARTITION COEFFICIENT AS A DESCRIPTOR OR EQUILIBRIUM ADSORPTION: (1) ADSORPTION KINETICS ARE RAPID AND THERFORE UNIMPORTANT TO FATE CONSIDERATIONS; (2) ADSORPTION EQUILIBRIUM IN INDEPENDENT OF INITIAL COMPOUND OR SOLIDS CONCENTRATIONS; AND (3) ADSORPTION IS REVERSIBLE. ADSORPTION WAS TWO-STEPPED. AN INITIAL RAPID PHASE ACCOUNTED FOR MOST OF THE TOTAL ADSORPTION, SUGGESTING THAT KINETICS ARE UNIMPORTANT TO EXPOSURE CONCENTRATION PREDICITONS. AN INVERSE RELATIONSHIP BETWEEN PARTITION COEFFICIENT AND SEDIMENT CONCENTRATION WAS OBSERVED, INDICATING THAT A SINGLE PARTITION COEFFICIENT IS NOT ADEQUATE TO FATE CONSIDERATIONS. THE IRREVERSIBLE ADSORPTION OF MPS WAS ATTRIBUTED TO THE BIOLOGICALLY MEDITAED FORMATION OF BOUND RESIDUES. THE EXTENT OF THE BINDING PROCESS WAS AFFECTED BY SEDIMENT CONCENTRATION, TEMPERATURE, AND ANAEROBIC CONDITIONS BUT UNAFFECTED BY SALINITY. THIS STUDY DEMONSTRATED THAT EXPOSURE CONCENTRATION PREDICITIONS FOR RAPIDLY DEGRADED COMPOUNDS SHOULD INCLUDE THE BIOLOGICAL PROCESSES AFFECTING THEIR FATE.

CONKLIN, P.J., D. DRYSDALE, D.G. DOUGHTIE, K.R. RAO, J.P. KAKAREKA, T.R. GILBERT, AND R.F. SHOKES. 1983. COMPARATIVE TOXICITY OF DRILLING MUDS: ROLE OF CHROMIUM AND PETROLEUM HYDROCARBONS. MAR. ENVIRON. RES. 10(2):105-125. (ERL,GB X398).

SAMPLES OF USED DRILLING MUDS COLLECTED DURING THE COURSE OF A SINGLE WELL DRILLING OPERATION EXHIBITED DIFFERENT DEGREES OF ACUTE TOXICITY TO SHEEPSHEAD MINNOWS AND GRASS SHRIMP. FOR MOLTING GRASS SHRIMP (PALAEMONETES PUGIO), THE 96-H LC50'S WERE 360 TO 14,560 PPM (UL/LITER); MANY OF THESE VALUES WERE CONSIDERABLY LOWER THAN THOSE REPORTED FROM PREVIOUS DRILLING MUD ASSAYS. HOWEVER, WHEN SOME OF THE MUDS USED IN THIS STUDY WERE TESTED ON SHEEPSHEAD MINNOWS (CYPRINODON VARIEGATUS) THE RESULTING 96-H LC50'S (6,300 TO 100,000 PPM) WERE WELL WITHIN THE RANGE OF PREVIOUSLY REPORTED VALUES. ALTHOUGH A NUMBER OF THE DRILLING MUD SAMPLES HAD RELATIVELY HIGH AMOUNTS OF CHROMIUM DUE TO THE ADDITION OF SODIUM CHROMATE, THERE WAS A LOW CORRELATION BETWEEN CHROMIUM CONCENTRATION AND TOXICITY. IN ONLY THREE DRILLING MUDS COULD CHROMIUM CONTENT ALONE ACCOUNT FOR THE OBSERVED TOXICITIES. FURTHERMORE, CHEMICAL /ANALYSIS REVEALED THE PRESENCE OF NO. 2 FUEL OIL-LIKE PETROLEUM HYDROCARBONS IN THE MUD SAMPLES. BASED ON THE RESULTS OF TOXICITY TESTS WITH NO. 2 FUEL OIL AND THE CONCENTRATIONS OF OIL PRESENT IN THE MUDS, THE TOXICITY OF THE MUD SAMPLES TO GRASS SHRIMP APPEARS TO BE LARGELY ATTRIBUTABLE TO THE PETROLEUM HYDROCARBON CONTENT.

CONNOLLY, JOHN P., MARY E. CLEVELAND, AND PARMELY H. PRITCHARD. IN PREP. VALIDITY OF PARTITION COEFFICIENT AS THE ADSORPTION DESCRIPTOR IN EXPOSURE CONCENTRATIONS PREDICTIONS: STUDIES WITH KEPONE AND METHYL PARATHION. WATER RES. (ERL,GB 415).

THIS WORK INVESTIGATES THREE MAJOR ASSUMPTIONS IMPLICIT IN THE USE OF PARTITION COEFFICIENT AS SOLE ADSORPTION DESCRIPTOR: (1) ADSORPTION KINETICS ARE UNIMPORTANT TO FATE AND TRANSPORT OF THE TOXIC CHEMICAL BECAUSE THEY ARE RAPID; (2) ADSORPTION IS A REVERSIBLE PROCESS; AND (3) EQUILIBRIUM CONDITIONS ARE INDEPENDENT OF THE INDIVIDUAL CONCENTRATIONS OF TOXIC CHEMICAL AND ADSORBING SOLID, DEPENDING ONLY ON THEIR RATIO. ADSORPTION OF KEPONE AND METHYL PARATHION WAS FOUND TO BE RAPID AND TWO-STEP, A FAST ADSORPTION FOR APPROXIMATELY 5 MIN. FOLLOWED BY A SLOWER ADSORPTION TO EQUILIBRIUM AT 1 TO 2 HR. KINETICS OF ADSORPTION INDICATED ADSORPTION RATE WAS CONTROLLED BY MASS TRANSPORT MECHANISMS. KINETICS OF METHYL PARATHION ADSORPTION WERE IDENTICAL FOR STERILE AND BIOLOGICALLY ACTIVE SYSTEMS TO THE POINT OF STERILE SYSTEM EQUILIBRIUM. CONTINUED DECREASE OF DISSOLVED 14C AND TOTAL MASS RECOVERY IN THE ACTIVE SYSTEM SUGGESTED DEGRADATION TO AN IRREVERSIBLY ADSORBED COMPOUND. THE RESULTS INDICATE THAT KINETICS CAN BE IGNORED FOR SMALL PARTICLE SIZE SEDIMENTS BUT THAT REVERSIBILITY OF ADSORPTION CANNOT BE ASSUMED. EQUILIBRIUM ADSORPTION OF BOTH COMPOUNDS AT CONSTANT SEDIMENT CONCENTRATION WAS DESCRIBED BY A LINEAR ISOTHERM. PARTITION COEFFICIENT WAS, HOWEVER, AN INVERSE FUNCTION OF SEDIMENT CONCENTRATION, DECREASING BY AS MUCH AS AN ORDER OF MAGNITUDE BETWEEN SEDIMENT CONCENTRATIONS REPRESENTATIVE OF SUSPENDED SEDIMENT AND SEDIMENT CONCENTRATIONS REPRESENTAIVE OF BED SEDIMENT. THEREFORE, A SINGLE PARTITION COEFICIENT IS INADEQUATE FOR EXPOSURE CONCENTRATION PREDICTIONS.

CONNOLLY, JOHN P. IN PREP. WASTOX: PRELIMINARY ESTUARY AND STREAM VERSION DOCUMENTATION. 103P. (ERL,GB X392).

WASTOX IS A BATCH ORIENTED COMPUTER PROGRAM THAT SOLVES THE MASS BALANCE EQUATIONS THAT DEFINE THE FATE OF TOXIC CHEMICALS IN AQUATIC SYSTEMS. THIS MANUAL DOCUMENTS A PRELIMINARY VERSION OF THE PROGRAM WHICH ANALYZES THE TIME-VARIABLE, PHYSICAL-CHEMICAL BEHAVIOR OF CHEMICALS. LATER VERSIONS WILL INCLUDE A STEADY-STATE SOLUTION SCHEME AND AN ANALYSIS OF TOXIC CHEMICALS IN AQUATIC FOOD CHAINS. THE KINETICS OF VOLATILIZATION SPECIFIED IN THIS VERSION ARE ORIENTED TO FLOWING SYSTEMS (STREAMS AND ESTUARIES) ALTHOUGH THE MODEL IS GENERALLY APPLICABLE TO ALL TYPES OF WATER BODIES.

COUCH, JOHN A., AND K. RANGA RAO, EDITORS. 1983. BIORATIONAL WORKSHOP, GULF BREEZE, FLORIDA, SEPTEMBER 15-17, 1982. EPA-600/X-83-054, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 64P.

THE GENERAL PURPOSE OF THE WORKSHOP WAS TO EVALUATE THE STATE-OF-THE-ART OF TESTING, AND THE SAFETY OF BIORATIONALS TO BIRDS, MAMMALS, AQUATIC ORGANISMS, PLANTS, AND INSECTS AND TO REVIEW THE PART OF SUBPART M OF THE GUIDELINES (GUIDLINES DOCUMENT FOR REGISTERING PESTICIDES IN THE U.S.: BIORATIONALS) DRAFTED BY THE ECOLOGICAL EFFECTS BRANCH, OFFICE OF PSTICIDES PROGRAMS (HED/OPP).

COUCH, JOHN A. 1983. DISEASES CAUSED BY PROTOZOA. IN: BIOLOGY OF CRUSTACEA: ECONOMIC ASPECTS: FISHERIES, CULTURE AND PATHOBIOLOGY, VOL. 6. ANTHONY J. PROVENZANO, EDITOR, ACADEMIC PRESS, NEW YORK, NY. PP. 79-111. (ERL,GB 380).

CRUSTACEA SERVE AS HOSTS TO SYMBIOTIC, COMMENSAL, PARASITIC, AND PATHOGENIC REPRESENTATIVES OF ALL MAJOR TAXA OF PROTOZOA. STUDIES OF MICROSCPORIDIAN EPIZOOTICS IN SHRIMP (VIOSCA, 1943; INVERSEN AND MANNING, 1959), CRAYFISH (PIXELL-GOODRICH, 1956), AND OTHER DECAPOD CRUSTACEA (PIXELL-GOODRICH, 1928; SPRAGUE, 1970A), AMOEBIC EPIZOOTICS IN CRABS (SPRAGUE ET AL., 1969; J.A. COUCH, UNPUBLISHED; NEWMAN AND WARD, 1973; JOHNSON, 1977), AND CILIATE PROTOZOAN OUTBREAKS IN SHRIMPS AND CRABS (COUCH, 1967A, 1978; OVERSTREET, 1973; LIGHTNER, 1975) DEMONSTRATE THE STRONG PERIODIC AND CHRONIC IMPACT OF PROTOZOA.

COUCH, JOHN A., W. PETER SCHOOR, WILL DAVIS, AND LEE COURTNEY. 1983. EFFECTS OF CARCINOGENS, MUTAGENS, AND TERATOGENS ON NONHUMAN SPECIES (AQUATIC ANIMALS): FOURTH ANNUAL REPORT NCI/EPA COLLABORATIVE PROGRAM. EPA-600/9-83-005, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 46P.

AQUATIC SYSTEMS AND ORGANISMS ARE UNDER BOTH LABORATORY AND FIELD STUDY IN ORDER TO DEVELOP INDICATOR, SCREENING, AND MODELING CAPABILITIES FOR DETECTION AND EVALUATION OF RISKS OF CACINOGENS, MUTAGENS, AND TERATOGENS. STUDIES INCLUDE BOTH GULF BREEZE LABORATORY PROJECTS AND COMPLEMENTARY, EXTRAMURAL PROJECTS. IN THE FOURTH YEAR OF THE PROGRAM, SEVERAL ADVANCES WERE MADE IN THE DEVELOPMENT OF LABORATORY AND FIELD CARCINOGEN ASSAYS, UTILIZING FISHES SUCH AS THE SHEEPSHEAD MINNOW (LIVER LESIONS VIA AFLATOXIN EXPOSURES), AND FRESHWATER CAT FISH (PAPILLOMATOUS-LIKE LESIONS VIA CHLORINATED EFFLUENT EXPOSURES). EMPHASIS IS STILL PLACED ON THE DEVELOPMENT AND UTILIZATION OF CRITICAL LIFE STAGE EXPOSURES (E.G., EMBRYO AND NEWLY HATCHED FRY EXPOSURES) IN ORDER TO EXPEDITE CARCINOGEN TESTS AND MINIMIZE TIME REQUIRED FOR TUMOROGENIC RESPONSES. PRENEOPLASTIC HEPATIC LESION DEVELOPMENT IN MENIDIA AT 12 WEEKS SUGGESTS PROMISE FOR THIS SPECIES AND EXPOSURE METHOD. A NOVEL APPROACH HAS SHOWN THAT TIGER SALAMANDERS MAY BE GOOD BIOCHEMICAL AND HISTOLOGIC INDICATORS OF THE PRESENCE OF CERTAIN CARCINOGENS (POLYCYCLIC AROMATIC HYDROCARBONS - PAH'S). SKIN AND LIVER TISSUES OF THE SALAMANDERS REVEALED INDUCED ENZYME ACTIVITY (MFO SYSTEM) FOLLOWING EXPOSURE TO THE PAH, PERYLENE. CONSIDERABLE FIELD MONITORING WORK ON MOLLUSKS AND CARCINOGENIC PAH'S ALONG THE COAST OF OREGON HAS REVEALED A POSITIVE CORRELATION BETWEEN PREVALENCE OF CELLULAR PROLIFERATION DISORDERS IN SHELLFISH AND HIGHER CONCENTRATIONS OF CERTAIN PAH'S IN NATURAL WATER.

COUCH, JOHN A. IN PREP. ATROPHY OF DIVERTICULAR EPITHELIUM AS AN INDICATOR OF ENVIRONMENTAL IRRITANTS IN THE OYSTER, CRASSOSTREA VIRGINICA (ABSTRACT). IN: PROCEEDINGS OF THE SECOND INTERNATIONAL SYMPOSIUM ON RESPONSES OF MARINE ORGANISMS TO POLLUTANTS, APRIL 27-29, 1983, WOODS HOLE OCEANOGRAPHIC INSTITUTION, WOODS HOLE, MA. (ERL,GB 493).

CERTAIN DISEASES OF FISHES AND SHELLFISHES FROM COASTAL POPULATIONS HAVE BEEN SUGGESTED TO BE RELATED TO, CAUSED BY, OR ENHANCED BY POLLUTANT ACTIVITY. CONSIDERABLE DATA HAVE BEEN PUBLISHED FROM WHICH INFERENCES HAVE BEEN MADE THAT FISHES AND SHELLFISHES INHABITATING CONTAMINATED WATERS ARE AT HIGHER DISEASE RISKS THAN THOSE IN CLEANER ENVIRONMENTS. PROSPECTIVE STUDIES OF ESTUARIES WITHOUT PRIOR KNOWLEDGE OF DISEASE PREVALENCE TO DETERMINE POSSIBLY PREVIOUSLY UNDETECTED FREQUENCIES AND RELATIONSHIPS OF DISEASES AND POLLUTANT RESIDUES IN FISHES AND SHELLFISHES HAVE BEEN RARE. THE PRESENT STUDY OF THREE NORTHERN GULF COAST ESTUARIES, PENSACOLA AND ESCAMBIA BAYS IN NORTHWEST FLORIDA, MOBILE BAY, ALABAMA, AND PASCAGOULA HARBOR IN MISSISSIPPI SOUND, MISSISSIPPI, WAS UNDERTAKEN IN AUGUST, 1978. THE SPECIFIC GOALS OF THIS PROSPECTICE STUDY WERE TO: 1) DETERMINE AND COMPARE RELATIVE CONTAMINATION OF SELECT POLLUTANTS OF SPECIFIC SITES IN AND AMONG THE THREE ESTUARINE AREAS, 2) DETERMINE FREQUENCIES OF KNOWN OR NEW DISEASES, INCLUDING NEOPLASMS, IN SHELLFISH (OYSTERS) AND FISHES AT THESE SITES AMONG THE ESTUARIES, AND 3) TO EXAMINE CRITICALLY ANY RELATIONSHIPS BETWEEN DISEASE FREQUENCY AND ASSESS THE ROLE OF POLLUTANT ACTIVITY IN INFLUENCING DISEASE PREVALENCES IN FISH AND SHELLFISH POPULATIONS IN COASTAL REGIONS CHARACTERIZED BY VARYING DEGREES OF HUMAN POLLUTANT ACTIVITY. DISEASE PREVALENCES IN OYSTERS WERE GENERALLY GREATER IN THE MORE POLLUTED ESTUARY (PASCAGOULA HARBOR). A SINGLE OYSTER DISORDER, DIGESTIVE GLAND EPITHEIAL ATROPHY, DEMONSTRATED A POSITIVE ASSOCIATION WITH RELATIVE CONTAMINATION BY BASE-NEUTRAL, ORGANIC POLLUTANT CHEMICALS. THIS DISORDER WAS CHARACTERIZED BY SEVERE REDUCTION IN EPITHELIAL IN DIGESTIVE GLAND TUBULES, WAS FOUND THROUGHOUT THE GLAND, AND OCCURRED IN CERTAIN CONTAMINATED SAMPLES AT ALMOST 100%. THIS CONDITION MAY PROVIDE AN INDICATOR WITH WHICH TO VICARIOUSLY DETECT THE PRESENCE OF CHEMICAL IRRITANTS IN THE OYSTER'S HABITAT.

COUCH, J.A., AND ELSAYED ELNENAEY. IN PREP. COMPLEX CHROMATOPHOROMA IN A MARINE TELEOST FISH, FUNDULUS GRANDIS: MORPHOLOGICAL AND BIOCHEMICAL CHARACTERISTICS. CANCER RES. (ERL,GB 286).

THREE SPECIMENS OF FUNDULUS GRANDIS, THE GULF KILLIFISH, HAD PIGMENTED TUMORS COMPRISED OF A CELL TYPE THAT HAD CHARACTERISTICS OF DIFFERENT PIGMENT CELL PHENOTYPES. THE FISH WERE FROM A MARICULTURE ATTEMPT ON THE GULF COAST OF ALABAMA USA, AND WERE OLDER LARGER SPECIMENS OF OVER 6,000 F. GRANDIS EXAMINED. A DETAILED LILGHT MICROSCOPY, ELECTRON MICROSCOPY, CHROMATOGRAHIC, AND CELL CULTURE WAS CONDUCTED ON THE TUMORS FROM THREE FISH. THE TUMOR CELL POSSESSED PTERINOSOMES AS THE DOMINANT CYTOPLAMIC ORGANELLE, BUT ALSO HAD PREMELANOSOMES, MELANOSOMES, AND POSSIBLE REFLECTING PLATELETS. THE MAJOR PIGMENTS ISOLATED AND IDENTIFIED WERE PTERIDINE PIGMENTS. NO CAROTENOID PIGMENTS OR CAROTENOID VESTICLES WERE IDENTIFIED OR DETECTED. THE TUMORS WERE INVASIVE, REPLACED AND ISOLATED NORMAL MUSCLE TISSUES, BUT WERE NOT METASTATIC. ONE FISH WITH THE TUMORS BECAME MORIBUND WHILE HELD IN AQUARIUM, AND PRESENTED EVIDENCE THAT THE NEOPLASMS GREW AND INCREASED IN NUMBERS. THE CAUSES OF THE NEOPLASM IN FUNDULUS ARE UNKNOWN, BUT BOTH ENVIRONMENTAL AND GENETIC FACTORS MAY PLAY ROLES IN ITS GENESIS.

COUCH, J.A., S.M. MARTIN, G. TOMPKINS, AND J. KINNEY. IN PREP. DESIGN AND TEST OF A SIMPLE SYSTEM FOR THE PRELIMINARY EVALUATION OF INFECTIVITY AND PATHOGENESIS OF INSECT VIRUS IN A NON-TARGET ESTUARINE SHRIMP. J. INVERTEBR. PATHOL. 25P. (ERL,GB 460).

BIOLOGICAL CONTROL AGENTS (BIORATIONALS) ARE INCREASINGLY IMPORTANT IN PEST CONROL CONCEPTS. CERTAIN INSECT VIRUSES, PARTICULARLY THE BACULOVIRUSES (NUCLEAR POLYHEDROSIS VIRUSES), ARE CONSIDERED TO HAVE POTENTIAL AS BIOLOGICAL PESTICIDES, AND COULD BE USED WIDELY IN THE ENVIRONMENT. THEREFORE, TEST ANIMALS MUST BE SELECTED AND METHODS DEVELOPED TO EVALUATE THE SAFETY OF BIORATIONALS TO NON-TARGET SPECIES. A SIMPLE LABORATORY SYSTEM HAS BEEN DESIGNED AND TESTED TO DETERMINE RISKS OF INFECTIVITY AND PATHOGENICITY OF AN INSECT BACULOVIRUS, ORIGINALLY ISOLATED FROM THE ALFALFA LOOPER AUTOGRAPHA CAILFORNICA, TO A NON-TARGET ARTHROPOD, THE GRASS SHRIMP, PALAEMONETES VULGARIS, BY DIETARY EXPOSURE. THIS LABORATORY METHOD ALSO PERMITS TESTING OF OTHER MICROBIAL BIORATIONALS AGAINST NON-TARGET AQUATIC SPECIES, AND PROVIDES AND INEXPENSIVE, PROCEDURE OF SAFETY TESTING. RSULTS FROM THIS STUDY INDICATED THAT HISTOPATHOLOGICAL, ULTRASTRUCTURAL AND SEROLOGICAL METHODS USED PROVIDED NO EVIDENCE THAT EXPERIMENTAL EXPOSURE TO THE VIRUS CAUSED VIRAL INFECTION OR RELATED PATHOGENICITY IN THE GRASS SHRIMP.

COUCH, JOHN A. IN PRESS. ENLARGEMENT OF AND HISTOPATHOLOGIC EFFECTS IN THE PITUITARY OF A TELEOST EXPOSED TO THE HERBICIDE TRIFLURALIN. J. FISH DISEASES. (ERL,GB 438).

PITUITARY GLANDS OF SHEEPSHEAD MINNOWS, CYPRINODON VARIEGATUS, EXPOSED FOR 19 MONTHS TO 1-5 UG/L TRIFLURALIN WERE SIGNIFICANTLY ENLARGED AND POSSESSED HISTOPATHOLOGIC CHARACTERISTICS (WHEN COMPARED TO GLANDS OF CONTROLS) SUCH AS PSEUDOCYSTS, CONGESTION OF BLOOD VESSELS AND EDEMA. MOST OF THE FISH WITH ENLARGED PITUITARIES ALSO HAD DIFFUSE VERTEBRAL HYPEROSTOSIS AND OTHER DYSPLASTIC VERTEBRAL CHANGES. SEVERAL SPECULATIVE MECHANISTIC PATHS ARE SUGGESTED FOR THE MODE OF EFFECT OF TRIFLURALIN ON THE VERTEBRAL AND PITUITARY TISSUES. STUDY OF THE FORM AND FUNCTION OF PITUITARY GLANDS OF TELEOSTS FROM NATURAL POPULATIONS MIGHT PROVIDE INDICATIONS OF CHRONIC PHYSIOLOGICAL STRESS, PARTICULARLY IN RELATION TO CHEMICAL POLLUTANT STRESS.

COUCH, JOHN A. IN PRESS. MOUSE VS MINNOW: THE FUTURE OF FISH IN CARCINOGENICITY TESTING (A FRIENDLY DISCUSSION/DEBATE BY DR. JOHN COUCH AND DR. CLYDE DAWE) - DEBATE: THE FISHY SIDE. IN: PROCEEDINGS OF THE SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENCITY TESTING, BETHESDA, MARYLAND, DECEMBER 8-10, 1981. U.S. NATIONAL CANCER INSTITUTE. 24P. (ERL,GB 472).

THE TEXT IS PART OF A DEBATE AND ADVOCATES THE USE OF SMALL FISH SPECIES AS LABORATORY TEST ORGANISMS IN DETECTING AND DETERMINING POTENCY AND ACTIVITY OF SUSPECTED CARCINOGENS. THE USEFULLNESS OF FISH SPECIES IS COMPARED AND CONTRASTED WITH THE USEFULNESS OF THE MORE CONVENTIONAL ASSAY SPECIES, SUCH AS RODENTS.

COURTNEY, LEE A., AND JOHN A. COUCH. IN PRESS. USEFULNESS OF CYPRINODON VARIEGATUS AND FUNDULUS GRANDIS IN CARCINOGENICITY TESTING: ADVANTAGES AND SPECIAL PROBLEMS. IN: PROCEEDINGS OF SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENCITY TESTING, BETHESDA, MARYLAND, DECEMBER 8-10, 1981. U.S. NATIONAL CANCER INSTITUTE. (ERL,GB 442).

CYPRINODON VARIEGATUS AND FUNDULUS GRANDIS, TWO SPECIES OF CYPRINODONTID FISHES EXTENSIVELY STUDIED AND USED IN TOXICOLOGICAL AND BIOLOGICAL INVESTIGATIONS, ARE COMPARED AS LABORATORY TEST ANIMALS. THEIR ECOLOGY AND GENERAL BIOLOGY, AND SUITABILITY FOR VARIOUS TYPES OF EXPERIMENTATION ARE EXAMINED. A LABORATORY SYSTEM FOR EXPOSING CRITICAL LIFE STAGES (E.G., EMBRYOS, FRY, JUVENILES) OF THESE SPECIES TO SUSPECT CARCINOGENS IS DESCRIBED. A DISCUSSION OF THE USE, FINDINGS, AND POTENTIAL OF THESE SPECIES IN ONCOLOGICAL STUDIES AND CARCINOGEN ASSAYS IS PRESENTED, PARTICULARLY IN REGARD TO RESPONSES TO THREE KNOWN OR SUSPECT CARCINOGENIC CHEMICALS (E.G., TRIFLURALIN, BENZIDINE, AND AFLATOXIN). FINALLY, ADVANTAGES AND DISADVANTAGES OR SPECIAL PROBLEMS IN USING THE SPECIES AS CARCINOGEN TEST ANIMALS ARE REVIEWED.

CRAWFORD, RICHARD B. 1983. EFFECTS OF DRILLING FLUIDS ON EMBRYO DEVELOPMENT. EPA-600/3-83-021, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 30P.

TOXICITY OF USED DRILLING FLUIDS TO EMBRYO DEVELOPMENT WAS INVESTIGATED TO ASCERTAIN THE LIMITS OF SAFE USAGE OF THESE FLUIDS IN MARINE ENVIRONMENTS. EMBRYOS USED AS TEST SYSTEMS WERE OF THE TELEOST, FUNDULUS HETEROCLITUS, AND FOUR ECHINODERMS ECHINARACHNIUS PARMA, STRONGYLOCENTROTUS PURPURATUS, LYTECHINUS PICTUS, LYTECHINUS VARIEGATUS. THE DRILLING FLUIDS TESTED CAME FROM VARIOUS SOURCES; 24 DIFFERENT SAMPLES WERE EVALUATED. IN ADDITION, SEVERAL COMMERCIAL DRILLING FLUID COMPONENTS WERE EXAMINED IN THE TEST SYSTEMS INCLUDING A SYNTHETIC REFERENCE MUD. STUDIES DEMONSTRATED THAT NO SINGLE DRILLING FLUID IS "TYPICAL" AND THAT THE QUANTITATIVE EFFECTS OF EMBRYOS VARY CONSIDERABLY FROM ONE FLUID TO ANOTHER. SOME DRILLING FLUIDS ARE QUITE TOXIC TO ONE OR MORE OF THE EMBRYO SYSTEMS, REQUIRING DILUTIONS OF OVER 10(5) TO BECOME "SAFE". OTHERS ARE RELATIVELY INNOCUOUS, REQUIRING VERY LITTLE DILUTION TO ACHIEVE A CONCENTRATION IN WHICH EMBRYO DEVELOPMENT CAN PROCEED NORMALLY. ALSO, THE EFFECTS ON DEVELOPMENT SHOW VARIATION FROM ONE FLUID TO ANOTHER, THUS INDICATING THAT A VARIETY OF COMPONENTS OR COMPOUNDS ARE RESPONSIBLE FOR TOXIC MANIFESTATIONS.

CRAWFORD, RICHARD B. 1983. EFFECTS OF DRILLING FLUIDS ON EMBRYO DEVELOPMENT (PROJECT SUMMARY). EPA-600/S3-83-021, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 5P.

CRIPE, G.M., L.R. GOODMAN, AND D.J. HANSEN. IN PREP. EFFECT OF CHRONIC EXPOSURE TO EPN AND TO GUTHION ON THE CRITICAL SWIMMING SPEED AND BRAIN ACETYLCHOLINESTERASE ACTIVITY OF CYPRINODON VARIEGATUS. AQUAT. TOXICOL. 22P. (ERL,GB 398).

SWIMMING PERFORMANCE OF THE SHEEPSHEAD MINNOW, CYPRINODON VARIEGATUS, WAS MEASURED IN A STAMINA TUNNEL AT THE END OF LIFE-CYCLE TOXICITY TESTS WITH THE ORGANOPHOSPHATE PESTICIDES, EPN AND GUTHION. SWIMMING STAMINA WAS AFFECTED BY 2.2 UG EPN/L, BUT NOT BY 0.88 UG EPN/L; THESE CONCENTRATIONS ARE ABOUT ONE HALF OF THOSE THAT SIGNIFICANTLY AFFECT SURVIVAL, GROWTH OR REPRODUCTION. FISH BRAIN ACETYCHOLINESTERASE (ACHE) ACTIVITY, ASSAYED BY THE PH-STAT METHOD, WAS INHIBITED 72% BY 0.88 UG EPN/L AND 83% BY 2.2 UG EPN/L. SWIMMING PERFORMANCE WAS NOT AFFECTED BY GUTHION CONCENTRATIONS UP TO 0.5 UG/L; THIS CONCENTRATION REDUCED SURVIVAL AND INHIBITED ACHE 78%.

DAVIS, WILLIAM P., AND JAMES A. FAVA. 1983. INTERACTION OF AQUATIC ECOSYSTEM COMPONENTS WITH CHLORINATION: AN OVERVIEW. IN: WATER CHLORINATION: ENVIRONMENTAL IMPACT AND HEALTH EFFECTS, VOL. 4. ROBERT L. JOLLEY, ET AL., EDITOR, ANN ARBOR SCIENCE PUBLISHERS, ANN ARBOR, MI. PP. 791-796. (ERL,GB X377).

THE USE OF TOOLS SUCH AS DISINFECTANTS, OXIDANTS, OR BIOCIDES TO PROTECT PUBLIC HEALTH REMAINS HIGHLY DEBATABLE RELATIVE TO ENVIRONMENTAL ISSUES, RESEARCH, AND QUALITY OF LIFE. INCREASED PUBLIC AWARENESS IS EVIDENCED BY REGIONAL CONFERENCES (E.G., "CHLORINATION: BANE OR BENEFIT"), WHICH ADDRESS SPECIFIC STRESSED SYTEMS SUCH AS THE CHESAPEAKE BAY. THAT USE OF CHLORINATION PROVIDES BENEFITS TO MAN IS NOT AN ISSUE-THE QUESTIONS ARE HOW MUCH TO USE AND WHAT RISKS AND COSTS ARE INVOLVE. OVERZEALOUS CHLORINATION CAN CAUSE ECOLOGICAL DAMAGE AND DISFUNCTION OF ECOLOGY; CONTROL METHODS SUCH AS CRITERIA AND REGULATIONS ARE DEBATABLE AND UNDER CHALLENGE. OVER THE PAST SIX OR MORE YEARS, THE BASIC QUESTIONS ABOUT CHLORINATION HAVE NOT SIGNIFICANTLY CHANGED; HOWEVER, THE DETAILS AND DATA AVAILABLE TO US HAVE INCREASED IMMENSELY. TWO ONGOING ACTIVITIES SERVED AS THE MOTIVATING FORCE BEHIND BOTH FORMAL AND INFORMAL DISCUSSIONS IN THE SESSION "INTERACTION OF AQUATIC ECOSYSTEM COMPONENTS WITH CHLORINATION" AT THE FOURTH WATER CHLORINATION CONFERENCE. THESE WERE (1) THE RECOGNITION THAT IN SOME AREAS OF THE UNITED STATES, SERIOUS CONSIDERATION HAS BEEN GIVEN TO BANNING ALL CHLORINATION FOR DISINFECTION BECAUSE OF THE POTENTIAL FOR ECOLOGICAL DAMAGE; AND (2) MANY SCIENTSITS, REGULATORS, OR ENVIRONMENTAL MANAGERS FEEL THAT SUFFICIENT RESEARCH HAS NOW BEEN CONDUCTED TO JUSTIFY ELIMINATING FURTHER FUNDING OF CHLORINATION EFFECTS STUDIES. THIS PAPER EXAMINES THE SALIENT ASPECTS OF THE TOPICS DISCUSSED DURING THE CONFERENCE WITH THE HOPE OF ADDRESSING THE QUESTION: WHERE DO WE GO FROM HERE?

DAVIS, W.P., D.E. HOSS, G.I. SCOTT, AND P.F. SHERIDAN. IN PRESS. FISHERY RESOURCE IMPACTS FROM SPILLS OF OIL OR HAZARDOUS SUBSTANCES. 27P. (ERL,GB 376).

DODGE, RICHARD E., AND JUDITH C. LANG. 1983. ENVIRONMENTAL CORRELATES OF HERMATYPIC CORAL (MONTASTREA ANNULARIS) GROWTH ON THE EAST FLOWER GARDENS BANK, NORTHWEST GULF OF MEXICO. LIMNOL. OCEANOGR. 28(2):228-240. (ERL,GB X378).

TIME SERIES OF ANNUAL LINEAR GROWTH INCREMENTS FROM 12 MONTASTREA ANNULARIS (E. AND S.) HERMATYPIC CORALS COLLECTED AT THE EAST FLOWER GARDENS BANK REEF IN THE NORTHWESTERN GULF OF MEXICO HAVE A COMMON PATTERN. THIS IS BEST EXPRESSED IN AN INDEX MASTER CHRONOLOGY (AVERAGE BY YEAR OF THE ANNUAL PERCENTAGE DEVIATIONS FRROM THE MEAN OF EACH CORAL). COMPARISONS WITH TIME SERIES OF ENVIRONMENTAL DATA INDICATE THAT CORAL EXTENSION RATES VARY POSITIVELY WITH SEASONAL (FEBRUARY THROUGH MAY - 4 MONTHS) SURFACE WATER TEMPERATURE AND NEGATIVELY WITH ANNUAL DISCHARGE OF THE ATCHAFALAYA RIVER. WE PROPOSE THE SECULAR VARIATIONS OF WATER TEMPERATURE AND OTHER PARAMETERS ARE THE MAJOR LONG-TERM CONTROLS OF CORAL GROWTH IN THE AREA. OUR DATA DO NOT SUPPORT THE VIEW THAT SINKING OF THE FLOWER GARDENS REEF, CAUSED BY CATASTROPHIC COLLAPSE OF THE UNDERLYING SUBSTRATE, HAS BEEN A PRIME INFLUENCE ON THE CORALS.

DODGE, RICHARD E., AND ALINA SZMANT-FROELICH. IN PREP. EFFECTS OF DRILLING FLUIDS ON REEF CORALS: A REVIEW. IN: WASTES IN THE OCEAN, VOLUME IV: ENERGY WASTES IN THE OCEAN. I.W. DUEDALL, EDITOR, JOHN WILEY & SONS, INC., NEW YORK, NY. 50P. (ERL,GB 480).

THIS CHAPTER REVIEWS RESEARCH ON THE EFFECTS OF DRILLING MUD ON CORAL REEF COMMUNITIES, CONCENTRATION ON THE MAJOR REEF FAUNA: THE REEF-BUILDING OR HERMATYPIC CORALS. DRILLING MUD IS AN EFFLUENT INTRODUCED TO THE MARINE ENVIRONMENT IN LARGE QUANTITES DURING A TYPICAL OFFSHORE DRILLING OPERATION. CONCERN OVER ITS POSSIBLE DETRIMENTAL EFFECTS, WHEN DRILLING ACTIVITIES ARE NEAR CORAL REEFS, HAS BEEN THE IMPETUS FOR THE WORK TO BE DISCUSSED. THE TOPIC IS OF RECENT ORIGIN; UNTIL 1977, THERE WERE NO LITERATURE REPORTS OF DRILLING MUD - CORAL STUDIES.

DOUGHTIE, DANIEL G., AND K. RANGA RAO. 1983. ULTRASTRUCTURAL AND HISTOLOGICAL STUDY OF DEGENERATIVE CHANGES IN THE ANTENNAL GLANDS, HEPATOPANCREAS, AND MIDGUT OF GRASS SHRIMP EXPOSED TO TWO DITHIOCARBAMATE BIOCIDES. J. INVERTEBR. PATHOL. 41(3):281-299. (ERL,GB X395).

HISTOLOGICAL AND ULTRASTRUCTURAL ALTERATIONS OBSERVED IN THE ANTENNAL GLANDS, HEPATOPANCREAS, AND MIDGUT OF GRASS SHRIMP EXPOSED TO EITHER A 50% POTASSIUM DIMETHYLDITHIOCARBAMATE BIOCIDE (BUSAN-85; 5-60 PPB) FOR 14 DAYS, OR TO A DIFFERENT BIOCIDE, COMPOSED OF 15% SODIUM DIMETHYLDITHIOCARBAMATE AND 15% SODIUM ETHYLENE BIODITHIOCARBAMATE (AQUATREAT ONM-30), FOR 3-4 DAYS (60-140 PPB) AND 28-35 DAYS (40-120 PPB), WERE COMPARED AND CONTRASTED WITH THE NORMAL MORPHOLOGICAL FEATURES IN CONTROL SHRIMP. ONLY THOSE EXPERIMENTAL SHRIMP THAT EXHIBITED VARIOUS DEGREES OF BRANCHIAL ABNORMALITY WERE EXAMINED. ALTHOUGH THE ALTERATIONS IN BUSANN -EXPOSED SHRIMP WERE GENERALLY MORE PROBOUNCED, THE ANTENNAL GLANDS OF 32 OUT 36 EXPERIMENTAL SHRIMP EXHIBITED ABNORMALITIES THAT WERE MANIFESTED PRIMARILY AS INCREASED SECRETORY ACTIVITY BY THE LABYRINTH CELLS. IN DITHIOCARBAMATE-EXPOSED SHRIMP WITH "BLACK GILLS," THE LABYRINTH EPITHELIUM EXHIBITED MODERATE NUCLEAR HYPERTROPHY, APPARENT CELL SLOUGHING, INTENSE SECRETORY ACTIVITY, AND OCCASIONAL MELANIZED LESIONS; ALTERATIONS IN THE ANTENNAL GLAND COELOMOSAC INCLUDED NUCLEAR PYKNOSIS, A GENERAL DETERIORATION OF PODOCYTE ORGANIZATION, AND AN UNUSUAL INCREASE IN HEMOLYMPH DENSITY ADJACENT TO AFFECTED TISSUES. ALTHOUGH THERE WAS AN APPARENT INCREASE IN MITOTIC ACTIVITY IN THE HEPATOPANCREATIC TUBULES OF SHRIMP EXPOSED TO AQUATREAT FOR 28-35 DAYS, DEGENERATIVE CHANGES WERE MOST FREQUENT AND EXTENSIVE IN THE HEPATOPANCREAS AND MIDGUT OF DITHIOCARBAMATE-EXPOSED SHRIMP WITH "BLACK GILLS." THESE OBSERVED CHANGES INCLUDED THE DIMINUTION OF THE BASAL MIDGUT AND HEPATOPANCREATIC FIXED PHAGOCYTES, DEVELOPMENT OF MITOCHONDRIAL INCLUSIONS AND MEGAMITOCHONDRIA, LOSS OF CYTOPLASMIC DENSITY, HEPATOPANCREATIC NUCLEAR PYKNOSIS, AND IRREVERSIBLE DEGENERATION OF HEPATOPANCREATIC TUBLUE APICES. THIS STUDY SUGGESTS THAT SOME OF THE OBSERVED ABNORMAL/PATHOLOGICAL CHANGES ARE THE INDIRECT CONSEQUENCE OF BRANCHIAL DEGENERATION. A NUMBER OF POSSIBLE DEFENSIVE REACTIONS TO DITHIOCARBAMATE POISONING, INCLUDING HETEROSTASIS, PHAGOCYTOSIS, ENCAPSULATION, AND THE POSSIBLE PARTICIPATION OF RESERVE INCLUSION CELLS ARE PROPOSED.

DOUGHTIE, DANIEL G., AND K. RANGA RAO. 1983. ULTRASTRUCTURAL AND HISTOLOGICAL STUDY OF DEGENERATIVE CHANGES LEADING TO BLACK GILLS IN GRASS SHRIMP EXPOSED TO A DITHIOCARBAMATE BIOCIDE. J. INVERTEBR. PATHOL. 41(1):33-50. (ERL,GB X384).

PATHOLOGIC "MILKY" AND BROWN-BLACK GILLS OF GRASS SHRIMP, PALAEMONETES PUGIO, EXPOSED TO LOW LEVELS (5 TO 60 PPB) OF A 50% POTASSIUM-DIMETHYLDITHIOCARBAMATE BIOCIDE (BUSAN-85) FOR 14 DAYS WERE STUDIED USING LIGHT AND ELECTRON MICROSCOPY. IN SHRIMP EXPOSED TO 5 PPB BUSAN-85, A GRADATION OF DEGENERATIVE CHANGES COULD BE ASCERTAINED BOTH WITHIN THE GILLS OF INDIVIDUAL SHRIMP AND AMONG THE GILLS OF DIFFERENT SHRIMP. PRIMARY DEGENERATIVE CHANGES, FIRST EVIDENT IN THE APICAL EPITHELIUM OF THE LAMELLAR PLATES, INCLUDED: SWOLLEN MITOCHONDRIA, DILATED ROUGH ENDOPLASMIC RETICULUM, THE APPEARANCE OF A DENSE GRAINY MATERIAL WITHIN THE SUBCUTICULAR SPACES AND OF PARACRYSTALLINE ELEMENTS WITHIN THE EPITHELIAL CYTOPLASM, THE FORMATION OF AUTOPHAGOSOMES, AND A LOSS OF MEMBRANE CONTINUITY. GRANULAR HEMOCYTES MIGRATED INTO THE SUBCULTULAR SPACES AND APPEARED TO PHAGOCYTOSE THE GRAINY MATERIAL, WHILE OTHER HEMOCYTES PHAGOCYTOSED AND ENCAPSULATED THE PATHOLOGICAL EPITHELIUM. LATER, THE LAMELLAR TIPS BECAME CONGESTED WITH NUMEROUS INTERDIGITATING HEMOCYTES WHICH FORMED A "PLUG". A NEW EPITHELIUM, DERIVED PARTLY FROM MITOSIS OF BASAL LAMELLAR TISSUES, DEVELOPED SUBJACENT TO THE PLUG AND CONTRIBUTED TO THE FORMAION OF AN ABNORMAL AND SOMETIMES PERFORATED CUTICLE DURING PREMOLT. AT ECDYSIS, THE HEMOCYTE PLUGS IN THE APICAL REGION OF THE LAMELLA WERE SLOUGHED RESULTING IN MARKEDLY TRUNCATED AND SWOLLEN LAMELLAE. THIS PROCESS OF PATHOLOGICAL LAMELLAR REDUCTION APPEARS TO BE AN IMPORTANT DEFENCE MECHANISM IN RESPONSE TO BRANCHIAL TRAUMA CAUSED BY EXPOSURE TO ENVIRONMENTAL CONTAMINANTS.

DOUGHTIE, DANIEL G., AND K. RANGA RAO. IN PREP. CUTICULAR LESIONS INDUCED IN GRASS SHRIMP EXPOSED TO HEXAVALENT CHROMIUM. J. INVERTEBR. PATHOL. 24P. (ERL,GB X434).

ADULT GRASS SHRIMP WERE EXPOSED TO FOUR CONCENTRATIONS (0.5, 1.0, 2.0, 4.0 PPM) OF HEXAVALENT CHROMIUM FOR 28 DAYS. AT THE END OF THE EXPOSURE PERIOD, OVER FIFTY PERCENT OF THE SURVIVING SHRIMP POSSESSED CUTICULAR LESIONS THAT HAD MANY OF THE GROSS CHARACTERISTICS OF "SHELL DISEASE". THESE LESIONS WERE USUALLY ASSOCIATED WITH ARTICULATIONS OF THE APPENDAGES AND ABDOMEN. FURTHERMORE, IT WAS FOUND THAT AT INCREASING LEVELS OF CHROMIUM EXPOSURE, THERE WAS A PROPORTIONATE INCREASE IN THE LOSS OF LIMBS SUCH THAT NEARLY 50% OF THE LIMBS WERE LOST IN GRASS SHRIMP EXPOSED TO THE HIGHEST TEST CONCENTRATION OF CHROMIUM. HISTOLOGICAL AND ULTRASTRUCTURAL EXAMINATION OF NUMEROUS LESIONS DEMONSTRATED A RANGE OF DEGENERATIVE FEATURES WITHIN THE SUBCUTICULAR EPITHELIUM THAT INCLUDED CYTOPLASMIC VACUOLIZATION, MITOCHONDRIAL SWELLING, CHROMATIN EMARGINATION AND THE PRESENCE OF UNUSUAL NUCLEAR INCLUSIONS THAT APPEAR TO INDICATE DIRECT CHROMIUM TOXICITY. ADDITIONALLY A MARKED RETARDATION IN NEW EPICUTICLE AND EXOCUTICLE FORMATION WAS OBSERVED IN VIABLE TISSUES ASSOCIATED WITH LESIONS IN LATE PREMOLT SHRIMP. IT IS PROPOSED THAT CHROMIUM INTERFERES WITH THE NORMAL FUNCTIONS OF SUBCUTICULAR EPITHELIUM, PARTICULARLY CUTICLE FORMATION, AND SUBSEQUENTLY CAUSES STRUCTURAL WEAKNESSES OR PERFORATIONS TO DEVELOP IN THE CUTICLE OF NEWLY MOLTED SHRIMP. BECAUSE OF THESE CHROMIUM-INDUCED EXOSKELETAL DEFICIENCIES, A VIADUCT FOR PATHOGENIC ORGANISMS (E.G., BACTERIA) AND DIRECT CHROMIUM INFLUX IS FORMED THAT PERPETUATES LESION DEVELOPMENT.

DOUGHTIE, DANIEL G., AND K. RANGA RAO. IN PREP. HISTOPATHOLOGICAL AND ULTRASTRUCTURAL CHANGES IN THE ANTENNAL GLAND, MIDGUT, HEPATOPANCREAS, AND GILL OF GRASS SHRIMP FOLLOWING EXPOSURE TO HEXAVALENT CHROMIUM. J. INVERTEBR. PATHOL. 32P. (ERL,GB X400).

GRASS SHRIMP, PALAEMONETES PUGIO, WERE EXPOSED FOR ONE MONTH TO SUBACUTE CONCENTRATIONS OF HEXAVALENT CHROMIUM (0.5, 1.0, 2.0, 4.0 PPM) AFTER WHICH THE GILLS, MIDGUT, HEPATOPANCREAS, AND ANTENNAL GLANDS WERE EXAMINED FOR HISTOPATHOLOGICAL AND ULTRASTRUCTURAL CHANGES. PATHOLOGICAL CHANGES WERE GREATEST IN THE ANTENNAL GLANDS, FOLLOWED BY HEPATOPANCREAS, GILLS, AND MIDGUT. SEVERE CHANGES OCCURRED IN SOME SHRIMP, EVEN AT 0.5 PPM CHROMIUM. CELLS OF ALL TISSUES FREQUENTLY HAD BOTH SWOLLEN MITOCHONDRIA AND ROUGH ENDOPLASMIC ETICULUM. SMALL, SPHERICAL OR RING-LIKE INTRANUCLEAR INCLUSIONS, POSSIBLE INDICATIVE OF CELLULAR HYPERACTIVITY OR MANIFESTIONS OF CHROMIUM AND/OR PROTEIN COMPLEXES, WERE MOST PREVALENT IN THE HEPATOPANCREAS AND ANTENNAL GLANDS BUT ALSO OCCURRED IN THE MIDGUT AND GILLS. OTHER MAJOR DEGENERATIVE CHANGES N THE ANTENNAL GLANDS WERE RESTRICTED TO THE LABYRINTH AND INCLUDED DIMINUTION OF BASAL PLASMALEMMAL INFOLDINGS AND CYTOPLASMIC DENSITY, NUCLEAR HYPERTROPHY FOLLOWED BY WIDESPREAD NUCLEAR PYKNOSIS AND EPITHELIAL DESQUAMATION. IN SEVERELY ALTERED HEPATOPANCREAS HYPERTROPHY WAS INDICATED FOR THE BASAL LAMINAE, NUCLEI, POSSIBLE FOR THE NUCLEOLI. THERE WAS AN APPARENT REDUCTION IN MITOTIC EVENTS AND MANY OBSERVED MITOTIC NUCLEI WERE ABNORMAL. ABNORMAL MIDGUT HYPERTROPHY WAS PRESENT IN ONLY EIGHT OF TWENTY EXAMINED SHRIMP, EXPOSED TO 0.5 AND 1.0 PPM CHROMIUM. FURTHER, THE GILLS OF ONLY 10 OF THE 40 EXAMINED CHROMIUM-EXPOSED SHRIMP POSSESSED ABNORMAL FEATURES DETECTABLE WITH LIGHT MICROSCOPY. ULTRASTRUCTURAL ANALYSIS OF THE LATTER INDICATED AN INCREASE IN LYSOSOMES AND A DECREASE IN CYTOPLASMIC DENSITY. IN ADDITION, THERE WAS A PRONOUNCED DIMINUTION IN THE DEGREE OF LAMELLAR, SUBCUTICULAR PLASMALEMMAL INFOLDING. THIS LATTER FEATURE IS POSTULATED TO BE A MECHANISM FOR THE REGULATION OF CHROMIUM INFLUX. POSSIBLE EXPLANATIONS FOR MOST OBSERVED ALTERATIONS IN THE ABOVE TISSUES ARE PROPOSED.

DUKE, THOMAS W. IN PREP. INTRODUCTION: PROCEEDINGS OF CONFERENCE ON MEANINGFUL MEASURES OF MARINE POLLUTION EFFECTS. IN: PROCEEDINGS OF CONFERENCE ON MEANINGFUL MEASURES OF MARINE POLLUTION EFFECTS, APRIL 26-29, 1982, PENSACOLA BEACH, FL. U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 9P. (ERL,GB 457).

IN SUMMARY, DISCUSSIONS AND PRESENTATIONS IN THE TOXICITY TEST SESSION INDICATED THAT MEASUREMENTS OF TOXICITY AT THE SINGLE, MULTISPECIES, COMMUNITY, AND SYSTEM LEVELS ARE USEFUL IN RANKING CHEMICALS BY THEIR TOXICITY AND IN HAZARD EVALUATIONS. HOWEVER, RELATING THE RESULTS OF THOSE TESTS DIRECTLY TO THE ENVIRONMENT IS ESPECIALLY RISKY WHEN: 1) THE MANNER IN WHICH LABORATORY ORGANISMS ARE EXPOSED TO POLLUTANTS DIFFER FROM EXPOSURE IN THE ENVIRONMENT; 2) LABORATORY TESTS DEAL WITH SINGLE CHEMICALS AND ORGANISMS ARE EXPOSED TO COMPLEX MIXTURES IN THE ENVIRONMENT AND; 3) CRITERIA FOR EFFECTS IN THE LABORATORY ARE NOT IMPORTANT FUNCTIONAL END-POINTS IN POPULATION AND SYSTEM DYNAMICS. THE DOMINANT THEME OF THIS CHAPTER IS THE NECESSITY FOR AN APPROPRIATE BALANCE BETWEEN LABORATORY AND FIELD STUDIES. THE NEED FOR THIS BALANCE IN EASILY ARTICULATED, BUT WILL REQUIRE CONCERTED EFFORT TO IMPLEMENT.

DUKE, THOMAS M. IN PREP. POTENTIAL IMPACT OF DRILLING FLUIDS ON ESTUARINE PRODUCTIVITY. IN: PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON THE UTILIZATION OF COASTAL ECOSYSTEMS: PLANNING, POLLUTION, AND PRODUCTIVITY, NOV. 22-27, 1982, RIO GRANDE, BRAZIL. 35P. (ERL,GB 449).

THIS PAPER DISCUSSES THE POTENTIAL EFFECTS OF DRILLING FLUIDS ON SEMI-ENCLOSED BODIES OF WATER SUCH AS ESTUARIES. DRILLING FLUIDS HAVE BEEN DISCHARGED INTO OUTER CONTINENTAL SHELF WATERS FOR MANY YEARS BUT THERE IS SOME CONCERN OF POTENTIAL ECOLOGICAL IMPACT WHEN DRILLING FLUID ARE DISCHARGED NEAR CORAL REEFS OR IN BAYS AND ESTUARIES. THE CONCERN IS BASED ON POTENTIAL ADVERSE EFFECTS OF THE FLUIDS TO CORALS, SHELLFISH, FISH, GRASS BEDS AND GENERAL PRODUCTIVITY. POTENTIAL EFFECTS CAN BE EVALUATED THROUGH A HAZARD ASSESSMENT PROCESS THAT INVOLVES EFFECTS AND EXPOSURE MEASUREMENTS. A SUGGESTED HAZARD ASSESSMENT INVOLVING THE ADAPTIVE ENVIRONMENTAL ASSESSMENT APPROACH (AEA) IS PRESENTED. THE COMPONENTS OF THE AEA APPROACH ARE DESCRIBED AND EVALUATED. IN DEVELOPING THE HAZARD ASSESSMENT, A REVIEW IS MADE OF EXISTING EFFECTS DATA. A PRESENTATION IS MADE OF ISSUES OF CONCERN SUCH AS RESUSPENSION OF DRILLING FLUIDS IN SHALLOW, WIND-DRIVEN ESTUARIES, RESTRICTION OF LIGHT PENETRATION TO PRIMARY PRODUCERS BY SUSPENDED SEDIMENTS, CHANGES IN BENTHIC COMMUNITIES AND THEIR SUBSTRATES, AND DIRECT TOXICITY OF THE FLUIDS TO ORGANISMS.

ERICKSON, STANTON J. IN PREP. INHIBITION OF PHOTOSYNTHESIS IN ESTUARINE PHYTOPLANKTON BY MIXTURES OF COPPER AND PENTACHLOROPHENOL. BULL. ENVIRON. CONTAM. TOXICOL. 11P. (ERL,GB 463).

INHIBITORY EFFECTS OF COPPER AND PENTACHLOROPHENOL ON PHYTOPLANKTON WERE DETERMINED IN TWO SYSTEMS: (1) FLOWING SEAWATER (SALINITY 26-33 G/L, TEMPERATURE 17.5-26.5 DEGREES C, PH 8.0) AND UPTAKE OF 14-C BY NATURAL COMMUNITIES OF PHYTOPLANKTON AND (2) STATIC GROWTH TESTS IN WHICH POPULATIONS OF THE DIATOM THALASSIOSIRA PSEUDONANA WERE GROWN IN FILTERED (0.22 UM POROSITY) UNENRICHED SEAWATER (PH 8.0, TEMPERATURE 20 DEGREES C, SALINITY 26.0 G/L) UNDER 2700 LUX OF COOL-WHITE FLUORESCENT LIGHT. DIATOMS WERE THE DOMINANT ORGANISMS IN THE FLOWING TEST. CONCENTRATIONS OF THE TEST MATERIALS WERE: COPPER 20-160 UG/L, PENTACHLOROPHENOL 62.5-500 UG/L, SINGLY, AND IN COMBINATION. COPPER AND PENTACHLOROPHENOL WERE LESS INHIBITORY IN FLOWING SEAWATER THAN IN STATIC TESTS. COMBINATIONS THAT CONTAINED 20 TO 40 UG CU/L AND 62.5 TO 125 UG PENTACHLOROPHENOL/L WERE SYNERGISTIC (POTENTIATION). COMBINATIONS THAT CONTAINED 80 TO 160 UG CU/L AND 250 TO 500 UG PENTACHLOROPHENOL/L WERE ADDITIVE.

ERICKSON, S., E. DAVEY, M. MORGAN, AND A. SOPER. IN PRESS. EFFECTS OF LEAD ON GENERATION TIME AND 14C-UPTAKE IN ESTUARINE PHYTOPLANKTON. J. PHYCOL. (ERL,GB 109).

INHIBITION OF CELL DIVISION IN THALASSIOSIRA PSEUDONANA (CLONE 13-1) BY LEAD, AS CONTAINED IN PBCL2, WAS STUDIED IN CULTURES GROWN AT 20 DEGREES C IN PASTEURIZED, MEMBRANE-FILTERED (0.22 MM) SEAWATER OF 28 TO 33 G/L SALINITY TAKEN SEASONALLY FROM CHARLESTOWN INLET, WASHINGTON COUNTY, RHODE ISLAND. CONCENTRATIONS OF LEAD WERE FROM 25 TO 100 MG/L. EFFECTS ON GENERATION TIME AND 14C-UPTAKE OF NATURAL PHOSPHORUS AND ADDED NITROGEN, PHOSPHORUS, IRON AND MANGANESE WERE TESTED SINGLY AND IN COMBINATION. GENERATION TIME IN UNENRICHED SEAWATER RANGED FROM 10.2 TO 37.8 HR. LEAD INCREASED GENERATION TIME AND DECREASED 14C-UPTAKE. RESPONSES VARIED WITH ORIGIN OF WATER SAMPLES. GENERATION TIME WAS INCREASED 74% BY 100 MG/L, BUT THE INHIBITORY EFFECTS WERE ELIMINATED BY ADDITION OF 3.09 MG/L. INHIBITION OF CELL DIVISION APPEARS TO BE RELATED TO NUTRIENT LIMITATION CAUSED BY COMPLEXING OF LEAD WITH PHOSPHORUS, MAKING PHOSPHORUS UNAVAILABLE FOR ALGAL GROWTH.

FEDERLE, THOMAS W., MEREDITH A. HULLAR, ROBERT J. LIVINGSTON, DUANE A. MEETER, AND DAVID C. WHITE. 1983. SPATIAL DISTRIBUTION OF BIOCHEMICAL PARAMETERS INDICATING BIOMASS AND COMMUNITY COMPOSITION OF MICROBIAL ASSEMBLIES IN ESTUARINE MUD FLAT SEDIMENTS. APPL. ENVIRON. MICROBIOL. 45(1):58-63. (ERL,GB X371).

THE SPATIAL DISTRIBUTION OF COMMUNITIES WAS EXAMINED IN ESTUARINE MUD FLAT SEDIMENTS BY THE BIOCHEMICAL ANALYSIS OF THE LIPIDS AND LIPID COMPONENTS EXTRACTED FROM THE SEDIMENTS. TOTAL PHOSPHOLIPID WAS USED AS A MEASURE OF TOTAL BIOMASS, AND FATTY ACIDS WERE USED AS INDICATORS OF COMMUNITY COMPOSITION. COMPARISONS WERE MADE AMONG 2- BY 2-M (LOCATION) AND 0.2- BY 0.2-M (CLUSTER) SAMPLING PLOTS BY USING A NESTED ANALYSIS OF VARIANCE TO DESIGN AN OPTIMAL SAMPLING STRATEGY TO DEFINE THE MICROBIAL CONTENT OF A LARGE, RELATIVELY HOMOGENOUS AREA. AT TWO OF THE THREE STATIONS, A 2- BY 2-M PLOT WAS REPRESENTATIVE OF THE STATION, BUT 0.2- BY 0.2-M AREAS WERE IN NO CASE REPRESENTATIVE OF THE STATION. THE BIOMASS MEASURED BY THE EXTRACTABLE PHOSPHOLIPID AND THE TOTAL LIPID PALMITIC ACID SHOWED EXCELLENT CORRELATION WITH THE FATTY ACID "SIGNATURES" CHARACTERISTIC OF BACTERIA, BUT SHOWED A LOWER CORRELATION WITH THE LONG-CHAIN POLYENOIC FATTY ACIDS CHARACTERISTIC OF THE MICROFAUNA.

FEDERLE, THOMAS W., ROBERT J. LIVINGSTON, DUANE A. MEETER, AND DAVID C. WHITE. IN PREP. MODIFICATION OF ESTUARINE SEDIMENTARY MICROBIOTA BY EXCLUSION OF TOP PREDATORS. SCIENCE. 10P. (ERL,GB 467).

IN AN ESTUARINE MUDFLAT, ANALYSIS OF THE LIPID COMPONENTS OF THE SEDIMENTARY MICROBIOTA SHOWED REPRODUCIBLE SHIFTS IN THE COMMUNITY COMPOSITION IN AREAS FROM WHICH TOP PREDATORS (FISH AND CRABS) ARE EXCLUDED. AFTER SIX WEEKS, THE MICROEUCARYOTES AND CIS-VACCENIC ACID CONTAINING MICROBES EXHIBITED SIGNIFICANT DECREASES IN THE EXCLUSION AREAS. NO VARIABLE DISPLAYED A SIGNIFICANT CAGE DIFFERENCE WITHIN THE TREATMENTS. EXCLUDING LARGE PREDATORS PROFOUNDLY AFFECTED THE MICROBIOTA, POSSIBLY AS THE RESULT OF AN OBSERVED INCREASE IN THE DENSITY OF THE DEPOSIT FEEDING POLYCHAETE, MEDIOMASTUS AMBISETA.

FINDLAY, ROBERT H., AND DAVID C. WHITE. 1983. POLYMERIC BETA-HYDROXYALKANOATES FROM ENVIRONMENTAL SAMPLES AND BACILLUS MEGATERIUM. APPL. ENVIRON. MICROBIOL. 45(1):71-78. (ERL,GB X380).

THE PROCARYOTIC ENDOGENOUS STORAGE POLYMER KNOWN AS POLY-BETA-HYDROXYBUTYRATE IS ACTUALLY A MIXED POLYMER OF SHORT-CHAIN BETA-HYDROXY FATTY ACIDS. A METHOD FOR THE QUANTITATIVE RECOVERY OF THIS MIXED POLYMER, CALLED POLY-BETA-HYDROXYALKANOATE (PHA), WITH ANALYSIS BY CAPILLARY GAS-LIQUID CHROMATOGRAPHY SHOWED THE PRESENCE OF AT LEAST 11 SHORT-CHAIN BETA-HYDROXY ACIDS IN POLYMERS EXTRACTED FROM MARINE SEDIMENTS. POLYMERS EXTRACTED FROM BACILLUS MEGATERIUM MONOCULTURES WERE ALSO A COMPLEX MIXTURE OF BETA-HYDROXY ACIDS WITH CHAIN LENGTHS BETWEEN FOUR AND EIGHT CARBONS. LYOPHILIZED SEDIMENTS WERE EXTRACTED IN A MODIFIED SOXHLET ESTRACTOR, AND THE POLYMER WAS PURIFIED WITH ETHANOL AND DIETHYL ETHER WASHES. THE PURIFIED POLYMER WAS TREATED WITH ETHANOL-CHLOROFORM-HYDROBCHLORIC ACID (8.5:2.5:1) FOR 4 H AT 100 DEGREES CELSIUS, A TREATMENT WHICH RESULTED IN THE FORMATION OF THE ETHYL ESTERS OF THE THE CONSTITUENT BETA-HYDROXY ACIDS. SUBSEQUENT ASSAY OF THE PRODUCTS BY GAS-LIQUID CHROMATOGRAPHY INDICATED EXCELLENT REPRODUCIBILITY AND SENSITIVITY (DETECTION LIMIT, 100 FMOL). DISTURBING SEDIMENTS MECHANICALLY OR ADDING NATURAL CHELATORS INCREASED ALL MAJOR PHA COMPONENTS RELATIVE TO THE BACTERIAL BIOAMSS. GARDENING OF SEDIMENTARY MICROBES BY CLYMENELLA SP., AN ANNELID WORM, INDUCED DECREASES IN PHA, WITH CHANGES IN THE RELATIVE PROPORTION OF COMPONENT BETA-HYDROXY ACIDS. THE CONCENTRATION OF PHA RELATIVE TO THE BACTERIAL BIOMASS CAN REFLECT THE RECENT METABOLIC STATUS OF THE MICROBIOTA.

GAETZ, CHARLES T., RICHARD MONTGOMERY, AND THOMAS W. DUKE. IN PREP. TOXICITY OF PHASIC COMPONENTS OF USED DRILLING FLUIDS TO THE MYSID MYSIDOPSIS (ABSTRACT). ENVIRON. TOXICOL. CHEM. (ERL,GB 483).

TO ASSESS THE TOXICITY OF "USED" DRILLING MUDS, STATIC ACUTE BIOASSAYS WERE CONDUCTED ON THE ESTUARINE MYSID SHRIMP, MYSIDOPSIS BAHIA, USING BOTH WHOLE DRILLING MUD AND THREE PHASES OF EACH MUD: A LIQUID PHASE WITH ALL PARTICULATE MATERIALS REMOVED, A SUSPENDED PARTICULATE PHASE COMPOSED OF SOLUBLE AND LIGHTER PARTICULATE FRACTIONS, AND A SOLID PHASE COMPOSED MAINLY OF DRILL CUTTINGS AND RAPIDLY SETTLING PARTICULATES. THE 11 DRILLING MUDS TESTED WERE OBTAINED FROM ACTIVE DRILLING PLATFORMS IN THE GULF OF MEXICO, U.S.A. AND REPRESENT SEVEN OF THE EIGHT GENERIC MUD TYPES DESCRIBED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY. THE LOWEST 96-HOUR LC50 VALUES FOR M. BAHIA WERE: WHOLE MUD, 26 UL/L; LIQUID PHASE, 23,300 UL/L; SUSPENDED PARTICULATE PHASE, 145 UL/L; SOLID PHASE, 1456 MG/L. THESE TOXICITY VALUES ARE BELIEVED TO BE DUE, TO A GREAT EXTENT, TO DIESEL OIL PRESENT IN THE MUDS. THE CORRELATION BETWEEN DIESEL CONTENT AND WHOLE MUD TOXICITIES WAS 0.72, FURTHERMORE, ONE OF THE MUDS SHOWED A SIGNIFICANT LOSS OF TOXICITY WITH TIME, PRESUMABLE FROM VOLATILIZATION OF THE AROMATIC FRACTIONS. WE SHOW THE DIFFICULTY IN PREDICTING TOXICITY OF MUDS BASED ON GENERIC CLASSIFICATION WHEN DIESEL IS PRESENT.

GAETZ, CHARLES T., AND COLLARD B. SNEED. IN PRESS. LABORATORY CULTURE AND OBSERVATIONS ON THE REPRODUCTIVE BIOLOGY OF THE MARINE PELAGIC ISOPOD, IDOTEA METALLICA (CRUSTACEA; ISOPODA). MAR. BIOL. (ERL,GB 153).

LABORATORY CULTURE OF THE MARINE PELAGIC ISOPOD, IDOTEA METALLICA, IS DESCRIBED. I. METALLICA WAS REARED THROUGH MULTIPLE GENERATIONS AND OBSERVATIONS WERE MADE ON ITS REPRODUCTUVE BIOLOGY. THESE DATA ARE COMPARED WITH THOSE OBTAINED BY OTHERS FOR THIS AND RELATED SPECIES. FEMALE I. METALLICA ARE CAPABLE OF PRODUCING SEQUENTIAL BROODS IN THE LABORATORY WITHOUT PASSING THROUGH INTERVENING NON-REPRODUCTIVE INTERMOLT PERIODS. MEAN BROOD SIZE IS 33 AND THE MEAN PERIOD BETWEEN EGG FERTILIZATION AND JUVENILE RELEASE IS 16 TO 17 DAYS. JUVENILES EMERGE FROM THE MARSUPIUM 1.5 TO 2.0 MM IN LENGTH AND BEGIN FEEDING IMMEDIATELY. SEXUAL DIMORPHISM IS EVIDENT IN 25 TO 30 DAYS AT WHICH TIME ISOPODS ARE 6.0 TO 7.5 MM IN LENGTH. SEXUAL MATURITY IS ATTAINED WHEN ISOPODS REACH 10 TO 12 MM, RESULTING IN A GENERATION TIME OF 80 TO 85 DAYS.

GILBERT, T.R. 1983. SURVEY OF THE TOXICITIES AND CHEMICAL COMPOSITIONS OF USED DRILLING MUDS: DATA SUMMARY, JANUARY 1, 1983. 31P. (ERL,GB X465).

THE DATA PRESENTED IN THIS SUMMARY ARE THE RESULTS OF A ONE-YEAR STUDY OF THE TOXICITIES AND CHEMICAL COMPOSITIONS OF USED DRILLING FLUIDS. A MORE COMPLETE FINAL REPORT WILL BE SUBMITTED IN FEBRUARY 1983. THE SPECIFIC OBJECTIVES OF THIS PROJECT WERE TO DEVELOP A SENSITIVE SUBLETHAL LARVAL BIOASSAY TO TEST LIQUID PHASE AND SUSPENDED SOLID-PHASE DRILLING FLUID-SEAWATER MIXTURES AND TO DEVELOP A NOVEL SOLID-PHASE BIOASSAY BASED ON LARVAL SETTLING. MERCENARIA MERCENARIA LARVAE WAS USED AS THE TEST ORGANISM IN ALL THE EXPERIMENTS. IN ADDITION, CHEMICAL ANALYSIS WAS PERFORMED TO HELP ELUCIDATE THE COMPOSITION OF USED DRILLING FLUIDS AND HOPEFULLY TO IDENTIFY THE TOXIC COMPONENTS. THE PRESENTATION OF THE RESULTS IS DIVIDED INTO THREE SECTIONS. FIRST, THE RESULTS OF LIQUID AND SUSPENDED SOLID-PHASE BIOASSAYS ARE PRESENTED. SECOND, THE RESULTS OF CHEMICAL ANALYSES ARE GIVEN. IN THE SECTION THE CONCENTRATION AND CHEMICAL FORMS OF SEVERAL ELEMENTS IN THE DRILLING FLUID-SEAWATER MIXTURES ARE PRESENTED IN TABLE II THROUGH VI. THIS IS FOLLOWED BY BULK CHARACTERISTICS OF THE WHOLE DRILLING FLUID USED IN THESE STUDIES (TABLE VII). TABLES VIII AND IX CONTAIN DATA ON ORGANIC COMPONENTS IN THE WHOLE MUDS INCLUDING # 2 DIESEL FUEL CONTENT. THE THIRD AND FINAL SECTION OF THIS REPORT COVERS THE WORK DONE ON THE SOLID-PHASE BIOASSAY, USING LARVAL SETTLING.

GOODMAN, L.R., D.J. HANSEN, D.P. MIDDAUGH, G.M. CRIPE, AND J.C. MOORE. IN PREP. METHOD FOR EARLY LIFE-STAGE TOXICITY TESTS USING THREE ATHERINID FISHES AND RESULTS WITH CHLORPYRIFOS. IN: AQUATIC TOXICOLOGY AND HAZARD ASSESSMENT, ASTM SEVENTH SYMPOSIUM ON AQUATIC TOXICOLOGY. AMERICAN SOCIETY FOR TESTING AND MATIERIALS, PHILADELPHIA, PA. 20P. (ERL,GB 476).

WE HAVE DEVELOPED METHODS FOR OBTAINING EMBRYOS AND CONDUCTING EARLY LIFE-STAGE TOXICITY TESTS (CONTINUOUS EXPOSURE FROM THE EMBRYONIC STAGE TO APPROXIMATELY THREE WEEKS OR MORE INTO THE EXOGENOUS FEEDING STAGE) WITH THREE ESTUARINE SPECIES OF ATHERINID FISHES. EARLY LIFE-STAGE TESTS WERE CONDUCTED FOR 28-D WITH MENIDIA BERYLLINA, M. MENIDIA, AND M. PENINSULAE AND THE INSECTICIDE CHLORPYRIFOS. RESPONSES OF THE THREE SPECIES WERE VERY SIMILAR: UPPER CHRONIC VALUES ("EFFECT" CONCENTRATIONS) RANGED FROM 0.48 TO 1.8 UG CHLORPYRIFOS/L AD LOWER CHRONIC VALUES ("NO EFFECT" CONCENTRATIONS) RANGED FROM 0.28 TO 0.75 UG/L. CHLORPYRIFOS EXPOSURE DID NOT AFFECT SURVIVAL OF EMBRYOS AND HATCHED FISHES AVERAGED 51% AND FISH WEIGHTS AVERAGED 23 MG; FOR M. PENINSULAE, 69% AND 13.6 MG; AND FOR M. BERYLLINA, 81% AND 8.7 MG. BIOCONCENTRATION FACTORS (CONCENTRATION IN WHOLE BODY/AVERAGE MEASURED CONCENTRATION IN WATER) AVERAGED 220 FOR M. BERYLLINA, 460 FOR M. PENINSULAE, AND PROBABLY LESS THAN 420 FOR M. MENIDIA. FROM THESE THREE SPECIES, TOXICOLOGISTS MAY SELECT AN ATLANTIC OR GULF COAST SPECIES THAT OCCURS IN EITHER HIGH OR LOW SALINITY.

GOODMAN, LARRY R., DOUGLAS P. MIDDAUGH, DAVID J. HANSEN, PEGGY K. HIGDON, AND GERALDINE M. CRIPE. IN PREP. METHOD FOR EARLY LIFE-STAGE TOXICITY TESTS WITH THE TIDEWATER SILVERSIDE (MENIDIA PENINSULAE) AND RESULTS OBTAINED WITH CHLORINE PRODUCED OXIDANTS. AQUAT. TOXICOL. 15P. (ERL,GB 466).

EARLY LIFE-STAGE TOXICITY TESTS (CONTINUOUS EXPOSURE FROM EMBRYONIC STAGE TO APPROXIMATELY THREE WEEKS OR MORE INTO THE EXOGENOUS FEEDING STAGE) WITH NORTH AMERICA MARINE FISHES HAVE BEEN CONDUCTED ALMOST EXCLUSIVELY WITH CYPRINODONTIDS. IN THIS PAPER, WE PRESENT METHODS FOR TESTING A REPRESENTATIVE OF AN ADDITIONAL FAMILY, ATHERINIDAE. EMBRYOS OF THE TIDEWATER SILVERSIDE, MENIDIA PENINSULAE, WERE OBTAINED BY A LABORATORY SPAWNING PROCEDURE THAT REQUIRED LIGHTING AND TIDAL (CURRENT) CUES. THE 28-DAY TOXICITY TEST WITH CHLORINE PRODUCED OXIDANTS (CPO) BEGAN WITH STAGE 21 AND 22 EMBRYOS (APPROXIMATELY 36-H OLD). AVERAGE MEASURED CPO CONCENTRATIONS IN EXPOSURE WATER WERE: NONDETECTABLE (LESS THAN 0.01 MG/L) IN THE CONTROL AND THE TWO LOWEST EXPOSURE CONCENTRATIONS; AND 0.01, 0.04, AND 0.21 MG/L. SURVIVAL OF EMBRYOS TO HATCHING AVERAGED 99%, WITH NO SIGNIFICANT DIFFERENCE AMONG TREATMENTS. ALTHOUGH NO FRY SURVIVED EXPOSURE TO 0.21 MG CPO/L, SURVIVAL WAS GREATER THAN OR EQUAL TO 88% IN THE CONTROL AND THE FOUR OTHER CPO TREATMENTS. AVERAGE WET WEIGHTS OF INDIVIDUAL FISH RANGED FROM 11.7 MG IN 0.04 MG/L TO 13.2 MG IN 0.01 MG/L WITH NO SIGNIFICANT DIFFERENCE AMONG TREATMENTS.

GOODMAN, L.R. IN PRESS. CHRONIC TOXICITY OF ORGANOPHOSPHORUS PESTICIDES TO ESTUARINE FISH (ABSTRACT). PRESENTED AT THE SYMPOSIUM ON ORGANOPHOSPHORUS PESTICIDES IN THE MARINE ENVIRONMENT, JUNE 7-9, 1981, DUKE UNIVERSITY MARINE LABORA. (ERL,GB 368).

TWO TYPES OF TOXICITY TESTS OF DIFFERING DURATIONS AND DIFFERENT ENDPOINTS ARE FREQUENTLY USED TO DETERMINE THE CHRONIC EFFECTS OF PESTICIDES TO FISHES. THE LIFE-CYCLE TOXICITY TEST IS THREE TO NINE MONTHS LONG AND MEASURES EFFECTS ON SURVIVAL, GROWTH, AND REPRODUCTION TO DETERMINE MAXIMUM ACCEPTABLE TOXICANT CONCENTRATIONS (MATC'S; "SAFE CONCENTRATION"). THE EARLY LIFE STAGE TOXICITY TEST IS FOUR WEEKS LONG, MEASURES EFFECTS ON SURVIVAL AND GROWTH OF EMBRYOS AND FRY, AND IS USED TO DERIVE AND ESTIMATE OF THE MATC. FOR THE ESTUARINE SHEEPSHEAD MINNOW, CYPRINODON VARIEGATUS, ESTIMATED MATC'S FOR PHORATE, CARBOPHENOTHION, CHLORPYRIFOS, OR ETHOPROP AND MATC'S FOR DIAZINON, EPN, OR MALATHION RANGED FROM LESS THAN 0.47 MG/L TO BETWEEN 12 AND 21 MG/L. APPLICATION FACTORS (MATC DIVIDED BY 96-HR LC50) RANGED FROM LESS THAN 0.0003 TO BETWEEN 0.46 AND 1.0. THE MOST SENSITIVE RESPONSES NOTED IN EARLY LIFE STAGE TOXICITY TESTS WITH THESE PESTICIDES WERE EITHER REDUCED SURVIVAL, REDUCED GROWTH, OR BOTH. THE MOST SENSITIVE RESPONSE IN THE DIAZINON EXPERIMENT WAS REDUCED FECUNDITY OF FISH WHOSE BRAIN ACETYLCHOLINESTERASE (ACHE) ACTIVITY WAS 79% OF NORMAL OR LESS. IN THE EPN EXPERIMENT, THE MOST SENSITIVE CHRONIC RESPONSES WERE REDUCED SURVIVAL, GROWTH, AND FERTILITY OF EGGS PRODUCED BY FISH WHOSE BRAIN ACHE ACTIVITY WAS 14% OF NORMAL. RESULTS OF THESE TESTS WITH ORGANOPHOSPHATE PESTICIDES DEMONSTRATED THAT (1) THEY CAN BE CHRONICALLY TOXIC AT LOW MG/L CONCENTRATIONS, (2) THE MOST SENSITIVE RESPONSE CAN BE REDUCED SURVIVAL, GROWTH, REPRODUCTION, OR A COMBINATION OF THESE, AND (3) EFFECTS CAN OCCUR IN FISH THAT EXHIBIT A WIDE RANGE OF BRAIN ACHE ACTIVITY.

HANSEN, DAVID J., LARRY R. GOODMAN, JAMES C. MOORE, AND PEGGY K. HIGDON. 1983. EFFECTS OF THE SYNTHETIC PYRETHROIDS AC 222, 705, PERMETHRIN, AND FENVALERATE ON SHEEPSHEAD MINNOWS IN EARLY LIFE-STAGE TOXICITY TESTS. ENVIRON. TOXICOL. AND CHEM. 2(2):251-258. (ERL,GB 462).

SHEEPSHEAD MINNOWS (CYPRINODON VARIEGATUS) WERE EXPOSED TO THE SYNTHETIC PYRETHROID INSECTICIDES AC 222, 705, FENVALERATE AND PERMETHRIN FOR 28 DAYS IN EARLY LIFE STAGE TOXICITY TESTS. AC 222, 705 WAS 370 TIMES MORE TOXIC THAN PERMETHRIN AND 30 TIMES MORE TOXIC THAN FENVALERATE WITH SURVIVAL AND SIZE OF NEWLY HATCHED FISH BEING THE MOST SENSITIVE MEASURE OF EFFECT. AC 222, 705 REDUCED SURVIVAL OF HATCHED FISH 0.61 UG/L AND AVERAGE WEIGHT AT 0.06 UG NO EFFECTS WERE DETECTED AT 0.03 UG/L. TWO OF THE AC 222, 705 CONCENTRATIONS THAT DIMINISHED WEIGHTS, 0.06 AND 0.12 UG/L, WERE BELOW OUR LIMITS OF CHEMICAL DETECTION, 0.15 UG/L. PERMETHRIN REDUCED SURVIVAL OF HATCHED FISH AT 22 UG/L; NO EFFECTS WERE DETECTED AT 10 UG/L. FENVALERATE REDUCED SURVIVAL OF HATCHED FISH AR 3.9 UG/L AND BOTH WEIGHT AND LENGTH AT 2.2 UG/L; NO EFFECTS WERE DETECTED AT 0.56 UG/L. PERMETHRIN REDUCED SURVIVAL OF HATCHED FISH AT 22 UG/L AND NO EFFECTS WERE DETECTED AT 10 UG/L. THE QUOTIENT OF THE 96-HR LC50 DIVIDED BY THE NO-EFFECT CONCENTRATION WAS 0.8 FOR PERMETHRIN, 9 FOR FENVALERATE AND 37 FOR AC 222, 705. THE MEAN BIOCONCENTRATION FACTORS, CONCENTRATIONS MEASURED IN WHOLE FISH DIVIDED BY CONCENTRATIONS MEASURED IN EXPOSURE WATER, WERE 480 FOR PERMETHRIN AND 570 FOR FEVALERATE; AC 222, 705 WAS NOT DETECTED IN FISH THAT SURVIVED THE EXPOSURE.

HANSEN, DAVID J. IN PREP. UTILITY OF TOXICITY TESTS TO MEASURE EFFECTS OF SUBSTANCES ON MARINE ORGANISMS. IN: PROCEEDINGS OF CONFERENCE ON MEANINGFUL MEASURES OF MARINE POLLUTION EFFECTS, APRIL 26-29, 1982, PENSACOLA BEACH, FL. U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. (ERL,GB 456).

DISCUSSIONS IN THIS PAPER WILL EMPHASIZE ACUTE, EARLY LIFE-STAGE, LIFE CYCLE AND COMMUNITY TOXICITY TESTS WITH MARINE (ESTUARINE OR OCEANIC) SPECIES AS CONDUCTED AT THE U.S. EPA ENVIRONMENTAL RESEARCH LABORATORY AT GULF BREEZE, FLORIDA. THESE TESTS ARE EMPHASIZED BECAUSE OF THEIR IMPORTANCE IN THE HAZARD EVALUATION PROCESS, AS DISCUSSED IN WORKSHOP PROCEEDINGS BY CAIRNS ET AL. (1978) AND DICKSON ET AL. (1979). INDIVIDUAL PAPERS PUBLISHED IN THE PROCEEDINGS OF THESE TWO WORKSHOPS DETAIL HAZARD EVALUATION TECHNIQUES USED BY THE AMERICAN ISTITUTE OF BIOLOGICAL SCIENCE, AMERICAN SOCIETY FOR TESTING AND MATERIALS, MONSANTO COMPANY, U.S. ENVIRONMENTAL PROTECTION AGNECY AND BY JAPANESE AND FRENCH SCIENTISTS. IN ADDITION, TESTING REQUIREMENTS FOR EFFECTS ASSESSMENTS HAVE BEEN RECENTLY IDENTIFIED FOR DEVELOPMENTAL OF WATER QUALITY CRITERIA BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY (1980A) AND THE U.S. ARMY (PEARSON AND GLENNON, 1979).

HAYES, MILES O., ERICH R. GUNDLACH, GEOFFREY I. SCOTT, R. CRAIG SHIPP, JACQUELINE MICHEL, KENNETH FINKELSTEIN, AND WILLIAM P. DAVIS. IN PREP. THE PECK SLIP OIL SPILL: A PRELIMINARY REPORT. J. ROBINSON, EDITOR, U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, CO. 257P. (ERL,GB X429).

HENDRICKS, J. D., T. R. MEYERS, AND D. W. SHELTON. IN PRESS. HISTOLOGIC PROGRESSION OF HEPATIC NEOPLASMS IN RAINBOW TROUT (SALMO GAIRDNERI). IN: PROCEEDINGS OF SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENCITY TESTING. U.S. NATIONAL CANCER INSTITUTE. (ERL,GB X353).

HINTON, DAVID E., AND JOHN A. COUCH. IN PREP. PATHOBIOLOGICAL MEASURES OF MARINE POLLUTION EFFECTS. IN: PROCEEDINGS OF CONFERENCE ON MEANINGFUL MEASURES OF MARINE POLLUTION EFFECTS, APRIL 26-29, 1982, PENSACOLA BEACH, FL. U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 25P. (ERL,GB 475).

THE INTENT OF THIS REVIEW IS TO DISCUSS THE MAJOR CATEGORIES OF PATHOBIOLOGICAL RESEARCH AND TO PRESENT STRENGTHS AND WEAKNESSES OF EACH. WHERE APPROPRIATE, EXAMPLES FROM THE AQUATIC TOXICOLOGY LITERATURE ARE CITED. FIINALLY, THE APPLICATION OF THE PATHOBIOLOGIC APPROACH TO FIELD STUDIES AND THE IMPORTANCE OF FINDINGS IN AQUATIC SPECIES TO OTHER SPECIES INCLUDING MAN IS DISCUSSED.

KENDALL, J.J., E.N. POWELL, S.J. CONNOR, AND T.J. BRIGHT. 1983. EFFECTS OF DRILLING FLUIDS (MUDS) AND TURBIDITY ON THE GROWTH AND METABOLIC STATE OF THE CORAL ACROPORA CERVICORNIS, WITH COMMENTS ON METHODS OF NORMALIZATION FOR CORAL DATA. BULL. MAR. SCI. 33(2):336-352. (ERL,GB X396).

THE EFFECTS OF A USED DRILLING MUD ON CORAL HEALTH HAVE BEEN EXAMINED BY MONITORING CHANGES IN CALCIFICTION RATE, SOLUBLE TISSUE PROTEIN CONCENTRATION AND TOTAL NINHYDRIN POSITIVE SUBSTANCE (NPS) CONCENTRATION IN THE CORAL ACROPORA CERVICORNIS. EXPOSURE TO A USED DRILLING MUD REDUCED CALFICATION RATE IN GROWING TIPS BY 62%, 83% AND 88% AT 25 PPM, 50 PPM AND 100 PPM (V/V), RESPECTIVELY AFTER A 24-H EXPOSURE PERIOD. SOLUBLE TISSUE PROTEIN CONCENTRATION DROPPED SIGNIFICANTLY IN THE GROWING TIP AFTER 24 H EXPOSURE TO A SOLUTION OF 25-, 50-, 100- AND 500-PPM DRILLING MUD FOR 24 H. EQUIVALENT CONCENTRATIONS OF KAOLIN (TO PRODUCE TURBIDITY) CAUSED NO DROP IN BPS OR PROTEIN CONCENTRATION AND A MUCH LOWER DROP IN CALCIFICATION RATE SUGGESTING THAT THE TOXIC EFFECTS OBSERVED FOR THE DRILLING MUD USED WERE NOT CAUSED BY AN INCREASE IN TURBIDITY ALONE. THE SIGNIFICANT DROP IN PROTEIN CONCENTRATION SUGGESTS THAT THE USE OF PROTEIN OR OTHER TISSUE COMPONENTS FOR NORMALIZATION IN CORALS MAY NOT BE JUSTIED IN SOME CASES AND SHOULD BE VIEWED WITH CAUTION.

LAWRENCE, DAVID R., ALAN M. DENNIS, AND GEOFFREY I. SCOTT. IN PRESS. RATES OF SEDIMENT REWORKING BY SACCOGLOSSUS AT NORTH INLET, SOUTH CAROLINA. J. SEDIMENT. PETROL. (ERL,GB X001).

COILED SEDIMENT CASTINGS PRODUCED BY THE DEPOSIT-FEEDING HEMICHORDATE SACCOGLOSSUS KOWALEVSKYI (A. AGASSIZ) ARE CONSPICUOUS SURFICIAL FEATURES OF THE LOWER, MUDDIER, AND MARSH-FACING PORTIONS OF SAND FLATS INSIDE NORTH INLET, GEORGETOWN COUNTY, SOUTH CAROLINA. THE ORGANISMS LIVE IN L- OR U-SHAPED BURROWS ABOUT 20 CM DEEP; THEIR DENSITIES RANGE UP TO 11 INDIVIDUALS/M2. DEFECATION BY SACCOGLOSSUS IS AFFECTED BY THE SEASONS AND THE TIDAL CYCLE; ACTIVITY IS GREATER DURING THE WARMER MONTHS OF THE YEAR AND DECREASES DURING THE HOURS OF LOW TIDE EXPOSURE OF THE FLATS. ONE INDIVIDUAL REWORKS OVER 25 LITERS OF SEDIMENT PER YEAR AND, AT MEAN POPULATION DENSITY, THESE ORGANISMS ALONE WOULD COMPLETELY TURN OVER THE VOLUME OF SEDIMENT THEY INHABIT IN SLIGHTLY MORE THAN 29 MONTHS.

LORES, EMILE M., AND JAMES C. MOORE. IN PREP. QUANTITATIVE RECOVERY OF SEVERAL ORGANOPHOSPHORUS PESTICIDE RESIDUES FROM ENVIRONMENTAL SAMPLES WITH SILICA GEL CLEANUP (ABSTRACT). IN: PROCEEDINGS OF THE 1984 PITTSBURG CONFERENCE AND EXPOSITION ON ANALYTICAL CHEMISTRY AND APPLIED SPECTROSCOPY, MARCH 5-9, 1984, ATLANTIC CITY, N.J. (ERL,GB 492).

QUANTITATIVE RECOVERY OF SOME ORGANOPHOSPHORUS PESTICIDE RESIDUES FROM ENVIRONMENTAL SAMPLES HAS NOT BEEN POSSIBLE WITH PREVIOUS CLEANUP PROCEDURES DUE TO LOSSES ON THE CLEANUP COLUMN. WE HAVE DEVELOPED A NEW CLEANUP METHOD THAT PERMITS QUANTITATIVE RECOVERY OF MANY ORGANOPHOSPHORUS PESTICIDES, E.G., FENTHION, PHORATE AND MALATHION. THE METHOD USES 3.5G SILICA GEL COLUMN WITH A 1% ACETIC ACID IN HEXANE WASH TO CONDITION THE COLUMN PRIOR TO ADDTION OF THE SAMPLES FROM THE MARINE ENVIRONMENT FORTIFIED WITH THESE PESTICIDES, THE RECOVERY EXCEEDED 90%. THE IMPROVEMENT IN THE RECOVERY IS DUE TO THE ACETIC ACID WASH USED TO CONDITION THE COLUMN. ACID CONDITIONING WAS ALSO HELPFUL ON OTHER TYPES OF CLEANUP COLUMNS, SUCH AS FLORISIL AND ALUMNIA USED FOR CLEANUP OF ORGANOPHOSPHORUS PESTICIDES.

MARTIN, B.J., R.D. ELLENDER, S.A. HILLEBERT, AND M.M. GUESS. IN PREP. PRIMARY CELL CULTURES FROM THE TELEOST, CYPRINODON VARIEGATUS: CULTURE ESTABLISMENT AND APPLICATION IN CARCINOGEN EXPOSURE STUDIES. IN: PROCEEDINGS OF THE SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENICITY TESTING, BETHESDA, MARYLAND, DECEMBER 8-10, 1981. U.S. NATIONAL CANCER INSTITUTE. 25P. (ERL,GB X260).

METHODS WERE DEVELOPED TO MAINTAIN C. VARIEGATUS FRY ASEPTICALLY FOR EXTENDED PERIODS. PRELIMINARY STUDIES INDICATED THAT UNDER OPTIMUM CONDITIONS STERILE EMBRYOS DEVELOP NORMALLY FOR A SUFFICIENT TIME TO FUNCTION AS CARCINOGEN/TERATOGEN ASSAY SYSTEMS. AN EMBRYO-PRIMARY CELL CULTURE TECHNIQUE WAS DEVELOPED THAT INCORPORATES, IN A SINGLE SYSTEM, CERTAIN CHARACTERISTICS OF BOTH INTACT EMBRYOS AND PRIMARY CELL CULTURES, ALLOWING SIMULTANEOUS OBSERVATION OF THE EFFECTS OF CARCINOGENS ON THE WHOLE ORGANISM AND PRIMARY CELL MONOLAYERS. THE EFFECTIVE USE OF THESE SYSTEMS PROVIDES THE OPPORTUNITY TO STUDY THE EFFECTS OF CARCINOGENS ON TELEOSTS AT THE CELLULAR AND ORGANISMIC LEVEL.

MCKENNEY, CHARLES L., JR. IN PREP. ASSOCIATIONS BETWEEN PHYSIOLOGICAL ALTERATIONS AND POPULATION CHANGES IN AN ESTUARINE MYSID DURING CHRONIC EXPOSURE TO A PESTICIDE. TO BE PRESENTED AT THE 6TH SYMPOSIUM ON POLLUTION AND PHYSIOLOGY OF MARINE ORGANISMS, NOV. 1-3, 1983, MYSTIC, CT. (ERL,GB 495).

A NUMBER OF VITAL LIFE PROCESSES OF AN ESTUARINE MYSID (MYSIDOPSIS BAHIA) WERE EXAMINED THROUGHOUT ITS LIFE CYCLE DURING EXPOSURE TO THE THIOCARBAMATE HERBICIDE, THIOBENCARB. INITIAL EXPOSURE OF JUVENILE MYSIDS TO THIOBENCARB RESULTED IN ELEVATED RESPIRATION RATES. CONCENTRATION OF THIOBENCARB THAT PRODUCED SIGNIFICANT REDUCTIONS IN POPULATION SURVIVAL THROUGH A COMPLETE LIFE CYCLE (IN APPROXIMATELY 24 DAYS) SIGNIFICANTLY STIMULATED RESPIRATION RATES OF JUVENILES AFTER ONLY 4 DAYS OF EXPOSURE. INCREASED METABOLIC DEMANDS WITH SUBLETHAL THIOBENCARB EXPOSURE REDUCED THE AMOUNT OF ASSIMILATED ENERGY AVAILABLE FOR PRODUCTION OF NEW TISSUE BY JUVENILE MYSIDS, RESULTING IN RETARDED JUVENILE GROWTH RATES. HIGHER O:N RATIOS DURING THE MATURATION OF THIOBENCARB-EXPOSED MYSIDS SUGGEST A GREATER RELIANCE ON THE MORE ENERGY-RICH LIPID SUBSTRATES IN ORDER TO SUPPORT THE ELEVATED RATES OF OXIDATIVE METABOLISM, RESULTING IN LESS LIPID MATERIAL BEING AVAILABLE FOR GAMETE PRODUCTION.

MCKENNEY, CHARLES L. IN PREP. PHYSIOLOGICAL RESPONSES OF MYSIDOPSIS BAHIA EXPOSED THROUGH AN ENTIRE LIFE CYCLE TO AN ORGANIC TOXICANT (ABSTRACT). (ERL,GB 455).

DISCUSSIONS AND PRESENTATIONS IN THE TOXICITY TEST SESSION INDICATED THAT MEASUREMENTS OF TOXICITY AT THE SINGLE AND MULTISPECIES, COMMUNITY AND SYSTEM LEVELS ARE USEFUL IN RANKING CHEMICALS BY THEIR TOXICITY AND IN HAZARD EVALUATIONS. HOWEVER, RELATING THE RESULTS OF THOSE TESTS DIRECTLY TO THE ENVIRONMENT IS ESPECIALLY RISKY WHEN: 1) THE MANNER IN WHICH LABORATORY ORGANISMS ARE EXPOSED TO POLLUTANTS DIFFER FROM EXPOSURE IN THE ENVIRONMENT, 2) LABORATORY TESTS DEAL WITH SINGLE CHEMICALS AND ORGANISMS ARE EXPOSED TO COMPLEX MIXTURES IN THE ENVIRONMENT, 3) CRITERIA FOR EFFECTS IN THE LABORATORY ARE NOT IMPORTANT FUNCTIONAL END-POINTS IN POPULATION AND SYSTEM DYNAMICS. THE DOMINANT THEME OF THIS CHAPTER IS THE NECESSITY FOR AN APPROPRIATE BALANCE BETWEEN LABORATORY AND FIELD STUDIES. THE NEED FOR THIS BALANCE IS EASILY ARTICULATED BUT WILL REQUIRE CONCERTED EFFORT TO IMPLEMENT.

MEADOR, C.B., B.L. MIDDLEBROOKS, AND B.J. MARTIN. IN PRESS. SEROLOGIC ALTERATIONS IN CARCINOGEN-EXPOSED TELEOSTS: PROCEDURES FOR PREPARATION AND ANALYSIS OF SAMPLES FROM SMALL FISH. IN: PROCEEDINGS OF THE SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENICITY TESTING, BETHESDA, MARYLAND, DECEMBER 8-10, 1981. U.S. NATIONAL CANCER INSTITUTE. 36P. (ERL,GB X261).

IN ORDER TO STUDY THE EFFECTS OF ENVIRONMENTAL CARCINOGENS ON THE IMMUNE SYSTEM OF CYPRINODON VARIEGATUS, IT WAS NECESSARY TO MINIATURIZE OR MODIFY STANDARD IMMUNOLOGICAL PROCEDURES, DUE TO THE SMALL SIZE OF THE FISH. MODIFICATIONS IN STANDARD BLEEDING PROCEDURES ALLOWED COLLECTION OF SUFFICIENT SERUM TO PERFORM MOST SEROLOGICAL PROCEDURES. SERUM ELECTROPHORESIS SHOWED CONSIDERABLE VARIATON BETWEEN EXPOSED AND UNEXPOSED FISH AS DID QUALITATIVE IMMUNOELECTROPHORESIS TECHNIQUES. A BACTERIOPHAGE NEUTRALIZATION PROCEDURE WAS SUCCESSFULLY ADAPTED FOR USE WITH THE C. VARIEGATUS SYSTEM TO MEASURE ANTIVIRAL ANTIBODIES. THE PRESENCE OF ANTIBODY-FORMING CELLS IN SPLEEN SUSPENSIONS FROM FISH IMMUNIZED WITH HUMAN TYPE O ERYTHROCYTES WAS DEMONSTRATED BY A MODIFIED IMMUNE ROSETTE PROCEDURE. A CAPILLARY TUBE PROCEDURE WAS DEVELOPED FOR SEPARATION OF LEUCOCYTES FOM ERYTHROCYTES IN BLOOD DEVELOPED FOR SEPARATION OF LEUCOCYTES FROM ERYTHROCYTES IN BLOOD FROM C. VARIEGATUS.

MELIUS, PAUL. IN PRESS. COMPARATIVE BENZO(A)PYRENE METABOLITE PATTERNS IN FISH AND RODENTS. IN: PROCEEDINGS OF THE SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENICITY TESTING, BETHESDA, MARYLAND, DECEMBER 8-10, 1981. U.S. NATIONAL CANCER INSTITUTE. (ERL,GB X365).

BENZO(A)PYRENE IS CONVERTED TO 3-HYDROXYBENZO(A)-PYRENE, 9-HYDROXYBENZO(A)PYRENE, 4,5-BENZO(A)PYRENE-DIHYDRODIOL, 7,8-BENZO(A)PYRENEDIHYDRODIOL, 9,10-BENZO(A)-PYRENEDIHYDRODIOL AND BENZO(A)PYRENE QUINONES BY POST MITOCHONDRIAL SUPERNATANT OR MICROSOMES IN SUCH FISH AS THE RAINBOW TROUT FLOUNDER, SALMON, MULLET, LITTLE SKATE, FUNDULUS GRANDIS AND SEA CATFISH. IT IS ALSO NOW WELL-ESTABLISHED THAT MANY FISH CONVERT BENZO(A)PYRENE TO POTENT MUTAGENIC MTEBOLITES AS HAS BEEN DEMONSTATED USING THE AMES TEST, ESPECIALLY WHEN THE FISH ARE INDUCED WITH AROCLOR OR 3-METHYLCHOLANTHRENE, THE METABOLITE PATTERNS OBTAINED AT DIFFERENT SUBSTRATE CONCENTRATION LEVELS INDICATE THAT THE METABOLISM IS MORE COMPLEX AT LOW CONCENTRATIONS WHERE RECYCLING OF METABOLITES IS PRODUCED IN THE IN VITRO SYSTEM.

MEYERS, T.R., AND J.D. HENDRICKS. IN PRESS. HISTOPATHOLOGY OF FOUR SPONTANEOUS NEOPLASMS IN THREE SPECIES OF SALMONID FISHES. J. FISH DIS. (ERL,GB X358).

MEYERS, T.R., AND J.D. HENDRICKS. IN PRESS. LIMITED EPIZOOTIC OF GANGLIONEUROBLASTOMA IN COHO SALMON REARED IN CHLORINATED-DECHLORINATED WATER. J. NATL. CANCER INST. (ERL,GB X401).

MIDDAUGH, DOUGLAS P., H.W. KOHL, AND L.E. BURNETT. 1983. CONCURRENT MEASUREMENT OF INTERTIDAL ENVIRONMENTAL VARIABLES AND EMBRYO SURVIVAL FOR THE CALIFORNIA GRUNION, LEURESTHES TENUIS AND ATLANTIC SILVERSIDE, MENIDIA MENIDIA (PISCES: ARTHERINIDAE). CALIF. FISH GAME. 69(2):89-96. (ERL,GB 221).

CONCURRENT DAILY MEASUREMENTS OF ENVIRONMENTAL VARIABLES AND EMBRYO SURVIVAL WERE MADE FOR TWO ATHERINID FISHES, THE CALIFORNIA GRUNION, LEURESTHES TENUIS, OBSERVED AT BLACKS BEACH, LA JOLLA, CALIFORNIA; AND THE ATLANTIC SILVERSIDE, MENIDIA MENIDIA, OBSERVED AT THE POINT OF PINES, EDISTO ISLAND, SOUTH CAROLINA. MEASUREMENTS WERE MADE DURING APRIL 1980. BOTH SPECIES SPAWNED IN THE UPPER INTERTIDAL ZONE ON HIGH TIDE. L. TENUIS EGGS WERE DEPOSITED APPROXIMATELY 4 CM BELOW THE BEACH SURFACE DURING NIGHTTIME. SUBSEQUENT SAND DEPOSITION BURIED EMBRYOS TO A DEPTH OF APPROXIMATELY 8 CM WHERE THEY WERE PROTECTED FROM THERMAL AND DESICCATION STRESSES. DAILY SURVIVAL OF INCUBATING EMBRYOS AVERAGED 97%. M. MENIDIA UTILIZED THREE SPAWNING SUBSTRATES: 1) ABANDONED CRAB BURROWS, 2) DETRITAL MATS, AND 3) THE STEMS AND PRIMARY LEAVES OF CORDGRASS, SPARTINA ALTERNIFLORA. THESE SUBSTRATES PROVIDED EMBRYOS WITH VARYING DEGREES OF PROTECTION FROM THERMAL AND DESICCATION STRESSES. DAILY SURVIVAL OF EMBRYOS LOCATED 15 CM DEEP IN ABANDONED CRAB BURROWS AVERAGED 88%. SURVIVAL WAS LESS, 76% AT THE ENTRANCE. DAILY SURVIVAL AVERAGED 94% AT THE SURFACE OF DETRITAL MATS AND AT THE AXIS OF STEMS AND PRIMARY LEAVES OF CORDGRASS. SURVIVAL WAS LOWER AT OTHER LOCATIONS ON THESE SUBSTRATES.

MIDDAUGH, DOUGLAS P., AND TORU TAKITA. 1983. TIDAL AND DIURNAL SPAWNING CUES IN THE ATLANTIC SILVERSIDE, MENIDIA MENIDIA. ENVIRON. BIOL. FISH. 8(2):97-104. (ERL,GB 150).

FIELD AND LABORATORY OBSERVATIONS REVEALED TIDAL AND DIURNAL CUES FOR SPAWNING IN THE ATLANTIC SILVERSIDE, MENIDIA MENIDIA. IN THE FIELD, SPAWNING RUNS BEGAN NEAR THE TIME OF DAYTIME HIGH TIDES AT FLOOD TIDE VELOCITIES RANGING FROM 3 TO 16, X 11 CM SEC -1. SPAWNING RUNS ENDED AT EBB TIDE VELOCITIES RANGING FROM 5 TO 22, X 17 CM SEC -1. IN THE LABORATORY M. MENIDIA WERE REARED FROM EMBRYOS TO SEXUAL MATURITY IN 10 MONTHS (APRIL 1979 TO JANUARY 1980). DURING THIS TIME, APPROXIMATELY 50 FISH WERE HELD IN EACH OF TWO, 1 M DIAMETER TANKS. A PUMP WAS USED TO MAINTAIN A CONSTANT CURRENT VELOCITY OF 8 CM SEC -1 IN THE HOLDING TANKS. WATER TEMPERATURE RANGED FROM 16 TO 25 DEGREES C , THE SALINITY WAS 30 PLUS OR MINUS 2 PPT. FISH WERE FED TETRA-MIN FLAKE FOOD AND ARTEMIA NAUPLII EACH DAY. DURING JANUARY 1980, THE SEAWATER CIRCULATION PUMP WAS TURNED OFF TWICE DAILY FOR ONE HOUR, 1200 TO 1300 AND 2400 TO 0100. CURRENT VELOCITIES DECREASED FROM 8 CM SEC -1 TO 0.0 CM SEC -1 DURING THESE PERIODS. M. MENIDIA HELD UNDER A 24 H LIGHT: 0 H DARL (24L:0D) PHOTOPERIOD SPAWNED FROM 1200 TO 1300 AND 2400 TO 0100 IN RESPONSE TO DECREASED CURRENT VELOCITIES. MODIFICATION OF THE PHOTOPERIOD TO 14L:10D (WITH THE CIRCULATING PUMP TURNED OFF FROM 1200 TO 1300 AND 2400 AND 0100) RESULTED IN SPAWNING BETWEEN 0500 AND 0600 IN RESPONSE TO "LIGHTS-ON" AND AT 1200 TO 1300 IN RESPONSE TO DECREASED CURRENT VELOCITIES. NO SPAWNING OCCURRED WHEN CURRENT VELOCITIES DECREASED TO 0.0 CM SEC -1 BETWEEN 0400 AND 0100 DURING DARKNESS.

MIDDAUGH, DOUGLAS P., R.G. DOMEY, AND G.I. SCOTT. IN PREP. REPRODUCTIVE RHYTHMICITY IN THE ATLANTIC SILVERSIDE, MENIDIA MENIDIA, (PISCES: ATHERINIDAE). TRANS. AM. FISH. SOC. 31P. (ERL,GB 491).

THE REPRODUCTIVE PERIODICITY OF THE ATLANTIC SILVERSIDE, MENIDIA MENIDIA, WAS STUDIED AT TWO LOCATIONS ON THE NORTH EDISTO RIVER ESTUARY IN SOUTH CAROLINA DURING MARCH - JULY OF 1976-1978. SPAWNING RUNS OCCURRED IN THE UPPER INTERTIDAL ZONE AND COINCIDED PRECISELY WITH DAYTIME HIGH TIDES. TIME SERIES ANALYSIS OF DAILY CHANGES IN THE INTENSITY OF SPAWNING RUNS REVEALED A FORTNIGHTLY REPRODUCTIVE PERIODICITY. ADDITIONAL ANALYSES INDICATE THAT THE OBSERVED REPRODUCTIVE RHYTHMICITY IN M. MENIDIA MAY BE MEDIATED BY A HIGH TIDE-SUNRISE CUE THAT ALSO OCCURS AT FORTNIGHTLY INTERVALS. CORRELATION COEFFICIENTS BETWEEN EMPIRICAL FIELD DATA AND A THEORETICAL FOURIER HARMONIC SERIES INCREASED AS THE NUMBER OF HARMONICS INCREASED FROM 35 (R = 0.66, P IS LESS THAN OR EQUAL TO 0.001) TO 140 (R = 0.86, P IS LESS THAN OR EQUAL TO 0.001). EXAMINATION OF THE OVARIES AND TESTES OF SEXUALLY MATURE INDIVIDUALS COLLECTED N 98 DAYS DURING THE 1976-1977 REPRODUCTIVE SEASON INDICATED HIGHLY SIGNIFICANT CORRELATIONS (P IS LESS THAN OR EQUAL TO 0.01) AMONG THE MALE GONADAL INDEX, FEMALE GONADAL INDEX, AND THE OCCURRENCE OF INTERMEDIATE, MATURING AND HYDRATED EGG STAGES IN FEMALES.

MIDDAUGH, DOUGLAS P., R. G. DOMEY, AND G. I. SCOTT. IN PREP. REPRODUCTIVE RHYTHMICITY IN THE ATLANTIC SILVERSIDE, MENIDIA MENIDIA, (PISCES: ATHERINIDAE). TRANS. AM. FISH. SOC. (ERL,GB 485).

IN THIS PAPER, WE REVIEW ASPECTS OF REPRODUCTIVE RHYTHMICITY IN M. MENIDIA FROM THE NORTH EDISTO RIVER ESTUARY IN SOUTH CAROLINA. DAILY OBSERVATIONS FOR SPAWNING WERE MADE FROM MARCH THROUGH JULY OF 1976-1978 AT TWO ESTUARINE SITES. ADULTS WERE ALSO COLLECTED DURING THE 1976 AND 1977 REPRODUCTIVE SEASONS TO DOCUMENT CHANGES IN THE GONADOSOMATIC INDICES OF EACH SEX AND THE OCCURRENCE OF SEVERAL EGG STAGES IN SEXUALLY MATURE FEMALES.

MIDDAUGH, DOUGLAS P., AND MICHAEL J. HEMMER. IN PRESS. SPAWNING OF THE TIDEWATER SILVERSIDE, MENIDIA PENINSULAE (GOODE AND BEAN) IN RESPONSE TO TIDAL AND LIGHTING SCHEDULES IN THE LABORATORY. ESTUARIES. 30P. (ERL,GB 441).

TIDEWATER SILVERSIDE, MENIDIA PENINSULAE (GOODE AND BEAN) WERE MAINTAINED IN 1.3 M DIAMETER HOLDING TANKS IN IDENTICAL LABORATORY RECIRCULATING SYSTEMS. DURING TWO WEEKS UNDER CONSTANT CONDITIONS (A CURRENT VELOCITY OF 8 CM S -1/1 AND CONTINOUS ILLUMINATION, 24 L:0 D) THERE WAS A LOW RELATIVE FREQUENCY OF ARRHYTHMIC SPAWNING. IN THE SUBSEQUENT TWO-WEEK PERIOD, FISH IN ONE PAIR OF TANKS WERE MAINTAINED UNDER THE SINGULAR INFLUENCE OF TWICE DAILY DECREASES IN CURRENT VELOCITY FROM 8 TO 0 CM S -1/1 AT 0600-0700 AND 1800-1900, UNDER CONTINOUS ILLUMINATION. THE RELATIVE FREQUENCY OF SPAWNING REMAINED LOW AND THERE WAS NO EVIDENCE OF A DAILY SPAWNING RHYTHM. HOWEVER, THE MEAN NUMBER OF OF EGGS PER SPAWN INCREASED SUBSTANTIALLY. FISH IN THE SECOND HOLDING SYSTEM WERE SUBJECTED TO DIEL LIGHT CYCLE OF 13 L:11 D WITH A CONSTANT CURRENT VELOCITY OF 8 CM S -1/1 FOR TWO WEEKS. THE RELATIVE FREQUENCY OF SPAWNING REMAINED LOW AND THERE WAS NO INDICATION OF SPAWNING RHYTHMICITY; MOREOVER, THERE WAS ONLY A SLIGHT INCREASE IN THE MEAN NUMBER OF EGGS PER SPAWN. DURING THE THIRD TWO-WEEK PERIOD, FISH IN THE FIRST PAIR OF TANKS WERE PROVIDED A 13 L:11 D DIEL LIGHT CYCLE, IN CONJUNCTION WITH PREEXISTING TWICE DAILY DECREASES IN CURRENT VELOCITY; THOSE IN THE SECOND PAIR OF TANKS WERE PROVIDED TWICE DAILY DECREASES IN CURRENT VELOCITY IN CONJUNCTION WITH THE PREEXISTING 13 L:11 D LIGHT CYCLE. UNDER THE COMBINED INFLUENCE OF DECREASES IN CURRENT VELOCITY AND A DIEL LIGHT CYCLE, THERE WAS A MARKED INCREASE IN THE RELATIVE FREQUENCY OF SPAWNING IN BOTH PAIRS OF TANKS. FISH MANIFESTED A DISCERNIBLE SPAWNING PERIODICITY, SPAWNS TYPICALLY OCCURRED BETWEEN 1800 AND 2400; THE MEAN NUMBER OF EGGS PER SPAWN ALSO INCREASED. WHEN FISH WERE RETURNED TO CONSTANT CONDITIONS, CURREN VELOCITY 8 CM S -1/1 AND 24 L:0 D FOR TWO WEEKS, THE FREQUENCY OF SPAWNING DECREASED AND THERE WAS NO INDICATION OF A SPAWNING PERIODICITY. RESULTS OF ANOTHER EXPERIMENT (DECREASED CURRENT VELOCITIES AT 1200-1300 AND 2400-0100 WITH 13 L:11 D LIGHT CYCLE) INDICATED GRADUAL EXPRESSION OF A TIDAL SPAWNING RHYTHM DURING NIGHTTIME, 2000-0359. OUR LABORATORY RESULTS INDICATE THAT M. PENINSULAE IS PREDOMINANTLY A NOCTURNAL SPAWNER AND THAT SPAWNING COINCIDES WITH DECREASED CURRENT VELOCITIES.

MIX, MICHAEL C. 1983. CARCINOGENS AND NEOPLASIA IN INDIGENOUS POPULATIONS OF AQUATIC ORGANISMS: PROJECT SUMMARY (UNPUBLISHED). 3P. (ERL,GB X389).

SEVERAL SEPARATE STUDIES WERE CONDUCTED TO EXTEND RESULTS OBTAINED FROM PREVIOUS EPA-SPONSORED RESEARCH. INDIGENOUS BIVALVE-MOLLUSCS, BOTH FRESHWATER AND MARINE SPECIES, WERE EMPLOYED AS BIOMONITORS TO MEASURE BASELINE LEVELS OF ARSENIC, CADMIUM AND NICKEL IN AQUATIC SYSTEMS. RESULTS OF PREVIOUS STUDIES HAVE SHOWN THAT CLAMS, MUSSELS AND OYSTERS CONCENTRATE POLYNUCLEAR AROMATIC HYDROCARBONS (PAH) IN THEIR TISSUES. THEREFORE, EFFORTS WERE MADE TO DEVELOP SIMPLE METHODS THAT COULD BE USED TO ROUTINELY MEASURE PAH IN SEAWATER. FUTURE STUDIES WILL BE DIRECTED TOWARDS DETERMINING RELATIONSHIPS BETWEEN AMBIENT SEAWATER AND SHELLFISH TISSUE CONCENTRATIONS OF PAH. A MAJOR EFFORT WAS MADE TO ASSESS THE IMPORTANCE OF FOREST FIRES AND SLASH BURNING AS SOURCES OF PAH IN AQUATIC SYSTEMS. MOST BAYS AND ESTUARIES ALONG THE OREGON COAST HAVE WATERSHEDS IN WHICH SUCH FIRES ARE COMMON AND TRANSPORT OF PAH AWAY FROM BURNED SITES VIA WATER RUNOFF OR ATMOSPHERIC DEPOSITION MAY CONTRIBUTE TO THE PAH LOAD IN ADJACENT AQUATIC SYSTEMS. TWO SYSTEMS WERE DEVELOPED FOR TESTING POSSIBLE MUTAGENIC AND/OR TERATOGENIC EFFECTS OF ENVIRONMENTAL LEVELS OF PAH IN THE LABORATORY. THE FIRST IS A BIOASSAY SYSTEM IN WHICH CULTURED EGGS AND EMBRYOS OF THE GOOSENECK BARNACLE, POLLICIPES POLYMERUS, CAN BE EXPOSED TO NG QUANTITIES OF CONTAMINANTS OF INTEREST. SEVERAL PARAMETERS, INCLUDING ABNORMAL LARVAL DEVELOPMENT, CAN BE USED TO EVALUATE EXPOSURE EFFECTS. THE SECOND SYSTEM, EMPLOYING MAMMALIAN CELL CULTURES, WAS DESIGNED TO MEASURE THE INFLUENCE OF SIMULATED SUNLIGHT (290 NM)--IRRADIATED PAH ON CELL SURVIVAL AND THE REDUCTION OF SISTER CHROMATID EXCHANGES. STUDIES ARE ALSO MADE TO DETERMINE WHETHER OR NOT VIRUSES ARE ASSOCIATED WITH THE NEOPLASTIC DISORDERS OF MUSSELS, MYTILUS EDULIS, FROM YAQUINA BAY, OREGON. POSITIVE AND CONTROL MUSSELS WERE SUBJECTED TO NUMEROUS METHODS; NONE REVEALED THE PRESENCE OF AN RNA TUMOR VIRUS. DATA ON THE PREVALENCE OF NEOPLASTIC DISORDERS IN M. EDULIS WERE SUBJECTED TO EXTENSIVE STATISTICAL ANALYSES IN ORDER TO FORMULATE CONCLUSIONS ABOUT THE OCCURRENCE, PREVALENCE AND SEASONALITY OF THESE DISORDERS.

MIX, MICHAEL C., AND RANDY L. SCHAFFER. 1983. CONCENTRATIONS OF UNSUBSTITUTED POLYCYCLIC AROMATIC HYDROCARBONS IN SOFTSHELL CLAMS FROM COOS BAY, OREGON, USA. MAR. POLLUT. BULL. 14(3):94-97. (ERL,GB X388).

CONCENTRATIONS OF BENZO(A)PYRENE (BAP) WERE MEASURED IN SUBPOPULATIONS OF SOFTSHELL CLAMS, MYA ARENARIA, FROM FOUR INTERTIDAL SITES IN COOS BAY FROM JUNE 1976 TO JUNE 1978. SUBSEQUENTLY, CONCENTRATIONS OF 15 UNSUBSTITUTED POLYNUCLEAR AROMATIC HYDROCARBONS (PNAH) WERE DETERMINED IN TWO SUBPOPULATIONS FROM SEPTEMBER 1978 TO AUGUST 1979. THERE WERE SIGNIFICANT DIFFERENCES BETWEEN BAP CONCENTRATIONS IN CLAMS FROM THE FOUR SITES. FOR THE TWO-YEAR PERIOD, THEY WERE HIGHEST IN CLAMS INHABITING AREAS ADJACENT TO THE INDUSTRIALIZED BAYFRONT AND LOWEST IN CLAMS INHABITING MORE REMOTE AREAS. THERE WERE NO SIGNIFICANT SEASONAL VARIATIONS IN BAP CONCENTRATIONS DURING THIS PERIOD. DURING THE 1978-79 STUDY, THE AVERAGE TOTAL PNAH CONCENTRATION IN CLAMS FROM THE BAYFRONT AREA WAS 555.1 UG KG(-1) COMPARED TO 76.3 UG KG(-1) FOR CLAMS FROM A MORE REMOTE ENVIRONMENT. IN GENERAL, PNAH CONCENTRATIONS WERE LOWEST IN THE FALL-WINTER AND HIGHEST DURING THE SPRING-SUMMER.

MIX, MICHAEL C., AND RANDY L. SCHAFFER. 1983. CONCENTRATIONS OF UNSUBSTITUTED POLYNUCLEAR AROMATIC HYDROCARBONS IN BAY MUSSELS (MYTILUS EDULIS) FROM OREGON, USA. MAR. ENVIRON. RES. 9(4):193-209. (ERL,GB X397).

CONCENTRATION OF FIFTEEN UNSUBSTITUTED POLYNUCLEAR AROMATIC HYDROCARBONS (PNAH) WERE MEASURED IN MYTILUS EDULIS FROM TWO SITES IN YAQUINA BAY, OREGON, USA, DURING 1979-1980. THERE WERE SIGNIFICANT DIFFERENCES IN PNAH LEVELS BETWEEN THE TWO POPULATIONS. THE AVERAGE TOTAL CONCENTRATION IN MUSSELS INHABITING THE MORE INDUSTRIALIZED BAYFRONT WAS 986 X 2 UG/KG COMPARED WITH 273 X 9 UG/KG IN MUSSELS FROM A MORE REMOTE SITE ACROSS THE BAY. SUBSTANTIAL DIFFERENCES WERE FOUND IN THE CONCENTRATIONS OF DIFFERENT PNAH IN M. EDULIS EXAMINED DURING THIS STUDY. THE SMALLER, MORE WATER SOLUBLE, COMPOUNDS WERE CONCENTRATED TO ONE OR TWO ORDERS OF MAGNITUDE ABOVE THE LARGER, LESS SOLUBLE PNAH.

MIX, M.C. 1983. HAEMIC NEOPLASMS OF BAY MUSSELS, MYTILUS EDULIS, FROM OREGON: OCCURRENCE, PREVALENCE, SEASONALITY, AND HISTOPATHOLOGICAL PROGRESSION. J. FISH DIS. 6(3):239-248. (ERL,GB X379).

THE OCCURRENCE, PREVALENCE, SEASONALITY AND HISTOPATHOLOGICAL PROGRESSION OF A CELLULAR DISORDER, THOUGHT TO BE A HAEMIC NEOPLASM, WERE STUDIED IN SUBPOPULATIONS OF MYTILUS EDULIS INHABITING DIFFERENT SITES IN YAQUINA BAY, OREGON, FROM 1976-1981. THERE WERE SIGNIFICANT DIFFERENCES IN THE OCCURRENCE OF THE DISORDER THAT WERE RELATED TO GEOGRAPHICAL LOCATION. IN THE SUBPOPULATION WITH THE HIGHEST LEVELS OF THE DISEASE, THE PREVALENCE RATES RANGED FROM 0 TO 20% WITH A 5-YEAR MEAN OF 9.8%. THERE WAS A STATISTICIALLY SIGNIFICANT RELATIONSHIP BETWEEN PREVALENCE AND SEASON. DURING THE 5-YEAR STUDY PERIOD, THERE WAS A CONSISTENT PATTERN CHARACTERIZED BY HIGHEST PREVALENCES DURING JANUARY TO MARCH FOLLOWED BY A PERIOD OF DECLINE TO LOWER LEVELS DURING THE SUMMER AND EARLY AUTUMN, AFTER WHICH THERE WAS AN INCREASE. DATA ANALYSES REVEALED THAT THERE WAS NO SEASONAL HISTOPATHOLOGICAL PROGRESSION OF THE DISORDER. NUMBERS OF STAGE 1 (EARLY), 2, 3 AND 4 (ADVANCED) CASES WERE NOT RELATED TO SEASON BUT OCCURRED IN A RANDOM MANNER THROUGHOUT THE ENTIRE YEAR.

MIX, MICHAEL C. 1983. STUDIES ON POLYNUCLEAR AROMATIC HYDROCARBONS AND METALS IN MOLLUSCS (ABSTRACT). IN: WORKSHOP ON SUBLETHAL EFFECTS OF STRESS ON MARINE ORGANISMS, MARCH 30-31, 1982, ASILOMAR, PACIFIC GROVE, CALIFORNIA. MICHAEL MARTIN AND FLORENCE HARRISON, EDITORS, NTIS, SPRINGFIELD, VA. PP. 55. (ERL,GB X283).

DURING THE PAST 5 YEARS, OUR RESEARCH HAS FOCUSED ON MEASURING LEVELS OF 15 UNSUBSTITUTED POLYNUCLEAR AROMATIC HYDROCARBONS (PNAH) AND CERTAIN METALS IN BIVALVE MOLLUSCS FROM INDIGENOUS POPULATIONS THAT INHABIT OREGON ESTUARIES. THE PRIMARY OBJECTIVES OF SOME OF THE MAJOR STUDIES WERE TO: (1) MEASURE CONCENTRATIONS OF PNAH AND METALS IN SHELL FISH FROM DIFFERENT LOCATIONS FOR AN EXTENDED PERIOD OF TIME IN ORDER TO ESTABLISH A DEPENDABLE BASELINE, (2) DETERMINE WHETHER OR NOT PNAH CONCENTRATIONS IN MOLLUSCS REFLECT THE DEGREE OF ENVIRONMENTAL CONTAMINATION, (3) EVALUATE SEASONAL VARIATIONS IN PNAH AND METAL CONCENTRATIONS IN MOLLUSCS, (4) DETERMINE WHETHER OR NOT THERE WERE STATISTICAL CORRELATIONS BETWEEN THE PRESENCE OF CELLULAR PROLIFERATIVE DISORDERS IN SUBPOPULATIONS OF MUSSELS (MYTILUS EDULIS) AND PNAH CONCENTRATIONS IN THEIR TISSUES, AND (5) DETERMINE WHETHER OR NOT CERTAIN STATISTICAL RELATIONSHIPS COULD BE USED FOR PREDICTIVE PURPOSES IN DETERMINING AND EVALUATING PNAH CONCENTRATIONS IN INDIGENOUS SHELLFISH. OUR DATA SUGGEST THAT A TWO OR THREE YEAR PERIOD IS REQUIRED TO ESTABLISH BASELINE LEVELS OF PNAH IN SHELLFISH. THERE WERE SIGNIFICANT CORRELATIONS BETWEEN PNAH CONCENTRATIONS IN MUSSELS, THE OCCURRENCE OF CELLULAR DISORDERS AND THE QUALITY OF THE ENVIRONMENT THEY INHABIT. THERE WERE SIGNIFICANT SEASONAL VARIATIONS IN BOTH PNAH AND METAL CONCENTRATIONS IN M. EDULIS. FINALLY, THE DATA FROM OUR STUDIES INDICATE THAT IT MAY BE POSSIBLE TO IDENTIFY SITE-SPECIFIC VARIABLES (INDIVIDUAL PNAH OR METALS) THAT CAN BE USED FOR ASSESSING PNAH CONCENTRATION IN THE ENVIRONMENT.

MONTI, C., E. O'NEILL, D. AHEARN, P. PRITCHARD, AND A. BOURQUIN. IN PREP. MODELING THE MOVEMENT OF KEPONE ACROSS AND DISTURBED SEDIMENT-WATER INTERFACE IN LABORATORY SYSTEMS (ABSTRACT). ENVIRON. TOXICOL. CHEM. (ERL,GB 482).

THE PRESENCE OF SEDIMENTS IN AQUATIC ENVIRONMENTS HAS AN IMPORTANT EFFECT ON THE FATE OF MANY POLLUTING CHEMICALS. SIMPLE LABORATORY TEST SYSTEMS, SUCH AS SHAKE FLASKS, FREQUENTLY USED TO EXAMINE THE INTERACTION BETWEEN POLLUTANTS AND SEDIMENT. BECAUSE SHAKE FLASKS DO NOT INCORPORATE THE INHERENT COMPLEXITIES OF THE INTACT SEDIMENT-WATER INTERFACE, WE ALSO USED MICROCOSM SYSTEMS HAVING WATER OVERLYING SEDIMENT TO STUDY THE TRANSPORT OF TOXIC CHEMICALS. RADIOLABELED KEPONE WAS CHOSEN AS THE TEST COMPOUND BECAUSE OF ITS RESISTANCE TO DEGRADATION, LOW VOLATILITY AND EASE OF ANALYSIS. SHAKEN FLASKS CONTAINING FORMALIN STERILIZED SEDIMENT AND WATER WERE USED TO OBTAIN PARTITION VALUES FOR KEPONE. IN ADDITION, KEPONE WAS ADDED IN CONTINUOUSLY FLOWING SEAWATER TO FOUR IDENTICAL MICROCOSMS, EACH CONTAINING FORMALIN STERILIZED SEDIMENT AND WATER. EACH MICROCOSM RECEIVED KEPONE FOR DIFFERENT PERIODS OF TIME, RANGING FOR 100 TO 1200 HOURS. AT THE END OF EACH EXPOSURE PERIOD, THE MICROCOSM WAS DISASSEMBLED AND THE SEDIMENT WAS FRACTIONATED INTO LAYERS. THE SORBED KEPONE CONCENTRATION, ORGANIC CONTENT AND POROSITY WERE DETERMINED IN EACH LAYER. A MATHEMATICAL MODEL, UTILIZING A PARTITION COEFFICIENT DERIVED FROM THE FLASK STUDY, WAS USED TO SIMULATE KEPONE DISTRIBUTION OBSERVED IN THE MICROCOSMS. THE MODELS WAS CALIBRATED TO THE TOTAL SORBED KEPONE OF EACH MICROCOSMS TO QUANTIFY THE TTRANSPORT RATE OF KEPONE ACROSS THE SEDIMENT-WATER INTERFACE. SIMULATION OF THE MICROCOSM RESULTS COULD NOT BE OBTAINED USING A CONSTANT TRANSPORT RATE. SIMULATION WAS OBTAINED USING A CALCULATED RANSPORT RATE WHICH DECREASED WITH EXPOSURE IME. USING THIS ECREASING TRANSPORT RATE THE MODEL PREDICTED THE SORBED TOXICANT DISTRIBUTION WITH DEPTH. THE DECREASE IN TRANSPORT RATE COULD HAVE BEEN CAUSED BY SEDIMENT COMPACTION, HOWEVER, NO MEASURABLE CHANGES OCCURRED IN POROSITY. THE RESULTS SHOW THAT PARTITION COEFFICIENT AND TANSPORT RATES WERE SUFFICIENT TO DESCRIBE THE DISTRIBUTION OF KEPONE IN THE MICROCOSM SEDIMENT. SHAKE FLASK TESTS ARE ADEQUATE TO QUANTIFY SOME FATE PROCESSES SUCH AS PARTITION COEFFICIENT BUT ARE NOT SUFFICIENT TO ESCRIBE POLLUTANT MOMEENT AND DISTRIBUTION. THIS STUDY DEMONSTRATES THE IMPORTANCE OF MEASURING THE TRANSPORT ACROSS THE SEDIMENT-WATER INTERFACE IF THE POLLUTANT FATE IS TO BE ADEQUATELY MODELED.

MOORE, JAMES C., DAVID J. HANSEN, RICHARD L. GARNAS, AND LARRY R. GOODMAN. IN PREP. SAND FILTRATION/ACTIVATED CARBON TREATMENT SYSTEM FOR REMOVING PESTICIDE RESIDUES FROM A MARINE TOXICOLOGY LABORATORY EFFLUENT. WATER RES. 30P. (ERL,GB 481).

FLOW-THROUGH TOXICITY TESTS USING MARINE ORGANISMS CAN GENERATE LARGE VOLUMES OF CONTAMINATED SEA WATER EFFLUENT WHICH SHOULD BE TREATED TO REMOVE THE CONTAMINANTS BEFORE DISCHARGE INTO THE ENVIRONMENT. WE HAVE DEVELOPED A SAND FILTRATION/ACTIVATED CARBON TREATMENT SYSTEM THAT REMOVES A DIVERSITY OF ORGANOPHOSPHATE, ORGANOCHLORINE AND PYRETHROID PESTICIDE RESIDUES FROM THESE EFFLUENTS. THE SAND FILTER REMOVES FROM 60 TO 97% OF THE CHEMICALS BY CONTINUOUSLY FILTERING SUSPENDED PARTICULATES AND ASSOCIATED CHEMICALS AS WELL AS BY FACILITATING PARTITIONING OF CHEMICALS FROM WATER TO ORGANIC MATERIAL IN THE SAND FILTER. FOLLOWING SAND FILTRATION, EFFLUENT WATER SLOWLY PERCOLATES THROUGH GRANULAR ACTIVATED CARBON. OVERALL, REMOVAL EFFICIENCIES EXCEED 90%. THE ORGANIC MATERIAL AND ASSOCIATED CHEMICALS ARE BACKWASHED FROM THE SAND WEEKLY, SEPARATED AND CONCENTRATED BY GRAVITY, AND PACKAGED FOR DISPOSAL. THIS SYSTEM HAS BEEN OPERATING EFFICIENTLY FOR OVER TWO YEARS, PROCESSING A MONTHLY AVERAGE OF 200,000 LITERS OF SEA WATER CONTAMINATED WITH 0.10 TO 100 UG OF PESTICIDES LITER(-1). INITIAL CONSTRUCTION COST WAS $16,300.00.

O'NEILL, E., C. MONTI, P. PRITCHARD, AND A. BOURQUIN. IN PREP. EFFECTS OF LUGWORMS AND SEAGRASS ON KEPONE DISTRIBUTION IN COMPLEX LABORATORY SYSTEMS (ABSTRACT). TO BE PRESENTED AT THE SETAC MEETING, NOV. 6, 1983, WASHINGTON, DC. (ERL,GB 484).

THE FATE OF MANY TOXIC CHEMICALS IN AQUATIC ENVIRONMENTS IS AFFECTED BY THEIR INTERACTION WITH SEDIMENT. TWO BIOTIC FACTORS WHICH COULD AFFECT THE DEGREE OF SEDIMENT INTERACTION ARE BIOTURBATIONG BENTHIC INVERTEBRATES AND THE PRESENCE OF VASCULAR AQUATIC PLANTS. THE EFFECTS OF THESE FACTORS ON FATE PROCESSES CAN BEST BE OBSERVED IN LABORATORY SYSTEMS WHICH SIMULATE THE COMPLEXITY OF NATURAL ENVIRONMENTS. EXPERIMENTS WERE CONDUCTED FOR THE PURPOSE OF STUDYING THE INFLUENCE OF LUGWORMS (ARENICOLA CRISTATA) AND SEAGRASSES (THALASSIA TESTUDINUM) ON POLLUTANT DISTRIBUTION IN ESTUARINE SEDIMENT-WATER SYSTEMS. KEPONE WAS CHOSEN AS THE TEST CHEMICAL BECAUSE ITS RESISTANCE TO DEGRADATION AND OF ITS TRANSPORT AND DISTRIBUTION. RADIOLABELED C(14) KEPONE WAS INTRODUCED CONTINUOUSLY INTO DUPLICATE GLASS VESSELS CONSISTING OF WATER OVERLYING A SEDIMENT BED CONTAINING LUGWORMS OR PLANTS. CHANGES IN THE DISSOLVED KEPONE CONCENTRATIONS WERE MONITORED DAILY FOR 16 DAYS. AT THE TERMINATION OF THE EXPERIMENTS, THE SEDIMENT WAS FRACTIONATED INTO LAYERS, AND RADIOACTIVITY ASSOCIATED WITH INTERSTITIAL WATER, SEDIMENT, LUGWORMS, AND SEAGRASSES (LEAVES, RHIZOMES, AND ROOTS) WAS MEASURED TO DETERMINE KEPONE DISTIBUTION. LUGWORM ACTIVITY SIGNIFICANTLY DECREASED THE KEPONE CONCENTRATION IN THE WATER AND INCREASED THE CONCENTRAION AND DEPTH OF KEPONE IN SEDIMENT. KEPONE BIOACCUMULATION IN THE WORMS WAS A MINOR FACTOR IN THE FINAL DISTRIBUTION. PLANT LEAF SURFACES SORBED KEPONE, BUT ONLY SLIGHTLY AFFECTED OVERALL TOXICANT DISTRIBUTION IN THE SYSTEMS. OUR RESULTS SUGGEST THAT BIOTURBATION MAY BE AN IMPORTANT PROCESS AFFECTING THE FATE OF POLLUTANTS IN SEDIMENT-WATER SYSTMES. FURTHER QUANTITATIVE STUDIES ON THE EFFECTS OF BIOTURABTION MUST BE UNDERTAKEN TO ADEQUATELY PREDICT TOXICANT DISTRIBUTION IN NATURAL ECOSYSTEMS.

PARKER, JEFFREY H., JANET S. NICKELS, ROBERT F. MARTZ, MICHAEL J. GEHRON, NORMAN L. RICHARDS, AND DAVID C. WHITE. IN PRESS. EFFECT OF OIL AND GAS WELL-DRILLING FLUIDS ON THE PHYSIOLOGICAL STATUS AND MICROBIAL INFECTION OF THE REEF BUILDING CORAL MONASTREA ANNULARUS. ARCH. ENVIRON. CONTAM. TOXICOL. 21P. (ERL,GB X382).

THE REEF BUILDING CORAL MONTASTREA ANNULARUS WAS EXPOSED CONTINUOUSLY TO SUSPENSIONS OF OIL AND GAS-WELL DRILLING FLUIDS AT CONCENTRATIONS OF 0.1 ML LITER(-1), 0.01 ML LITER(-1), AND 0.0001 ML LITER(-1) IN FLOWING SEAWATER AT THE U.S. NAVAL STAGE I PLATFORM (30 DEGREES 7.5' N, 85 DEGREES 46.3' W). AFTER 6 WEEKS EXPOSURE, CORAL FRAGMENTS OF 12 TO 65 CM(2) SURFACE AREA WERE BROKEN OFF, RINSED IN SEAWATER, AND EXTRACTED IN A ONE-PHASE CHLOROFORM-METHANOL-BUFFER AND RETURNED TO THE LABORATORY. IN THE LABORATORY, THE EXTRACTION WAS COMPLETED AND THE PHASES SEPARATED. THE LIPIDS WERE FRACTIONATED USING SILICIC ACID AND THIN LAYER CHROMATOGRAPHY. TOTAL PHOSPHOLIPID, TRIGLYCERIDE GLYCEROL, TOTAL EXTRACTABLE FATTY ACIDS, TRIGLYCERIDE FATTY ACIDS AS WELL AS THE ESTER FATTY ALCOHOLS SHOWED NO CONSISTENT CHANGES WITH EXPOSURE TO THE DRILLING FLUIDS. CHANGES IN FREE AMINO ACID CONCENTRATIONS WERE EXTRACTED AS WELL AS SIGNIFICANT DEGREASES IN THE RECOVERABLE DIACYL PHOSPHOLIPID. SIGNIFICANT INCREASES IN PLASMALOGEN PHOSPHOLIPIDS APPEARED WITH EXPOSURE. INCREASES IN PLASMALOGEN PHOSPHOLIPIDS ARE CONSISTENT WITH INFECTION BY ANAEROBIC FERMENTING BACTERIA WHICH CAN INDICATE DISEASE. THIS EVIDENCE SUGGESTS THAT BIOCHEMICAL INDICATORS OF INFECTION WITH ANAEROBIC BACTERIA MAY BE USEFUL AS SENSITIVE MARKERS FOR POLLUTION-INDUCED CHANGES IN REEF BUILDING CORALS AND THUS FOR MONITORING THE HEALTH OF CORAL REEFS.

PATTON, JOHN S., AND JOHN A. COUCH. IN PRESS. CAN TISSUE ANOMALIES THAT OCCUR IN MARINE FISH IMPLICATE SPECIFIC POLLUTANT CHEMICALS?. IN: PROCEEDINGS OF CONFERENCE ON MEANINGFUL MEASURES OF MARINE POLLUTION EFFECTS, APRIL 26-29, 1982, PENSACOLA BEACH, FL. U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 26P. (ERL,GB 474).

THE ADVANTAGE OF USING TISSUE ABNORMALITIES IN WILD FISH AS A MEASURE OF FISH HEALTH IS THAT THE ABNORMALITY, UNLIKE SENSITIVE BIOCHEMICAL ANOMALIES, CANNOT BE SAID TO HAVE OCCURRED DURING CAPTURE OR TRANSPORT TO THE LAB. IT USUALLY TAKES HOURS, DAYS, WEEKS, AND SOMETIMES EVEN MONTHS FOR ABNORMAL TISSUE PATHOLOGIES TO DEVELOP. THE RESEARCHER CAN BE CONFIDENT THAT SOME FACTOR IN THE FIELD CAUSED THE ABORMALITY. WHEN AN ABNORMAL FISH IS CAPTURED, LOGICAL QUESTIONS APPEAR AT FOUR DIFFERENT LEVELS: 1) WHAT IS THE STRUCTURE OF MORPHOLOGY OF THE ABNORMALITY? MANY SCHOLARLY ARTICLES BY HISTOPATHOLOGISTS DESCRIBE IN DETAIL TISSUE ANOMALIES OBSERVED IN FIELD SPECIMENS. AT THIS LEVEL THE FOCUS IS ON THE PATHOLOGY ITSELF. 2) WHAT IS THE INCIDENCE OF THE PATHOLOGY IN THE POPULATION? HOW MANY ARE AFFLICTED, OLD OR YOUNG, MALE OR FEMALE? HERE THE FOCUS IS ON THE SPECIES POPULATION. 3) CAN THE INCIDENCE OF A FISH DISEASE BE LINKED TO ENVIRONMENTAL POLLUTION? HERE THE FOCUS IS ON CORRELATING PATHOLOGY WITH POLLUTION. 4) WHAT FACTOR OR FACTORS (CHEMICAL, PHYSICAL, AND/OR BIOLOGICAL) CAUSED THE PATHOLOGY IN THE POLLUTED WATERS? THIS IS PROBABLY THE MOST DIFFICULT QUESTION TO ANSWER AND THE SUBJECT OF THIS PAPER. ANSWERS TO THE FIRST THREE QUESTIONS MUST BE FOUND BEFORE ATTEMPTS CAN BE MADE AT ANSWERING THE FOURTH. IF A SPECIFIC FISH DISEASE CAN BE LINKED TO A SPECIFIC XENOBIOTIC, THEN A ANOTHER TIER OF QUESTIONS ARISES. 5) WHAT IS THE SIGNIFICANCE OF THIS TO HUMAN HEALTH AND WELL BEING? IS A FOOD SOURCE DIMINISHED, ARE HUMANS INGESTING FISH CONTAINING TOXIC CHEMICALS? WHAT IS THE AESTHETIC/ECONOMIC COST VERSUS THE INDUSTRIAL/ECONOMIC GAIN OF HAVING CONTINUED POLLUTION? ANSWERS TO THESE QUESTIONS ARE BEYOND THE SCOPE OF THIS PAPER. THIS PAPER WILL FOCUS ON THE QUESTION - ARE THERE POLLUTANT SPECIFIC PATHOLOGIES IN MARINE FISH?

PORTIER, R.J., AND S.P. MEYERS. IN PRESS. USE OF MICROCOSMS FOR ANALYSES OF STRESS-RELATED FACTORS IN ESTUARINE ECOSYSTEMS. IN: INTERNATIONAL WETLANDS CONFERENCE, SEPTEMBER, 1980, NEW DELHI, INDIA. (ERL,GB X247).

FATE AND TRANSPORT OF PESTICIDES AND THEIR RESIDUES, AS WELL AS A VARIETY OF OTHER TOXIC SUBSTANCES, IS OF CRITICAL IMPORTANCE IN SOILS AND SEDIMENT/WATER SYSTEMS. A MAJOR PROBLEM IN DEALING WITH SEDIMENTARY MATERIALS IS THE DIFFICULTY OF OBTAINING REPRODUCIBLE INFORMATION FOR MONITORING OF KEY STRESS INDICES IN ESTUARINE ECOSYSTEMS. MICROCOSMS PROVIDE A CORRELATED INTERPRETATIVE APPROACH TO FIELD STUDIES IN AQUATIC ENVIRONMENTS, CONTRIBUTING DATA ON FATE AND TRANSPORT OF SHORT-LIVED COMPOUNDS OF BIOLOGICAL SINGIFICANCE. THE MICROCOSM APPROACH IS DESIGNED TO STIMULATE A SPECIFIC TARGET ENVIRONMENT IN THE LABORATORY, WHEREIN CRITICAL PARAMETERS CAN BE CONTROLLED OR MONITORED IN CONJUNCTION WITH INTRODUCTION OF A VARIETY OF CHEMICAL AND PHYSICAL STRESS-RELATED FACTORS. A REGULATED CONTINUOUS FLOW-THROUGH MICROCOSM SYSTEM HAS BEEN DEVELOPED TO DISCERN SUBSTRATE RATES EFFECTS AND STRESS INDICES BASED ON MICROBIAL RESPONSE AND COMPOUND TURNOVER. FEATURES OF THE MICROCOSM ALLOW FOR VARIABILITY IN FLOW RATE, TEMPERATURE, AND PH, MAINTENANCE OF SOIL/WATER INTERFACE ANALOGOUS TO CONDITIONS IN A NATURAL ENVIRONMENT, AND INPUT AND OUTFLOW OF A VARIETY OF LIQUID SUBSTRATES. EVALUATIONS OF THESE SYSTEMS HAVE INCLUDED TIME/ACTIVITY ANALYSES AND DATA VALIDITY DETERMINATIONS.

PRITCHARD, P., J. CONNOLLY, T. MAZIARZ, E. CLEVELAND, R. CRIPE, AND A.W. BOURQUIN. IN PREP. APPLICATION OF MICROCOSM STUDIES TO VERIFY CHEMICAL FATE ASSESSMENTS; COMPARISONS OF THE FATE OF METHYL PARATHION IN SEDIMENT-WATER SYSTEMS. WATER RES. (ERL,GB 453).

THIS PAPER REPORTS ON THE FATE OF AN ORGANOPHOSPHATE PESTICIDE, METHYL PARATHION, IN A SALT MARSH MICROCOSM AS A REPRESENTATION OF THE "STATE-OF-THE-WHOLE" AND ATTEMPTS TO DEMONSTRATE THE EFFICACY OF DATA FROM SIMPLE LABORATORY TESTS, USING A MATHEMATICAL MODEL TO DESCRIBE THIS FATE. TESTING THE ADEQUACY OF THIS DESCRIPTION WILL REPRESENT AN INITIAL EXERCISE IN DETERMING IF A SYSTEM-CENTERED APPROACH TO EXPOSURE ASSESSMENT IS REALLY NECESSARY.

PRITCHARD, P.H., AND A.W. BOURQUIN. IN PREP. AQUATIC MICROBIAL TOXICITY STUDIES. IN: CONCEPTS IN AQUATIC BIOLOGY. PERGAMON PRESS, INC., ELMSFORD, NY. 100P. (ERL,GB 471).

THIS CHAPTER CITES EXAMPLES OF THE COMMON METHODS USED TO DETERMINE THE TOXICITY OF CHEMICALS TO BACTERIA. IT COVERS ONLY THE MOST COMMON METHODS, PARTICULARLY THOSE THAT ARE EASY TO PERFORM. NUMEROUS LITERATURE CITATIONS HAVE BEEN INCLUDED TO HELP ILLUSTRATE HOW A METHOD IS USED AND WHERE ITS ADVANTAGES AND DISADVANTAGES LIE. THE INFORMATION PRESENTED HERE IS NOT A COMPLETE SURVEY, BUT RATHER AN AID TO UNDERSTANDING OF CURRENT METHODS USED IN THE FIELD OF MICROBIAL TOXICOLOGY. TOXICITY OF CHEMICALS TO BACTERIA IS DISCUSSED RELATIVE TO THE ORGANISMS GROWTH AND METABOLISM. EXAMPLES ARE GIVEN OF METHODS INVOLVING HETEROTROPHIC ACTIVITY, GEOCHEMICAL CYCLING, AND DECOMPOSITION PROCESSES. IN ADDITION, APPLICATION OF TOXICITY STUDIES TO UNIQUE BACTERIAL PROCESSES AND HABITATS ARE DISCUSSED.

PRITCHARD, P.H., AND C.R. CRIPE. IN PREP. MICROCOSM SYSTEM TO MODEL THE FATE AND EFFECTS OF P-CRESOL AND OTHER POLLUTANTS IN LOTIC STREAM ECOSYSTEMS. LIMNOL. OCEANOGR. 21P. (ERL,GB 469).

A TANK-TYPE MICROCOSM WAS DESIGNED TO SIMULATE THE RIFFLE AND POOL AREAS OF A LOTIC ECOSYSTEM. CONDITIONS OF NATURAL TURBULENCE AND PHYSICAL INTEGRITY WERE PRESERVED. WATER COLUMN MIXING WAS OPTIMIZED. INTACT SECTIONS OF THE STREAM INCLUDING ASSOCIATED PERIPHYTON, MACROPHYTES AND INVERTEBRATES WERE TRANSPORTED TO MICROCOSMS USING TRAYS. CALIBRATION OF THE MICROCOSM'S BEHAVIOR WITH THE FIELD IS DEOMSTRATED WITH STUDIES INVOLVING THE FATE AND EFFECT OF A TOXICANT, P-CRESOL.

PRITCHARD, P.H., AND A.W. BOURQUIN. IN PREP. PERSPECTIVE ON THE ROLE OF MICROCOSMS IN ENVIRONMENTAL FATE AND EFFECTS ASSESSMENTS. IN: PROCEEDINGS OF CONFERENCE ON MEANINGFUL MEASURES OF MARINE POLLUTION EFFECTS, APRIL 26-29, 1982, PENSACOLA BEACH, FL. U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 30P. (ERL,GB 468).

THIS PAPER ATTEMPTS TO ILLUSTRATE HOW MICROCOSM STUDIES INTERFACE WITH BOTH WASTE ASSIMILATIVE CAPACITY DETERMINATIONS (REGARDLESS OF THE APPROACH TAKEN OR ENDPOINTS SELECTED) AND OTHER LESS QUANTITATIVE TYPES OF ASSESSMENTS.

PRITCHARD, P.H., P.A. VAN VELD, AND W.P. COOPER. IN PRESS. BIODEGRADATION OF P-CRESOL IN ARTIFICIAL STREAM CHANNELS (ABSTRACT). IN: ABSTRACTS OF THE ANNUAL MEETING OF THE AMERICAN SOCIETY FOR MICROBIOLOGY. (ERL,GB X246).

THE FATE AND EFFECTS OF P-CRESOL WERE STUDIES IN AN ARTIFICIAL STREAM CHANNEL IN MONTICELLO, MN. THE OUTDOOR CHANNEL, WHICH IS 2/3 MILE NARROW OVAL WITH MECHANICAL RECIRCULATION OF THE WATER, IS REPRESENTATIVE OF A FIELD STREAM ECOSYSTEM. IT WAS DOSED WITH 8 PPM P-CRESOL FOR 48 HOURS. CIRCULATION TIME OF THE STREAM WAS 6 HOURS. TOTAL PHENOL CONCENTRATION DROPPED FROM 8.0 TO 7.5 PPM OVER THE LENGTH OF THE STREAM. AFTER DOSING, THE CONCENTRATION DECREASED CONSIDERABLY FASTER THAN EXPECTED, BASED ON A RATE CALCULATED DURING DOSING. ATTEMPTS TO PREDICT THE FATE OF P-CRESOL IN THE CHANNEL BY USING LABORATORY BIODEGRADATION STUDIES WERE ONLY PARTIALLY SUCCESSFUL. RATES OF DEGRADATION OF RADIOLABELED P-CRESOL WERE DETERMINED IN SHAKE FLASKS CONTAINING WATER, SEDIMENT, ALGAE, PLANT AND ROCK COMPONENTS FROM THE STREAM. DISAPPEARANCE OF P-CRESOL WAS FOLLOWED AND RADIOLABLED CO2 RELEASE WAS MEASURED. ALL STREAM COMPONENTS CAUSED SIGNIFICANT BIODEGRADATION OF P-CRESOL. ROCKS AND WATER WERE THE MOST ACTIVE PER UNIT BIOMASS. PREDICTION OF THE FATE OF INTERGRADATION OF BIODEGRADATION RATE INFORMATION FROM LABORATORY STUDIES ON EACH COMPONENT FROM THE STREAM.

PRITCHARD, P.H., AND A.W. BOURQUIN. IN PRESS. USE OF MICROCOSMS FOR EVALUATION OF INTERACTONS BETWEEN POLLUTANTS AND MICROORGANISMS. IN: ADVANCES IN MICROBIAL ECOLOGY. PLENUM PRESS, NEW YORK, NY. 124P. (ERL,GB 477).

MICROCOSMS OR MODERN ECOSYSTEM STUDIES ARE DESCRIBED AND EVALUATED AS TOOLS TO ASSESS THE RESPONSE OF A MICROBIAL COMMUNITY TO A POLLUTANT RELEASED IN THE ENVIRONMENT. PRECAUTIONS AND POTENTIALS ARE DISCUSSED REGARDING THE POTENTIIAL ROLE OF MICROCOSMS IN RISK ASSESSMENT OF ENVIRONMENTAL HAZARDS, AND THEIR CAPABILITY TO PREDICT THE FATE AND EFFECTS OF ORGANIC COMPOUNDS IN AQUATIC ENVIRONMENTS.

RAO, K. RANGA/DOUGHTIE, DANIEL G. IN PREP. HISTOPATHOLOGICAL CHANGES IN GRASS SHRIMP EXPOSED TO CHROMIUM, PENTACHLOROPHENOL, AND DITHIOCARBAMATES. 32P. (ERL,GB X435).

THIS REPORT DEALS WITH THE HISTOPATHOLOGICAL/ULTRASTRUCTURAL CHANGES IN VARIOUS TISSUES OF GRASS SHRIMP PALAEMONETES PUGIO) EXPOSED TO HEXAVALENT AQUATREAT ONM-30 (15% SODIUM DIMETHYL DITHIOCARBAMATE PLUS 15% DISODIUM ETHYLENE BISDITHIOCARBAMATE) AND BUSAN-85 (50% POTASSIUM DIMETHYL DITHIOCARBAMATE). THE PATHOLOGICAL ALTERATIONS INDUCED BY DITHIOCARBAMATES AND PCP WERE MOST SEVERE AND FIRST EVIDENT IN THE GILLS. OF THE BIOCIDES TESTED, THE DITHIOCARBAMATES CAUSED THE MOST EXTENSIVE BRANCHIAL DAMAGE--THE SO CALLED BLACK GILL SYNDROME, INVOLVING EARLY MELANIZATION AND EVENTUAL LAMELLAR TRUNCATION. HEXAVALENT CHROMIUM, ON THE OTHER HAND, DID NOT INDUCE MARKED CHANGES IN THE GILLS, BUT IT CAUSED INVASIVE MELANIZED CUTICULAR LESIONS (PARTICULARLY AT THE ARTICULATIONS OF THE PEREIOPODS, PLEOPODS, AND ABDOMINAL SEGMENTS). ADDITIONALLY CHROMIUM CAUSED APPARENT LABYRINTH HYPOACTIVITY IN THE ANTENNAL GLANDS, WHEREAS THE DITHIOCARBAMATES SEEMED TO INDUCE LABYRINTH HYPERACTIVITY. HEPATOPANCREATIC HISTOPATHOLOGY WAS MORE SEVERE IN SHRIMP EXPOSED TO CHROMIUM AND PCP THAN IN DITHIOCARBAMATE-EXPOSED SHRIMP. THE APPARENT MITOTIC ACTIVITY IN THE HEPATOPANCREAS WAS INCREASED IN AQUATREAT-EXPOSED SHRIMP AND SUPPRESSED IN CHROMIUM-EXPOSED SHRIMP; MANY MITOTIC FIGURES IN THE LATTER CASE WERE ABNORMAL. ALL FOUR COMPOUNDS CAUSED VARYING DEGREES OF MIDGUT EPITHELIAL HYPERTROPHY, CYTOPLASMIC VACUOLIZATION, AND DIMINUTION OF BASAL TUBULAR ENDOPLASMIC RETICULUM, BUT ONLY PCP CAUSED WIDESPREAD RUPTURE OF MIDGUT EPTITHELIAL CELL APICES. ADDITIONAL NOTABLE ULTRASTRUCTURAL ANOMALIES INCLUDED: MITOCHONDRIAL COMPARTMENTALIZATION IN PCP -EXPOSED SHRIMP; MITOCHONDRIAL FUSION IN DITHIOCARBAMATE-EXPOSED SHRIMP. THESE PATHOLOGICAL CHANGES POINT TO DIFFERENCES IN THE MECHANISMS OF POLLUTANT TOXICITY AND INDICATE THEIR POTENTIAL USE IN THE BIOLOICAL MONITORING OF AQUATIC POLLUTANTS.

RAO, K. RANGA. IN PREP. TOXIC, SUBLETHAL AND LATENT EFFECTS OF BARIUM SULFATE AND SELECTED PETROLEUM HYDROCARBONS ON MARINE ORGANISMS--FINAL REPORT--SUMMARY OF RESEARCH MAY 17, 1976 - MARCH 16, 1980. (ERL,GB X163).

THE PRIMARY PURPOSE OF THIS RESEARCH PROGRAM WAS TO STUDY THE TOXIC, SUBLETHAL AND LATENT EFFECTS OF SELECTED XENOBIOTICS ON MARINE ORGANISMS. BECAUSE OF INCREASING ENERGY DEVELOPMENT IN THE MARINE ENVIRONMENT, SPECIAL RESEARCH EMPHASIS WAS DIRECTED TOWARDS CERTAIN CHEMICALS RELATED TO OIL WELL DRILLING OPERATIONS. ONE OF THE COMPOUNDS STUDIED, PENTACHLOROPHENOL (PCP), IS KNOWN TO BE USED AS A BACTERICIDE IN WELL DRILLING FLUIDS ("MUDS") IN ADDITION TO NUMEROUS OTHER BIOCIDAL USES. AT THE COMMUNITY LEVEL, PCP SIGNIFICANTLY AFFECTED THE ESTABLISHMENT OF MEIOFAUNA IN EXPERIMENTAL AQUARIA. THERE WERE SIGNIFICANT DECREASES IN NEMATODE DENSITY AND BIOMASS AS WELL AS A MARKED CHANGE IN SPECIES COMPOSITION AND SHIFTS IN NEMATODE FEEDING TYPES. IN TOXICITIY TESTS GRASS SHRIMP (PALAEMONETES PUGIO) EXHIBITED THE GREATEST SENSITIVITY TO PCP AND ITS SODIUM SALT, SODIUM PENTACHLOROPHENATE (NA-PCP), IMMEDIATELY AFTER MOLTING. THE INCREASED TOXICITY IN RELATION TO MOLTING WAS ALSO OBSERVED FOR THE TETRA- AND TRICHLOROPHENOLS TESTED ALTHOUGH NOT FOR 2,4-DICHLOROPHENOL. RADIOTRACER STUDIES INDICATE THAT THE INCREASE IN CHLOROPHENOL TOXICITY IS CORRELATED WITH INCREASED CHLOROPHENOL UPTAKE IN NEWLY MOLTED SHRIMP. IN METABOLISM STUDIES WITH GRASS SHRIMP, C(14)-PCP WAS RAPIDLY METABOLIZED WITH THE RESULTANT METABOLITES TENTATIVELY IDENTIFIED AS PENTACHLOROANISOLE, TETRACHLOROHYDROQUINONE, A POSSIBLE GLUCURONIDE CONJUGATE OF PCP AND LESSER CHLORINATED PHENOLS. PHYSIOLOGICALLY, PCP AFFECTED GRASS SHRIMP RESPIRATION RATES IN VIVO, AND CAUSED IN VITRO INHIBITION OF OXYGEN CONSUMPTION IN ISOLATED TISSUES OF THE BLUE CRAB, CALLINECTED SAPIDUS. THE RESULTS OF BIOCHEMICAL INVESTIGATIONS SUGGEST THAT PCP IS AN EVEN MORE POTENT INHIBITOR OF HEPATOPANCREATIC ENZYMES IN THE BLUE CRAB THAN 2,4-DINITROPHENOL. PATHOLOGICAL CHANGES WERE OBSERVED AT THE ULTRASTRUCTURAL LEVEL IN GRASS SHRIMP TISSUES FROM ANIMALS EXPOSED TO NA-PCP FOR COMPLETE MOLT CYCLE. THE FEASIBLITY OF UTILIZING CRUSTACEAN LIMB REGENERATION AS A SUBLETHAL BIOASSAY WAS INVESTIGATED USING GRASS SHRIMP. PENTACHLOROPHENOL, 2,3,4,5-TETRACHLOROPHENOL, 2,3,4,6-TETRACHLOROPHENOL, DIBUTYL PHTHALATE AND THE WELL DRILLING BACTERICIDE B-33 SURFLO (MAIN ACTIVE INGREDIENT A BIS-CHLOROPHENOL) INHIBITED GRASS SHRIMP LIMB REGENERATION IN A DOSE-DEPENDENT MANNER. THE MOST CRITICAL PERIOD FOR INHIBITION OF REGENERATION APPEARS TO BE DURING THE INITIAL PROCESSES OF WOUND HEALING AND LIMB BUD FORMATION. THE UPTAKE, DISTRIBUTION AND DEPURATION OF TE POLYCYLCI AROMATIC HYDROCARBONS, BENZO(A)PYRENE AND BENZ(A)ANTHRACENE, WERE STUDIED IN GRASS SHRIMP. BOTH COMPOUNDS, WHICH MAY OCCUR AS PETROLEUM CONTAMINANTS, WERE RAPIDLY ACCUMULATED FROM SEAWATER MEDIUM BY GRASS SHRIMP, WITH THE HIGHEST CONCENTRATION IN THE DIGESTIVE TRACT AND HEPATOPANCREAS. BENZOPYRENE WAS DEPURATED VERY SLOWLY FROM THE SHRIMP TISSUES.

REISH, DONALD J., GILL G. GEESEY, FRANK G. WILKES, PHILLIP S. OSHIDA, ALAN J. MEARNS, STEVEN S. ROSSI, AND THOMAS C. GINN. 1983. MARINE AND ESTUARINE POLLUTION. J. WATER POLLUT. CONTROL FED. 55(6):767-787. (ERL,GB 464).

RICHARDSON, LEONARD B., DENNIS T. BURTON, RONALD M. BLOCK, AND ANN M. STAVOLA. 1983. LETHAL AND SUBLETHAL EXPOSURE AND RECOVERY EFFECTS OF OZONE-PRODUCED OXIDANTS ON ADULT WHITE PERCH (MORONE GMELIN). WATER RES. 17(2):205-213. (ERL,GB X370).

ADULT WHITE PERCH (MORONE AMERICANA), ACCLIMATED TO 15 DEGREES CELSIUS, WERE EXPOSED TO A SERIES OF OZONE-PRODUCED OXIDANT (OPO) CONCENTRATIONS FOR 96 H USING CONTINUOUS FLOW BIOASSAY TECHNIQUES. TOXICITY DATA WERE ANALYZED USING BOTH RESPONSE SURFACE MODELING AND STANDARD PROBIT REGRESSION. WHITE PERCH WERE ALSO EXPOSED TO A SERIES OF NEAR AND SUBLETHAL OPO CONCENTRATIONS, SELECTED FROM THE ACUTE TOXICITY STUDY, FOR 96 H AND THEN PLACED IN CLEAN NON-OZONATED WATER FOR 14 DAYS. BLOOD PH, HEMATOCRIT AND GILL HISTOPATHOLOGY WERE ANALYZED DURING EXPOSURE AT 24, 48 AND 96 H AND AFTER 4 DAYS IN THE RECOVERY PERIOD. BLOOD PH AND HEMATOCRIT LEVELS WERE ANALYZED STATISTICALLY USING STANDARD ANOVA AND MULTIPLE RANGE TESTS. HIISTOPATHOLOGICAL EFFECTS WERE EXAMINED USING BOTH LIGHT MICROSCOPY AND SCANNING ELECTRON MICROSCOPY. THE 24-, 48 AND 96-H LC50'S WERE 0.38, 0.26 AND 0.20 MG OPO 1(-1), RESPECTIVELY. BLOOD PH WAS SIGNIFICANTLY REDUCED AT CONCENTRATIONS GREATER THAN OR EQUAL TO 0.15 MG OPO 1(-1) BUT NOT AT 0.10 MG 1(-1) OR LOWER CONCENTRATIONS. HEMATOCRIT SIGNIFICANTLY INCREASED AT CONCENTRATIONS GREATER THAN OR EQUAL TO 0.10 MG OPO 1(-1). HISTOPATHOLOGICAL EXAMINATION REVEALED MINIMAL EFFECTS ON GILL TISSUE AT 0.01 MG OPO 1(-1), MODERATE EPITHELIAL SLOUGHING AND HEAVY MUCUS PRODUCTION AT 0.05 MG OPO 1(-1) AND EXTREME TISSUE DAMAGE AT CONCENTRATIIONS GREATER THAN OR EQUAL TO 0.10 MG 1(-1). RESULTS FROM BOTH THE ACUTE TOXICITY AND THE EXPOSURE AND RECOVERY STUDY WERE COMPARED WITH THE EFFECTS OF CHLORINE-PRODUCED OXIDANTS (CPO) OBTAINED FROM THE LITERATURE. BOTH OPO AND CPO APPEAR TO HAVE SIMILAR EFFECTS ON ADULT WHITE PERCH.

RICHARDS, NORMAN L. IN PRESS. AQUATIC TOXICITY OF DRILLING FLUIDS: RECENT FINDINGS (ABSTRACT). (ERL,GB X328).

THIS PAPER SUMMARIZES PRELIMINARY RESULTS OF BOTH LABORATORY AND FIELD RESEARCH INTO THE FATE AND EFFECTS OF DRILLING FLUIDS. DIFFERENCES IN SPECIES-TO-SPECIES TOXICITY IN ESTUARINE VS OFFSHORE AND COLD-WATER VS WARM-WATER LOCALITIES ARE REVIEWED. A SCHEME IS DESCRIBED FOR TOXICITY TESTING THAT USES LABORATORY AND FIELD EXPERIMENTS TO INVESTIGATE MORTALITY, ACCUMULATION OF SELECTED DRILLING FLUID COMPONENTS, BEHAVIORAL AND OTHER FUNCTIONAL EFFECTS, INCLUDING REPRODUCTION AND PATHOBIOLOGY.

RUBINSTEIN, N.I., E. LORES, AND N.R. GREGORY. 1983. ACCUMULATION OF PCB, MERCURY AND CADMIUM BY NEREIS VIRENS, MERCENARIA MERCENARIA AND PALAEMONETES PUGIO FROM CONTAMINATED HARBOR SEDIMENTS. AQUAT. TOXICOL. (AMST.). 3(3):249-260. (ERL,GB 452).

ACCUMULATION OF POLYCHLORINATED BIPHENYLS (PCBS), MERCURY, AND CADMIUM BY SANDWORMS (NEREIS VIRENS), HARD CLAMS (MERCENARIA MERCENARIA) AND GRASS SHRIMP (PALAEMONETES PUGIO) EXPOSED TO CONTAMINATED SEDIMENTS FROM FOUR SITES IN NEW YORK HARBOR WAS STUDIED FOR A 100-DAY PERIOD. OF THE THREE CONTAMINANTS MONITORED, ONLY PCBS WERE FOUND TO BIOACCUMULATE ABOVE BACKGROUND (CONTROL) CONCENTRATIONS. SMALL INCREASES IN PCB BODY BURDEN WERE DETECTED IN M. MERCENARIA AND P. PUGIO, WHEREAS HIGHER CONCENTRATIONS WERE MEASURED IN N. VIRENS. UPTAKE WAS AFFECTED BY THE ORGANIC CONTENT OF THE SEDIMENT. BIOACCUMULATION FACTORS (CONCENTRATION IN TISSUE/CONCENTRATION IN SEDIMENT) FOR N. VIRENS RANGED FROM 1.59 IN A LOW ORGANIC SEDIMENT TO 0.15 IN A HIGH ORGANIC SEDIMENT. RESULTS FROM THIS STUDY SUPPORT THE CONTENTION THAT SEDIMENT CONCENTRATION ALONE DOES NOT REFLECT BIOAVAILABILITY AND THAT TOXICITY TESTS (BIOASSAYS) AND FIELD MONITORING REMAIN THE MOST DIRECT METHOD FOR ESTIMATING BIOACCUMULATION POTENTIAL OF SEDIMENT-BOUND CONTAMINANTS.

RUBINSTEIN, N.I., W.T. GILLIAM, AND N.R. GREGORY. 1983. EVALUATION OF THREE FISH SPECIES AS BIOASSAY ORGANISMS FOR DREDGED MATERIAL TESTING. EPA-600/X-83-062, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 22P.

THE OBJECTIVE OF THIS STUDY WAS TO EVALUATE SEVERAL MARINE FISH SPECIES INTERMS OF THEIR ACTUE SENSITIVITY TO MODERATELY CONTAMINATED SEDIMENTS AND THEIR POTENTIAL FOR BIOACCUMULATION OF POLYCHLORINATED BIPHENYL (PCB), A UBIQUITOUS ORGANIC CONTAMINANT. SEELYE ET AL. (1982) HAVE PREVIOUSLY EXAMINED ACCUMULATION OF CONTAMINANTS RELEASED FROM DREDGED SEDIMENTS IN A FRESHWATER FISH SPECIES (PERCA FLAVESCENS). CONSIDERATIONS FOR BIOASSAY SPECIES SELECTION: A RATIONALE TO AID IN SELECTION OF APPROPRIATE BIOASSAY ORGANISMS WAS DEVELOPED BY SHUBA ET AL. (1981). THEIR LIST OF SELECTION FACTORS INCLUDE: 1). THE ORGANISM IS FOUND AT, OR IS RELATED TO, SPECIES AT THE DISPOSAL SITE; 2). THE ORGANISM IS READILY AVAILABLE THROUGHOUT THE YEAR, EITHER THROUGH FIELD COLLECTION OR PURCHASING; 3). A TOXICOLOGICAL DATA BASE EXISTS FOR THE SPECIES; 4). THE ORGANISM CAN BE MAINTAINED IN A HEALTH CONDITION IN THE LABORATORY; 5) THE ORGANISM IS CULTURABLE IN THE LABORATORY; 6) THE ORGANISM OCCURS OVER A WIDE GEOGRAPHIC AREA; AND 7) THE ORGANISM IS ECONOMICALLY OR ECOLOGICALLY IMPORTANT OR BOTH. ADDITIONAL FACTORS THAT APPLY TO SPECIES SELECTED FOR BIOACCUMULATION STUDIES ARE: THE ORGANISM SHOULD ACCUMULATE THE POLLUTANT WITHOUT EXCESSIVE MORTALITY AT CONCENTRATIONS FOUND IN THE ENVIRONMENT AND THE ORGANISM SHOULD BE OF ADEQUATE SIZE FOR TISSUE ANALYSIS (D.J.H. PHILLIPS, 1980). THREE SPECIES THAT MEET THE SELECTION CRITERIA ARE THE SHEEPSHEAD MINNOW (CYPRINODON VARIEGATUS), THE KILLIFISH (FUNDULUS SIMILIS) AND THE ATLANTIC SILVERSIDE (MENIDIA MENIDIA). THESE SPECIES WERE SELECTED FOR STUDY AND TESTED WITH DREDGED MATERIAL TAKEN FROM NEW YORK HARBOR. IT WAS OUR INTENTION TO EVALUATE THESE ORGANISMS FROM THE PERSPECTIVE OF A CONTRACTING LABORATORY REQUIRED TO USE STANDARD METHODS AND TO APPLY RECOMMENDED PROCEDURES FOR DREDGED MATERIAL EVALUATION (EPA/CE, 1977).

SCHATTEN, GERALD, CALVIN SIMERLY, AND HEIDE SCHATTEN. IN PRESS. EFFECTS OF BARIUM SULFATE ON SEA URCHIN FERTILIZATION AND EARLY DEVELOPMENT. IN: WASTES IN THE SEA, VOLUME 3. JOHN WILEY, NEW YORK. 35P. (ERL,GB X427).

FERTILIZATION AND DEVELOPMENT OF SEA URCHINS OFFER AN UNRIVALED SYSTEM TO STUDY THE CELLULAR CONSEQUENCES OF EXOGENOUS IONS. AT FERTILIZATION, A VARIETY OF EVENTS OCCUR, INCLUDING THE ACROSOME REACTION OF THE SPERM, THE CORTICAL REACTION OF THE EGG, SPERM INCORPORATION, THE UNION OF THE SPERM AND EGG NUCLEI WITHIN THE EGG CYTOPLASM, BIOELECTRIC CHANGES, THE ESTABLISHMENT OF THE BLOCK TO POLYSPERMY AND THE ACTIVATION OF THE METABOLISM OF THE FERTILIZED EGG. THESE EVENTS REQUIRE A COMPLEX REPERTOIRE OF ENZYMATIC AND STRUCTURAL CHANGES IN CELLULAR BEHAVIOR AND ARE REGULATED BY IONIC FLUXES, PARTICULARLY BY CHANGES IN INTRACELLULAR CALCIUM CONCENTRATION. BARIUM, A DIVALENT CATION, MIGHT BE EXPECTED TO MIMIC CALCIUM IN THIS MARINE SYSTEM AND TO INTERFERE WITH THE CELLULAR AND DEVELOPMENTAL EVENTS NORMALLY REGULATED BY CALCIUM FLUXES. GAMETES FROM THE GULF COAST SEA URCHINS LYTECHINUS VARIEGATUS AND ARBACIA PUNCTULATA WERE STUDIED BY LIGHT, ELECTRON AND TIME-LASPE VIDEO MICROSCOPY TO EVALUATE THE INTERFERENCE BY BARIUM SULFATE WITH NORMAL FERTILIZATION AND DEVELOPMENT. IN BARIUM SULFATE CONCENTRATIONS ABOVE 1 MILLIMOLAR, ALL THE NORMAL EVENTS AT FERTILIZATION WERE DRASTICALLY REDUCED; AT 10 MILLIMOLAR BARIUM SULFATE, ZERO PERCENT FERTILIZATION AND DEVELOPMENT WERE NOTED. THESE RESULTS INDICATE THAT HIGH CONCENTRATIONS (LESS THAN 1 MM) OF BARIUM SULFATE CAN INTERFERE WITH NORMAL FERTILIZATION AND DEVELOPMENT OF SEA URCHINS AT SITES THAT ARE USUALLY REGULATED BY CALCIUM IONS.

SCHIMMEL, STEVEN C., RICHARD L. GARNAS, JAMES M. PATRICK, JR., AND JAMES C. MOORE. 1983. ACUTE TOXICITY, BIOCONCENTRATION, AND PERSISTENCE OF AC 222, 705, BENTHIOCARB, CHLORPYRIFOS, FENVALERATE, METHYL PARATHION, AND PERMETHRIN IN THE ESTUARINE ENVIRONMENT. J. AGRIC. FOOD CHEM. 31(1):104-113. (ERL,GB 186).

SIX PESTICIDES WERE EVALUATED IN LABORATORY STUDIES TO DETERMINE: ACUTE (96-H) TOXICITY, OCTANOL/WATER PARTITION COEFFICIENTS (LOG P), SOLUBILITY, AND PERSISTENCE IN SEAWATER. IN ADDITION, THREE OF THE SIX PESTICIDES (SYNTHETIC PYRETHROIDS) WERE TESTED USING THE EASTERN OYSTER (CRASSOSTREA VIRGINICA) IN LONG-TERM (28 DAYS) TESTS TO DETERMINE THEIR RESPECTIVE BIOCONCENTRATION FACTORS (BCF). ACUTE TOXICITY TESTS PROVIDED THE FOLLOWING DECREASING ORDER OF TOXICITY TO ESTUARINE CRUSTACEANS AND FISHES: AC 222, 705; FENVALERATE, PERMETHRIN, CHLORPYRIFOS, METHYL PARATHION, AND BENTHIOCARB. THE ESTUARINE MYSID (MYSIDOPSIS BAHIA) WAS CONSISTENTLY THE MOST SENSITIVE SPECIES, WITH LC50 VALUES AS LOW AS 0.008 MG/L. THE SHEEPSHEAD MINNOW (CYPRINODON VARIEGATUS) WAS GENERALLY THE LEAST SENSITIVE (RANGE OF LC50 VALUES = 1.1 TO 1.370 MG/L). LOG P VALUES AND PESTICIDE HALF-LIVES IN SEDIMENT-WATER SYSTEMS WERE INVERSELY RELATED TO SOLUBILITY IN SEAWATER. THE FOLLOWING ARE THE INCREASING ORDER OF LOG P VALUES (RANGE, 1.8 TO 6.5) AND PESTICIDE HALF-LIVES (RANGE, 1.2 TO 34 DAYS) AND DECREASING ORDER OF SOLUBILITY (RANGE, 1000 TO 24 MG/L): METHYL PARATHION, BENTHIOCARB, CHLORPYRIFOS, AC222, 705, FENVALERATE, AND PERMETHRIN. THE STEADY-STATE BCFS OF THE THREE SYNTHETIC PYRETHROIDS WERE: 1,900 FOR PERMETHRIN: 2,300 FOR AC 222, 705: 4,700 FOR FENVALERATE. AFTER TERMINATION OF THE EXPOSURE, EACH INSECTICIDE WAS DEPURATED BY OYSTERS TO NON-DETECTABLE CONCENTRATIONS WITHIN ONE WEEK.

SCHOOR, W. PETER, AND CHARLES L. MCKENNEY. 1983. DETERMINATION OF FENVALERATE IN FLOWING-SEAWATER EXPOSURE STUDIES. BULL. ENVIRON. CONTAM. TOXICOL. 30(1):84-92. (ERL,GB 434).

FENVALERATE (PYDRIN)2 IS A PYRETHROID WHICH WHEN PRESENT IN THE WATER AT LOW CONCENTRATIONS APPEARS TO BE HIGHLY TOXIC TO CRUSTACEANS, REPORTED 96-H LC-50 VALUES ARE 0.14 UG/L FOR LOBSTER (HOMARUS AMERICANUS) AND 0.04 UG/L FOR SHRIMP (CALLINECTES SEPTEMSPINOSA) IN STATIC TESTS (MCLEESE ET AL. 1980) AND 0.002 UG/L FOR GRASS SHRIMP LARVAE (PALAEMONETES PUGIO) IN FLOW-THROUGH TESTS (TYLER MCKENNEY, PERS. COMM.). SINCE THE 0.002 UG/L VALUE WAS BASED ON NOMINAL RATHER THAN MEASURED CONCENTRATIONS, AND ESTABLISHED METHODS WERE NOT SENSITIVE ENOUGH, (BUCK ET AL. 1980; CHAPMANN HARRIS 1978; HILL 1981; LEE ET AL. 1978; PAPADOPOULOU-MOURKIDOU ET AL. 1980; WSZOLEK ET AL. 1980; HORIBA ET AL. 1980A,B; HORIBA ET AL. 1980), A METHOD FOR THE ANALYSIS OF FENVALERATE AT LOW CONCENTRATIONS IN SEAWATER WAS DEVELOPED. FENVALERATE HAS TWO CENTERS OF CHIRALITY AND THEREFORE EXISTS AS A MIXTURE OF FOUR STEREOISOMERS, TWO OF WHICH ARE DIASTEREOISOMERS, THE OTHER TWO ARE THE CORRESPONDING ENANTIOMERS.

SCHOOR, W. PETER, ELSAYED ELNENAEY, AND BARRIE TAN. IN PREP. BENZO(A)PYRENE METABOLISM IN 3-METHYCHOLANTHRENE-TREATED SEA CATFISH. (ERL,GB 384).

SCHOOR, W. PETER, AND MEERA SRIVASTAVA. IN PREP. EFFECTS OF TRICHLOROPROPENE OXIDE ON THE METABOLISM OF BENZO(A)PYRENE BY 3-METHYLCHOLANTHRENE- AND PHENOBARBITAL-TREATED MULLET (MUGIL CEPHALUS), A MARINE FISH (ABSTRACT). IN: FIRST INTERNATIONAL SYMPOSIUM ON FOREIGN COMPOUND METABOLISM, OCT. 30 THRU NOVEMBER 4, 1983, WEST PALM BEACH, FLORIDA. (ERL,GB 490).

MARINE FISH, MULLET (MUGIL CEPHALUS), WERE TREATED WITH 3-METHYLCHOLANTHRENE (3-MC) AND PHENOBARBITAL (PB) BY INTRAPERITONEAL INJECTION, AND THE EFFECTS OF TRICHLOROPROPENE OXIDE (TCPO), AN INHIBITOR OF EPOXIDE HYDRATASE ACTIVITY, ON THE METABOLISM OF BENZO(A)PYRENE (BAP) BY ISOLATED LIVER MICROSOMES WERE EVALUATED. THE MOST SINGIFICANT EFFECT FOUND WAS AN INCREASE IN THE OXIDATION OF BAP AT THE BAY REGION (POSITION 9 AND 10) IN FISH WHICH WERE PRETREATED WITH 3-MC AND PB. NO SIGNIFICANT DIFFERENCES WERE FOUND IN THE METABOLIC PATTERNS OF 3-MC- AND PB-TREATED FISH. WHEN METABOLITE PATTERNS OF THE DIHYDRODIOLS IN THE PRESENCE AND ABSENCE OF TCPO WERE COMPARED, THE PREDICTED SHIFTS WERE OBSERVED IN CONTROL AS WELL AS 3-MC- AND PB-TREATED ANIMALS. COMPARISON OF METABOLITE PATTERNS IN THE PRESENCE OF TCPO SHOWED DISTINCT DIFFERENCES BETWEEN CONTROL AND 3-MC- AND PB-TREATED ANIMALS. NO SIGNIFICANT DIFFERENCE IN METABOLITE PATTERNS WERE FOUND BETWEEN 3-MC- AND PB-TREATED ANIMALS IN EITHER PRESENCE OR ABSENCE OF TCPO. COMPARISON TO MAMMALIAN DATA SHOWED THE INDUCTION-RELATED METABOLITE PATTERN IN FISH TO BE VERY SIMILAR TO THAT FOUND IN RATS.

SCHOOR, W. PETER, AND MEERA SRIVASTAVA. IN PREP. POSITION-SPECIFIC INDUCTION OF BENZO(A)PYRENE METABOLISM BY 3-METHLCHOLANTHRENE AND PHENOBARBITAL IN MULLET (MUGIL CEPHALUS), A MARINE FISH. (ERL,GB 166).

MIXED-FUNCTION OXYGENASE ACTIVITIES IN MULLET (MUGIL CEPHALUS) WERE INDUCED WITH 3-METHYLCHOLANTHRENE AND PHENOBARBITAL (PB) ADMINISTERED INTRAPERITONEALLY TWICE OVER A THIRTY-DAY PERIOD. CONTROL AND INDUCED MFO ACTIVITIES WERE STUDIED AT 25 DEGREES AND 37 DEGREES CELSIUS USING 0.1 - 4.0 MM NADPH. INCREASES IN NADPH CONCENTRATIONS IN ACTIVITY DETERMINATIONS OF CONTROL MULLET MFO AT BOTH TEMPERATURES SHOWED CORRESPONDING ACTIVITY INCREASES AND RATHER BROAD ACTIVITY OPTIMA. NO SIGNIFICANT CHANGES IN THE METABOLITE COMPOSITION WERE OBSERVED. MFO ACTIVITIES INDUCED BY 3-MC AND CONDUCTED AT 37 DEGREES CELSIUS SHOWED INCREASES OF ALL METABOLITES EXCEPT THE 4,5-EPOXIDE AND 5-PHENOL WITH INCREASING NADPH CONCENTRATIONS. NO SUCH INCREASES WERE FOUND AT 25 DEGREES CELSIUS. INCREASES IN THE INDIVIDUAL METABOLITES WERE DISPROPORTIONATELY HIGHER AT 37 DEGREES CELSIUS AND HIGH NADPH CONCENTRATIONS WHEN COMPARED AT 25 DEGREES CELSIUS. SIMILAR TRENDS WERE FOUND WITH THE PB INDUCED MFO ACTIVITIES. THE DATA INDICATE THAT WITH REGARD TO COMPARATIVE INDUCTION, PHYSIOLOGICAL TEMPERATURE RANGES MAY MAKE COMPARISON OF ACTIVITIES DIFFICULT BETWEEN WARM- AND COLD-BLOODED SPECIES. PRELIMINARY DATA AT LOWER TEMPERATURES INDICATE THAT THE ANOMALIES OF MFO ACTIVITY IN THE MULLET OCCUR AT 37 DEGREES C RATHER THAN AT THE LOWER TEMPERATURES.

SCHOOR, W. PETER. IN PRESS. EXPOSURE OF FISHES TO BENZO(A)PYRENE AND SOME ASPECTS OF ANALYSIS OF METABOLITES. J. NAT. CANCER INST. 22P. (ERL,GB 454).

THE DISPOSTION OF BENZO(A)PYRENE [B(A)P] IN MOST ANIMAL SPECIES DEPENDS LARGLEY ON THE EFFECT THAT THE MIXED FUNCTION OXYGENASE (MFO) AND TRANSFERASE SYSTEMS EXERT ON IT. SINCE THESE ENZYMES ARE INDUCIBLE BY COMPOUNDS SUCH AS PHENOBARBITAL (PB) AND 3-METHYLCHOLANTHRENE (3-MC), MUCH EFFORT WAS SPENT TO DETERMINE THEIR EFFECTS ON THE ENZYME SYSTEMS PRESENT IN SOME AQUATIC SPECIES. IN THE SPECIES TESTED SO FAR (MULLET, SEA CATFISH, AND KILLIFISH), INDUCTION WAS FOUND WHEN THE INDUCER WAS ADMINISTERED INTRAPERITONEALLY. FLOW-THROUGH EXPOSURE TO PB ALSO INDUCED MFO ACTIVITY IN MULLET AND KILLIFISH. MFO ACTIVITY WAS DETERMINED USING B(A)P AS SUBSTRATE AND THE RESULTING METABOLITES HAVE BEEN SEPARATED. THE PROBLEMS ASSOCIATED WITH THESE DETERMINATIONS ARE DISCUSSED IN LIGHT OF USING DATA ON AN INTER-LABORATORY BASIS.

SCHOOR, W. PETER, AND ELSAYED ELNENAEY. IN PRESS. METABOLITES OF BENZO(A)PYRENE FROM MULLET (MUGIL CEPHALUS): PROPERTIES AND DETECTION (ABSTRACT). (ERL,GB 408).

INDIVIDUAL METABOLITES OF BENZO(A)PYRENE WERE SEPARATED BY HIGH PRESSURE LIQUID CHROMATOGRAPHY WITH METHANOL/WATER GRADIENTS. EXCITATION AND EMISSION SPECTRA WERE OBTAINED FOR EACH PEAK AFTER STOPPING THE HPLC FLOW AND COMPARED TO THOSE OF PURE STANDARDS. ALL TWELVE PHENOLS OF BENZO(A)PYRENE SHOWED DISTINCTLY DIFFERENT EXCITATION SPECTRA WHILE SHIFTS IN THE EMMISSION SPECTRA WERE NOT UNIQUELY DIFFERENT. THE PHENOXIDES DID NOT YIELD DISTINCT SPECTRA. THE QUINONES AS WELL AS THE DIOLS SHOWED DIFFERING SENSITIVITIES TOWARDS LIGHT. CERTAIN REVERSE PHASE COLUMNS APPEAR TO HAVE THE TENDENCY TO REACT WITH PHENOLS CAUSING EITHER BINDING OR OTHER CATALYZED REACTIONS.

SCHULTZ, MARY E., AND R. JACK SCHULTZ. IN PRESS. DIETHYLNITROSAMINE-INDUCED HEPATIC TUMORS IN WILD VS. INBRED STRAINS OF A VIVIPAROUS FISH. IN: SYMPOSIUM ON THE USE OF SMALL FISH SPECIES IN CARCINOGENCITY TESTING. U.S. NATIONAL CANCER INSTITUTE. (ERL,GB X311).

THE PRESENT STUDY FOCUSES ON THE QUESTION OF THE ROLE OF GENETIC DIVERSITY IN CANCER SUSCEPTIBILITY IN POECILIOPSIS LUCIDA MILLER, A SMALL LIVE-BEARING FISH FROM NORTHWESTERN MEXICO, BELONGING TO THE SAME FAMILY AS GUPPIES, MOLLIES, AND PLATYFISHES.

SCOTT, GEOFFREY I., DOUGLAS P. MIDDAUGH, AND SCOTT KLINGENSMITH. 1983. BIOCONCENTRATION OF BROMOFORM BY AMERICAN OYSTER, CRASSOSTREA VIRGINICA (G.) EXPOSED TO CHLORINATED AND DECHLORINATED SEAWATER, WITH NOTES ON SURVIVAL AND FEEDING. IN: WATER CHLORINATION: ENVIRONMENTAL IMPACT AND HEALTH EFFECTS, VOL. 4. ROBERT L. JOLLEY, ET AL., EDITOR, ANN ARBOR SCIENCE PUBLISHERS, ANN ARBOR, MI. PP. 1029-1037. (ERL,GB 429).

CHLORINE ADDED TO SEAWATER REACTS WITH ORGANIC PRECURSORS TO FORM NUMEROUS OXIDATION PRODUCTS INCLUDING BROMOFORM. WHILE SEVERAL STUDIES HAVE EXAMINED THE TOXICOLOGICAL, BEHAVIORAL AND PHYSIOLOGICAL RESPONSES OF BIVALVE MOLLUSCS TO CONTINIOUS CHLORINATION, IN MOST INSTANCES, ONLY ACTIVE OXIDANTS WERE MEASURED; THE POTENTIAL EFFECTS OF EXPOSURE TO, OR BIOCONCENTRATION OF, BROMOFORM WERE NOT CONSIDERED. NOTABLE EXCEPTIONS INCLUDE STUDIES BY GIBSON ET AL. (7), IN WHICH BIOCONCENTRATION OF BROMOFORM BY SEVERAL MARINE ORGANISMS WAS EXAMINED, AND SCOTT ET AL. (8), IN WHICH BROMOFORM, GENERATED DURING CHLORINATION OF SEAWATER, WAS BIOCONCENTRATED BY AMERICAN OYSTER, CRASSOSTREA VIRGINICA. RECENTLY, ROBERTS DETERMINED THE RESPONSE OF AMERICAN OYSTERS TO CHLORINATED SEAWATER AND SEAWATER DECHLORINATED WITH SODIUM THIOSULFATE. DETOXIFICATION OF CHLORINE-PRODUCED OXIDANTS (CPO) WAS APPARENTLY ACHIEVED BY DECHLORINATION, HOWEVER, THE POTENTIAL FOR BIOCONCENTRATION OF BROMOFORM WAS NOT DETERMINED. THE OBJECTIVES OF OUR STUDY WERE: (1) TO DETERMINE THE RATE OF BROMOFORM PRODUCTION IN CHLORINATED SEAWATER; (2) TO ASSESS THE SURVIVAL AND FEEDING RESPONSE OF OYSTERS EXPOSED TO CHLORINATED SEAWATER CONTAINING ACTIVE OXIDANTS BROMOFORM, AND OTHER CHLORINATED ORGANICS, AND TO DECHLORINATED SEAWATER CONTAINING BROMOFORM PLUS OTHER CHLORINATED ORGANICS; AND (3) TO DETERMINE THE POTENTIAL FOR BIOCCONCENTRATION OF BROMOFORM IN OYSTERS EXPOSED TO CHLORINATED AND DECHLORINATED SEAWATER.

SHIREMAN, JEROME V., WILLIAM T. HALLER, DOUGLAS E. COLLE, CURTIS E. WATKINS, DOUGLAS F. DURANT, AND DANIEL E. CANFIELD. 1983. ECOLOGICAL IMPACT OF INTEGRATED CHEMICAL AND BIOLOICAL AQUATIC WEED CONTROL. PP. 1-333. (ERL,GB

SOMERVILLE, C.C., L.C. BUTLER, T.J. LEE, A. W. BOURQUIN, AND J.C. SPAIN. IN PREP. DEGRADATION OF JET FUEL HYDROCARBONS BY AQUATIC MICROBIAL COMMUNITIES (ABSTRACT). IN: PROCEEDINGS OF THE AMERICAN SOCIETY FOR MICROBIOLOGY CONFERENCE, MARCH 6-11, 1983, NEW ORLEANS, LA. (ERL,GB 458).

A MIXTURE OF FIFTEEN HYDROCARBONS REPRESENTATIVE OF THOSE IN DISTILLATE JET FUELS WAS USED TO DETERMINE WHETHER DEGRADATION BY NATURAL MICROBIAL COMMUNITIES COULD AFFECT THE PERSISTENCE OF SUCH FUELS RELEASED INTO AQUATIC ENVIRONMENTS. THE MIXTURE INCLUDED HEXANE, CYCLOHEXANE, N-HEPTANE, METHYLCYCLOHEXANE, TOLUENE, N-OCTANE, ETHYLCYCLOHEXANE, P-XYLENE, CUMENE, 1,3,5-TRIMETHYLBENZENE, INDAN, NAPHTHALENE, 2-METHYLNAPHTHALENE, N-TETRADECANE, AND 2,3-DIMETHYLNAPTHTHALENE. THE MIXTURE WAS INCUBATED WITH WATER OR WATER AND SEDIMENT SUSPENSIONS COLLECTED AT ESTUARINE AND FRESHWATER SITES. DISAPPEARANCE OF HYDRBOCARBONS WAS MEASURED BY CAPILLARY COLUMN GAS CHROMATOGRAPHY. CONTROL FLASKS WERE STERILIZED WITH HGCL(2) TO ESTIMATE LOSSES DUE TO VOLATILIZATION. C(6)-C(9) COMPOUNDS VOLATILIZED QUICKLY. INDAN, NAPTHTHALENE, AND 2-METHYLNAPHTHALENE WERE MUCH LESS VOLATILE AND WERE BIODEGRADED RAPIDLY AFTER AND INITIAL 24H LAG PERIOD. THE PRESENCE OF SEDIMENT AND ITS ASSOCIATED MICROFLORA STIMULATED BIODEGRADATION. ASSAYS OF TOTAL HETEROTROPHS AND HYDROCARBONOCLASTIC BACTERIA INDICATED AND INITIAL TOXICITY OF THE FUEL MIXTURE FOLLOWED BY A STIMULATION OF HYDROCARBON-DEGRADING BACTERIA.

SPAIN, JIM C., AND P.A. VAN VELD. 1983. ADAPTATION OF NATURAL MICROBIAL COMMUNITIES TO DEGRADATION OF XENOBIOTIC COMPOUNDS: EFFECTS OF CONCENTRATION, ENOCULUM, AND CHEMICAL STRUCTURE. APPL. ENVIRON. MICROBIOL. 45(2):428-435. (ERL,GB 440).

ADAPTION OF MICROBIAL POPULATIONS TO DEGRADE XENOBIOTIC COMPOUNDS FASTER AFTER EXPOSURE TO THE COMPOUND WAS STUDIED IN ECO-CORES. RADIOLABELED TEST COMPOUNDS WERE ADDED TO CORES THAT CONTAINED NATURAL WATER AND SEDIMENT. ADAPTATION WAS DETECTED BY COMPARING MINERALIZATION RATES OR DISAPPEARANCE OF PARENT COMPOUND IN PRE-EXPOSED AND UNEXPOSED CORES. MICROBIAL POPULATIONS IN PRE-EXPOSED CORES FROM A NUMBER OF FRESHWATER SAMPLING SITES ADAPTED TO DEGRADE P-NITROPHENOL FASTER; POPULATIONS FROM ESTUARINE OR MARINE SITES DID NOT SHOW ANY INCREASE IN RATES OF DEGRADATION AS A RESULT OF PRE-EXPOSURE. ADAPTATION WAS MAXIMAL AFTER TWO WEEKS AND NOT DETECTABLE AFTER SIX WEEKS. A THRESHOLD CONCENTRATION OF 10 PPB WAS NOTED; BELOW WHICH NO ADAPTATION WAS DETECTED. WITH CONCENTRATIONS OF 20 TO 100 PPB, THE BIODEGRADATION RATES IN PRE-EXPOSED CORES WERE MUCH HIGHER THAN IN CONTROL CORES AND WERE PROPORTIONAL TO RESPIKE CONCENTRATION. IN ADDITION, TRIFLURALIN, 2,4-DICHLOROPHENOXYACETIC ACID (2,4-D) AND P-CRESOL WERE TESTED TO DETERMINE WHETHER PRE-EXPOSURE AFFECTED SUBSEQUENT BIODEGRADATION. MICROBIAL POPULATIONS DID NOT ADAPT TO TRIFLURALIN. ADAPTATION TO 2,4-D WAS SIMILAR TO THAT WITH NITOPHENOL. P-CRESOL WAS MINERALIZED RAPIDLY IN BOTH PRE-EXPOSURE AND UNEXPOSED POPULATIONS.

SPAIN, J.C., C.C. SOMERVILLE, T.J. LEE, L.C. BUTLER, AND A.W. BOURQUIN. 1983. DEGRADATION OF JET FUEL HYDROCARBONS BY AQUATIC MICROBIAL COMMUNITIES: AN INTERIM REPORT 23 OCTOBER 1981 TO 30 SEPTEMBER 1982. EPA-600/X-83-059, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 205P.

A MODEL FUEL MIXTURE OF FIFTEEN HYDROCARBONS REPRESENTATIVE OF THOSE DISTILLATE JET FUELS WAS USED TO DETEMINE WHETHER DEGRANDATION BY NATURAL MICROBIAL COMMUNITIES COULD AFFECT THE PERSISTENCE OF SUCH FUELS RELEASED IN AQUATIC ENVIRONMENTS. THE MIXTURE INCLUDED HEXANE, CYCLOHEXANE, N-HEPTANE, METHYLCYCLOHEXANE, TOLUENE, N-OCTANE, ETHYLCYCLOHEXANE, P-XYLENE, CUMENE, TRIMETHYLBENZENE, INDAN NAPHTHALENE, N-TETRADECANE, 2,3-DIMETHYLNAPHTHALENE. THE WATER SOLUBLE FRACTION OF THE MODEL FUEL WAS INCUBATED IN SHAKE FLASKS WITH WATER OR WATER AND SEDIMENT SUSPENSIONS COLLECTED AT ESTUARINE AND FRESHWATER SITES. SURFACES FILMS OF THE MODEL MIXTURE WERE STUDIED UNDER QUIESENT INCUBATION. THE DISAPPEARANCE OF HYDROCARBONS WAS MEASURED BY CAPILARY COLUMN GAS CHROMATOGRAPHY. CONTROL FLASKS WERE STERILIZED WITH HGCL(2) TO ESTIMATE LOSSES DUE TO ABIOTIC PROCESSES. C(6)-C(9) COMPOUNDS VOLATILIZED QUICKLY. INDAN, NAPHTHALENE, AND 2-METHYLNAPHTHALENE WERE MUCH LESS VOLATILE AND WERE BIOEGRADED FROM SOLUTION AFTER AND INTIAL 24H LAG PERIOD. THE PRESENCE OF SEDIMENT ASSOCIATED MICROFLORA STMULATED DEGRADATION. BIODEGRADATION WAS NOT AN IMPORTANT FATE PROCESS OF THE MODEL FUEL COMPONENTS IN THE QUIESCENT TEST. ASSAYS OF TOTAL HETERTROPHS AD HYDROCARONOCLASTIC BACTERIA INDICATED AN INITIAL TOXICITY OF THE FUEL MIXTURE FOLLOWED BY A STIMULATION OF HYDROCARBON-DEGRADING BACTERIA. FATE TESTS WERE REPEATED WITH PETROLEUM-DERIVED JP-4. THE SOLUBLE COMPONENTS OF JP-4 VOLATILIZED TOO RAPIDLY FOR BIODEGRADATION TO OCCUR. SEDIMENTATION DRAMATICALLY AFFECTED THE FATE OF FUEL COMPONENTS WHEN MIXING OF THE HYDROCARBON AND SEDIMENT LAYERS STUDIED. SEDIMENT ASSOCIATED COMPOUNDS WERE MORE RESISTANT TO VOLATILIZATION AND MICROBIAL ATTACK. SUBSTITUTED BENZENES AND N-ALKANES WERE RADILY BIODEGRADED WHEN NOT LIMITED BY EVAPORATION AND SEDIMENTATION. JP-4 DID NOT PROVE TOXIC TO THE MICROBIAL COMMUNITITES OF THE TEST SYSTEMS, BUT DID STIMULATE THE REPLICATON OF HYDRCARBONOCLASTIC BACTERIA.

SULLIVAN, TIMOTHY J., AND MICHAEL C. MIX. 1983. PYROLYTIC DEPOSITION OF POLYNUCLEAR AROMATIC HYDROCARBONS DUE TO SLASH BURNING ON CLEAR-CUT SITES. BULL. ENVIRON. CONTAM. TOXICOL. 31(2):208-215. (ERL,GB X445).

THE OBJECTIVES OF THIS RESEARCH WERE TO IDENTIFY QUALITATIVELY AND QUANTITATIVELY THE DEPOSITION, PERSISTENCE AND FATE OF SELECTED UNSUBSTITUTED PNAH COMPOUNDS ON BURNED CLEAR-CUT SITES IN OREGON. THE PRESENT PAPER PRESENTS DATA ON THE INITIAL DEPOSITION OF PNAH AFTER SLASH BURNING. A SUBSEQUENT PAPER WILL CONSIDER THE FATE AND PERSISTENCE OF THE PNAH PRODUCED.

SULLIVAN, TIMOTHY J., AND MICHAEL C. MIX. 1983. SIMPLE AND INEXPENSIVE METHOD FOR MEASURING INTEGRATED LIGHT ENERGY. ENVIRON. SCI. TECHNOL. 17(2):127-128. (ERL,GB X461).

THE OZALID TECHNIQUE IS A SIMPLE AND INEXPENSIVE METHOD FOR MEASURING INTEGRATED SUNLIGHT ENERGY IN THE FIELD FOR PERIODS UP TO A MAXIMUM OF 1 DAY. THIS PAPER DISCRIBES A MODIFICATION OF THE OZALID TECHNIQUE THAT MAKES IT SUITABLE FOR LONG-TERM LIGHT MEASUREMENTS. DATA FROM THE MODIFIED OZALID METER WERE CALIBRATED AGAINST AN EPLEY PRECISION SPECTRO PYRANOMETER, YIELDING A STRONG POSITIVE CORRELATION (R(SQUARED) = 0.97).

SZMANT-FROELICH, ALINA. 1983. PHYSIOLOGICAL EFFECTS OF DRILLING MUDS ON REEF CORALS. EPA-600/3-83-013, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 54P.

PIECES OF CORAL FROM TWO SPECIES, MONTASTREA ANNULARIS AND ACROPORA CERVICORNIS, WERE EXPOSED IN THE LABORATORY TO CONCENTRATIONS OF 0, 1, 10, AND 100 PPM DRILLING MUD FOR PERIODS TWO DAYS TO SEVEN WEEKS. SEVERAL PHYSIOLOGICAL FUNCTIONS OF THE CORAL ANIMAL (CALCIFICATION RATE, RESPIRATION RATE) AND OF THEIR ZOOXANTHELLAE (PHOTOSYNTHESIS RATE, NUTRIENT UPTAKE RATE) WERE MONITORED AT REGULAR INTERVALS DURING THE EXPOSURE PERIODS. IN ADDITION, BIOMASS PARAMETERS (TISSUE NITROGEN, ZOOXANTHELLAE CELL DENSITY, CHLOROPHYLL CONTENT) WERE MEASURED AT TWO-WEEK INTERVALS FOR THE LONGER EXPOSURE EXPERIMENT, AND AT THE END OF EACH EXPERIMENT FOR THE SHORTER EXPOSURES. INITIAL LONG-TERM EXPOSURES OF PIECES OF MONTASTREA ANNULARIS TO A SERIES OF DRILL MUDS (DESIGNATED JX-2 THROUGH JX-7) COLLECTED FROM A JAY OIL-FIELD WELL SHOWED A SIGNIFICANT DETRIMENTAL EFFECT ON CALCIFICATION, RESPIRATION, AND NO(3) UPTAKE RATES DURING THE FOURTH WEEK OF EXPOSURE TO 100 PPM DRILL MUD. PHOTOSYNTHESIS AND NH(4) UPTAKE RATES WERE AFFECTED ALSO DURING THE FIFTH WEEK OF EXPOSURE. NORMAL FEEDING BEHAVIOR WAS ABSENT FROM THESE CORALS WHEN TESTED DURING THE SIXTH AND SEVENTH WEEKS OF EXPOSURE. SEVERAL 100 PPM CORALS DIED DURING THE FIFTH AND SIXTH WEEKS.

SZMANT-FROELICH, ALINA. 1983. PHYSIOLOGICAL EFFECTS OF DRILLING MUDS ON REEF CORALS (PROJECT SUMMARY). EPA-600/S3-83-013, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 19P.

TAGATZ, M.E., C.H. DEANS, J.C. MOORE, AND G.R. PLAIA. 1983. ALTERATIONS IN COMPOSITION OF FIELD- AND LABORATORY-DEVELOPED ESTUARINE BENTHIC COMMUNITIES EXPOSED TO DI-N-BUTYL PHTHALATE. AQUAT. TOXICOL. (AMST.). 3(3):239-248. (ERL,GB 451).

PHTHLATE ESTERS ARE A LARGE CLASS OF SYNTHETIC ORGANIC CHEMICALS (ESTERS OF ORTHO BENZNE DICARBOXYL ACID) WIDELY USED AS PLATICIZERS (ADDED TO PLASTIC RESINS SUCH AS POLYVINYL CHLORIDE). ALONG WITH A HIGH RATE OF PRODUCTION, ABOUT 5 X 10(8) KG ANNUALLY IN THE UNITED STATES, SIGNIFICANT AMOUNTS OF PHTHALATES ARE ENTERING THE MARINE ENVIRONMENT (GIAM ET AL., 1978). THEY ARE COMMON IN INDUSTRIAL AND MUNICIPAL WASTES. SURFACE WATER COLLECTED IN THE GULF OF MEXICO OFF THE MISSISSIPPI RIVER CONTAINED 0.6 MG/L DI-2-ETHYLEXYL PHTHALATE (DEHP); LESSER AMOUNTS ALSO OCCURRED IN WATERS OFF ESCAMBIA BAY NEAR PENSACOLA, FLORIDA (CORCORAN, 1973).

TAGATZ, MARLIN E., AND CHRISTINE H. DEANS. 1983. COMPARISON OF FIELD- AND LABORATORY-DEVELOPED ESTUARINE BENTHIC COMMUNITIES FOR TOXICANT-EXPOSURE STUDIES. WATER AIR SOIL POLLUT. 20(2):199-209. (ERL,GB 439).

THE STRUCTURES OF MACROBENTHIC COMMUNITIES THAT COLONIZED SAND-FILLED BOXES WERE COMPARED TO LEARN IF LABORATORY-DEVELOPED ASSEMBLAGES OF ANIMALS USED IN TOXICITY STUDIES REALISTICALLY SIMULATE THOSE IN NATURE. LABORATORY BOXES WERE COLONIZED FOR EIGHT WEEKS IN SPRING AND FALL BY PLANKTONIC LARVAE FROM CONTINUOUSLY-SUPPLIED UNFILTERED SEAWATER; FIELD BOXES, BY NATURALLY-OCCURRING ESTUARINE ANIMALS. LABORATORY COMMUNITITIES HAD LARGER NUMBERS, BUT FEWER SPECIES THAN FIELD COMMUNITIES. ONE-FOURTH OF THE SPECIES FOUND IN FIELD BOXES ALSO OCCURRED IN LABORATORY BOXES. SPECIES DENSITY, DIVERSITY, AND DOMINANCE WERE SIMILAR IN BOTH ENVIRONMENTS IN FALL, BUT DIFFERED IN SPRING. THE DEGREE OF SIMILARITY OF LABORATORY ASSEMBLAGES OF BENTHIC ANIMALS TO THE HIGHLY VARIABLE ASSEMBLAGES IN THE FIELD INDICATES APPLICABILITY OF LABORATORY TOXICITY STUDIES TO NATURE.

TAGATZ, MARLIN E. IN PREP. TOXICITY OF CREOSOTE TO BENTHIC COMMUNITIES. ENVIRON. TOXICOL. CHEM. 26P. (ERL,GB 486).

MACROBENTHIC ANIMAL COMMUNITIES THAT COLONIZED UNCONTAMINATED AND CREOSOTE-CONTAMINATED SAND (177, 844, AND 4420 UG/G, NOMINAL) DURING 8 WEEKS WERE COMPARED TO ASSESS EFFECTS OF MARINE-GRADE CREOSOTE ON COMMUNITY STRUCTURE. AQUARIA WERE COLONIZED IN THE LABORATORY BY PLANKTONIC LARVAE ENTRAINED IN CONTINUOUSLY SUPPLIED UNFILTERED SEAWATER AND IN THE FIELD BY ANIMALS THAT OCCURRED NATURALLY. INDIVIDUALS AND SPECIES IN AQUARIA THAT CONTAINED 844 AND 4420 UG CREOSOTE/G WERE SIGNIFICANTLY FEWER (ALPHA=0.05) THAN THOSE IN THE CONTROL. ABUNDANCE OF ANIMALS IN FIELD-COLONIZED COMMUNITIES CONTAMINATED WITH 177 UG/G, BUT NOT IN LABORATORY-COLONIZED COMMUNITIES, ALSO WAS LESS THAN THAT IN THE CONTROL. THE LOWEST CONCENTRATION AT EITHER SITE THAT AFFECTED NUMBERS OF INDIVIDUALS OR SPECIES WAS 844 UG/G FOR MOLLUSKS AND 177 UG/G FOR ECHINODERMS, ANNELIDS, AND ARTHROPODS. THE SHANNON-WEAVER INDEX OF DIVERSITY, SIMPSON'S INDEX OF DOMINANCE, AND THE BRAY-CURTIS DISSIMILARITY INDEX DIFFERENCES WERE GREATER WITH EACH INCREASE IN CREOSOTE CONCENTRATION. RAREFACTION INDICES OF DIVERSITY INDICATED THAT THE DISTRIBUTION OF INDIVIDUALS WITHIN SPECIES WAS ABOUT THE SAME FOR LABORATORY AND FIELD ASSEMBLAGES OF ANIMALS. INITIAL MEASURED CONCENTRATIONS OF CREOSOTE IN SAND (MID-RANGE CONCENTRATION) DECREASED BY 30% IN THE LABORATORY AND BY 42% IN THE FIELD AT THE END OF THE EIGHT-WEEK TEST.

TAGATZ, M.E., C.H. DEANS, G.R. PLAIA, AND J.D. POOL. IN PRESS. IMPACT ON AND RECOVERY OF EXPERIMENTAL MACROBENTHIC COMMUNITIES EXPOSED TO PENTACHLOROPHENOL. NORTHEAST GULF SCI. (ERL,GB 443).

RECOVERY OF MACROBENTHIC ANIMAL COMMUNITIES WAS DETERMINED 7 WEEKS AFTER A 5-WEEK EXPOSURE TO 55 UG/L PENTACHLOROPHENOL. THE COMMUNITIES DEVELOPED FROM PLANKTONIC LARVAE IN AQUARIA CONTAINING CLEAN SAND AND CONTINUOUSLY FLOWING ESTUARINE WATER. SIGNIFICANTLY FEWER (ALPHA=0.05) INDIVIDUALS AND SPECIES OCCURRED IN CONTAMINATED AQUARIA THAN IN CONTROL AQUARIA IMMEDIATELY AFTER EXPOSURE TO PENTACHLOROPHENOL. NUMBERS OF ARTHROPODS, CHORDATES, ECHINODERMS, AND MOLLUSKS WERE DECREASED; ANNELIDS AND COELENTERATES WERE NOT AFFECTED. SEVEN WEEKS AFTER EXPOSURE WAS DISCONTINUED, AND WITH CONTINUED INPUT OF ESTUARINE WATER, THE COMMUNITIES SHOWED VARIOUS DEGREES OF RECOVERY, CARRY-OVER EFFECTS, AND CHANGES UNRELATED TO EXPOSURE. EXCEPT FOR ANNELIDS THAT WERE MORE ABUNDANT IN THE CONTROL, AVERAGE DENSITY OF ANIMALS AND NUMBERS OF SPECIES PER PHYLUM IN PREVIOUSLY CONTAMINATED AQUARIA DID NOT SIGNIFICANTLY DIFFER FROM THOSE IN CONTROL AQUARIA. HOWEVER, THE MOLLUSK THAT WAS DOMINANT AT 5 WEEKS AND REDUCED IN CONTAMINATED AQUARIA DID NOT RECOVER AT 12 WEEKS. IN ADDITION, CHANGES IN RELATIVE ABUNDANCE OF SPECIES AND PHYLA BETWEEN THE TWO PERIODS OCCURRED IN BOTH CONTROL AND CONTAMINATED AQUARIA.

TAKITA, TORU, DOUGLAS P. MIDDAUGH, AND JOHN M. DEAN. IN PREP. PREDATION OF SPAWNING ATLANTIC SILVERSIDES, MENIDIA MENIDIA, BY WADING BIRDS AND AQUATIC PREDATORS. ENVIRON. BIOL. FISH. 20P. (ERL,GB 465).

PREDATION OF ATLANTIC SILVERSIDES WAS OBSERVED DURING SPAWNING RUNS IN TE INTERTIDAL ZONE OF THE NORTH EDISTO RIVER ESTUARY, SOUTH CAROLINA. SNOWY EGRETS, EGRETTA THULA, AND GREAT EGRETS, CASMERODIUS ALBUS, WERE THE DOMINANT AVIAN PREDATORS. SNOWY EGRETS OFTEN CAUGHT M. MENIDIA WHILE MAKING FREQUENT LOW FLIGHTS, AND ALSO WHILE WADING AT THE WATER'S EDGE. INDIVIDUAL SNOWY EGRETS REMAINED UNSATIATED AFTER CONSUMING UP TO 21 M. MENIDIA. GREAT EGRETS ALWAYS STRUCK AT M. MENIDIA FROM A STANDING POSITION. ONE INDIVIDUAL WAS SATIATED AFTER CONSUMING 114 M. MENIDIA IN APPROXIMATELY 90 MINUTES. INTRASPECIFIC DISTURBANCES WERE OFTEN OBSERVED IN BOTH SNOWY AND GREAT EGRETS. INTRASPECIFIC INTERACTION DID NOT PRESENT A SERIOUS PROBLEM TO THE SUBORDINATE SPECIES, SNOWY EGRET.

VAN VELD, P.A., AND J.C. SPAIN. IN PREP. BIODEGRADATION OF METHYLPARATHION, P-NITROPHENOL, AND P-CRESOL IN THREE TYPES OF LABORATORY TEST SYSTEMS (ABSTRACT). (ERL,GB 459).

THREE TYPES OF LABORATORY TEST SYSTEM WERE USED TO MEASURE THE BIODEGRADATION OF METHYL PARATHION (MP), P-NITROPHENOL (PNP), AND P-CRESOL TO ASSESS THE EFFECT OF SYSTEM DESIGN ON THE DEGRADATION AND FATE OF SUCH COMPOUNDS. SHAKE FLASKS CONTAING WATER OR WATER/SEDIMENT SLURRIES AND INTACT CORES WITH WATER AND SEDIMENT WERE PREPARED WITH ESTUARINE WATER AND SEDIMENT. RADIOLABELED TEST COMPOUNDS (200 UG/L) WERE ADDED TO EACH TEST SYSTEM AND DISAPPEARANCE OF THE PARENT COMPOUNDS WAS MEASURED BY HIGH-PRESSURE LIQUID CHROMATOGRAPHY OR GAS-LIQUID CHROMATOGRAPHY. DEGRADATION OF MP AND PNP WAS FASTEST IN ECOCORES AND SLOWEST IN WATER FLASKS. IN MOST CASES, DEGRADATION OF PNP IN FLASKS WAS NEGLIGIBLE. P-CRESOL DISAPPEARED RAPIDLY IN ALL SYSTEMS AFTER A VARIABLE LAG PERIOD. THE RESULTS SUGGEST THAT FOR SOME COMPOUNDS THAT CAN BE TRANSFORMED BY REDUCTIVE AS WELL AS OXIDATIVE PATHWAYS, DEGRADATION MAY BE ASTER IN SYSTEMS WITH UNDISTURBED SEDIMENTS. FOR P-CRESOL THE PRESENCE OF SEDIMENT IN THE TEST SYSTEM SEEMS TO BE LESS IMPORTANT.

VAN VELD, P.A., AND J.C. SPAIN. IN PREP. DEGRADATION OF SELECTED XENOBIOTIC COMPOUNDS IN THREE TYPES OF AQUATIC TEST SYSTEMS. CHEMOSPHERE. 11P. (ERL,GB 478).

THE BIODEGRADATION RATES OF P-NITROPHENOL, METHYL PARATHION AND P-CRESOL WERE COMPARED IN TEST SYSTEMS COMPOSED OF SEDIMENT AND WATER COLLECTED FROM VARIOUS ESTUARINE SITES. P-NITROPHENOL AND METHYL PARATHION DEGRADATION WAS FASTEST IN INTACT SEDIMENT/WATER CORES FOLLOWED BY SEDIMENT-WATER SHAKE FLASKS AND SLOWEST IN WATER SHAKE FLASKS. P-CRESOL DEGRADED RAPIDLY IN ALL TEST SYSTEMS. THE APPLICABLILITY OF A FIRST-ORDER KINETIC MODEL TO DESCRIBE THE DEGRADATION OF THESE COMPOUNDS WAS EXAMINED.

WALSH, GERALD E. 1983. CELL DEATH AND INHIBITION OF POPULATION GROWTH OF MARINE UNICELLULAR ALGAE BY PESTICIDES. AQUAT. TOXICOL. (AMST.). 3(3):209-214. (ERL,GB 430).

THE MARINE DIATOM, SKELETONEMA COSTATUM, WAS EXPOSED TO THE PESTICIDES HEXACLOROCYCLOPENTADIENE, EPN, CHLORPYRIFOS, CARBONPHENOTHION, AND ATRAZINE AND EXAMINED FOR DEATH OF CELLS WITH EVANS BLUE, A MORTAL STAIN. ALL PESTICIDES CAUSED DEATH OF CELLS, BUT SIGNIFICANTLY MORTALITY OCCURRED AT CONCENTRATIONS GREATER THAN THE EC50. THE INSECTICIDE, AMDRO, DID NOT KILL THE MARINE ALGAE S. COSTATUM, THALASSIOSIRA PSEUDONANA, ISOCHRYSIS GALBANA, CHLORELLA SP., OR DUNALIELLA TERTIOLECTA. HOWEVER, AMDRO WAS VERY INHIBITORY TO ALGAL POPULATION GROWTH AT LOW CONCENTRATIONS, I.E., EC50'S AT 48 HOURS WERE BETWEEN 0.14 PPB FOR T. PSEUDONANA AND 10.3 PPB FOR D. TERTIOLECTA. EC50'S WERE LOWEST AFTER 48 HOURS OF EXPOSURE IN TESTS CONDUCTED FOR 96 HOURS. BY 96 HOURS AFTER EXPOSURE, MAXIMUM GROWTH RATES RECOMMENDED THAT, BECAUSE OF PROBLEMS ASSOCIATED WITH THE FATE OF TOXICANTS, ALGAL LABORATORY TOXICITY TESTS BE CONDUCTED FOR 48 TO 72 HOURS INSTEAD OF THE USUAL 96 HOURS LONGER.

WALSH, GERALD E., AND RICHARD L. GARNAS. 1983. DETERMINATION OF BIOACTIVITY OF CHEMICAL FRACTIONS OF LIQUID WASTES USING FRESHWATER AND SALTWATER ALGAE AND CRUSTACEANS. ENVIRON. SCI. TECHNOL. 17(3):180-182. (ERL,GB 450).

COMPLEX WASTES FROM INDUSTRIAL AND MUNICIPAL OUTFALLS WERE FRACTIONATED CHEMICALLY AND TESTED FOR TOXOCITIY WITH FRESH AND SALTWATER ALGAE AND CRUSTACEANS. THE ORGANIC FRACTION OF EACH WASTE WAS SUBFRACTIONATED INTO ACID-, BASE-, AND NEUTRAL-EXTRACTABLE PORTIONS, AND THE INORGANIC FRACTION WAS SUBFRACTIONATED INTO ITS ANION AND CATION COMPONENTS. ALL WASTES AFFECTED GROWTH OF THE ALGAE SKELETONEMA COSTATUM (SALTWATER) AND MONORAPHIDIUM CAPRICORNAUTUM (FRESHWATER). USUALLY, BIOACTIVITY WAS LIMITED TO ONE OR TWO SUBFRACTIONS. IN SOME CASES, ALGAL GROWTH WAS STIMULATED BY A FRACTION OR SUBFRACTION, WHEREAS STIMULATION WAS NOT DETECTED IN WHOLE WASTE. IT IS SUGGESTED THAT FRACTIONATION MUST BE DONE IN ORDER TO ESTIMATE THE FULL POTENTIAL IMPACT OF COMPLEX WASTES ON AQUATIC SYSTEMS. THE METHOD CAN ALSO BE USED TO IDENTIFY TOXIC FACTORS BEFORE APPLICATION OF CONTROL TECHNOLOGY.

WALSH, GERALD E. 1983. EFFECTS OF TOXICANTS ON PLANKTON. IN: HEALTH ASPECTS OF CHEMICAL SAFETY: ENVIRONMENTAL TOXICOLOGY. WORLD HEALTH ORGANIZATION, COPENHAGEN, DENMARK. PP. 117-167. (ERL,GB 448).

EFFECTS OF HEAVY METALS, PESTICIDES, AND INDUSTRIAL AND MUNICIPAL WASTES ON PLANKTON IN THE FIELD AND LABORATORY ARE REVIEWED. BOTH HOLOPLANKTON AND MEROPLANKTON ARE DISCUSSED. IN MANY CASES, MEROPLANKTONIC STAGES OF BENTHIC SPECIES ARE MORE SENSITIVE THAN ADULTS ALTHOUGH DEATH OR DEPRESSION OF PHYSIOLOGICAL ACTIVITIES ARE OFTEN USED AS CRITERIA FOR EFFECTS OF POLLUTANTS WITH ALGAE AND ANIMALS, ALGAE MAY BE USED TO DETECT EFFECTS OF GROWTH STIMULANTS.

WALSH, GERALD E. IN PRESS. AN EGYPTIAN-UNITED STATES PROJECT FOR STUDY OF POLLUTION IN SALINE WATERS OF EGYPT. (ERL,GB 428).

THIS PAPER DESCRIBES A JOINT EGYPTIAN-UNITED STATES RESEARCH PROJECT ON POLLUTION OF THE SALINE WATERS OF EGYPT. THIS PROJECT BEGAN IN 1977 AND WILL CONTINUE INTO 1983. STUDIES ARE DONE IN THE SALINE LAKES AND ABU-KIR BAY NEAR ALEXANDRIA, FAYOUM GOVERNORATE, AND THE NORTHWESTERN RED SEA NEAR HURGHADA. EACH AREA HAS UNIQUE PROBLEMS OF POLLUTION, BUT ALL STUDIES ADDRESS PHYSICAL, CHEMICAL, AND BIOLOGICAL ASPECTS OF THE ENVIRONMENT, DETECTION AND QUANTITATION OF POLLUTION IN NATURAL SYSTEMS, AND USE OF TOXICITY TESTS ON ALGAE AND ANIMALS TO EVALUATE POLLUTION POTENTIAL FROM MUNICIPAL AND INDUSTRIAL WASTES (ALEXANDRIA), PESTICIDES (FAYOUM), AND OIL (HURGHADA). ALTHOUGH THE STUDIES ARE DONE TO EVALUATE POLLUTION EFFECTS IN EGYPT, DATA AND DESCRIPTIVE AND PREDICTIVE MODELS DERIVED FROM THEM SHOULD BE OF VALUE IN OTHER SIMILAR GEOGRAPHICAL AREAS.

WALSH, GERALD E. IN PRESS. CHEMICAL FRACTIONATION AND BIOASSAY OF COMPLEX WASTES (ABSTRACT). PRESENTED AT THE MEETING OF THE DIVISION OF ENVIRONMENTAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, MARCH-APRIL, 1982, LAS VEGAS, NEVA. (ERL,GB 435).

A METHOD IS DESCRIBED FOR ANALYSIS OF COMPLEX INDUSTRIAL AND MUNICIPAL WASTES. THE METHOD USES CHEMICAL FRACTIONATION AND SUBFRACTIONATION COMBINED WITH LABORATORY TOXICITY TESTS ON MARINE AND FRESHWATER ALGAE AND CRUSTACEANS TO DETERMINE TOXICITY OF WHOLE WASTE AND TO IDENTIFY ITS TOXIC COMPONETS. ENDPOINTS ARE STIMULATION OR INHIBITION OF ALGAL POPULATION GROWTH AND DEATH OF CRUSTACEANS. ALGAE ARE PARTICULARLY GOOD INDICATORS OF BIOACTIVITY, OFTEN REACTING TO GROWTH STIMULANTS AT LOW CONCENTRATIONS (LESS THAN 0.1%) AND TO TOXICANTS AT HIGHER CONCENTRATIONS IN A SINGLE WASTE. EFFECTS OF BIOACTIVE SUBSTANCES MAY BE SUPPRESSED BY OTHER BIOACTIVE SUBSTANCES, AND FRACTIONATION OFTEN REVEALS EFFECTS NOT FOUND IN TESTS WITH RAW WASTE. AFTER IDENTIFICATION OF TOXIC FRACTIONS AND SUBFRACTIONS, PRODUCTION AND TREATMENT SYSTEMS CAN BE MODIFIED TO ELIMINATE SPECIFIC TOXICANTS, THUS SAVING THE CONSIDERABLE COST OF WHOLE WASTE TREATMENT.

WALSH, GERALD E. IN PRESS. EGYPTIAN-UNITED STATES PROJECT FOR STUDY OF POLLUTION IN SALINE WATERS OF EGYPT (ABSTRACT). (ERL,GB 414).

THE INSTITUTE OF OCEANOGRAPHY AND FISHERIES OF THE EGYPTIAN ACADEMY OF SCIENTIFIC RESEARCH AND TECHNOLOGY, IN CONJUNCTION WITH THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA), CONDUCTS STUDIES ON POLLUTION OF THE SALINE WATERS OF EGYPT. FUNDED UNDER THE PL480 PROGRAM, THE RESEARCH PROJECT ENTITLED "INVESTIGATION OF LEVEL AND EFFECTS OF POLLUTANTS IN SALINE LAKES AND LITTORAL MARINE ENVIRONMENTS" IDENTIFIES EFFECTS OF POLLUTION AT LABORATORIES ON THE MEDITERRANEAN SEA, RED SEA, AND LAKE QARUN. BASIC STUDIES ON THE BIOLOGY AND CHEMISTRY OF EACH AREA ARE CONDUCTED AND LABORATORY TESTS DONE ON SPECIFIC POLLUTANTS. POPULATION PROBLEMS ARE DIFFERENT AT EACH LABORATORY SITE, AND RESEARCH OBJECTIVES HAVE BEEN PLANNED WITH REGARD FOR LOCAL CONDITIONS AND INTERESTS OF STAFF RESEARCHERS. AT THE LABORATORY IN ALEXANDRIA, EFFECTS OF POLLUTION BY INDUSTRIAL AND MUNICIPAL WASTES IN COASTAL LAKES AND THE COASTAL MEDITERRANEAN ARE STUDIED IN THE FIELD AND BY LABORATORY BIOASSAYS. EXTENSIVE CHEMICAL ANALYSES AND A STRONG COMPUTER PROGRAM COMPLETE THE OVERALL PROJECT. AT THE RED SEA, THE LABORATORY AT AL GHARDAQA CONDUCTS FIELD AND LABORATORY STUDIES ON EFFECTS OF OIL ON BENTHIC AND PELAGIC ORGANISMS AND CONDUCTS CHEMICAL ANALYSES FOR POLLUTANTS BY PLANTS AND ANIMALS ARE STUDIED IN THE FIELD AND LABORATORY AT LAKE QARUN, A SALINE INLAND LAKE.

WHITE, DAVID C., JANET S. NICKELS, MICHAEL J. GEHRON, JEFFREY H./MARTZ PARKER, ROBERT F., AND NORMAN L. RICHARDS. IN PREP. BIOCHEMICAL MEASURES OF CORAL METABOLIC ACTIVITY, NUTRITIONAL STATUS AND MICROBIAL INFECTION WITH EXPOSURE TO OIL AND GAS WELL DRILLING FLUIDS. PP. 1-24. (ERL,GB X394).

THE REEF BUILDING CORAL MONTASTREA ANNULARUS WAS EXPOSED CONTINUOUSLY TO SUSPENSIONS OF OIL AND GAS-WELL DRILLING FLUIDS AT CONCENTRATIONS OF 0.1 ML LITER (-1), 0.01 ML LITER (-1), AND 0.001 ML LITER (-1) IN FLOWING SEAWATER AT THE U.S. NAVAL STAGE I PLATFORM (30 DEGREES 7.5 ' N, 85 DEGREES 46.3' W). AFTER 6 WEEKS EXPOSURE, CORAL FRAGMENTS OF 30 TO 60 CM SQUARED SURFACE AREA WERE BROKEN OFF, RINSED IN SEAWATER, AND EXTRACTED IN A ONE-PHASE CHLOROFORM-METHANOL SEAWATER EXTRACT AND RETURNED TO THE LABORATORY. IN THE LABORATORY, THE EXTRACTION WAS COMPLETED AND THE LIPIDS WERE ANALYZED FOR THEIR PHOSPHOLIPID CONTENT, ALKYL FATTY ACID COMPOSITION, AND NEUTRAL LIPID TRIGLYCERIDE GLYCEROL. THE AQUEOUS PHASE WAS ANALYZED FOR FREE AMINO ACID COMPOSITION. BIOCHEMICAL EVIDENCE OF STRESS WAS REFLECTED IN THE CESSATION OF GROWTH AS MEASURED IN DEPRESSED DIACYL PHOSPHOLIPID. DETAILED ANALYSIS OF THE ACYL FATTY ACID COMPOSITION BY CAPILLARY GAS CHROMATOGRAPHY SHOWED CHANGES IN POLYENOIC FATTY ACIDS SUGGESTING POSSIBLE CHANGES IN THE METABOLISM OF THE FATTY ACIDS INDUCED BY THE EXPOSURE TO THE DRILLING FLUIDS. THERE WAS NO SIGNIFICANT EFFECT ON THE LEVEL OF TRIGLYCERIDE GLYCEROL. THE CORAL ALSO SHOWED INCREASED LEVELS OF THE FREE ASPARTIC ACID AND A DOSE-RESPONSE RELATED DECREASE IN THE FREE GLUTAMIC ACID WITH EXPOSURE. THIS EVIDENCE SUGGESTS THAT BIOCHEMICAL ANALYSIS OF METABOLIC ACTIVITY AND NUTRITIONAL STATUS MAY BE USEFUL AS MARKERS FOR POLLUTION INDUCED CHANGES IN REEF BUILDING CORALS AND THUS FOR MONITORING CORAL REEFS.