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## KEY=RISK - DALTON ONEILL

**Human exposure assessment : a guide to risk ranking, risk reduction, and research planning** *DIANE Publishing* **Assessing Risks to Endangered and Threatened Species from Pesticides** *National Academies Press* **The US Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) are responsible for protecting species that are listed as endangered or threatened under the Endangered Species Act (ESA) and for protecting habitats that are critical for their survival. The US Environmental Protection Agency (EPA) is responsible for registering or reregistering pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and must ensure that pesticide use does not cause any unreasonable adverse effects on the environment, which is interpreted to include listed species and their critical habitats. The agencies have developed their own approaches to evaluating environmental risk, and their approaches differ because their legal mandates, responsibilities, institutional cultures, and expertise differ. Over the years, the agencies have tried to resolve their differences but have been unsuccessful in reaching a consensus regarding their assessment approaches. As a result, FWS, NMFS, EPA, and the US Department of Agriculture asked the National Research Council (NRC) to examine scientific and technical issues related to determining risks posed to listed species by pesticides. Specifically, the NRC was asked to evaluate methods for identifying the best scientific data available; to evaluate approaches for developing modeling assumptions; to identify authoritative geospatial information that might be used in risk assessments; to review approaches for characterizing sublethal, indirect, and cumulative effects; to assess the scientific information available for estimating effects of mixtures and inert ingredients; and to consider the use of uncertainty factors to account for gaps in data. Assessing Risks to Endangered and Threatened Species from Pesticides, which was prepared by the NRC Committee on Ecological Risk Assessment under FIFRA and ESA, is the response to that request. Guidelines for carcinogen risk assessment** *DIANE Publishing* **Review of the Environmental Protection Agency's Draft IRIS Assessment of Formaldehyde** *National Academies Press* **Formaldehyde is ubiquitous in indoor and outdoor air, and everyone is exposed to formaldehyde at some concentration daily. Formaldehyde is used to produce a wide array of products, particularly building materials; it is emitted from many sources, including power plants, cars, gas and wood stoves, and cigarettes; it is a natural product in come foods; and it is naturally present in the human body as a metabolic intermediate. Much research has been conducted on the health effects of exposure to formaldehyde, including effects on the upper airway, where formaldehyde is deposited when inhaled, and effects on tissues distant from the site of initial contact. The U.S. Environmental Protection Agency (EPA) released noncancer and cancer assessments of formaldehyde for its Intergated Risk Information System (IRIS) in 1990 and 1991, respectively. The agency began reassessing formaldehyde in 1998 and released a draft IRIS assessment in June 2010. Given the complexity of the issues and the knowledge that the assessment will be used as the basis of regulatory decisions, EPA asked the National Research Council (NRC) to conduct an independent scientific review of the draft IRIS assessment. In this report, the Committee to Review EPA's Draft IRIS Assessment of Formaldehyde first addresses some general issues associated with the draft IRIS assessment. The committee next focuses on questions concerning specific aspects of the draft assessment, including derivation of the reference concentrations and the cancer unit risk estimates for formaldehyde. The committee closes with recommendations for improving the IRIS assessment of formaldehyde and provides some general comments on the IRIS development process. Science and Decisions Advancing Risk Assessment** *National Academies Press* **Risk assessment has become a dominant public policy tool for making choices, based on limited resources, to protect public health and the environment. It has been instrumental to the mission of the U.S. Environmental Protection Agency (EPA) as well as other federal agencies in evaluating public health concerns, informing regulatory and technological decisions, prioritizing research needs and funding, and in developing approaches for cost-benefit analysis. However, risk assessment is at a crossroads. Despite advances in the field, risk assessment faces a number of significant challenges including lengthy delays in making complex decisions; lack of data leading to significant uncertainty in risk assessments; and many chemicals in the marketplace that have not been evaluated and emerging agents requiring assessment. Science and Decisions makes practical scientific and technical recommendations to address these challenges. This book is a complement to the widely used 1983 National Academies book, Risk Assessment in the Federal Government (also known as the Red Book). The earlier book established a framework for the concepts and conduct of risk assessment that has been adopted by numerous expert committees, regulatory agencies, and public health institutions. The new book embeds these concepts within a broader framework for risk-based decision-making. Together, these are essential references for those working in the regulatory and public health fields. Review of the Environmental Protection Agency's Draft IRIS Assessment of Tetrachloroethylene** *National Academies Press* **Tetrachloroethylene is a volatile, chlorinated organic hydrocarbon that is widely used as a solvent in the dry-cleaning and textile-processing industries and as an agent for degreasing metal parts. It is an environmental contaminant that has been detected in the air, groundwater, surface waters, and soil. In June 2008, the U.S. Environmental Protection Agency released its draft Toxicological Review of Tetrachloroethylene (Perchloroethylene) (CAS No. 127-18-4) in Support of Summary Information on the Integrated Risk Information System (IRIS). The draft IRIS assessment provides quantitative estimates of cancer and noncancer effects of exposure to tetrachloreothylene, which will be used to establish airquality and water-quality standards to protect public health and to set cleanup standards for hazardous waste sites. At the request of EPA, the National Research Council conducted an independent scientific review of the draft IRIS assessment of tetrachloroethylene from toxicologic, epidemiologic, and human clinical perspectives. The resulting book evaluates the adequacy of the EPA assessment, the data and methods used for deriving the noncancer values for inhalation and oral exposures and the oral and inhalation cancer unit risks posed by tetrachloroethylene; evaluates whether the key studies underlying the draft IRIS assessment are of requisite quality, reliability, and relevance to support the derivation of the reference values and cancer risks; evaluates whether the uncertainties in EPA's risk assessment were adequately described and, where possible, quantified; and identifies research that could reduce the uncertainty in the current understanding of human health effects associated with tetrachloroethylene exposure. Review of the Environmental Protection Agency's State-of-the-Science Evaluation of Nonmonotonic Dose-Response Relationships as they Apply to Endocrine Disruptors** *National Academies Press* **Potential health effects from chemicals that disrupt endocrine function pose an environmental health concern because of their ability to interfere with normal hormone function in human and wildlife populations. The endocrine system regulates biological processes throughout the body and is sensitive to small changes in hormone concentrations. Endocrine-disruptor research has focused primarily on chemicals that affect three hormone pathways that play important roles in reproduction and development - the estrogen, androgen, and thyroid hormone pathways. Some of this research has identified dose-response relationships that have nonmonotonic curves. Nonmonotonic dose-response curves (NMDRs) are of concern because they do not follow the usual assumption made in toxicology that as dose decreases the response also decreases. The existence of NMDRs has been a controversial topic for decades, and there has been considerable debate about their implications for how chemicals are tested and for how risks from such chemicals are assessed. Toxicity tests are designed to identify hazards and to characterize dose-response relationships, so tests are aimed at finding a (high) dose that elicits a response, and dose-response is explored by testing lower doses spaced to identify statistically a no- or lowest-observed-adverse-effect level. The concern for NMDRs is that such studies, as currently designed, might not detect the inflection of the dose-response curve if only a few doses are tested or if the change in inflection occurs below the range of doses tested. Another concern is that some NMDRs are found for biological effects that are not usually evaluated in toxicity tests. If current testing strategies are inadequate to account for NMDRs, changes to risk assessment practices might be necessary. To help address these issues, the U.S. Environmental Protection Agency (EPA) developed a draft State-of-the-Science Evaluation: Nonmonotonic Dose Responses as they Apply to Estrogen, Androgen, and Thyroid Pathways and EPA Testing and Assessment Procedures. EPA asked the National Research Council to conduct an independent review of this evaluation to ensure that it is scientifically sound and of high quality. Review of Environmental Protection Agency's State-of-the-Science Evaluation of Nonmonotonic Dose-Response as they Apply to Endocrine Disrupters evaluates whether EPA's evaluation presents a scientifically sound and high-quality analysis of the literature on NMDRs. This report reviews how well the EPA evaluation described how the assessment was performed, whether consistent methods and criteria were applied in the analysis of different evidence streams, and whether appropriate methods were applied to evaluating the evidence. The report makes recommendations to improve EPA's process and strengthen the evaluation. Toxicity Testing for Assessment of Environmental Agents Interim Report** *National Academies Press* **Toxicity testing in laboratory animals provides much of the information used by the Environmental Protection Agency (EPA) to assess the hazards and risks associated with exposure to environmental agents that might harm public health or the environment. The data are used to establish maximum acceptable concentrations of environmental agents in drinking water, set permissible limits of exposure of workers, define labeling requirements, establish tolerances for pesticides residues on food, and set other kinds of limits on the basis of risk assessment. Because the number of regulations that require toxicity testing is growing, EPA called for a comprehensive review of established and emerging toxicity-testing methods and strategies. This interim report reviews current toxicity-testing methods and strategies and near-term improvements in toxicity-testing approaches proposed by EPA and others. It identifies several recurring themes and questions in the various reports reviewed. The final report will present a long-range vision and strategic plan to advance the practices of toxicity testing and human health assessment of environmental contaminants. Review of the Army's Technical Guides on Assessing and Managing Chemical Hazards to Deployed Personnel** *National Academies Press* **To guide mission planning, military decision makers need information on the health risks of potential exposures to individual soldiers and their potential impact on mission operations. To help with the assessment of chemical hazards, the U.S. Army Center for Health Promotion and Preventive Medicine developed three technical guides for characterizing chemicals in terms of their risks to the mission and to the health of the force. The report reviews these guides for their scientific validity and conformance with current risk-assessment practices. The report finds that the military exposure guidelines are appropriate (with some modification) for providing force health protection, but that for assessing mission risk, a new set of exposure guidelines is needed that predict concentrations at which health effects would degrade the performance of enough soldiers to hinder mission accomplishment. Phthalates and Cumulative Risk Assessment The Tasks Ahead** *National Academies Press* **People are exposed to a variety of chemicals throughout their daily lives.**

**To protect public health, regulators use risk assessments to examine the effects of chemical exposures. This book provides guidance for assessing the risk of phthalates, chemicals found in many consumer products that have been shown to affect the development of the male reproductive system of laboratory animals. Because people are exposed to multiple phthalates and other chemicals that affect male reproductive development, a cumulative risk assessment should be conducted that evaluates the combined effects of exposure to all these chemicals. The book suggests an approach for cumulative risk assessment that can serve as a model for evaluating the health risks of other types of chemicals. Cancer Risk Assessment Chemical Carcinogenesis, Hazard Evaluation, and Risk Quantification** *John Wiley & Sons* **With a weight-of-the-evidence approach, cancer risk assessment indentifies hazards, determines dose-response relationships, and assesses exposure to characterize the true risk. This book focuses on the quantitative methods for conducting chemical cancer risk assessments for solvents, metals, mixtures, and nanoparticles. It links these to the basic toxicology and biology of cancer, along with the impacts on regulatory guidelines and standards. By providing insightful perspective, Cancer Risk Assessment helps researchers develop a discriminate eye when it comes to interpreting data accurately and separating relevant information from erroneous. Toxicity Testing in the 21st Century A Vision and a Strategy** *National Academies Press* **Advances in molecular biology and toxicology are paving the way for major improvements in the evaluation of the hazards posed by the large number of chemicals found at low levels in the environment. The National Research Council was asked by the U.S. Environmental Protection Agency to review the state of the science and create a far-reaching vision for the future of toxicity testing. The book finds that developing, improving, and validating new laboratory tools based on recent scientific advances could significantly improve our ability to understand the hazards and risks posed by chemicals. This new knowledge would lead to much more informed environmental regulations and dramatically reduce the need for animal testing because the new tests would be based on human cells and cell components. Substantial scientific efforts and resources will be required to leverage these new technologies to realize the vision, but the result will be a more efficient, informative and less costly system for assessing the hazards posed by industrial chemicals and pesticides. Models in Environmental Regulatory Decision Making** *National Academies Press* **Many regulations issued by the U.S. Environmental Protection Agency (EPA) are based on the results of computer models. Models help EPA explain environmental phenomena in settings where direct observations are limited or unavailable, and anticipate the effects of agency policies on the environment, human health and the economy. Given the critical role played by models, the EPA asked the National Research Council to assess scientific issues related to the agency's selection and use of models in its decisions. The book recommends a series of guidelines and principles for improving agency models and decision-making processes. The centerpiece of the book's recommended vision is a life-cycle approach to model evaluation which includes peer review, corroboration of results, and other activities. This will enhance the agency's ability to respond to requirements from a 2001 law on information quality and improve policy development and implementation. EPA 630/R Sustainability and the U.S. EPA** *National Academies Press* **Sustainability is based on a simple and long-recognized factual premise: Everything that humans require for their survival and well-being depends, directly or indirectly, on the natural environment. The environment provides the air we breathe, the water we drink, and the food we eat. Recognizing the importance of sustainability to its work, the U.S. Environmental Protection Agency (EPA) has been working to create programs and applications in a variety of areas to better incorporate sustainability into decision-making at the agency. To further strengthen the scientific basis for sustainability as it applies to human health and environmental protection, the EPA asked the National Research Council (NRC) to provide a framework for incorporating sustainability into the EPA's principles and decision-making. This framework, Sustainability and the U.S. EPA, provides recommendations for a sustainability approach that both incorporates and goes beyond an approach based on assessing and managing the risks posed by pollutants that has largely shaped environmental policy since the 1980s. Although risk-based methods have led to many successes and remain important tools, the report concludes that they are not adequate to address many of the complex problems that put current and future generations at risk, such as depletion of natural resources, climate change, and loss of biodiversity. Moreover, sophisticated tools are increasingly available to address cross-cutting, complex, and challenging issues that go beyond risk management. The report recommends that EPA formally adopt as its sustainability paradigm the widely used "three pillars" approach, which means considering the environmental, social, and economic impacts of an action or decision. Health should be expressly included in the "social" pillar. EPA should also articulate its vision for sustainability and develop a set of sustainability principles that would underlie all agency policies and programs. Toxicogenomic Technologies and Risk Assessment of Environmental Carcinogens A Workshop Summary** *National Academies Press* **Toxicogenomics is a discipline that combines expertise in toxicology, genetics, molecular biology, and environmental health to help understand the response of living organisms to stressful environments. The National Research Council convened a workshop to discuss how toxicogenomic data could be applied to improve risk assessments, particularly cancer risk from environmental exposure to chemicals. Risk assessments serve as the basis of many public-health decisions in environmental, occupational, and consumer protection from chemicals. The workshop provided a forum for communities of experts, including those working in "-omics" and those in the policy arena, to discuss where their fields intersect, and how toxicogenomics could address critical knowledge gaps in risk assessments. Veterinary Toxicology Basic and Clinical Principles** *Academic Press* **Veterinary Toxicology, 2nd Edition, is a unique single reference that teaches the basic principles of veterinary toxicology and builds upon these principles to offer an essential clinical resource for those practicing in the field. This new edition brings together insights from qualified and well-experienced authorities across all areas of veterinary toxicology to provide an authoritative and in-depth look at all facets of veterinary toxicology, including target organ toxicity, melamine and cyanuric acid, toxicogenomics, chemical terrorism and nanoparticles. While most comparable texts are primarily directed toward the field of human toxicology, this is the one text needed to thoroughly prepare future veterinarians on the newest approaches for diagnosing poisoning cases in all animals from chemicals and plants of a diverse nature as a result of inadvertent, accidental, or malicious intents. It is thoroughly updated with new chapters and the latest coverage of topics not tackled in any previous books such as target organ toxicity, radiation and radioactive materials, FDA regulatory issues, and ethics in veterinary toxicology. There are also expanded discussions on international topics such as epidemiology of animal poisonings and regulatory guidelines and poisonous plants in Europe. Problem solving strategies are offered for treatment. This volume will be of interest to practitioners, professors and students of veterinary medicine and veterinary toxicology, poison control centers, marine biologists, environmentalists and animal scientists. Selected for inclusion in Doody's Core Titles 2013, an essential collection development tool for health sciences libraries New chapters covering important and timely topics such as melamine and cyanuric acid, toxicogenomics, toxic gases and veterinary medical geology Expanded look at international topics, such as epidemiology of animal poisonings, regulatory guidelines and poisonous plants in Europe Heavily contributed book with chapters written by qualified and well-experienced authorities across all areas of veterinary toxicology Problem solving strategies are offered for treatment as well as in-depth knowledge of the basic mechanisms of veterinary toxicology Biosolids Applied to Land Advancing Standards and Practices** *National Academies Press* **The 1993 regulation (Part 503 Rule) governing the land application of biosolids was established to protect public health and the environment from reasonably anticipated adverse effects. Included in the regulation are chemical pollutant limits, operational standards designed to reduce pathogens and the attraction of disease vectors, and management practices. This report from the Board on Environmental Studies and Toxicology evaluates the technical methods and approaches used by EPA to establish those standards and practices, focusing specifically on human health protection. The report examines improvements in risk-assessment practices and advances in the scientific database since promulgation of the regulation, and makes recommendations for addressing public health concerns, uncertainties, and data gaps about the technical basis of the biosolids standards. Sediment Dredging at Superfund Megasites Assessing the Effectiveness** *National Academies Press* **Some of the nation's estuaries, lakes and other water bodies contain contaminated sediments that can adversely affect fish and wildlife and may then find their way into people's diets. Dredging is one of the few options available for attempting to clean up contaminated sediments, but it can uncover and re-suspend buried contaminants, creating additional exposures for wildlife and people. At the request of Congress, EPA asked the National Research Council (NRC) to evaluate dredging as a cleanup technique. The book finds that, based on a review of available evidence, dredging's ability to decrease environmental and health risks is still an open question. Analysis of pre-dredging and post-dredging at about 20 sites found a wide range of outcomes in terms of surface sediment concentrations of contaminants: some sites showed increases, some no change, and some decreases in concentrations. Evaluating the potential long-term benefits of dredging will require that the U.S. Environmental Protection Agency step up monitoring activities before, during and after individual cleanups to determine whether it is working there and what combinations of techniques are most effective. Fluoride in Drinking Water A Scientific Review of EPA's Standards** *National Academies Press* **Most people associate fluoride with the practice of intentionally adding fluoride to public drinking water supplies for the prevention of tooth decay. However, fluoride can also enter public water systems from natural sources, including runoff from the weathering of fluoride-containing rocks and soils and leaching from soil into groundwater. Fluoride pollution from various industrial emissions can also contaminate water supplies. In a few areas of the United States fluoride concentrations in water are much higher than normal, mostly from natural sources. Fluoride is one of the drinking water contaminants regulated by the U.S. Environmental Protection Agency (EPA) because it can occur at these toxic levels. In 1986, the EPA established a maximum allowable concentration for fluoride in drinking water of 4 milligrams per liter, a guideline designed to prevent the public from being exposed to harmful levels of fluoride. Fluoride in Drinking Water reviews research on various health effects from exposure to fluoride, including studies conducted in the last 10 years. Evaluating Chemical and Other Agent Exposures for Reproductive and Developmental Toxicity** *National Academies Press* **The United States Navy has been concerned for some time with protecting its military and civilian personnel from reproductive and developmental hazards in the workplace. As part of its efforts to reduce or eliminate exposure of Naval personnel and their families to reproductive and developmental toxicants, the Navy requested that the National Research Council (NRC) recommend an approach that can be used to evaluate chemicals and physical agents for their potential to cause reproductive and developmental toxicity. The NRC assigned this project to the Committee on Toxicology, which convened the Subcommittee on Reproductive and Developmental Toxicology, to prepare this report. In this report, the subcommittee recommends an approach for evaluating agents for potential reproductive and developmental toxicity and demonstrates how that approach can be used by the Navy. This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the NRC's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report: James Chen (National Center for Toxicological Research), George Daston (Procter and Gamble Company), Jerry Heindel (National Institute of Environmental Health Sciences), Grace Lemasters (University of Cincinnati), and John Young (National Center for Toxicological Research). Health Risks from Dioxin and Related Compounds Evaluation of the EPA Reassessment** *National Academies Press* **Although the U.S. Environmental Protection Agency presented a comprehensive review of the scientific literature in its 2003 draft reassessment of the risks of dioxin, the agency did not sufficiently quantify the uncertainties and variabilities associated with the risks, nor did it adequately justify the assumptions used to estimate them, according to this new report from the National Academies' National Research Council. The committee that wrote the report recommended that EPA re-estimate the risks using several different assumptions and better communicate the uncertainties in those estimates. The agency also should explain more clearly how it selects both the data upon which the reassessment is based and the methods used to analyze them. Strategy for research on environmental risks to children** *DIANE Publishing* **Superfund and Mining Megasites Lessons from the Coeur d'Alene River Basin** *National Academies Press* **For more than 100 years, the Coeur dâ€™ Alene River Basin has**

**been known as "The Silver Valley" for being one of the most productive silver, lead, and zinc mining areas in the United States. Over time, high levels of metals (including lead, arsenic, cadmium, and zinc) were discovered in the local environment and elevated blood lead levels were found in children in communities near the metal-refining and smelter complex. In 1983, the U.S. Environmental Protection Agency (EPA) listed a 21-square mile mining area in northern Idaho as a Superfund site. EPA extended those boundaries in 1998 to include areas throughout the 1500-square mile area Coeur d'Alene River Basin project area. Under Superfund, EPA has developed a plan to clean up the contaminated area that will cost an estimated $359 million over 3 decades--and this effort is only the first step in the cleanup process. Superfund and Mining Megasites: Lessons from Coeur d'Alene River Basin evaluates the issues and concerns that have been raised regarding EPAâ€™s decisions about cleaning up the area. The scientific and technical practices used by EPA to make decisions about human health risks at the Coeur d'Alene River Basin Superfund site are generally sound; however, there are substantial concerns regarding environmental protection decisions, particularly dealing with the effectiveness of long-term plans. Preparing for Future Products of Biotechnology** *National Academies Press* **Between 1973 and 2016, the ways to manipulate DNA to endow new characteristics in an organism (that is, biotechnology) have advanced, enabling the development of products that were not previously possible. What will the likely future products of biotechnology be over the next 5â€"10 years? What scientific capabilities, tools, and/or expertise may be needed by the regulatory agencies to ensure they make efficient and sound evaluations of the likely future products of biotechnology? Preparing for Future Products of Biotechnology analyzes the future landscape of biotechnology products and seeks to inform forthcoming policy making. This report identifies potential new risks and frameworks for risk assessment and areas in which the risks or lack of risks relating to the products of biotechnology are well understood. Toxicological Effects of Perfluoroalkyl and Polyfluoroalkyl Substances** *Humana Press* **This book serves as a timely and comprehensive overview of the latest science for perfluoroalkyl and polyfluoroalkyl substances (PFASs), covering the development of methods for assessing PFASs in biological fluids and tissues as well as the current knowledge regarding their toxicity to vertebrate organisms. This book includes chapters on human and wildlife exposure/body burdens, reviews of metabolism and toxicological effects by organ system/developmental stage and aspects of PFAS toxicity that are driving PFAS research and regulatory oversight. Toxicological Effects of Perfluoroalkyl and Polyfluoroalkyl Substances provide critical assessments of the most controversial topics surrounding toxicological evaluation of PFASs to give readers an expert perspective on the issues. Emphasis is placed on the integration of modes and mechanisms of action with functional endpoints that are relevant to human and wildlife health. This book will be a useful resource for toxicologists, environmental chemists, risk assessors and researchers with an interest in the class of compounds known as perfluoroalkyl and polyfluoroalkyl substances. Refinements to the Methods for Developing Spacecraft Exposure Guidelines** *National Academies Press* **Human spaceflight is inherently risky, with numerous potential hazards posed at each phase of a mission. Potential health risks during spaceflights include short-term health consequences from being in microgravity, as well as long-term health consequences that arise, or continue, months or years after a flight. Additional health considerations are risks posed by exposure to environmental contaminants onboard spacecraft. Because the International Space Station and spacecraft are closed environments that require recirculation of air and water supplies, some contamination of the air and water will occur. Even with onboard air and water purification systems, chemicals will accumulate in the air and water as they recirculate or are recycled onboard. Therefore, it is necessary for the National Aeronautics and Space Administration (NASA) to identify hazardous contaminants and determine exposure levels that are not expected to pose a health risk to astronauts. NASA uses spacecraft maximum allowance concentrations (SMACs) and spacecraft water exposure guidelines (SWEGs) to provide guidance on acceptable exposures to air and water contaminants during normal operations and emergency situations. Refinements to the Methods for Developing Spacecraft Exposure Guidelines updates the methods for establishing SMACs and SWEGs and assists NASA with identifying chemicals that need updated SMACs or SWEGs and new chemicals for which these guidelines should be developed. Improving Health in the United States The Role of Health Impact Assessment** *National Academies Press* **Factoring health and related costs into decision making is essential to confronting the nation's health problems and enhancing public well-being. Some policies and programs historically not recognized as relating to health are believed or known to have important health consequences. For example, public health has been linked to an array of policies that determine the quality and location of housing, availability of public transportation, land use and street connectivity, agricultural practices and the availability of various types of food, and development and location of businesses and industry. Improving Health in the United States: The Role of Health Impact Assessment offers guidance to officials in the public and private sectors on conducting HIAs to evaluate public health consequences of proposed decisions -- such as those to build a major roadway, plan a city's growth, or develop national agricultural policies -- and suggests actions that could minimize adverse health impacts and optimize beneficial ones. Several approaches could be used to incorporate aspects of health into decision making, but HIA holds particular promise because of its applicability to a broad array of programs, consideration of both adverse and beneficial health effects, ability to consider and incorporate various types of evidence, and engagement of communities and stakeholders in a deliberative process. The report notes that HIA should not be assumed to be the best approach to every health policy question but rather should be seen as part of a spectrum of public health and policy-oriented approaches. The report presents a six-step framework for conducting HIA of proposed policies, programs, plans, and projects at federal, state, tribal, and local levels, including within the private sector. In addition, the report identifies several challenges to the successful use of HIA, such as balancing the need to provide timely information with the realities of varying data quality, producing quantitative estimates of health effects, and engaging stakeholders. Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites** *National Academies Press* **Across the United States, thousands of hazardous waste sites are contaminated with chemicals that prevent the underlying groundwater from meeting drinking water standards. These include Superfund sites and other facilities that handle and dispose of hazardous waste, active and inactive dry cleaners, and leaking underground storage tanks; many are at federal facilities such as military installations. While many sites have been closed over the past 30 years through cleanup programs run by the U.S. Department of Defense, the U.S. EPA, and other state and federal agencies, the remaining caseload is much more difficult to address because the nature of the contamination and subsurface conditions make it difficult to achieve drinking water standards in the affected groundwater. Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites estimates that at least 126,000 sites across the U.S. still have contaminated groundwater, and their closure is expected to cost at least $110 billion to $127 billion. About 10 percent of these sites are considered "complex," meaning restoration is unlikely to be achieved in the next 50 to 100 years due to technological limitations. At sites where contaminant concentrations have plateaued at levels above cleanup goals despite active efforts, the report recommends evaluating whether the sites should transition to long-term management, where risks would be monitored and harmful exposures prevented, but at reduced costs. Environmental Decisions in the Face of Uncertainty** *National Academies Press* **The U.S. Environmental Protection Agency (EPA) is one of several federal agencies responsible for protecting Americans against significant risks to human health and the environment. As part of that mission, EPA estimates the nature, magnitude, and likelihood of risks to human health and the environment; identifies the potential regulatory actions that will mitigate those risks and protect public health1 and the environment; and uses that information to decide on appropriate regulatory action. Uncertainties, both qualitative and quantitative, in the data and analyses on which these decisions are based enter into the process at each step. As a result, the informed identification and use of the uncertainties inherent in the process is an essential feature of environmental decision making. EPA requested that the Institute of Medicine (IOM) convene a committee to provide guidance to its decision makers and their partners in states and localities on approaches to managing risk in different contexts when uncertainty is present. It also sought guidance on how information on uncertainty should be presented to help risk managers make sound decisions and to increase transparency in its communications with the public about those decisions. Given that its charge is not limited to human health risk assessment and includes broad questions about managing risks and decision making, in this report the committee examines the analysis of uncertainty in those other areas in addition to human health risks. Environmental Decisions in the Face of Uncertainty explains the statement of task and summarizes the findings of the committee. Estimating Mortality Risk Reduction and Economic Benefits from Controlling Ozone Air Pollution** *National Academies Press* **In light of recent evidence on the relationship of ozone to mortality and questions about its implications for benefit analysis, the Environmental Protection Agency asked the National Research Council to establish a committee of experts to evaluate independently the contributions of recent epidemiologic studies to understanding the size of the ozone-mortality effect in the context of benefit analysis. The committee was also asked to assess methods for estimating how much a reduction in short-term exposure to ozone would reduce premature deaths, to assess methods for estimating associated increases in life expectancy, and to assess methods for estimating the monetary value of the reduced risk of premature death and increased life expectancy in the context of health-benefits analysis. Estimating Mortality Risk Reduction and Economic Benefits from Controlling Ozone Air Pollution details the committee's findings and posits several recommendations to address these issues. Recycling of Used Lead-Acid Batteries Guidelines for Appraisal of Environmental Health Impacts** *World Bank Publications* **THIS IS A CONFERENCE EDIT ... Exposure Science in the 21st Century A Vision and a Strategy** *National Academies Press* **From the use of personal products to our consumption of food, water, and air, people are exposed to a wide array of agents each day--many with the potential to affect health. Exposure Science in the 21st Century: A Vision and A Strategy investigates the contact of humans or other organisms with those agents (that is, chemical, physical, and biologic stressors) and their fate in living systems. The concept of exposure science has been instrumental in helping us understand how stressors affect human and ecosystem health, and in efforts to prevent or reduce contact with harmful stressors. In this way exposure science has played an integral role in many areas of environmental health, and can help meet growing needs in environmental regulation, urban and ecosystem planning, and disaster management. Exposure Science in the 21st Century: A Vision and A Strategy explains that there are increasing demands for exposure science information, for example to meet needs for data on the thousands of chemicals introduced into the market each year, and to better understand the health effects of prolonged low-level exposure to stressors. Recent advances in tools and technologies--including sensor systems, analytic methods, molecular technologies, computational tools, and bioinformatics--have provided the potential for more accurate and comprehensive exposure science data than ever before. This report also provides a roadmap to take advantage of the technologic innovations and strategic collaborations to move exposure science into the future. Using 21st Century Science to Improve Risk-Related Evaluations** *National Academies Press* **Over the last decade, several large-scale United States and international programs have been initiated to incorporate advances in molecular and cellular biology, -omics technologies, analytical methods, bioinformatics, and computational tools and methods into the field of toxicology. Similar efforts are being pursued in the field of exposure science with the goals of obtaining more accurate and complete exposure data on individuals and populations for thousands of chemicals over the lifespan; predicting exposures from use data and chemical-property information; and translating exposures between test systems and humans. Using 21st Century Science to Improve Risk-Related Evaluations makes recommendations for integrating new scientific approaches into risk-based evaluations. This study considers the scientific advances that have occurred following the publication of the NRC reports Toxicity Testing in the 21st Century: A Vision and a Strategy and Exposure Science in the 21st Century: A Vision and a Strategy. Given the various ongoing lines of investigation and new data streams that have emerged, this publication proposes how best to integrate and use the emerging results in evaluating chemical risk. Using 21st Century Science to Improve Risk-Related Evaluations considers whether a new paradigm is needed for data validation, how to integrate the divergent data streams, how uncertainty might need to be characterized, and how best to communicate the new approaches so that they are understandable to various stakeholders. Artisanal Scale Gold Mining A Framework for Collecting Site-Specific Sampling and Survey Data to Support Health-Impact Analyses** *World Bank Publications* **THIS IS A CONFERENCE EDIT ... Using Graywater and Stormwater to Enhance Local Water Supplies An Assessment of Risks, Costs, and Benefits** *National Academies Press* **Chronic**

**and episodic water shortages are becoming common in many regions of the United States, and population growth in water-scarce regions further compounds the challenges. Increasingly, alternative water sources such as graywater-untreated wastewater that does not include water from the toilet but generally includes water from bathroom sinks, showers, bathtubs, clothes washers, and laundry sinks- and stormwater-water from rainfall or snow that can be measured downstream in a pipe, culvert, or stream shortly after the precipitation event-are being viewed as resources to supplement scarce water supplies rather than as waste to be discharged as rapidly as possible. Graywater and stormwater can serve a range of non-potable uses, including irrigation, toilet flushing, washing, and cooling, although treatment may be needed. Stormwater may also be used to recharge groundwater, which may ultimately be tapped for potable use. In addition to providing additional sources of local water supply, harvesting stormwater has many potential benefits, including energy savings, pollution prevention, and reducing the impacts of urban development on urban streams. Similarly, the reuse of graywater can enhance water supply reliability and extend the capacity of existing wastewater systems in growing cities. Despite the benefits of using local alternative water sources to address water demands, many questions remain that have limited the broader application of graywater and stormwater capture and use. In particular, limited information is available on the costs, benefits, and risks of these projects, and beyond the simplest applications many state and local public health agencies have not developed regulatory frameworks for full use of these local water resources. To address these issues, Using Graywater and Stormwater to Enhance Local Water Supplies analyzes the risks, costs, and benefits on various uses of graywater and stormwater. This report examines technical, economic, regulatory, and social issues associated with graywater and stormwater capture for a range of uses, including non-potable urban uses, irrigation, and groundwater recharge. Using Graywater and Stormwater to Enhance Local Water Supplies considers the quality and suitability of water for reuse, treatment and storage technologies, and human health and environmental risks of water reuse. The findings and recommendations of this report will be valuable for water managers, citizens of states under a current drought, and local and state health and environmental agencies. Hayes' Handbook of Pesticide Toxicology** *Academic Press* **The Handbook of Pesticide Toxicology is a comprehensive, two-volume reference guide to the properties, effects, and regulation of pesticides that provides the latest and most complete information to researchers investigating the environmental, agricultural, veterinary, and human-health impacts of pesticide use. Written by international experts from academia, government, and the private sector, the Handbook of Pesticide Toxicology is an in-depth examination of critical issues related to the need for, use of, and nature of chemicals used in modern pest management. This updated 3e carries on the book's tradition of serving as the definitive reference on pesticide toxicology and recognizes the seminal contribution of Wayland J. Hayes, Jr., co-Editor of the first edition. Feature: Presents a comprehensive look at all aspects of pesticide toxicology in one reference work. Benefit: Saves researchers time in quickly accessing the very latest definitive details on toxicity of specific pesticides as opposed to searching through thousands of journal articles. Feature: Clear exposition of hazard identification and dose response relationships in each chapter featuring pesticide agents and actions Benefit: Connects the experimental laboratory results to real-life applications in human health, animal health and the environment. Feature: All major classes of pesticide considered. Benefit: Provides relevance to a wider variety of researchers who are conducting comparative work in pesticides or their health impacts. Feature: Different routes of exposure critically evaluated. Benefit: Connects the loop between exposure and harmful affects to those who are researching the affects of pesticides on humans or wildlife. Handbook on the Theory and Practice of Program Evaluation** *Edward Elgar Publishing* **'The economic crisis has simultaneously placed a strong emphasis on the role of R&D as an engine of economic growth and a demand that limited public resources are demonstrated to have had the maximum possible impact. Rigorous evaluation is the key to meeting these needs. This Handbook brings together highly experienced leaders in the field to provide a comprehensive and well-organised state-of-the-art overview of the range of methods available. It will prove invaluable to experienced practitioners, students in the field and more widely to those who want to increase their understanding of the complex and pervasive ways in which technological advance contributes to economic and social progress.' – Luke Georghiou, University of Manchester, UK 'Theoretical and empirical research on program evaluation has advanced rapidly in scope and quality. A concomitant trend is increasing pressure on policymakers to show that programs are "effective". Now is the time for a comprehensive status report on state-of-the-art research and methods by leading scholars in a variety of disciplines on program evaluation. This outstanding collection of contributions will serve as a valuable reference tool for academics, policymakers, and practitioners for many years to come.' – Donald S. Siegel, University at Albany, SUNY, US There has been a dramatic increase in expenditures on public goods over the past thirty years, particularly in the area of research and development. As governments explore the many opportunities for growth in this area, they – and the general public – are becoming increasingly concerned with the transparency, accountability and performance of public programs. This pioneering Handbook offers a collection of critical essays on the theory and practice of program evaluation, written by some of the most well-known experts in the field. As this volume demonstrates, a wide variety of methodologies exist to evaluate particularly the objectives and outcomes of research and development programs. These include surveys, statistical and econometric estimations, patent analyses, bibliometrics, scientometrics, network analyses, case studies, and historical tracings. Contributors divide these and other methods and applications into four categories – economic, non-economic, hybrid and data-driven – in order to discuss the many factors that affect the utility of each technique and how that impacts the technological, economic and societal forecasts of the programs in question. Scholars, practitioners and students with an interest in economics and innovation will all find this Handbook an invaluable resource. Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah Environmental Impact Statement Science for Environmental Protection The Road Ahead** *National Academies Press* **In anticipation of future environmental science and engineering challenges and technologic advances, EPA asked the National Research Council (NRC) to assess the overall capabilities of the agency to develop, obtain, and use the best available scientific and technologic information and tools to meet persistent, emerging, and future mission challenges and opportunities. Although the committee cannot predict with certainty what new environmental problems EPA will face in the next 10 years or more, it worked to identify some of the common drivers and common characteristics of problems that are likely to occur. Tensions inherent to the structure of EPA's work contribute to the current and persistent challenges faced by the agency, and meeting those challenges will require development of leading-edge scientific methods, tools, and technologies, and a more deliberate approach to systems thinking and interdisciplinary science. Science for Environmental Protection: The Road Ahead outlines a framework for building science for environmental protection in the 21st century and identified key areas where enhanced leadership and capacity can strengthen the agency's abilities to address current and emerging environmental challenges as well as take advantage of new tools and technologies to address them. The foundation of EPA science is strong, but the agency needs to continue to address numerous present and future challenges if it is to maintain its science leadership and meet its expanding mandates.**