

# Use and Abuse of Computer Models

**Do Computer Models  
Help ... *or* ... Hinder  
Collaboration?**

**Michele Straube, *CommUnity Resolution, Inc.***

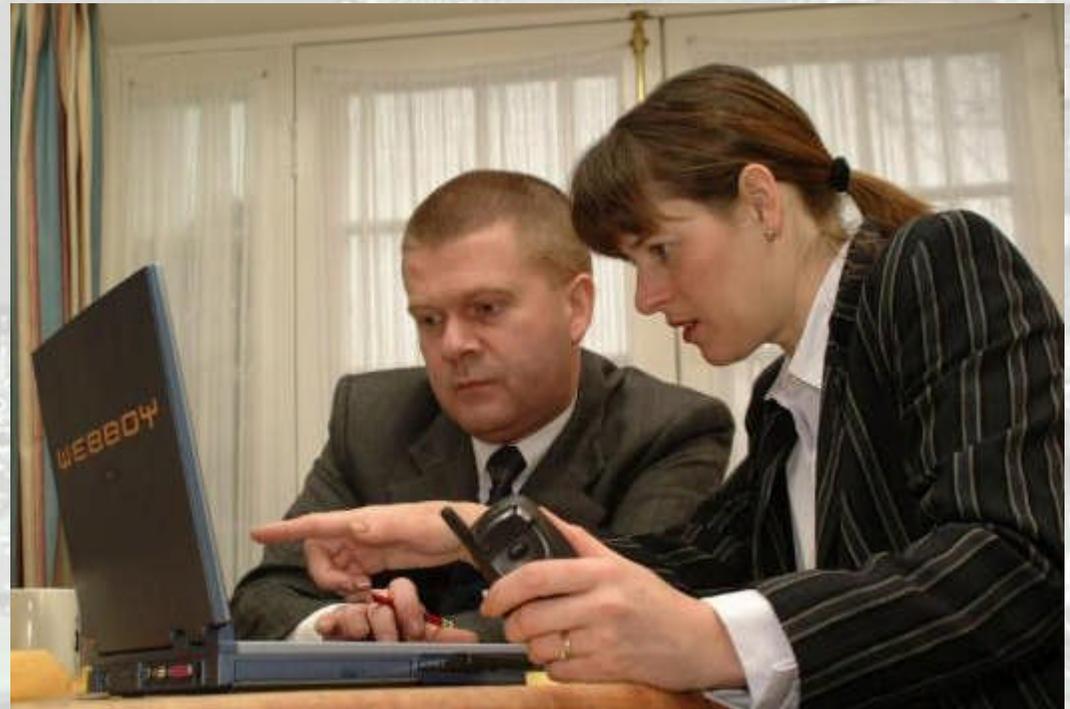
**Craig Forster, *University of Utah***

*“All models are wrong.....*

*..... some are useful”*

**- G.E.P. Box**

**Can models foster  
collaboration in ECR?**



# Outline

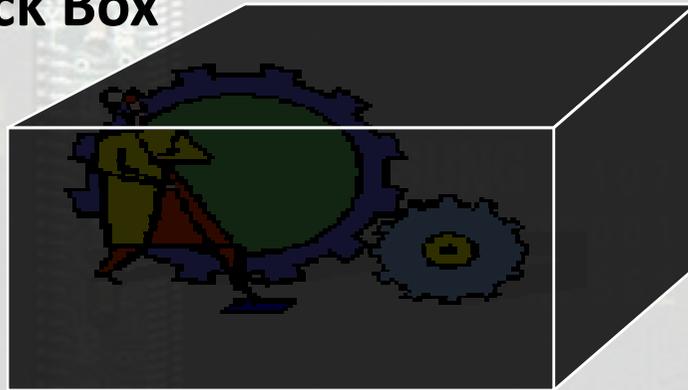
- **What is a model?**
- **What factors affect model use in ECR?**
- **Case examples**
- **Our collective experience**
- **Wrap-up**

# What is a model?

Simplification of reality

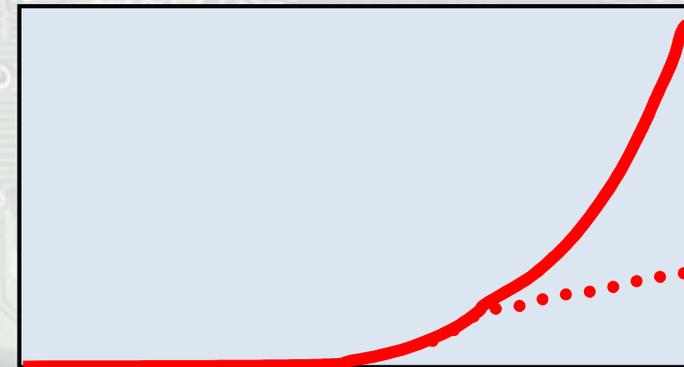


Often a 'Black Box'



Tool for exploring alternative futures

Outcomes depend upon  
*hidden assumptions*  
and *built-in limitations*



# Actors Using/Abusing Models



**Policy-Maker**



**Expert Modeler**



**Manager**



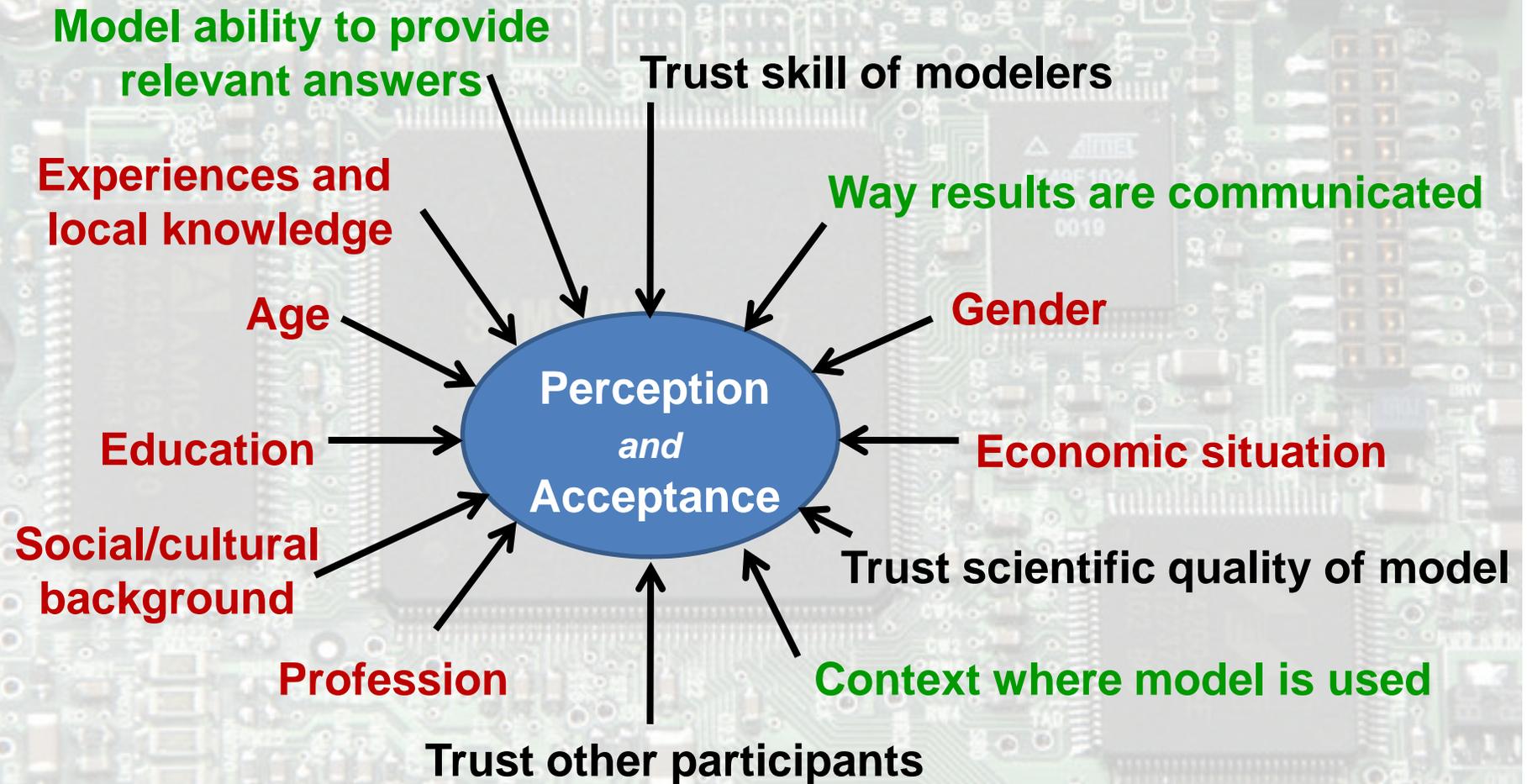
**Stakeholders**



**Mediator**

What role(s)  
do **YOU** play?

# Factors Affecting Model Use



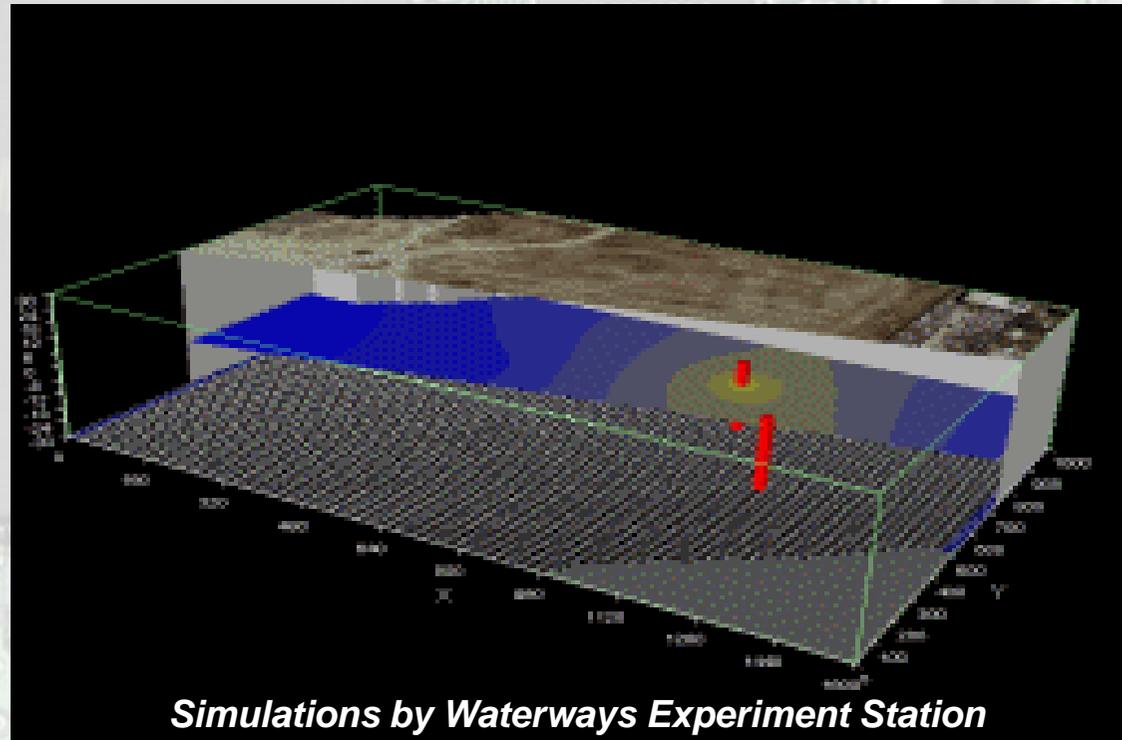
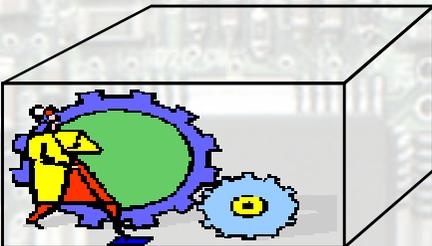
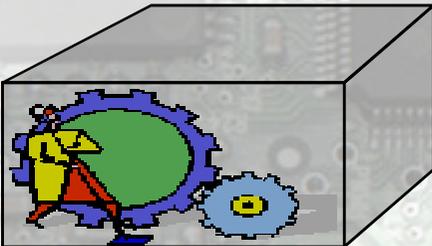
*After Olsson and Andersson (2006)*

# Model 'Abuse' in ECR

- **Manipulation by powerful actors**
- **Over-reliance in decision-making**
- **Unrevealed assumptions/limitations/errors**
- **User unfriendly and irrelevant (theoretical, complex)**
- **Looking for consensus on optimal 'best solution'**
- **Uncritical acceptance of results**
- **Too little time for dialogue**

**Understanding of  
Inner Workings?**

**Model Transparency  
Builds Confidence**



# Participatory Modeling

- Collaborative team learning experience
- All are involved in system model building
- Mental models are made explicit, examined and tested
- Model helps confront “beliefs” and “facts”
- Shared level of understanding
- Broad and deep consensus
- Facilitated by user-friendly system modeling language (e.g., *STELLA*®)

*van den Belt (2004)*

**3:30 to 5:00 TODAY**

**Computer Aided Dispute Resolution (CADRe) 101 (BO7B)**

# Questions

- **What is your experience with models in ECR?**
- **How can models foster collaboration?**
- **When should models not be used?**
- **How do we prevent model “abuse”?**
- **Who should ensure appropriate model use?**

# Enhance Collaboration ?

Opportunities to use models or modeling process to enhance collaboration?

- Collaborative modeling
- Traditional litigation / leverage to prompt compromise / collaborative attitude
- Educating stakeholders about model process to build trust in process, players and model results
- Obtaining stakeholder input into modeling, short of full collaborative modeling

# Legacy Highway

## Issues:

- Roadway alignment options
- Environmental impacts

## Stakeholders:

- UDOT
- Federal Highway Administration
- Utahns for Better Transportation
- Sierra Club (staff and attorneys)

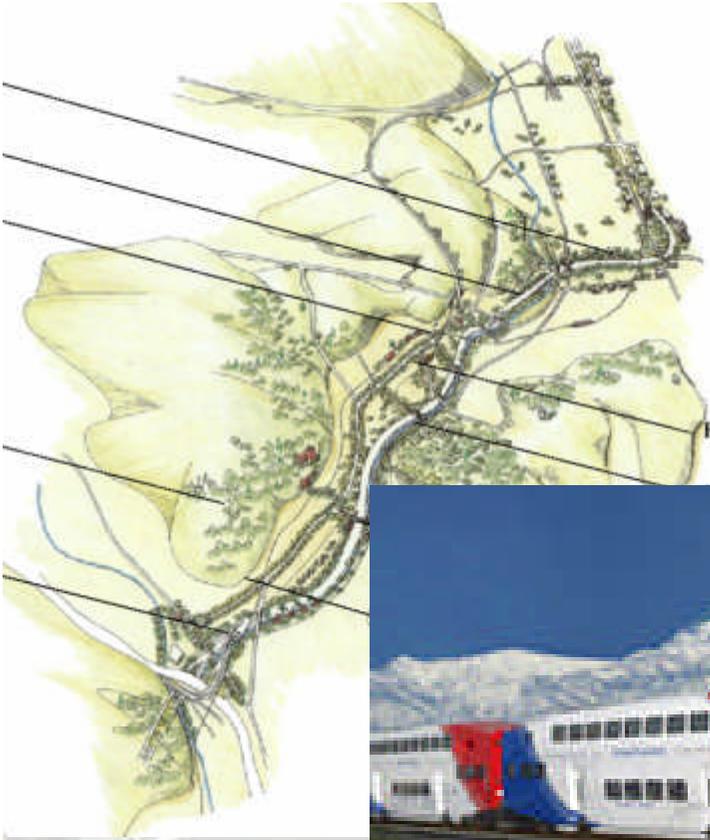
## Models Used:

- Hydrogeographic
- Travel demand



# Legacy Highway → Legacy Parkway

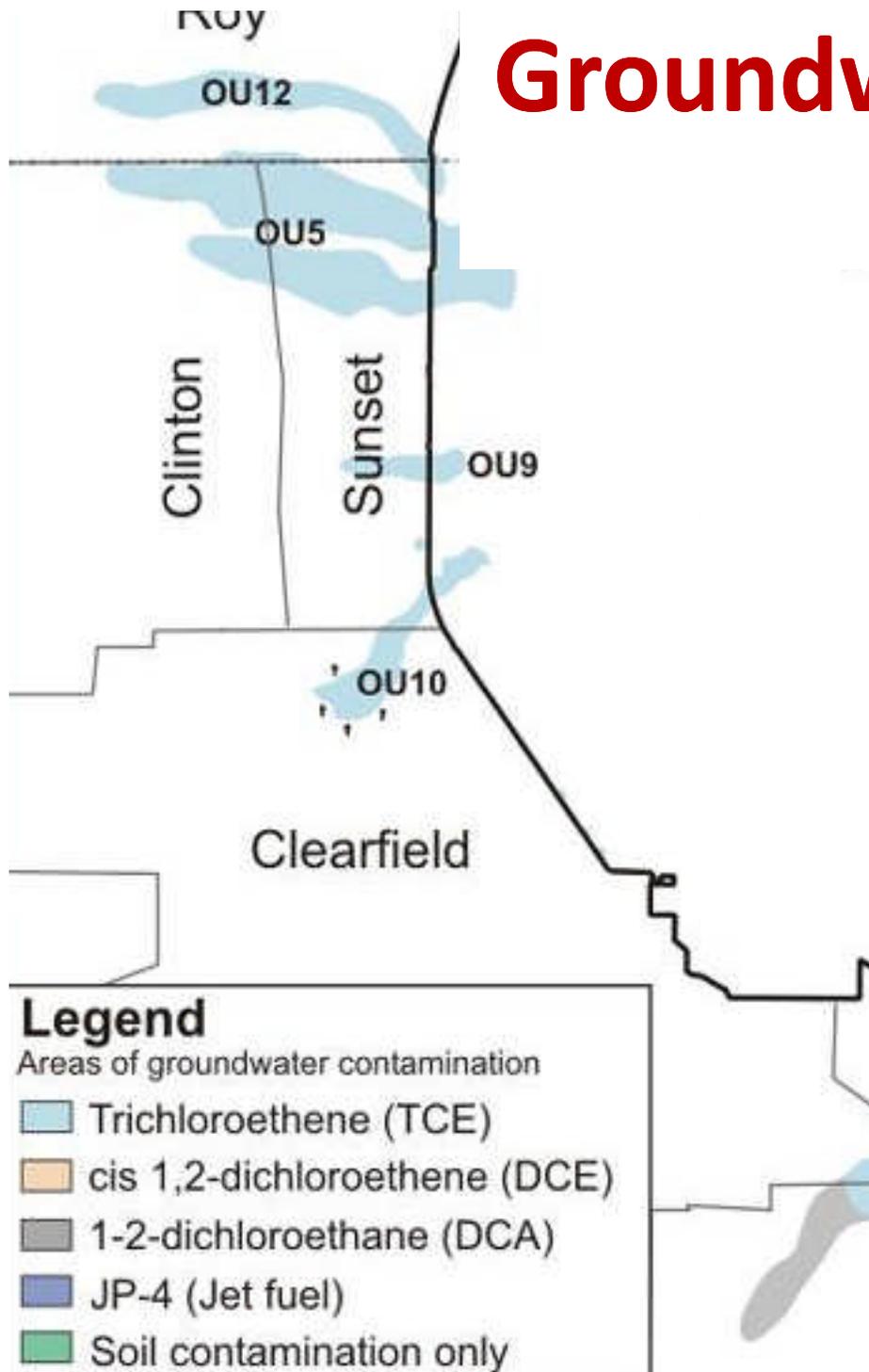
- All actors had high level of sophistication about models
- Successful litigation created leverage
- Dueling models → compromise and better solution
- Adversarial relationship
  - attempt to integrate two models
  - approached next project with collaborative intent



Electric Streetcar



# Groundwater Contamination at Hill AFB



## Issue:

- Citizen advisory board
- Distrust of models

## Stakeholders:

- 8 communities (2 each)
- 6 interested parties
- 3 regulators
- Sierra Club (volunteer)
- Hill AF Base

## Models:

- Groundwater flow
- Contaminant transport

# Hill AFB

## Restoration Advisory Board

- Citizen actors aware of their own lack of sophistication about models
- Citizen actors had varying levels of distrust
- Hired third party expert to review model and teach Modeling 101
- Built trust in modeling process and results, and expanded feelings of collaboration
- Empowered RAB to participate more effectively

# Lower Silver Creek Mine Tailings

## Issue:

- Engage stakeholders
- Model to reflect reality

## Stakeholders:

- 20+ landowners
- Developers
- Local government
- Regulators
- Interested parties

## Models:

- Groundwater flow
- Surface water flow
- Hydrochemistry



# Slide Introducing Model

## Phase I Sampling - Modeling

- **Conceptual Modeling Approach**
  - One dimensional advection-dispersion transport
  - Sediment transport (interactions between water and sediment segments)
  - Kinetic & Equilibrium Chemical reactions within both water and sediment segments
  - Tributaries and groundwater inflows

# Lower Silver Creek Mine Tailings

- **Extremes of actor sophistication about models**
- **Facilitator-initiated revisiting of modeling process**
- **Intent to solicit stakeholder input regarding assumptions about on-the-ground conditions**
- **Intent to use model results to:**
  - **Give stakeholders full understanding of hard choices**
  - **Inform conversation about options and consequences**
- **Work-in-progress**
- **Opportunity to enhance or stifle collaboration**

# Questions

- **How can models foster collaboration?**
- **How do we prevent model “abuse”?**
- **Who should ensure appropriate model use?**
- **At what point in model development can or should stakeholders become involved? To what purpose?**
- **Which actors can or should take responsibility for seeing models as a collaborative opportunity?**

