



**Rangitaiki catchment  
BOP**



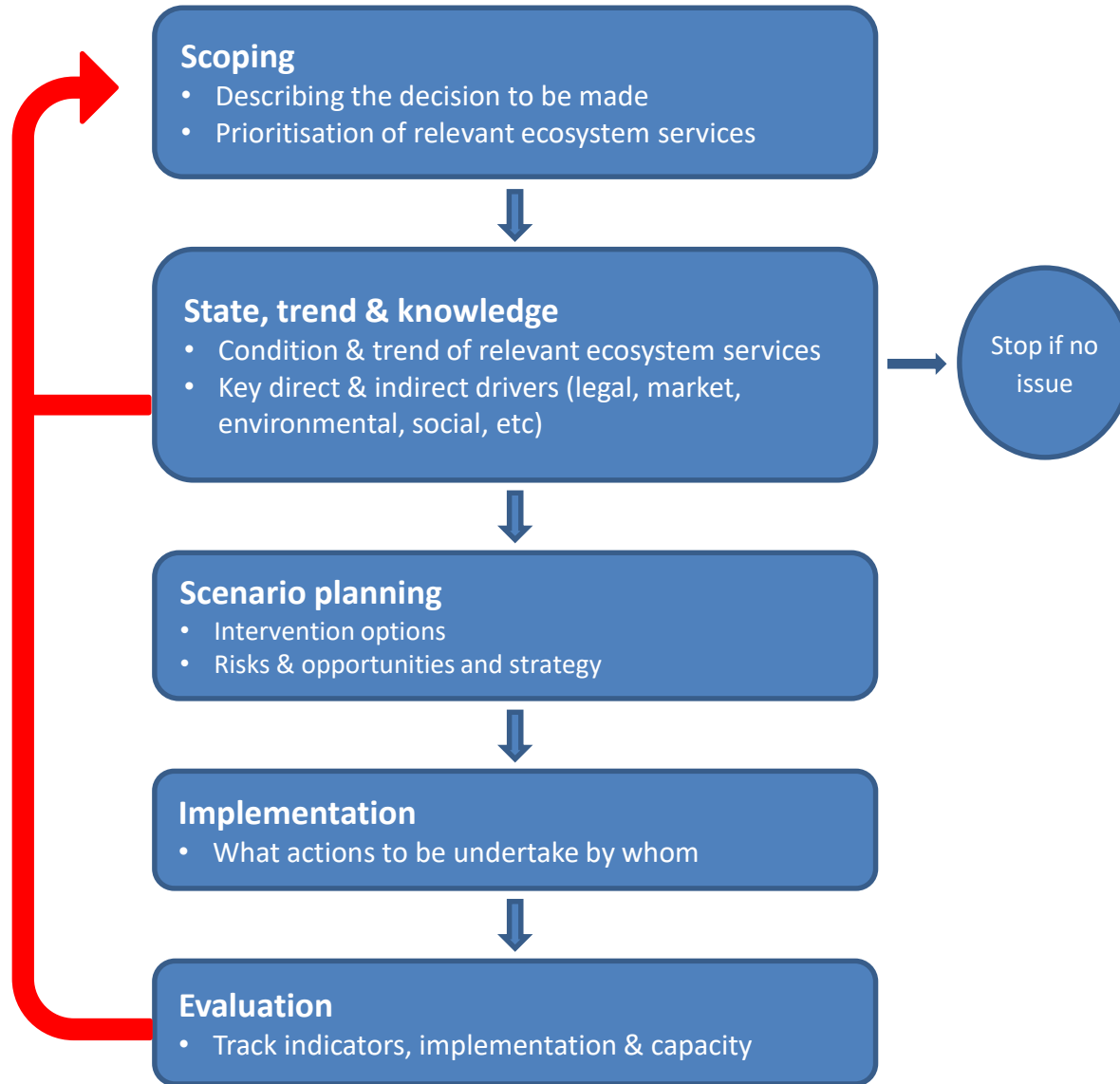
# **Ecosystem Services in Decision-making ~ Learnings from 2 catchments ~**

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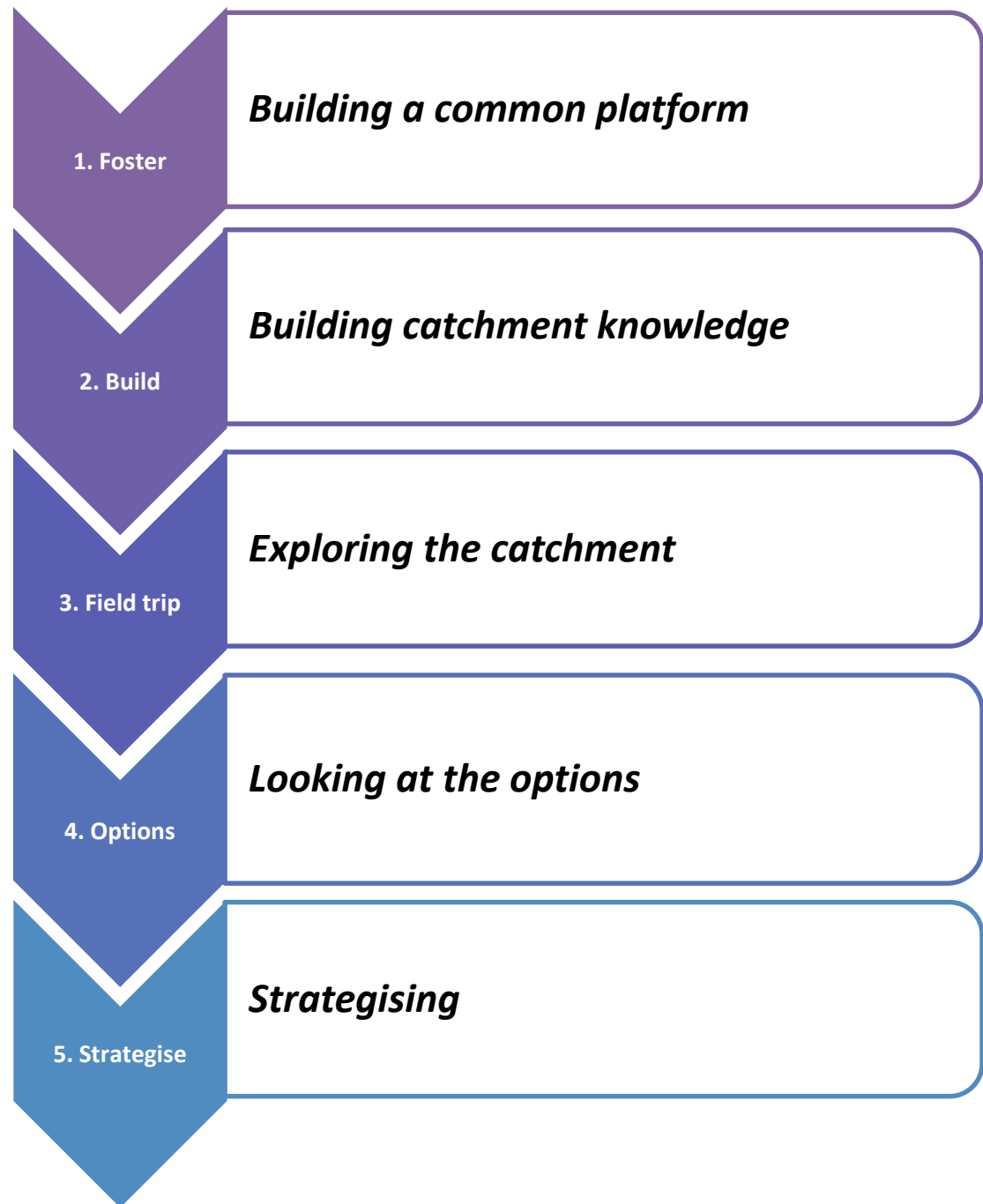


**Mangapiko catchment  
Waikato**

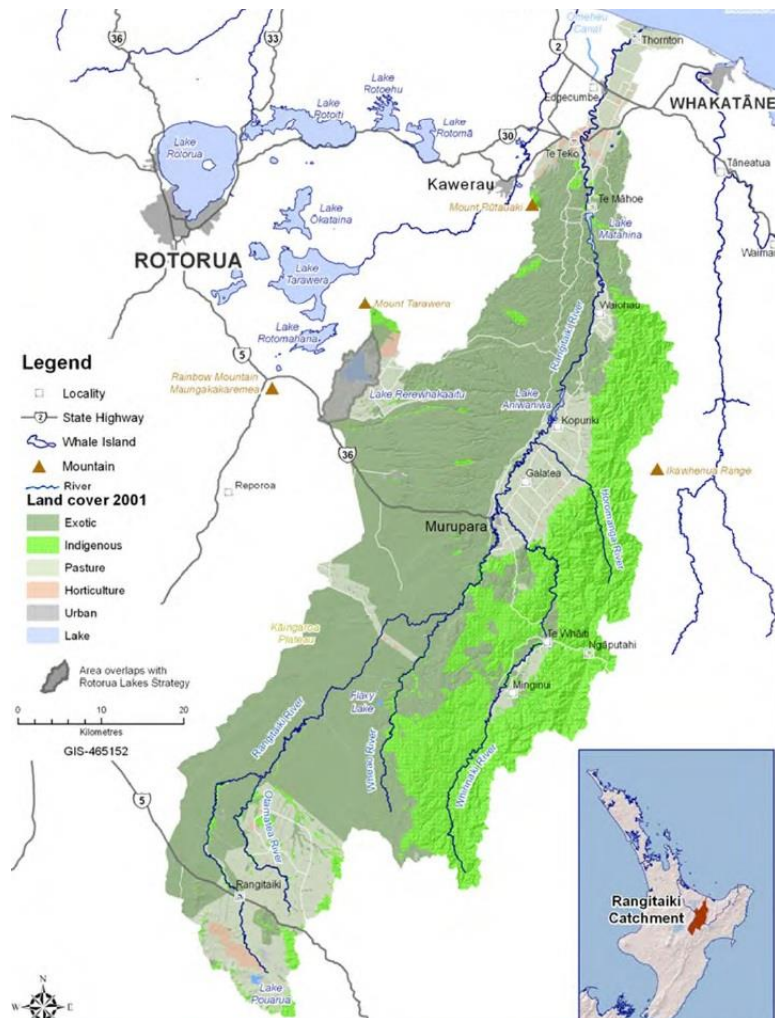
# BEST Decision-making Framework



# The process steps

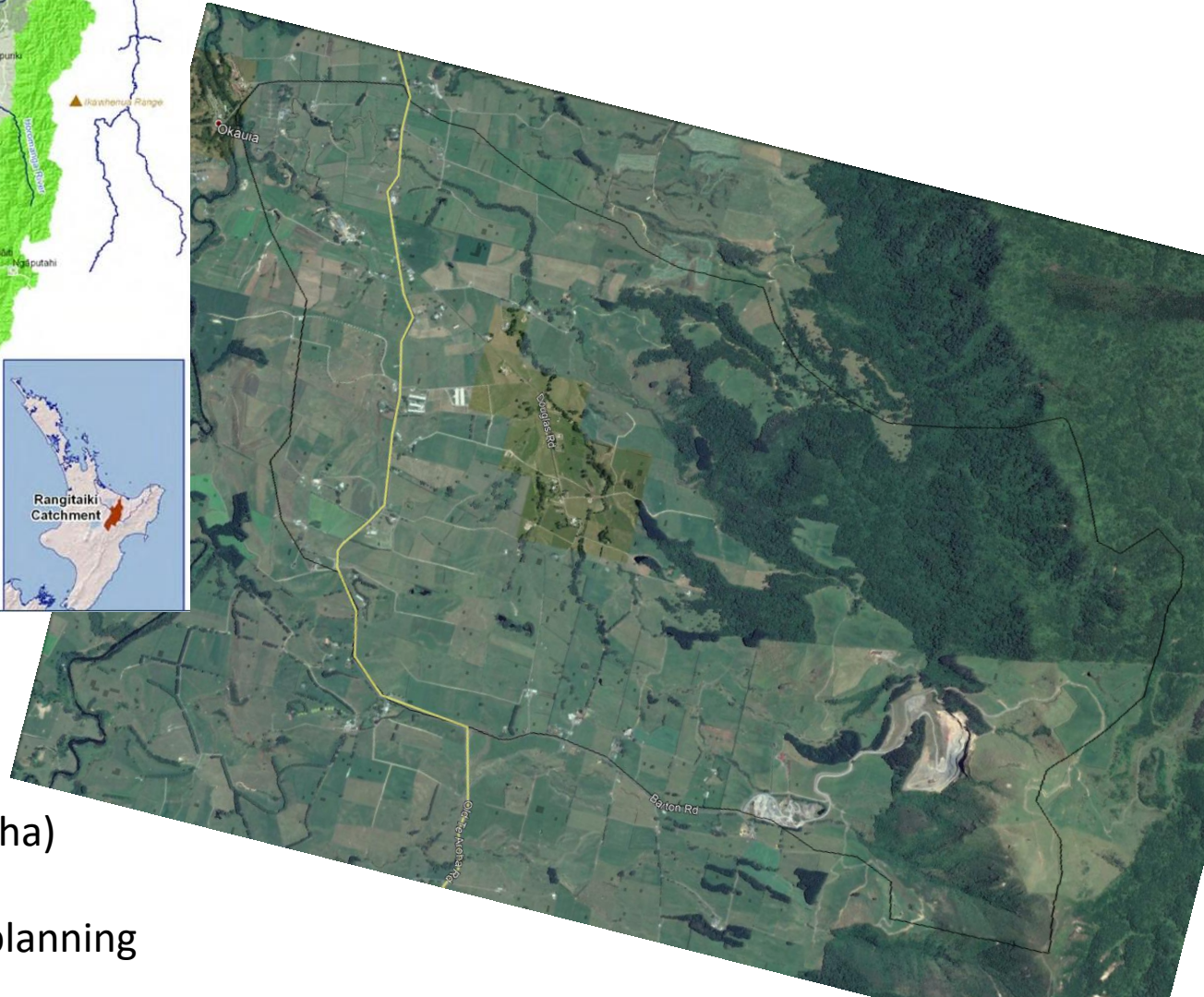






## Rangitaiki catchment

- Large catchment (~300,000ha)
- Large tracts of forest
- Implications of land use change

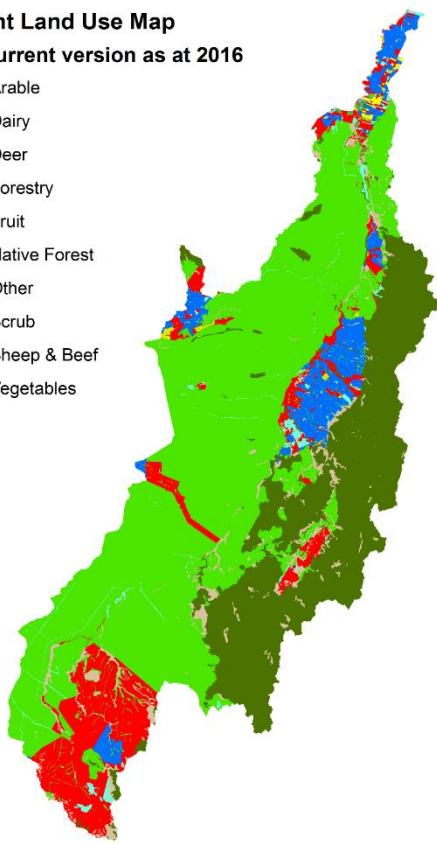


## Mangapiko catchment

- Small catchment (<2,000ha)
- Mostly pasture
- Biodiversity restoration planning

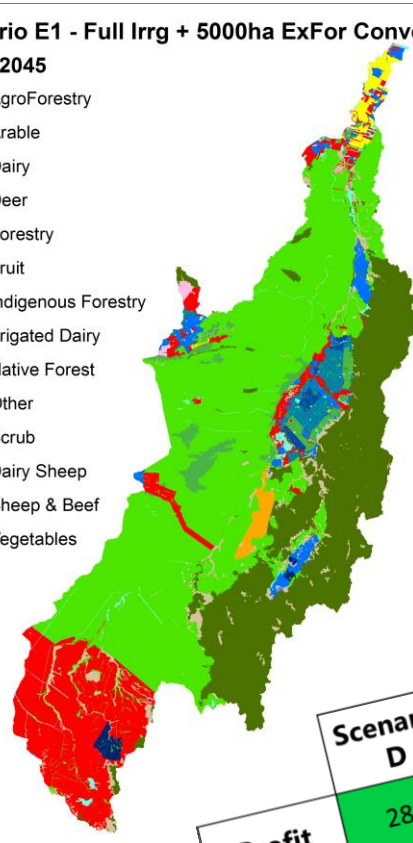
**Current Land Use Map**  
Best current version as at 2016

Arable  
Dairy  
Deer  
Forestry  
Fruit  
Native Forest  
Other  
Scrub  
Sheep & Beef  
Vegetables



**Scenario E1 - Full Irrg + 5000ha ExFor Convert**  
Out to 2045

AgroForestry  
Arable  
Dairy  
Deer  
Forestry  
Fruit  
Indigenous Forestry  
Irrigated Dairy  
Native Forest  
Other  
Scrub  
Dairy Sheep  
Sheep & Beef  
Vegetables



# Analysis



## ~ Rangitaiki ~

- LU scenarios
- Agent-based modelling
- ES assessment

Scenarios		D	E1	WN, LS	NN,NS	SN, NS
Air quality reg: pollen		↑↑↑	↑↑↑	↑	↑	↑
Climate reg		↓↓	↓↓	↑	↑	↑
Water reg: flow			↑↑↑	↑		↑
Erosion control		—	↓	↑	↑	↑
Water purification & waste treatment	N	↓	↓↓	—	↓	↓
	p	—	—	↑↑	↑	↑
Biological control						
Disease regulation		↑↑	↑↑	↑↑↑	↑↑↑	↑↑↑
Pollination						
Natural hazard reg						

	Scenario D	Scenario E1	Weak network Low succession	Normal network Normal succession	Strong network Normal succession
Profit	28%	30.5%	14.7%	18.4%	20.9%
Net GHG Emissions	-5.8%	-10.4%	8.5%	8.9%	8.8%
N Leaching	2.7%	7.4%	-0.9%	7.6%	9.8%
P Loss	1.0%	0.9%	-24.7%	-13.3%	-10.1%
Sediment	0.7%	1.2%	-6.1%	-5.9%	-6.1%
E.coli	-13.7%	-13.4%	-29%	-30%	-27%
Labour*	~182%	~186%	~49%	~46%	~51%



# Example Analysis

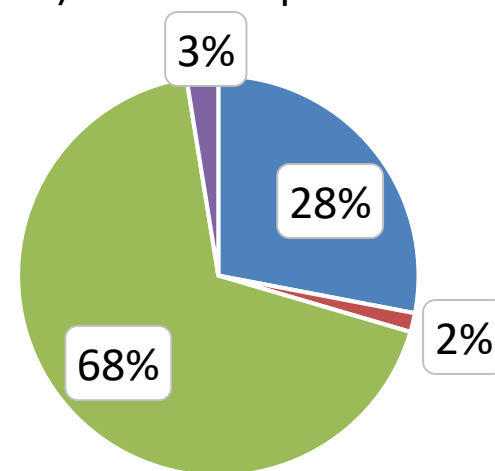
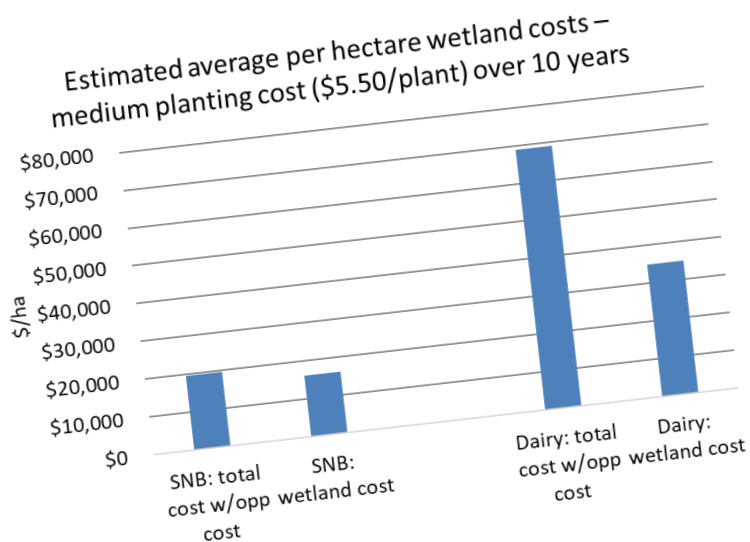
## ~ Mangapiko ~

- Options
- Cost-benefit analysis
- ES assessment

Wetland location	area (hectares)
SNB	1.6
Dairy	8.3
<b>Total</b>	<b>9.9</b>



Breakdown of wetland establishment costs (yr 1) - medium plant cost



■ Plants ■ pre spot ■ Fence ■ Release

# What are the hard bits?

- Building trust
- Language & communication
- Meaningfully understanding cultural values
- Getting the balance right in options/scenarios
- Choice of indicators & availability of knowledge
- Use in decision-making
- Achieving on-the-ground impact

		Ecosystem service												
		Global Climate	Regional Climate	Water Supply and Flow	Erosion Control	Water Purification	Waste Treatment	Disease Mitigation	Pollution	Habitat Provision	Nutrient Cycling	Soil Formation	Primary Production	Water Cycling
Forest	Indigenous Forest	6	16	16	12	16	0	3	0	16	16	1	16	5
	Deciduous Hardwoods	0	0	1	1	0	0	0	0	0	2	0	0	0
	Exotic Forest	12	12	16	16	16	0	2	0	12	16	1	14	10
	Mangro/Kanuka/Kanuka	2	1	3	3	1	1	0	0	3	6	0	1	1
Shrubland	Forestland	0	0	0	0	0	0	0	0	0	1	0	0	0
	Wetland	1	0	1	1	0	0	0	0	0	3	0	0	0
	Sub-alpine Shrubland	0	1	1	0	1	0	0	0	0	2	0	0	0
	Mixed Exotic Shrubland	0	1	0	0	1	0	0	1	1	0	0	1	0
Land Cover	Grass and/or Sown	1	0	0	0	0	0	1	0	0	1	0	0	1
	Fieldland	0	0	0	0	0	0	0	0	1	0	0	0	0
	Tall Tussock wetland	1	7	17	1	15	0	0	0	7	16	1	6	0
	Low Prod. Grassland	2	1	4	1	3	0	0	0	4	9	1	4	1
Crop/land	Exotic Grassland	17	17	41	17	35	1	5	1	17	13	1	13	10
	Short rotation Crops	4	1	7	4	3	0	0	0	0	12	2	3	2
	Perennial Crops	0	1	1	0	1	1	2	0	0	0	0	0	0
	Urban Parkland	0	0	0	1	0	0	0	1	0	1	0	0	0
Artificial surface	Built Up Area (Urban)	0	3	3	1	3	0	3	0	3	1	0	0	0
	Surface Mine	0	0	0	0	0	0	0	0	0	0	0	0	0



# Some take homes



## Process

- Social capital is key
- Clear messaging throughout the process
- Usefulness of building up the modelling to tell the story with the group
- Maintain process flexibility to ensure meets your & participant needs
- People want to be engaged and are open to sharing knowledge and their experiences



## Research

- A process can give you the mandate to engage differently with other groups

## Impacts

- Ecosystem service approaches enable us to identify the key benefits and where they lie
- Best results are often local (farm or location specific)
- A good lunch goes a long way!

