

COST-EFFECTIVE RESOURCE ALLOCATOR: A DECISION SUPPORT TOOL FOR THREATENED SPECIES MANAGEMENT

Appendix S2. Tutorial with spreadsheet screenshots for each step.

Please begin by viewing the 'Process Flowchart' cover sheet, which provides an overview of the tool's components.

**Cost-Effective Resource Allocator
PROCESS FLOWCHART**

PART A - SETUP

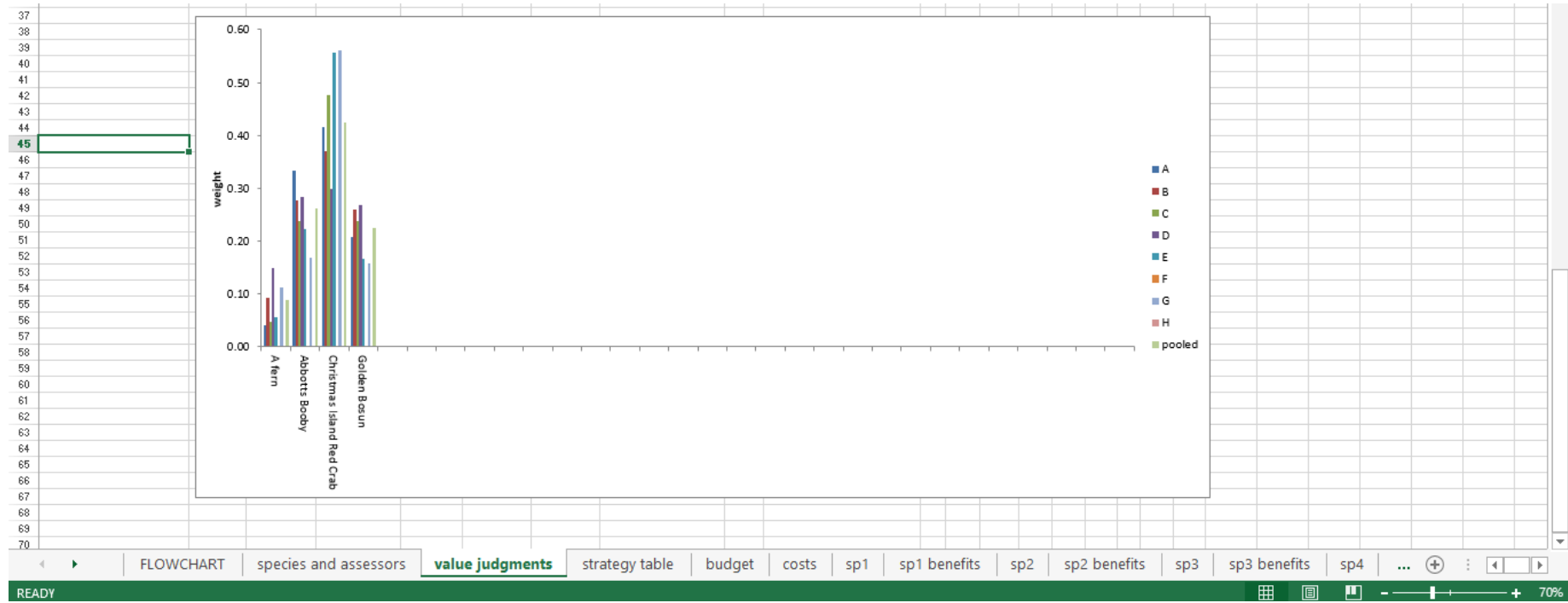
- INPUT SPECIES AND ASSESSORS**
Enter the names of the species and the assessors. Optionally, also enter each assessor's view of the relative utility of each species.
[species and assessors value judgments](#)
- STRATEGIES**
Enter the strategies available to managers. Assemble linked strategies into a single strategy.
[strategy table](#)
- PROGRAM ADMIN**
Enter administrative details of the program budget and costs of actions
[budget costs](#)

PART B - PERFORM ASSESSMENTS

FLOWCHART | species and assessors | value judgments | strategy table | budget | costs | sp1 | sp1 benefits | sp2 | sp2 benefits | sp3 | sp3 benefits | sp4

2. Some species may be more important than others for ecological or economic reasons. This spreadsheet has the option of specifying different species 'values' by filling out the 'value judgements' worksheet. If you are compiling multiple assessors' answers, collect the responses of different assessors using Appendix S3.

								value									
		<i>Iconic</i>	<i>Economic value</i>	<i>Phylogenetically distinct</i>	<i>Keystone</i>	<i>Endemic</i>	<i>Nationally listed</i>	<i>International obligation to protect</i>									
									A	B	C	D	E	F	G	H	
6	A fern	-	-	-	-	•	•	-	10	25	10	50	10		20		
7	Abbotts Booby	-	•	•	-	•	•	-	80	75	50	95	40		30		
8	Christmas Island Red Crab	•	•	-	•	•	-	-	100	100	100	100	100		100		
9	Golden Bosun	-	•	-	-	•	-	•	50	70	50	90	30		28		
10		-	-	-	-	-	-	-									
11		-	-	-	-	-	-	-									
12		-	-	-	-	-	-	-									
13		-	-	-	-	-	-	-									
14		-	-	-	-	-	-	-									
15		-	-	-	-	-	-	-									
16		-	-	-	-	-	-	-									
17		-	-	-		-	-	-									
18		-	-	-	-	-	-	-									
19		-	-	-	-	-	-	-									
20		-	-	-	-	-	-	-									



3. List the candidate strategies required to manage your species of interest in the 'strategy table' worksheet (in no particular order). If certain strategies must be carried out together, group these under the same strategy (by adding a dot under the same strategy number). If they are independent, specify them as independent strategies. Define which species are impacted by which strategy by filling in the table at the bottom of the same worksheet.

	A	B	C	D	E
1		RETURN TO FLOWCHART			
2					
3			STRATEGY		
4		CANDIDATE STRATEGY	Strategy 1	Strategy 2	Strategy 3
5		YCA survey and control	•	-	-
6		Forest rehabilitation	-	•	-
7		Cat eradication	-	-	•
8		Cat control	-	-	-
9		Rat control	-	-	-
10		Fern Propagation and planting	-	-	-
11		Fern Weed management	-	-	-
12		Road management	-	-	-
13		Red crab Community education	-	-	-
14		Eradicate false curry bush	-	-	-
15			-	-	-
16			-	-	-
17			-	-	-
18			-	-	-
19			-	-	-

56		Which species are impacted (for better or worse)?			
57		A fern	-	-	-
58		Abbotts Booby	-	•	-
59		Christmas Island Red Crab	•	•	-
60		Golden Bosun	•	•	•
61			-	-	-
62			-	-	-
63			-	-	-
64			-	-	-
65			-	-	-
66			-	-	-
67			-	-	-
68			-	-	-
69			-	-	-
70			-	-	-
71			-	-	-
72			-	-	-
73			-	-	-
74			-	-	-
75			-	-	-
76			-	-	-
77			-	-	-
78			-	-	-
79			-	-	-

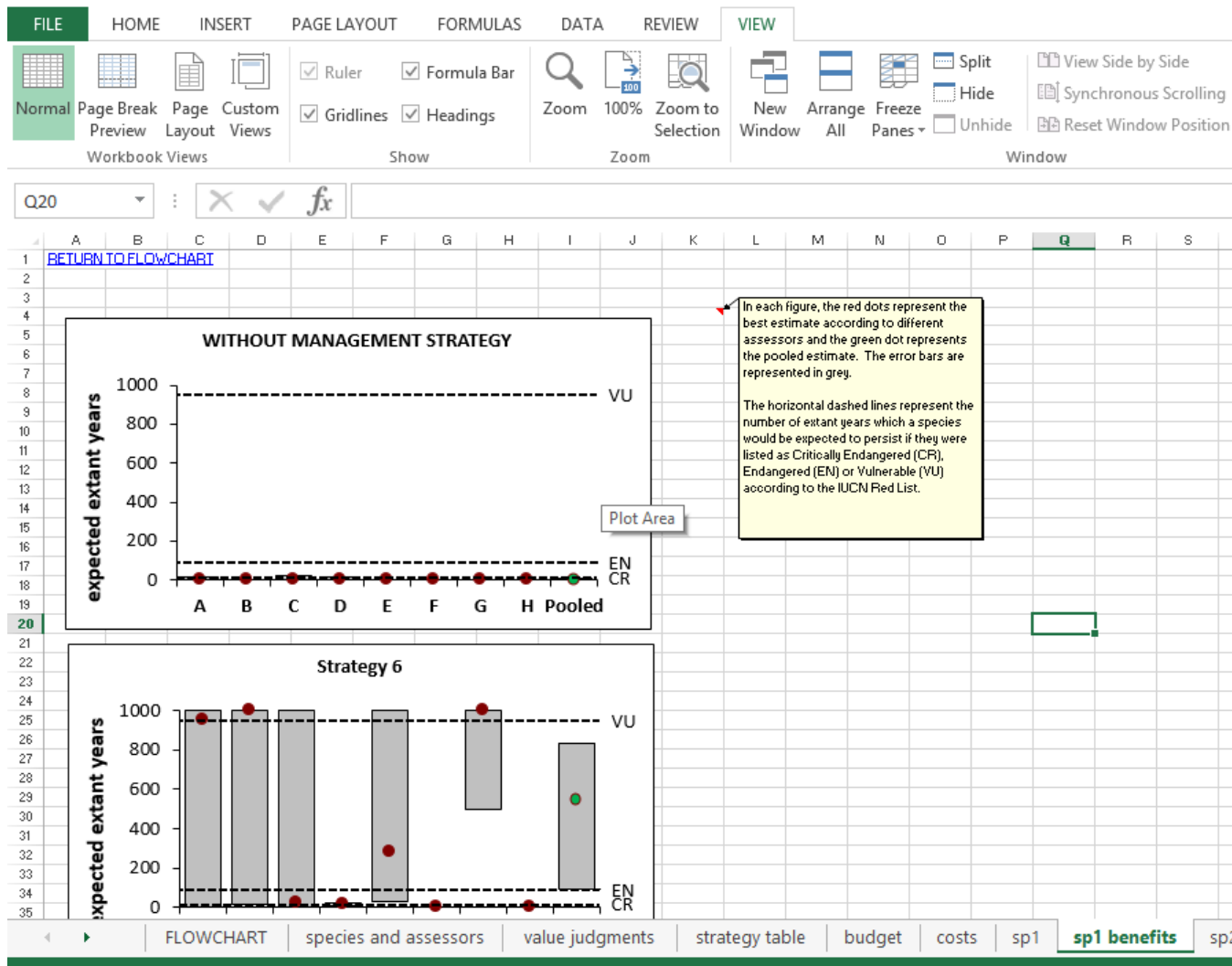
- Define the budget and planning time-horizon by filling in the green cells in the 'budget' worksheet. Divide your total budget into the salary resources required for one year and the additional cash that you expect will be allocated over the course of one year.

	A	B	C
1			
2	BUDGET ESTIMATE		
3	Time horizon for planning (years)	10	
4	Median annual salary (\$'000)	\$88.00	
5	Estimated cost per person-day (\$'000)	\$0.38	
6	Annual allocation of personnel (person-days)	1000	
7	Annual allocation of cash resources (\$'000)	\$500.00	
8	Annual budget (\$'000)	\$882.61	
9	Assumed budget over the planning horizon (\$'000)	\$8,826.09	
10			
11	Discount rate (%)	3%	
12			
13			
14			

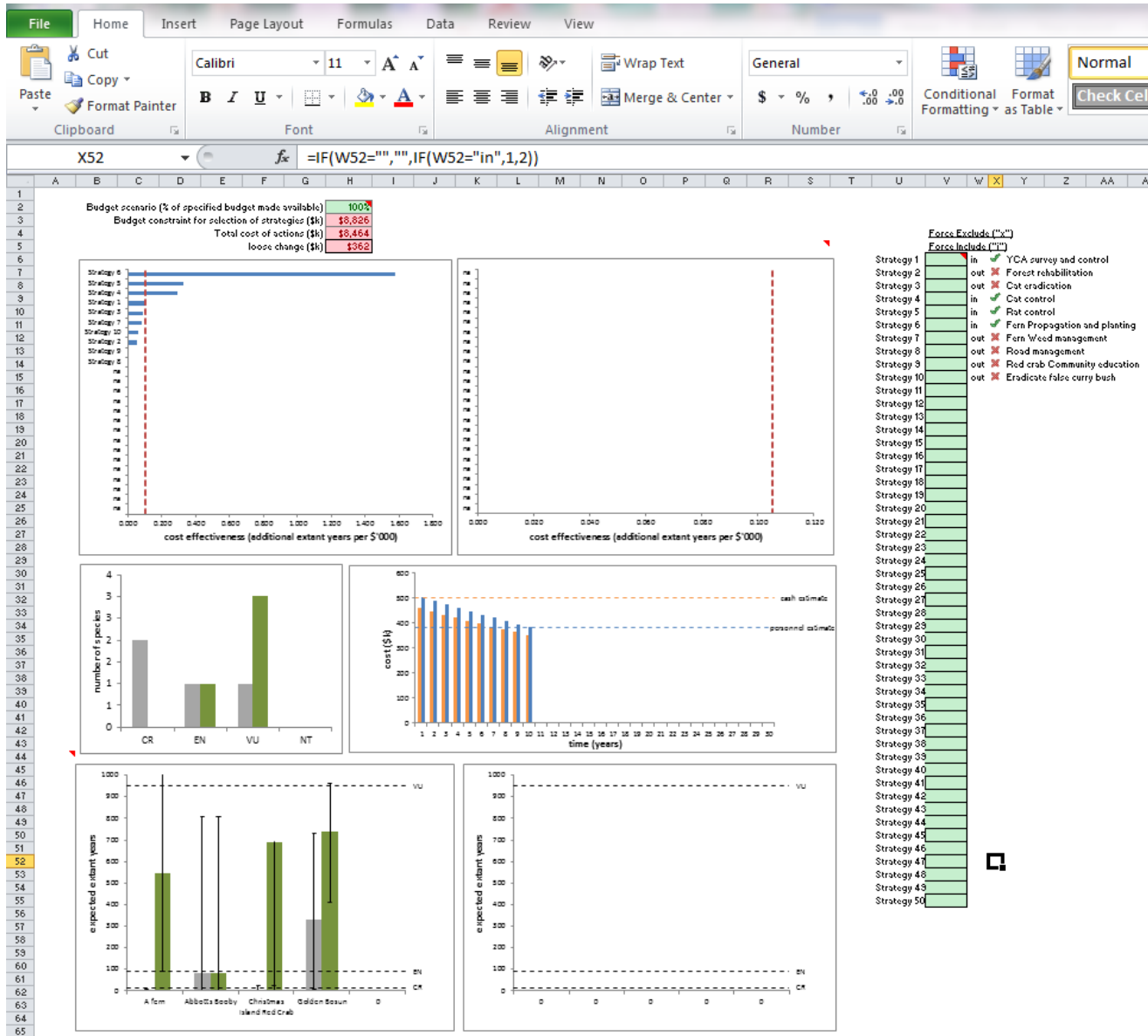
6. Define the benefit of different strategies by answering the questions in each 'species' worksheet, e.g. 'sp 1'. Please fill in all the parts (in italics) to each question (see Appendix S5 for further information regarding these questions). If you do not know the answer to one, leave all its parts blank. You are required to fill in at least one out of the two questions. If you are compiling multiple assessors' answers, please collect their responses using Appendix S4. Repeat this step for each species worksheet.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
1	RETURN TO FLOWCHART																						
2																							
3																							
4	A fern		Confidence level % (after adjustment)																80		This refers to the width of the error bars around the final benefit calculation.		
5																							
6	WITHOUT MANAGEMENT STRATEGY																						
7	<i>At the conclusion of the planning period, and in the absence of management intervention</i>																						
8	1. What will have been the magnitude of decline (%) over the planning period?		Assessor								generation and planning horizon adjustment 1								per annum probability				
9	<i>best case scenario (±0%)</i>		A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C		
10	<i>worst case scenario (±100%)</i>		20	50	50	20	50	40	20	23	56	56	23	56	46	23							
11	<i>most likely estimate (this should lie between worst and best case scenarios)</i>		85	100	100	80	100	80	90	30	100	100	86	100	86	94	best	0.0010	0.0595	0.0428			
12	<i>how confident are you the truth will lie between your nominated worst case and best case scenarios? (as a percentage >50%)</i>		25	70	60	50	70	50	50	29	76	67	56	76	56	56	upper	1.0000	1.0000	1.0000			
13			60	60	50	80	70	70	50	60	60	50	80	70	70	50	lower	0.0010	0.0106	0.0106			
14	2. What will be the population size of mature individuals?																						
15	<i>worst case scenario</i>		0	0	0	20	0	1	5	0	0	0	20	0	1	5							
16	<i>best case scenario</i>		50	30	100	50	5	20	20	50	30	100	50	5	20	20	best	0.7201	0.8134	0.6268			
17	<i>most likely estimate (this should lie between worst and best case scenarios)</i>		15	10	20	35	2	5	10	15	10	20	35	2	5	10	upper	1.0000	1.0000	1.0000			
18	<i>how confident are you the truth will lie between your nominated worst case and best case scenarios? (as a percentage >50%)</i>		60	60	50	80	70	70	50	60	60	50	80	70	70	50	lower	0.0636	0.3096	0.0396			
19																							
20																							
21																							
22																							
23																							
24	WITH MANAGEMENT STRATEGY																						
25	<i>At the conclusion of the planning period, and in the presence of ONLY the specified management action</i>																						
26	Strategy 6		Assessor								generation and planning horizon adjustment 1								per annum probability				
27	1. What will have been the magnitude of decline (%) over the planning period?		A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C		
28	<i>best case scenario (±0%)</i>		0	10	30	5	0		0	0	12	35	6	0		0							
29	<i>worst case scenario (±100%)</i>		40	70	100	60	50		10	46	76	100	67	56		12	best	0.0010	0.0010	0.0428			
30	<i>most likely estimate (this should lie between worst and best case scenarios)</i>		15	25	60	25	30		5	18	29	67	29	35		6	upper	0.0148	0.0651	1.0000			
31	<i>how confident are you the truth will lie between your nominated worst case and best case scenarios? (as a percentage >50%)</i>		65	75	50	70	60		80	65	75	50	70	60		80	lower	0.0010	0.0010	0.0010			
32																							
33	2. What will be the population size of mature individuals?																						
34	<i>worst case scenario</i>		50			50			1000	50			50			1000							
		FLOWCHART	species and assessors	value judgments	strategy table	budget	costs	sp1	sp1 benefits	sp2	sp2 benefits	sp3	sp3 benefits	sp4	...	+	:	←	→				

Move onto the next worksheet to view the benefit of carrying out different management strategies on a particular species (e.g. 'species1 benefits' worksheet). Your responses have been converted into the number of additional years that we would expect the species to survive (known as 'expected extant years') if no management strategy were applied, and following each management strategy in turn (see Appendix S5 for details on how these were calculated).



7. View how the strategies rank based on their cost-effectiveness in the 'outcomes – all species equal' worksheet. The top strategies are the most cost-efficient. The only strategies that can be carried out under the specified budget are those that either cross over or simply touch the red vertical dashed line (e.g. the top left figure in the screenshot below illustrates that it is possible to fund Strategies 6, 5, 4 and 1). The figures below provide additional information on how the strategies will impact your chosen species. Optional: force the inclusion or exclusion of different strategies.



Move onto the next worksheet ('outcomes – pooled values') to view the cost-effectiveness ranking of different strategies when these are weighted according to the importance of the species they benefit. The figures below provide additional information on how the strategies will impact your chosen species. These results can be viewed according to the 'pooled' values for each species (i.e. averaged across all assessors), or according to the values perceived by each assessor (subsequent worksheets).

