

## Coordinating Models and Monitoring within the Adaptive Management Cycle

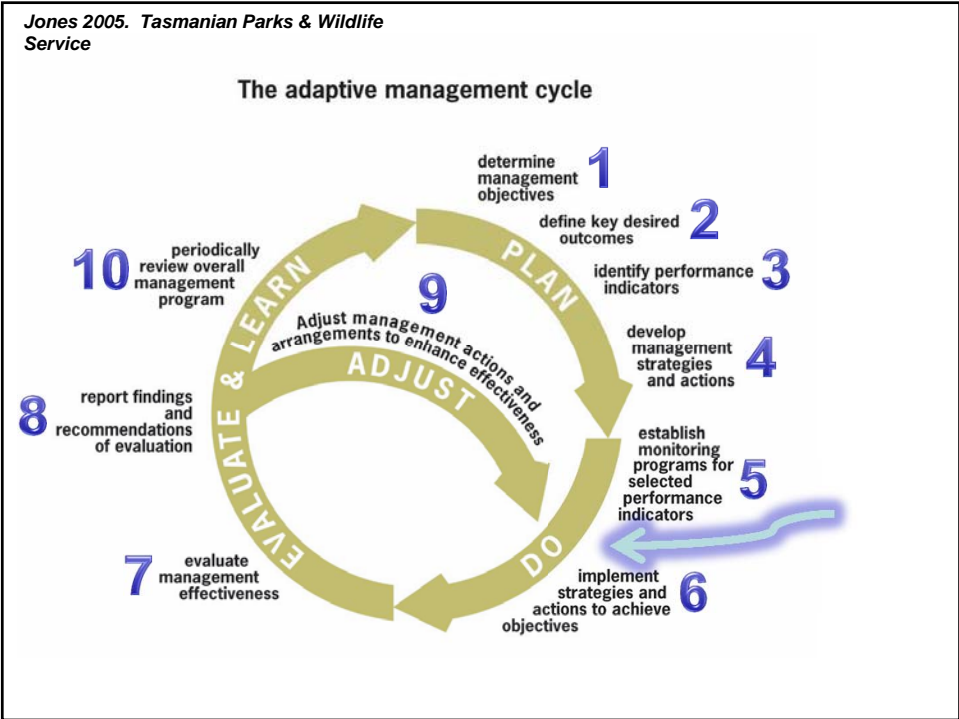
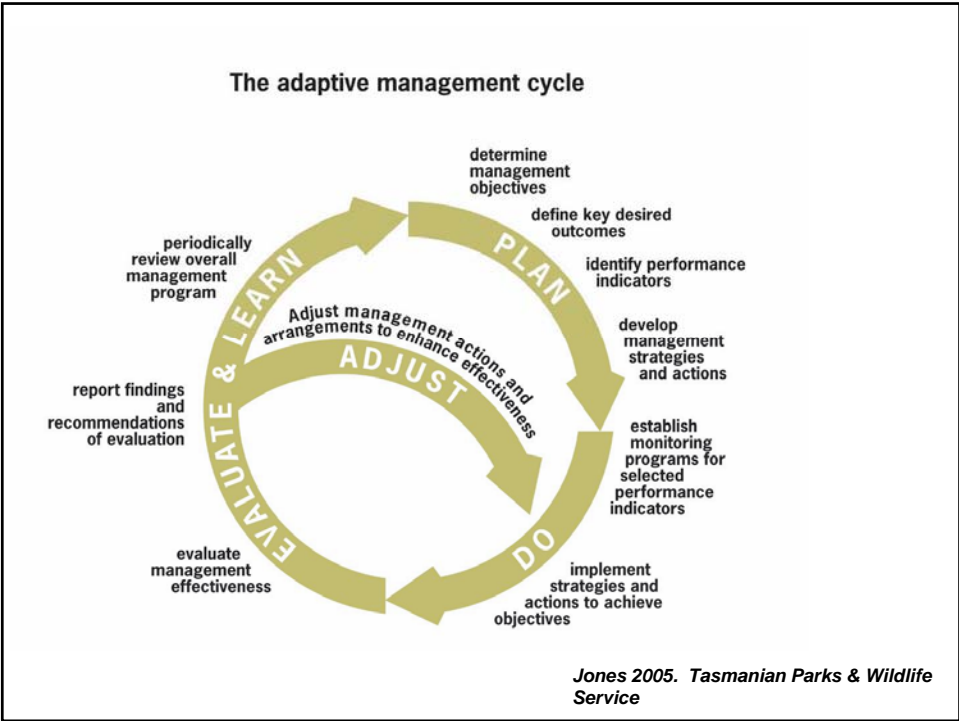
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SRST Expert Panel Meeting  
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### Why Adaptive Management?

- Uncertainties in the Conceptual System Model
  - Mass balance / mass loading
  - Bioavailable pool of mercury
  - Complexities of mercury cycling / threshold concentrations
  - In-channel MNR processes
  - Time for system to respond to actions
- Uncertainty in public acceptance of remedies
- Implementability (access issues)
- Scale lends itself to phased implementation
- “Stress” the system in order to validate the CM





## 4 & 5 Develop Management Strategies / Actions, Develop Monitoring Plan

- Developed Interim Measures Work Plan
- Developing Enhanced Adaptive Management Model and links to MCM and RRM
  - **MCM** quantifies the CM and predicts system Hg response to remedy / timing (2015)
  - **RRM** frames current risks and predicts changes based on proposed remedy including unintended consequences / benefits
  - **EAM** decision model compares alternatives based on all evaluation criteria using the MCM for decision analysis and will incorporate output from the RRM
- Collect Baseline Data (STM and LTM plans)



## 6 Implement Strategies and Actions to Achieve Objectives

### IM Phase 1 Remedy Design and Construction

- Fill design data gaps and complete preliminary remedial design
- Obtain landowner feedback and prepare final remedial design
- Obtain permits and access agreements
- Construct and Monitor
  - Remedy Performance Monitoring – erosion, as built
  - STM: THg and MeHg in clams and sediments, rapid bioassessment protocol



## 7 Evaluate Management Effectiveness

- a. Evaluate whether remedial action was constructed as designed or planned
- b. Evaluate effectiveness of Phase 1 remedy; compare actual post-remedy monitoring results with predicted short-term outcome using mapping and statistical data analysis, **MCM and RRM** and other tools as appropriate.
  - o Is the conceptual model sound or should it be revised?
  - o Has sufficient time elapsed to realize the expected reductions considering disturbance of the system and other temporal responses?
  - o Was the remedial approach appropriate?
- c. Evaluate overall implementability and cost effectiveness.
- d. If outcome does not meet predicted, input new data and run **EAM** decision model.



## 8 Report Findings and Recommendations of Evaluation

- o Work with VADEQ and SRST to identify lessons learned on the conceptual model and effectiveness of off-site Phase 1 corrective actions
- o Review effectiveness and robustness of monitoring program
- o Communicate results to other affected stakeholders and obtain feedback on successes / concerns



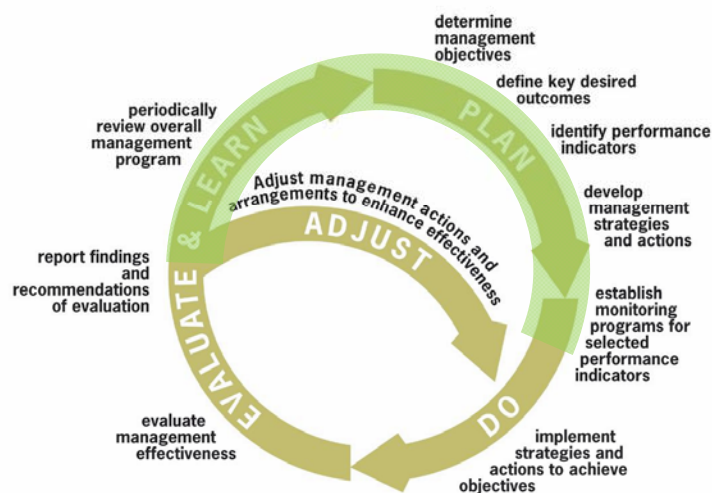
## 9 Adjust Management Actions and Arrangements to Enhance Effectiveness

- Incorporate findings and recommendations and update – as appropriate - the Conceptual Model, the **MCM**, **RRM** and **EAM**
- Incorporate learnings on remedy design, permitting and stakeholder preferences
- Incorporate findings from ongoing ROPs programs
- Review and refine outreach plan
- Refine or optimize short-term monitoring plan
- Implement next phase of risk management strategies



## Long Term Objectives and Responses

The adaptive management cycle



Jones 2005. Tasmanian Parks & Wildlife Service

## 10 Periodically Review Overall Management Program

- Assess whether trends can be ascertained in downstream and terrestrial monitoring stations
- After sufficient time, evaluate long-term monitoring data for trends in performance indicators based on projections and refine the CM or the overall objectives, as needed.
- May require more than one phase of remedial action to assess long term / systemic management objectives

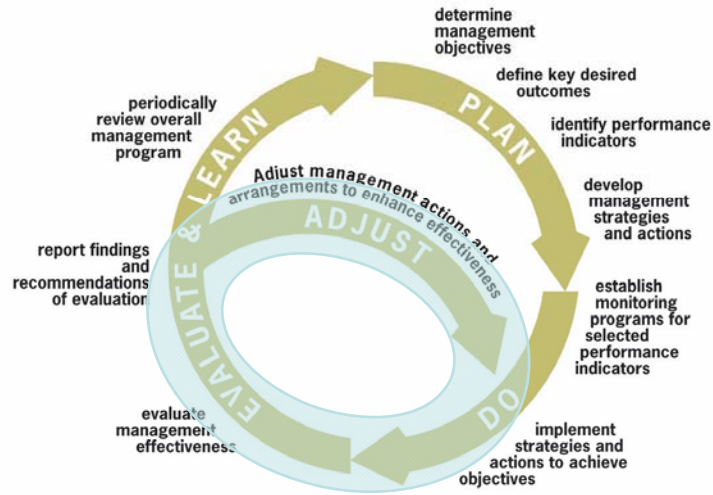


QUESTIONS?



## Short Term Actions and Responses

### The adaptive management cycle



Jones 2005. *Tasmanian Parks & Wildlife Service*