

Evaluating Criteria Guiding Transition of Science and Management Activities in Adaptive Management Programs



Technical Work Group Meeting
Phoenix, AZ
June 29-30, 2010

Project Objectives

Literature Review:

- Evaluate adaptive management literature for guidance on criteria to transition between science and management actions

Review Existing AM Programs:

- Survey active adaptive management programs for criteria being utilized for transitions

Adaptive Management Conservation Programs Reviewed

- Kissimmee River Restoration Program
- Cal-Fed ERP
- Lower Bridge River Restoration Program
- Trinity River Restoration Program
- Platte River RIP
- Lincoln National Forest Restoration Program
- San Juan River RIP Implementation Program
- Upper Colorado River RIP
- Lower Colorado Multispecies Conservation Plan
- Apache Sitgreaves NF Restoration Program

Observations

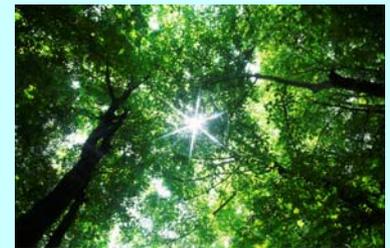
Impetus for AM Development; 1960s-1970s

- Need to incorporate input from diverse stakeholder group
- Need to address large complex natural resource management issues under significant uncertainty
- Need to conduct policy experiments using management actions and monitoring



AM Development

- Relatively new approach in management science
- Development of methodology in 1970s to 1990s
- Incorporates both passive and active approaches
- Utilizes concepts from several science areas
 - Management science
 - Probability theory
 - Risk and uncertainty
 - Decision theory
 - Ecosystem science



Observations

Difference in Traditional Science Model and Adaptive Management Model

Traditional Science Model: Focus on learning through disaggregation of ecosystem issues and controlled experimentation

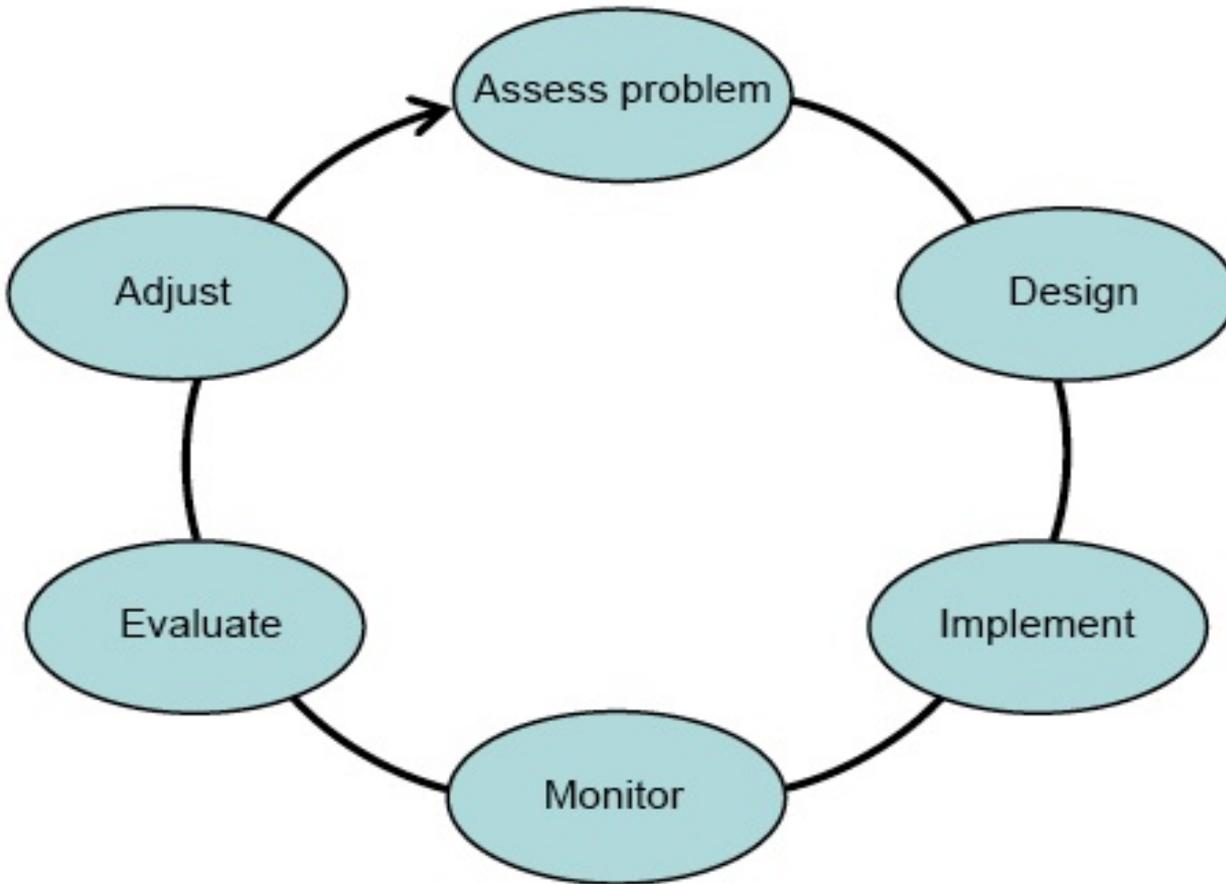
- Issue: Wildfire danger from high fuel volumes. →
Science Question: Can controlled fires remove fuels? →
- Hypotheses →
- Controlled Experiments →
- Science Proofs →
- Management Action →

Observations

AM Model: Focus on Improving Resources in the Ecosystem and Learning With Cyclical Management Actions

- Problem: Loss of forest Ecosystem Integrity In the landscape →
- Managers, Stakeholders provide need specification →
- Design: Multiple management actions and hypotheses→
- Implement Management Actions→
- Monitor and Evaluate: →
- Adjust Management Actions →





Adaptive Management Model

Role of Science

- Science provides critical support to the AM model through alternative management assessments, simulation modeling, monitoring, hypothesis tests, evaluation, etc.



Observations

AM Theory and Practice Does Not Identify Expressed Need to Resolve Certainty Before Moving to Management Actions

- AM accepts reality that we cannot resolve uncertainty in complex programs
- Adapted to issues of continued high uncertainty where traditional science paradigms have limited effectiveness
- AM approach is “learning by doing management”, i.e. implement management actions; monitor results; evaluate; revise management actions
- Use of risk analysis, probability theory, Bayesian statistics, tradeoff analysis, etc. to respond to managers willingness to accept risks

Two Key Findings Of Assessment

- AM process treats management/science as continuum of blended activities.
- Learning is but one linkage in management and science transitions.

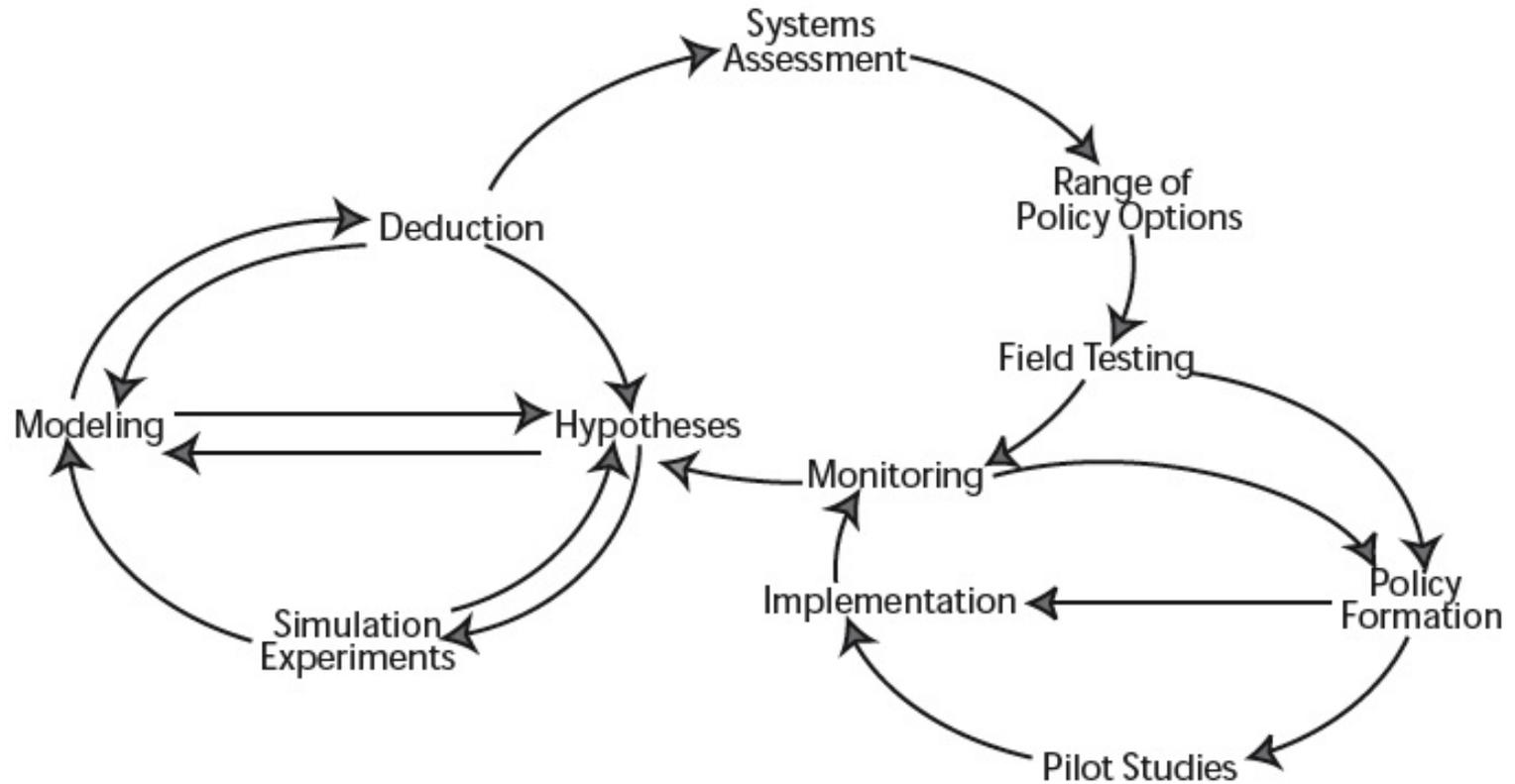


Related to the First Finding

- The AM paradigm follows a principle of no explicit separations of management and science activities.
- Uses instead integrated cyclic applications of both in a more holistic management model.



The Holling Model



Related to Second Finding

- Developed criteria to guide programmatic transitions among attributes of AM programs, ie consensus building, assessments, management actions, monitoring, evaluation, revised management actions, etc, can support effectiveness of management/science transitions.

Approach to Evaluating Criteria/Guidelines for Management/Science Transitions

- Identify AM attributes from literature that effect management/science transitions.
- Identify attribute areas needing improvement in GCDAMP.
- Identify criteria/guidelines in attributes of operating AM programs offering potential improvements to GCDAMP.

Observations from Literature on AM Attributes Effecting Program Transitions

- Organization, Goals and Roles of Entities
- Program Planning and Budgeting
- Effective Science and Monitoring Programs
- Assessments of Knowledge
- Responding to Perturbations
- Responding to Independent Review

- Organization, Goals and Roles
 - Consensus building; conflict resolution
 - More specific goals; dfcs
 - Roles and responsibilities of GCDAMP entities
- Program Planning and Budgeting
 - Focus on integrated system approaches
 - Focus on priority resources and issues
 - Incorporating tradeoff and risk assessments
 - Long term program and budget planning.

- Effective Science Monitoring
 - Defining managers most critical information and management needs.
 - Specifying most effective designs for management actions, monitoring and research.



Organization, Goals and Roles

- Improved CAM processes: Consensus building, dispute resolution, etc.
 - GCDAMP uses consensus building, ie. 2004 AMWG; 2005 SPG; TWG program and budget reviews; GCMRC workshops, etc. Repeated consistent processes needed.
 - Improved criteria for consistent consensus building, dispute resolution, tradeoff and risk assessment, decision processes could assist program.
 - Example issues: HFE criteria and guidelines; non native fish control, etc.

Organization & Goals, cont.

- Improved CAM processes:
 - Kissimmee River Restoration Program. Restore ecological integrity. Multiple groups, multiple formal and informal approaches. Extensive committee problem solving. Developed methods and criteria.



Organization & Goals, cont.

- Improved CAM processes, cont:
 - Lincoln National Forest Restoration Program: Restore forest health and social fabric. Multiple groups and monthly committee meetings for problem solving. Structured analytical and informal methods and guidelines used.

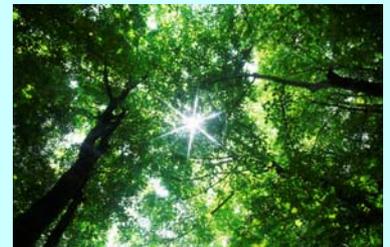


Organization & Goals, cont.

- Improved CAM processes, cont:
 - Lower Bridge River CAM. Protect native fish, enhance riverine habitat, improve recreation and maintain water and power requirements. Working group and committees. Formal approaches, structured and analytical guidelines for consensus building, dispute resolution, tradeoff assessments, decision making.

Organization & Goals, cont.

- Specifying goals, dfcs, priorities.
 - GCDAMP has developed goals (1996) and established priorities (2004). DFCs not complete.
 - Reviews identified needed improved goal specification, defined dfcs.
 - Issues are conflicts, program planning, and funding goal needs, new HBC related science needs and increasing needs for management actions.



Organization & Goals, cont.

- Improved Goals and Priorities
 - Upper Colorado, San Juan and Platte River RIPs have explicit goals, prioritization of short and long term accomplishments. Programs use law, regulation, authorities and responsibilities of involved federal and state parties to develop explicit criteria for AM processes, i.e. goals, dfcs, long term funding etc. Science is primarily monitoring. Less volatile transitions of management and science.

Organization & Goals and Entity Roles

- Entity roles
 - GCDAMP entity roles are specified in law, policy, and protocol. Exist in advisory role to DOI Secretary.
 - Need for improved criteria and guidelines for entity operation, flexibility to provide needed recommendations, more structured guidelines for developing proposals for revised management actions and science, greater continuity in criteria for tradeoff analysis, decision process, etc.

Organization, Goals and Entity Roles, cont.

- Issues of concern: Lack of structural criteria and guidelines on responsibilities results in wide variance in quality of proposals; lack of criteria and tools to insure consistency in evaluating proposals (workshops, structured tradeoff and decision making tools) results in differential treatment of proposals. HFE protocols, non-native fish control, Native American dispute resolution.

Organization, Goals, Entity Roles

- Entity Roles
 - CAL-FED ERP, Kissimmee River Program have very structured process of committees and recommending bodies for proposing change in management actions (Scoping workshops; revised proposals; tradeoff assessments; structured decision process)
 - LNFRP and A/SNFRP, although less structured, use similar criteria utilizing ID Teams and NEPA formats
 - Colorado and Platte River RIPS and Lower Bridge River RP use developed criteria and consistent processes.

Program Planning and Budgeting

- Improved criteria needed for better specification of manager/stakeholder and scientist information needs; i.e type, amount, resolution, accuracy; etc.
- Reviews of GCDAMP identified issues in manager/stakeholder ability to provide information because of uncertainties, risks, desire vs. need, tradeoff and decision process, etc.
- Issues: Lack of manager/stakeholder specificity may cause scientist group to pursue more data of high resolution and accuracy than potentially needed. Expanding need for management actions/science from declining budget requires focus on system integration and minimal information sets.

Program Planning and Budgeting

- Improved specification of information needs.
 - LNF RP uses an integrated tradeoff model and decision support system (TEAMS) and NEPA requirements to inform the AM process and evaluate minimal information needs.
 - Lower Bridge River RP uses workshops and structured tradeoff and decision support systems to manage information needs and costs.

Program Planning and Budgeting

- GCDAMP uses short term budget planning (1-2 years) but, 10 year program and budget planning needed
- GCDAMP reviews reveal lack of criteria for long term programs and budget plans to guide management action/science transitions.
- Issues: Lack of long term (10 year) program and budget plans may limit effectiveness of management/science integration; identifying program perturbations; knowing needed information at critical program junctures; integration of Colorado River Programs.

Program Planning and Budgeting

- 10 Year Program and Budget Planning Needed
 - CAL-FED, South Florida CERP, Kissimmee River, Migratory Bird Programs have sophisticated out year budget planning criteria for increasing, decreasing, level budgets.
 - Upper and Lower Colorado RIPS have long term program and budget plans, i.e. 10-50 years to address critical program junctures.



Conclusions

- AM is a Management Model, not Science Model. Science is a critical part. Primary focus is resource improvement.
- AM needed to address large complex and dynamic natural resource issues where uncertainty cannot be resolved and increased risks exist in decision processes.
- Traditional science model of controlled experiments to resolve uncertainty and risks has limited application..
- AM depends on integration of management/science in cyclic pattern of defining and implementing management actions, monitoring and evaluating resource impacts, and implementing revised management actions.

Conclusions, cont.

- Criteria and guidelines for effective programmatic transitions of AM processes are critical to insuring management/science transitions. Several require improvement in the GCDAMP.
 - Organization goals and entity roles
 - Program planning and budgeting
 - Effective monitoring approaches
- Opportunities exist to learn and adapt criteria from other AM programs to inquire GCDAMP management/science transitions.



Recommendations

- To improve management/science transitions GCDAMP should review and revise several areas of its programs.
- Improved criteria and guidelines should be developed for consensus building; conflict resolve; goals and drc's; entity roles; planning and budgeting; monitoring programs.
- The TWG/GCMRC/SA should recommend a three year program for accomplishing needed revisions.