

Measuring success in the Swan Region: Creating a culture of adaptive management

Geoff Barrett and David Mitchell

Are we having an impact?

Are we learning and improving our management?

“The effectiveness of DEC’s planning, management and regulatory frameworks is dependent on science-based knowledge that informs these processes”.

- DEC Science Policy (April 2008)

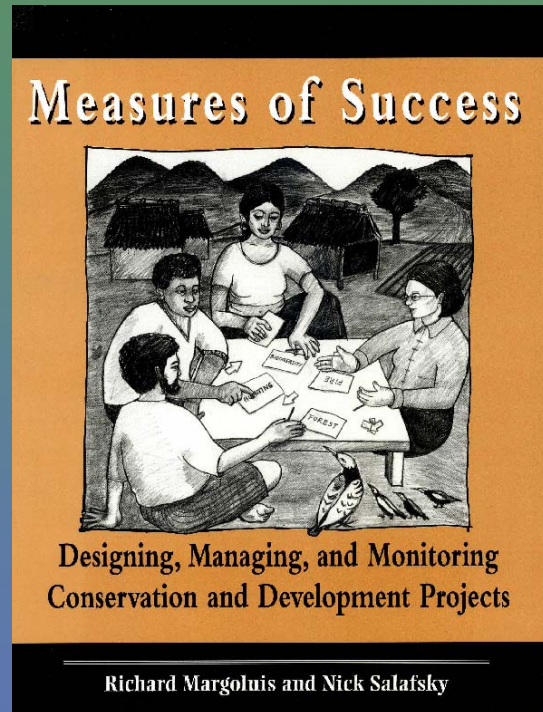
Science policy:

- *Science is relevant to departmental objectives*
- *Quality is high (good science, testable questions)*
- *Good communication of results*
- *Data are accessible for future application*
- *Personal responsibility for projects is promoted (via links to EPDP)*
- *A legacy remains to promote the retention of corporate knowledge.*



Are we having an impact?

Are we learning and improving our management?



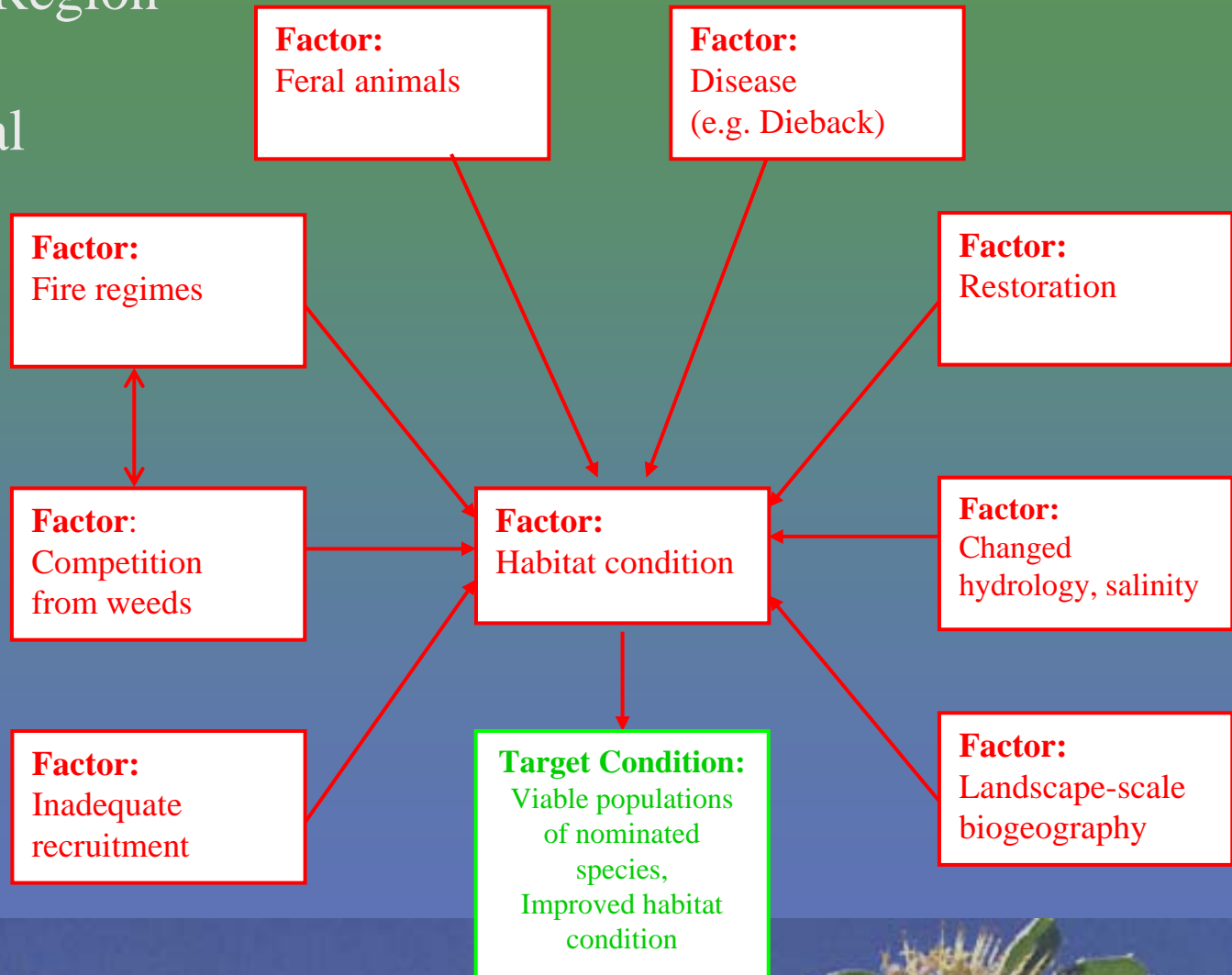
“Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs”.
- *British Columbia Ministry of Forests (2004)*

Margolius, R., Salafsky, N. (1998).
Island Press, Washington, DC, USA.

http://fosonline.org/resources/publications/AdapManHTML/Adman_1.html

There are 70 on-ground, adaptive management projects in the Swan Region

Conceptual Model:



The adaptive management process was formalized using the following tool:

A new project is in Cycle 1

Stage 1: The question is defined

- clear program logic and conceptual model
- scoping document and peer review
- stakeholder engagement

Stage 2: Know how to address the question and success criteria

- methods and experimental design clear
- know what to measure and when to stop
- sites chosen



Stage 3: Monitoring and evaluation are underway

- data are being collected
- time frame has been defined (visualise final message)
- analysis is underway

Stage 4: Know the story, who to tell and how to tell it

- final analysis done and report written
- main message identified as well as learnings and implications for management
- communication with stakeholders underway

Also a tool for measuring success and building a culture of adaptive management



Measuring success

	A	B	C	D	E	F	G	H	I	J	K
	Project #	Factor (Topic being addressed - see conceptual model)	Link to the draft Nature Conservation Service Swan Region Plan (2009)	Project title	Project question(s)	Cycle and Stage	Major learnings	Main DEC Staff involved (and non-DEC partners)	Data Custodian	Metadata reference / Science register	Reports / documents / publications
1											
17	17	Fire regimes	29, 75, 76, 92	Synaphea and soil disturbance	Does disturbance have a positive effect (germinate/re-sprout) on <i>Synaphea</i> sp. Pinjarra?	Cycle 1/ Stage 3	Synaphea seedlings regenerated after control burning but not after soil disturbance with mattock	Swain Coastal - Lyndon Mutter, Mel Hoskins, Fiona Felton, Leigh...	Mel Hoskins		Felton 2008 Managing Club-Leafed <i>Synaphea</i> (scoping...
	18	Fire regimes	29, 81, 65, 67, 92	Recovery of floristic community type 26a (limestone ridge shrublands) after fire	How many years post spring fire does it take floristic community type 26a (limestone ridge shrublands) to re-establish to pre-burn state?	Cycle 1/ Stage 3					
			29, 81, 75, 76, 92	Recruitment of <i>Andersonia gracilis</i> following summer wildfire	Will there be recruitment of <i>Andersonia gracilis</i> within population 2 of following summer wildfire?	Cycle 1/ Stage 3					
			29, 81, 75, 76, 92	Effect of prescribed burning on <i>Darwinia foetida</i>	What is the response of <i>Darwinia foetida</i> to prescribed fire?	Cycle 1/ Stage 3					
			8, 29, 81, 75, 76, 92, 94	Re-establishment of <i>Macarthuria keigheryi</i> following fire and fencing	Will sub-population 3a of <i>Macarthuria keigheryi</i> re-establish if 1) Fire and/or vermin fencing is applied or 2) different management practices are applied (Vermin fencing, burning)?	Cycle 1/ Stage 3					
				Germination of <i>Lasioptalum pterocarpum</i> following fire	Will seedlings subpopulation pterocarpum follow fire?						
				Animals on the move	Can we model animals under future climate different scenarios?						
				Drought-proofing habitat for the Western Swamp Tortoise (Retaining surface water with bunding to drought-proof habitat of the endangered Western Swamp Tortoise at Moore River Nature Reserve)	Can the Twin Swamp area support WST in the future with habitat modification?						
					improve water dry year						
					adding lined pools and fill in dry years with groundwater or from water tank)						
					(from bore) supplements all winter (bore capacity is struggling supply						

Factor:
Fire regimes

Nat. Cons. Plan candidate actions:
29, 75, 92

Project title:
Synaphea and soil disturbance

Project question: Does disturbance have a positive effect on *Synaphea* germination?

Cycle 1 / Stage 3

- Main DEC staff involved
- Data custodian
- Metadata reference / DEC Science Register
- Reports / documents/ publications

Major learnings:
Synaphea seedlings regenerated after control burning but not after soil disturbance with mattock

Measures of success:

Adaptive management projects in Swan Region
(December 2009)

Success criteria	Total
# Projects	70
# Pending projects	19
# Projects that have progressed at least one <i>stage</i> in Adaptive Management Cycle (since May 2009)	24
# Times a project progressed at least one <i>stage</i> (since May 2009)	38
# DEC staff in regular communication regarding their projects	20

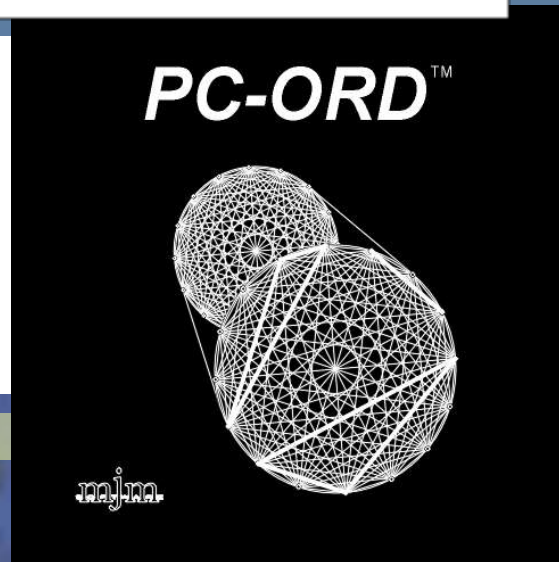
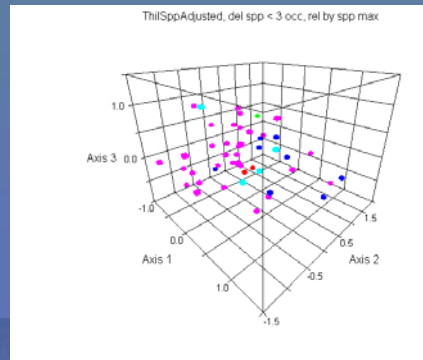
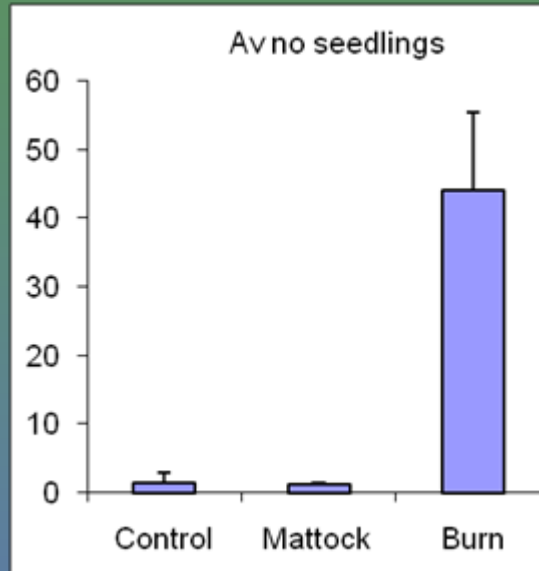
Success criteria	Total
# Candidate actions in Swan Region Nat. Cons. Plan (June 2009)	43
# Candidate actions addressed (60% of projects address 20% of candidate actions)	32

Urban Nature program January to June 2009:

Success criteria	Total
# Urban Nature adaptive management projects	19
# organised onground activities	81
# stakeholders in close working relationships	37
# times technical advice was provided	18
# Newsletters or brochures printed with relevant articles	3,730

Building an adaptive management culture

Choosing the analysis



Access to stats programs

<http://www.statistixl.com/>

Microsoft Excel - Example calculations

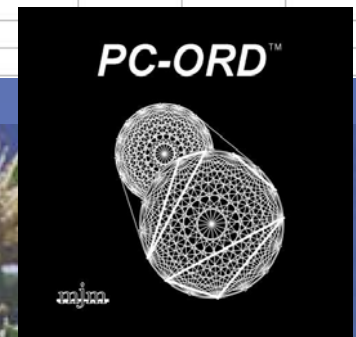
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Q1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q																																									
1	Treatment	No Seedlings		Treatment	Mean	SD	n	SE		Analysis of Variance results for:																																																
2	Control	5		Control	5.5	1.048809	6	0.437004		Y Variable Range = \$B\$1:\$B\$25																																																
3	Control	6		Cool burn	12.5	1.048809	6	0.437004		Factor Range = \$A\$1:\$A\$25																																																
4	Control	7		Hot burn	4.5	1.048809	6	0.437004		Analysis of Variance for Y=No Seedlings																																																
5	Control	4		Ploughing	9.833333	6.968979	6	2.903741		<table border="1"> <thead> <tr> <th>Source</th> <th>Type III SS</th> <th>Df</th> <th>Mean Sq.</th> <th>F</th> <th>Prob.</th> </tr> </thead> <tbody> <tr> <td>Model</td> <td>252.500</td> <td>3</td> <td>84.167</td> <td>6.491</td> <td>0.003</td> </tr> <tr> <td>Error</td> <td>259.333</td> <td>20</td> <td>12.967</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>511.833</td> <td>23</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>								Source	Type III SS	Df	Mean Sq.	F	Prob.	Model	252.500	3	84.167	6.491	0.003	Error	259.333	20	12.967			Total	511.833	23																				
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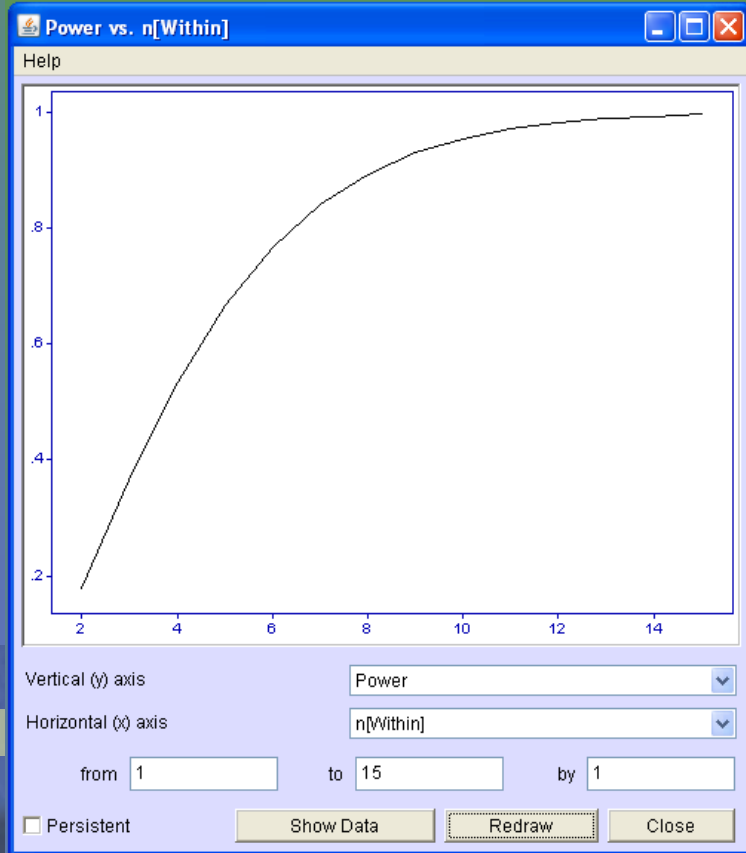
No. seedlings

Treatment	Mean No. seedlings
Control	5.5
Cool burn	12.5
Hot burn	4.5
Ploughing	9.833333



Experimental design:

e.g. Power Analysis

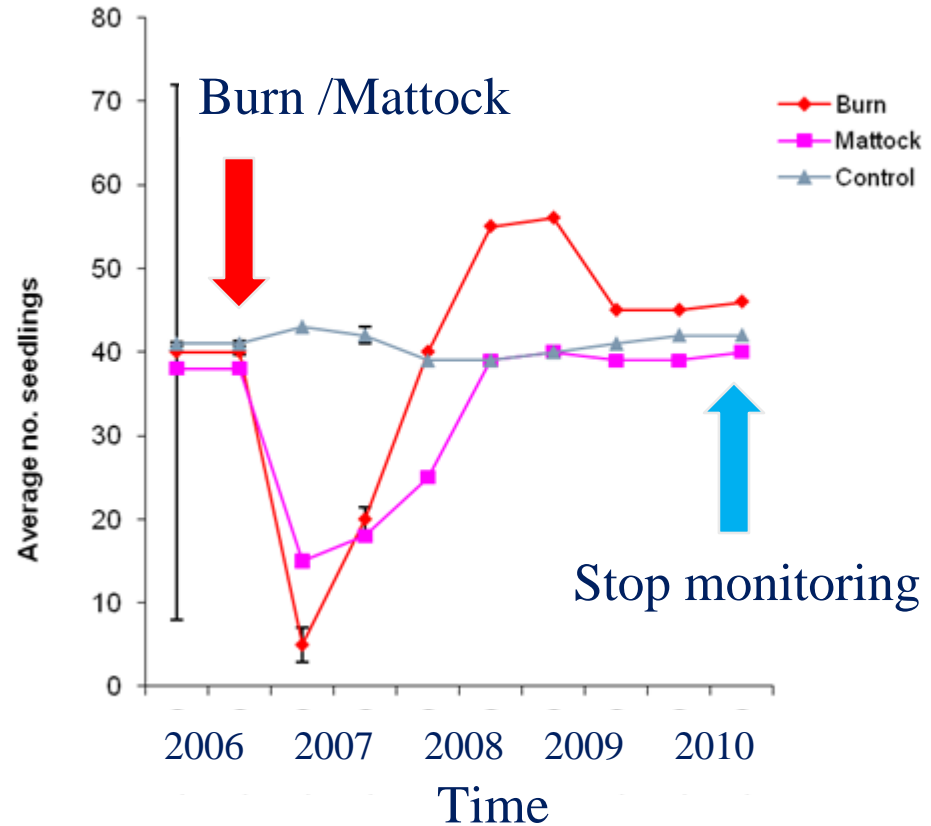


<http://www.stat.uiowa.edu/~rlenth/Power/>

When to stop monitoring?

Hypothetical scenario based on *Synaphea* seedling counts in 2006 and 2007

Usually stop monitoring when control and treatment converge or when treatments plateau



Conclusions

DEC has expectations regarding the uptake of adaptive management

Adaptive management is possible but need to build capacity

Working towards a workforce that understands adaptive management concepts and can implement them within their works program

Regional staff have responded well to the process

Thank you





