



Adaptive Management For EBM

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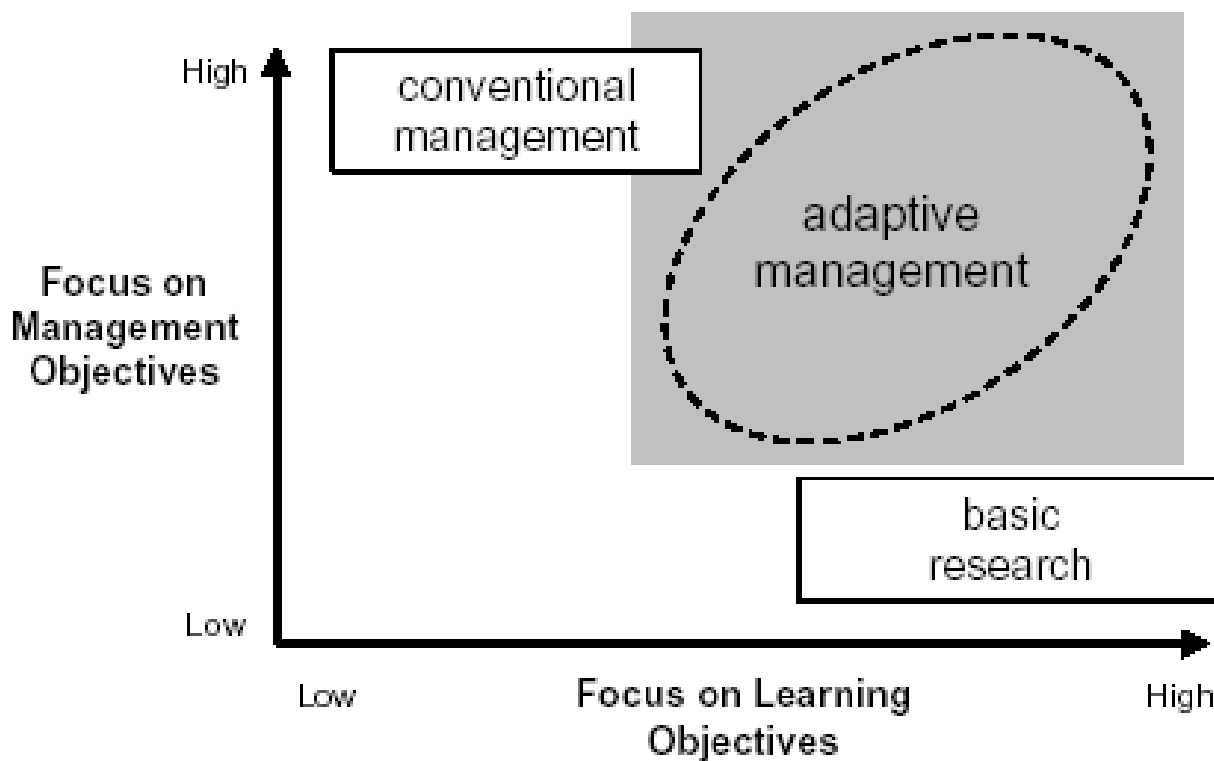
Workshop Objectives

- To build a common understanding among implementation partners
- To get concrete input about elements of the framework
- To clarify roles and opportunities in implementation



Why Do We Need AM?

1. Uncertainty – Need to Learn
2. Urgency - Need to Take Action



Marmorek, D.R., D.C.E. Robinson, C. Murray and L. Greig. 2006.



When to apply it

- Conditions that warrant AM
 - A real management **decision** is to be made
 - There is an opportunity to **learn**
 - The **value of information for decision making** is high – something will change
- Also need:
 - Clear and measurable management **objectives** can be identified
 - **Uncertainty** can be expressed as explicit hypotheses
 - A **monitoring** system can reduce uncertainty
 - Long term **commitment** exists
 - Decisions are **reviewed** –actions can be adjusted



Adaptive Management

*US Dept of
Interior,
2007.*

*U.S.
National
Research
Council*

Adaptive management is a systematic approach for improving resource management by learning from management outcomes...It is..not just monitoring activities and occasionally adjusting them...It involves:

- exploring alternative ways to meet management objectives
- predicting the outcomes of alternatives based on the current state of knowledge
- implementing one or more of these alternatives
- monitoring to learn about the impacts and
- using results to update knowledge and adjust management actions.

Though learning plays a key role in adaptive management, it is seen here as a means to an end, namely good management, and not an end in itself.



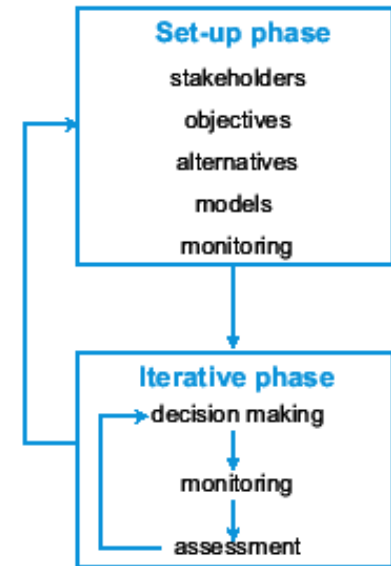
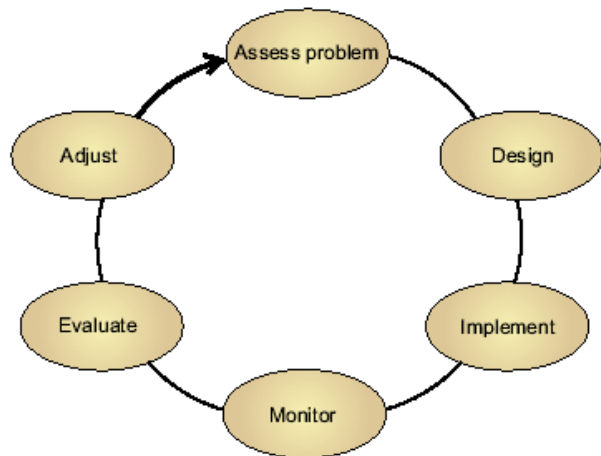
Adaptive Management

- **Passive (implement and monitor)**
 - Implement an action, monitor the response, modify actions
- **Active**
 - Define several possible actions, implement them, compare them, choose one
- **Both can support learning and improved management. Difference tends to be:**
 - Timeline
 - (Rigor)
- **AM for EBM will encompass both**



Different Versions of AM

- From those focused primarily on rigorous monitoring and experimental design
- To those focused on project implementation with a more holistic interpretation of adaptive learning....
- To those focused on informing and improving planning and decision making...





AM for EBM – A framework for discussion

A framework for discussion

- Overview – it's a “straw dog”
- For each step:
 - What to do
 - Key concepts
 - Key design considerations for EBMWG
 - AM Products
- Key Success Factors



Key Design Issues

AM for EBM must address

- Both Ecological Integrity (EI) and Human Well Being (HWB)
- Decisions already made + decisions still to come
- Multi-scale issues
- Multi-objective decisions
- Multiple stakeholders and decision makers
- Integration of science and management
- Roles of implementing partners
- More...



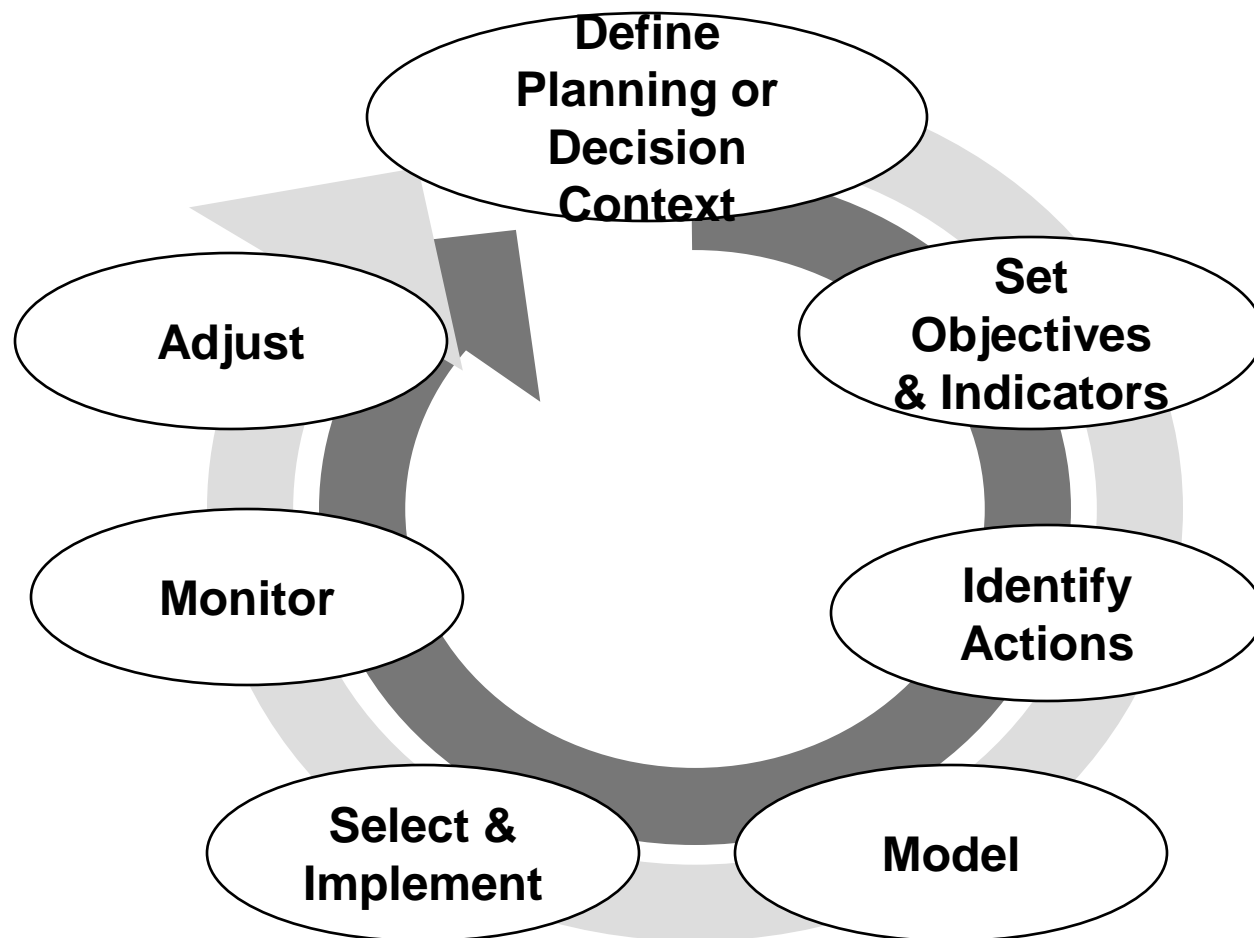
An AM Framework for EBM

A Straw Dog

There are two tracks:

Core track
(EBMWG)

Non-core track





Core Track

- This is the primary responsibility of the EBMWG. It is what we must do to execute our mandate.

Implementation

- *Were all the actions agreed to in LRMPs / G2G agreements implemented?*

Effectiveness

- *Have we been successful in maintaining or enhancing ecological integrity and human well being?*

Validation

- *What EBM actions have been or are likely to be most effective to (further) enhance them?*



Non-Core Track

- This just acknowledges that there are plans and decisions that are related to EBM implementation, but not core to EBMWG mandate. There are many:
 - *What can we do as a community to enhance employment stability / economic diversity?*
 - *What can we do as a forest company to enhance interior forest habitat?*
 - *Etc.*
- The steps outlined in the framework provide guidelines for what we mean by “doing AM” in an EBM context. They can be used by anyone to support management and decision making that maximizes learning and feedback.



Core Track: Three Big Questions

Implementation Monitoring

- Did we do what we said we'd do?

Effectiveness Monitoring

- Did it work? Did we get the outcome we wanted?

Validation Monitoring

- Why or why not? What could we do to improve?



**Define
Planning or
Decision
Context**

What to do at this stage:

Clarify the context by asking:

- What planning process or decision are we trying to inform?
- When will decisions be required?
- Who should be involved?
- What problem are we trying to solve – what's the driver?
- What is the scope of what is under consideration – what range of actions and what issues will need to be addressed?



Planning Context

Key Concepts:

- Learning has value only if a plan or an action is changed. Define what will change as a result of the information generated with a “**change statement**”.
- Need to generate **buy-in and build partnerships** at this stage
- It is essential make **links to planning processes** early

*The success of the EBMWG’s AM program will be judged by the extent to which decisions are changed, and **on-ground results** improved as a result.*



Planning Context

Sample Change Statements

- “The *LRFs* will use the monitoring information to determine whether a review of the actions outlined in the CC LRMP is warranted”
- “The *EBMWG* will use the information to decide whether to recommend a review of patch size guidance in the EBMHB.”
- “*MyNation* will use monitoring information to review and revise decisions taken under the DSP in 2012.”
- “*Mytown council* will use the results to evaluate the performance of its tourism development policy and identify new actions in 2010.”



Planning Context

Key design considerations for EBMWG

- Which **decisions** are core to our mandate?
 - Review of LRMP/G2G decisions
- What is the **range of actions** under consideration?
 - Specifically, are we considering land use planning actions only? Or are we explicitly designing the AM program to evaluate initiatives to enhance human well being (e.g., investment capital programs, etc.)



Planning Context

EBMWG AM Products

- LUP Summary – of existing agreements
- A decision matrix (or roles matrix) – what, when, who – and change statement(s)

Set Objectives and Indicators

Set Objectives & Indicators

What to do at this stage:

- Define the objectives and indicators – these become the basis for evaluating proposed actions and reporting progress
- The EBMWG will define a core set and encourage others to use these to report costs/benefits of actions



Objectives and Indicators

Key Concepts

- There must be **explicit** objectives to guide decisions about what actions to consider and how to evaluate them
- Stakeholders must **agree** on the objectives and indicators by which actions will be evaluated – they should cover all the things that matter when evaluating possible management actions
- The AM framework can structure and **inform dialogue** about trade-offs among multiple objectives, but it is not designed to resolve conflicts.
- The set of objectives and indicators must be **well-designed** – concise, hierarchical, results-oriented...

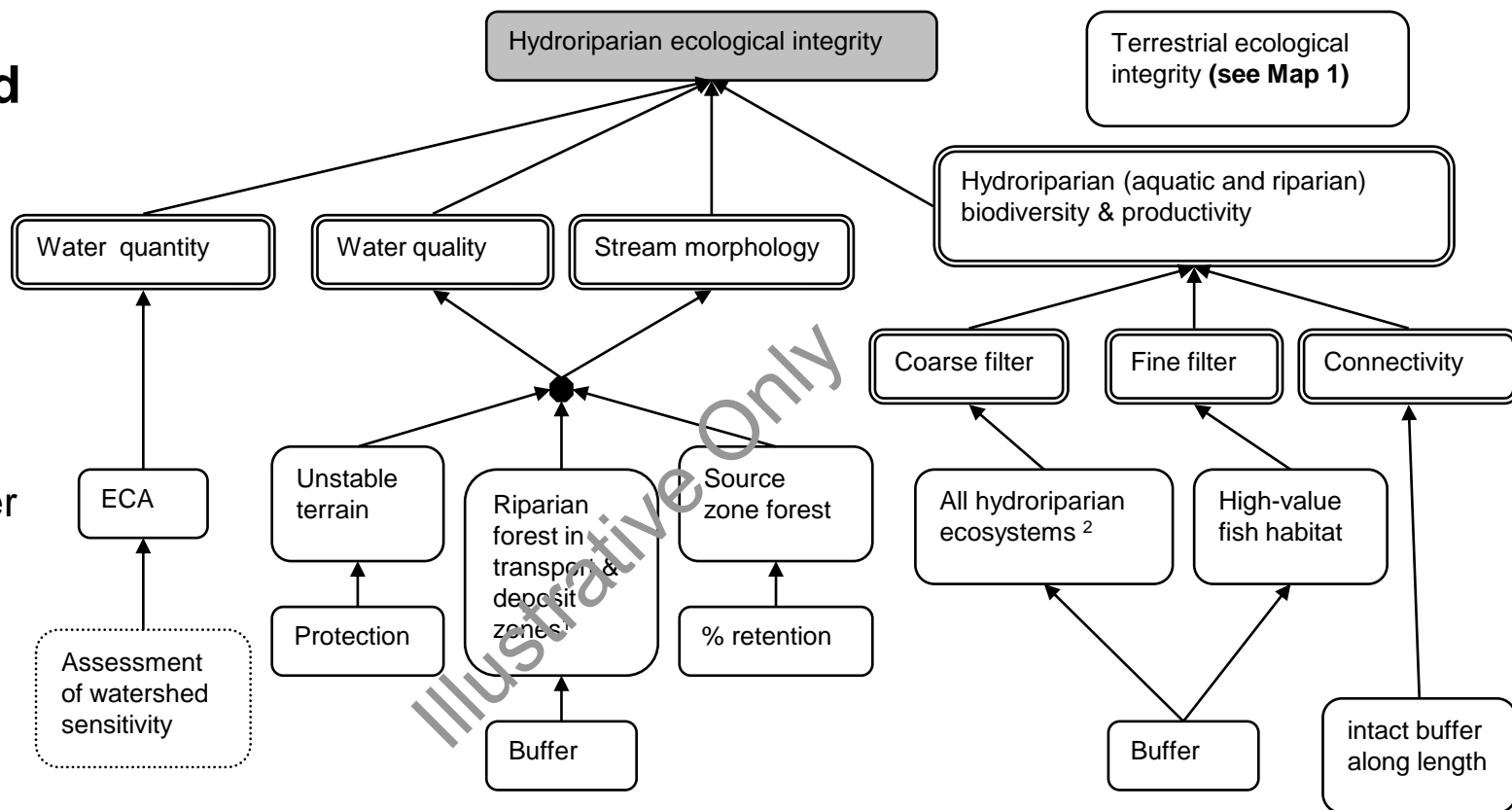


Set Objectives and Indicators

Indicators are mapped to objectives and goals

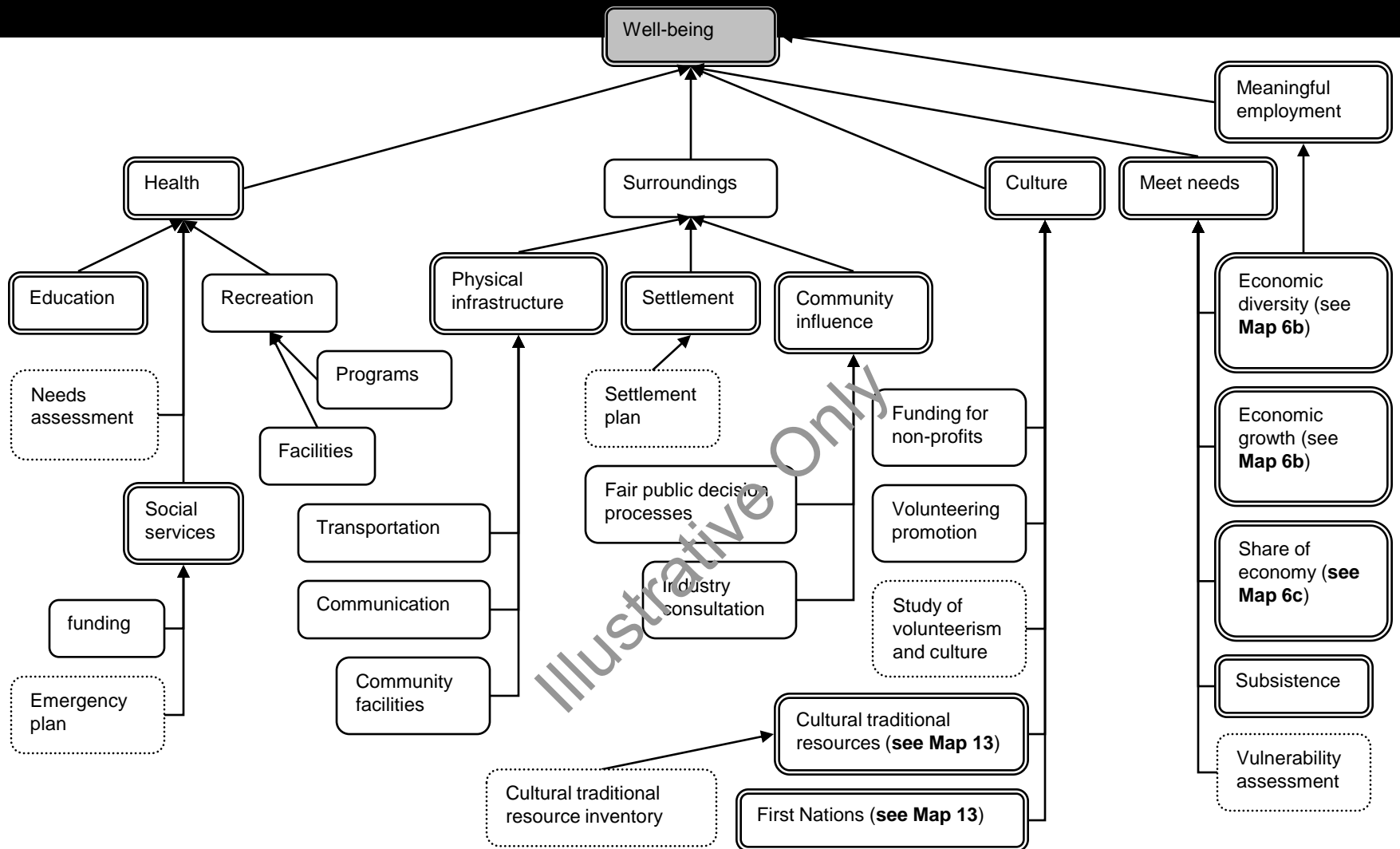
This defines how we will define EI in order to answer the questions:

- Did we maintain it?
- What actions should we consider to improve it?





Set Objectives and Indicators



Key Design Considerations for EBMWG

- How will we define EI and HWB for the purposes of **monitoring progress** toward them?
- Consideration must be given to:
 - Developing a **core set** of indicators as a starting point
 - Developing the “**conceptual map**” or “hypothesis diagram” so that as other indicators are added, their relationship to the core is clear
 - Ensuring that indicators are **scalable** so that results can be interpreted and aggregated across scales
 - Addressing the needs of decision makers in evaluating EBM actions – supporting the inevitable **multi-attribute evaluation** that decision makers will want



Objectives and Indicators

EBMWG AM Products

- Conceptual maps for Ecological Integrity and Human Well Being
- “Working” set of core indicators – structured, hierarchical
 - These may not all be operationalized initially (via data collection)

Identify Actions

What to do at this stage

Identify the range of actions that are either:

- **Under consideration** and we want to evaluate them in order to select one or more; or
- **Have been adopted** and we want to monitor/evaluate them



Identify Actions

Key Concepts

- The **link between actions and objectives** is the focus of AM
- To maximize value from AM, we need to be clear not just about what actions have been adopted and are currently being implemented, but **which actions we foresee** wanting to consider in the future.
- **Experiments** are a particular type of action.... If experiments are under consideration, it is at this stage that alternative experimental designs can be developed.



Identify Actions

Key Design Considerations for EBMWG

- What is the **range of actions** under consideration?
 - Land use planning actions only?
 - Or are we explicitly designing the AM program to evaluate initiatives to enhance human well being (e.g., investment capital programs, etc.)



Identify Actions

EBMWG AM Products

- Inventory of actions underway
 - This is provided by AM01 LUP Summary
- Inventory of actions under consideration
 - Context specific



Model Actions

What to do at this stage

- Estimate the **effect of the actions** on the outcomes using predictive models or expert judgment. Estimates may be quantitative or qualitative.
- State **hypotheses** about cause-effect relationships between actions and objectives explicitly



Key Concepts

- Very **simple models** or expert judgment may be as or more useful than complex, mechanistic ones
- The purpose is not to develop complex predictive models that are “right”, but to **enhance learning** by allowing comparison between expected and observed outcomes thereby improving hypotheses and predictive capability over time



Key Design Considerations for EBMWG

- What level and kind of modeling is useful and practical?

EBMWG AM Products

- Current status of indicators (baseline - AM08/09)
- Explicit hypotheses about relationship between core actions and objectives and between objectives and goals
- Simple models based on a mix of data and expert judgment (to be continually updated)

Select & Implement

What to do at this stage

- Present information to decision makers about the **consequences** of proposed alternatives against all the affected objectives
- Facilitate a structured dialogue among stakeholders to discuss **trade-offs**
- Discuss **implications of uncertainty** for decisions

Select and Implement

Key Concepts

- Evaluation will be **multi-attribute**
- There will be **trade-offs**
- AM does not make a decision, but it helps to **structure and inform dialogue** among stakeholders about trade-offs

		Baseline	Tourism Strategy 1	Tourism Strategy 2
Ave annual income	# people > \$35,000	3,000	5,000	6,000
Sense of Place	% pop with high commy ID	Low	High	Low



Select and Implement

Key Design Considerations for EBMWG

- How to present information in a multi-attribute framework?
- How to inform decisions without intruding on the making of them?

EBMWG AM Products

- Case study(ies) showing the use of multi-attribute information generated by the AM program



Monitor

What to do at this stage

- Identify and prioritize monitoring needs
- Design monitoring plans/programs capable of delivering useful information
- Establish standards for them
- Implement them



Key Concepts

- Two kinds of AM
 - Passive
 - Active (“experimentation”)
- Three kinds of monitoring
 - Implementation
 - Effectiveness
 - Validation
- You can’t monitor everything – choose carefully



Key Design Considerations for EBMWG

- How can we **prioritize** monitoring needs and design monitoring programs to maximize the **value of information** for decision making within practical resource constraints?



EBMWG AM Products

- Explicit system for prioritizing monitoring, research, inventory needs according to their utility for management/decision making
- A learning plan, including but not limited to monitoring
- Standards / guidelines for monitoring
- A baseline against which progress can be compared (AM08/09)



Adjust

What to do at this stage:

- Assess monitoring results and decide whether a review of the decision is warranted
 - Assess monitoring results
 - Update models as appropriate
 - Identify new actions as appropriate
 - Assess whether indicators need to be revised
 - Consult with stakeholders about the above
 - Report out on implications for review of decisions



Key Concepts

- The feedback part is what usually fails!

Key Design Considerations

- How can we ensure feedback of monitoring results to management and decision making?

EBMWG AM Products

- Shared understanding among implementation partners about roles, and about how this step occurs

Key Success Factors

AM often
“fails”.

What’s
needed to
make it
work?

- **Leadership and partnership**
- Clear links to planning or **decision making processes**
- Early and systematic **stakeholder** involvement
- **Relevant science**
- Explicit **objectives** and performance metrics
- Recognition of and constructive approach to **trade-offs**
- Explicit **hypotheses**
- **Commitment** to ongoing monitoring



Thanks!