



**Harvard Center for Risk Analysis Seminar Series**  
Together with the Society for Risk Analysis, New England Chapter

**February 14, 2008**  
**Refreshments: 3:30 pm - 3:45 pm**  
**Presentations: 3:45 pm – 6:00 pm**

**APPLICATIONS OF RELATIVE RISK  
MODELING**

**RISKY BUSINESS: ECOLOGICAL RISK ASSESSMENT AT  
REGIONAL SCALES FOR CHEMICAL AND NON-CHEMICAL  
STRESSORS**

Wayne G. Landis, Ph.D., Institute of Environmental Toxicology and Chemistry, Huxley College  
of the Environment, Western Washington University

and

**RELATIVE RISK MODELING FOR OYSTER MANAGEMENT IN  
CHESAPEAKE BAY**

Charles Menzie, Ph.D., and Theodore W. Wickwire, M.F.S., Exponent, Inc.

**Location**

Harvard School of Public Health  
FXB G-13  
618 Huntington Avenue

*Note: Not the Landmark Building!!!!*

Please RSVP by Wednesday, February 7<sup>th</sup> to Katherine von Stackelberg  
([kvon@hsph.harvard.edu](mailto:kvon@hsph.harvard.edu)). Space is limited, so reserve your seat today!

## ABSTRACTS OF PRESENTATIONS

**Wayne G. Landis.** *Risky Business: Ecological risk assessment at regional scales for chemical and non-chemical stressors.* Managing regional ecological structures must take into account the multiple uses, outfalls of many types, the introduction of invasive species, the distribution of habitat types, and alterations in land use, transportation corridors, and policy directives from multiple levels of Federal, State and local governments. Conventional processes only incorporate one or a few of these factors. A method that has proven adaptable to understanding risks and making decisions in a diversity of scales has been regional risk assessment using the Relative Risk Model (RRM). The use of the RRM places management actions, sources, stressors, receptors and effects in a landscape context and is robust over a variety of spatial scales and types of stressors. The seminar will provide a brief synopsis of the RRM approach to regional risk assessment and then summarize three case studies. The first scenario is Codorus Creek near York, PA, a classic contaminant related risk assessment incorporating industrial effluents. The second case is the application of the approach to estimate risks due to invasive species with Cherry Point Washington as the site. The last case study is the application to a forestry management scenario in the Upper Grande Ronde Watershed, Oregon. Finally a short synopsis of current and future developments will be presented to included incorporation of Bayesian tools, assessment of climate change, and human-ecological system interactions.

**Charles Menzie and Theodore Wickwire.** *Relative risk modeling for oyster management in Chesapeake Bay.* Virginia and Maryland have engaged in a five-year program to address how to best restore oysters to Chesapeake Bay. Several alternatives are being evaluated including restoration efforts for the native oyster *Crassostrea virginica*, aquaculture, and the introduction of a new oyster species *Crassostrea ariakensis*. We were charged with developing and implementing an approach for evaluating the ecological risks associated with these options. Demographic modeling was used to project changes in oyster abundance over a ten-year period for each alternative. A mechanistic model was used to translate these changes into influences on other ecological components. The Relative Risk Model (RRM) was used to compare the positive and negative influences of each alternative on the various ecological receptors. A separate invasive species methodology was used to evaluate the probability that sterile triploid *C. ariakensis* in aquaculture might result in a reproductive population (the Jurassic Park outcome). Finally, recent research on the biology of *C. ariakensis* was used to evaluate the potential for competition with *C. virginica*, the possibility of introducing new diseases, the potential for escapement from the Bay, and the potential for becoming a nuisance species. Exciting insights will be provided on all these topics. And at the end we will serve lots of uncertainty to refresh the inquiring mind.

## BIOGRAPHICAL SKETCHES OF PRESENTERS

**Dr. Landis** is the Director of the Institute of Environmental Toxicology and Chemistry, part of Huxley College of the Environment at Western Washington University. Currently his efforts have been to apply ecological risk assessment at regional and landscape scales using the relative risk model. The use of the relative risk model has now been applied to contaminated sites, invasive species, forestry and species conservations. Sites investigated have been worldwide. He has been the lead or co-editor on four books on environmental toxicology and risk assessment. Dr. Ming-Ho Yu and Dr. Landis have also written the popular textbook Introduction to Environmental Toxicology, now in its third edition. He is currently serving on the Board of Editors for Human and Ecological Risk Assessment and is one of the Founding Editors for the new SETAC journal Integrated Environmental Assessment and Management and is the Environmental Risk Assessment Editor for Risk Analysis. Dr. Landis current serves on the Board of Scientific Councilors and Ecological Process and Effects Committee of the SAB for the US Environmental Protection Agency. (email address: [wayne.landis@wwu.edu](mailto:wayne.landis@wwu.edu))

**Dr. Menzie** is a Principal Scientist and Director of Exponent's EcoSciences practice. His primary area of expertise is the environmental fate and effects of physical, biological, and chemical stressors on terrestrial and aquatic systems. He is recognized as one of the leaders in the field of risk assessment and was awarded the Risk Practitioner Award by the Society for Risk Analysis. He has served on the Council of SRA and the Board of SETAC, the two major professional organizations in this field. Dr. Menzie has led numerous peer reviews for industry and for government. He has taken the lead in developing guidance documents for industry and government and has focused on methods that are workable and acceptable to a broad range of parties. He was one of the committee members to draft the ASTM Standard for risk-based corrective action (RBCA) for chemical release sites and extended that standard to ecological considerations. In addition to Dr. Menzie's work on chemical-related matters, he has been involved in evaluating the risks associated with habitat modifications and the introduction of species. Prominent among these efforts was work related to the introduction of shrimp viruses to U.S. coastal systems. Dr. Menzie has developed a number of software tools to analyze the effects of chemical and other stressors at the level of landscapes. Much of this work is being used to predict future effects and to sort among alternatives. (email address: [camenzie@exponent.com](mailto:camenzie@exponent.com)).

**Mr. Wickwire** is a Senior Scientist in Exponent's EcoSciences practice. Mr. Wickwire has 14 years of experience in evaluating the exposure and effects of contaminants in aquatic and terrestrial ecosystems. He is an ecologist focusing on aquatic and terrestrial ecological risk assessment. He conducts and manages ecological risk assessments including: the development of quality assurance project plans, design and implementation of multi-media field sampling programs, development of conceptual models, application of wildlife exposure models, implementation of weight-of-evidence risk assessment approaches, preparation of final risk characterization reports, development of preliminary remediation goals, and risk communication. Mr. Wickwire incorporates ecological principles in wildlife exposure models and oversees the development of modeling packages to improve the realism of exposure modeling incorporating wildlife behaviors relative to habitat suitability. (email address: [wickwire@exponent.com](mailto:wickwire@exponent.com)).

## GETTING TO THE EVENT

Directions to FXB G-13: <http://www.hsph.harvard.edu/about/location-and-directions/longwood-campus-directions/index.html>

- **From the MBTA Subway (on foot)** - The school is directly across from the Brigham Circle Green Line (E) stop.

- **Driving directions**

*From North or South of Boston:* Take I-93 North/South to Exit 26 (Storrow Drive). Follow Storrow Drive approximately 2.5 miles to Kenmore Square/Fenway exit (on left). The exit ramp forks, stay to your right. Take right at first light into Kenmore Square. Take leftmost fork at second light onto Brookline Avenue. Follow Brookline Avenue approximately 1 mile and through a major intersection (Beth Israel Hospital will be on the left). Watch for blue and white Longwood Medical area signs. Take left on Longwood Avenue and a right onto Huntington Avenue.

*From West of Boston:* Take I-90 to exit 18. Follow Storrow Drive eastbound to Kenmore Square/Fenway exit. Follow directions above.

- **Once you arrive at HSPH**

*Parking:* There are a limited number of metered parking spaces available on Huntington Avenue in front of the HSPH, as well as on adjacent streets. There is also limited visitor parking, and/or parking lots.

*Room location:* Enter 618 Huntington Avenue (FXB Building). Room G-13 is down the stairs on your right after you enter the building.