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The Water Quality Information Center (WQIC)
Agricultural Research Service, U. S. Department of Agriculture

Risk Assessment and Communication Related to Water Resources III

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National Agricultural Library

This bibliography lists 99 articles on risk assessment and risk communication as it relates to water resources, risk assessment theories, and methodologies dated 1995 - 1999. This bibliography updates Risk Assessment and Communication Related to Water Resources II (QB96-04). All articles are from the AGRICOLA database.

This electronic bibliography is intended primarily to provide awareness of recent investigations and discussions of a topic and is not intended to be in-depth and exhaustive. The inclusion or omission of a particular publication or citation should not be construed as endorsement or disapproval. Citations are arranged alphabetically by title and abstracts are included where available. All citations are in English unless otherwise noted.

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1. Acute toxicity of hardboard mill effluents to different bioindicators.

Leal, H. E., Rocha, H. A., and Lema, J. M.
Environ toxicol water qual. 12: 1 pp. 39-42. (Feb 1997).
NAL Call #: RA1221.T69

Descriptors: pinus-radiata, hardboard, waste water, pulp mill effluent, factory-effluents, toxicity, risk assessment, biological indicators, rainbow-trout, daphnia-pulex vibrio,

vibrio-fischeri.

Abstract: The risk assessment of two kinds of wastewaters from a hardboard mill were determined by acute toxicity tests. Three different bioindicators, water fleas from a local stream (*Daphnia pulex*), local fish hatchery specimens (*Salmo gairdneri*), and a bacterial test (*Vibrio fischeri* Microtox test) were considered. The three tests showed a wide range of sensitivities and presented different but compatible LC50/EC50 values, with *S. gairdneri* being the most sensitive. The obtained toxicity values could serve as a reference to evaluate the toxicity of wastewater from this type of industries.

2. **Assessing and managing health risks from drinking water contamination : approaches and applications.**

Reichard, Eric George., Zapponi, Giovanni A., and International Commission on Groundwater. Istituto superiore di sanita (Italy).
Wallingford, England : International Association of Hydrological Sciences, 1995. xii, 339 : ill., maps.
NAL Call #: RA591.A77--1995

Descriptors: Drinking water, Health-aspects, Congresses, Contamination, Water supply, Groundwater-Purification.

3. **Assessing aquifer contamination risk using immunoassay: trace analysis of atrazine in unsaturated zone sediments.**

Juracek, K. E. and Thurman, E. M.
J environ qual 26: 4 pp. 1080-1089. (July/Aug 1997).
NAL Call #: QH540.J6

Descriptors: water pollution, contamination.

Abstract: The vulnerability of a shallow aquifer in south-central Kansas to contamination by atrazine (2-chloro-4, ethylamino-6-isopropylamine-s-triazine) was assessed by analyzing unsaturated zone soil and sediment samples from about 60 dryland and irrigated sites using an ultrasensitive immunoassay (detection level 0.02 microgram/kg) with verification by gas chromatography/mass spectrometry (GC/MS). Samples were collected at depths of 0 to 1.2 m (i.e., the root zone), 1.2 to 1.8 m, and 1.8 to 3.0 m during two time periods-prior to planting and after harvest of crops. About 75% of the samples contained detectable concentrations of parent atrazine. At the shallow sampling depth, atrazine concentrations ranged from 0.5 to approximately 12 micro gram/kg. Atrazine concentrations at the intermediate (1.2-1.8m) depth generally were <1.0 microgram/kg, with most of the concentrations <0.10 microgram/kg, which suggests substantial degradation of parent atrazine in the root zone. Likewise, atrazine concentrations from the deepest (1.8-3.0 m) depth ranged from <0.02 to 0.33 microgram/kg. The metabolite deethylatrazine (2-amino-4, chloro-6-isopropylamine-s-triazine) was detected by GC/MS only in 2 of 60 samples with concentrations of 1.4 and 1.5 microgram/kg. The reconnaissance survey shows that, in spite of atrazine use ranging from 1 to 5 or more years, there does not appear to be a significant buildup of parent compound below the root zone. Therefore, the unsaturated zone does not appear to be a major storage compartment of atrazine contamination for the underlying shallow aquifer.

4. **Assessing nonpoint-source pollution risk: a GIS application.**

Lull, K. J., Tindall, J. A., and Potts, D. F.

J for 93: 1 pp. 35-40. (Jan 1995).

NAL Call #: 99.8-F768

Descriptors: water pollution, risk, geographical-information-systems, land use, watersheds, Montana, risk assessment.

5. **Assessing risk for water harvesting systems in arid environments.**

Cohen, I. S., Lopes, V. L., Slack, D. C., and Yanez, C. H.

J soil water conserv 50: 5 pp. 446-449. (Sept/Oct 1995).

NAL Call #: 56.8-J822

Descriptors: water-harvesting, arid-zones, risk assessment, simulation models, stochastic-models.

6. **Assessing risk in operational decisions using Great Lakes probabilistic water level forecasts.**

Lee, D. H., Clites, A. H., and Keillor, J. P.

Environ-manage. New York, Springer-Verlag. Jan/Feb 1997. v. 21 (1) p. 43-58.

NAL Call #: HC79.E5E5

7. **Assessing the environmental fate of agrochemicals.**

Roberts, T. R.

J environ sci health, Part B, Pestic food contam agric wastes B31: 3 pp. 325-335. (1996).

NAL Call #: TD172.J61

Descriptors: pesticides, agricultural-chemicals, environmental impact, soil, water, risk assessment, simulation models, soil-pollution water pollution,

8. **Assessing the risks associated with exposure to waterborne pathogens: an expert panel's report on risk assessment.**

Neumann, D. A. and Foran, J. A.

J food prot 60: 11 pp. 1426-1431. (Nov 1997).

NAL Call #: 44.8-J824

Descriptors: waterborne-diseases, risk assessment.

Abstract: The resurgence of outbreaks of waterborne diseases in the United States underscores the need for quantitative methods for assessing the human health risks associated with various types of waterborne pathogens in diverse environments (e.g., drinking water, waste water, recreational water) under different exposure scenarios (e.g., ingestion, inhalation from aerosols). An expert panel developed a three-stage general framework for conducting risk assessments of waterborne pathogens. An initial problem formulation stage involving all stakeholders identifies the purpose of the risk assessment, the critical issues to be addressed, and how the results might be used to protect public health. The analysis characterizes both the exposure and the health effects. This compilation of quantitative and qualitative data, expert opinion, and other information

yields a host/pathogen profile that explicitly identifies the assumptions and uncertainties associated with the profile. The final stage, risk characterization, states the likelihood and types and magnitude of effects likely to be observed in the exposed population under the expected exposure scenario, including all the inherent assumptions and uncertainties. This characterization will be used by risk managers and policy makers to reduce human health risks and by risk communication specialists to inform the public.

9. Assessment, management, and minimization.

Hess, T. F., Buyuksonmez, F., Watts, R. J., and Teel, A. L.
Water environ res 70: 4 pp. 699-705. (June 1998).
NAL Call #: TD419.R47

Descriptors: soil-pollution, polluted-soils, pollution-control, risk assessment, literature-reviews, pollutants, industrial-wastes.

10. Atrazine and water quality: an evaluation of alternative policy options.

Lakshminarayan, P. G., Bouzaher, A., and Shogren, J. F.
J environ manage 48: 2 pp. 111-126. (Oct 1996).
NAL Call #: HC75.E5J6

Descriptors: atrazine, water quality, opportunity costs, cost benefit analysis, regulations, environmental policy, substitution, triazines, weed control, maize, sorghum, environmental impact, economic impact, application-methods, application depth, simulation models, USA, comprehensive-economic-and-environmental-policy-evaluation-system-cepces-model, simulation-model, post emergence application, benefit risk tradeoffs.

11. Baseflow mapping of the south-central and southeastern United States using GIS.

Muttiah, R. S., Srinivasan, R., Allen, P. M., and Arnold, J. G.
Applications of GIS to the modeling of non-point source pollutants in the vadose zone.
Madison, Wis. : Soil Science Society of America, c1996. p. 247-257.
NAL Call #: S590.S62-no.48

Descriptors: aquifers, groundwater pollution, risk assessment, water-flow, unsaturated-flow, groundwater-flow hydrology, mapping, geographical information systems, simulation models, USA, vulnerability models.

12. Biological toxicity testing.

United States. Environmental Protection Agency. Office of Emergency and Remedial Response. United States. Environmental Protection Agency. Office of Research and Development.
Washington, DC : U.S. Environmental Protection Agency, Office of Emergency and Remedial Response ; Cincinnati, Ohio : Office of Research and Development, [1995] 16 p. : ill
NAL Call #: Fiche--S-133-EP-1.3/3:540/S-95/501

Descriptors: Biological assay, Toxicity testing, Hazardous wastes, Ecological risk assessment.

13. Biomarkers used for assessment of cancer risk in populations living in areas of high potential carcinogenic hazard (near communal and chemical waste dumping sites).

Indulski, J. A. and Lutz, W.

Environmental biomonitoring exposure assessment and specimen banking. International Chemical Congress of Pacific Basin Societies. Washington, DC : American Chemical Society, c1997. p. 195-205.

NAL Call #: QD1.A45-no.654

Abstract: Biological monitoring of people exposed to environmental carcinogens using biomarkers provides measurable information on the intensity of absorption of specific carcinogens and the possibility to determine whether the agent is absorbed by the organism in a critical dose to produce specified health effects. Biomarkers enable the recording of very early health effects produced by environmental carcinogens and to determine cancer risk. Biomarkers also permit enhanced analysis of health risk in humans exposed to carcinogens and, because determinations are performed directly in human organism, uncertainties inherent in epidemiologic studies are avoided. A range of biomarkers are available enabling early detection of the disease and of the phenomena which precede it. It is now possible to assess cancer risk by laboratory test results.

14. Carcinogenic risk associated with radon-enriched well water.

Mose, D. G. and Mushrush, G. W.

Energy sources 19: 7 pp. 705-713. (Aug/Sept 1997).

NAL Call #: QC73.6.E5

Descriptors: drinking-water, risk assessment, Maryland, Virginia.

15. A comparison of potential contamination from conventional and alternative cropping systems in northeast Kansas.

Koo, S. and Diebel, P. L.

J soil water conserv 51: 4 pp. 329-335. (July/Aug 1996).

NAL Call #: 56.8-J822

Descriptors: water pollution, point sources, surface water, contamination, atrazine, nitrogen, sediment, water quality, cropping-systems, comparisons, pollution control, alternative farming, simulation models, risk, economic evaluation, costs, returns, meteorological factors, Kansas, contaminant loadings, non-point-source pollution, alternative-versus-conventional-cropping-systems, risk-analysis.

16. Conceptual and methodological aspects of assessing pesticide environmental impact in developing areas.

Wagenet, R. J., Bouma, J., and Hutson, J. L.

Economic, environmental, and health tradeoffs in agriculture pesticides and the sustainability of Andean potato production. Dordrecht ; Boston : Kluwer Academic Publishers in cooperation with International Potato Center, c1998. p. 41-63.

NAL Call #: SB211.P8E337-1998

Descriptors: pesticides, risk assessment, simulation models,.

17. Conditional expectation for evaluation of risk groundwater flow and solute transport: one-dimensional analysis.

Liou, T. S. and Yeh, H. D.

J Hydrol 199: 3/4 pp. 378-402. (Dec 10, 1997).

NAL Call #: 292.8-J82

Descriptors: groundwater pollution, pollutants.

Abstract: A one-dimensional groundwater transport equation with two uncertain parameters, groundwater velocity and longitudinal dispersivity, is investigated in this paper. The analytical uncertainty of the predicted contaminant concentration is derived by the first-order mean-centered uncertainty analysis. The risk of the contaminant transport is defined as the probability that the concentration exceeds a maximum acceptable upper limit. Five probability density functions including the normal, lognormal, gamma, Gumbel, and Weibull distributions are chosen as the models for predicting the concentration distribution. The risk for each distribution is derived analytically based on the conditional probability. The mean risk and confidence interval are then computed by Monte Carlo simulation where the groundwater velocity and longitudinal dispersivity are assumed to be lognormally and normally distributed, respectively. Results from the conditional expectation of an assumed damage function show that the unconditional expectation generally underestimates the damage for low risk events. It is found from the sensitivity analysis that the mean longitudinal dispersivity is the most sensitive parameter and the variance of longitudinal dispersivity is the least sensitive one among those distribution models except the gamma and Weibull distributions.

18. Contaminated land remediation in the UK with reference to risk assessment: two case studies.

Ellis, B. and Rees, J. F.

J Inst Water Environ Manag 9: 1 pp. 27-36. (Feb 1995).

NAL Call #: TD420.W374

Descriptors: polluted- soils, soil pollution, reclamation, bioremediation, groundwater pollution, petroleum-hydrocarbons, polycyclic hydrocarbons, biological treatment, petroleum, risk, industrial wastes, UK, heating oil.

Abstract: The approach to land reclamation in the UK has traditionally relied upon the use of cover and concealment which can leave a legacy of problems below the ground. Alternatively, the bulk export of materials to licensed landfill has often been used, but this (a) simply transfers a problem, (b) can cause considerable disruption, and (c) is becoming increasingly expensive. Remedial strategies involving the use of barrier systems or off-site removal both have their place in the efficient and economic development of contaminated sites. However, there is now increasing interest in the use of on-site technology which can provide cost savings and by treating, destroying or stabilizing contamination, can serve to minimize future liabilities. The design, costing and application of treatment, as opposed to cover or disposal, depends fundamentally on

understanding the problem and evaluating the capabilities and availability of appropriate technologies. With reference to UK case studies, this paper highlights some of the options available and routes taken in order to achieve site-specific, commercially-acceptable, remedial responses.

19. A critical evaluation of safety (uncertainty) factors for ecological risk assessment.

Chapman, P. M., Fairbrother, A., and Brown, D.
Environ toxicol chem 17: 1 pp. 99-108. (Jan 1998).
NAL Call #: QH545.A1E58

Descriptors: contaminants, risk-factors, uncertainty, risk assessment.

Abstract: Evaluation of environmental risks posed by potentially hazardous substances requires achieving a balance between over, and underprotection, i.e., between societal benefits posed by the use of particular substances and their potential risks. Uncertainty (e.g., only laboratory data may be available, field or epidemiological data may be limited and less than clear-cut, etc.) will always exist and is often conservatively dealt with by the use of so-called "safety" or "uncertainty" factors, some of which remain relatively little changed since their origin in 1945. Extrapolations involving safety factors for both aquatic and terrestrial environments include inter, and intraspecies, acute-to-chronic, lowest, to no-observed-effect concentration (NOEC), and laboratory-to-field extrapolation (e.g., extrapolation of laboratory results to the field). To be realistic, such extrapolations need to have a clear relationship with the field effect of concern and to be based on good science. The end result is, in any case, simply an estimate of a field NOEC, not an actual NOEC. Science-based versus policy-driven safety factors, including their uses and limitations, are critically examined in the context of national and international legislation on risk assessment. Key recommendations include providing safety factors as a potential threshold effects range instead of a discrete number and using experimental results rather than defaulting to safety factors to compensate for lack of information. This latter recommendation has the additional value of rendering safety factors predictive rather than simply protective. We also consider the so-called "Precautionary Principle," which originated in 1980 and effectively addresses risk by proposing that the safety factor should be infinitely large.

20. Demonstration of a toxicological risk ranking method to correlate measures of ambient toxicity and fish community diversity.

Hartwell, S. I.
Environ toxicol chem 16: 2 pp. 361-371. (Feb 1997).
NAL Call #: QH545.A1E58

Descriptors: estuaries, water quality, monitoring, risk assessment.

Abstract: The goal of this study was to assess a new toxicological risk ranking model, field validate it with results from a battery of sediment and water column bioassays, and identify correlations of model output with fish community and population metrics. The model has five components: severity of effect, degree of response, bioassay variability, consistency, and number of measured endpoints. The model can reliably reduce an array of ambient toxicity data into a site-specific metric that is appropriate for comparisons

with other metrics, such as Index of Biotic Integrity (IBI) or community diversity indices. The model is tolerant of variable amounts of data between stations. It does not generate probability limits without repeated sampling. The model can identify trends between sampling stations and document where chemical contamination is contributing to community impacts as well as where toxicological impacts are not likely to be contributing to observed population level impairment. The model was evaluated with field/laboratory data, Test sites were located in tributaries of Chesapeake Bay watersheds that are impacted by industrial, urban, and agricultural land use patterns. The toxicological risk scores correlate with fish community health metrics. The strongest correlations were between sediment toxicity risk and bottom trawl fish community diversity index.

21. **A diffusion-based interpretation of tetrachloroethene and trichloroethene concentration profiles in a groundwater aquitard.**

Ball, W. P., Liu, C., Xia, G., and Young, D. F.

Water resources 33: 12 pp. 2741-2757. (Dec 1997).

NAL Call #: 292.8-W295

Descriptors: aquifers, silt-loam-soils, clay-loam-soils, groundwater pollution, pollution-control, contaminants, tetrachloroethylene, trichloroethylene, sorption, diffusion, diffusion models, mathematical-models, prediction, risk assessment, military-areas, Delaware, groundwater-remediation, silty-clay-loam-soils, Dover-air-force-base.

Abstract: Analysis of subsurface soil cores from the site of a field-scale groundwater remediation experiment at Dover Air Force Base, Delaware, has revealed that tetrachloroethane (PCE) and trichloroethene (TCE) contamination extends into an aquitard underlying a groundwater aquifer. The site location is well downgradient of the locations of contaminant release, and the aquitard contamination is believed to have begun when contaminated groundwater first arrived in the overlying aquifer. Using independent estimates of sorption and diffusion properties in the accreted layers, mathematical modeling based on diffusion in laminate slabs has been used to make inferences regarding the historical concentration conditions in the overlying aquifer. The results suggest that plume arrival occurred within the last two decades, with some important differences in the inferred TCE and PCE plume histories. The diffusion model was also applied toward predicting future aquitard concentrations and fluxes under scenarios based on the current condition as a starting point and hypothesized conditions of future groundwater cleanup. The results demonstrate how accreted sampling and diffusion modeling can provide essential information relevant to forensic analysis, risk assessment, and subsurface cleanup.

22. **Do participants in well water testing programs update their exposure and health risk perceptions?.**

Poe, Gregory L. and New York State College of Agriculture and Life Sciences. Dept. of Agricultural, Resource and Managerial Economics.

Ithaca, N.Y. : Dept. of Agricultural, Resource, and Managerial Economics, Cornell University, [1996] 23 p. : ill.

NAL Call #: HD1751.W67--no.96-11

Descriptors: Groundwater pollution, Health-aspects, Public-opinion, Wells, Health-risk assessment.

23. **Ecological considerations in pesticide risk assessment for aquatic ecosystems.**

Maund, S. J., Sherratt, T. N., Stickland, T., Biggs, J., Williams, P., Shillabeer, N., and Jepson, P. C.

Pestic sci 49: 2 pp. 185-190. (Feb 1997).

NAL Call #: SB951.P47

Descriptors: pesticides, toxicity, aquatic-environment, risk assessment, toxicology, ecotoxicology.

Abstract: Risk assessment of pesticides for aquatic ecosystems is typically based on comparisons of exposure and effect concentrations at a variety of levels (tiers). At the highest tier, effects assessment can involve generating data under field conditions, typically in mesocosm experiments. However, interpreting the ecological significance of effects measured in these studies can be difficult because ecological factors can influence the outcome of perturbations in the real world. The influence of ecological factors is not readily addressed experimentally and so a strategic modelling approach is proposed which may aid in defining acceptability of effects.

24. **Ecological issues and environmental impact assessment.**

Cheremisinoff, Paul N. and Abasheyeva, N. E.

Houston, Tex. : Gulf Publishing, c1997. xiii, 802 p. : ill., maps.

NAL Call #: QH541.A1E276--1997

Descriptors: Pollution, environmental-aspects, ecological risk assessment, Environmental chemistry.

25. **An ecological risk assessment for the use of the biocide, dibromonitripropionamide (DBNPA), in industrial cooling systems.**

Klaine, S. J., Cobb, G. P., Dickerson, R. L., Dixon, K. R., Kendall, R. J., Smith, E. E., and Solomon, K. R.

Environ toxicol chem 15: 1 pp. 21-30. (Jan 1996).

NAL Call #: QH545.A1E58

Descriptors: biocides, exposure, toxicity, aquatic organisms, risk, industrial-applications.

Abstract: A tiered approach was employed to determine risks posed to aquatic organisms exposed to dibromonitripropionamide (DBNPA). Tier one assessments used conservative exposure and toxicity data and indicated that potential toxicity warranted a more rigorous risk assessment. Tier two used discharge and stream flow data to develop a probabilistic model of DBNPA concentrations reaching the stream. Predicted 90th percentile in-stream DBNPA concentrations were compared to all available toxicity data for aquatic organisms at several different trophic levels. The EC10 for one organism was similar to the calculated 90th percentile of DBNPA concentrations in streams. Using the complete EC10 data set and comparing the 10th percentile EC10 with the 90th percentile

environmental concentration. DBNPA did not pose a measurable risk to the aquatic ecosystem.

26. Ecological risk assessment of atrazine in North American surface waters.

Solomon, K. R., Baker, D. B., Richards, R. P., Dixon, K. R., Klaine, S. J., La Point, T. W., Kendall, R. J., Weisskopf, C. P., Giddings, J. M., and Giesy, J. P.

Environ toxicol chem 15: 1 pp. 31-76. (Jan 1996).

NAL Call #: QH545.A1E58

Descriptors: atrazine, exposure, toxicity, aquatic organisms, aquatic-environment nontarget-organisms nontarget-effects water pollution, water quality, risk, usa.

Abstract: The triazine herbicide atrazine (2-chloro-4-ethylamino-6-isopropyl-amino-s-triazine) is one of the most used pesticides in North America. Atrazine is principally used for control of certain annual broadleaf and grass weeds, primarily in corn but also in sorghum, sugarcane, and, to a lesser extent, other crops and landscaping. Atrazine is found in many surface and ground waters in North America, and aquatic ecological effects are a possible concern for the regulatory and regulated communities. To address these concerns an expert panel (the Panel) was convened to conduct a comprehensive aquatic ecological risk assessment using probabilistic risk assessment techniques. The environmental exposure assessment concentrated on monitoring data from Midwestern watersheds, the area of greatest atrazine use in North America. This analysis revealed that atrazine concentrations rarely exceed 20 micrograms/L in rivers and streams that were the main focus of the aquatic ecological risk assessment. Following storm runoff, biota in lower-order streams may be exposed to pulses of atrazine greater than 20 micrograms/L, but these exposures are short-lived. The assessment also considered exposures in lakes and reservoirs. Atrazine residues were widespread in reservoirs (92% occurrence), and the 90th percentile of this exposure distribution for early June to July was about 5 micrograms/L. Mathematical simulation models of chemical fate were used to generalize the exposure analysis to other sites and to assess the potential effects of reduction in the application rates. Based on an integration of laboratory bioassay data, field effects studies, and environmental monitoring data from watersheds in high-use areas in the Midwestern United States, the Panel concluded that atrazine does not pose a significant risk to the aquatic environment. It is recommended that site-specific risk assessments be conducted at these sites to assess possible ecological effects in the context of the uses to which these ecosystems are put and the effectiveness and cost-benefit aspect of any risk mitigation measures that may be applied.

27. Ecological risk assessment of contaminants in soil.

Straalen, N. M. van., Lokke, Hans., and SERAS Network. Netherlands Integrated Soil Research Programme.

London ; New York : Chapman & Hall, 1997. xiii, 333 p. : ill.

NAL Call #: TD878.E26--1997

Descriptors: Soil pollution, Congresses, Soil ecology, Soil remediation.

28. Ecological risk assessment of contaminated sediments : proceedings of the Pellston Workshop on Sediment Ecological Risk Assessment, 23-28 April 1995, Pacific Grove, California.

Ingersoll, Christopher G. 1955, Dillon, Tom 1949, Biddinger, Gregory R., and Pellston Workshop on Sediment Ecological Risk Assessment (1995 : Pacific Grove, Calif. SETAC Society SETAC Foundation for Environmental Education. Pensacola, Fla. : SETAC Press, c1997. 389 p. : ill. NAL Call #: QH545.C59P45-1995

Descriptors: Contaminated sediments, Environmental aspects, Congresses, Ecological risk assessment.

29. An ecological risk assessment of lead shot exposure in non-waterfowl avian species: upland game birds and raptors.

Kendall, R. J., Lacher, T. E. Jr., Bunck, C., Daniel, B., Driver, C., Grue, C. E., Leighton, F., Stansley, W., Watanabe, P. G., and Whitworth, M. *Environ toxicol chem* 15: 1 pp. 4-20. (Jan 1996). NAL Call #: QH545.A1E58

Descriptors: lead, exposure, wild-birds, game birds, predatory-birds, lead-poisoning, nontarget-effects, nontarget-organisms risk.

Abstract: There is increasing concern that birds in terrestrial ecosystems may be exposed to spent lead shot. Evidence exists that upland birds, particularly mourning doves (*Zenaidura macroura*), ingest spent lead shot and that raptors ingest lead shot by consuming wounded game. Mortality, neurological dysfunction, immune suppression, and reproductive impairment are documented effects of exposure to lead in birds. An ecological risk assessment on the impact of lead shot exposure in upland birds was conducted and is presented in the context of the new United States Environmental Protection Agency's Ecological Risk Assessment Paradigm. A considerable amount of spent lead shot is released into the environment each year from shooting and hunting. Doves collected from fields that are cultivated to attract mourning doves for hunting activities show evidence of ingestion of spent lead shot. Because lead can cause both acute and chronic toxicity if ingested by birds, and because there is evidence of wide spread deposition of lead shot in terrestrial ecosystems, concern for impacts on upland game birds and raptors seems warranted. Although this ecological risk assessment does not clearly define a significant risk of lead shot exposure to upland game birds, this issue merits continued scrutiny to protect our upland game bird and raptor resources.

30. Economic analysis of best management practices in the Gum Creek Watershed water quality program.

Sun, H., Houston, J., and Bergstrom, J. *J soil water conserv* 51: 2 pp. 176-180. (Mar/Apr 1996). NAL Call #: 56.8-J822

Descriptors: crop-management, water-management, watersheds, pollution, point-sources, pollution-control, economic-analysis, risk, simulation, stochastic-processes, water quality, programs, subsidies, Georgia, non-point-source-pollution.

31. **Environmental and health atlas of Russia = Atlas "okruzhaiushcha sreda i zdorove naseleniia Rossii".**

Feshbach, Murray

Moscow, Russia : Pains Pub. House, 1995. 1 atlas (various pagings) : ill., maps (some col.)

NAL Call #: G2141.E55E58--1995

Descriptors: Environmental-health, Russia-Federation, Maps, Health-risk assessment, Environmentally-induced-diseases.

32. **Environmental fate/risk assessment.**

Lavy, T. L., Senseman, S. A., Mattice, J. D., and Skulman, B. W.

Alternatives accomplishments of the University of Arkansas Alternative Pest Control Center 1989-1995. Fayetteville, Ark. : Arkansas Agricultural Experiment Station, [1997]. p. 77-84.

NAL Call #: 100-Ar42Sp-no.180

Descriptors: pesticides, water pollution, soil pollution

33. **Environmental hazard of selenium in the Animas La Plata water development project.**

Lemly, A. D.

Ecotoxicol environ saf 37: 1 pp. 92-96. (June 1997).

NAL Call #: QH545.A1E29

Descriptors: contaminants, water-supply irrigation-water risk assessment,

34. **Environmental health assessment of the benthic habitat adjacent to a pulp mill discharge. I. Acute and chronic toxicity of sediments to benthic macroinvertebrates.**

Sibley, P. K., Legler, J., Dixon, D. G., and Barton, D. R.

Arch-environ-contam-toxicol. New York, Springer-Verlag. Apr 1997. v. 32 (3) p. 274-284.

NAL Call #: TD172.A7

Descriptors: pulp-mill-effluent, pollutants, toxicity, aquatic-invertebrates, risk assessment.

35. **Environmental toxicology and risk assessment : modeling and risk assessment, sixth volume.**

Dwyer, F. James., Doane, Thomas R., Hinman, Mark L., and ASTM Committee E 47 on Biological Effects and Environmental Fate. Symposium on Environmental Toxicology and Risk Assessment (6th : 1996 : Orlando, Fla.

West Conshohocken, PA : ASTM, c1997. 564 p. : ill., maps.
NAL Call #: RA1226.E69--1997

Descriptors: Environmental-toxicology, Congresses, Pollution, Environmental-aspects, Health-risk assessment, Environmental-health.

36. Estimating probabilities of nitrogen and phosphorus loss from animal waste application.

Johnson, A. F., Vietor, D. M., Rouquette, F. M. Jr., Haby, V. A., and Wolfe, M. L.
Animal waste and the land-water interface. Boca Raton : Lewis Publishers, c1995. p.
411-418. pp.
NAL Call #: TD930.A55-1995

Descriptors: dairy-effluent application-to-land, application-rates, losses-from-soil, nitrogen, phosphorus, leaching, irrigation, dairy-farming, cynodon-dactylon, lolium-multiflorum, water pollution, risk, texas, risk assessment.

37. Estimating risks from exposure to methylmercury: application to First Nations People in China.

Hoover, S., Hill, R., and Watson, T.
Water air soil pollut 97: 1/2 pp. 107-118. (June 1997).
NAL Call #: TD172.W36

Descriptors: mercury, exposure, risk assessment, food-intake, fish, freshwater-fishes, food-contamination, water pollution, lakes, rivers, American Indians, British Columbia.

38. Estimating the long-term phosphorus accretion rate in the Everglades: a Bayesian approach with risk assessment.

Qian, S. S. and Richardson, C. J.
Water resour res 33: 7 pp. 1681-1688. (July 1997).
NAL Call #: 292.8-W295

Descriptors: wetlands, pollutants, pollution, phosphorus, retention, risk assessment, bayesian-theory, decision-making, linear models, Florida, constructed-wetlands, phosphorus-retention, nonpoint-source-pollution.

Abstract: Using wetlands as a sink of nutrients, phosphorus in particular, is becoming an increasingly attractive alternative to conventional wastewater treatment technology. In this paper, we briefly review the mechanism of phosphorus retention in wetlands, as well as previous modeling efforts. A Bayesian method is then proposed for estimating the long-term phosphorus accretion rate in wetlands through a piecewise linear model of outflow phosphorus concentration and phosphorus mass loading rate. The Bayesian approach was used for its simplicity in computation and its ability to accurately represent uncertainty. Applied to an Everglades wetland, the Bayesian method not only produced the probability distribution of the long-term phosphorus accretion rate but also generated a relationship of acceptable level of "risk" and optimal phosphorus mass loading rate for

the proposed constructed wetlands in south Florida. The latter is a useful representation of uncertainty which is of interest to decision makers.

39. Evaluating mediterranean soil contamination risk in selected hydrological change scenarios.

Rosa, D. de la and Crompvoets, J.

Agric ecosyst environ 67: 2/3 pp. 239-250. (Feb 1998).

NAL Call #: S601.A34

Descriptors: agricultural-land, xeric-soils, soil-pollution, water pollution, risk assessment, land-evaluation, land use, soil-types, soil-water-regimes, intensification, models, hydrology, Spain, extensification, land-vulnerability-evaluation-mod el, pantanal-model

40. Evaluation of contaminated groundwater cleanup objectives.

Arquiett, C., Gerke, M., and Datskou, B.

Water air soil pollut 90: 1/2 pp. 83-92. (July 1996).

NAL Call #: TD172.W36

Descriptors: groundwater pollution, groundwater, water-purification, polluted-water, risk assessment, databases, estimated-costs, Georgia.

41. An evaluation of nitrogen runoff and leaching potential in the High Plains.

Wu, J. J., Bernardo, D. J., Mapp, H. P., Geleta, S., Teague, M. L., Watkins, K. B., Sabbagh, G. J., Elliott, R. L., and Stone, J. F.

J soil water conserv 52: 1 pp. 73-80. (Jan/Feb 1997).

NAL Call #: 56.8-J822

Descriptors: agricultural land, nitrogen, losses-from-soil, leaching, runoff, evaluation, estimation, crop-management, cropping systems, soil management, soil properties, simulation models, groundwater-pollution, risk assessment, water quality, environmental protection, pollution control, irrigation water, water management, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma, Texas.

42. Evaluation of the Farmstead Assessment System (FARM*A*SYST) in Minnesota.

Anderson, J. L., Bergsrud, F. G., and Ahles, T. M.

Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri. St. Joseph, MI: ASAE, c1995. v. 3 p. 9-12.

NAL Call #: TD365.C54-1995

Descriptors: pollution-control, groundwater pollution, risk, family farms, prevention, dairy farms, water quality, decision making, farmers' attitudes, surveys, educational programs, program evaluation, Minnesota, pollution prevention programs.

43. **Fallacies in ecological risk assessment practices.**

Power, M. and McCarty, L. S.

Environ sci technol 31: 8 pp. 370A-375A. (Aug 1997).

NAL Call #: TD420.A1E5

44. **Farm-level economic analysis incorporating stochastic environmental risk assessment.**

Teague, M. L., Bernardo, D. J., and Mapp, H. P.

Am j agric econ 77: 1 pp. 8-19. (Feb 1995).

NAL Call #: 280.8-J822

Descriptors: water quality, farm-income, environmental-protection, risk, agricultural-production, nitrates, pesticides, percolation, runoff, motad, regulation, stochastic-processes, indexes, Oklahoma, target-motad.

Abstract: A farm-level risk programming framework is presented which evaluates income/environmental risk tradeoffs. This framework uses a time-series of environmental risk indices to incorporate the stochastics, multiattribute characteristics of environmental outcomes associated with agricultural production practice. The model is applied to a representative farm in the Oklahoma Panhandle region of the Central High Plains. Results indicate that expected income is sensitive to nitrate loading restrictions, and relatively less sensitive to pesticide loading restrictions. Results also indicate that prescriptions derived using deterministic environmental risk measures may ignore significant probabilities of exceeding an environmental standard.

45. **Fishing in a polluted estuary: fishing behavior, fish consumption, and potential risk.**

May, H. and Burger, J.

Risk anal 16: 4 pp. 459-471. (Aug 1996).

NAL Call #: T174.5.R557

Descriptors: angling, crabs, fish consumption, polluted water, estuaries, risk assessment, risk-behavior, food-safety, food beliefs, food-contamination, health hazards, New York, New Jersey, risk-perception, crabbing, fish and crab consumption.

46. **Fundamentals of aquatic toxicology : effects, environmental fate, and risk assessment.**

Rand, Gary M. 1945

Washington, D.C. : Taylor & Francis, c1995. xxi, 1125 p. : ill.

NAL Call #: QH90.57.B5F86--1995

Descriptors: water quality, bioassay, Toxicity-testing, water pollution, toxicology, aquatic organisms, Effect of water pollution.

47. **The future of ecological risk assessment.**

Lackey, R. T.

Northwest sci 69: 2 pp. 171-174. (May 1995).

NAL Call #: 470-N81

Descriptors: environmental assessment, analysis, risk, philosophy, decision-making.

48. Genotoxic risk assessment of drinking water consumed in the city of Tehran, Iran.

Sabouni, F. and Zia'ee, A. A.

Arch-environ-contam-toxicol. New York, Springer-Verlag. Apr 1995. v. 28 (3) p. 391-395.

NAL Call #: TD172.A7

Descriptors: drinking-water, urban-areas, contaminants, toxicity, chromosome-aberrations, fibroblasts, in-vitro toxicity, public-health risk, Iran.

49. GIS and hydrologic models of non-point source pollution in subsurface water.

Maidment, D. R.

Applications of GIS to the modeling of non-point source pollutants in the vadose zone.

Madison, Wis. : Soil Science Society of America, c1996. p. 163-174.

NAL Call #: S590.S62-no.48

Descriptors: mapping-units, agricultural-chemicals, pollutants, nitrate, transport-processes, unsaturated-flow, groundwater pollution, models, hydrological-data, hydrology, geology, databases, geographical information systems, spatial-variation, environmental impact, risk assessment, Texas, vadose-zone, state-soil-geographic-database, hydrogeology, spatial-analysis.

50. GIS-based modeling of non-point source pollutants in the vadose zone.

Corwin, D. L., Loague, K., and Ellsworth, T. R.

J soil water conserv 53: 1 pp. 34-38. (First Quarter 1998).

NAL Call #: 56.8-J822

Descriptors: geographical information systems, simulation models, solutes, transport, groundwater-pollution, risk assessment, uncertainty.

51. Great Lakes water quality initiative criteria documents for the protection of human health.

United States. Environmental Protection Agency. Office of Water.

[Washington, DC] : U.S. Environmental Protection Agency, Office of Water, [1995] ii, 84 p.:

NAL Call #: TD223.3.G77--1995

Descriptors: water quality management, Great-Lakes, Health-risk assessment.

52. Great Lakes water quality initiative technical support document for human health criteria and values.

United States. Environmental Protection Agency. Office of Water.

[Washington, DC] : U.S. Environmental Protection Agency, Office of Water, [1995] 1 v. (various pagings):

NAL Call #: TD223.3.G775--1995

Descriptors: water quality management, Great-Lakes, Health-risk assessment.

53. Handbook of ecotoxicology.

Calow, Peter.

Oxford ; Malden, MA : Blackwell Science, c1998. 2 v. in 1 : ill.

NAL Call #: QH545.A1H363--1998

Descriptors: Pollution - Environmental aspects, Environmental-toxicology, Ecological risk assessment.

54. Handbook of ecotoxicology. Ecotoxicology.

Hoffman, David J. David John 1944

Boca Raton : Lewis Publishers, c1995. x, 755 p. : ill., maps.

NAL Call #: QH545.A1H364--1995

Descriptors: Pollution-Environmental aspects, Pollutants, Toxicology, Environmental-risk-assessment.

55. Hydrogeologic setting, hydraulic properties, and ground-water flow at the O-Field area of Aberdeen Proving Ground, Maryland.

Banks, William S. L., Smith, Barry S., Donnelly, Colleen A., and Aberdeen Proving Ground (Md.). Environmental Conservation and Restoration Division. Geological Survey (U.S.).

Towson, Md. : U.S. Dept. of the Interior, U.S. Geological Survey ; Denver, CO : Branch of Information Services [distributor], 1996. iv, 29 p. : ill., maps.

NAL Call #: GB701.W375--no.95-4248

Descriptors: Hydrogeology, Maryland, Aberdeen-Proving-Ground, Groundwater-flow, Hazardous-substances, risk assessment.

56. An indicator of pesticide environmental impact based on a fuzzy expert system.

Werf, H. M. G. van der. and Zimmer, C.

Chemosphere 36: 10 pp. 2225-2249. (Apr 1998).

NAL Call #: TD172.C54

Descriptors: pesticide residues, environmental impact, fuzzy-logic, expert-systems, groundwater-pollution, water pollution, air pollution, risk assessment, leaching, runoff, volatilization, toxicity, man, application methods, ipest-expert-system.

57. A memoir on risk assessment and environmental policy.

Samuels, S. W.

Preventive strategies for living in a chemical world a symposium in honor of Irving J Selikoff. New York : The New York Academy of Sciences, 1997. p. 418-432.

NAL Call #: 500-N484-v.837

Descriptors: risk assessment, environmental-policy, regulations, pollution, health-risk-assessment.

58. Mercury from power plants: a probabilistic approach to the evaluation of potential health risks.

Constantinou, E., Gerath, M., Mitchell, D., Seigneur, C., and Levin, L.

Water air soil pollut 80: 1/4 pp. 1129-1138. (Feb 1995).

NAL Call #: TD172.W36

Descriptors: mercury, power-stations, smoke, emission, air-pollution, deposition, water pollution, food-chains, freshwater-fishes, vegetation, crops, food-contamination, risk, probability-analysis, mathematical models, simulation models,.

59. Mercury in soils and crops from fields receiving high cumulative sewage sludge applications: validation of U. S. EPA's risk assessment for human ingestion.

Granato, T. C., Pietz, R. I., Gschwind, J., and Lue Hing, C.

Water air soil pollut 80: 1/4 pp. 1119-1127. (Feb 1995).

NAL Call #: TD172.W36

Descriptors: mercury, contamination, sewage-sludge, application-to-land, organic-amendments, uptake, zea-mays, triticum-aestivum, reclamation, coal-mined-land risk, public-agencies, Illinois, EPA.

60. On the performance of computational methods for the assessment of risk from ground-water contamination.

Hamed, M. M. and Bedient, P. B.

Ground-water. Westerville, Ohio : Ground Water Pub. Co. July/Aug 1997. v. 35 (4) p. 638-646.

NAL Call #: TD403.G7

Descriptors: groundwater pollution, polluted-water, groundwater, risk, risk assessment, neoplasms, man, benzene, tetrachloroethylene, probability-analysis, drinking-water contamination, probability, California, reliability-methods.

Abstract: The effect of parameter uncertainty and overly conservative measures on risk assessment has been addressed in numerous researches. Most of the work conducted to date is based on the use of the classic Monte Carlo simulation method (MCS) as a probabilistic modeling tool. Although the MCS is robust and asymptotically convergent, it lacks computational efficiency when the simulated probability is small. Furthermore, the sensitivity information can only be obtained with additional computational effort. First, and second-order reliability methods (FORM and SORM) have been developed in the structural analysis field and have been recently applied to ground-water contaminant transport and remediation problems. In this work, we extend the application of the reliability methods to the probabilistic assessment of cancer risk due to ground-water contamination. Results of the reliability methods compared well with a published case study of PCE contamination of a ground-water supply in California. The target risk level is extended over a larger range, and the sensitivity of the probability of failure to the

relevant random variables is analyzed. The application of the methods to another case study, cancer risk due to the ingestion of benzene contaminated water, further illustrates a systematic way of directly accounting for the intrinsic uncertainty of the transport and fate model parameters involved in the risk assessment procedure. The probability of exceeding the target risk level in this case was found to be most sensitive to the uncertainty in the parameters describing the ground-water transport process.

61. An outline of a guidance framework for assessing hydrogeological risks at early stages.

Rosen, L. and LeGrand, H. E.

Ground-water. Westerville, Ohio : Ground Water Pub. Co. Mar/Apr 1997. v. 35 (2) p. 195-204.< NAL Call #: TD403.G7

Descriptors: groundwater pollution, aquifers, contaminants, pollutants, groundwater flow, transport-processes, hydrology, risk assessment, decision making, simulation models, conceptual models, quantitative models.

Abstract: The prevalent and straightforward routine of impulsively collecting masses of new data for studies relating to ground-water contamination can be inefficient and costly as it does not provide optimal value from existing hydrogeologic and other information. A preliminary guidance framework is outlined, for early stage monetary risk assessments prior to any new measurements, considering both the probability and the economical consequences of contamination. The framework is aimed at providing a basis for cost-effective decision-making regarding ground-water protection and management actions. It centers on improved conceptual hydrogeological site descriptions based on existing information and professional judgments prior to any new measurements. A key aspect of the framework is to derive maximum possible quantitative understanding of risks from limited prior available qualitative information. The framework has a dual-site approach, assuming a situation of a contaminant source site and a receptor site. A two-step procedure leads to the monetary risk assessment with respect to existing compliance levels: (1) conceptual model development, and (2) quantitative model realization, addressing the probability of contaminant release at the contamination source, the hydraulic connection between the source and the receptor, and the contaminant transport conditions. The purpose of the framework is twofold: (1) to provide a risk assessment framework which optimizes use of professional judgment for studies where data are limited, and (2) to give synergistic interpretive values that complement field measurements and that can be used as prior estimates in more detailed studies.

62. Pesticide leaching assessment method for ranking both single substances and scenarios of multiple substance use.

Sorensen, P. B., Mogensen, B. B., Gyldenkaerne, S., and Rasmussen, A. G.

Chemosphere 36: 10 pp. 2251-2276. (Apr 1998).

NAL Call #: TD172.C54

Descriptors: herbicide-residues, leaching, risk assessment, usage, ranking, risk, groundwater-pollution, application-rates, half-life sorption, probability, simulation models, statistical-analysis, Denmark, hasse-diagram-analysis.

63. **Pesticide use water quality : an assessment of claims.**

Rikoon, Sandy., Constance, Doug., and University of Missouri Columbia. Dept. of Rural Sociology.

Columbia, Mo. : Dept. of Rural Sociology, University of Missouri-Columbia, [1997] 15 p. : col. ill.

NAL Call #: 100--M693Sp-no.505

Descriptors: Pesticides, Environmental-aspects, Missouri, Pesticides-risk assessment, water quality.

64. **Policy implications of ranking distributions of nitrate runoff and leaching from corn production by region and soil productivity.**

Boisvert, R. N., Regmi, A., and Schmit, T. M.

J prod agric 10: 3 pp. 477-483. (July/Sept 1997).

NAL Call #: S539.5.J68

Descriptors: maize-soils, nitrate, runoff, leaching, losses-from-soil, soil-variability, simulation-models, regression-analysis, mathematical models, risk assessment, water pollution, nitrogen-fertilizers, application-rates, crop-production, land- productivity, environmental-policy, pollution-control, stochastic-processes, New York, groundwater-loading-effects-of-agricultural-management-systems, GLEAMS.

Abstract: The purpose of this study was to understand the implications of farm-to-farm and regional variations in N runoff and leaching for targeting specific policies to reduce nutrient contamination. To do this, we estimated distributions of runoff and leaching for individual soils on nearly 150 farms in three farm production regions of New York and ranked the distributions according to second degree stochastic dominance criteria (SSD). Based on these rankings, it was evident that cropland a cross farms and regions of New York is so heterogeneous that it is impossible to target polices to reduce nitrate contamination based on farm or regional characteristics. A much clearer ranking was found when soils were grouped by productivity group as me asured by corn (*Zea mays* L.) yield. Based on the estimated elasticities of nitrate runoff and leaching with respect to N application, one can target those areas where contamination problems are most severe by focusing on soils with potential yields greater than 125 bu/acre. For it to make sense to target lower productivity soils, the productivity of additional N application at the margin on the highest yielding soils would have to be about double that of the lower yielding group. Evidence indicates that t he ratios of productivities are less than unity in all three production regions.

65. **Prioritization of ground water contaminants and sources.**

Knox, R. C. and Canter, L. W.

Water air soil pollut 88: 3/4 pp. 205-226. (Apr 1996).

NAL Call #: TD172.W36

Descriptors: groundwater pollution, pollutants, chlorinated-hydrocarbons, metals, organic-compounds risk, risk assessment, pesticide-residues, classification, pollution-sources

66. Probabilistic tools for assessing and minimizing risks to water quality.

Vietor, D. M., Johnson, A. F., Harris, B. L., Wolfe, M. L., and Thompson, P. B.
Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri. St. Joseph, Mich. : ASAE, c1995. v. 3 p. 299-302.
NAL Call #: TD365.C54-1995

Descriptors: probability, analysis, probability, computer-analysis, computer-software, water pollution, groundwater pollution, risk, dairy-effluent, application-to-land, waste water treatment, dairy-wastes, lagoons, computer-simulation, permanent- grasslands, nutrient-uptake runoff, Texas.

67. Proceedings of the SCOPE Workshop on Soil and Groundwater Pollution : fundamentals, risk assessment, and legislation : Cesky Krumlov, Czech Republic, June 6 and 7, 1994.

Zehnder, Alexander J. B. and SCOPE Workshop on Soil and Groundwater Pollution (1994 : Cesky Krumlov, Czech Republic International Council of Scientific Unions. Scientific Committee on Problems of the Environment. United Nations Environment Programme. Swiss Federal Institute for Environmental Science and Technology. Dordrecht ; Boston : Kluwer Academic Publishers, c1995. xi, 164 p. : ill., map.
NAL Call #: TD878.S38--1994

Descriptors: Soil-pollution, Groundwater pollution, Pollution-Risk-assessment, Soil-pollution, Groundwater pollution, Europe.

68. Recovery analysis in risk management of hazardous materials.

Rossi, E. and Ettala, M.
Uncertainty, risk and transient pollution events selected proceedings of the IAWQ Interdisciplinary International Symposium on Uncertainty, Risk and Transient Pollution Events, held in Exeter, UK, 26-28 July 1995. IAWQ Interdisciplinary International Symposium on Uncertainty, Risk and Transient Pollution Events. 1st ed. Oxford : Pergamon ; New York : Elsevier Science, c1996. p. 133-141.
NAL Call #: TD420.A1P7-v.33-no.2

Descriptors: pulp-and-paper-industry, fuel-oils, lubricants, oil-spills, fuel-tanks, prevention, pollution-control, water pollution, groundwater pollution, monitoring.

69. Reporting on risk : a journalist's handbook on environmental risk assessment.

Kamrin, Michael A., Katz, Dolores J., Walter, Martha L., and Foundation for American Communications. National Sea Grant College Program (U.S.).
Ann Arbor, MI : Produced by Foundation for American Communications and National Sea Grant College Program, c1995. x, 113 p.
NAL Call #: PN4784.M4K36--1995

Descriptors: Health-risk assessment, Environmental health.

70. Research and development needs in monitoring agroecosystems in Canada.

Smith, C. A. S.

North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems = Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos Mexico City, September 18-22, 1995. North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems. Fort Collins, CO : USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, [1996]. p. 97-104.

NAL Call #: aSD11.A42-no.284

Descriptors: agricultural-land, ecosystems, ecology, monitoring, environmental assessment, remote-sensing, soil-surveys, land use, surveys, sustainability, farming-systems, risk assessment, soil-degradation, water quality, use-efficiency, cycling, nutrients, landscape, pollutants, air-pollution, mathematical models, Canada.

71. A review and assessment of the ecological risks associated with the use of chlorine dioxide for the bleaching of pulp.

Solomon, K., Bergman, H., Huggett, R., Mackay, D., and McKague, B.

Pulp pap Can 97: 10 pp. 35-44. (Oct 1996).

NAL Call #: 302.8-P96

Descriptors: chlorine-dioxide, bleaching-agents, bleaching, wood-pulp, pulp-mill-effluent, organochlorine-compounds, aquatic-environment, risk assessment, literature-reviews.

72. Risk assessment and fuzzy logic as related to environmental science.

Bogardi, I., Bardossy, A., Mays, M. D., and Duckstein, L.

Data reliability and risk assessment in soil interpretations.. Madison, Wis. : Soil Science Society of America, 1996. p. 81-97.

NAL Call #: S590.S62-no.47

Descriptors: soil-pollution, contamination, risk assessment, fuzzy-logic, uncertainty, soil, information, reliability.

73. Risk assessment and management of drinking water pollutants in Korea.

Chung, Y., Shin, D., Park, S., Lim, Y., Choi, Y., Cho, S., Yang, J., Hwang, M., Park, Y., and Lee, H.

Water quality conservation in Asia selected proceedings of Asian Waterqual '97, the 6th IAWQ Asia-Pacific Regional Conference, held in Seoul, Korea, 20-23 May, 1997. IAWQ Asian Regional Conference on Water Conservation and Pollution Control. 1st ed . Oxford, U.K. ; Tarrytown, N.Y. : Pergamon, 1997. p. 309-323.

NAL Call #: TD420.A1P7-v.36-no.12

Descriptors: water pollution, rivers, pesticide-residues, pollutants, metals, volatile-compounds, polycyclic-hydrocarbons, water-supply, drinking-water, risk assessment,

hazards, carcinogens, Korea, hazard-identification, polycyclic-aromatic-hydro carbons, risk-management.

74. Risk assessment for a proposed groundwater abstraction scheme in Strathmore, North-East Scotland: a modelling approach.

Chen, M. and Soulsby, C.

J Inst Water Environ Manag 11: 1 pp. 47-55. (Feb 1997).

NAL Call #: TD420.W374

Descriptors: groundwater-extraction, groundwater-flow, aquifers, streams, environmental impact, mathematical models, simulation models, stream-flow, northern-scotland, stream-aquifer-interactions.

Abstract: The Lower Old Red Sandstones in northern Strathmore have favourable hydrogeological conditions for groundwater development. A scheme was proposed to abstract water in the north Esk catchment in order to augment water supplies to local villages, and a production borehole was drilled into the Edzell Sandstones to give a design yield of 2420 m³/d. However, this scheme has been abandoned because of concern that the abstraction would significantly reduce the flow in a nearby stream which is an important salmonid fishery. This study demonstrates the potential value of using a stream-aquifer numerical model in an environmental risk assessment for the proposed scheme.

75. Risk assessment in agriculture. Methodologies, organizations, communication and education.

Partridge, Natalie Updegrove., Roberts, Cindy., Gold, Mary., Dobert, Raymond., McCarthy, Sue., Lassanyi, Mary E., Olson, Wayne., and United States. Dept. of Agriculture. Office of Risk Assessment and Cost Benefit Analysis. National Agricultural Library (U.S.).

Beltsville, MD : The Library, 1996, 5 v. : ill.

NAL Call #: aS494.5.R5R57--1996

Descriptors: Agricultural-risk assessment, Environmental-risk assessment.

76. Risk assessment : logic and measurement.

Newman, Michael C. and Stojan, Carl L.

Chelsea, Mich. : Ann Arbor Press, c1998. viii, 352 p. : ill.

NAL Call #: GE145.R58--1998

Descriptors: Environmental-risk assessment, Human-ecology, Environmental-toxicology.

77. Risk assessment of mercury in Alta Floresta. Amazon Basin--Brazil.

Hacon, S., Rochedo, E. R., Campos, R., Rosales, G., and Lacerda, L. D.

Water air soil pollut 97: 1/2 pp. 91-115. (June 1997).

NAL Call #: TD172.W36

Descriptors: mercury, exposure, risk assessment, food-intake, fish, freshwater-fishes, food-contamination, water pollution, rivers, food-chains, mato-grosso.

78. Risk assessment of opportunistic bacterial pathogens in drinking water.

Rusin, P. A., Rose, J. B., Haas, C. N., and Gerbe, C. P.

Rev-environ-contam-toxicol. New York : Springer-Verlag, 1997. v. 152 p. 57-83.

NAL Call #: TX501.R48

Descriptors: drinking-water, water quality, pathogens, bacteria, literature-reviews.

79. A risk-based approach for selecting priority pesticides for groundwater monitoring programs.

Shukla, S., Mostaghimi, S., and Bruggeman, A. C.

Trans ASAE 39: 4 pp. 1379-1390. (July/Aug 1996).

NAL Call #: 290.9-Am32T

Descriptors: pesticides, groundwater pollution, risk assessment, techniques, leaching, usage, toxicity, indexes, environmental impact, mathematical models, comparisons, man, health-protection, monitoring, decision-making, Virginia, pesticide-pollution-potential, leaching-potential, total-mobility-index, impact-potential-score, relative-mobility-index, relative-toxicity-index, relative-usage-index, relative-extent-index, relative-loading-index.

Abstract: A technique for screening pesticides with respect to their overall risk to potential contamination of groundwater was developed for the purpose of selecting priority pesticides for groundwater monitoring programs. The risk assessment technique considers leaching potential, extent of usage, and toxicity of pesticides. These three factors were integrated to obtain an index, the Impact Potential Score (IPS). To evaluate leaching potential, a second index, Total Mobility Index (TMI) was also developed. The two indices were evaluated for their performance by applying them to a monitored watershed in Virginia's Coastal Plain. TMI predictions were compared against five years of groundwater monitoring data. TMI performed fairly well in identifying the top few high mobility pesticides. The IPS can be effectively used to select "high risk" pesticides for groundwater monitoring programs and for qualitative risk assessment. Incorporation of risk screening techniques, into environmental management decision processes is useful for evaluation of pesticide contamination potential of groundwater.

80. Risk-based contaminated land investigation and assessment.

Petts, Judith., Cairney, T. Thomas, and Smith, Mike.

Chichester ; New York : Wiley, c1997. xviii, 334 p. : ill.

NAL Call #: TD1050.R57P48--1997

Descriptors: Hazardous-wastes, risk assessment, Hazardous-waste-sites, Management.

81. Risk-based decision analysis in the design of water supply projects.

Latinopoulos, P., Mylopoulos, N., and Mylopoulos, Y.

Water resour manag 11: 4 pp. 263-281. (Aug 1997).
NAL Call #: TC401.W27

Descriptors: water-resources, groundwater, aquifers, groundwater pollution, risk assessment, decision-analysis, water-supply design, groundwater-flow, simulation models, stochastic models, villages, pollutants, transport-processes.

Abstract: The application of a decision analysis methodology to a small-scale water-supply/aquifer-contamination problem is presented. The main characteristic of the study is the development of a series of alternative strategies to ensure a continuous water supply to a village under variable risk conditions. It is assumed that the risks involved in the analysis reflect the uncertainty as to the hydraulic conductivity. Thus, a stochastic simulation model for groundwater flow and contaminant transport is employed in order to evaluate the implications of uncertainty in the system's behaviour upon the overall design decisions. Alternative decision strategies are formulated by considering both actual and probabilistic costs, and they are finally compared using a risk-cost-benefit objective function.

82. Risk-based decision making in water resources VII : proceedings of the seventh conference, October 8-13, 1995, Santa Barbara, California.

Haimes, Yacov Y., Moser, David A., Stakhiv, Eugene Z., Zisk, Grace I., and Engineering Foundation (U.S.). Universities Council on Water Resources. American Society of Civil Engineers. Task Committee on Risk Analysis and Management. Engineering Foundation Conference on Risk Based Decision Making in Water Resources (7th : 1995 : Santa Barbara, Calif.

New York : American Society of Civil Engineers, c1996. ix, 450 p. : ill., maps
NAL Call #: TC401.R563--1996

Descriptors: Water-resources-development, Decision-making, Congresses, risk assessment.

83. Risk versus risk : tradeoffs in protecting health and the environment. Risk vs. risk.

Graham, John D. John David 1956 and Wiener, Jonathan Baert 1962

Cambridge, Mass. : Harvard University Press, 1995. xiii, 337 p. : ill.

NAL Call #: RA427.3.R58--1995

Descriptors: Health-risk assessment, Health-behavior, Decision-making, Environmental-health-Decision-making.

84. Risks due to groundwater contamination at a plutonium processing facility.

Datskou, I. and North, K.

Water air soil pollut 90: 1/2 pp. 133-131. (July 1996).

NAL Call #: TD172.W36

Descriptors: groundwater pollution, radionuclides, uranium, iodine, technetium, chromium, fluoride, chloroform, trichloroethylene, carbon-tetrachloride pollutants,

nitrate, power-industry, nuclear-energy, risk-assessment, groundwater-flow costs, water-purification, cost-benefit-analysis, USA, cyanide.

85. The role of risk analysis in water resources engineering.

Mays, L. W.

Water resour update Vol. 103 pp. 8-11. (Spring 1996).

NAL Call #: TD201.U61

86. Selection of priority properties to assess environmental hazard of pesticides.

Halfon, E., Galassi, S., Bruggemann, R., and Provini, A.

Chemosphere 33: 8 pp. 1543-1562. (Oct 1996).

NAL Call #: TD172.C54

Descriptors: pesticides, insecticides, herbicides, pesticide-residues, insecticide-residues, herbicide-residues, water pollution, rivers, persistence, physicochemical-properties, solubility, usage, vapor-pressure risk, ranking, Italy.

87. Significance and application of microbial toxicity tests in assessing ecotoxicological risks of contaminants in soil and sediment.

Beelen, P. van and Doelman, P.

Chemosphere 34: 3 pp. 455-499. (Feb 1997).

NAL Call #: TD172.C54

Descriptors: polluted-soils, sediment, pollutants, toxicity, tests, bioassays, contaminants, soil-flora, soil-enzymes, biological-activity-in-soil, respiration, mineralization, microbial-degradation, nitrogen, carbon, microbial-activities, literature-reviews.

88. Soil ecotoxicological risk assessment: how to find avenues in a pitch dark labyrinth.

Eijsackers, H.

Diversification in toxicology, man and environment EUROTOX proceedings proceedings of the 1997 EUROTOX Congress Meeting held in Aarhus, Denmark. EUROTOX Congress Meeting. Berlin ; New York : Springer, 1998. p. 83-96.

NAL Call #: RA1190.A7-Suppl.20

Descriptors: contaminants, polluted-soils toxicology, ecotoxicology.

89. Support for waste facility siting: differences between community leaders and residents.

Spies, S., Murdock, S. H., White, S., Krannich, R., Wulfhorst, J. D., Wrigley, K.,

Leistritz, F. L., Sell, R., and Thompson, J.

Rural sociol 63: 1 pp. 65-93. (Mar 1998).

NAL Call #: 281.28-R88

Descriptors: waste-disposal-sites, public-opinion, risk perception, surveys, demography, socioeconomics, multivariate-analysis, Colorado, Nebraska, Oklahoma, Texas, Utah.

Abstract: Decisions regarding hazardous waste facility siting are now open to extensive public debate. Efforts on the part of public officials and private companies to site waste

management facilities have been thwarted by public opposition. Using survey data from leaders and residents in communities which are hosting or siting facilities, this study examines their sociodemographic characteristics, knowledge, levels of trust, perceptions of risk, perceptions of economic impacts, perceptions of equity issues and the differential effects of these factors on acceptance of local waste facility siting. Leaders in these communities were more supportive of local waste facility siting than were other community residents. The major determinant of leaders' acceptance of waste siting was their perceptions of the economic benefits of a facility to the community. Although this was also important to residents, perceptions of health, safety, and environmental contamination risks had larger effects on their acceptance of such facilities.

90. **SYNOPSIS 1.1: a model to assess and to compare the environmental risk potential of active ingredients in plant protection products.**

Gutsche, V. and Rossberg, D.

Agric ecosyst environ 64: 2 pp. 181-188. (July 1997).

NAL Call #: S601.A34

Descriptors: plant-protection, pesticides, environmental impact, nontarget-effects, risk assessment, soil-pollution, water pollution, toxicity, mathematical models, ecotoxicology, assessment models.

91. **Territorial vulnerability evaluation in Tiber watershed.**

Mennella, V. G. G., Borghi, P., Macellari, E., and Porceddu, P. R.

Environ monit assess 41: 2 pp. 183-200. (June 1996).

NAL Call #: TD194.E5

Descriptors: pig-farming, pig-manure, watersheds, rivers, water pollution, environmental impact, risk-assessment, Italy.

92. **Towards a Regional Index of Biological Integrity: the example of forested riparian ecosystems.**

Brooks, R. P., O'Connell, T. J., Wardrop, D. H., and Jackson, L. E.

Environ monit assess 51: 1/2 pp. 131-143. (June 1998).

NAL Call #: TD194.E5

Descriptors: wetlands, ecosystems, riparian-vegetation, forest-ecology, habitats, community-ecology, biological indicators, indexes, stress, decision-making, risk assessment, Pennsylvania, middle-atlantic-states-of-usa, environmental-stressors.

93. **Uncertainties in leaching risk assessments due to field averaged transfer function parameters.**

Mallawatantri, A. P.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. May/June 1996. v. 60 (3) p. 722-726.

NAL Call #: 56.9-So3

Descriptors: agricultural soils, irrigated soils, solutes, agricultural chemicals, leaching, movement-in-soil, risk assessment, water pollution, point sources, stochastic models, spreading, soil variability, spatial variation, soil water content, bulk density, evapotranspiration, irrigation water, soil depth, water-management, Washington, local-versus-field-scale-transport-parameters, nonpoint source pollution, net-applied-water-distribution, solute spreading.

Abstract: The transfer function model is widely used to estimate solute transport patterns at the field scale. Leaching risk assessments with the transfer function model may be influenced by spatial variability in the net applied water (NAW) distribution, but few researchers have investigated this possibility. The objective of this study was to evaluate the impact of spatial variability in the NAW distribution on leaching risk assessment and identification of leaching risk categories at the field scale. Bromide concentration profiles, irrigation depths, bulk densities, and soil moisture contents were measured in 40 plots across a 57-ha potato (*Solanum tuberosum* L.) farm, along with field-scale evapotranspiration estimates, to estimate solute transport parameters. Values for field, and plot-scale means and standard deviations for the NAW distribution were estimated using the stochastic convective lognormal transfer function (CLT) model. The probability of NO₃(-) leaching below a depth of 2 m was then estimated using field-averaged versus plot-scale estimates for the mean and standard deviation of the NAW distribution. For 30-cm NAW, NO₃(-) leaching risks estimated with the CLT model and plot-scale means and standard deviations were very high in 0.4 ha of the field, high in 1.8 ha, moderate in 8.7 ha, low in 23.0 ha, and none in 23.1 ha. In contrast, when field-scale average estimates of NAW were used, there was a low risk of NO₃(-) leaching for the entire field. Thus, when estimating leaching risks using the CLT, information about spatial variability of the NAW distribution is important.

94. **Uncertainty in regional-scale assessments of non-point source pollutants.**

Loague, K. and Corwin, D. L.

Applications of GIS to the modeling of non-point source pollutants in the vadose zone. Madison, Wis. : Soil Science Society of America, c1996. p. 131-152.

NAL Call #: S590.S62-no.48

Descriptors: solutes, transport-processes, movement-in-soil, subsurface-layers, unsaturated-flow, pollutants, risk assessment, environmental-management, decision-making, data-analysis, uncertainty, simulation, simulation models, geographical information systems, landscape, mapping, maps, vulnerability-mapping, landscape-scale, solute-transport models, risk-management, data-uncertainty, simulation-uncertainty.

95. **Uncertainty of groundwater vulnerability assessments for agricultural regions in Hawaii: review.**

Loague, K., Bernknopf, R. L., Green, R. E., and Giambelluca, T. W.

J environ qual 25: 3 pp. 475-490. (May/June 1996).

NAL Call #: QH540.J6

Descriptors: groundwater pollution, geographical information systems, simulation models, risk-assessment.

Abstract: There are important challenges associated with assessing potential groundwater vulnerability hazards that may result from regional scale applications of agrochemicals. The increasing availability of Geographic Information System (GIS) software to those involved in assisting with land use decisions has resulted in the widespread production of multicolored risk management maps for many environmentally sensitive issues. Soil-based GIS's have recently been coupled to various solute-leaching models to make near-surface groundwater vulnerability assessments for guidance in pesticide regulation in several states. In general, these assessments rest on soil, climatic, and chemical data that are extremely sparse and contain considerable uncertainty. It is also important to acknowledge the uncertainty associated with the transport/fate processes that are not accounted for by the modeling approach used to make the assessment. In this paper, we review the results from a series of papers that have focused on characterization of uncertainty in pesticide mobility estimates, using the attenuation and retardation indices (AF and RF), for the Pearl Harbor Basin on the Hawaiian island of Oahu. Relative to data error uncertainties, we discuss the impacts of: (i) soil, climatic, and chemical data base uncertainties, (ii) reductions in data base uncertainties, (iii) extrapolation of soil data base information based on soil taxonomy and soil survey, and (iv) importing information from outside the region of interest. Relative to model error uncertainties, we compare pesticide leaching estimates from the simple AF and RF mobility indices with simulations from the EPA's Pesticide Root Zone Model (PRZM) and field observations. Finally, we outline a Regional Integrated Risk Assessment approach for characterizing regional scale groundwater vulnerability for near-surface nonpoint sources.

96. Uniform System for the Evaluation of Substances. V. ESPE, risk assessment for pesticides.

Linders, J. B. H. J. and Luttk, R.
Chemosphere 31: 5 pp. 3237-3248. (Sept 1995).
NAL Call #: TD172.C54

Descriptors: pesticides, pesticide-residues, water pollution, health-hazards, risk, regulations, evaluation, decision-making, soil-pollution, air-pollution, simulation models, Netherlands, agricultural-pesticides, non-agricultural-pesticides.

97. The uptake of radionuclides by beans, squash, and corn growing in contaminated alluvial soils at Los Alamos National Laboratory.

Fresquez, P. R., Armstrong, D. R., Mullen, M. A., and Naranjo, L. Jr.
J environ sci health, Part B, Pestic food contam agric wastes B33: 1 pp. 99-122. (1998).
NAL Call #: TD172.J61

Descriptors: radionuclides, contaminants, uptake, phaseolus-vulgaris, zea-mays, cucurbita-pepo, fruits, stems, leaves, concentration, soil-analysis, chemical-analysis, polluted-soils, risk assessment, food-safety, public-health, New Mexico.

98. Use of variable and uncertain data to quantify environmental pesticide risk.

Parker, R. D., Nelson, H. P., and Jones, R. D.
Data reliability and risk assessment in soil interpretations. Madison, Wis. : Soil Science

Society of America, 1996. p. 131-142.
NAL Call #: S590.S62-no.47

Descriptors: water pollution, pesticides, adverse-effects, aquatic organisms, toxicity, exposure, concentration, duration, risk assessment, ecosystems, spatial-variation, temporal-variation, simulation-models, computer-simulation, uncertainty, probability, agroecosystems, environmental-fate-and-transport-models.

99. A watershed-level ecological risk assessment methodology.

Hession, W. C., Storm, D. E., Haan, C. T., Burks, S. L., and Matlock, M. D.
Water resour bull 32: 5 pp. 1039-1054. (Oct 1996).
NAL Call #: 292.9-Am34

Descriptors: watersheds, aquatic-environment, water pollution, water quality, pollutants, phosphorus, eutrophication, risk assessment, uncertainty, probability, monte-carlo-method, geographical-information-systems, watershed-management, Oklahoma, wister-lake-watershed, nonpoint-source-pollution, pollutant-transport-and-fate models, euromod-model knowledge-uncertainty stochastic-variability.

Abstract: We present an ecological risk assessment methodology at the watershed level for freshwater ecosystems. The major component is a pollutant transport and fate model (a modified EUTROMOD) with an integrated uncertainty analysis utilizing a two-phase Monte Carlo procedure. The uncertainty analysis methodology distinguishes between knowledge uncertainty and stochastic variability. The model assesses the ecological risk of lentic (lake) ecosystems in response to the stress of excess phosphorus resulting in eutrophication. The methodology and model were tested on the Wister Lake watershed in Oklahoma with the lake and its trophic state as the endpoint for ecological risk assessment. A geographic information system was used to store, manage, and manipulate spatially referenced data for model input.

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