

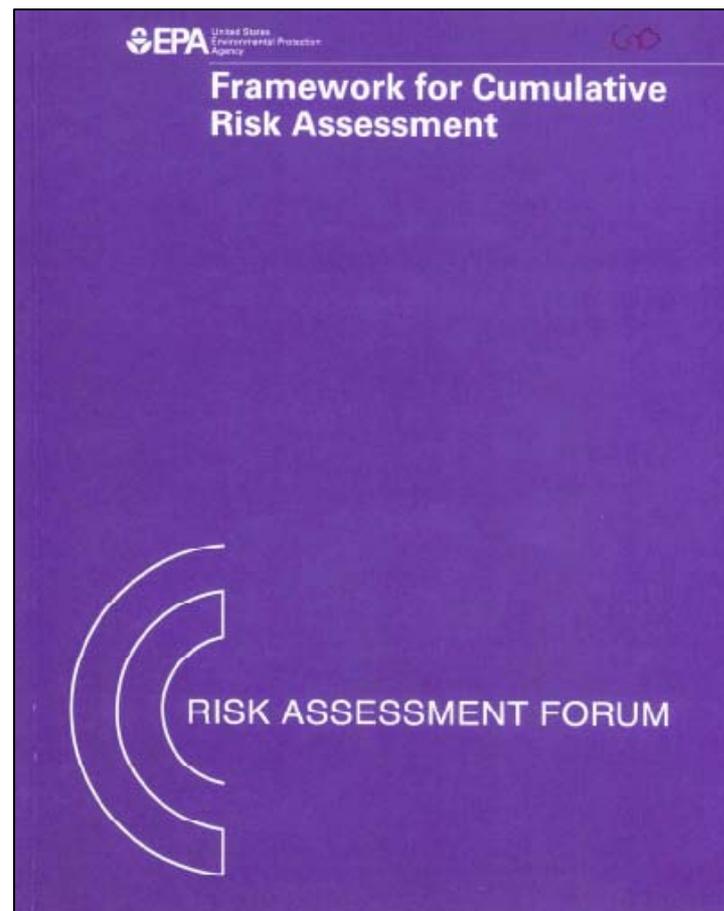
# Changing the Risk Assessment Paradigm: EPA's Activities in Cumulative Risk

*Elizabeth Lee Hofmann, Ph.D.*  
*Deputy Director*  
*Office of the Science Advisor*



## Long-term Effort to Develop Guidance

- **1997:** EPA Science Policy Council issued guidance on planning and scoping for cumulative risk assessments
- **2003:** Published the *“Framework for Cumulative Risk Assessment”* (Phase 1)
- **Today:** Producing a report, *“Issues, Case Studies, and Research Needs in Cumulative Risk Assessment”* (Phase 2)
- **Future:** Agency guidelines for cumulative risk assessment (Phase 3)



## ***Issues, Case Studies, and Research Needs in Cumulative Risk Assessment***

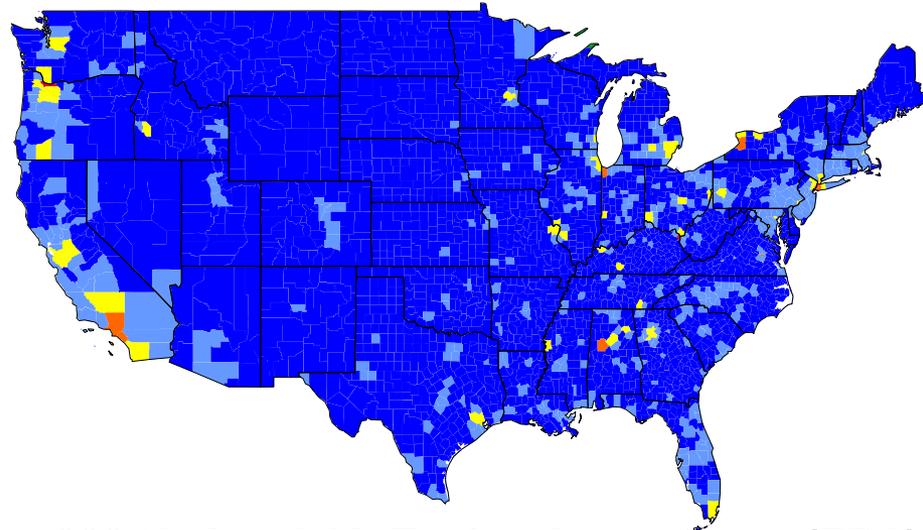
- Purpose: to assist risk assessors in planning and conducting cumulative risk assessments
  - Provides illustrative examples, methods, tools
- Attempts to equally address ecological and human health approaches
- Format follows the *Framework*
  - Planning and Scoping/Problem Formulation
  - Analysis
  - Risk Characterization

## “Issues Papers” on Cumulative Risk Assessment

- Published in *Environmental Health Perspectives* (2007)
- Topics:
  - Overview / rationale for cumulative risk assessment
  - Integrating / disaggregating health effects data
  - Combining multiple chemical and non-chemical stressors
  - Vulnerability due to environmental effects, lack of resilience or resources

## Illustrative Case Studies

- Large-scale assessments
  - Ecological: watershed, landscape level approaches
  - Human health: community, population-centered assessments
- “Integrated” human health and ecological risk assessments



**1999 National Air Toxics Assessment (EPA)**  
National Scale Assessment Predicted County  
Level Cancer Risk– County Medians

## Evaluation of Illustrative Case Studies

- **Project Initiation:** Impetus, participants
- **Objectives and Scope:** Risk questions, management goals
- **Methods:** Approaches, data sources and gaps, resource/time investment
- **Results and Conclusions:** Risk characterization, risk communication, uncertainty analyses
- **Impact of Study:** Influence on management decision, stakeholder satisfaction, lessons learned
- **Evaluation:** Compared to *Framework*

## Overarching Research Needs

- GIS-based technologies for accessing, retrieving, processing data
- Methods to couple environmental and public health data with epidemiologic information
- Computational methods to connect multiple data layers and capture uncertainties
- Improved decision frameworks and criteria to integrate cumulative effects to guide decisions and policies
  - Qualitative and quantitative approaches for various metrics
- Advanced methods: biologically-based modeling, toxicogenomics, nanoscale monitoring, etc.

# Community-Based Risk Assessment (CBRA)

- NCER Workshop (October 2007)
- Draft research needs:
  - Infrastructure to share databases and methodologies to characterize stressors
  - Greater understanding of stressor interactions
  - New framework to integrate all chemical, non-chemical, and vulnerability issues into risk assessment
  - Apply models, tools, and frameworks from ecological sciences to human health risk

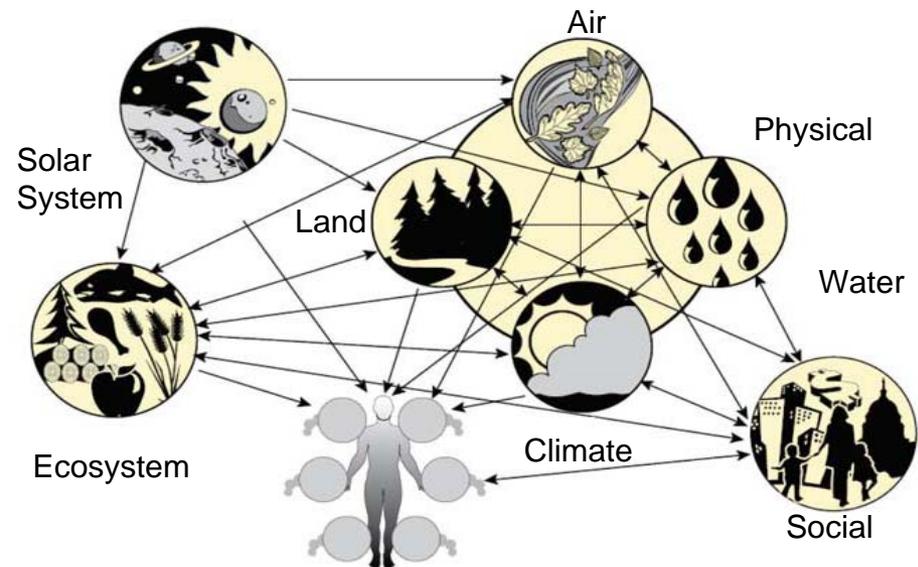


Figure adopted from Gohlke & Portier (2007)