DOCUMENTATION PAGE

Form Approved
OMB No 0704-0188

1 AGENCY USE ONLY (Leave blank)	2 REPORT DATE	3 REPORT TYPE AND DATES COVERED
	April 1993	professional paper

4 TITLE AND SUBTITLE

ASSESSING ECOLOGICAL RISK USING EXPOSURE RESPONSE MODELS—THE ALLEN HARBOR CASE STUDY

5 FUNDING NUMBERS

PR: ME83
PE: N/A
WU: DN301108

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Naval Command, Control and Ocean Surveillance Center (NCCOSC)
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San Diego, CA 92152-5001

8 PERFORMING ORGANIZATION REPORT NUMBER

9 SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

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10 SPONSORING/MONITORING AGENCY REPORT NUMBER

11 SUPPLEMENTARY NOTES

12a DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b DISTRIBUTION CODE

13 ABSTRACT (Maximum 200 words)

Exposure-response models were developed as the final phase in a multiyear case study to assess risks to marine ecosystems in Allen Harbor, RI associated with land-based hazardous waste sites. These models were developed for acute and chronic responses of marine species exposed to sediments, sediment extracts, and ground water associated with a landfill adjacent to Allen Harbor. Serial dilutions of these media were characterized chemically and presented in the laboratory to seven species representative of taxa found in the harbor. The toxicological endpoints generally responded in a classic sigmoid fashion with increasing exposure medium concentration, although variation was observed in endpoint sensitivity. The resulting exposure-response models will be useful in defining ecological risk at current chemical stressor concentrations, in identifying remediation levels required to reduce risk to acceptable levels, and in predicting future risk associated with changes in stressor concentration.

Published in *Abstracts: 13th Annual Meeting Society of Environmental Toxicology and Chemistry*, Nov. 1992, p. 130.

14 SUBJECT TERMS	15 NUMBER OF PAGES
marine chemistry bentic flux	16 PRICE CODE

17 SECURITY CLASSIFICATION OF REPORT	18 SECURITY CLASSIFICATION OF THIS PAGE	19 SECURITY CLASSIFICATION OF ABSTRACT	20 LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	SAME AS REPORT

21a. NAME OF RESPONSIBLE INDIVIDUAL	21b. TELEPHONE *(Include Area Code)*	21c. OFFICE SYMBOL
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An Ecological Risk Assessment Using GIS To Analyze The Impacts Of Oil And Gas Production In Galveston Bay, TX. P.F. Roscigno, MMS, New Orleans, LA USA; M.E. McNiff, USFWS, Lafayette, LA USA W. Ji, TGS, Inc., Lafayette, LA USA.

Oil and gas production was examined for the Galveston Bay ecosystem using ARC/INFO to produce maps. Various data sources documenting urbanization and industrialization were overlayed with fish and wildlife resources, habitats and other features in order to estimate impacts. Concern over wetland loss, benthic-bottom disturbances, and sediment contaminant can be quantified on a regional level so as to allow resource managers the faculty to make decisions on a comprehensive basis. Ecological risk assessments of the impact of human development on important natural resources can be developed in a systematic and comparative way. Geographic Information Systems (GIS) offer policymakers and regulatory agencies a means for managing complex and disparate databases through analytical and modeling capabilities. A series of preliminary maps illustrating the risk to natural resources from oil and gas development is presented.

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Em GIS In Risk Assessment Of Water Pollution. V.N.Bashkin, M.Ya.Kozlov, Institute of Soil Science and Photosynthesis RAS, Pushchino, Moscow region 142292 Russia

The aim of given study is the risk assessment of nonpoint source loading of surface and ground water pollution using new approaches on a basis of expert-modelling geoinformation system (EM GIS). We considere as nonpoint sources the agrochemicals and their soil derivates (N and P compounds). Due to very high complexity of both N and P biogeochemical cycles, the use only simulation or statistical models is non-informative. EM GIS creation included various DBs formed on the results of ecological-biogeochemical monitoring of agrolandscape component (soil-biota-waters), knowledge base formed on a basis of expert assessments and graphical vizualization of existing information in form of ecological-biogeochemical mapping. The adaptation of given EM GIS was carried out for risk assessment of surface water resources and ground drinking waters in Moscow region characterizing by very complex natural organization, high population density, high levels of industry and agriculture. It was carried out the ecological- biogeochemical mapping for risk assessment and probability of population of drinking waters and aquatic ecosystems by N and P fertilizers. The corresponding risk assessment criteria were presented.

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Validation Of Pesticide Risk Assessment Procedures A D M Hart and P.W. Greig Smith, Central Science Laboratory, Worplesdon, Surrey, UK.

New European guidelines have been developed for assessing the side-effects of pesticides on the environment. The procedures involve decision-making schemes, which are being validated by several methods. Products already registered for use in European countries were assessed by the new schemes to check whether the classifications of risk are similar to those produced using existing guidelines. In addition, the results were validated by comparing their predictions with data on actual environmental effects, obtained from national wildlife monitoring schemes, or field research studies. Results are presented from validation for beneficial invertebrates, honeybees, birds and aquatic organisms. The analysis identified modifications which would improve the reliability of the procedures, and emphasises the value of systematic environmental monitoring.

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Assessing Ecological Risk Using Exposure-Response Models - The Allen Harbor Case Study. W.R. Munns, Jr., SAIC, Narragansett, RI USA; C. Mueller, SAIC, Narragansett, RI USA; R.K. Johnston, NCCOSC, San Diego, CA USA; W.G. Nelson, U.S. EPA, Narragansett, RI USA.

Exposure-response models were developed as the final phase in a multiyear case study to assess risks to marine ecosystems in Allen Harbor, RI associated with land-based hazardous waste sites. These models were developed for acute and chronic responses of marine species exposed to sediments, sediment extracts, and ground water associated with a landfill adjacent to Allen Harbor. Serial dilutions of these media were characterized chemically and presented in the laboratory to seven species representative of taxa found in the harbor. The toxicological endpoints generally responded in a classic sigmoid fashion with increasing exposure medium concentration, although variation was observed in endpoint sensitivity. The resulting exposure-response models will be useful in defining ecological risk at current chemical stressor concentrations, in identifying remediation levels required to reduce risk to acceptable levels, and in predicting future risk associated with changes in stressor concentration.