

# **Strengths of the Ecological Risk Assessment Process for Use in Decisionmaking**

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# The Status of ERA – February 1981

- Term not yet invented, process non-existent
- Assessments performed independently by different organizations using different principles and methods
- Little communication, no opportunity to compare methods, identify common approaches, advance stage-of-science
- Risk management judgments often hidden within assessment procedures

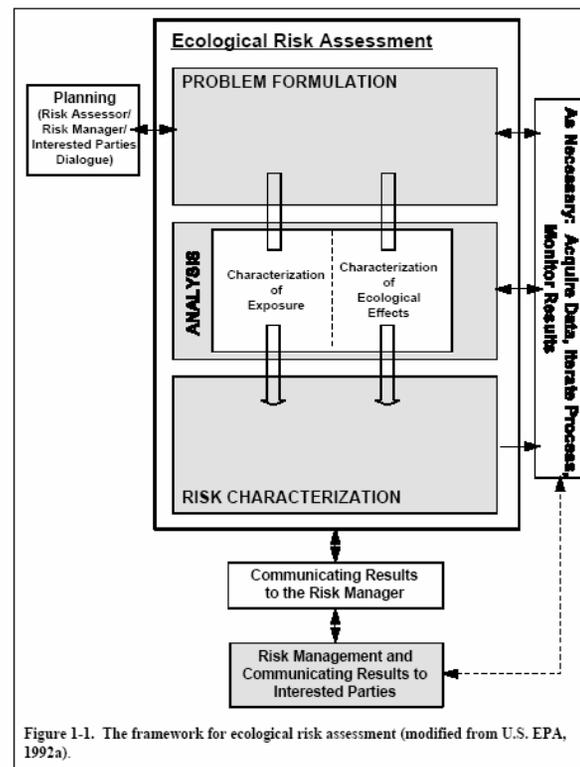
# Goals of ERA “Pioneers”

- Develop unified conceptual approach to environmental assessment
- Facilitate cooperation/collaboration between assessment-related disciplines
- Increase transparency of risk assessments to users (i.e., decisionmakers)
- Provide standardized tools & techniques
- *Dispel common perception that “ecological risk assessment is impossible”*

# The Status of ERA – February 2006

- Framework and Guidelines documents in place for nearly a decade
- Numerous agency-wide, program-specific, and problem-specific documents on shelf
- Framework widely imitated outside U.S.
- *Many, many applications to all levels of decisionmaking, in all four corners of globe*

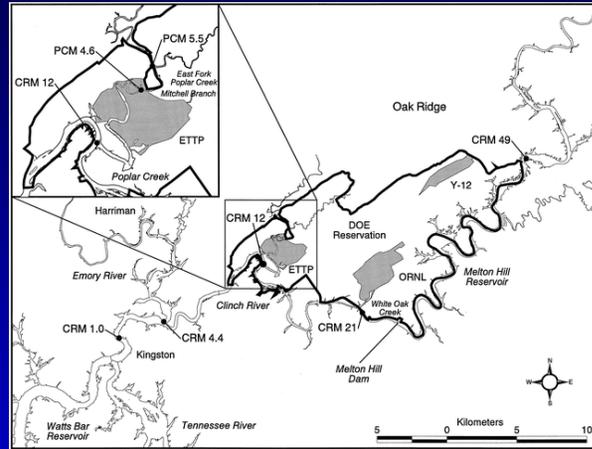
# The Key to Success: Recognition of ERA as *Process*, not *Technique*



# Three Case Studies Illustrate Application of Common Framework to Diverse Regulatory Assessments

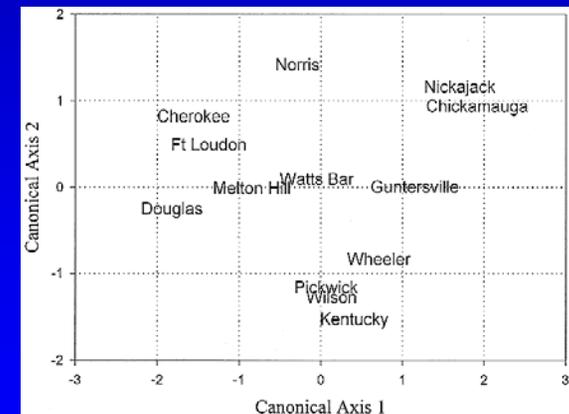
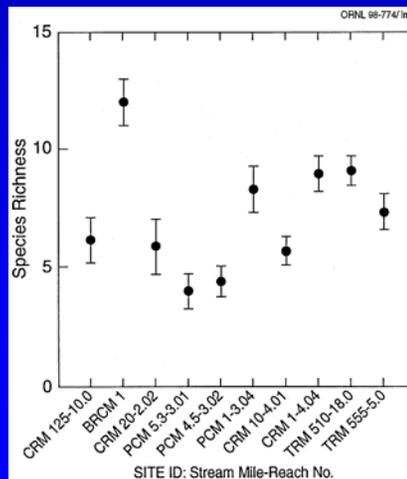
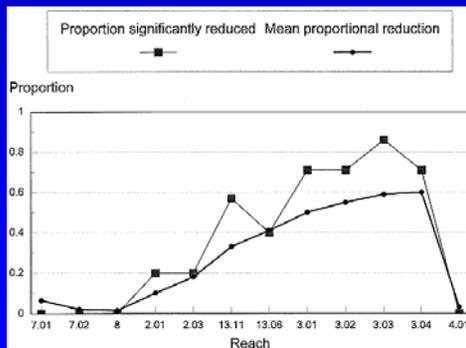
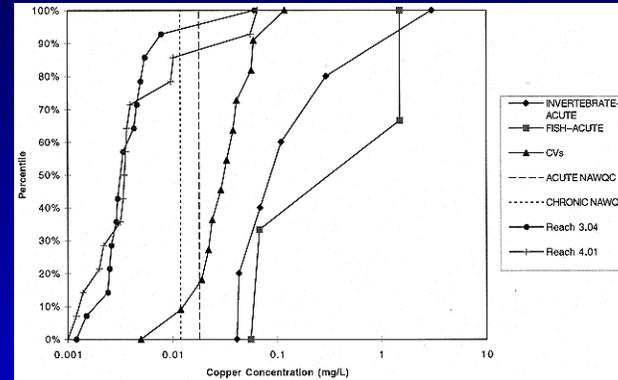
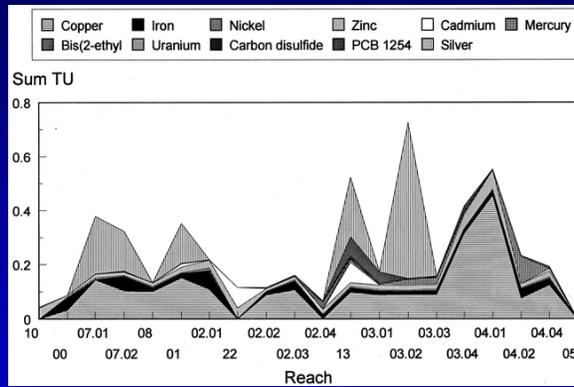
- Clinch River BERA
  - Site-specific assessment of remediation requirements at a Superfund site
- Atrazine special review
  - Regional/continental assessment of need for risk reduction
- Validation of EU pharmaceutical ERA procedure
  - Evaluation of level of protection provided by standardized hazard classification process

# The Clinch River Baseline ERA



- **Assessment endpoint:** fish community
- **Measures of exposure:** measured chemical concentrations in water and sediment
- **Measures of effect:** literature-derived tox data; site-specific tox tests; local and regional fish community composition
- **Risk characterization:** multiple lines of evidence

# Integration of Exposure and Effects Data in the Clinch River BERA

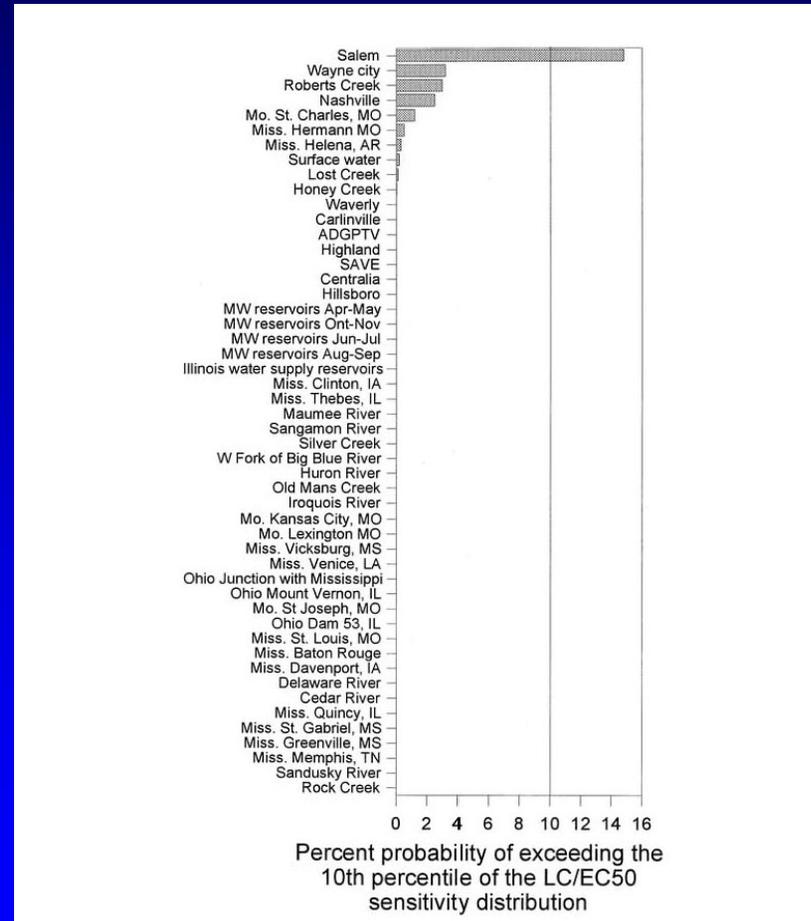
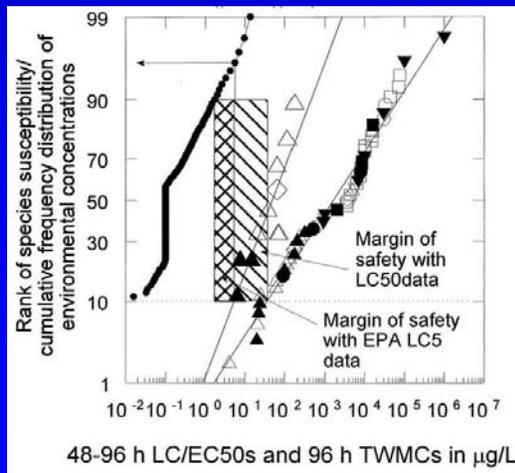
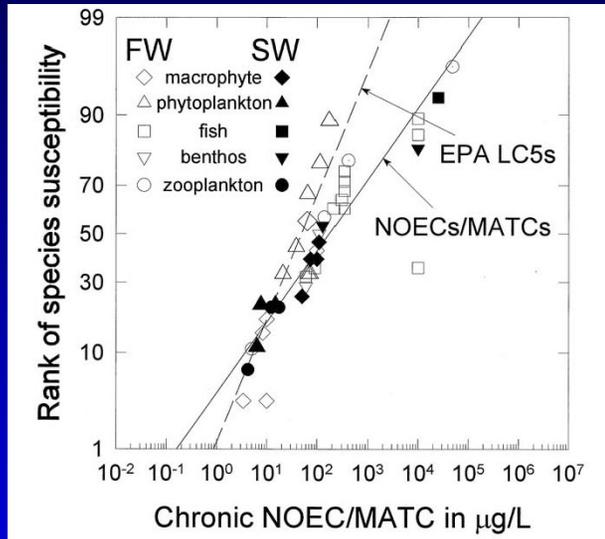


# Continental-Scale Ecological Risk Assessment of Atrazine

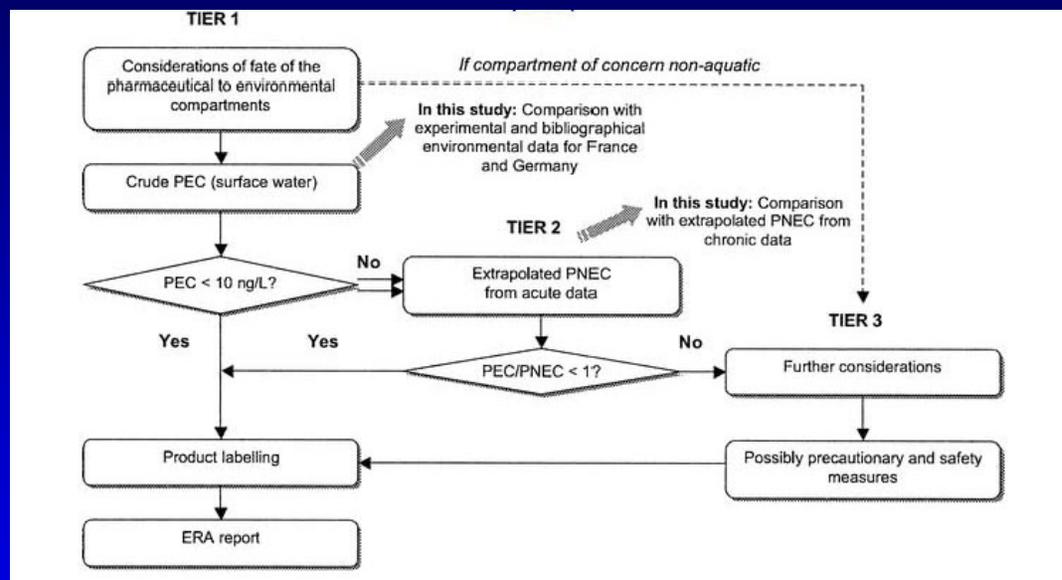


- **Assessment endpoint:** aquatic community (emphasis on plants)
- **Measures of exposure:** measured and modeled atrazine concentrations in water
- **Measures of effect:** literature-derived tox data for various aquatic taxa
- **Risk characterization:** probability of exceeding effects threshold for 10% of aquatic taxa

# Integration of Exposure and Effects Data in the Atrazine ERA

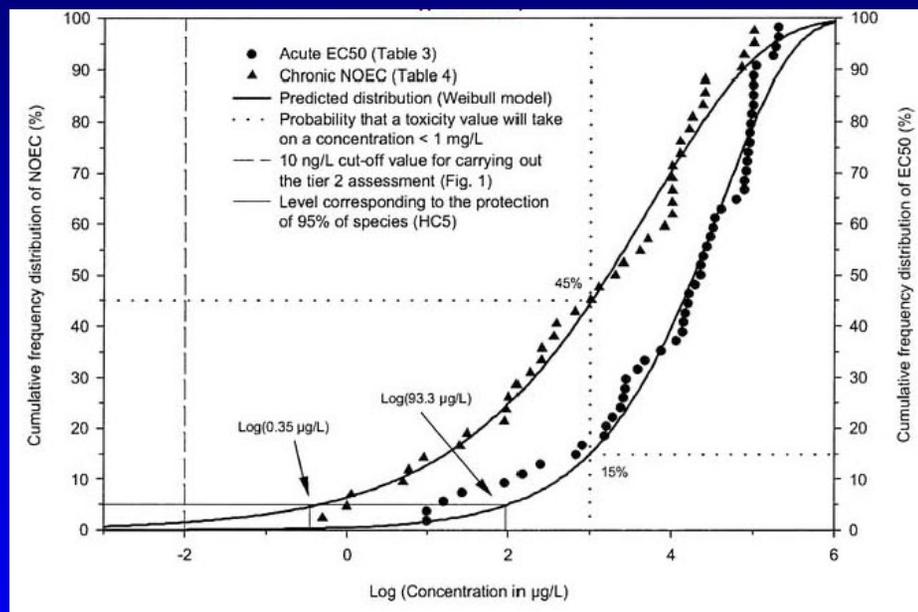
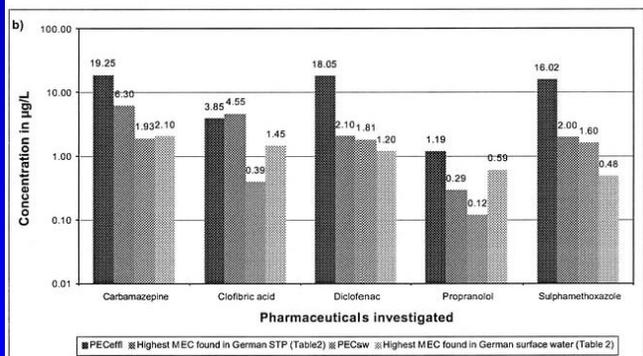
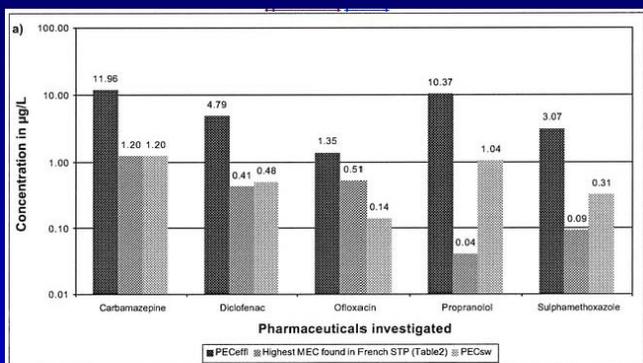


# ERA for Pharmaceutical Products in the European Union



- **Assessment endpoint:** aquatic ecosystem function
- **Measures of exposure:** measured and modeled concentrations in water
- **Measures of effect:** literature-derived tox data
- **Risk characterization:** hazard quotient

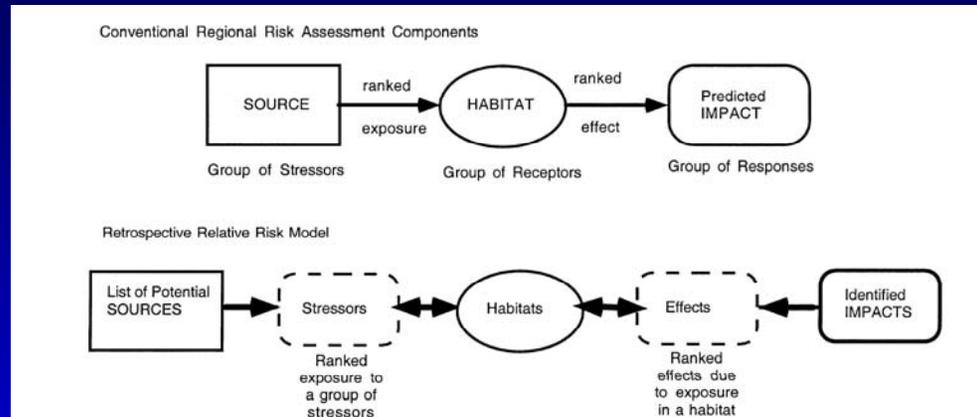
# Integration of Exposure and Effects Data in the Pharmaceutical ERA



# Strengths Demonstrated in Case Studies

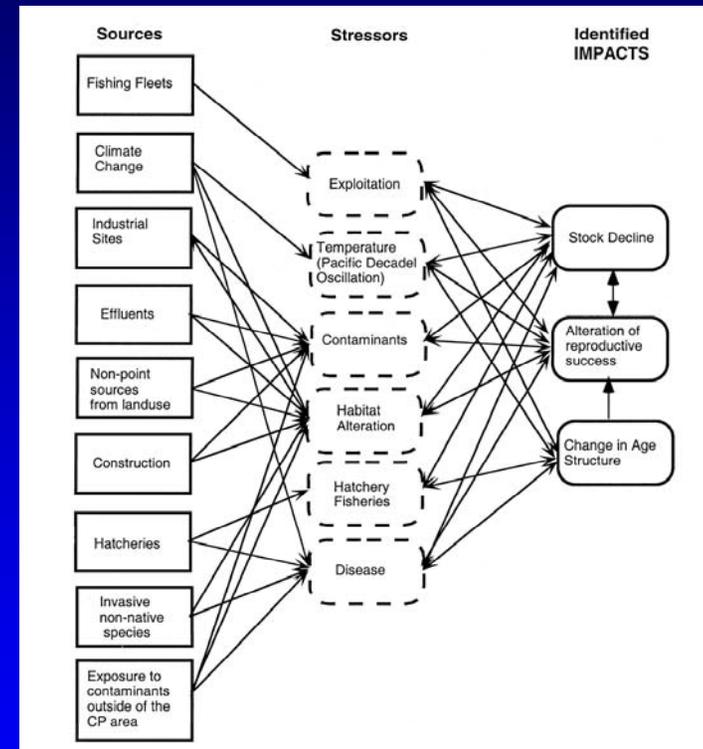
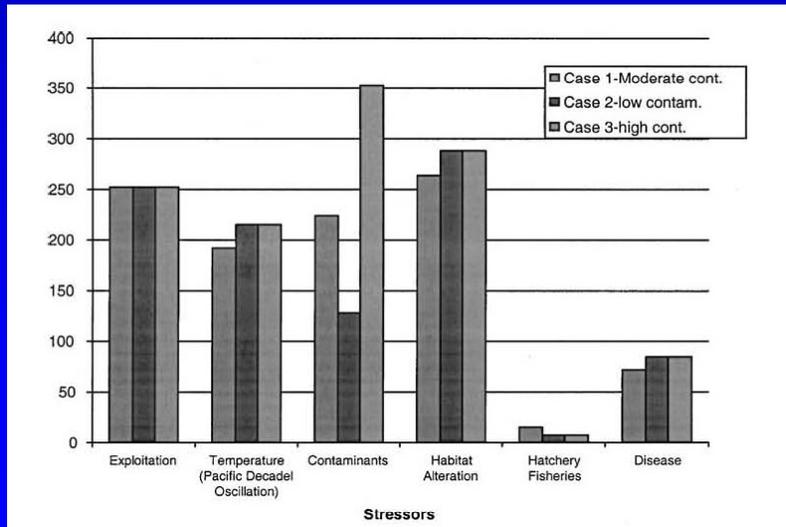
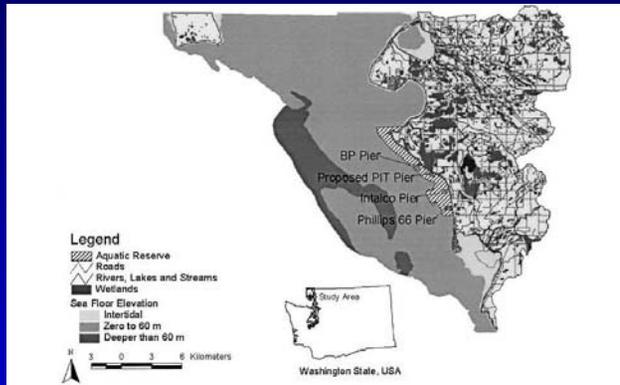
- Consistent approach for using diverse types of data
  - Use of laboratory and field data in Clinch River BERA
  - Use of SSD approach in atrazine and pharmaceutical ERAs
- Transfer of assessment methods between assessments
  - Use of “triad” approach in Clinch River BERA
  - Use of SSD approach in atrazine and pharmaceutical ERAs
- Consistent format for reporting risks and uncertainties

# Nonregulatory Risk Assessments Using the Relative Risk Model



- **Assessment endpoints:** diverse; defined by stakeholders
- **Measures of exposure:** quantitative and qualitative information on sources of stressors affecting assessment endpoints
- **Measures of effect:** quantitative and qualitative information on effects of stressors
- **Risk characterization:** multiplication of ranked exposure and effects indices

# Integration of Exposure and Effects Information in the Cherry Point Pacific Herring ERA



# Despite Unique Characteristics, the Cherry Point Herring Assessment is Clearly an ERA

- Assessment endpoints defined with stakeholder input
  - Abundance of the spawning run
- Conceptual model that clearly relates exposures to effects
  - Multiple sources and stressor types
- Risk characterization using an integrative model
  - The RRM
- Linkage to management objectives
  - Management of the Cherry Point Aquatic Preserve

# The Conflicting Goals of ERA

- Ensure that the assessment addresses management needs
- Maintain distinction between management and science
- Use the best available science
- Use all available and relevant science
- Ensure that the process is transparent
- Ensure that the methods and results are comprehensible to decisionmakers and stakeholders

# Ecological Risk Assessment 2006

- ***A systematic approach*** to organizing scientific information to support environmental decisionmaking
- ***A source of analytical tools*** applicable to a wide array of environmental problems
- ***A stimulus for development*** of even better tools to improve future environmental decisions