Presentation by Charles W. Powers, Executive Director CRESP & PI CRESP II
at the Long-term Stewardship Implementation Session
of the Industry Partnerships for Environmental Science and Technology Conference
National Energy Technology Laboratory
Morgantown, West Virginia
October 18, 20000

CRESP in Transition:

Where we have been

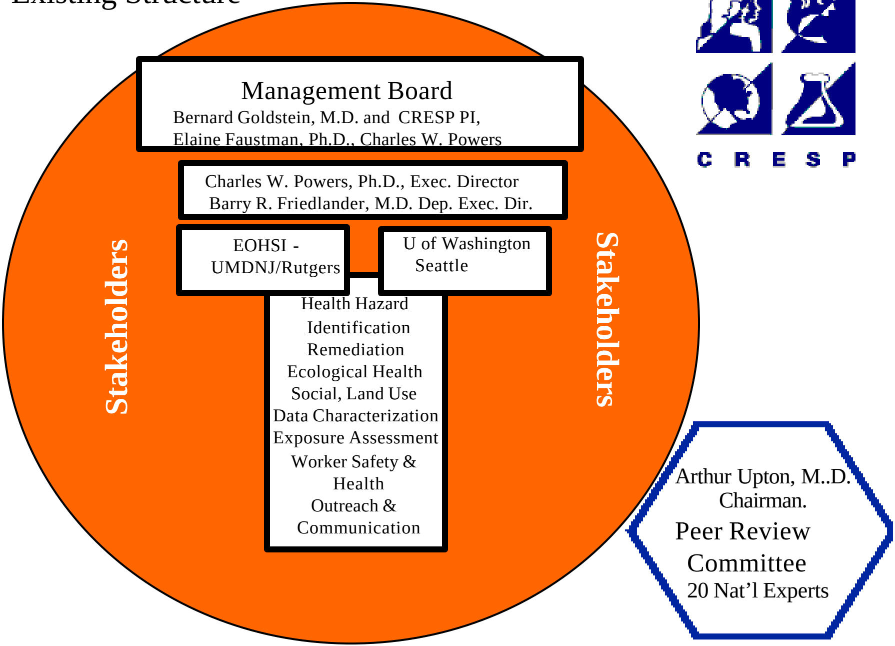
Where we will focus in the future

How we are evolving our mission and activities

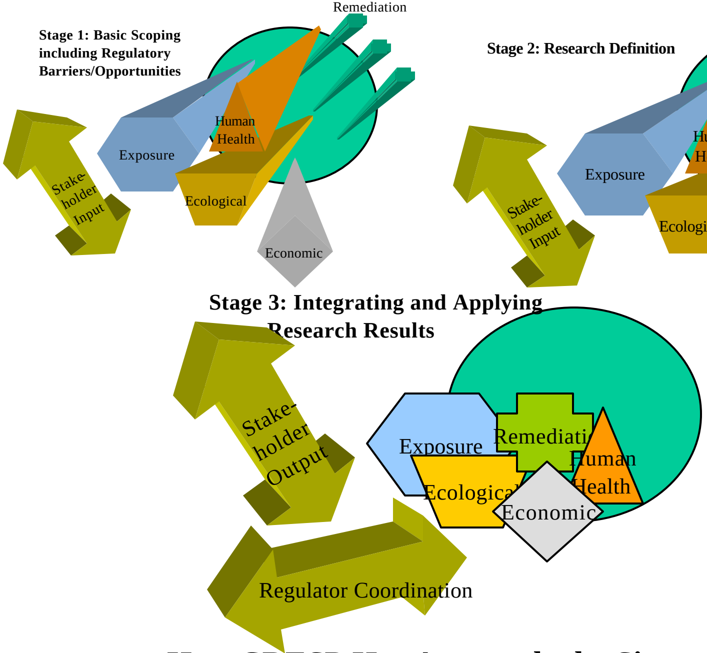
C R E S P

CRESP II

Existing Structure



C R E S P



How CRESP Has Approached a Site

C R E S P

Where we have been:

C R E S P

Independent and yet Knowledgeable

Participative Stakeholder Involvement

Very Productive Scientific and Technical Research Focus

Shaping Impact on Key Risk-Related DOE Processes

Shaping Impact on Regulatory Structure and Approaches

see our website www.cresp.org

CRESP II Consortium for Risk Evaluation with Stakeholder Participation*

.......working to advance cost-effective cleanup and greater stakeholder understanding of the nation's hazardous and nuclear federal facility waste sites by improving the scientific and technical basis of environmental management decisions. (www.cresp.org)

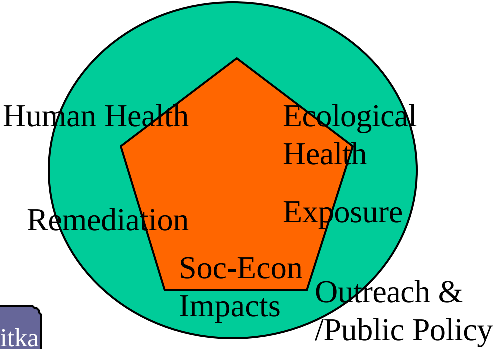
I R M

THE STATE UNIVERSITY OF NEW JERSEY RUTGERS

UMD NEW JERSEY

University of Arizona
University of Georgia
University of Alaska
Towson State University

A True Consortium of Universities and Others Organized for Interdisciplinary Work



At sites across the complex:

SRS

RL

RF

OR

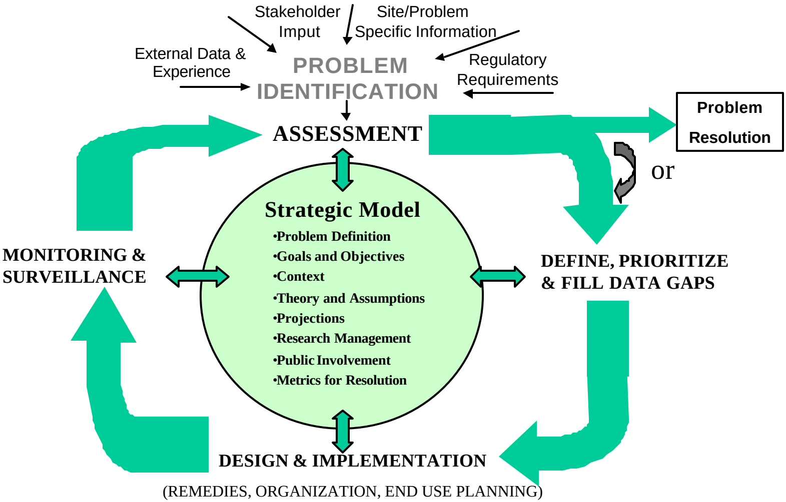
Amchitka

Where we are organizing ourselves to go

STEWARDSHIP

The process and commitment to establish, sustain and improve long-term protection and integrity of the environment for human, ecological and social/cultural health from the risks of DOE managed hazards and DOE operations.

The CRESP mission in relation to stewardship is to support it:
By conducting research, interacting with stakeholders, and offering scientifically grounded assessments for risk-based management of DOE hazards and operations.



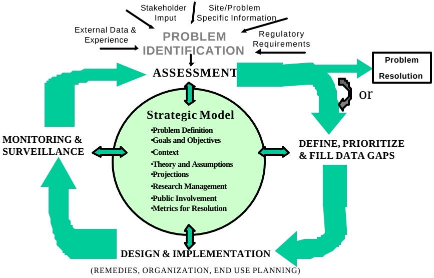
CRESP's Evolving research framework for stewardship

Characteristics of the CRESP Stewardship Research Framework

Generalized
Scalable

Cohering with a consistent approach:

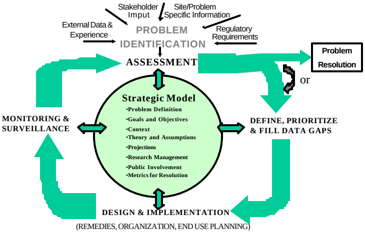
problem identification/definition
then:
assessing current information and
initial feasibility of resolution
defining data gaps
designing system to meet goals
designing system to monitor and provide surveillance
every step with understandable stakeholder comunication



Just like an RI/FS?

Yes:

both seek to:
understand a problem,
and assess more than a single way to address it with systems or devices to “fix it”

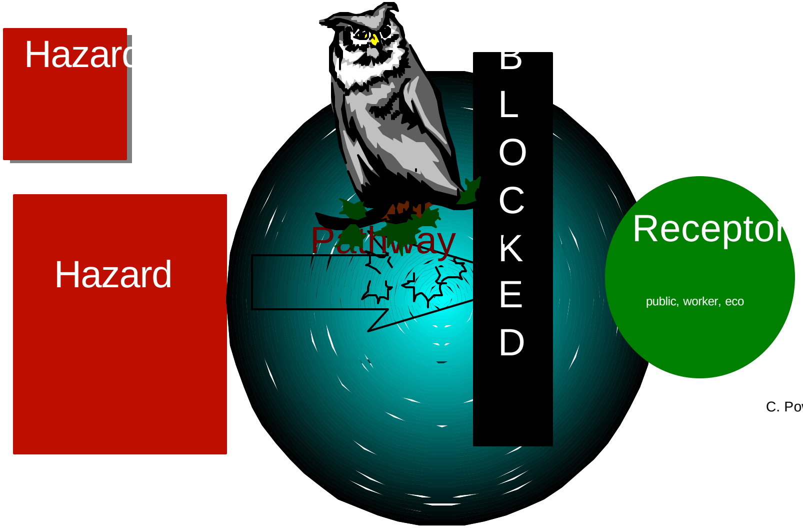


But different:

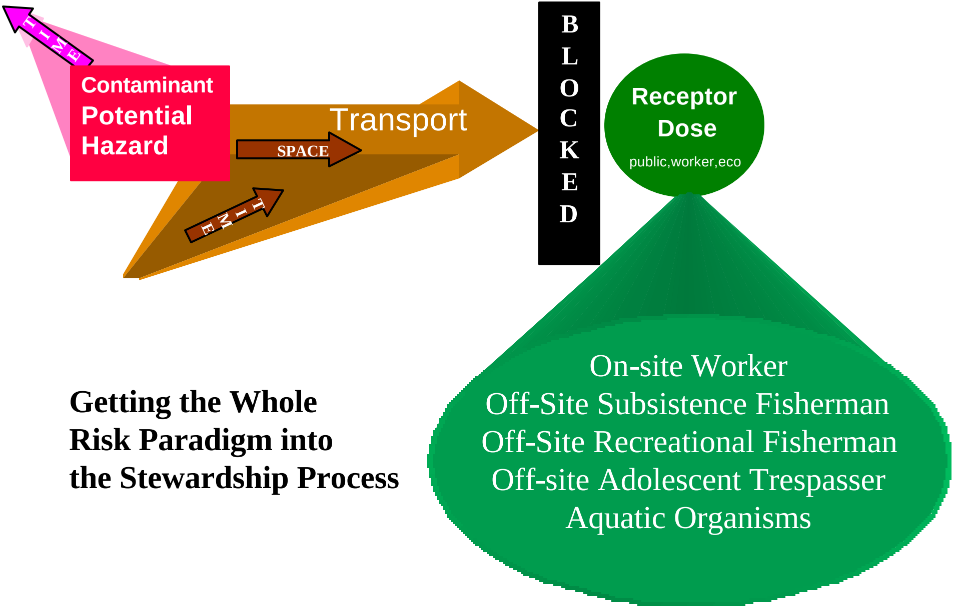
acknowledges long time horizon
accepts likelihood of unanticipated future events and thus:

- **a stewardship system** will require not only physical but institutional and financial system components which must be integrated (nested components will be the rule)
- **a stewardship system** and its framework is inherently iterative to respond to changes in relevant technical, scientific, social factors
- **a stewardship system,** though always meeting current regulatory objectives, is driven by the *logic of problem definition/resolution*, not solely criteria, levels or even cultures of such regulatory programs since regulatory evolution will be needed

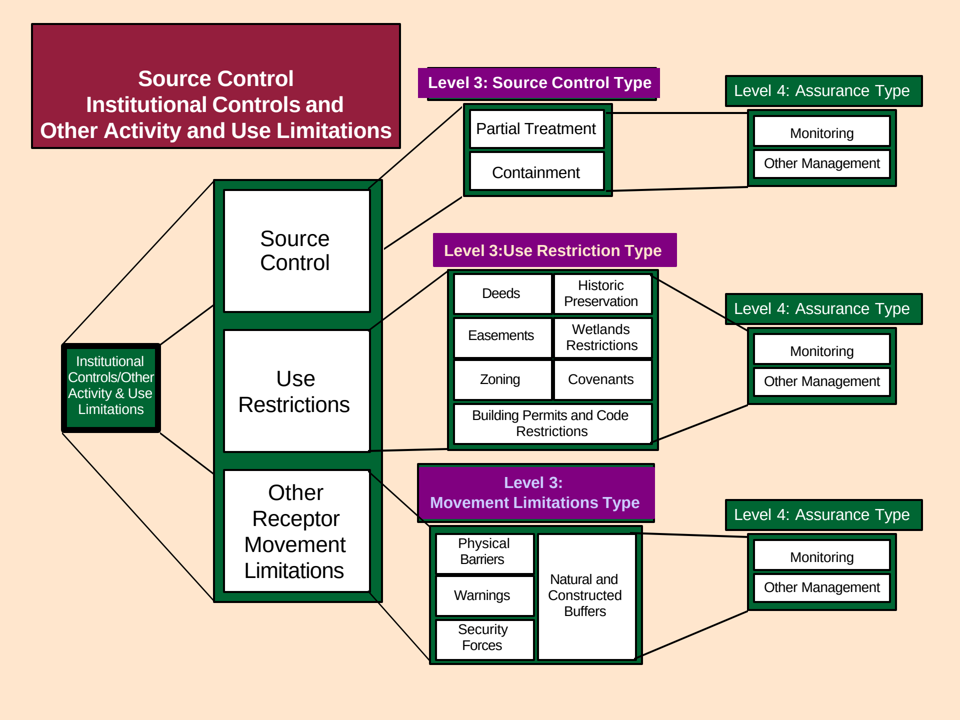
How to assure that the pathways are blocked from receptors -- now and in the future



C. Powers



Getting the Whole Risk Paradigm into the Stewardship Process

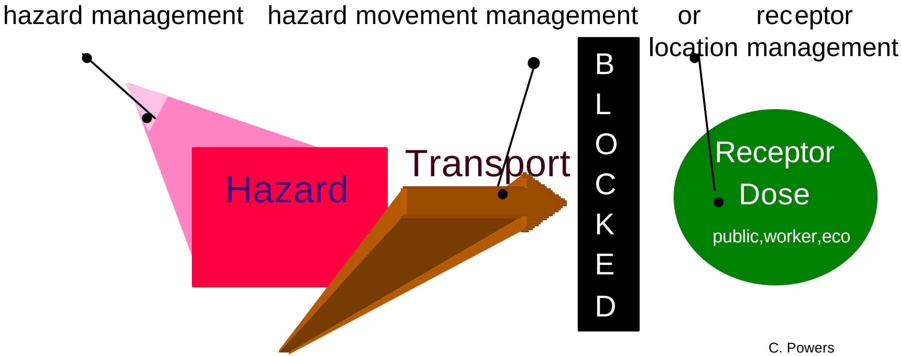

Source Control
Institutional Controls and
Other Activity and Use Limitations
Level 3: Source Control Type
Partial Treatment
Containment
Level 4: Assurance Type
Monitoring
Other Management
Institutional Controls/Other Activity & Use Limitations
Source Control
Use Restrictions
Other Receptor Movement Limitations
Level 3:Use Restriction Type
Deeds
Historic Preservation
Easements
Wetlands Restrictions
Zoning
Covenants
Building Permits and Code Restrictions
Level 4: Assurance Type
Monitoring
Other Management
Level 3:
Movement Limitations Type
Physical Barriers
Warnings
Security Forces
Natural and Constructed Buffers
Level 4: Assurance Type
Monitoring
Other Management

Stewardship Risk Management is Focused on 3 different types of activities:

Hazard Management

Hazard Transport Management

Receptor Location Management



C. Powers

Hazard Management: 3 basic options if you act before the hazard is “released”

Make it go away:

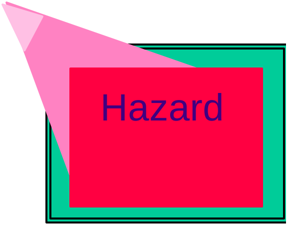
TREAT TO MAKE LESS HARMFUL
- CHANGE THE PHYSICAL/ CHEMICAL CHARACTERISTICS

or

REDUCE VOLUME OR ACTIVITY (e.g.. RADIONUCLIDE HALF-LIVES; MIX TO NEUTRALIZE CHEMICALS)

Tie it up so it can’t harm:

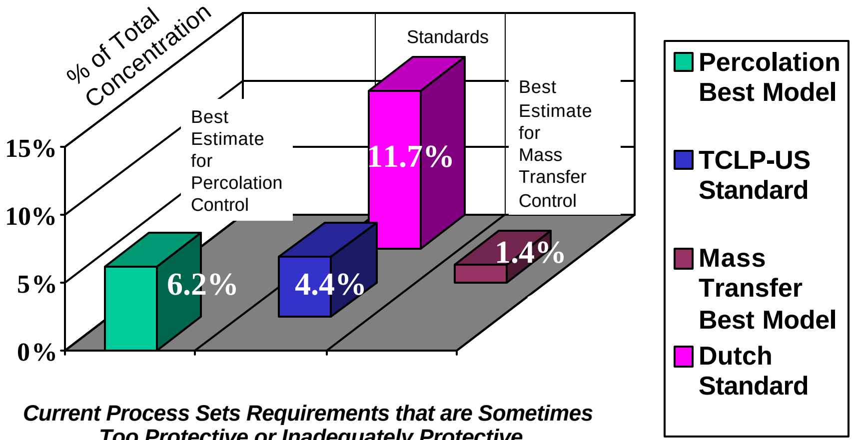
ENCAPSULATE OR CONCENTRATE/ IMMOBILIZE PERMANENTLY



Tie it up until it goes away

ENCAPSULATE OR IMMOBILIZE UNTIL IT NO LONGER POSES A DANGER

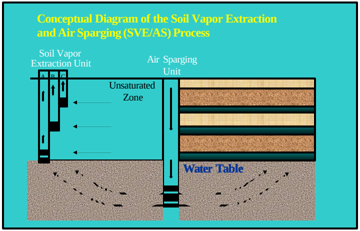
100-Year Arsenic Releases from Contaminated Soil: Best Scientific Estimates vs. Two Government Standards



Current Process Sets Requirements that are Sometimes Too Protective or Inadequately Protective

This slide was originally used in a CRESP Presentation by David Kosson, Ph.D. at a Seminar, “Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience”, April 12, 1999, in Washington, D.C.

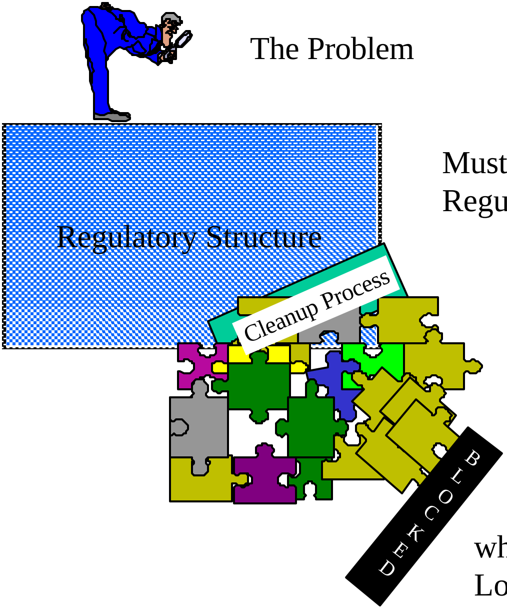
CRESP Objectives for C-BRP



- Develop a contaminant mass transport model to simulate Soil Vapor Extraction (SVE) and Air Sparging (AS) unit operations.
- Incorporate stratigraphic heterogeneity and mass transfer limitations to describe “tailing” and “rebound” effects.
- Estimate the effect of continued system operation on restoration of vadose zone and groundwater quality.
- Estimate the potential benefits from intermittent system operation.
- Estimate the required duration of remediation system operation and define operational limits and achievable endpoints.
- Use the SVE/AS model to optimize the operation of the SVE/AS system at the C-Area Burning Rubble Pit (C-BRP)

This slide was originally used in a Presentation by David Kosson, Ph.D. at a Seminar, “Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience”, April 12, 1999, in Washington, D.C.

The Problem



Must Cohere with the Regulatory Structure

which Coheres with the Remediation Process

which Coheres with the Long-term Controls Process


Watershed Areas of the SRS
Upper Three Runs
Fourmile Branch
Pen Branch
Steel Creek
Lower Three Runs
Miles

OU’s
and
IOU’s

A related approach is to be sure that the pathways are comprehensively defined and assessed

Integrator Operable Units (IOUs) at SRS

Objective: Define approach for evaluating and establishing restoration needs for large land areas

Approach:

- Provide independent input to refocus existing evaluation process
- Work closely with DOE, SCDHEC and USEPA teams to provide consistent program objectives
- Coordinate with on-going CRESP research

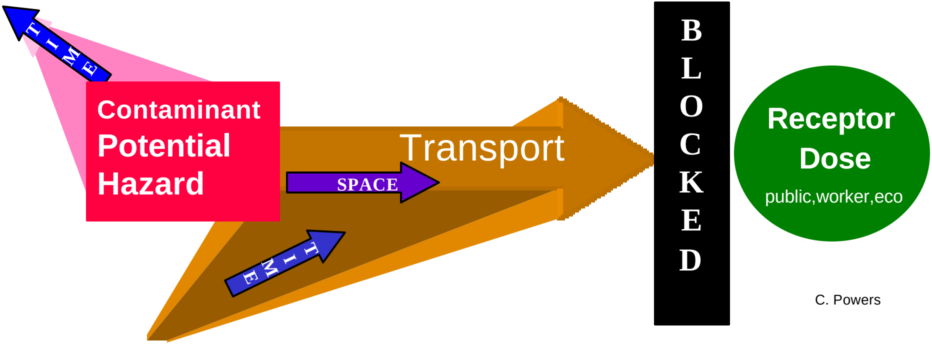
Expected Result:

- Process to achieve integrated evaluation, remediation, and final "sign off" on large land areas

This slide was originally used in a Presentation by David Kosson, Ph.D. at a Seminar, in Augusta Georgia, June 6, 2000

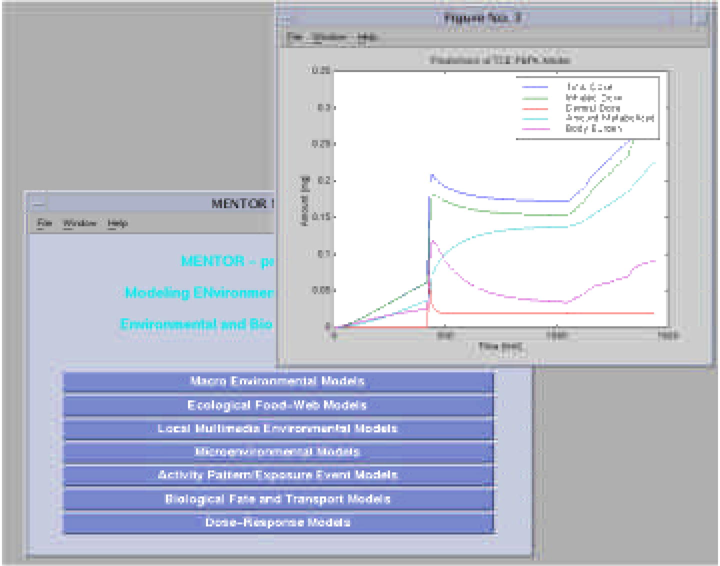
Hazard Transport Management

Can Contaminant transport pathway be blocked before receptor contact ?



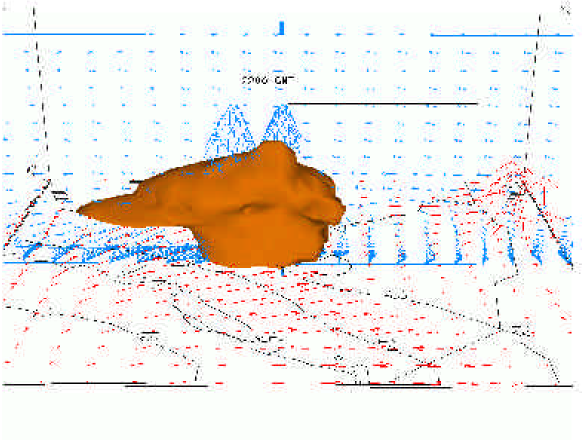
Or will the contaminant be diluted or decay during transport before receptor contact?

Case Study: Source-to-Dose Modeling for TCE in Groundwater - PBPK Modeling of TCE from Shower Use of Well Water: Inhalation and Dermal Exposure



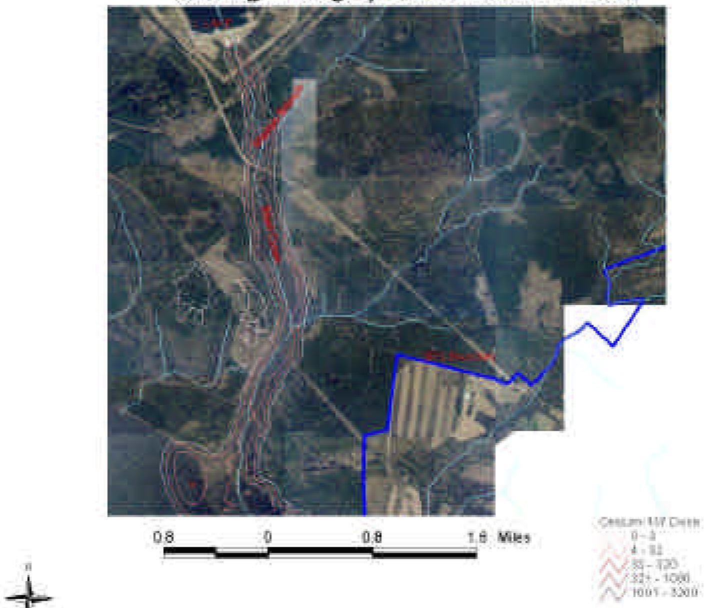
This slide was originally used in a CRESP Presentation by Paul Lioy, Ph.D. at a Seminar, "Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience", April 12, 1999, in Washington, D.C.

Figure 9a: 3-D view of the smoke plume superimposed with the horizontal and vertical wind vectors and mixing ratio contours at 2200 GMT (5:00 PM local time). [Two mpeg files, one for horizontal view (fire1.mpg, see below) and the other for vertical view (fire2.mpg, see below), are included for visualizing the 3-D evolution and transport of smoke plume.]



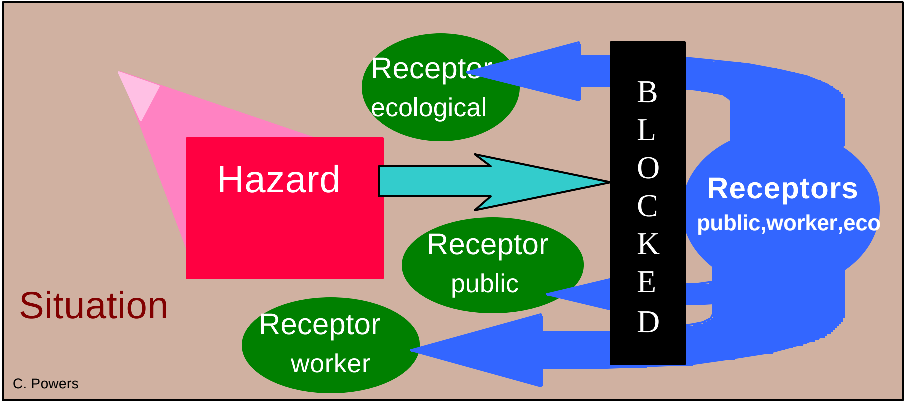
This slide is found in a report on tools for modeling particulate movement in forest fires by Panos Georgopolous and colleagues on the CRESP website, www.cresp.org.

Overflight Imagery Downstream of L Lake



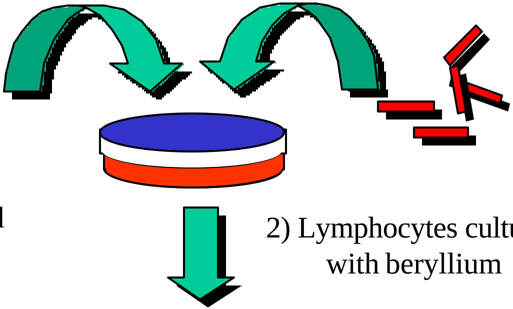
Fundamental to Protective Transport Management is effective and accurate monitoring of contaminant movement

Receptor Location Management: receptors differ and move unless hazards are moved away or receptors are persuaded not to move toward contact



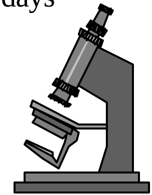
Beryllium Lymphocyte Biomarker: Proliferation Test

1) Lymphocytes isolated from human blood or lung lavage



2) Lymphocytes cultured with beryllium

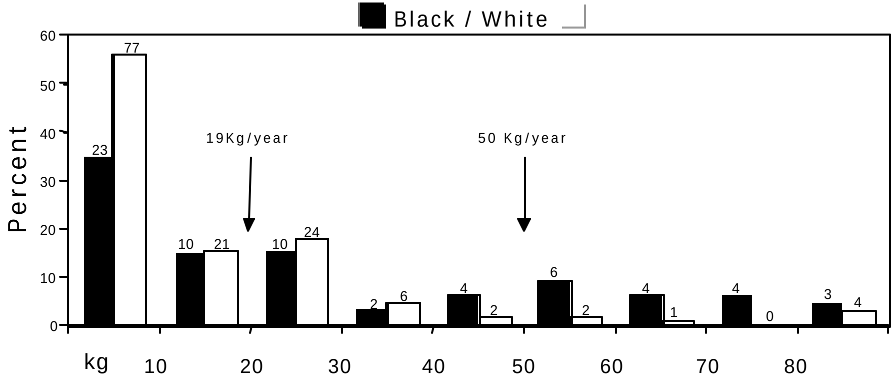
4-6 days



3) Assess proliferative response to beryllium

This slide was originally used in a Presentation by Elaine Faustman, Ph.D. at a Seminar, "Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience", April 12, 1999, in Washington, D.C.. See CRESP website, www.cresp.org.

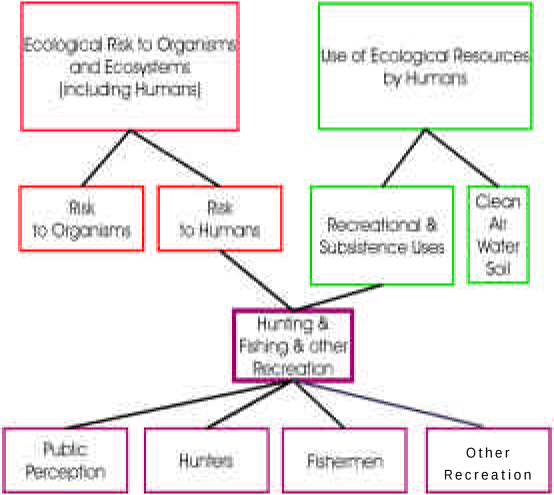
CONSUMPTION



Fish Eaten per Ye

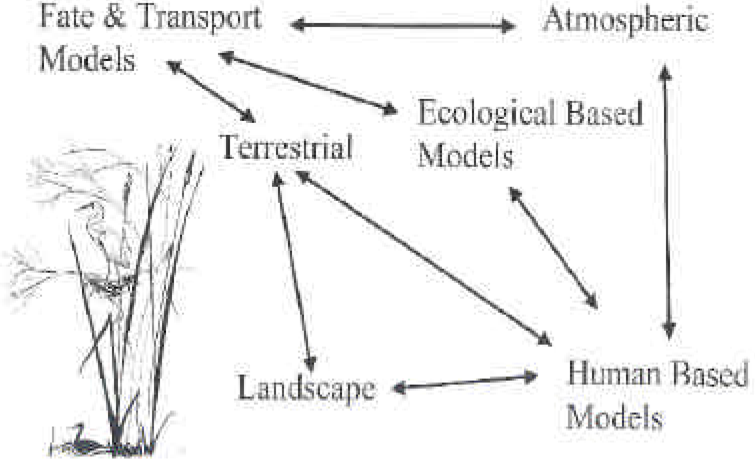
This slide was originally used in a Presentation by Joanna Burg er, Ph.D. at a Seminar, "Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience", April 12, 1999, in Washington, D.C.. See CRESP website, www.cresp.org.

Science for Ecological Risk, Food Chains, and Regulation

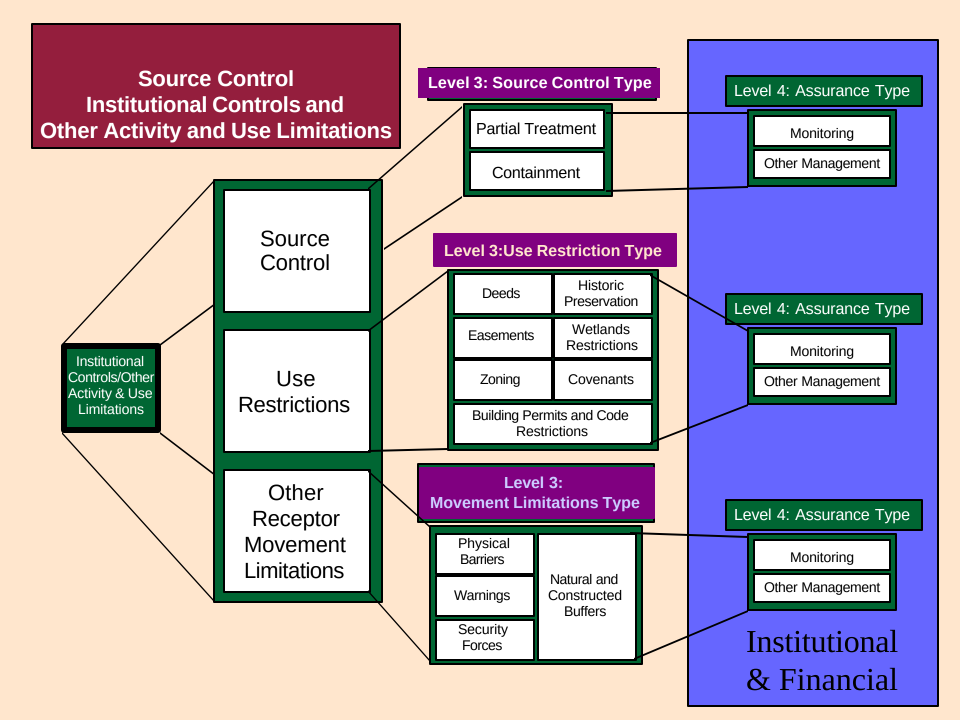


This slide was originally used in a Presentation by Joanna Burg er , Ph.D. at a Seminar, "Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience", April 12, 1999, in Washington, D.C.. See CRESP website, www.cresp.org.

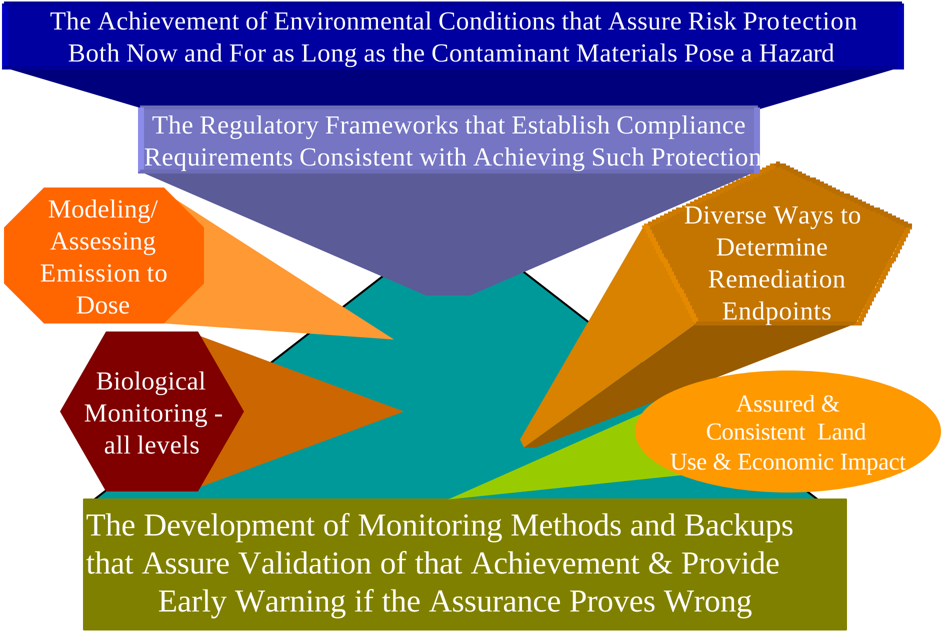
Relationships Between Several Models



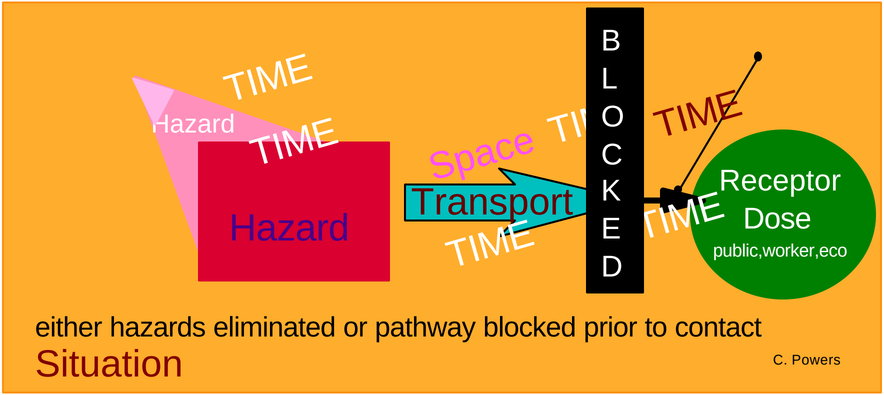
This slide was originally used in a Presentation by Joanna Burg er , Ph.D. at a Seminar, “Can Science Really Foster Better Public Policy Decisions? The Lessons of the CRESP Experience”, April 12, 1999, in Washington, D.C.. See CRESP website, www.cresp.org.



Source Control
Institutional Controls and
Other Activity and Use Limitations
Level 3: Source Control Type
Partial Treatment
Containment
Level 4: Assurance Type
Monitoring
Other Management
Source Control
Institutional Controls/Other Activity & Use Limitations
Use Restrictions
Level 3:Use Restriction Type
Deeds
Historic Preservation
Easements
Wetlands Restrictions
Zoning
Covenants
Building Permits and Code Restrictions
Level 4: Assurance Type
Monitoring
Other Management
Other Receptor Movement Limitations
Level 3:
Movement Limitations Type
Physical Barriers
Warnings
Security Forces
Natural and Constructed Buffers
Level 4: Assurance Type
Monitoring
Other Management
Institutional & Financial

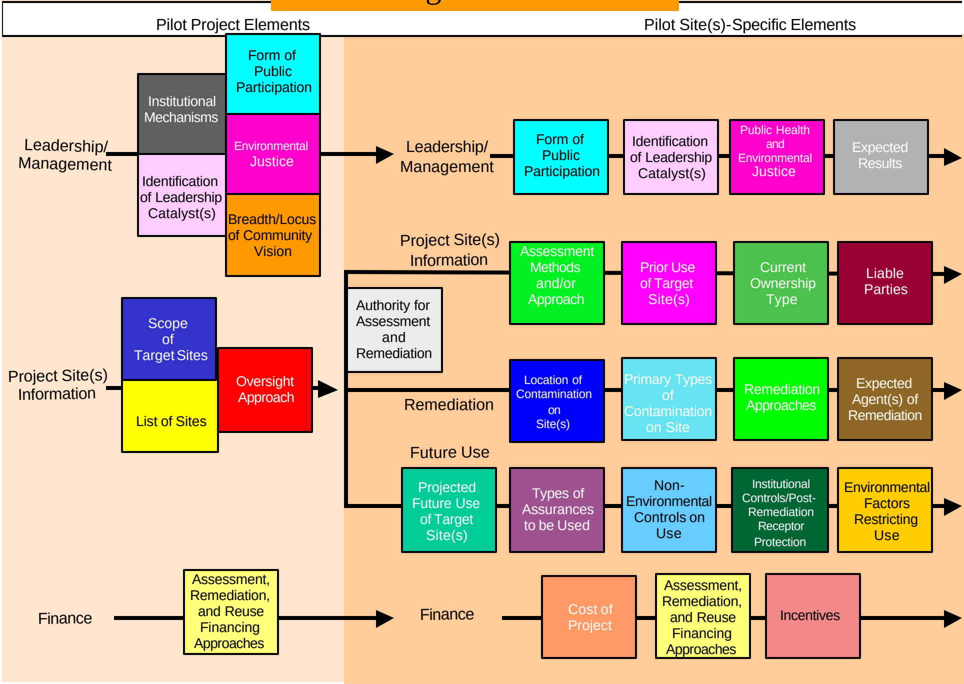


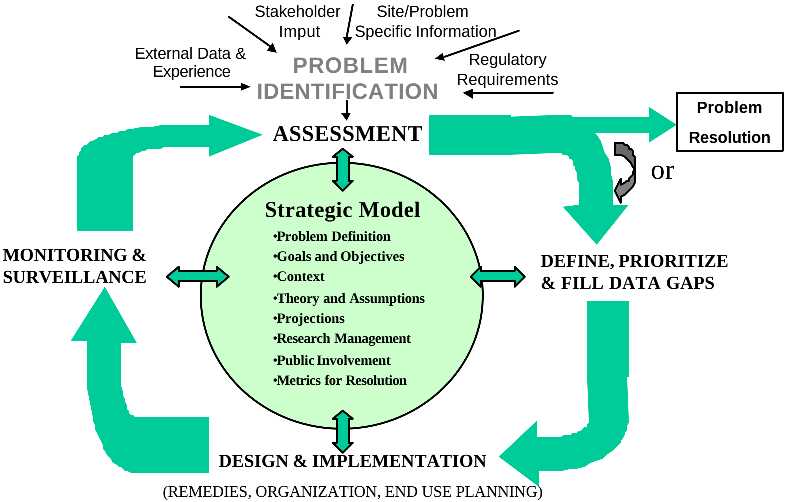
Stewardship's Challenge to Science and Technology



When Stewardship is integrated into the process, time and space are both the enemy and the friend of protective, cost-effective cleanup & LTS at DOE sites: because radionuclides decay over time; space is a buffer, but implementing land use is a challenge

Pilot Organization Matrix





CRESP's Evolving research framework for stewardship