

Adaptive management: introduction and ideas

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- Introduction to why adaptive management (AM) may be appropriate
- Overview of the AM process
- Look at where we are in our current actions/thinking

The problem



- Managers manage/fire-fighters fight fires
 - Policy makers make policy
 - Researchers research (what they can)
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- Often disconnected. Where integrated, very localised and isolated

- We all sometimes meet up
- Danger is, we all agree meeting was good, must do it again etc etc....and nothing happens
- AM is a possible framework to allow continual dialog and advancement of understanding

AM operates when....



- Resource management involves uncertainty
 - In results of management practices
 - In socio-economic system driving land use
 - In environment (e.g. climate change)
- Resources will always change
- Surprises will occur
- New uncertainties will become apparent

- AM doesn't seek certainty, but provides framework to resolve complex issues

Need to



- Confront uncertainty, express in terms of competing hypotheses, embedded in resource models
- Include the human element
- Act now (don't wait for consensus, or for more research)

Need to ID



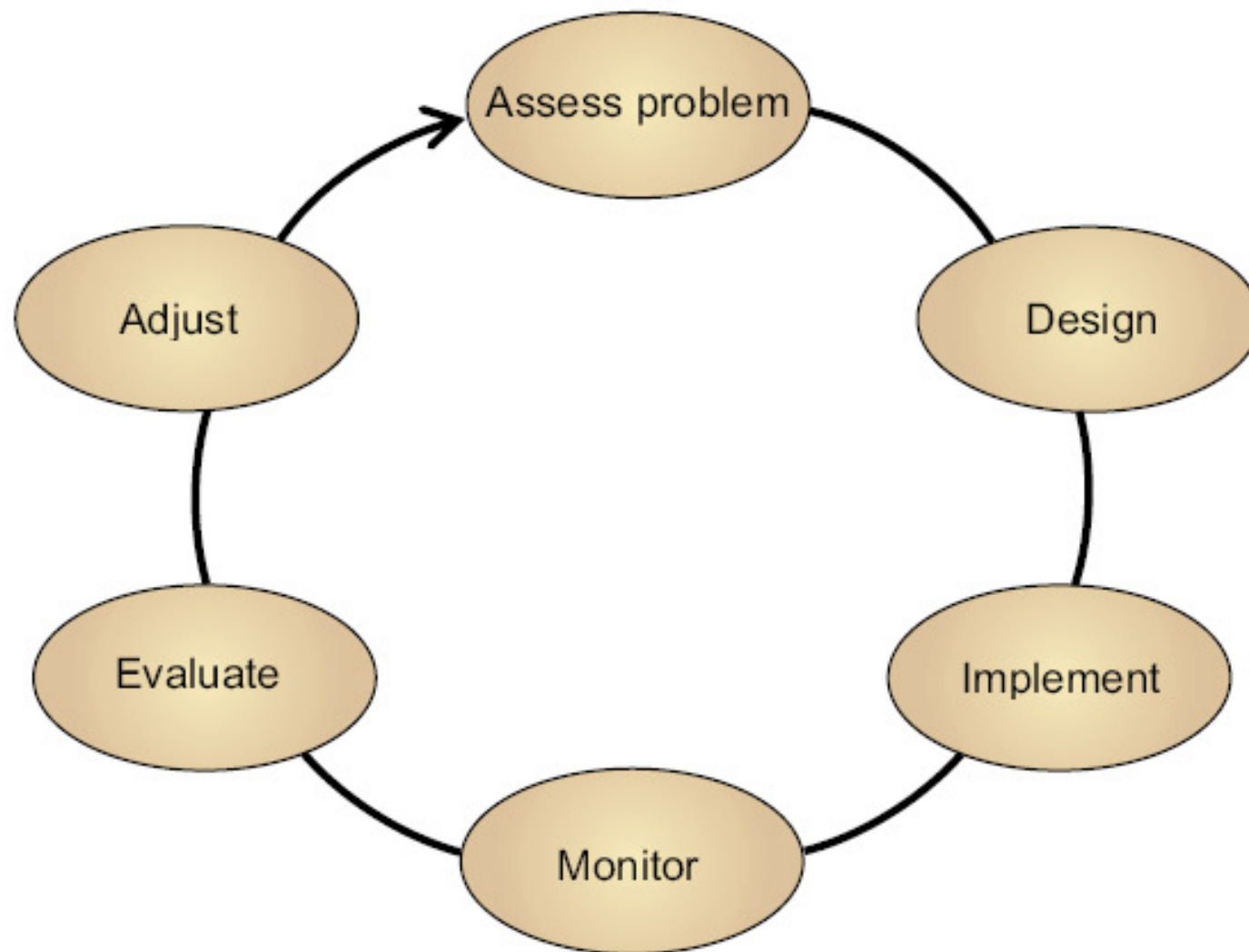
- Current state of knowledge
- Current and possible future management aims
- Current and possible future socio-economic conditions
- Current and possible future environmental conditions

Adaptive management



- Framework that recognises (biological) uncertainty
- Accepts a mandate to proceed on basis of best knowledge available

‘ a systematic process for continually improving management policies and practices by learning from the outcomes of operational programmes ’



Desired outcomes



- Improved understanding
- From that, improved management

Is this something new?



- Good managers work this way
- Scale much smaller though
- Lack of integration with research/policy

Important ideas



- Flexibility in management institutions
 - How flexible are they? Can we proceed without the institutions that are inflexible?
- Ecological resilience in systems

Resilience



- Magnitude of change that can be absorbed before system changes (e.g. heather moorland into grass moorland)
- Ability to return to equilibrium after disturbance
- To adapt to future change, systems must possess resilience

- Results from a combination of **PROBABILITY** of event occurring, and **SEVERITY** of outcome
- Can reduce risk by decreasing one or both of the above
- AM can help with both, by reacting quickly to changes (e.g. increasing fuel loads)

Benefits of AM



- Flexibility in the face of uncertainty
- Learning based
- Specifies what actions to take and when
- Encourages long-term collaboration
- Promotes optimal decision making in terms of available information

Problem-scoping



- Management decisions to be made
- Stakeholders can be engaged
- Objectives can be stated
- Uncertainty exists
- Resources and management can be modelled
- Monitoring can inform decision making
- Progress can be measured
- Mgt can adjust in response to results
- All within supporting legal framework

AM steps – set up



1. Stakeholder involvement
2. Objectives - clear, measurable, agreed
3. ID potential management actions
4. ID models that correspond to or can handle different ideas
5. Design and implement monitoring

AM steps - iterative

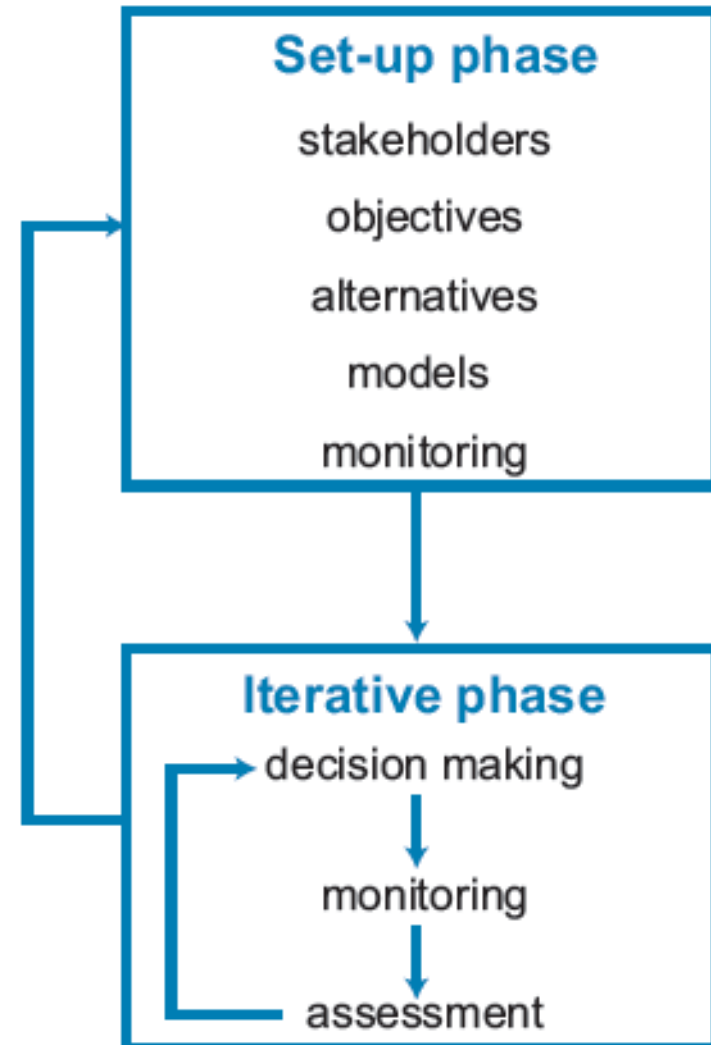


6. Decision making – select actions
7. Follow system response to actions
8. Assess outcomes
9. Cycle back to step 6

Two-phase learning



- Process/institutional learning
- Technical learning



Challenges of AM



- Reluctance to change (personal, institutional)
- Agreement needed on aims and methods
- Long-term monitoring & evaluation commitment
- Long timelag between management and demonstrated effects
- Collect enough (& appropriate) data to evaluate
- Legal framework issues

When is AM successful?



- Stakeholders involved and committed
- Progress towards management objectives s achieved
- Monitoring results used to adjust and improve management decisions
- Done within legal framework

Example: waterfowl in US



- Autumn hunting targets set
- Monitoring occurs during autumn and after
 - No shot, population sizes
 - Reproduction, habitat conditions
- Data analysis
- Incorporation of results into next targets/regs
- Sequence of regulation-setting, monitoring, assessment and feedback

Kissimee river restoration



- Be aware of political will of people
- Goals will evolve
- Larger and simpler goals ('ecological integrity') can be useful in communication
- Learn from mistakes
- Beware of early success
- Be proactive
- Building constituencies – go slow to go fast
- Killing myths – by education and research

From managers/operations



- Willingness to work with researchers
- Try out 'new' or seemingly controversial practices
- Need for monitoring/feedback
- Willingness to accept results and alter management accordingly

From policy makers



- Flexibility in allowing appropriate trials
- Legislation that can accommodate change
- Support
- Willingness to accept results and alter policy accordingly

From researchers



- Research tied to management
- Research design that allows quick turnaround, feedback quickly
- Scaling from local results to wider implications
- Willingness to accept results and alter research accordingly

Scale – temporal and spatial

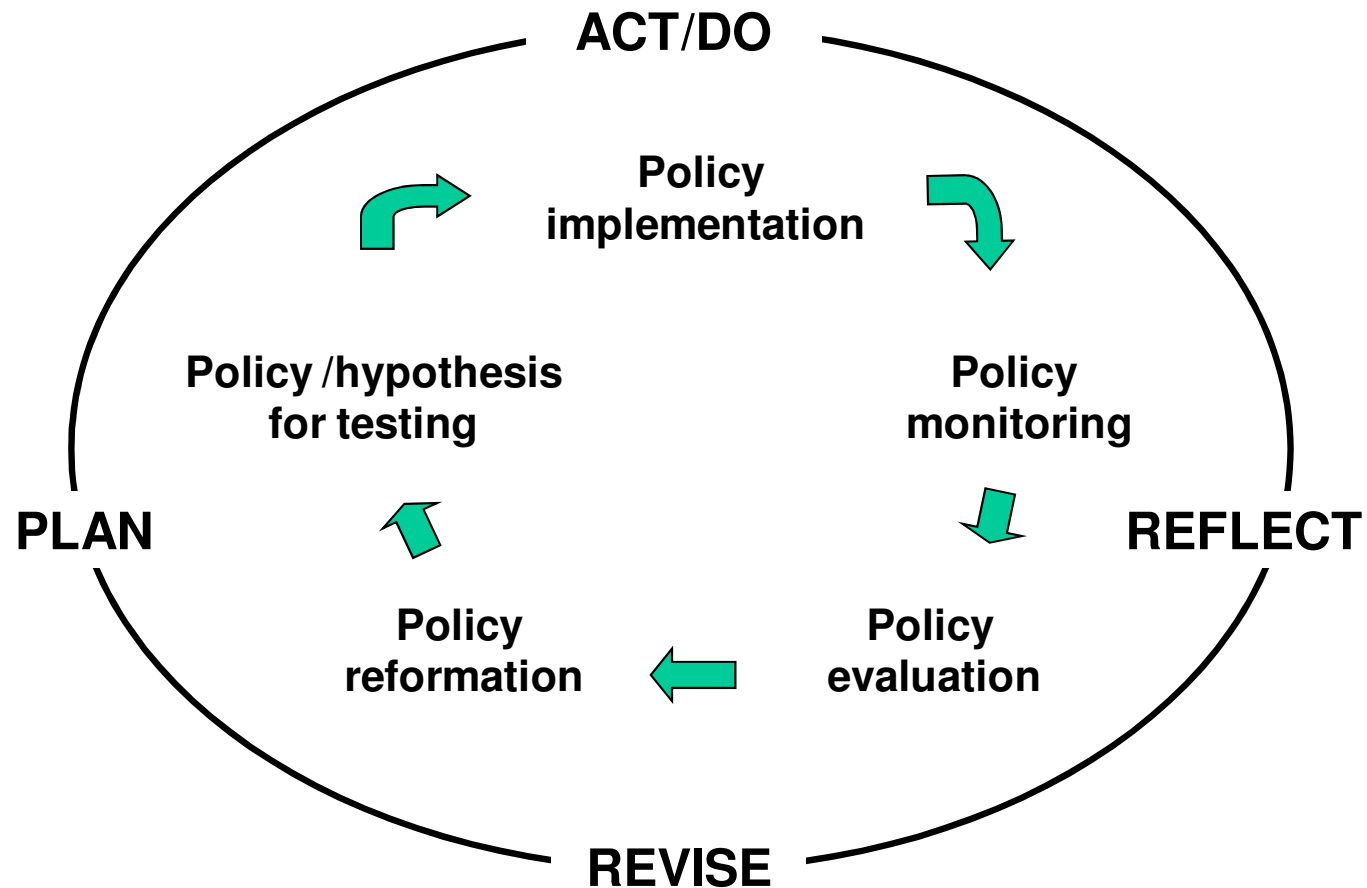


- Management and practical research local
- Results need to be scaled up and wider applicability explored
- Need integrated framework to collate results, look for patterns, feed back results to more localised work
- This also provides basis for building necessary tools (fire models, prediction, risk assessment)

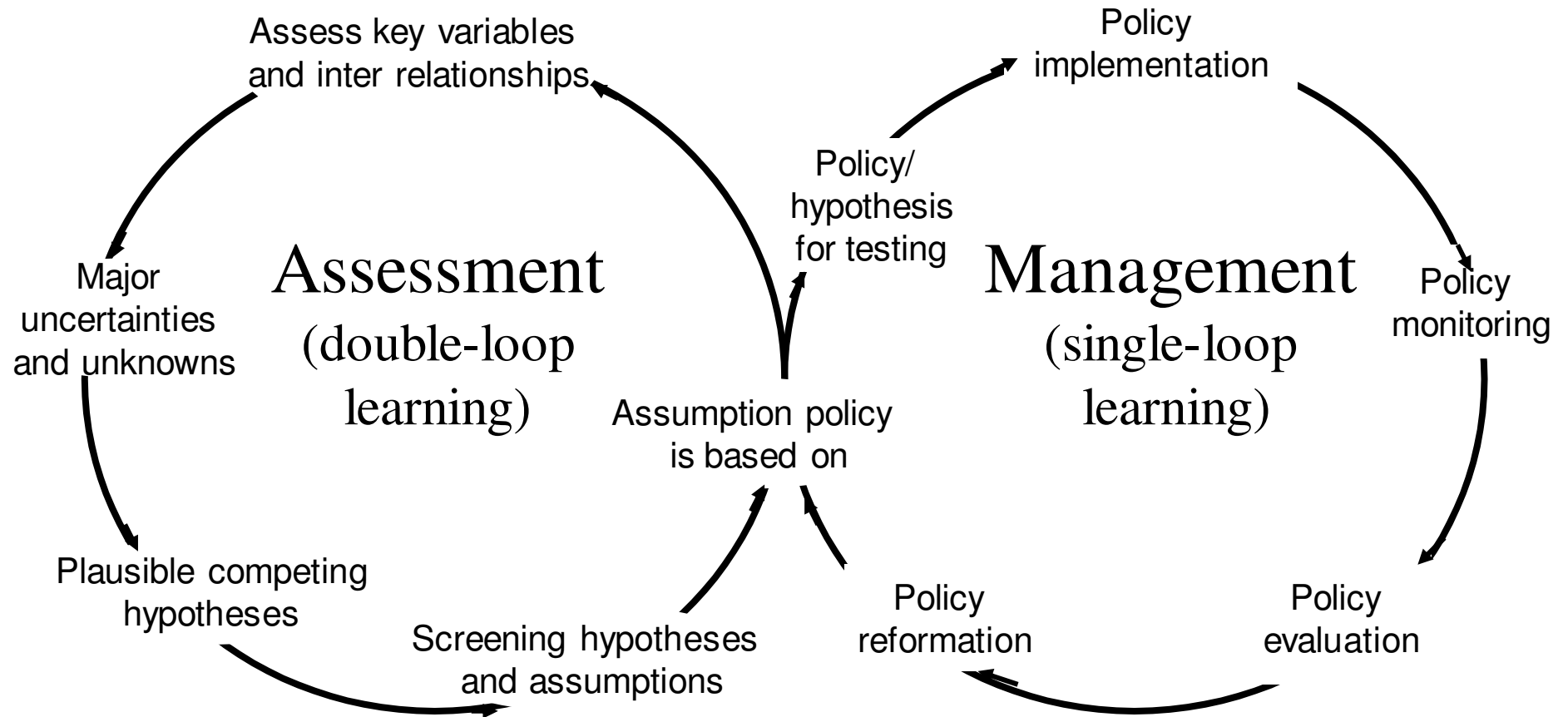
Another way of looking at it



The Learning Wheel: Single Loop Learning



Single and double loop learning-while-doing in AEAM



- Can allow us to think about the bigger questions
 - Overall aims of management, in terms of system?
 - Possible alternatives?
 - Can we maintain current systems in the face of change?

Are we doing AM already?



- Andy Elliott – Dorset County Council
 - Stakeholder involvement (partnership)
 - Identified objectives (reduce fire occurrence)
 - Monitor results to evaluate effectiveness

 - How are results feeding back into objectives?
 - Alternative or conflicting outcomes? (e.g. fuel loads building up)
 - How are results affecting fire risk?

1. Stakeholder involvement



- Effort to engage all
- Need commitment (time, to AM change, etc)
- Enhancing knowledge exchange (Julia McM)
- Education (Cath)
- UHP specialist advisors/recorders (Andy)
- Increased stakeholder involvement (Claire Q)
- Promoting partnership working (Richard C)
- Need for interdisciplinary approach (Julia McM)

2. Define objectives



- Need to be SMART
- Incorporate social, economic and/or ecological values
- Reduce fire risk (discussion yesterday)
- Adapt to changing asset values (Mark J)
- Incorporate planned adaptation (Rob G)
- Encourage national approach (Jonathan A)
- Explore new fire fighting approaches (using fire)
- Develop recommendations for FRB

3. Potential (alternative) management actions



- Should promote learning
- All options must be explicit
- e.g. To reduce fire risk, we can
 - Ban people
 - Educate people
 - Reduce fuel loads
 - Establish attack/stop lines
 - Combination of the above (but harder to distinguish)

4. ID models



- Do we have necessary baseline data?
- Being done (e.g. last meeting), but appropriate? (do they allow objectives and different mgt options to be tested?)
- Sufficient expert opinion captured?
- Need to incorporate change (some cannot)
- Not just computer models!

5. Monitoring plans



- Need commitment and must be timely
- Data must be applicable, not biased (temporally, spatially, sectorally) (Claire Q)
- Incorporate all data of interest (e.g. socio economic, that often is unavailable) (Claire Q)
- Issues of scale, losers and winners (Claire Q)
- Data collected must be able to distinguish between alternatives
- Build risk assessment in to all trials
- Include data required to get onto EN radar (Jon S)
- Costs of alternative strategies (Jonathan A)

6. Decision making



- what to actually do!
- Is it clear how decisions will be made?
 - Select from alternatives (based on objectives)
 - Adjust management over time in response to results
 - e.g. set fuel levels or burn freq for trials of FRB
 - May seek to focus on one variable, or multiple

7. Follow-up monitoring



- Is monitoring being done properly and in time?
- Are appropriate data available?
- Track system response
- Don't just finish project and ignore!
- Feed back into decision making

- AM not a solution – just a tool
- Requires individual and institutional flexibility and commitment (normal research grants cannot commit or sustain AM)

In conclusion



- We actually know a lot already!
- We seem to agree a lot.
- We will have to handle increasing uncertainty/change
- We need to adopt a common approach or framework, that gets us out of entrenched ideas, puts management onto an evidence base, and allows it/us to adapt

**Fire is a good servant....but
a bad master**

Finnish proverb