

# Module 16



## Completing the cycle of strategic adaptive management

All catchment management occurs within a policy framework of some kind

In this Module, we take participants through the Strategic Adaptive cycle, helping them build goals they will use in their home catchment

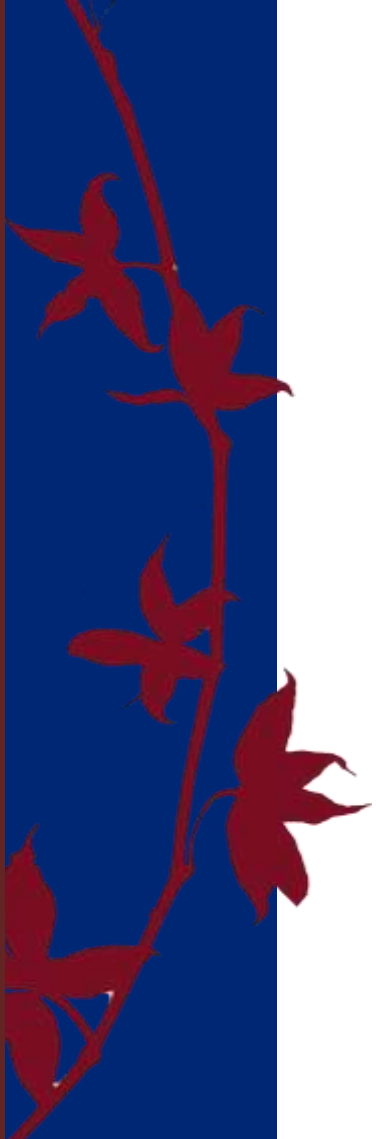
We use small group-plenary structure to encourage interaction and thought



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# Recap of Module 8

Ecosystems behave like complex adaptive systems because of their interconnectedness

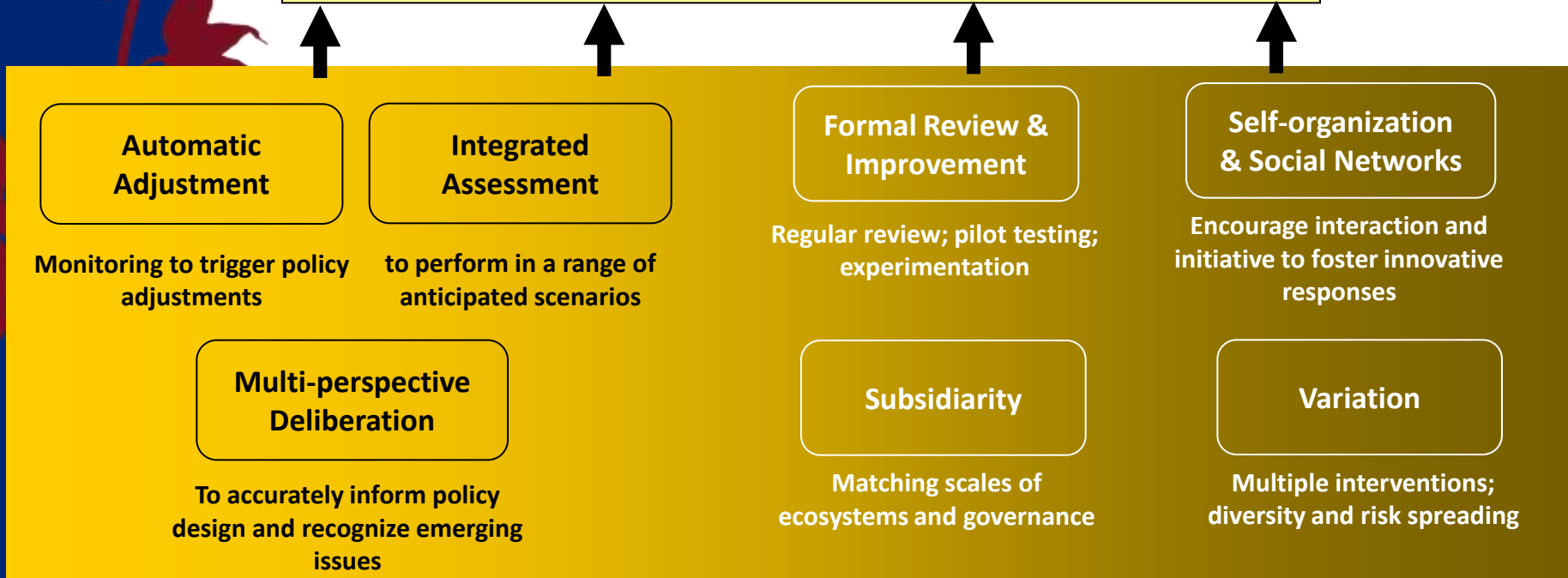
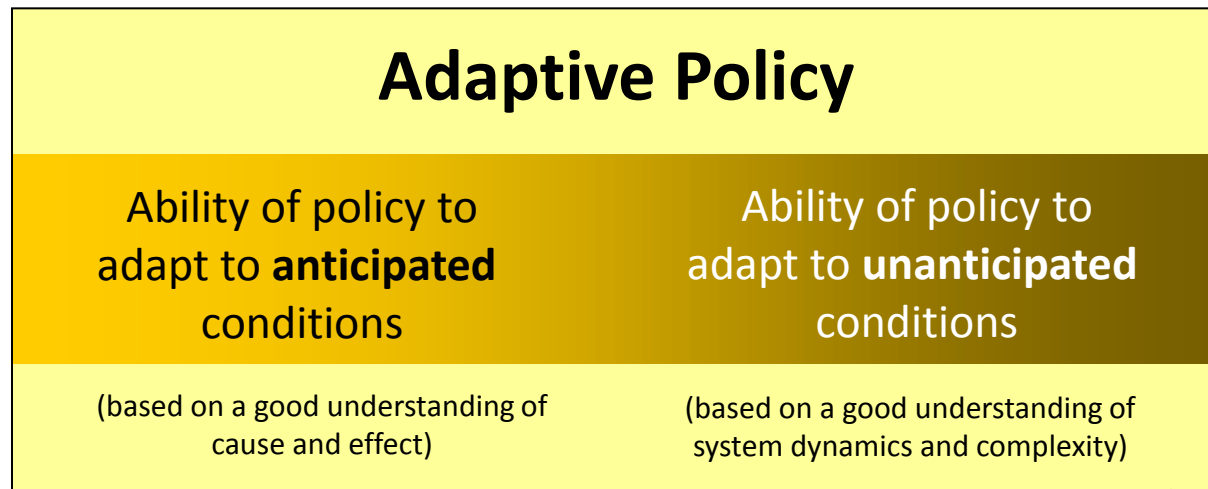
Adaptive management techniques are important to successfully implement ecosystem initiatives

Interventions at one level of an ecosystem will affect conditions at other levels

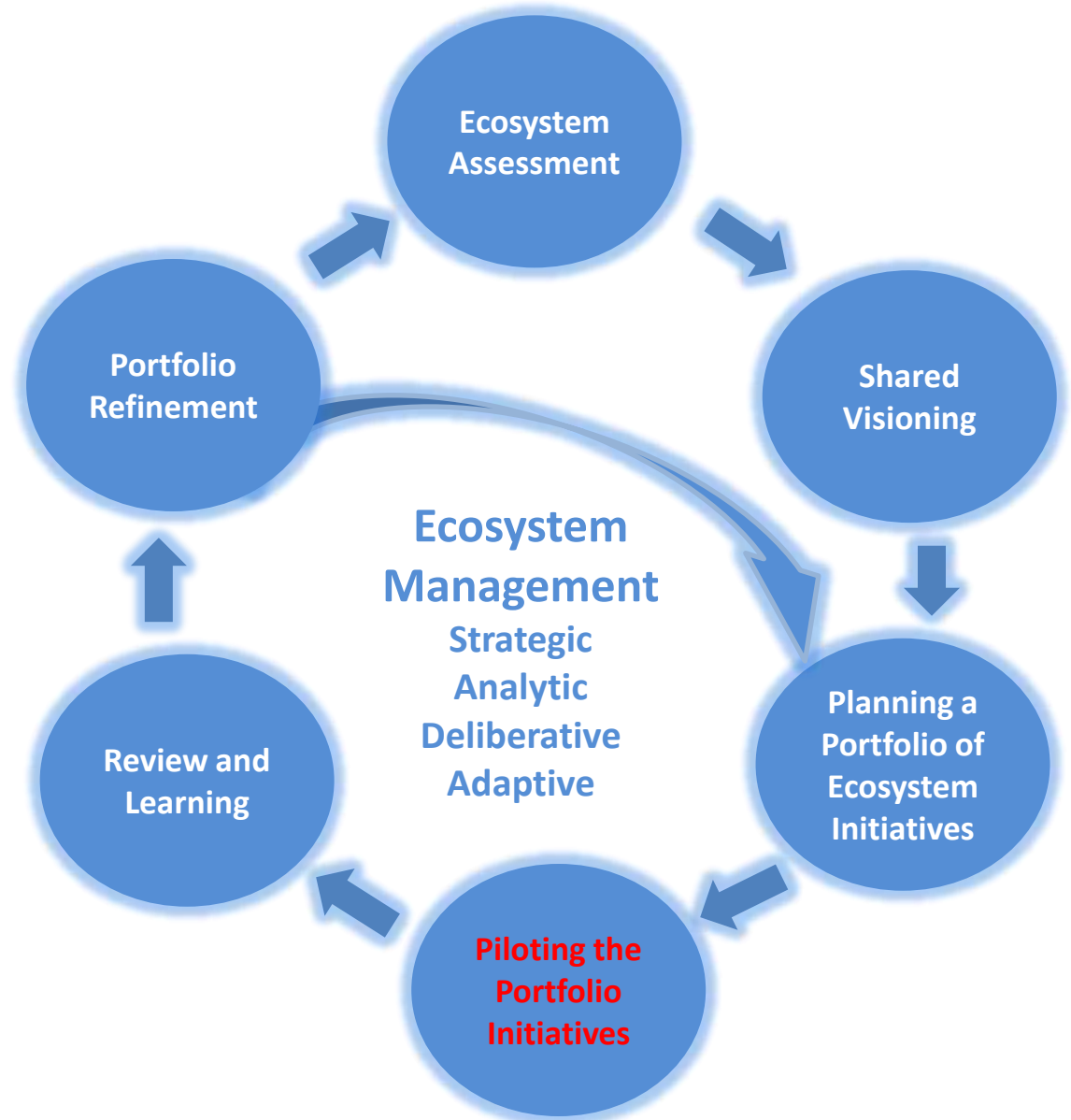
Ecosystems can exhibit **non-linear behavior** and **threshold effects**



# Guidance for Adaptive Policies



# Cycle of strategic adaptive management

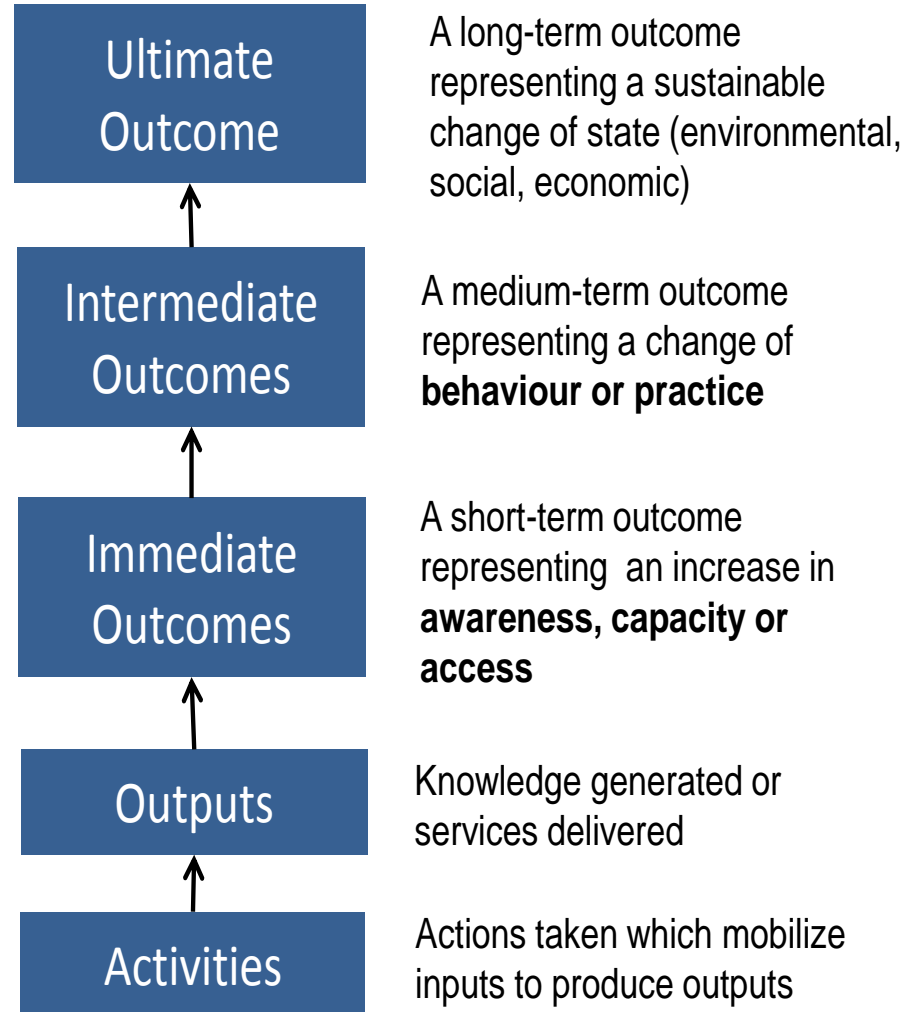


# A. Piloting of Ecosystem Initiatives

- **Implementation stage of strategic adaptive ecosystem management**
- **Manager pilots ecosystem initiatives aimed at achieving a shared long-term outcome**



# Outcome-based Management Framework



# Key Performance Indicators (KPIs)

- The **Key Performance Indicator (KPI)** is the primary tool used to measure results
- Two types: Near-term and long-term results





# Characteristics of **Smart** KPIs

**S**pecific

**M**easurable

**A**chievable

**R**elevant

**T**ime-bound



# Case Example

## Columbia River Basin



Results Chain	Ecosystem Initiative #1 Spillway Pilot Initiative	Ecosystem Initiative #2 Fish Ladder Pilot Initiative
<b>Ultimate Outcomes</b> <i>(change in state of environment, society, economy)</i>	Restoration of salmon population and hydropower that can meet demand <i>KPI: total salmon population</i> <i>Target: 20% above baseline counts within 5 years</i>	
<b>Intermediate Outcomes</b> <i>(new/improved policy or practice)</i>	More frequent spillway operation <i>KPI: Total spillway operation time</i> <i>Target: x hours more per month</i>	Permanent increase in fish ladder capacity <i>KPI: Salmon count immediately downstream of ladder</i> <i>Target: x% of upstream count</i>
<b>Immediate Outcomes</b> <i>(increased awareness, capacity or access)</i>	Awareness among hydropower policy-makers that increased spillway operation is a feasible means to increase salmon population <i>KPI: # of hydropower planners and policy-makers attending presentation on results of spillway experiments</i> <i>Target: (this target should include the specific names of influential persons identified in the impact strategy)</i>	Awareness among hydropower policy-makers that improved fish ladder technology can increase salmon population <i>KPI: # of hydropower planners and policy-makers attending presentation on results of fish ladder experiments</i> <i>Target: (this target should include the specific names of influential persons identified in the impact strategy)</i>
<b>Outputs</b> <i>(Knowledge generated or services delivered)</i>	Ecosystem initiative results showing the impact of spillway operation on salmon population <i>KPI: % increase in downstream salmon population.</i> <i>Target: 20%</i>	Ecosystem initiative results showing the impact of fish ladder operation on salmon population <i>KPI: % increase in downstream salmon population.</i> <i>Target: 20%</i>
<b>Activities</b> <i>(ecosystem management projects)</i>	Ecosystem initiative to test the impact of increased spillway operation on salmon population (including salmon population and stream flow monitoring). <i>KPI: Progress toward completion of ecosystem experiment</i> <i>Target: Completed on schedule</i>	Ecosystem initiative to test the impact of improved fish ladder design on salmon population (including salmon population and stream flow monitoring). <i>KPI: Progress toward completion of ecosystem experiment</i> <i>Target: Completed on schedule</i>

# KPIs to measure near-term results

- Activities and outputs are undertaken that will lead to achievement of desired outcomes.
- Can the initiative deliver a positive ecosystem benefit?

<b>Outputs</b> <i>(Knowledge generated or services delivered)</i>	Ecosystem initiative results showing the impact of spillway operation on salmon population  <i>KPI: % increase in downstream salmon population. Target: 20%</i>
<b>Activities</b> <i>(ecosystem management projects)</i>	Ecosystem initiative to test the impact of increased spillway operation on salmon population (including salmon population and stream flow monitoring).  <i>KPI: Progress toward completion of ecosystem experiment Target: Completed on schedule</i>

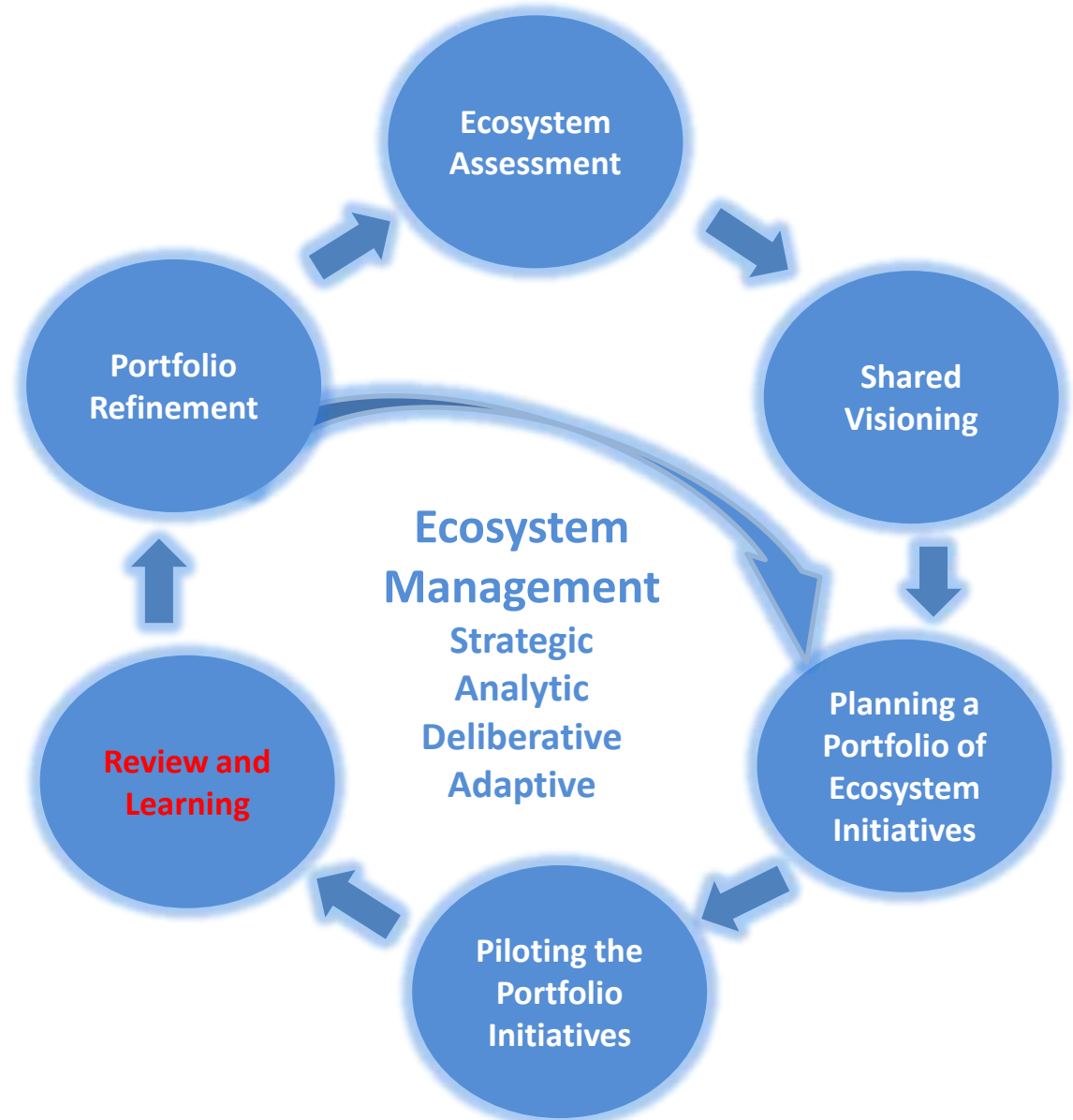
# KPIs to measure long-term results

- Gauge achievement of desired high level changes

Results Chain	Ecosystem Initiative #1 Spillway Pilot Initiative
<p><b>Ultimate Outcomes</b> <i>(change in state of environment, society, economy)</i></p>	<p>Restoration of salmon population and hydropower that can meet</p> <p><i>KPI: total salmon population</i> <i>Target: 20% above baseline counts within 5 years</i></p>
<p><b>Intermediate Outcomes</b> <i>(new/improved policy or practice)</i></p>	<p>More frequent spillway operation</p> <p><i>KPI: Total spillway operation time</i> <i>Target: x hours more per month</i></p>
<p><b>Immediate Outcomes</b> <i>(increased awareness, capacity or access)</i></p>	<p>Awareness among hydropower policy-makers that increased spillway operation is a feasible means to increase salmon population</p> <p><i>KPI: # of hydropower planners and policy-makers attending presentation on results of spillway experiments</i> <i>Target: (this target should include the specific names of influential persons identified in the impact strategy)</i></p>



# Cycle of strategic adaptive management



## B. Reviewing the portfolio

- Purpose is to **assess what is working and what is not** (monitoring & evaluation)
- Listen to **stakeholders, scientists and signals from the KPIs**
- Ecosystem manager is learning about **interactions and outcomes of initiatives**



# Rationale for formal review

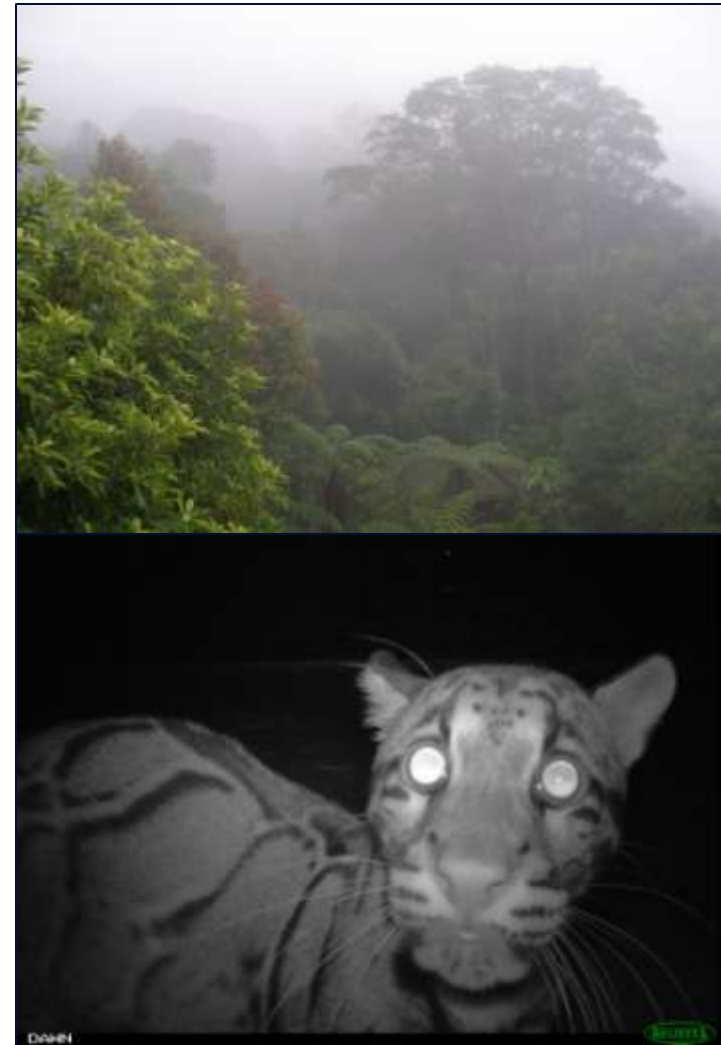
(after Holling 1978)

- Changes in a variable can affect others in unexpected ways
- Events at one place can re-emerge as impacts at distant places
- Need to determine significant connections



# Rationale for formal review

- **Monitoring the wrong variable can falsely indicate no change even when drastic change is imminent**
- **Impacts may be non-linear; they may change abruptly after the event**
- **Variability of ecological systems provides a buffering capacity that maintains resilience**
- **Standard impact assessment methods (e.g., cost-benefit analysis, input-output, cross-impact matrices, linear models, discounting) may not recognize importance of these interactions**





# Review Triggers

- **Specified time period identified in planning stages**
  - Annual to 5-year reviews usually recommended
  - Monitoring KPIs may indicate shorter time interval needed to respond to changing conditions
- **New scientific information**



# Exercise: Sharing experiences in monitoring and review

- In small groups, discuss your experiences piloting initiatives. Were hypotheses clearly defined? Were key indicators developed, tracked and monitored? Was a review process incorporated? What were triggers for review? Were improvements made as a result of lessons learned? If these components were not part of the process, what barriers prevented thorough implementation? (15 min)
- Discuss in plenary (10 min)

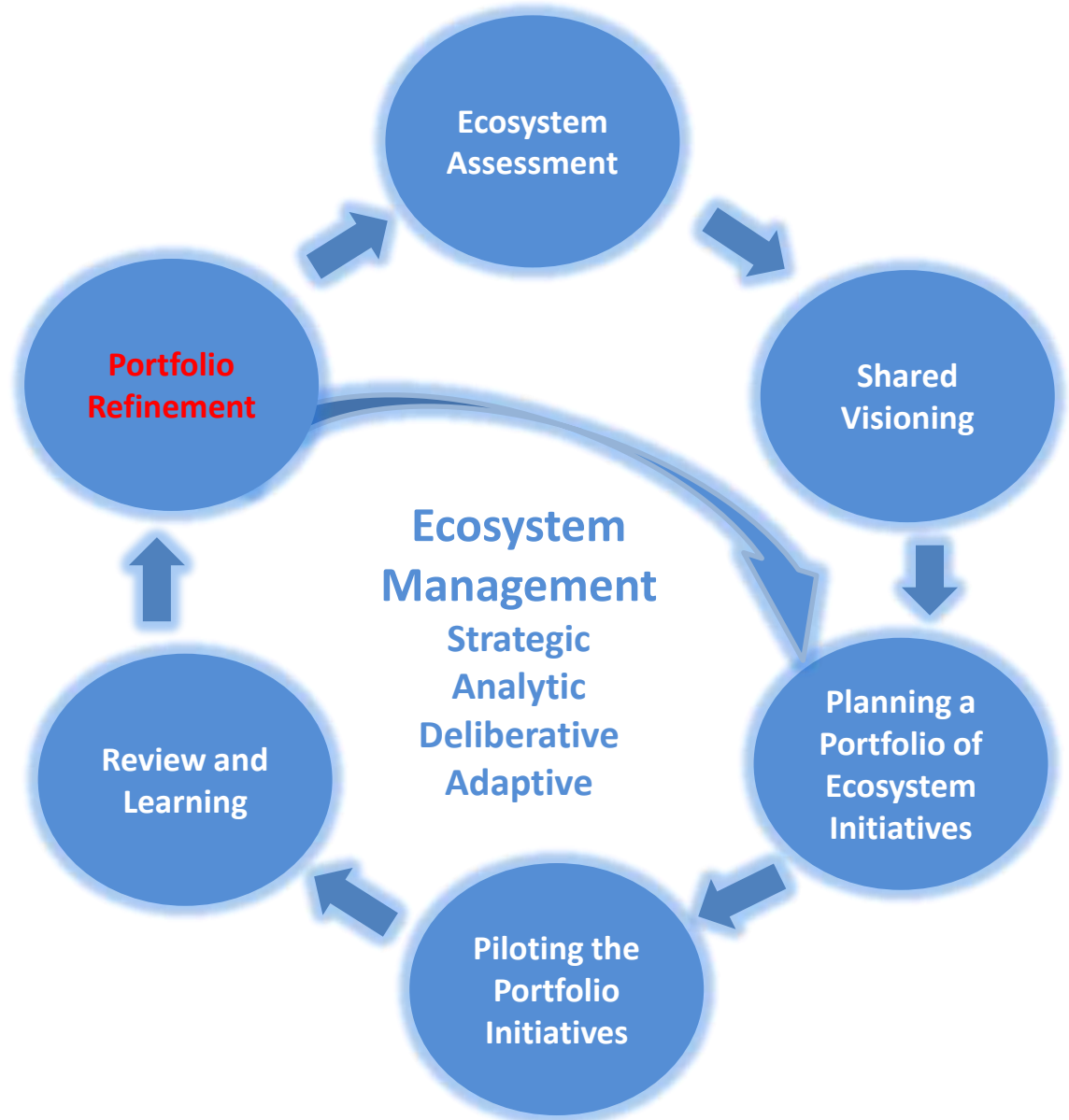


# Stakeholder Feedback

- Each EM initiative should have an expert team that reviews feedback and develops ways to respond
- On an individual basis, stakeholder feedback is often seen as a host of complaints that cannot all be addressed
- Aggregated, stakeholder feedback can tell an important story about an emerging issue or an unintended consequence of an initiative



# Cycle of strategic adaptive management



## C. Portfolio Refinement

- As a result of refining the portfolio, the manager has a better understanding of what works and what does not toward achieving ultimate outcomes
- As you go forward
  - Initiatives that are most promising can be strengthened for longer-term implementation; those that are failing can be dropped
  - Maintain a mixed portfolio because of the complexity and adaptive nature of ecosystems
  - Initiatives should be monitored for ability to test original hypotheses regarding their performance



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adaptive management



**Does this flow make sense to you?**

**Can you see how you will lead  
participants in this kind of exercise?**

**Any questions?**

