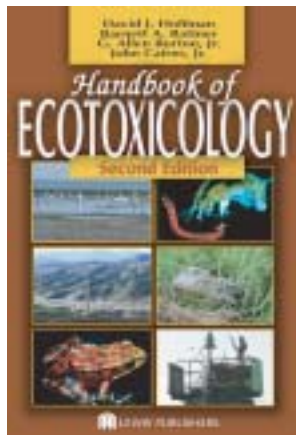


Release: February 2003	Contact: Dr. David J. Hoffman	Phone: 301-497-5712	Email: dave_hoffman@usgs.gov	Address: 12011 Beech Forest Rd. Laurel, MD 20708
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Handbook of Ecotoxicology, second edition

Ecotoxicology is a rapidly growing field focused on the study of the effects of potentially toxic agents on natural ecosystems, including prediction of effects on nontarget species. This second edition of Handbook of Ecotoxicology, containing 45 chapters with contributions from over 75 international experts, has expanded considerably in both scope and content over the first edition.

- The following contaminants were identified as significant hazards in ecosystems: persistent organochlorines, heavy metals, petroleum and PAHs, organophosphorus/carbamate anticholinesterases pesticides, selenium and other trace elements, polyhalogenated aromatic hydrocarbons, and mixtures as found in urban runoff.
- Other important human processes that disrupt ecosystems include global deforestation, pathogens and disease, abiotic factors that interact with contaminants, and nuclear and thermal pollution.
- Current methodologies and regulatory guidelines employed to study contaminant toxicity include aquatic toxicology testing with use of microcosms and mesocosms, sediment toxicity testing, soil ecotoxicology, algal and plant phytotoxicity, wildlife toxicology testing for multiple terrestrial species, and landscape ecotoxicology.
- Biomonitoring programs that use biomarkers and bioindicators in aquatic and terrestrial monitoring are becoming increasingly dependent upon use of rapid assays, often for on-site evaluation.
- Seven case histories illustrate the full impact of different environmental contaminants on diverse ecosystems and include effects of agricultural pesticides on migratory birds, PCBs on the aquatic food chain, impact of mining and smelting on river basins, white phosphorus from spent munitions, and nuclear meltdown.
- Ecological risk assessment evaluates the likelihood that adverse ecological effects will occur as a result of exposure to one or more stressors. Important tools for this in contaminant studies include measurements of bioaccumulation and bioconcentration, quantitative structure activity relationships (QSARs), population modeling, and global disposition.



- Contaminants are being identified that may be related to endocrine disruption, to worldwide decline of amphibian populations, to species endangerment, and to potential genetic effects on animal populations.
- Other important topics include industrial ecology and natural capitalism, indirect effects of agricultural pesticides on wildlife, and the role of nutrition on contaminant toxicity.

Management Implications:

It is clear that with loss of habitat, the quality of the remaining habitat becomes increasingly critical to the survival of species and ecosystems. Species at risk that occupy a very limited geographical area could be easily decimated by a single pollution event such as an oil or chemical spill, or misapplication of pesticides. On a temporal basis, when large numbers of individuals occupy a small geographical area (e.g. during migration or on wintering grounds), any localized impact could have the potential for serious consequences to populations. For these reasons, the balance between shrinking habitat and anthropogenic stressors becomes increasingly crucial to sustain both ecosystems and species diversity.

Text Themes:

- (1) Methods used to quantify ecotoxicological effects under controlled experimental conditions and under natural conditions.
- (2) Major classes and effects of environmental contaminants and other anthropogenic processes that disrupt ecosystems.
- (3) Real case histories involving contaminant disruption of natural ecosystems.
- (4) Techniques used for making estimates, predictions, and models for risk assessments of potential ecotoxicological effects.
- (5) New and significant issues in ecotoxicology.

Hoffman, D.J., B.A. Rattner, G.A. Burton, Jr. and J. Cairns, Jr. (Editors). 2003. Handbook of Ecotoxicology, 2nd edition, CRC Press, Boca Raton, FL, 1290 pp.