

## Friday's Agenda (8 am – 12 pm)

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



## Recap: Structured Decision Making & Rapid Prototyping

Michael C. Runge  
USGS Patuxent Wildlife Research Center

SDM Workshop, 21-25 July 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

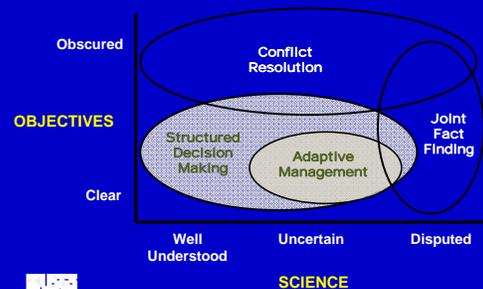


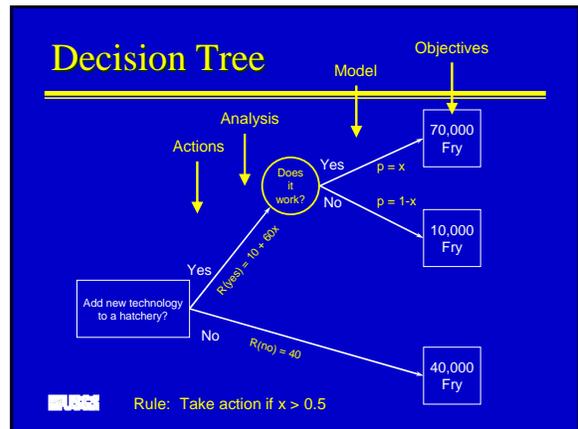
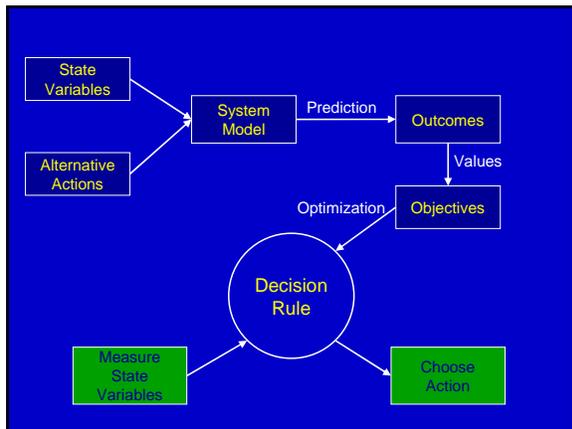
## PrOACT+

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



## When is SDM appropriate?

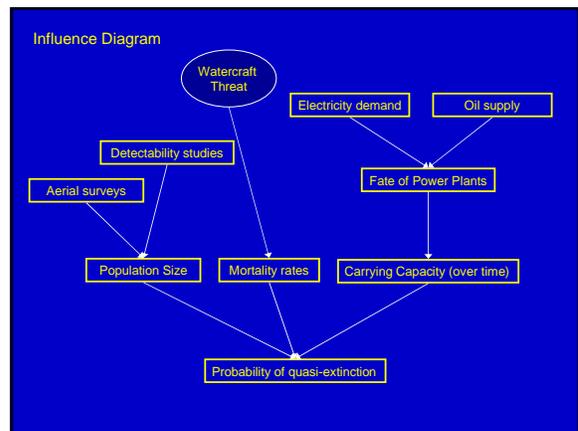




### Consequence Table

Expected Return	Actions			
	Status quo	Minor repair	Major repair	Re-build
Objectives				
Cost (\$M)	0	5	12	20
Environmental Benefit (0-10)	1	3	10	10
Disturbance (0-10)	0	1	7	10
Silt runoff (k ft³)	3	1	5	5
Water Retention (MG)	41	42	40	41

Model



- ### 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



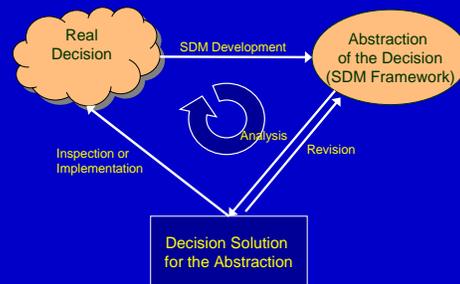
## Benefits of SDM

- 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, all concern allocation of resources to maximize conservation benefit
- 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



## Extra Slides

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Not used this time

## Monitoring and ARM

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- Three purposes for monitoring
  - Evaluation
  - State-dependent decisions
  - Learning
- Monitoring design should be driven by the decision context
- Iterated decisions provide the opportunity for adaptation

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