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62. (EVALUATION OF TOTAL HYDROCARBONS IN MUSSELS BY SPECTROFLUORIMETRY. POLLUTION CONTROL ON THE LITTORAL AFTER THE BOHLEN WRECK.); ESTIMATION DES HYDROCARBURES TOTAUX DANS LA MOULE PAR SPECTROFLUORIMETRIE. CONTROLE DE LA POLLUTION LE DU LITTORAL APRES LE NAUFRAGE DU BOHLEN
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70. STUDIES ON THE GENETIC EFFECTS OF POLLUTION IN THE SEA
70. CYTOLOGIC, CYTOGENETIC, AND DEVELOPMENTAL STATE OF ATLANTIC MACKEREL EGGS FROM SE SURFACE WATERS OF THE NEW YORK BIGHT, AND PROSPECTS FOR BIOLOGICAL EFFECTS MONITORING WITH ICHTHYOPLANKTON
71. MIXED-FUNCTION OXYGENASE STUDIES IN MONITORING FOR EFFECTS OF ORGANIC POLLUTION
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72. PERSISTENCE OF THE INSECT GROWTH REGULATOR DIMILIN(R) IN BRACKISH WATER: A LABORATORY EVALUATION USING LARVAE OF AN ESTUARINE CRAB AS INDICATOR.
72. CADMIUM IN MYTILUS EDULIS FROM GERMAN COASTAL WATERS.
72. NEREIS VIRENS (POLYCHAETA) IN MARINE POLLUTION RESEARCH: CULTURE METHODS AND ORAL ADMINISTRATION OF A POLYCHLORINATED BIPHENYL.
73. SEA-URCHIN LARVAE AS A TOOL FOR ASSESSMENT OF THE QUALITY OF SEA WATER.
73. TRANSFORMATION OF 2,5-DIPHENYLOXAZOLE AND DERIVATIVES BY MIXED-FUNCTION OXIDASES OF A MARINE FISH.
73. MONITORING TRACE ELEMENTS IN THE MUSSEL, MYTILUS EDULIS USING X-RAY ENERGY SPECTROSCOPY.
73. EFFECTS OF SUBLETHAL CONCENTRATIONS OF CADMIUM AS POSSIBLE INDICATORS OF CADMIUM POLLUTION FOR TWO POPULATIONS OF ACARTIA (CLAUSI) (COPEPODA) LIVING AT TWO DIFFERENTLY POLLUTED AREAS.
74. IDENTIFICATION OF SUBSTANCES TRANSFERRED TO FISH OR SHELLFISH FROM PETROLEUM SUSPENSION.
74. BIOGEOCHEMISTRY OF SELECTED HEAVY METALS IN WESTERN PORT, VICTORIA, AND USE OF INVERTEBRATES AS INDICATORS WITH EMPHASIS ON MYTILUS EDULIS PLANULATUS.
74. A STUDY OF INDICATION OF TRACE METAL POLLUTION OF MARINE AREAS BY ANALYSIS OF SAL MARSH SOILS.
75. BIOLOGICAL INDICATORS OF WATER QUALITY.
75. SEASONAL VARIATIONS OF ZINC IN THE BARNACLE, BALANUS BALANOIDES (L.) MAINTAINED ON A RAFT IN THE MENAI STRAIT.
75. THE LITTLENECK CLAM, PROTOTHACA STAMINEA, AS A TOOL FOR POTENTIAL OIL POLLUTION ASSESSMENT: PART 1-DENSITY OF STOCK.
75. ORGANOCHLORINE RESIDUES IN HARP SEAL (PHAGOPHILUS GROENLANDICUS) TISSUES, GULF OF ST. LAWRENCE, 1971, 1973.
76. APPLICATION OF IN SITU CAGE CULTURES ON PHYTOPLANKTON FOR MONITORING HEAVY METAL POLLUTION IN TWO NORWEGIAN FJORDS.
76. SEXUAL MATURATION AS A SOURCE OF VARIATION IN THE RELATIONSHIP BETWEEN CADMIUM CONCENTRATION AND BODY WEIGHT OF MYTILUS EDULIS L.
76. THE DOMINANCE OF NANOPLANKTON AS AN INDICATOR OF MARINE POLLUTION: A CRITIQUE.

76. THE MARINE ALGAE OF ELIE, SCOTLAND: A RE-ASSESSMENT.
77. AN ATTEMPTED POLLUTION ABATEMENT IN THE GULF OF LA NAPOULE (CANNES, FRANCE).
77. EFFECTS OF SEWAGE SLUDGE ON THE BENTHIC INVERTEBRATE COMMUNITY OF THE INSHORE NEW YORK BIGHT.
77. VESSEL-RELATED CONTAMINATION OF SOUTHERN CALIFORNIA HARBOURS BY COPPER AND OTHER METALS.
77. THE PETROLEUM-INDUCIBLE MIXED-FUNCTION OXIDASE OF CUNNER (TAUTOGOLABRUS ADSPERSUS WALBAUM 1792): SOME CHARACTERISTICS RELEVANT TO HYDROCARBON MONITORING.
78. INDICATORI BIOLOGICI DI INQUINAMENTO MARINO: FITOPLANCTON.
78. INDICATORI BIOLOGICI DI INQUINAMENTO MARINO: ZOOPLANCTON.
78. INDICATORI BIOLOGICI DI INQUINAMENTO MARINO: ZOOBENTHOS.
78. INQUINAMENTO DA IDROCARBURI NEL BACINO SETTENTRIONALE DELLA LAGUNA VENETA.
79. EVALUATION OF THE A-1 METHOD IN ESTIMATING FECAL COLIFORM DENSITIES IN SHELLFISH.
79. MARINE ECOLOGY AND OIL POLLUTION.

SUBLETHAL BIOLOGICAL EFFECTS MONITORING IN THE REGION OF SULLOM VOE SHETLAND, JULY 1985  
REPORT TO THE SHETLAND OIL TERMINAL ENVIRONMENTAL ADVISORY GROUP. - 2601 1850026

Widdows, J. Dixon, D. Donkin, P. Evans, S.V. Harris, J.R.W. Livingstone, D.R. Lowe, D. Moore, M.N. Pipe, R. et al.

PUBLISHER- SHETLAND OIL TERMINAL ENVIRONMENTAL ADVISORY GROUP (SOTEAG) PUB. PLACE-  
ABERDEEN (UK) 48 pp LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION  
CLASS- BOOK TAPE ISS- 2601 COMPANY RELATED- Inst. Mar. Environ. Res.,  
Prospect Place, The Hoe, Plymouth PL1 3DH, UK NDN- 024-0012-6853-0

The overall objective of this field programme is to monitor the performance and biological "health" of "sentinel organisms" inhabiting the littoral environment in the vicinity of the oil terminal at Sullom Voe in order to detect any effects of industrial activity in the area. This report is divided into two parts: firstly the annual progress report for 1985 and secondly, a review of the biological effects monitoring programme carried out by IMER during the period 1981 to 1985.

NEPHTYS CORNUTA (POLYCHAETA: NEPHTYIDAE) AND ITS SUBSPECIES, AND USE OF THE TRINOMIALS  
IN POLLUTION MONITORING. - 2601 1843088

Ellis, D.V. Ronaldson, L.D.

CAN. J. ZOOL./J. CAN. ZOOL., vol. 66, no. 8, pp. 1898-1900 LANGUAGE(S)- ENGLISH  
PUBL. DATE- 1988. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2601  
COMPANY RELATED- Dep. Biol., Univ. Victoria, Victoria, B.C. V8W 2Y2, Canada NDN-  
024-0012-6835-8

The form of *Nephtys cornuta* separated as the Californian subspecies *N. c. franciscana* is found widely in British Columbia waters, co-occurring and intergrading with the nominate subspecies *N. c. cornuta*. Previous identifications of the trinomial have tended to be inaccurate (36% of 127 specimens reexamined). The co-occurring forms show no apparent ecological distinctions relevant to pollution monitoring objectives at one location where the species is both abundant and significant as an indicator of seabed recovery from mine-waste environmental impact. It is concluded that the trinomial, hence subspecific designation, should not be used in the British Columbia area of the species range.

ACCUMULATION OF FE, MN, CU AND V IN BODY AND SHELLS OF THE BLACK SEA MUSSEL. - 2506  
1788854

Khrustalev, Yu.P. Morozov, V.M. Chernousov, S.Ya.

OKEANOLOGIYA/OCEANOLOGY., vol. 27, no. 6, pp. 934-938 LANGUAGE(S)- RUSSIAN  
PUBL. DATE- 1987. PUBLICATION CLASS- JOURNAL ARTICLE ISSN- ISSN 0030-1574  
ORIG. TITLE- Osobennosti nakopleniya zheleza, margantsa, medi, vanadiya v telakh i  
rakovinakh chernomorskoj midii TAPE ISS- 2506 COMPANY RELATED- Gos. Univ.  
Rostov, USSR NDN- 024-0012-5180-2

The rate of assimilation and spatial distribution of the chemical elements in *Mytilus galloprovincialis* was found to be dependent on the mussel age and size and on the lithological type of bottom sediments. Maximum concentrations in shells and body were recorded in mussels 35-60 and 10-35 mm long, respectively, inhabiting muddy and carbonate muddy silts whereas the minimum levels were found in those occurring on sandy bottom. The metal concentrations were found to decrease seaward, which can be explained by a corresponding decrease in the levels of river-brought pollutants. It is concluded that the mollusk can be successfully used as an indicator species for pollution control.

COMPARATIVE EXPERIMENT ON SENSITIVITY OF SPECIES OF TRADESCANTIA TO MARINE POLLUTION.  
2505 1761509

Chen, Dengqin Zhou, Fang

ACTA OCEANOL. SIN. (EN. ED.), vol. 5, no. 3, p. 424 LANGUAGE(S)- ENGLISH PUBL  
DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE ISSN- ISSN 0253-505X TAPE  
ISS- 2505 COMPANY RELATED- Dep. Mar. Biol., Shandong Coll. Oceanol., Qingdao,  
People's Rep. China NDN- 024-0012-3573-0

*Tradescantia paludosa*, a species from the U.S. (1979), is known for its high sensitivity to mutagens when used in *Tradescantia* micronucleus (MCN) bioassay. The sensitivity of *T. reflexa*, a special clone of *Tradescantia* found in Qingdao, China (1980), to mutagens has been observed to be even greater than that of *T. paludosa*. Series of experiments using MCN bioassay were carried out to compare the sensitivities of these two species in monitoring marine pollution.

TRACE METAL CONCENTRATIONS IN MUSSELS: COMPARISON BETWEEN ESTUARINE, COASTAL AND OFFSHORE REGIONS IN THE SOUTHEASTERN NORTH SEA FROM 1983 TO 1986. - 2505 1768959  
Borchardt, T. Burchert, S. Hablitzel, H. Karbe, L. Zeitner, R.

MAR. ECOL. (PROG. SER.), vol. 42, no. 1, pp. 17-31 LANGUAGE(S)- ENGLISH PUBL. DATE- 1988. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2505 COMPANY RELATED- Inst. Hydrobiol. und Fischereiwiss., Zeiseweg 9, D-2000 Hamburg 50, FRG NDN- 024-0012-3563-8

The blue mussel *Mytilus edulis* was used for monitoring trace metal contamination in the southeastern North Sea. From 1983 to 1986 more than 200 samples were collected from natural and cultured mussel beds, from groynes, anchor chains of nautical buoys and from biological monitoring stations. Soft bodies were analysed for mercury, cadmium, copper, silver, zinc and lead by atomic absorption spectrophotometry. Metal concentrations in mussels from the estuaries of Ems, Jade and Elbe were compared with those from the inner German Bight, from a region off southern Jylland, and the open sea. In some cases, *M. edulis* from offshore areas contained metal concentrations as high as specimens from the estuaries. Cadmium and lead concentrations increased from the inner German Bight towards the central North Sea. This is in contrast to the general distribution of trace metals in seawater. Using multiple regression analysis a standard mussel was defined.

ASSESSMENT OF HEPATIC MIXED FUNCTION OXIDASE INDUCTION IN WINTER FLOUNDER (*PSEUDOPLEURONECTES AMERICANUS*) AS A MARINE PETROLEUM POLLUTION MONITORING TECHNIQUE, WITH AN APPENDIX DESCRIBING PRACTICAL FIELD MEASUREMENTS OF MFO ACTIVITY. - 2505 177830

Addison, R.F. Payne, J.F.

CAN. TECH. REP. FISH. AQUAT. SCI., no. 1505 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- REPORT PATENT- ISSN 0706-6457 TAPE ISS- 2505 COMPANY RELATED- Bedford Inst. of Oceanography, Dartmouth, N.S. (Canada). Mar. Ecol. Lab NDN- 024-0012-3555-9

The rationale and potential for using measurements of hepatic mixed function oxidase (MFO) enzyme activity in winter flounder (*Pseudopleuronectes americanus*) as an index of exposure to petroleum hydrocarbons are discussed.

HEAVY METAL CONCENTRATION IN THE PLANKTON, PHYTOBENTHOS AND ZOOBENTHOS OF THE BALTIC SEA. - 2505 1756855

Jankovski, H. Poder, T. Simm, M. Kukk, H.

BALT. SEA ENVIRON. PROC., no. 19, pp. 88-103 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE CONF. NAME- Baltic Sea Monitoring Symp CONF. PLACE- Tallinn (USSR) CONF. DATE- 10 Mar 1986 ISSN- ISSN 0357-2994 TAPE ISS- 2505 COMPANY RELATED- Inst. Thermophys. Electrophys., Estonian SSR Acad. Sci., USSR NDN- 024-0012-3053-7

Studies were conducted on the concentrations of heavy metals in the plankton, bottom vegetation and zoobenthos of the Baltic Sea. Levels of copper, lead, cadmium and zinc were examined. An assessment is made of the suitability of these groups of organisms as bioindicators with respect to their bioaccumulation ability.

VIEWS ON THE USE OF PHYTOPLANKTON AS A PARAMETER IN MONITORING THE STATE OF THE BALTIC SEA. - 2505 1757059

Haellfors, G. Niemi, A.

BALT. SEA ENVIRON. PROC., no. 19, pp. 246-258 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE CONF. NAME- Baltic Sea Monitoring Symp CONF. PLACE- Tallinn (USSR) CONF. DATE- 10 Mar 1986 ISSN- ISSN 0357-2994 NOTES- Incl. 15 ref. TAPE ISS- 2505 COMPANY RELATED- Water Res. Off., Inst Water Res., Natl. Board of Waters, Box 250, SF-00101, Helsinki 10, Finland NDN- 024-0012-3039-2

A review is made of Baltic Sea phytoplankton dynamics, examining also developments in phytoplankton taxonomy and ecology. The significance of such data for monitoring the state of the Baltic Sea is discussed, suggesting improvements to make phytoplankton sampling more profitable.

WHY SHOULD PHYTOBENTHOS ALSO BE AN ELEMENT OF MONITORING?. - 2505 1757091

Plinski, M.

BALT. SEA ENVIRON. PROC., no. 19, pp. 286-296 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE CONF. NAME- Baltic Sea Monitoring Symp  
CONF. PLACE- Tallinn (USSR) CONF. DATE- 10 Mar 1986 ISSN- ISSN 0357-2994 TAPE  
ISS- 2505 COMPANY RELATED- Univ. Gdansk, Inst. Oceanogr., Gdansk, Poland  
NDN- 024-0012-3036-7

Details are given of studies conducted investigating changes in the phytobenthos in the Gulf of Gdansk. Findings of the 10-year investigation period showed changes to occur in the number of species, their range of occurrence and total biomass. The importance of the phytobenthos as indicators of biological changes in the marine environment and thus as a monitoring parameter is discussed in detail.

THE COOPERATIVE ICES MONITORING STUDIES PROGRAMME. - 2505 1757116

Pawlak, J.F.

BALT. SEA ENVIRON. PROC., no. 19, pp. 307-316 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE CONF. NAME- Baltic Sea Monitoring Symp  
CONF. PLACE- Tallinn (USSR) CONF. DATE- 10 Mar 1986 ISSN- ISSN 0357-2994 TAPE  
ISS- 2505 COMPANY RELATED- Int. Council. for the Exploration of the Sea,  
Copenhagen, Denmark NDN- 024-0012-3034-3

Monitoring-related activities coordinated by the ICES are described. Studies have concentrated mainly on fish and shellfish and their ability to bioaccumulate contaminants. The measurement of contaminants in seawater and sediments and the biological effects of marine pollution are also discussed.

AN ATTEMPT TO USE MEIOFAUNA AS A MONITORING TOOL: SOUTHERN BALTIC COASTAL MEIOBENTHIC COMMUNITIES, WITH A PARTICULAR REFERENCE TO HARPACTICOID COPEPODS. - 2505 1757279

Radziejewska, T. Drzycimski, I.

BALT. SEA ENVIRON. PROC., no. 19, pp. 442-455 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE CONF. NAME- Baltic Sea Monitoring Symp  
CONF. PLACE- Tallinn (USSR) CONF. DATE- 10 Mar 1986 ISSN- ISSN 0357-2994  
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Prot. of Sea, Poland NDN- 024-0012-3023-9

A study was conducted on coastal assemblages of meiofauna along the Polish coast with the aim to determine their potential value as a monitoring parameter. Data show that distinct spatial differences exist, which correlate with the varying degree of exposure of the communities to pollution load introduced in the area.

SOME PROBLEMS OF BIOLOGICAL ASSESSMENT OF HEAVY METAL POLLUTION UNDER THE ENVIRONMENTAL CONDITIONS OF THE BALTIC SEA. - 2505 1757463

Theede, H.

BALT. SEA ENVIRON. PROC., no. 19, pp. 550-551 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE CONF. NAME- Baltic Sea Monitoring Symp  
CONF. PLACE- Tallinn (USSR) CONF. DATE- 10 Mar 1986 ISSN- ISSN 0357-2994  
NOTES- Summary only. TAPE ISS- 2505 COMPANY RELATED- Inst. Meereskd., Univ  
Kiel, Duesternbrooker Weg 20, 2300 Kiel, FRG NDN- 024-0012-3012-0

Due to their kinetics of uptake and release, the dependence of accumulation of heavy metals on many external and internal factors restricts the ability of plants and animals to monitor contaminants. Part of the arising difficulties and uncertainties could be eliminated by relating metal burden of soft parts of mussels to their shell weights. The "Cd/shell weight index" proved to be independent of variables which modify the condition of a mussel such as individual size, tidal exposure, spawning and nutrient supply. In experiments, it was shown that oxygen saturation and temperature variations did not change this index. However, many external factors may change the chemical speciation of metals hence affecting their bioavailability and rates of uptake. In a strict sense, every organism will indicate only certain species of a contaminant which are available to the individual.

AN ECOSYSTEM PERSPECTIVE ON POTENTIAL IMPACTS OF DRILLING FLUID DISCHARGES ON SEAGRASSES. - 2502 1666082

Kelly, J.R. Duke, T.W. Harwell, M.A. Harwell, C.C.

ENVIRON. MANAGE., vol. 11, no. 4, pp. 537-562 LANGUAGE(S)- ENGLISH PUBL. DATE- 1987. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2502 COMPANY RELATED Ecosyst. Res. Cent., Corson Hall, Cornell Univ., Ithaca, NY 14853, USA NDN- 024-0011-9234-2

Potential effects of oil drilling fluid discharges upon *Thalassia* seagrass ecosystems were examined using seagrass core microcosms. Observed experimental effects, summarized in this article, included changes in both autotrophic (*Thalassia* and epiphyte) and heterotrophic (dominant benthic macroinvertebrates) species, and the processes of primary productivity and decomposition. The physical disturbance related to greater turbidity and sedimentation caused some effects, while others seemed a direct response to the toxic constituents of drilling fluids.

HEMOCYTES OF MYTILUS EDULIS AFFECTED BY PRUDHOE BAY CRUDE OIL EMULSION. - 2502 1669602

McCormick-Ray, M.G.

MAR. ENVIRON. RES., vol. 22, no. 2, pp. 107-122 LANGUAGE(S)- ENGLISH PUBL. DATE- 1987. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2502 COMPANY RELATED- Dep. Environ. Sci., Univ. Virginia, Charlottesville, VA 22903, USA NDN- 024-0011-9221-4

Hemocytes and tissues of *Mytilus edulis* were examined after 4-5 or 8-9 week's exposure to 390  $\mu$ g/liter or 740  $\mu$ g/liter Prudhoe Bay crude oil emulsion, during the animals most metabolically active season. A reduction in hemocytes occurred in animals exposed to 740  $\mu$ g/liter after 4-5 weeks. After 8-9 weeks, hemocyte counts of both test groups increased, due to higher densities of granulocytes, yet the phagocytic response was reduced. Agranulocyte densities were reduced in animals exposed to 390  $\mu$ g/liter, due to lower counts of 2-3  $\mu$ m agranulocytes. Further, adipogranular cells percentages in test animals were reduced. The results from oil-exposed mussels suggest a stress condition and have implications for monitoring.

(ENVIRONMENT PRECAUTION NORTH SEA. LOAD, QUALITY SITUATION AND PREVENTIVE MEASURES.). - 2502 1667685

Zauke, G.-P. Lemm, R.V. Meurs, H.-G. Todeskino, D. Baeumer, H.P. Butte, W.

pp. 325-338 LANGUAGE(S)- GERMAN PUBL. DATE- 1987. PUBLICATION CLASS- BOOK ORIG. TITLE- UMWELTVORSORGE NORDSEE. BELASTUNGEN, GUETESITUATION UND MASSNAHMEN. TAPE ISS- 2502 COMPANY RELATED- Niedersaechsisches Umweltministerium, Hannover (FRG) FB Biol., Univ. Oldenburg, Postfach 2503, 2900 Oldenburg, FRG NDN- 024-0011-8827-2

Biological monitoring of heavy metals in estuaries of the North Sea is conceptually discussed in the context of the Joint Monitoring Programme for the North Sea. For this purpose the cadmium content of euryhaline gammarids (*Gammarus*) was used as a model system. Cd-accumulation in gammarids was analysed in situ and in vitro. The role of Cd-bioaccumulation and the bioavailability of heavy metals in benthic invertebrates is discussed here.

SCYTOSIPHON LOMENTARIA (PHAEOPHYTA) AS AN INDICATOR OF HEAVY-METAL CONTAMINATION OF SEAWATERS. - 2501 1623600

Kristoforova, N.K.

P.S.Z.N. I:MAR. ECOL., vol. 6, no. 2, pp. 121-126 LANGUAGE(S)- ENGLISH PUBL. DATE- 1985. PUBLICATION CLASS- JOURNAL ARTICLE ISSN- ISSN 0173-9565 NOTES- Incl. bibliogr.: 22 ref. TAPE ISS- 2501 COMPANY RELATED- Pac. Inst. Geogr. Far East Sci. Cent., Vladivostok 690032, USSR NDN- 024-0011-7643-9

The brown alga *Scytosiphon lomentaria* is discussed as a possible indicator of heavy-metal contamination of marine coastal waters. A comparison with other brown algae shows that a strong development of the specific surface of *S. lomentaria* thallus increases the ability of accumulating suspended iron and lead from ambient waters. The paper presents the results obtained from several localities in the Sea of Japan. *Scytosiphon* has an advantage over other indicator species used in the monitoring of sea heavy-metal contamination due to its virtually "cosmopolitan" distribution.



subnormal zone where the concentration of pollutants is below a critical level is a typical feature of variously disturbed marine environments.

PCBS IN SCALLOPS AND SEDIMENTS FROM NORTH GREENLAND. - 2403 1471654

Kjoelholt, J.

MAR. POLLUT. BULL., vol. 17, no. 9, pp. 432-434 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2403 COMPANY RELATED- Cent. Terr. Ecol., Natl. Agency Environ. Prot., Gyden 2, DK-2860 Seborg, Denmark  
NDN- 024-0011-1661-3

The purpose of this study is to investigate the influence of the Thule Air Base as a suspect source of PCB pollution using bivalves as monitoring organisms. The air base is situated at Wolstenholme Fjord in Northwest Greenland. Scallops (*Chlamys islandicus*) were collected at points near the base as well as at a remote reference station. Furthermore, sediment samples from the vicinity of the base were used for detecting temporal trends in PCB contamination of the fjord.

MONITORING IN THE MARINE ENVIRONMENT. PART 1. - 2403 1474793

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 2 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine Environment  
CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE ISS- 2403  
COMPANY RELATED- Dep. Environ. Biol., State Univ. Leiden, P.O. Box 9516, 2300 RA Leiden, Netherlands  
NDN- 024-0011-1006-4

The monitoring programs dealt with in this article should enable one to detect and forecast changes in the most important biotic aspects of our environment and - by continuous monitoring - to control whether the use of policy instruments has been effective or not in averting or diminishing unwanted changes ('problems'). Two options of decision makers with respect to monitoring results are shown (either to disregard unwanted changes as a problem or to accept these changes as a problem and to do something about them). To contribute to an effective and efficient environmental policy monitoring results therefore have to be 'important' and reliable enough to react upon. The question is raised which biotic aspects in our environment are (or have to be considered as important (because of their own value, as indicator and/or as biotic 'conditions') and how reliable monitoring results can (have to) be obtained.

MONITORING IN THE MARINE ENVIRONMENT. PART 1. - 2403 1474833

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 2 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine Environment  
CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE ISS- 2403  
COMPANY RELATED- DGW-Rijkswaterstaat, Hereweg 99a, 9721 AA Groningen, Netherlands  
NDN- 024-0011-1004-0

Cyclic organochlorines are highly hydrophobic chemicals which usually possess a high persistence to microbial breakdown. These behavioural aspects determine the suitability of each environmental compartment for monitoring purposes, which is discussed. It is concluded that monitoring of (cyclic) organochlorines should only be executed for compounds about which solid information is available on their environmental behaviour in abiotic and biotic environmental compartments. Under these conditions benthic invertebrates which use glycogen as their main energy-depot, appear to be the most suitable tool for environmental monitoring of lipophilic compounds. Concentrations should be expressed on the basis of (total) extractable lipids.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1474856

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 3 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine Environment  
CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE ISS- 2403  
NDN- 024-0011-1003-9

Nine articles from the conference are published.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1474866

Kramer, C.J.M. Hekstra, G.P. (eds.)  
ENVIRON. MONIT. ASSESS., vol. 7, no. 3 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine  
Environment CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE  
ISS- 2403 COMPANY RELATED- TNO, P.O. Box 217, 2600 AE Delft, Netherlands  
NDN- 024-0011-1002-7

After discussing the usefulness of mussels (e.g. *Mytilus edulis*) for investigating contamination in the marine environment, four cases are presented: A survey of Cu bioavailability in and around the Eastern Scheldt during one winter (1974-1975); A surveillance with a six years interval (1974; 1980) of the bioavailability of Zn along the Dutch North Sea coast. A monitoring programme over the period 1972-1980 showing the decrease in bioavailable Hg in the water column of the Ems-Dollard estuary after decreased emissions at Delfzijl. Retrospective monitoring of two PCB's as a background for the effectiveness of legal restrictions to PCB use. These four cases are considered a first step in understanding the effects of pollutants in marine ecosystem. In depth physiological, histological and biochemical studies could lay the basis for improved routine biological effect monitoring.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1474888

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 3 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine  
Environment CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE  
ISS- 2403 COMPANY RELATED- Lab. Appl. Mar. Res., Div. Technol. Soc. TNO, P.O.  
Box 57, 1780 AB Den Helder, Netherlands NDN- 024-0011-1001-5

Examples are presented of different techniques which are in use, or could be used, to monitor the fate and effects of oil pollution in Dutch marine waters by oil spills and chronic contamination by rivers, processing water from the oil industry, etc. A number of techniques are presented to quantify the fate of oil in water, sediments and biota, and some readily available methods to monitor possible effects in the ecosystem. In Dutch coastal waters much effort is being given to airborne detection of oil at the sea surface in order to reduce pollution and to take rapid measures in cases of severe pollution. Oil concentrations in sediments and selected organisms can be monitored as a general quality control measure, and to check the functioning of licensed installation. If concentrations above background levels are found, research on possible effects should be initiated. In this context short term studies on stress-indicators are very useful.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1474906

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 3 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine  
Environment CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE  
ISS- 2403 COMPANY RELATED- Delta Inst. Hydrobiol. Res., Vierstr. 28, 4401 EA  
Yerseke, Netherlands NDN- 024-0011-1000-3

Problems in monitoring trace metals in the soil subsystem are due to variations in the input of these metals, the type of estuarine circulation and the distribution of physical and chemical conditions in the salt-marsh deposits. The degree of metal enrichment and the spectrum of chemical speciation of the metals by means of a sequential extraction procedure is shortly discussed. Problems in monitoring trace metals in salt-marsh plants are discussed with respect to the bioavailability of these metals from soil and inundation water as sources of contamination, the allocation and seasonal variation in metal accumulations, and the role of adhesive particulate matter carried on the shoots by the floods. *Aster tripolium* seems to be a good species for biomonitoring trace metals in the vegetational component of the salt-marsh ecosystem.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1474945

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 3 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine  
Environment CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE  
ISS- 2403 COMPANY RELATED- Res. Inst. Nat. Manage., Texel, Netherlands  
NDN- 024-0011-0999-2

feather material has been investigated as a suitable indicating tissue for heavy metal pollution. At least three different routes are described through which trace

metal content in the feathers can increase: internal deposition during growth, contamination by the bird's secretion and outside contamination. As mercury is only deposited during feather growth, the feather burden reflects the internal contamination of the bird. Internal deposition of zinc appears to be well regulated in the shaft but concentrations differ widely in the vanes. No external contamination of the vanes could be demonstrated, so these levels reflect contamination from inside. Selenium and lead contamination can be deposited by the birds secretion. When the time elapsed after feather formation is accounted for, the feather can give indirectly an indication of the birds exposure to these elements.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1475000

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 3. LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine  
Environment CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE  
ISS- 2403 COMPANY RELATED- Netherlands Inst. Sea Res., P.O. Box 59, 1790 AB  
Den Burg, Texel, Netherlands NDN- 024-0011-0996-7

Haemoglobin in *Arenicola* has a high oxygen affinity, with a half saturation oxygen pressure of about 180 Pa at pH 7.4 and 15 degree C. The oxygen affinity decreases with increasing copper concentration in the blood to about 300 Pa at pH 7.4, 15 degree C. at a copper concentration of 35  $\mu\text{g/ml}$  super(-). Copper exerts only a slight influence on the subunit cooperativity in oxygen binding. The oxygen affinity subunit cooperativity and the Bohr effect are pH dependent. Copper affects the functioning of the blood by inhibiting oxygen binding to the haemoglobin in the respiratory area and oxygen delivery in the tissues.

MONITORING IN THE MARINE ENVIRONMENT. PART 2. - 2403 1475018

Kramer, C.J.M. Hekstra, G.P. (eds.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 3. LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- Workshop on Monitoring in the Marine  
Environment CONF.PLACE- Texel (Netherlands) CONF.DATE- 4-6 Jun 1984 TAPE  
ISS- 2403 COMPANY RELATED- EON-NIOZ, Postbox 59, Den Burg, Netherlands  
NDN- 024-0011-0995-5

NO-ABSTRACT

BIOINDICATORS OF MARINE POLLUTION. 1974-AUGUST 1986 (CITATIONS FROM OCEANIC ABSTRACTS). - 2402 1444611

PUBLISHER- NTIS PUB. PLACE- SPRINGFIELD, VA (USA) 112 pp LANGUAGE(S)- ENGLISH  
PUBL. DATE- 1986. PUBLICATION CLASS- REPORT NOTES- NTIS Order No.:  
PB86-873916/GAR. TAPE ISS- 2402 COMPANY RELATED- National Technical  
Information Serv., Springfield, VA (USA) NDN- 024-0011-0041-1

This bibliography contains citations concerning the utilization of marine plants and animals as indicators of organic and inorganic pollutant distribution. Topics include descriptions of specific species and assemblages, regional and local monitoring studies, and analyses of the soft and hard parts of marine animals. Studies of algae bivalves, corals, crustaceans, bacterial counts, and seagrasses in estuaries and benthic areas are included. (This updated bibliography contains 256 citations, 76 of which are new entries to the previous editions.) (Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.).

TIN CONTAMINATION IN ARCACHON BAY: EFFECTS ON OYSTER SHELL ANOMALIES. - 2402 1445821

Alzieu, C. Sanjuan, J. Deltreil, J.P. Borel, M.

MAR. POLLUT. BULL., vol. 17, no. 11, pp. 494-498 LANGUAGE(S)- ENGLISH PUBL.  
DATE- 1986. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2402 COMPANY  
RELATED- IFREMER Nantes, B.P. 1049, 44037 Nantes Cedex 01, France NDN-  
024-0011-0040-0

Total tin and organotin levels in both sea water and in oysters (*Crassostera gigas*) from Arcachon Bay, and the frequency of shell anomalies have been monitored since the ban, in January 1982, of organotin compounds in antifouling paints. The results show that at the end of the survey period in November 1985, tin levels in areas of organotin input were 5 to 10 times lower than those found in 1982. The decrease in contamination of cultivated oysters has been particularly obvious since August 1984, when organotin concentrations found in oyster samples were less than 0.2  $\mu\text{g/kg}$  super(-). The decrease in the incidence and extent of anomalies in calcification mechanisms in oysters (chambers) was particularly notable during this period and seemed to be correlated with the decrease in tin contamination of the waters of Arcachon Bay.

Australia, in February 1984, to test the assumption that they are "integrators" of cadmium pollution. Groups of mussels were subjected to the same average dose of cadmium (21  $\mu$ g/l super(-1)), administered according to different dosing regimes. Results suggest that, at least for cadmium, the assumption that mussels are "integrators" of pollution should be treated with caution. They also have implications with regard to the quantitative biological monitoring of pollution. For example, even in a carefully controlled monitoring program, using mussels of standard size and condition, significant differences in cadmium content between mussels need not indicate exposure to different levels of contamination. Rather, these differences could reflect differences in the regime by which the contamination was received.

THE VIVIPAROUS BLENNY AS AN INDICATOR OF ENVIRONMENTAL EFFECTS OF HARMFUL SUBSTANCES. - 2401 1396295

Jacobsson, A. Neuman, E. Thoreson, G.

AMBIO., vol. 15, no. 4, pp. 236-238 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 2401 COMPANY RELATED- Natl.  
Swedish Environ. Prot. Board, Environ. Qual. Lab., Mar. Sect., Box 584, S-740 71  
Oeregrund, Sweden NDN- 024-0010-8732-7

The viviparous blenny (*Zoarces viviparus*) seems to have properties necessary for indicating environmental effects of harmful substances. It has two main advantages over most other marine fishes: it is stationary during its life-span and the hatched fry live within the mother for several months. It was established that pregnant females are suitable for laboratory experiments and that exposure to a pulp mill effluent at concentrations which did not affect the survival of the mothers caused mortality and reduced growth of fry.

INTEGRATED GLOBAL OCEAN MONITORING. - 2401 1395685

Izrael, Yu.A. (ed.)

ENVIRON. MONIT. ASSESS., vol. 7, no. 1 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF.NAME- 1. International Symposium on Integrated Global  
Ocean Monitoring CONF.PLACE- Tallin (USSR) CONF.DATE- 2-10 Oct 1983 TAPE  
ISS- 2401 COMPANY RELATED- Scripps Inst. Oceanogr., La Jolla, CA 92093, USA  
NDN- 024-0010-8429-6

The use of bivalves as sentinel organisms for collectives of marine pollutants is evaluated with data from the U.S. Mussel Watch, 1976-1978. The utilization of soft parts and of the shells are compared for metals and plutonium. Finally, the need for a global mussel watch, emphasizing the analyses of chlorinated hydrocarbon biocides in the tropics and southern hemisphere, is presented.

OCEANS '86 CONFERENCE RECORD: SCIENCE - ENGINEERING - ADVENTURE. VOL. 3. MONITORING STRATEGIES SYMPOSIUM. - 2401 1418681

OCEANS '86., PUBLISHER- IEEE PUBLISHING SERV.PUB.PLACE- NEW YORK, NY (USA) pp.  
751-1061 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986. PUBLICATION CLASS- BOOK  
CONF.NAME- National Symposium on Monitoring Strategies (at) Oceans '86  
"Science-Engineering-Adventure"CONF.PLACE- Washington, DC (USA) CONF.DATE- 23-25 Se  
1986 OTHER NUMB.- IEEE-86CH2863-0 TAPE ISS- 2401 COMPANY RELATED- Marin  
Technology Soc., Washington, DC (USA); IEEE, New York, NY (USA) NDN-  
024-0010-8152-0

The papers published in this volume are the proceedings of the National Symposium on Monitoring Strategies held at the Oceans '86 Conference. The focus for this years symposium was on comparing national versus regional monitoring strategies, the development of new monitoring techniques and strategies, the use of indicators of environmental degradation, and improved methods for making existing monitoring data useful in the regulatory, policy and decision-making process. This symposium was not designed as a forum to present the results of current monitoring studies, but rather to address the questions of "what" was monitored and "why" and "where do we go in the future". These papers are necessarily succinct summaries of ongoing studies, and the readers are encouraged to contact the authors for additional information. A directory of contributors has been published in the proceedings. The papers published in these proceedings have not been peer reviewed or edited.

PERSPECTIVES FOR STUDIES OF POLLUTION IN CETACEANS. - 0686 1199469

Reijnders, P.J.H.  
MAR. POLLUT. BULL., vol. 17, no. 2, pp. 58-59 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0686 COMPANY RELATED-  
Res. Inst. Nat. Manage., Dep. Estuar. Ecol., PO Box 59, 1790 AB Den Burg, Netherland  
NDN- 024-0010-2649-1

The complications inherent to the interpretation of analytical results of pollutant levels in cetaceans are discussed. It is shown that those have consequences for the understanding of the processes of contamination and the effects at individual, population or ecosystem level. Some thoughts are developed on criteria and restrictions of cetacean pollutant studies for monitoring marine pollution and evaluating the effects of pollutants on cetaceans in terms of changes in physiological processes.

BIOLOGY OF MEIOFAUNA. - 0686 1192162

Heip, C. (ed.)

HYDROBIOLOGIA., vol. 118, no. 1 LANGUAGE(S)- ENGLISH PUBL. DATE- 1984.  
PUBLICATION CLASS- BOOK CONF. NAME- 5. International Meiofauna Conference  
CONF. PLACE- Gent (Belgium) CONF. DATE- 16-20 Aug 1983 TAPE ISS- 0686 COMPAN  
RELATED- Lab. Biol. Mar., Fac. Sci. et Tech. Saint-Jerome, Rue Henri Poincare 13397,  
Marseille Cedex 13, France NDN- 024-0010-2059-2

Characteristic seasonal cycles have been found for interstitial opisthobranchs living in various sandy biotopes of different exposure in the Gulf of Marseilles (Mediterranean coast of France). Abnormal progressive degradation of the environment caused by increased pollution and a striking decrease of regional wind frequency throughout a seven-year period changed these cycles. The sensitivity of these interstitial opisthobranchs to the degradation of their habitat makes them valuable biological indicators which could be used to identify clean sublittoral sandy bottom which need to be protected.

8TH INTERNATIONAL SYMPOSIUM ON THE CHEMISTRY OF THE MEDITERRANEAN, PRIMOSTEN, YUGOSLAVIA, MAY, 1984. - 0686 1230851

Branica, M. (ed.)

MAR. CHEM., vol. 18, no. 2-4 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- BOOK CONF. NAME- 8. International Symposium on the Chemistry of the Mediterranean  
CONF. PLACE- Primosten (Yugoslavia) CONF. DATE- May 1984  
TAPE ISS- 0686 COMPANY RELATED- Lab. Phys. et Chim. Mar., B.P. 8 La Darse, 06230 Villefranche sur Mer, France NDN- 024-0010-1954-1

Results of trace metal analyses performed on two species of Euphausiacea, *Meganyctiphanes norvegica* and *Stylocheiron longicornis*, and one species of Decapoda *Sergestes arcticus*, collected off the east coast of Corsica, are reported. Analyses were carried out by atomic absorption spectrophotometry and by differential pulse anodic stripping voltammetry. *S. arcticus* contained lower concentrations of phosphorus (which was also analysed as a biological indicator), cadmium (0.33  $\mu\text{g g}^{-1}$ ), copper (17.7  $\mu\text{g g}^{-1}$ ), lead (2.13  $\mu\text{g g}^{-1}$ ) and zinc (51  $\mu\text{g g}^{-1}$ ) than the two Euphausiacea (0.50  $\mu\text{g Cd g}^{-1}$ , 25.4  $\mu\text{g Cu g}^{-1}$ , 4.03  $\mu\text{g Pb g}^{-1}$  and 59  $\mu\text{g Zn g}^{-1}$ ). Moreover, manganese concentrations were low in all the samples. When the results presented here are compared with previous results on phytoplankton and mesozooplankton, there appears to be no trend of trace metal enrichment from phytoplankton to the Decapoda.

USE OF BIO-INDICATORS IN MONITORING CONSERVATIVE CONTAMINANTS: PROGRAMME DESIGN IMPERATIVES. - 02 2 1153312

Phillips, D.J.H. Segar, D.A.

MAR. POLLUT. BULL., vol. 17, no. 1, pp. 10-17 LANGUAGE(S)- ENGLISH PUBL. DATE- 1986.  
PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 02 23 COMPANY RELATED-  
Hong Kong Environ. Prot. Agency, Hong Kong NDN- 024-0010-1279-0

The general acceptance of the advantages inherent in the use of bio-indicators to monitor aquatic pollution has given rise to the establishment of national and international programmes employing such species in many parts of the world over the last decade. The authors review the overall design of such programmes. Some deficiencies in the studies to date are noted, and suggestions for improvement in future monitoring programmes are presented.

EFFECTS OF A VARIETY OF IMPACTS ON SEAGRASS RESTORATION IN JAMAICA. - 0123 1075288

Thorhaug, A. Miller, B. Lupp, B. Bookers, F.  
MAR. POLLUT. BULL., vol. 9, no. 9, pp. 355-360 LANGUAGE(S)- ENGLISH PUBL.  
DATE- 1985. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0123 COMPANY  
RELATED- Dep. Biol. Sci., Florida Int. Univ., Miami, FL 33199, USA NDN-  
024-0009-9503-0

For the first time seagrass rehabilitation was attempted in a tropical nation, Jamaica. Repair to a variety of developmental impact types were attempted with test plots: dredge and fill, bauxite and oil spills, channelization, urban run-off, urban sewage, river bulkheading, jetty construction and artificial beach, industrial lagoons, saline lagoons, thermal effluents, and cement tailings. Three species were routinely planted (*Thalassia testudinum*, *Halodule wrightii*, *Syringodium filiforme*) plus *Ruppia maritima* in saline lagoons, each by two planting techniques. Types of damage which were successfully attempted to be restored for the first time were from heated wastes, bauxite spills, jettied river mouths, small scale oil spills, and diluted urban wastes. Types of pollution damage previously repaired in subtropics and temperate zones, which could be successfully repaired in the tropics also were dredge and fill and urban run-off. Erosion seagrass restoration repair was partially successful at some sites. Attempts to repair high salinity lagoons and cement tailings were unsuccessful. Functional species were found which could tolerate ongoing pollutant loads in some cases.

COMPARISON OF INDICATORS OF POLLUTION IN THE MEDITERRANEAN. - 0123 1082771

Satsmadjis, J.

MAR. POLLUT. BULL., vol. 16, no. 10, pp. 395-400 LANGUAGE(S)- ENGLISH PUBL.  
DATE- 1985. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0123 COMPANY  
RELATED- Natl. Cent. Mar. Res., GR-16604 Hellinikon, Greece NDN- 024-0009-9495-5

An attempt is made to evaluate different ways of estimating the extent of pollution in coastal areas, using data relating to Greece. The investigation reveals basic faults in the procedures. The concentrations of dissolved inorganic nutrients do not necessarily reflect the amounts of domestic wastes discharged into the location. The levels in the sea or marine organisms of impurities from industrial effluents may alter greatly in the same region from one date or spot to another. The metal content of unsullied sediments depends on its granulometric composition. Phytoplankton density varies according to, not only the availability of nutrients, but also the season and the rate of grazing. On the contrary, macrozoobenthos, being much less influenced by transient changes in the environment, affords a reliable picture of its average state.

SEASONAL VARIATION OF HEAVY METALS IN SEaweEDS FROM CONCEICAO DE JACAREI (R.J.), BRAZIL - 0123 1096005

Drude de Lacerda, L. Laneuville Teixeira, V. Davee Guimaraes, J.R.

BOT. MAR., vol. 28, no. 8, pp. 339-343 LANGUAGE(S)- ENGLISH PUBL. DATE- 1985.  
PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0123 COMPANY RELATED- Programa  
Post-Grad. em Geoquim., Inst. Quim., Univ. Fed. Fluminense, Morro do Valonguinho s/n  
super(0), Niteroi, 24.210, R.J., Brazil NDN- 024-0009-9487-6

Variations in the concentrations of the heavy metals Cu, Cr, Cd, Zn, Co and Pb, were studied in five benthic algae from the creek of Conceicao de Jacarei, Ilha Grande Bay, Rio de Janeiro, Brazil, from September 1981 to January 1983. Metal concentrations were similar to the ones reported for other non-contaminated areas, and as much as two orders of magnitude lower than those from metal polluted areas. The relative seasonal variations differed by as much as one order of magnitude between the minimum (winter) and the maximum (summer) concentrations, probably related to the increase in terrestrial inputs during the summer.

DISTRIBUTION OF SPECIES ALONG POLLUTION-INDUCED DIVERSITY GRADIENTS IN BENTHIC COMMUNITIES IN NORWEGIAN FJORDS. - 0123 1103229

Rygg, B.

MAR. POLLUT. BULL., vol. 16, no. 12, pp. 469-474 LANGUAGE(S)- ENGLISH PUBL.  
DATE- 1985. PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0123 COMPANY  
RELATED- Norwegian Inst. Water Res., P.O. Box 333, Blindern, N-0314 Oslo 3, Norway  
NDN- 024-0009-9477-3

The main aim of the present study was to detect species indicative of pollution impact on communities of soft-bottom fauna in Norwegian fjords. The work was based on the assumptions that increased pollutant load and lowered diversity are correlated and that different species respond differently to pollution. Low diversity was caused by high dominance of a limited number of opportunistic species capable of reaching

and fallout. The authors measured concentrations of the naturally occurring radionuclides  $^{7}\text{Be}$ ,  $^{40}\text{K}$  and the U and Th and have detected low levels of  $^{144}\text{Ce}$  and  $^{95}\text{Nb}$  ranging as far south as 68 degrees. There is a definite association between the radionuclide content of plankton and air filters, suggesting that aerosol resuspension of marine radioactivity may be occurring. Biological identification of the plankton suggests a possible correlation between radionuclide concentration and foraminifera content of the samples. (ERA citation 09:044576).

POLLUTION MONITORING USING THE NEMATODE/COPEPOD RATIO. A PRACTICAL APPLICATION. - 0322 0910887

Shiells, G.M. Anderson, K.J.

MAR. POLLUT. BULL., vol. 16, no. 2, pp. 62-68 LANGUAGE(S)- ENGLISH PUBL. DATE- 1985.  
SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE  
ISS- 0322 COMPANY RELATED- Dep. Biol. Sci., Napier Coll., Commerce and Technol.,  
Colinton Rd., Edinburgh EH10 5DT, UK NDN- 024-0009-2531-3

The practical application of the nematode/copepod ratio in a pollution monitoring study in the Firth of Forth was investigated. Ratios from polluted sites were much higher than from a clean site, but there is considerable evidence which casts doubt on the credibility of the ratio as a tool to detect organic pollution. Nematodes and copepods exhibited differing degrees of contagion. Seasonal patterns of variation of the ratio were shown to vary geographically and at some sites the seasonal range was great. Along sewage pollution gradients in time and space the ratio was shown to vary in an inconsistent manner. A possible improvement to the ratio whereby only interstitial forms are included is suggested.

POLLUTION BIOMONITORING PROGRAMS AND THE GENETIC STRUCTURE OF INDICATOR SPECIES. - 0322 0924982

Gyllensten, U. Ryman, N.

AMBIO., vol. 14, no. 1, pp. 29-31 LANGUAGE(S)- ENGLISH PUBL. DATE- 1985.  
SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0322  
COMPANY RELATED- Dep. Genet., Univ. Stockholm, S-106 91 Stockholm, Sweden NDN-  
024-0009-2522-2

Allozyme variability was studied in the fourhorn sculpin (*Myoxocephalus quadricornis*), a proposed indicator species for monitoring the effects of pollutants in the Baltic. There were significant genetic differences, both between samples from different localities and between samples from the same locality taken in different years. The temporal variations in allele frequency coincide with significant changes in the incidence of vertebral anomalies. The generally low degree of genetic differentiation throughout the range makes this species a good candidate for monitoring programs, but the temporal changes in the genetic structure of local populations should be better understood before such programs are implemented.

BIVALVE MOLLUSCS (*MYTILUS EDULIS* AND *MACOMA BALTICA*) FOR MONITORING DIFFUSE OIL POLLUTION IN A NORTHERN BALTIC ARCHIPELAGO. - 0322 0925033

Broman, D. Ganning, B.

AMBIO., vol. 14, no. 1, pp. 23-28 LANGUAGE(S)- ENGLISH PUBL. DATE- 1985.  
SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE ISS- 0322  
COMPANY RELATED- Dep. Zool., Univ. Stockholm, S-10691 Stockholm, Sweden NDN-  
024-0009-2520-9

The distribution of petroleum hydrocarbons (PHC) in the water of the Stockholm archipelago (northern Baltic proper) was studied using the bivalve molluscs *Mytilus edulis* L. and *Macoma baltica* L. as indicator organisms. A concentration gradient of PHC was found; concentrations were lowest in the outer archipelago and increased inwards. This gradient is due primarily to low level, diffuse, continuous discharges mainly within the inner zone. The background PHC, from discharges from ships at sea, distant industrial effluents, atmospheric fallout etc. seem to be less important. Sites influenced by local sources exhibited higher levels of PHC.

STUDY OF THE MACROBENTHIC POPULATIONS IN POLLUTED AREAS OF MARSELLA BAY (FRANCE). -  
0721519

Solis-Weiss, V.

AN. INST. CIENC. MAR LIMNOL. UNIV. NAC. AUTON. MEX., vol. 9, no. 1, pp. 1-18  
LANGUAGE(S)- SPANISH PUBL. DATE- 1982. SUMMARY LANGUAGE(S)- ENGLISH SPANISH  
PUBLICATION CLASS- JOURNAL ARTICLE ISSN- ISSN 0185-3287 ORIG. TITLE- Estudio de  
las poblaciones macrobenticas en areas contaminadas de la bahia de Marsella (Francia)  
TAPE NUMBER- 0521 COMPANY RELATED- Univ. Nac. Auton. Mexico, Inst. Cienc. Mar  
Limnol., Mexico, D.F., Mexico NDN- 024-0008-5666-2

An ecological analysis of macrobenthic species collected in the sedimentation basin from the Marseille area was done. Some species were studied in order to find out if their abundance, their gradual appearance or gradual disappearance could help to understand the fast evolution that those basins are undergoing due to the increasing pollution in that area. Six species were defined as "Biological indicators of organic matter from human origin". These are: *Myrtea spinifera*, *Corbula gibba*, *Thyasira flexuosa*, *Nematonereis unicornis*, *Lumbriconereis latreilli* and *Chaetozone setosa*. These indicators point to initiating condition of pollution.

THE SHELL OF MYTILUS AS AN INDICATOR OF ZONAL VARIATIONS OF WATER QUALITY WITHIN AN ESTUARY. - 0723558

Al-Dabbas, M.A.M. Hubbard, F.H. McManus, J.

ESTUAR. COAST. SHELF SCI., vol. 18, no. 3, pp. 263-270 LANGUAGE(S)- ENGLISH  
PUBL. DATE- 1984. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL  
ARTICLE TAPE NUMBER- 0521 COMPANY RELATED- Dep. Geol., The University, Dundee  
DD1 4HN, UK NDN- 024-0008-5660-1

Variations in the mineralogy and chemistry of the shells of the filter-feeding organism *Mytilus edulis* have allowed discrimination of subenvironments of growth within the Tay Estuary. Aragonite proportions higher than those predictable for the temperate, tidal, growth conditions are associated with stretches of the estuary affected by organic pollution. Accumulation and concentration of copper (Cu) in the organic periostracum suggest that *Mytilus* shell may also prove useful as a monitor of metallic element pollution. The relatively fragile nature of the polylayer shell of *Mytilus* and the layer specific distribution of components require the use of either complete, undamaged specimens or population groups to discriminate significant variations.

MERCURY POLLUTION IN THE WATERS AROUND HARBOOERE TANGE AND LIMFJORD, DENMARK. - 0729709

Riisgaard, H.U.

MAR. POLLUT. BULL., vol. 15, no. 4, pp. 129-133 LANGUAGE(S)- ENGLISH PUBL.  
DATE- 1984. PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0521 COMPANY  
RELATED- Odense Univ., Campusvej 55, DK-5230 Odense M, Denmark NDN-  
024-0008-5654-6

High concentrations of mercury have been measured in mussels (*Mytilus edulis*) collected in two "hot spot" areas: (1) near a closed-down chemical factory on the west coast of the Limfjord, and (2) on groynes in the immediate vicinity of a chemical deposit in the dunes on the Danish west coast. By collecting comparable samples of mussels from chains of buoys, the mercury pollution in the western Limfjord could be traced 50-100 km into the central and innermost parts of the Limfjord as a gradual decreasing mercury concentration gradient. The investigations have demonstrated the applicability of *M. edulis* as a monitoring organism.

A MODEL FOR THE MOVEMENT OF SEWAGE EFFLUENT, ACCORDING TO SEA STATE, IN A BAY SITUATION - 0724029

Thirkell, D. Keatch, R.

WATER RES., vol. 18, no. 7, pp. 917-920 LANGUAGE(S)- ENGLISH PUBL. DATE- 1984.  
SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER-  
0521 COMPANY RELATED- Dep. Biochem. and Microbiol., Univ. St. Andrews, Irvine  
Build., North St., St. Andrews, Fife, UK NDN- 024-0008-5626-1

A model system to describe the movement of sewage effluent according to sea state within a bay situation is described. The postulates were tested following dye movement under simulated conditions on a scale model of St. Andrews Bay down to the 2 fathom level and by following float movements in the bay under different sea state conditions. Bacterial counts for both coliforms and Group D streptococci further substantiate the postulates and show that the lowest counts are obtained alongshore under calm conditions and the highest counts under storm conditions. This is noteworthy since maximum recreational use is made of the water under calm sea conditions.



biological data from the affected area should be attempted prior to the selection of a target organism.

ECOLOGICAL STUDY OF THE AMOCO CADIZ OIL SPILL: REPORT OF THE NOAA-CNEXO JOINT SCIENTIFIC COMMISSION. - 0707460

Gundlach, E.R. Marchand, M. (eds.)

pp. 229-243 LANGUAGE(S)- FRENCH PUBL. DATE- 1982. SUMMARY LANGUAGE(S)- ENGLISH FRENCH PUBLICATION CLASS- BOOK CONF.NAME- NOAA/CNEXO Joint Scientific Commission Workshops: Physical, Chemical, and Microbiological CONF.PLACE- Charleston, SC (USA), Brest (France) CONF.DATE- 17 Sep 1981, 28 Oct 1981 ORIG.TITLE- Etude experimentale d'une pollution par hydrocarbures dans un microecosysteme sedimentaire 1. Effect de la contamination du sediment sur la meiofaune TAPE NUMBER- 0421 COMPANY RELATED- Stn. Biol., Roscoff 29211, France NDN- 024-0008-3205-0

Changes in the population characteristics of meiofauna (nematodes and copepods) were chosen to follow the effects of oil pollution. Irrespective of the intensity of pollution, the density of nematodes in the experimental tanks increased at a significantly higher rate than in the control tank during the first two months after pollution and then decreased slowly. The density of harpacticoid copepods was negatively related to the intensity of oil pollution. It appears that the nematodes/copepods ratio would be an useful indicator of the degree of oil pollution. After 3 months of experimental duration, the faunal composition of the nematodes in the highly polluted tank was drastically modified. This change is evident from a sharp fall in biomass and species diversity; small opportunistic nematode species, known for their association with eutrophicated environment, became dominant. Changes in the meiofauna population parameters in the slightly polluted experimental tank did not show any significant variation from those in the control tank.

DISTRIBUTION, ABUNDANCE AND TRACE METAL CONTENT OF MOLLUSCS OF THE POTOMAC ESTUARY AND RIVER, MARYLAND. - 0711394

Cory, R.L. Dresler, P.V. Martin, A. Harrison, G.

ESTUARIES., vol. 4, no. 3, pp. 269-270 LANGUAGE(S)- ENGLISH PUBL. DATE- 1981. PUBLICATION CLASS- JOURNAL ARTICLE CONF.NAME- 6. Biennial International Estuarine Research Conference CONF.PLACE- Gleneden Beach, OR (USA) CONF.DATE- 1-5 Nov 1981 NOTES- Summary only. TAPE NUMBER- 0421 COMPANY RELATED- Chesapeake Ba Cent. Environ. Stud., Edgewater, MD, USA NDN- 024-0008-3069-7

As part of a comprehensive U.S. Geological Survey water quality assessment of the Potomac Estuary, Maryland, the distribution, abundance and trace metal content of the molluscan fauna of the upper estuary and lower Potomac River has been investigated. In addition to mainstream sampling, collections were taken from the effluents of a tidal power plant, a riverine power plant and a tidal sewage plant. Five species of Urinonids (freshwater mussels), several species of snails and sphaerid clams and one species of Corbiculidae (Asian clam) were collected and together with associated sediments analyzed for their metal content of cadmium, chromium, copper, iron, manganese, lead and zinc. The Asian clam, *Corbicula fluminea*, a recent invader of the Potomac, a species both abundant and ubiquitous throughout the study area, shows promise as a bioindicator of trace metals.

COMPARATIVE EVALUATION OF POLLUTION BY HEAVY METALS OF INSHORE COASTAL WATERS OF THE ATLANTIC AND WEST PACIFIC BY MINERAL COMPOSITION OF FUCOID ALGAE. - 0628969

Khristorova, N.K. Maslova, L.M.

SOV. J. MAR. BIOL., vol. 9, no. 1, pp. 1-8 LANGUAGE(S)- ENGLISH PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0322 COMPANY RELATED- Lab. Geochem., Pac. Inst. Geogr., Lab. Comp. Biochem., Inst. Mar. Biol., Far East Sci. Cent., Acad. Sci. USSR, Vladivostok 690032 USSR NDN- 024-0008-2404-1

An evaluation is made of the state of pollution of inshore coastal waters of maritime territory based on data on the content of Fe, Mn, Cu, Zn, Pb, and Cd in fucoid algae used as indicators of the pollution of seawater by heavy metals. Zn is shown to be the main element of local pollution of shallow waters. A comparison of the mineral composition of Pacific and Atlantic fucoids made it possible to characterize the local geochemical situation in marine and estuarine waters of different regions of the northern hemisphere with the emphasis on zinc pollution.

SIMCA MULTIVARIATE DATA ANALYSIS OF BLUE MUSSEL COMPONENTS IN ENVIRONMENTAL POLLUTION STUDIES. - 0629167

Kvalheim, O.M. Oeygard, K. Grahl-Nielsen, O.

ANAL. CHIM. ACTA., vol. 150, no. 1, pp. 145-152 LANGUAGE(S)- ENGLISH PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0322 COMPANY RELATED- Dep. Chem., Univ. Bergen, N-5014 Bergen, Norway NDN- 024-0008-2401-6

Blue mussels (*Mytilus edulis*) from one pristine and one polluted location on the Norwegian coast were transferred to an aquarium. After 4 months under controlled unpolluted conditions, samples of muscle tissue and gonad tissue from ten specimens of each of the two classes of mussels were characterized by capillary gas chromatography (g.c.) after methanolysis and silylation. The g.c. patterns of the 50-60 predominant peaks representing naturally occurring components were treated by SIMCA multivariate data analysis implemented to run on a HP-85 desk-top computer. This analysis discriminated clearly between two classes of mussels for both the muscle and gonad tissue. Similarly, the g.c. patterns of the gonad tissue differentiated between male and gonad tissue. Similarly, the g.c. patterns of the gonad tissue differentiated between male and female mussels. Multivariate data treatment of naturally occurring components might thus be an alternative to the Mussel Watch survey which is based on measurements of foreign components in the mussel tissues.

THE USE OF CLAMS AS BIOINDICATOR OF FECAL POLLUTION IN SEAWATER. - 0651494

Jabar Al-Mossawi, M.A. Kadri, M.H. Salem, A.A. Chugh, T.D.

WATER AIR SOIL POLLUT., vol. 20, no. 3, pp. 257-263 LANGUAGE(S)- ENGLISH PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0322 COMPANY RELATED- Environ. Sci. Dep., Kuwait Inst. Sci. Res., P.O. Box 24885, Safat, Kuwait NDN- 024-0008-2384-0

The coastal waters of Kuwait are widely used for bathing during the long summer season. In order to assess the water quality along the beaches, a new approach was developed. It involves the use of clam, *Circenita callipyga*, as a bioindicator for seawater pollution by fecal coliform bacteria (FC), antibiotic resistant fecal coliform (ABR-FC) and *Salmonella* spp. These organisms were detected in clam and water samples and the efficiency of clam in concentrating *Salmonella* was confirmed. The number of FC and ABR-FC in clam and water samples were compared and a higher number was detected in clams than in water. Five isolates of *Salmonella* from clams were also multidrug resistant. The data suggests that clam can be used as a bioindicator of seawater pollution and is preferable to direct testing of water. The resistance to antibiotics in *E. coli* isolated from water and clams collected at the same time and site was of similar pattern and was determined by R-plasmid.

METALS IN THE PACIFIC SARGASSUM ALGAE AS RELATED TO POLLUTION MONITORING. - 0644244

Khristoforova, N.K. Bogdanova, N.N. Tolstova, L.M.

OKEANOLOGIYA., vol. 23, no. 2, pp. 270-275 LANGUAGE(S)- RUSSIAN PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH RUSSIAN PUBLICATION CLASS- JOURNAL ARTICLE ISSN- ISSN 0030-1574 ORIG. TITLE- Metally v sostave tikhookeanskikh sargassovykh vodoroslej v svyazi s problemoj monitoringa zagryazneniya vod TAPE NUMBER- 0322 COMPANY RELATED- Tikhookean. Inst. Geogr. DVNTs AN S.S.S.R., Vladivostok, USSR NDN- 024-0008-2340-1

Concentrations of Fe, Mn, Cu, Zn, Pb and Cd in Sargassum are considered in relation to anthropogenic effects in the habitats. Based on the mineral composition of algae, qualitative characteristics of some Pacific coastal areas are given. Mn accumulation by the algae is shown to depend on the illumination rather than on the geochemical factors, and to be controlled by the regulatory mechanisms.

WATER POLLUTION RESEARCH, PART 2. - 0628911

Jenkins, S.H. (ed.)

WATER SCI. TECHNOL., vol. 13, no. 1 LANGUAGE(S)- ENGLISH PUBL. DATE- 1981. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- BOOK CONF. NAME- 10. International Conference of the IAWPR CONF. PLACE- Toronto, Ont. (Canada) CONF. DATE- 23-27 Jun 1980 TAPE NUMBER- 0322 COMPANY RELATED- Dep. Civ. Eng., Univ. Newcastle upon Tyne, NE1 7RU, Newcastle upon Tyne, UK NDN- 024-0008-1977-0

Comparative investigations are reported on the survival characteristics of faecal streptococci and *E. coli* in sea water. Survival of the two groups was studied in the Bay of Naples in sea water, sediments and in plexiglass container studies. Results of supporting laboratory studies were also presented. The evidence strongly suggested

Derwent River and adjacent coastal waters. Oysters (*Crassostrea gigas*) were found to be suitable for monitoring zinc, cadmium, lead and copper contamination. Mussels were also suitable for monitoring zinc, cadmium and lead, but in this instance were found unsuitable for monitoring copper as the surveys indicate that copper accumulation is suppressed in mussels in a contaminated environment. The rate of accumulation and depuration of metals by oysters and mussels in field trials has been related to the anatomy of the animals and the sequestering of some metals in granulocytes. Uneven metal distribution between gonad and other tissues has been found to cause seasonal variation of heavy metals in oysters.

APPLICATION OF THE MUSSEL WATCH CONCEPT IN STUDIES OF THE DISTRIBUTION OF HYDROCARBONS IN THE COASTAL ZONE OF THE EBRO DELTA. - 0569287

Risebrough, R.W. Lappe, B.W. De Walker, W. Il Simoneit, B.T. Grimalt, J. Albaiges, J. Regueiro, J.A.G.

MAR. POLLUT. BULL., vol. 14, no. 5, pp. 181-187 LANGUAGE(S)- ENGLISH PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0284 COMPANY RELATED- Bodega Mar. Lab., Univ. California, Bodega Bay, CA 94923, USA NDN- 024-0007-8565-5

The Mussel Watch concept was applied in a study of man-induced chemical changes in the Ebro Delta on the Catalonian coast to obtain a preliminary assessment of the distribution of synthetic organic compounds, petroleum and biogenic hydrocarbons in the local coastal zone. Mussels, oysters and clams were selected as the indicator organisms. Levels of petroleum accumulated by mussels were generally high. The relative distributions of the steranes and pentacyclic triterpanes in the mussels were significantly different from those found in petroleum from a local field, indicating that local petroleum was not contributing to the present contamination. The composition of biogenic compounds was variable, probably reflecting differences in the composition of local plankton communities. PCB levels were high in relation to current levels in mussels from US sites, reflecting continuing PCB use in Spain.

MINE-DERIVED METAL POLLUTION IN THE ISLE OF MAN. - 0569309

Southgate, T. Slinn, D.J. Eastham, J.F.

MAR. POLLUT. BULL., vol. 14, no. 4, pp. 137-140 LANGUAGE(S)- ENGLISH PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0284 COMPANY RELATED- Dep. Zool., University Coll., Cork, Eire NDN- 024-0007-8564-3

The sediments of rivers draining areas of past mining activity in the Isle of Man contained greatly enhanced levels of zinc, lead and, to a lesser extent, copper and cadmium. This contamination extended into the estuarine harbors where it was reflected in the metal content of four species of bivalve molluscs. Of the latter, *Mytilus edulis* was the most useful indicator species in that it occurred in all five estuarine harbors but *Scrobicularia plana*, although of more limited distribution, concentrated much higher levels of zinc and lead. Individual variation of metal levels was high in all species of bivalves examined; a negative correlation of dry weight:metal content was demonstrated in many cases, but other factors may also contribute to such variation.

USE OF THE NEMATODE-COPEPOD RATIO AS AN INDEX OF ORGANIC POLLUTION. - 0569332

Amjad, S. Gray, J.S.

MAR. POLLUT. BULL., vol. 14, no. 5, pp. 178-180 LANGUAGE(S)- ENGLISH PUBL. DATE- 1983. SUMMARY LANGUAGE(S)- ENGLISH PUBLICATION CLASS- JOURNAL ARTICLE TAPE NUMBER- 0284 COMPANY RELATED- Inst. Marinbiol., Univ. Oslo, P.B. 1064, Blindern, Oslo 3, Norway NDN- 024-0007-8563-1

Controversy exists on the utility of the nematode-copepod ratio as a method for assessing the effects of pollution on benthic communities. In a test of this ratio along a known gradient of organic enrichment in Oslofjord, the index showed the same trends as a previously undertaken macrofaunal survey. Copepod numbers decreased and nematode numbers increased along the gradient of increasing organic enrichment giving rise to changes in the ratio. Grain-size parameters showed no correlation with the ratio. Copepod numbers, however, showed a significant negative correlation with oxygen concentration 1 m above the sediment. The nematode-copepod ratio is suggested as being an acceptable addition to a suite of techniques for the assessment of organic enrichment effects on benthic communities, but does require special expertise. A decrease in the numbers of meiofaunal taxa along the organic enrichment gradient was found and is similar to the gradient in the nematode-copepod ratio. The fact that all indices show responses in Oslofjord may merely reflect the strong organic enrichment gradient that exists; it should not necessarily be construed that such results will be found everywhere.

24 X 10 SUPER(-9) G ORGANIC DRY WEIGHT/ML) CAN BE MAINTAINED FOR WEEKS. THE SET UP FACILITATES CONTINUOUS CONTROL OF ANIMAL CONDITION BY MEASURING THE CLEARANCE RATE. CIRCUIT DIAGRAMS ARE GIVEN AND RESULTS ARE PRESENTED TO DEMONSTRATE THE PERFORMANCE.

BIOINDICATORS FOR MONITORING RADIOACTIVE POLLUTION OF THE MARINE ENVIRONMENT.  
EXPERIMENTS ON THE FEASIBILITY OF MYTILUS AS A BIOINDICATOR IN ESTUARINE ENVIRONMENTS  
-- WITH SOME COMPARISONS TO FUCUS - 8306638

DAHLGAARD, H.

PUBLISHER- RNL, ROSKILDE (DENMARK) LANGUAGE(S)- ENGLISH PAGES- 134 PP PUBL. DATE- 1981 AVAILABILITY- SUMMARY LANGUAGE - ENGLISH; NTIS ORDER NO.: DE82701055 U.S. SALES ONLY. COMPANY RELATED- RISOE NATIONAL LAB., ROSKILDE (DENMARK) NDN- 024-0007-5664-3

MUSSELS (MYTILUS EDULIS) ARE GLOBALLY USED AS BIOINDICATORS FOR POLLUTION OF COASTS AND ESTUARINE ENVIRONMENTS BY METALS AND RADIONUCLIDES. THE AIM OF THIS WORK HAS BEEN TO IMPROVE THE USE OF M. EDULIS AS A BIOINDICATOR BY GAINING KNOWLEDGE ON ITS ACCUMULATION AND LOSS OF CERTAIN RADIONUCLIDES (EXP 65 ZN, EXP 57 CO, EXP 54 MN, EXP 59 FE AND EXP 134 CS) UNDER DIFFERENT FIELD-COMPARABLE ENVIRONMENTAL CONDITIONS. A LABORATORY SET-UP IN WHICH NATURAL CONCENTRATIONS OF SUSPENDED PHYTOPLANKTON ARE KEPT CONSTANT FOR WEEKS WAS EVOLVED FOR THE ACCUMULATION EXPERIMENTS WITH MUSSELS. ACCUMULATION VIA FOOD INTAKE WAS STUDIED BY COMPARING EXPERIMENTS WITH DIFFERENT CONCENTRATIONS OF CONTAMINATED PHYTOPLANKTON (PHAEODACTYLUM TRICORNUTUM). THIS COMPARISON SHOWED NO EFFECT OF VARYING THE PHYTOPLANKTON CONCENTRATION. DECREASING THE SALINITY AND INCREASING THE TEMPERATURE ELEVATED THE INFLUX (INITIAL RATE OF ACCUMULATION) OF THE RADIONUCLIDES.

HYDROCARBONS, POLYCHORINATED BIPHENYLS, AND DDE IN MUSSELS AND OYSTERS FROM THE U.S. COAST -- 1976-1978 - THE MUSSEL WATCH - 8306640

FARRINGTON, J.W. RISEBROUGH, R.W. PARKER, P.L. DAVIS, A.C. LAPPE, B. DE

PUBLISHER- SIO, LA JOLLA, CA (USA) LANGUAGE(S)- ENGLISH PAGES- 111 PP PUBL. DATE- 1982 AVAILABILITY- SUMMARY LANGUAGE - ENGLISH; NTIS ORDER NO.: PB83-133371; GRANT EPA-R-804215. COMPANY RELATED- SCRIPPS INST. OF OCEANOGRAPHY, LA JOLLA, CA (USA) NDN- 024-0007-5662-0

MYTILUS EDULIS, MYTILUS CALIFORNIANUS, CRASSOSTREA VIRGINICA AND OSTREA EQUESTRIS WERE SAMPLED AT 90 TO 100 STATIONS AROUND THE UNITED STATES COASTLINE DURING EACH OF THREE YEARS -- 1976, 1977, 1978. DATA FOR CONCENTRATIONS OF PCB, DDE, TOTAL HYDROCARBONS, GAS CHROMATOGRAPHICALLY UNRESOLVED COMPLEX MIXTURE HYDROCARBONS, AND SELECTED AROMATIC HYDROCARBONS ARE PRESENTED FOR MOST OF THE SAMPLES.

AQUATIC ANIMALS AS INDICATORS OF ENVIRONMENTAL EXPOSURES - 8306642

COUCH, J.A.

PUBLISHER- EPA/GBERL, GULF BREEZE, FL (USA) LANGUAGE(S)- ENGLISH PAGES- 5 PP PUBL. DATE- 1982 AVAILABILITY- SUMMARY LANGUAGE - ENGLISH; NTIS ORDER NO.: PB83-131128. COMPANY RELATED- GULF BREEZE ENVIRONMENTAL RESEARCH LAB., FL (USA) NDN- 024-0007-5660-6

AQUATIC ANIMALS ARE USEFUL AS INDICATORS OF MANY KINDS OF POLLUTANTS IN THE AQUATIC ENVIRONMENT. THE PRESENCE OF POLLUTANTS IN THE GENERAL ENVIRONMENTS OF AIR, LAND AND WATER IS REFLECTED IN THEIR ACCUMULATIONS IN AND EFFECTS ON AQUATIC ORGANISMS BECAUSE THE AQUATIC PORTION OF THE BIOSPHERE IS OFTEN THE "SINK" FOR HUMAN-GENERATED POLLUTANTS. AQUATIC ANIMALS LEND THEMSELVES PARTICULARLY WELL TO THE STUDY OF SPECIAL PHENOMENA, SUCH AS CARCINOGENESIS AND TERATOGENESIS. THE USE OF AQUATIC ANIMALS AND SYSTEMS ADDS AN IMPORTANT DIMENSION TO RESEARCH ON THOSE POLLUTANTS THAT MAY AFFECT WILDLIFE AND HUMAN HEALTH.

STORM PETRELS AS INDICATORS OF ENVIRONMENTAL CONDITIONS - 8306660

BOERSMA, P.D.

ENVIRONMENTAL ASSESSMENT OF THE ALASKAN CONTINENTAL SHELF. ANNUAL REPORTS OF PRINCIPAL INVESTIGATORS FOR THE YEAR ENDING MARCH 1981. VOLUME 1: RECEPTORS -- BIRDS, FISH, MARINE MAMMALS, PLANKTON, LITTORAL., PP. 39-70 PUBLISHER- NOAA/OMPA, BOULDER, CO (USA) LANGUAGE(S)- ENGLISH PUBL. DATE- 1981 AVAILABILITY- NOAA/OMPA PRINC. INVEST. REP. ENVIRON. ASSESS. ALASKAN CONT. SHELF, SUMMARY LANGUAGE - ENGLISH COMPANY RELATED- NOAA OFF. OF MARINE POLLUTION ASSESSMENT, BOULDER, CO (USA) WASHINGTON UNIV., INST. ENVIRON. STUDIES, SEATTLE, WA 98195, USA NDN- 024-0007-5642-4

AN EARLY WARNING SYSTEM USES STORM-PETRELS TO REFLECT MARINE ENVIRONMENTAL QUALITY. STORM-PETRELS AND OTHER PORCELLANIFORMES FEED WITHIN A FEW CENTIMETERS OF THE OCEAN'S SURFACE WHERE MANY POLLUTANTS, INCLUDING OIL, BECOME CONCENTRATED. BY

CONCEPTS OF LIPID/WATER EQUILIBRATION TO EXPLAIN BIO-CONCENTRATION OF HYDROCARBONS WERE TESTED IN SITU AND SEEM TO HOLD FOR PETROLEUM MIXTURES COMMONLY ENCOUNTERED IN COASTAL WATERS. K SUB(BEF) IN BIVALVE LIPIDS WAS CONSTANT AT APPROXIMATELY 2 X 10 SUPER(5) WHEN CONCENTRATIONS WERE BETWEEN 1 AND 400 MU G L SUPER(-1). THESE AND RELATED STUDIES ON THE FACTORS CONTROLLING BODY BURDEN IN BIVALVES WERE USED TO FORMULATE A STRATEGY FOR MONITORING LEVELS OF CHRONIC OIL POLLUTION NECESSARY FOR WATER QUALITY MANAGEMENT.

HEAVY METAL POLLUTION FROM A POINT SOURCE DEMONSTRATED BY MEANS OF MUSSELS, MYTILUS EDULIS - 8200668

JENSEN, K. RANDLOEV, A. RIISGAARD, H.U.

CHEMOSPHERE, VOL. 10, NO. 7, PP. 761-765 LANGUAGE(S)- ENGLISH PUBL. DATE- 1981  
AVAILABILITY- SUMMARY LANGUAGE - ENGLISH COMPANY RELATED- MAR. POLLUT. LAB.,  
KAVALERGAARDEN 6, DK-2920 CHARLOTTENLUND, DENMARK NDN- 024-0006-1442-3

HEAVY METAL POLLUTION FROM A POINT SOURCE HAS BEEN DEMONSTRATED BY THE LEVELS OF MERCURY IN FLESH OF MUSSELS, MYTILUS EDULIS .

ON THE BEHAVIOR OF THE INDICATOR SPECIES OF MARINE BOTTOM POLLUTION - 8200695

SANUKIDA, S. OKAMOTO, H. HITOMI, M.

BULL. JAP. SOC. SCI. FISH., VOL. 47, NO. 7, PP. 863-869 LANGUAGE(S)- ENGLISH  
PUBL. DATE- 1981 AVAILABILITY- SUMMARY LANGUAGE - ENGLISH COMPANY RELATED-  
DEPT. BIOL., FAC. LIBERAL ARTS, KOBE UNIV., KOBE 657, JAPAN NDN- 024-0006-1415-0

RECENTLY, THE SUCCESSIVE INCREASE OF DISTRIBUTION HAS BEEN OBSERVED OF THE BIVALVE THEORA LUBRICA AND THE POLYCHAETE ANNELID PARAPRIONOSPION PINNATA IN POLLUTED ENVIRONMENTS OF THE INLAND SEA. THEY ARE WELL-KNOWN AS INDICATOR SPECIES OF THE DISHARMONIC ENCLOSED BAY. THIS PAPER DEALS WITH THE RELATION OF THE SEASONAL CHANGES IN QUANTITY OF THESE SPECIES TO THE ENVIRONMENTAL BOTTOM CONDITION IN THE OFFSHORE AND THE COASTAL AREAS OF CENTRAL AND SOUTH HARIMA-NADA. IN THE BOTTOM M LAYER, THE DISSOLVED OXYGEN VALUES DECREASED WITH INCREASING TEMPERATURES. THE NUMBERS OF INDIVIDUALS AND SPECIES OF THE MACROBENTHIC ANIMALS ALSO DECREASED RAPIDLY IN THIS STAGNATION PERIOD. T. LUBRICA THAT SHOWED THEIR MAXIMA AT MAY TO JUNE ALSO BEGAN TO DECLINE AS WELL AS P. PINNATA. AFTER THE STAGNATION PERIOD, THE FORMER BECAME EXTINCT, WHILE THE LATTER WAS THE ONLY SPECIES TO RECOVER QUICKLY IN THE TEMPORARY SEMI-AZOIC AREAS. THESE TRENDS WERE MARKEDLY SHOWN IN THE OFFSHORE AREAS. THESE INDICATE THAT THERE IS A CONSPICUOUS SEASONALITY IN DISHARMONIC REGIONS. THE DEGREES OF BOTTOM POLLUTION IN THE OFFSHORE AND THE COASTAL AREAS OF HARIMA-NADA AS COMPARED WITH OTHER POLLUTED SEA REGIONS WERE DISCUSSED.

SEASONAL VARIATION OF TRACE-METALS IN THE MUSSEL MYTILUS CALIFORNIANUS - 8200752

QUELLETTE, T.R.

ENVIRON. CONSERV., VOL. 8, NO. 1, PP. 53-58 LANGUAGE(S)- ENGLISH PUBL. DATE- 1981  
AVAILABILITY- SUMMARY LANGUAGE - ENGLISH COMPANY RELATED- DEPT. GEOGR.  
MAR. AFFAIRS, UNIV. RHODE ISLAND, KINGSTON, RI 02881, USA NDN- 024-0006-1358-3

MANY MARINE ENVIRONMENTAL MONITORING PROGRAMS HAVE EMPLOYED BIVALVE INDICATORS OF POLLUTION, INCLUDING MUSSELS OF THE GENUS MYTILUS, AS IN SITU INDICATORS OF TRACE-METALS AND OTHER CONTAMINANTS. THESE FILTER-FEEDERS ARE EFFICIENT ACCUMULATORS AND ARE GENERALLY TOLERANT OF ENVIRONMENTAL CONDITIONS. AN INVESTIGATION OF THESE PARAMETERS WAS CONDUCTED THROUGH FORTNIGHTLY ("BIWEEKLY") SAMPLING OF M. CALIFORNIANUS IN CONNECTION WITH ANALYSES FOR THE MUSSEL WATCH. THE OBJECTIVE OF THIS PRESENT STUDY IS TO DELINEATE BIOLOGICAL AND ENVIRONMENTAL MECHANISMS GOVERNING THE SEASONAL VARIATION OF TRACE-METALS IN MUSSELS, AND TO PROVIDE A BASELINE AGAINST WHICH THE EFFECTIVENESS OF LESS RIGOROUS SAMPLING ROUTINES MAY BE ASSESSED.

THE NEMATODE/ COPEPOD RATIO AND ITS USE IN POLLUTION ECOLOGY - 8200828

WARWICK, R.M.

MAR. POLLUT. BULL., VOL. 12, NO. 10, PP. 329-333 LANGUAGE(S)- ENGLISH PUBL. DATE- 1981  
AVAILABILITY- SUMMARY LANGUAGE - ENGLISH COMPANY RELATED- NERC,  
INST. FOR MAR. ENVIRON. RES., PROSPECT PLACE, THE HOE, PLYMOUTH, UK NDN- 024-0006-1283-9

THE NEMATODE/ COPEPOD RATIO IS CRITICALLY EXAMINED WITH A VIEW TO ADDING SOME PRECISION TO ITS PROPOSED USE IN POLLUTION ECOLOGY. AT TWO UNPOLLUTED INTERTIDAL SITES, DIFFERING MARKEDLY IN SEDIMENT GRADE, THE METABOLIC REQUIREMENTS OF COPEPODS ARE SHOWN TO BE EQUIVALENT TO THE REQUIREMENTS OF THAT FRACTION OF THE NEMATODE POPULATION WHICH FEEDS IN THE SAME WAY. THE

30.9 MU G/LITRE, 46.9 MU G/G DRY WT AND 7.1 MU G/G DRY WT RESPECTIVELY. THE DATA SUGGEST THAT MARINE PLANKTON ARE USEFUL INDICATORS OF OIL POLLUTION IN THIS REGION.

(HYDROCARBONS IN MOLLUSKS AND OYSTERS) HYDRIOCARBURES DANS LES MOULES ET LES HUITRES - 8106510

MARCHAND, M. CABANE, F.

REV. INT. OCEANOGR. MED., VOL. 59, NO. , PP. 3-30 LANGUAGE(S)- FRENCH PUBL. DATE- 1980 COMPANY RELATED- CIR. Océanol. BRETAGNE (CNEXO), B.P. 337,, BREST, FRA. NDN- 024-0005-8287-2

THE OIL POLLUTION IN THE MARINE ENVIRONMENT, EITHER AFTER OIL SPILLS OR CHRONIC POLLUTIONS, SET A PROBLEM OF HUMAN HEALTH WITH REGARD TO THE CONSUMPTION OF SOME MARINE SPECIES, LIKE MOLLUSCS (OYSTERS AND MUSSELS) WHICH CAN ACCUMULATE HYDROCARBON IN THEIR TISSUES SOMETIMES IN VERY IMPORTANT CONCENTRATION LEVELS. ON THE OTHER HAND THESE MOLLUSCS ARE MORE AND MORE USED AS BIOLOGICAL INDICATORS OF POLLUTION. THE FOLLOWING POINTS ARE DISCUSSED: HYDROCARBON LEVELS OBSERVED IN UNPOLLUTED AND POLLUTED AREAS, RATE AND LEVELS OF ACCUMULATION PROCESSES, AND RATE AND LEVELS OF EPURATION PROCESSES.

IDENTIFICATION OF ORGANIC SULFUR COMPOUNDS AND POLYCYCLIC HYDROCARBONS TRANSFERRED TO SHELLFISH FROM PETROLEUM SUSPENSION BY CAPILLARY MASS CHROMATOGRAPHY - 8106530

OGATA, M. MIYAKE, Y.

WATER RES., VOL. 15, NO. 2, PP. 257-266 LANGUAGE(S)- ENGLISH PUBL. DATE- 1981 COMPANY RELATED- DEPT. PUBL. HEALTH, OKAYAMA UNIV. MED. SCH., OKAYAMA CITY NDN- 024-0005-8267-7

AN ATTEMPT WAS MADE TO DETERMINE THE ORGANIC SULFUR COMPOUNDS, USUALLY CONTAINED IN CRUDE OIL, AS A MARKER OF OIL POLLUTION IN SHELLFISH. SHORT-NECKED CLAM (TAPEA ANGDALA PHILLIPINARUM A. ET REEVE) WERE MAINTAINED IN A CONTROLLED LABORATORY ENVIRONMENT AND IN WATER WITH A SUSPENSION OF CRUDE OIL. CHROMATOGRAPHY OF SHORT-NECKED CLAM EXTRACT SHOWED THE PRESENCE OF ORGANIC SULFUR COMPOUNDS OF ALKYL-BENZOTHIOPHENE (FROM C SUB(1)-C SUB(6)) AND DIBENZOTHIOPHENE AND ALKYL-DIBENZOTHIOPHENE (C SUB(1)-C SUB(4)). THESE ORGANIC SULFUR COMPOUNDS ARE A MARKER OF OIL POLLUTION OF SHELLFISH. OTHER ORGANIC AROMATIC COMPOUNDS, NAPHTHALENE, ALKYL-NAPHTHALENE (C SUB(1)-C SUB(5)), PHENANTHRENE, ALKYL-PHENANTHRENE (C SUB(1)-C SUB(3)), PYRENE AND ALKYL-PYRENE (C SUB(1)) IN SOFT BODY OF SHORT-NECKED CLAM WERE TRANSFERRED FROM OIL SUSPENSION TO SHELLFISH. THE CONCENTRATION FACTORS OF ORGANIC SULFUR COMPOUNDS ACCORDING WITH LAPSE OF TIME WERE DETERMINED.

POLLUTION FECALE EN MER DU NORD AU LARGE D'OSTENDE (BELGIQUE) (FECAL POLLUTION IN THE NORTH SEA OFF OSTENDE (BELGIUM)) - 8106545

YDE, M. DEMAeyerCLEEMPOEL, S. DARTEVELLE, Z.

REV. INT. OCEANOGR. MED., VOL. 59, NO. , PP. 47-54 LANGUAGE(S)- FRENCH PUBL. DATE- 1980 COMPANY RELATED- LAB. DE BACTERIOL., INST. HYGIENE ET D'ÉPIDÉMIOLOG., BRUXELLES, BELGIUM NDN- 024-0005-8252-5

AN IMPORTANT SEWAGE OUTFALL IN THE NORTH SEA IS SITUATED AT OSTEND, THE MOST IMPORTANT BELGIAN COASTAL TOWN. RELIABLE VALUES OF FECAL COLIFORM DENSITIES WERE FOUND IN SEA-WATER AT 5 KM FROM COASTLINE. IN SEDIMENT SAMPLES, POLLUTION INDICATORS WERE STILL DETECTABLE AT 11 KM FROM OSTEND. COLIFORMES WERE 100 TO 1,000 TIMES MORE RECOVERED IN SEDIMENT SAMPLES THAN IN SURFACE SAMPLES. THE RATIO FECAL COLIFORMS/TOTAL COLIFORMS DECREASED WITH THE SURVIVAL RATE OF THE ORGANISMS. IN MARINE SEDIMENT, 75 ( THE FECAL COLIFORMS WERE IDENTIFIED AS ESCHERICHIA COLI .

MONITORING CHESAPEAKE BAY SHELLFISH FOR HUMAN ENTEROVIRUSES - 8106567

LOMAX, N. HETRICK, F.

PUBLISHER- MD SEA GRANT PROG., COLL. PK., MD LANGUAGE(S)- ENGLISH PAGES- 18 PP PUBL. DATE- 1978 COMPANY RELATED- DEPT. MICROBIOL., UNIV. MD COLL. PK. NDN- 024-0005-8230-5

ALTHOUGH STATE HEALTH OFFICIALS ROUTINELY MONITOR SHELLFISH GROWING WATERS IN MARYLAND FOR BACTERIOLOGICAL AND CHEMICAL INDICATORS OF POLLUTION AND RESTRICT COMMERCIAL HARVESTING WHEN LEVELS OF THE INDICATORS POSE POTENTIAL HEALTH HAZARDS TO THE CONSUMER, THERE IS CURRENTLY NO ROUTINE MONITORING OF SHELLFISH FOR VIRUS CONTAMINATION. OUTBREAKS OF HEPATITIS TRACED TO CONSUMPTION OF SHELLFISH HARVESTED FROM "BACTERIOLOGICALLY SAFE" WATERS HAVE CAUSED GROWING CONCERN THROUGHOUT THE COUNTRY THAT THE VIROLOGICAL AND BACTERIOLOGICAL INDICATORS OF HUMAN FECAL POLLUTION ARE NOT ALWAYS PARALLEL.

WITH INCREASING CD CONCENTRATIONS BETWEEN 0.2 AND 0.8 MG/L; THERE WAS A LARGE INCREASE AT 1.0 MG/L CD. THE ANIMALS FROM THE UNPOLLUTED AREA WERE NOT AFFECTED BY 0.2-0.6 MG/L CD; AT 8.0 MG/L THE RESPIRATORY RATE INCREASED. THE INGESTION RATE OF THE POLLUTION ADAPTED POPULATION DECREASED AS CD CONCENTRATION INCREASED FROM 0-0.8 MG/L; THERE WAS AN ABRUPT INCREASE OF THE INGESTION RATE AT 1.0 MG/L CD. ACARTIA FROM UNPOLLUTED AREAS HAS A SLIGHT DECREASE IN INGESTION RATE AS THE CD CONCENTRATI

IDENTIFICATION OF SUBSTANCES TRANSFERRED TO FISH OR SHELLFISH FROM PETROLEUM SUSPENSION  
- 8003671

OGATA, M. MIYAKE, Y. YAMASAKI, Y.

WATER RESEARCH, 13(7), 613-618 PUBL. DATE- 1979 PUBLICATION CLASS- JOURNAL  
PAPER WATRAG ISSN- 0043-1354 COMPANY RELATED- OKAYAMA UNIV., MEDICAL  
SCHOOL, DEPT. OF PUBLIC HEALTH, 2-5-1 SHIKATA-CHO, OKAYAMA-CITY, OKAYAMA, JAPAN  
NDN- 024-0004-6800-5

IDENTIFICATION OF ORGANIC SULFUR COMPOUNDS CONTAINED IN CRUDE OIL AS A MARKER OF OIL POLLUTION OF FISH AND SHELLFISH WAS PERFORMED. EELS (ANGUILLA JAPONICA) OR SHORT-NECKED CLAMS (TAPES AMYGDALA PHILIPPINARUM A.) WERE MAINTAINED IN A CONTROLLED LABORATORY ENVIRONMENT OF WATER WITH A SUSPENSION OF CRUDE OIL. GC-MS OF EEL FLESH EXTRACT SHOWED THE PRESENCE OF 1-METHYL, 2-METHYL, DIMETHYL, TRIMETHYLNAPHTHALENES AND DIBENZOTHIOPHENE, AND THAT OF SOFT BODY OF SHORT-NECKED CLAMS SHOWED DIMETHYL, TRIMETHYLNAPHTHALENE, DIBENZOTHIOPHENE, AND MONOMETHYL AND DIMETHYLDIBENZOTHIOPHENES

BIOGEOCHEMISTRY OF SELECTED HEAVY METALS IN WESTERN PORT, VICTORIA, AND USE OF INVERTEBRATES AS INDICATORS WITH EMPHASIS ON MYTILUS EDULIS PLANULATUS. - 8003696

HARRIS, J. E. FABRIS, G. J. STATHAM, P. J. TAWFIK, F.

AUSTRALIAN JOURNAL OF MARINE AND FRESHWATER RESEARCH, 30(2), 159-178 PUBL. DATE-  
APR 1979 PUBLICATION CLASS- JOURNAL PAPER AJMFA4 ISSN- 0067-1940 COMPAN  
RELATED- MINISTRY FOR CONSERVATION, MARINE CHEMISTRY UNIT, 7B PARLIAMENT PL., E.  
MELBOURNE, VICTORIA 3002, AUSTRALIA NDN- 024-0004-6775-0

THE RELATIONSHIPS OF CD, CU, FE, MN, PB, AND ZN IN SEDIMENTS, SEAGRASSES, AND SEVERA INVERTEBRATES WITH GEOLOGICAL SOURCE AREAS IN THE WESTERN PORT CATCHMENT ARE INVESTIGATED. HIGHEST CONCENTRATIONS OF HEAVY METALS IN SEDIMENTS AND SEAGRASSES AR APPARENTLY DERIVED FROM AN OLD SWAMP ENVIRONMENT. HIGHEST LEVELS OF CD, FE, AND PB ARE FOUND IN MUSSELS ON THE EASTERN SIDE OF THE EMBAYMENT WHERE SUSPENDED SEDIMENT AND DETRITUS FROM SEAGRASS MEADOWS OF THE EMBAYMENT HEAD WOULD BE CARRIED BY THE CLOCKWISE NET CIRCULATION IN THE BAY. ZINC DISTRIBUTIONS ARE AFFECTED BY AN INDUSTRIAL DISCHARGE WHICH HAS BEEN STUDIED USING MUSSELS TRANSPLANTED FROM AN UNCONTAMINATED LOCATION. POSSIBLE LOSS OF PB AND FE FROM TISSUES OF M. EDULIS PLANULATUS DURING FREEZE-DRYING WAS NOTED AND THE CONCENTRATIONS OF CD, CU, MN, ZN, AND WATER CONTENT WERE FOUND TO BE LINEAR FUNCTIONS OF MUSSEL LENGTH. THE HIGHEST LEVELS OF CD IN M. EDULIS PLANULATUS ARE FOUND ALONG THE NONINDUSTRIALIZED EASTERN SIDE OF THE

A STUDY OF INDICATION OF TRACE METAL POLLUTION OF MARINE AREAS BY ANALYSIS OF SALT MARSH SOILS. - 8003709

VESTERGAARD, P.

MARINE ENVIRONMENTAL RESEARCH, 2(1), 19-31 PUBL. DATE- JAN 1979 PUBLICATION  
CLASS- JOURNAL PAPER MERSDW ISSN- 0141-1136 COMPANY RELATED- UNIV. OF  
COPENHAGEN, INST. OF PLANT ECOLOGY, OESTER FARIMAGSGADE 2D, DK-1353 COPENHAGEN K,  
DENMARK NDN- 024-0004-6762-1

SALT MARSH SOILS FROM THE MEAN WATER LEVEL AND FROM DIFFERENT LEVELS ABOVE THE MEAN WATER LEVEL AT 2 DANISH COASTAL LAGOONS, WHICH DIFFER IN WATER POLLUTION DUE TO DIFFERENCES IN THE CHARACTER OF THE SURROUNDING LAND USE, WERE ANALYZED FOR EDTA-EXTRACTABLE PB, CU, ZN, AND NI AND FOR ORGANIC MATTER AND CATION EXCHANGE CAPACITY. FROM THE RESULTS A POSITIVE CORRELATION WAS APPARENT BETWEEN THE TRACE METAL LOADING OF THE SOILS, EXPRESSED BY THE TRACE METAL CONCENTRATION IN RELATION TO THE CONTENT OF SOIL ORGANIC MATTER, AND THE MEAN TRACE METAL CONCENTRATION OF THE LAGOON WATER, SUBMERGING THE SALT MARSH AT HIGH WATER. THIS OPENS UP THE POSSIBILITY OF USING ANALYSES OF SALT MARSH SOILS IN THE INDICATION OF TRACE METAL POLLUTION OF PROTECTED COASTAL WATERS.

BIOLOGICAL INDICATORS OF WATER QUALITY. - 8004172

JAMES, A. EVISON, L. M.

BIOLOGICAL INDICATORS OF WATER QUALITY CONF. LOCATION- NEWCASTLE-UPON-TYNE, ENGLAND PUBLISHER- JOHN WILEY & SONS PUBL. PLACE- NEW YORK, NY PAGES- 596 P  
PUBL. DATE- 1979 CONF. DATE- SEP 12-15, 1978 PUBLICATION CLASS- BOOK ISBN- 0-471-27590-5 AVAILABILITY- PRICE: \$37.50 COMPANY RELATED- UNIV. OF  
NEWCASTLE-UPON-TYNE, CIVIL ENG. DEPT., DIV. OF PUBLIC HEALTH ENG., NEWCASTLE-UPON-TYNE NE1 7RU, ENGLAND NDN- 024-0004-6299-4

TEN CONFERENCE PAPERS REVIEWING THE ROLE BIOLOGICAL INDICATORS PLAY IN THE ASSESSMENT OF WATER QUALITY OF MARINE WATERS ARE PRESENTED. THE QUALITY REQUIREMENTS FOR THE VARIOUS USES OF WATER-E.G., WATER SUPPLY AND RECREATION-ARE SURVEYED, AND THE VARIOUS WAYS IN WHICH BIOLOGICAL SYSTEMS OF CLASSIFICATION HAVE BEEN DEVELOPED ARE DISCUSSED. THE WHOLE RANGE IS COVERED-FROM PHYSIOLOGICAL TESTS TO SPECIES DIVERSITY INDEXES, AND THE SPECTRUM OF ORGANISMS FROM BACTERIA TO FISH. THE PRACTICAL VALUE OF THE BIOLOGICAL METHODS IS STRESSED AND THEIR RELATION TO CHEMICAL OR PHYSICAL ALTERNATIVES CONSIDERED.

SEASONAL VARIATIONS OF ZINC IN THE BARNACLE, BALANUS BALANOIDES (L.) MAINTAINED ON A RAFT IN THE MENAI STRAIT. - 8002025

WALKER, G. FOSTER, P.

MARINE ENVIRONMENTAL RESEARCH, 2(3), 209-221 PUBL. DATE- JUL 1979 PUBLICATION CLASS- JOURNAL PAPER MERSDW ISSN- 0141-1136 COMPANY RELATED- NERC, UNIT OF MARINE INVERTEBRATE BIOLOGY, MARINE SCIENCE LABS., MENAI BRIDGE, GWYNEDD LL59 5EH, WALES NDN- 024-0004-5444-4

A POPULATION OF THE INTERTIDAL BARNACLE, B. BALANOIDES MAINTAINED ON A RAFT IN THE MENAI STRAIT WAS SAMPLED REGULARLY OVER A 2-YR PERIOD AND POOLED FRACTIONS WERE ANALYZED FOR ZN AND OTHER TRACE METALS. THE SEASONAL VARIATION OF ZN IN 3 FRACTIONS (BODY, OTHER SOFT TISSUES, AND SHELL) WAS FOLLOWED AND RELATED TO PHYSIOLOGICAL CONDITION. THE BODY ACCUMULATES ZN ALMOST CONTINUOUSLY WHILE THIS TRACE METAL ACCUMULATES IN THE OVARY ONLY AS IT DEVELOPS AND IS LOST IN THE GAMETES WHEN THESE ARE LAID. THE NEWLY FORMED EGG-MASSSES MAY BE THE MORE USEFUL SAMPLE FOR INDICATING ZN POLLUTION.

THE LITTLENECK CLAM, PROTOTHACA STAMINEA, AS A TOOL FOR POTENTIAL OIL POLLUTION ASSESSMENT: PART 1-DENSITY OF STOCK. - 8002026

VANDERHORST, J. R. WILKINSON, P.

MARINE ENVIRONMENTAL RESEARCH, 2(3), 223-237 CONTRACT NO.- ERDA EY-76-C-06-1830 PUBL. DATE- JUL 1979 PUBLICATION CLASS- JOURNAL PAPER MERSDW ISSN- 0141-1136 COMPANY RELATED- BATTELLE MEMORIAL INST., PACIFIC NORTHWEST LABS., MARINE RESEARCH LAB., ROUTE 5, BOX 1000, SEQUIM, WA 98382 NDN- 024-0004-5443-2

LITTLENECK CLAMS, P. STAMINEA, WERE SAMPLED ON 2 PLOTS IN THE NORTH PUGET SOUND REGION TO EVALUATE THE EFFECTS OF SAMPLING STRATEGY ON COSTS FOR MEASURING PLOT DENSITY IN AN HYPOTHESIS-TESTING FRAMEWORK. THE GENERAL APPROACH INVOLVED QUADRAT SAMPLING ON PERMANENTLY MARKED PLOTS. DETECTION OF DIFFERENCES IN DENSITY AS SMALL AS 10% WITH 80% PROBABILITY WOULD EXCEED IN COST THE ECONOMIC VALUE OF 10% OF THE STOCK AND DECIMATE >10% OF THE STOCK UNLESS PROVISION WERE MADE TO ALLOW SURVIVAL OF SAMPLED CLAMS. RESTRICTION OF SAMPLING TO THE MARKETABLE COHORT, RESTRICTION OF SAMPLING TO PARTS OF PLOTS COVERED BY VEGETATION, INCREASING THE PROBABILITY FOR A TYPE I ERROR, AND USE OF A SMALLER QUADRAT SIZE ALL SERVED TO REDUCE SAMPLING COSTS. THE PROJECTIONS OF SAMPLING REQUIREMENTS WERE MADE USING ESTIMATES OF VARIANCE OBTAINED FROM SAMPLING IN DIFFERING MANNERS AND AT DIFFERENT SEASONS. THE ESTIMATES DID NOT GIVE GOOD UNIFORMITY. THIS HAS AN IMPORTANT RAMIFICATION FOR POLLUTANT STUDIE

ORGANOCHLORINE RESIDUES IN HARP SEAL (PHAGOPHILUS GROENLANDICUS) TISSUES, GULF OF ST. LAWRENCE, 1971, 1973. - 8000662

ROSEWELL, K. T. MUIR, D. C. G. BAKER, B. E.

PESTICIDES MONITORING JOURNAL, 12(4), 189-192 PUBL. DATE- MAR 1979 PUBLICATION CLASS- JOURNAL PAPER PEMJAA ISSN- 0031-6156 COMPANY RELATED- MCGILL UNIV., MACDONALD COLLEGE, DEPT. OF AGRICULTURAL CHEMISTRY AND PHYSICS SAINT ANNE-DE-BELLEVUE, QUEBEC HOA 1C0, CANADA NDN- 024-0004-3805-0

BECAUSE SEALS CARRY LARGE QUANTITIES OF SUBCUTANEOUS FAT WHICH CAN STORE ORGANOCHLORINES, THEY HAVE BEEN USED AS INDICATORS OF POLLUTION IN THE MARINE ENVIRONMENT. LEVELS OF P.P.-DDT, P.P.-DDE, P.P.-DDE, DIELDRIN, PCBS, AND HCB WERE DETERMINED IN BLUBBER, KIDNEY, LIVER, MUSCLE, SPLEEN, BRAIN, AND GONAD TISSUES OF 31 HARP SEALS (P. GROENLANDICUS) TAKEN FROM THE GULF OF SAINT LAWRENCE DURING 1971 AND



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~~Ken Sheehy~~

4/5/95