

Friday's Agenda (8 am – 12 pm)

- Recap intro of SDM and RP
- SDM case studies
 - 30 min/group, incl. discussion
- Learning and process
 - 5 min/group + discussion
- Future opportunities
 - Training, practice, networking

Recap: Structured Decision Making & Rapid Prototyping

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USGS Patuxent Wildlife Research Center

SDM Workshop, 8-12 December 2008, NCTC

“A formal application of common sense for situations too complex for the informal use of common sense.”

R. Keeney

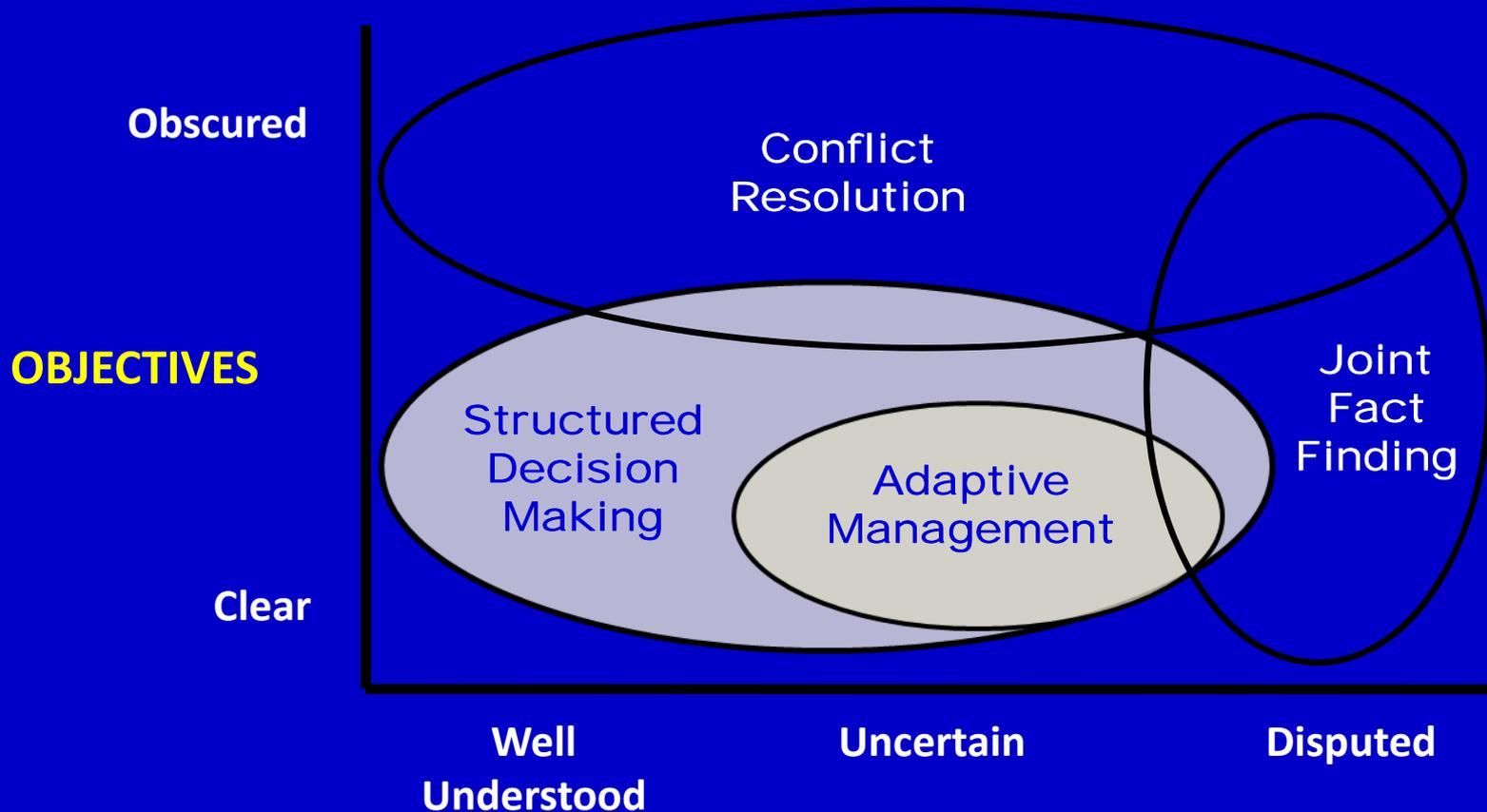
What makes decisions hard?

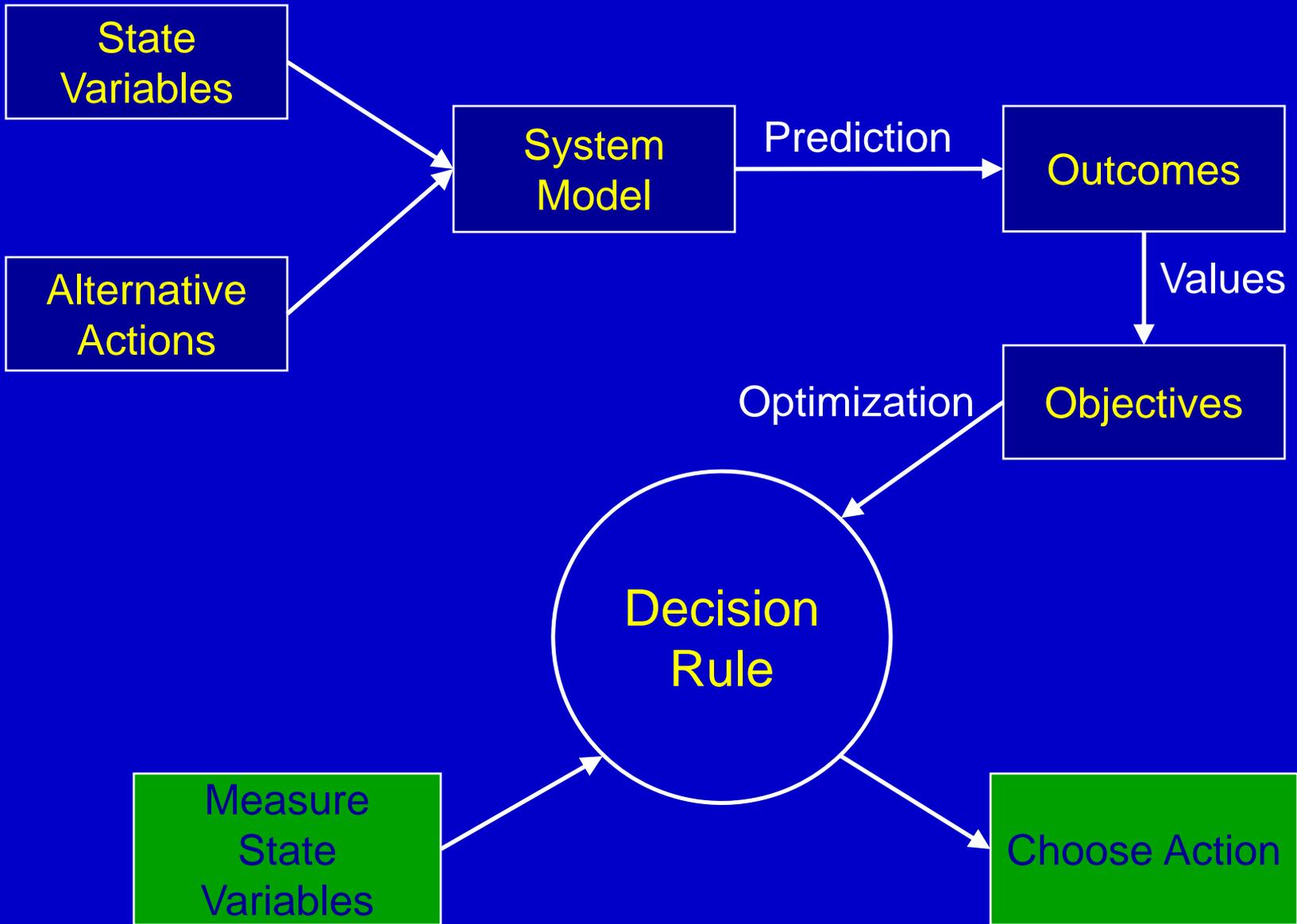
- Sometimes you don't know all the possible actions
- The objectives may be complex or contradictory, or in dispute
- The system dynamics may be poorly known
- Sometimes we confuse all the components
- Even knowing all the other components, the solution (optimization) may be difficult to figure out
- Sometimes it's just incredibly difficult to figure out the structure of the decision

PrOACT+

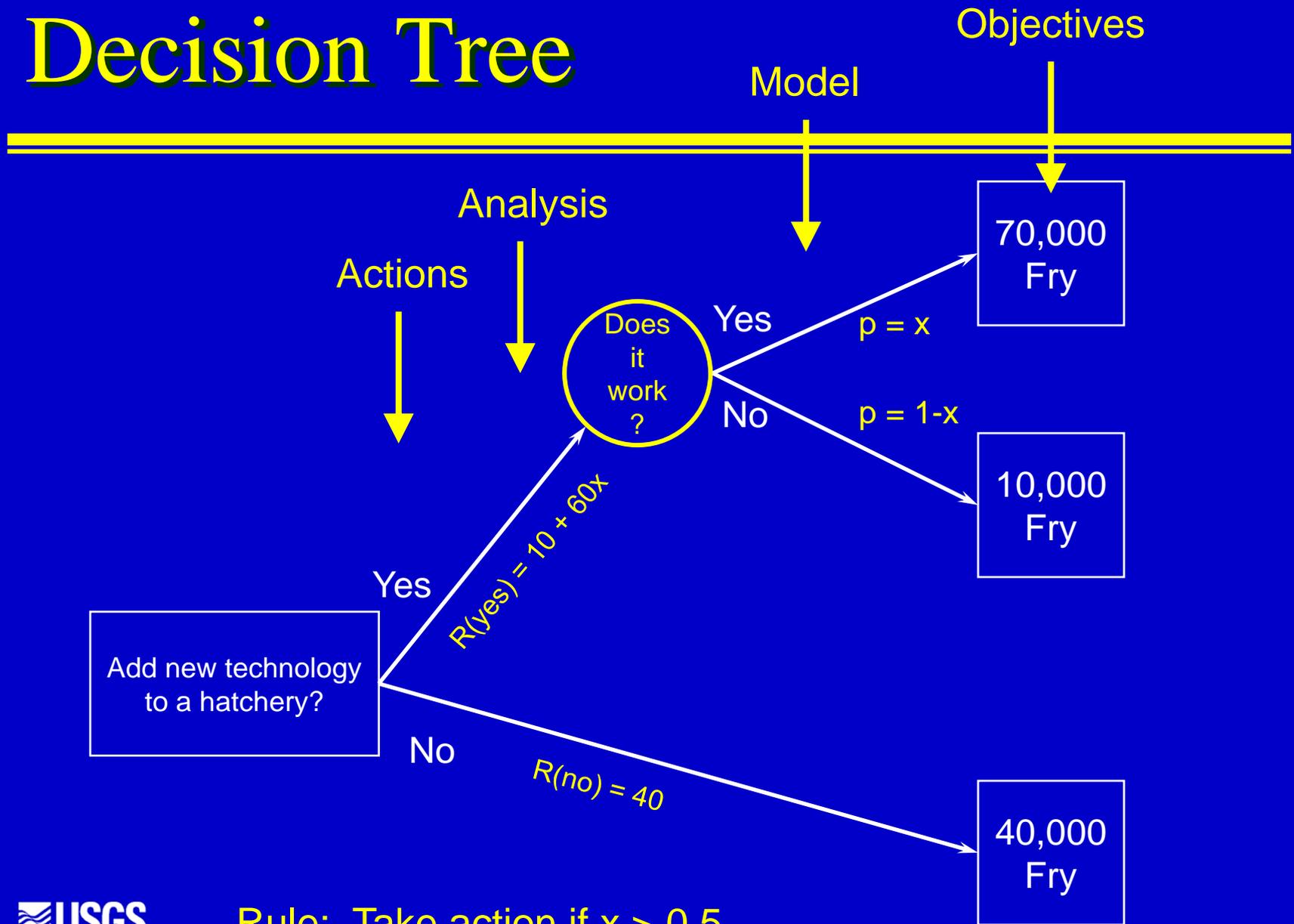
- A guide for defensible decision-making
 - Problem decomposition
 - Values-focused thinking
- Steps
 - Problem
 - Objectives
 - Actions
 - Consequences
 - Trade-offs
 - Additional steps

When is SDM appropriate?





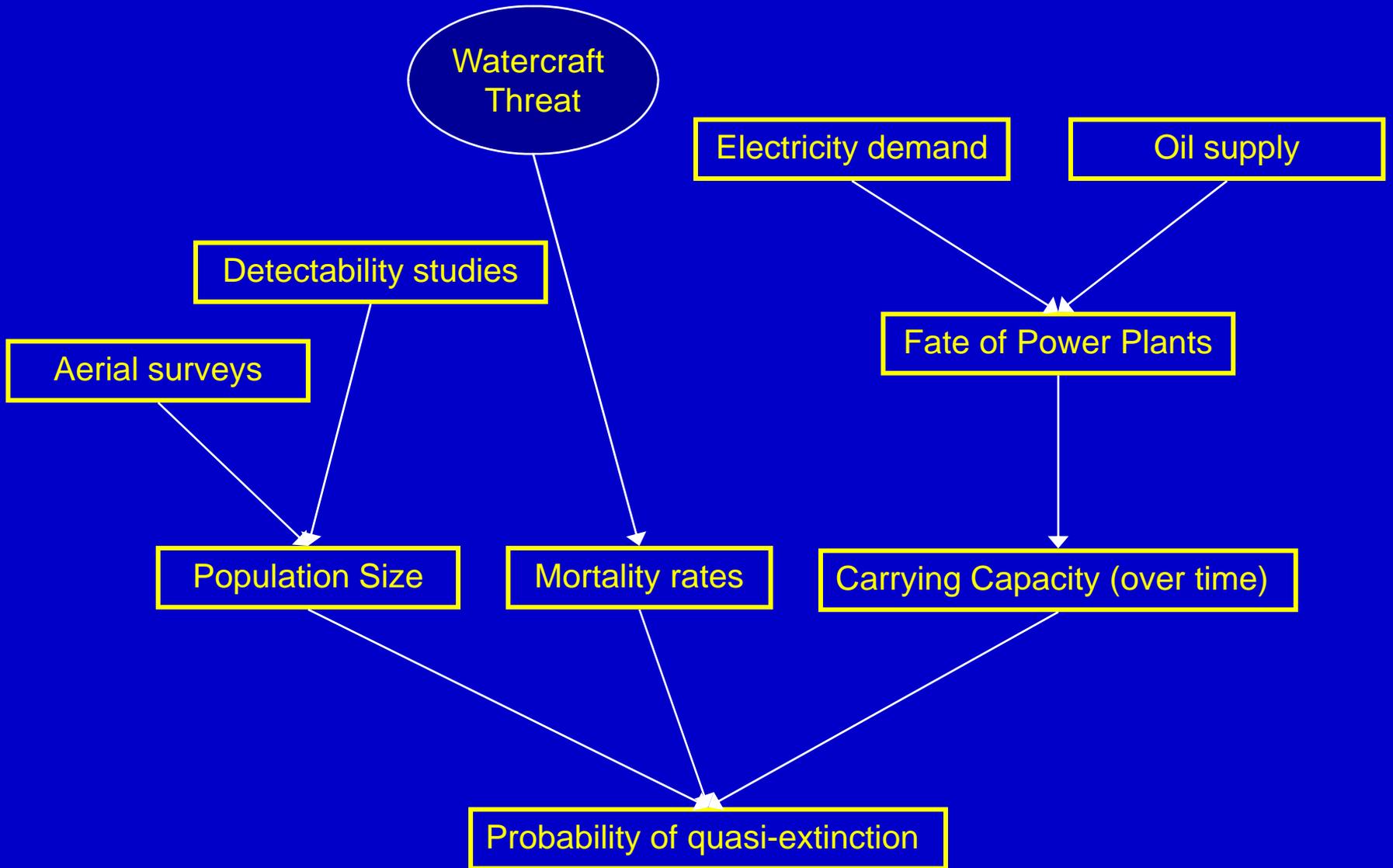
Decision Tree



Consequence Table

Expected Return	Actions			
Objectives	Status quo	Minor repair	Major repair	Re-build
Cost (\$M)	0	5	12	20
Environmental Benefit (0-10)	1	3	10	10
Disturbance (0-10)	0	1	7	10
Silt runoff (k ft ³)	3	1	5	5
Water Retention (MG)	41	42	40	41
	Model			

Influence Diagram



Other Considerations

- Uncertainty
 - Analyzing uncertainty
 - Managing risk
 - Expected value of information
 - Adaptive management
- Sensitivity analysis
- Linked decisions
- Review and revise

“Soft” Approaches

- May be more qualitative in nature
- But nevertheless use the same approach for analysis:
 - Enumerate actions
 - Articulate objectives
 - Predict consequences of actions in terms of objectives
 - Examine trade-offs
 - Perform sensitivity analysis to understand effects of uncertainty

What decisions is SDM good for?

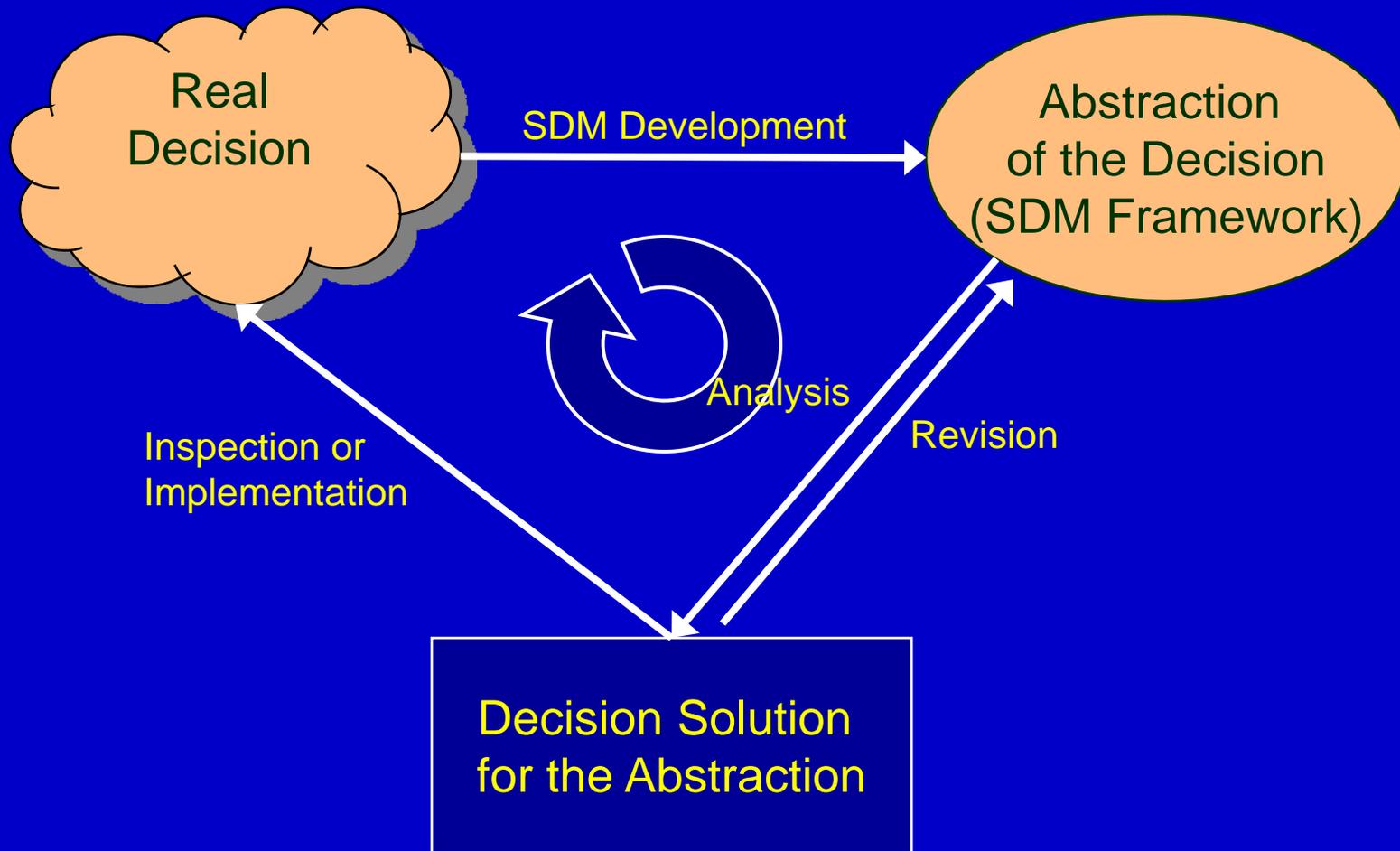
- Tiny ones
 - 1 person at their desk, an hour
 - Fine-tuning an impoundment drawdown schedule
- Little ones
 - Field office, days to weeks
 - Bull trout Section 7 workload allocation
- Middle-sized ones
 - Regional problems, months of analysis
 - Every single case study this week!
- Big ones
 - National scope, years
 - Waterfowl harvest regulations, Major listing decisions

Benefits of SDM

- Decision processes that are
 - Transparent
 - Explicit
 - Deliberative
 - Able to be documented
 - Replicable

Rapid Prototyping

Iterative Development



Rapid Prototyping

- You learn about and improve your framework by testing it
- Get around the track as fast as you can the first time
 - Include all the elements of a structured decision, but keep them very simple (find the skeleton)
 - See how it works
 - Discover what needs to be improved
- The advantage is empowerment
 - It doesn't matter if you're wrong the first time, you can start over with little loss

This week

- Four case studies, all real decisions
 - By chance, a common theme involved nested decisions across spatial scales
- Goal: use structured decision making to analyze the problem
- Philosophy: rapid prototype
 - Have a working, if somewhat abstract, prototype for the decision by Friday
 - Subsequent development occurs after the workshop, if needed