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Stakeholder preferences for native wildlife and invasive feral predator management in Dryandra Woodland

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Acknowledgement

Supervisors

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Dr. Marit Kragt (UWA)

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Common fox and feral cat management strategies

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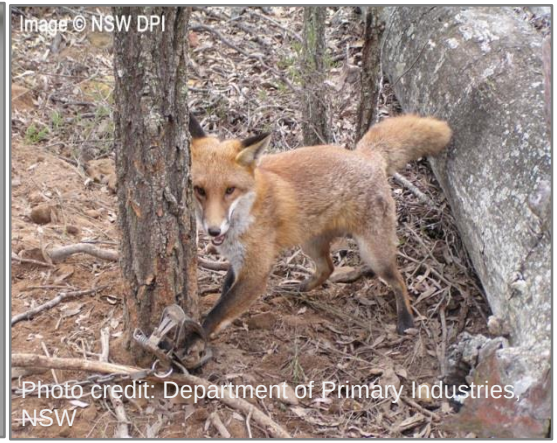
Lethal baiting (with1080)

Fox bait

Trapping



Fox caught in a padded leg-hold trap

Predator-exclusion fencing

Fencing along the Perup Nature Reserve, WA

Research context

People have preferences for conservation outcomes and also the means of achieving them

Socio-economics in conservation decision-making helps assess socially-optimal conservation policies

Limited research on benefit-cost analysis of invasive feral predator management

Research Objectives

1. Determine stakeholder preferences for various strategies to manage fox and feral cat populations at a conservation site in southwest WA

2. Quantify the non-market benefits of two threatened species– Numbats and Woylies, at the site

Research Methodology

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Discrete choice experiment (DCE) technique

In Collaboration with the WA Department of Biodiversity, Conservation and Attractions (DBCA)

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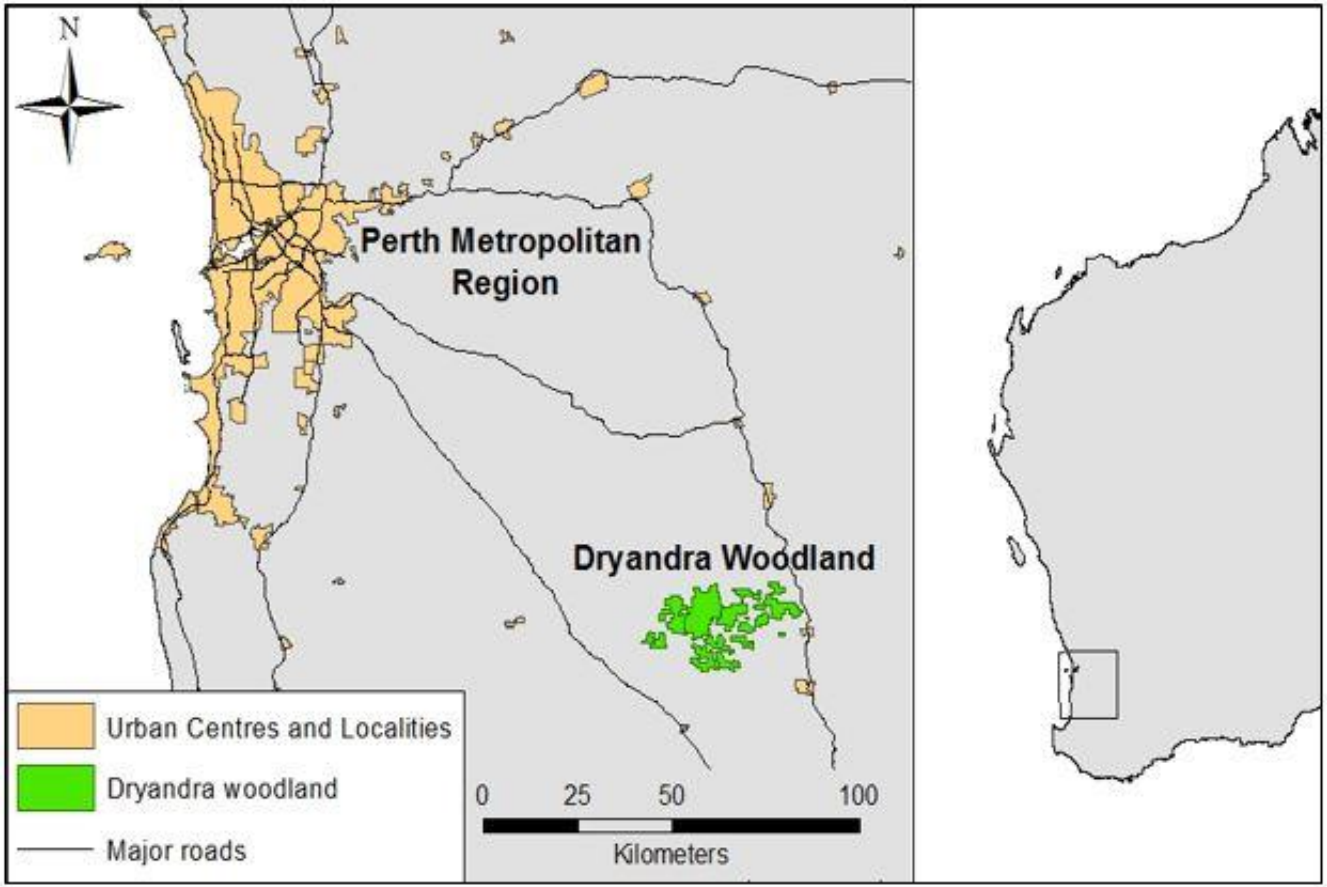
Department of **Biodiversity, Conservation and Attractions**

PARKS AND WILDLIFE SERVICE

Case study area– Dryandra Woodland



Location of Dryandra Woodland relative to Perth and WA

Dryandra Woodland

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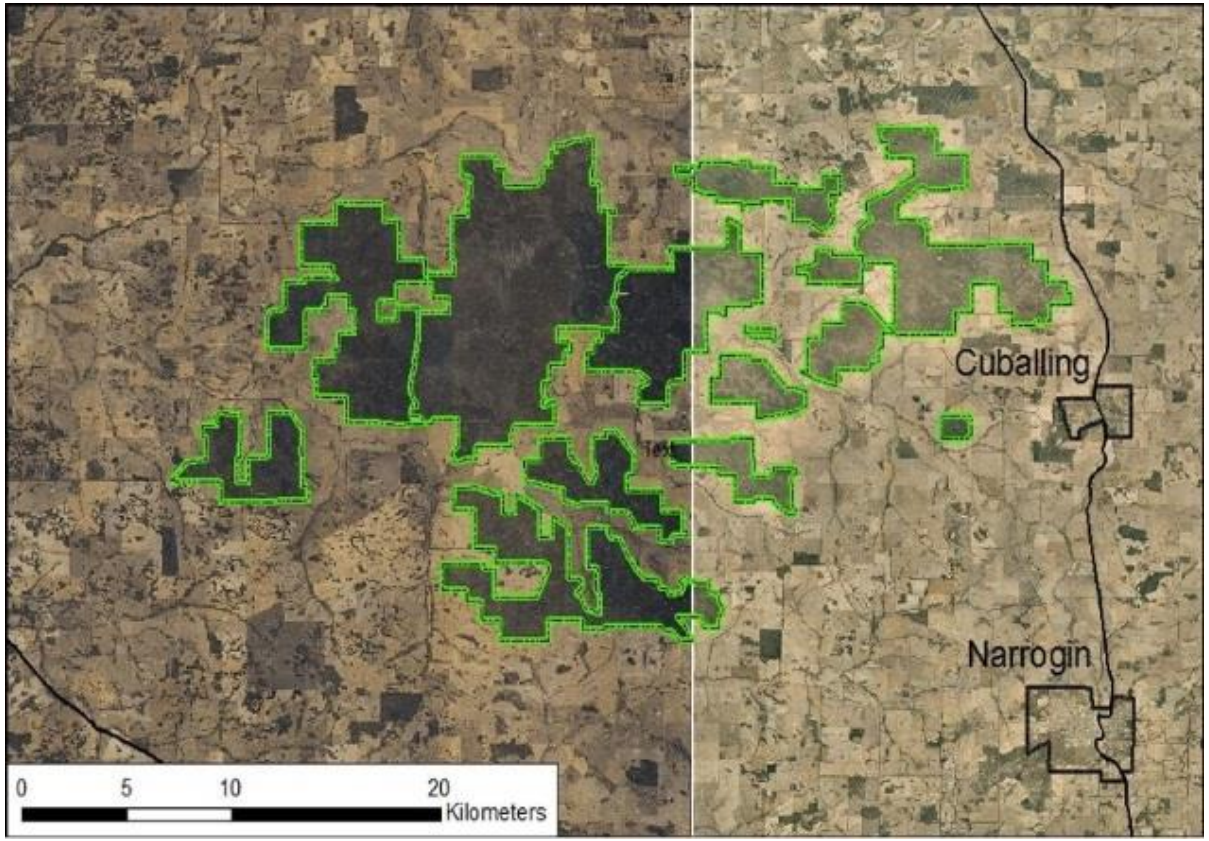

Important conservation site

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Numbat

Status: *Endangered*

Population in Dryandra Woodland: 80

Woylie

Status: *Critically Endangered*

Population in Dryandra Woodland: 2,000

Discrete Choice Experiment (DCE)

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Respondents presented with several choice sets

Each set has two or more alternatives

Each alternative includes several characteristics called *attributes* of the policy/good

Respondents select their preferred alternative implicitly indicating their tradeoffs

DCEs analysed using various statistical models

Attributes in the DCE

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Attribute	Description	Levels
Management strategy	Strategy to manage foxes and feral cats in Dryandra Woodland	1080 baiting (primary status quo strategy), Trapping, Fencing, Community engagement + combinations of the above (15 levels in total)
Numbat	Numbat population in 5 years' time in Dryandra Woodland	100 (status quo), 250, 400
Woylie	Woylie population in 5 years' time in Dryandra Woodland	2500 (status quo), 5000, 7500
Cost	Annual cost to WA households each year for the next 5 years	$0 - $400

	Option A (Primary management strategy)	Option B	Option C	Option D
Management strategy	1080 baiting	1080 baiting + Trapping	Fencing + Trapping + Community Engagement	Fencing
Numbat population in 5 years' time	100	100	250	400
Woylie population in 5 years' time	2,500	2,500	2,500	7,500
Annual cost to your household each year for the next 5 years	$0/year	$50/year	$400/year	$150/year
Which ONE of the four options would you choose?	o	o	o	o

Survey administration

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Four respondent samples

- General Public of WA
- Conservation Experts
- Direct Landholders
- Surrounding Community

Surveyed between December 2016 and May 2017

Survey mode: Online and in-person using tablets

Survey administration

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General Public of WA: Completed responses= 500

Conservation Experts: Completed responses= 58

Direct Landholders: Completed responses= 22

Surrounding Community: Completed responses= 117

Sample

Characteristic	General public of WA (n =500)	Conservation Experts (n =58)	Direct landholders (n =22)	Surrounding Community (n=117)
Gender: Female	49%	36%	14%	69%
Average age (years)	46.3	47.5	55.6	50.5
Average income (AU$/yr)	79,889	141,081	91,181	85,682
Undergraduate degree or higher	27%	95%	23%	23%
Member of conservation organization	29%	71%	27%	37%
Involvement in fox and/or feral cat management	16%	86%	91%	21%

Latent class models

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All four stakeholder samples analysed together

Models reveal different "*preference classes*" or segments of people with similar preferences

Four distinct preference classes revealed

Latent class model results

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Preference Class 1: “**Combined Management class**”

Largest class: 48% in size

Includes 65% of the experts and 43-59% of each of the public samples

Members preferred a combination of management strategies

Latent class model results

Three other equal-sized classes (17 - 18% in size each)

Class 2: **“Status Quo” -** members care only about cost and prefer the zero cost status quo option

Class 3: **“No 1080” -** members significantly averse to1080 baiting

Class 4: **“No management preference” -** members have no particular pattern of preferences for management strategies

Class Membership

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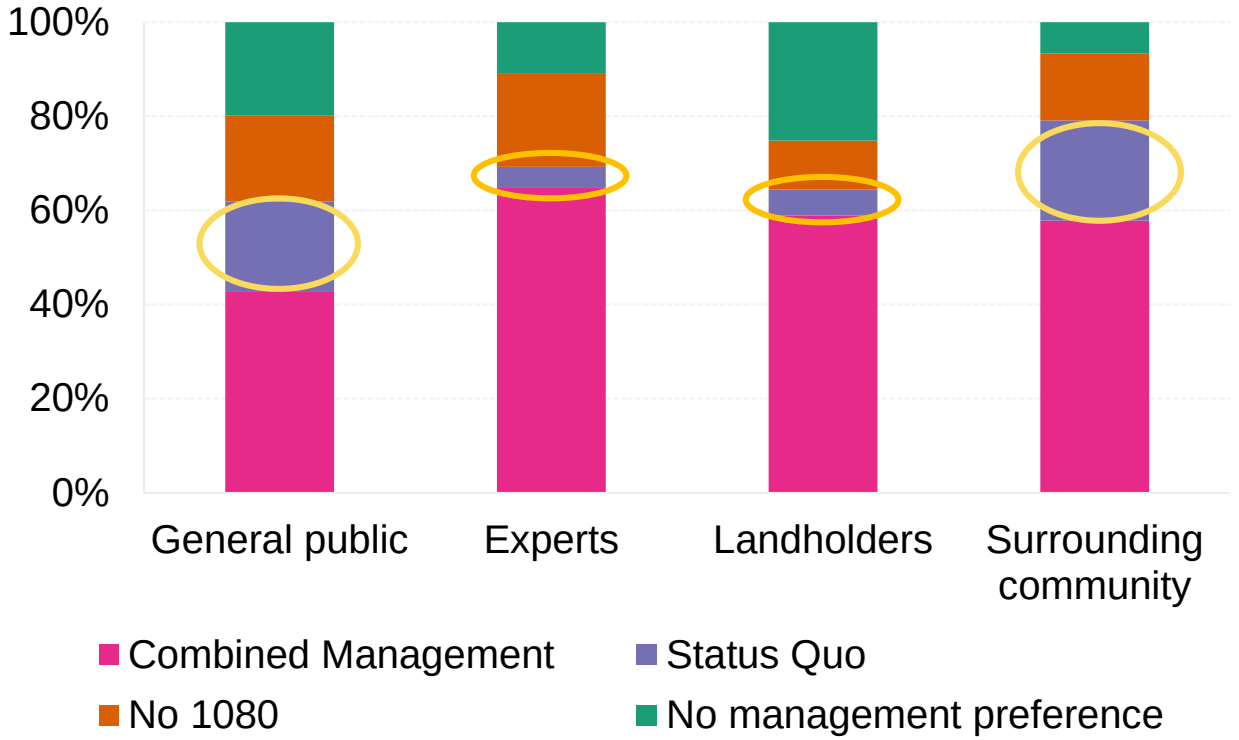
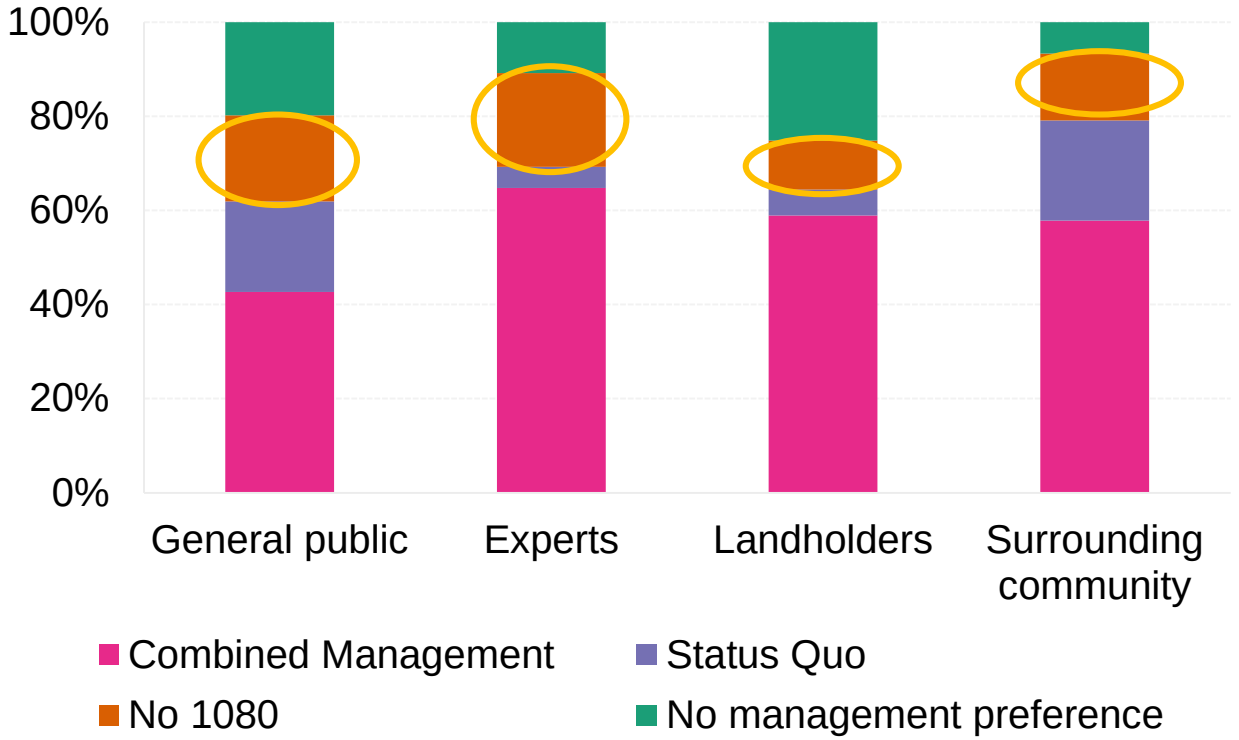


Class Membership



Willingness to pay* per Numbat and Woylie

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Species	Population Increase	Combined Management	No 1080	No management preference
Numbats	100 to 250	$0.40	$2.38	$0.26
	250 to 400	$0.23	$0.89	$0.03

* in AUD/household/year

Willingness to pay* per Numbat and Woylie

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Species	Population Increase	Combined Management	No 1080	No management preference
Numbats	100 to 250	$0.40	$2.38	$0.26
	250 to 400	$0.23	$0.89	$0.03
Woylies	2,500 to 5,000	$0.04	$0.18	$0.004
	5,000 to 7,500	-$0.06	$0.07	$0.002

* in AUD/household/year

Strategy	Combined management	No 1080	No management preference
FENCE	.	$985	.
CE	.	$890	.
TR	.	$390	.
FE+CE	.	$1145	.
TR+CE	$50	$890	.
FE+TR	$55	$665	.
1080+FE	.	.	$35
1080+FE+CE	$175	.	$35
1080+TR+CE	$120	.	.
1080+FE+TR	$115	.	.
FE+TR+CE	.	$1000	$30
1080+FE+TR+CE	$155	.	.

Willingness to pay in AUD/ household/ year

Key Results

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Overlap and divergence in preferences between stakeholder samples

Most prefer using a combination of strategies to manage fox and feral cat populations

Key Results

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Most prefer increasing Numbat and Woylie populations (except those in "**Status Quo**" class)

Values for Numbats and Woylies ($/individual animal) decrease as total population numbers increase (diminishing marginal utility)

Numbats valued more highly than Woylies

Next step – Benefit-cost analysis (BCA)

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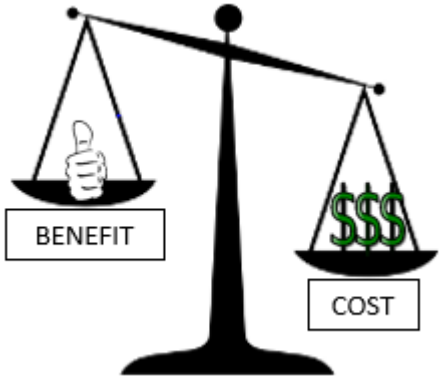
Widely-used economic decision support tool

Compares costs of policies and their financial and non- financial (social, environmental) benefits to determine beneficial outcomes



In this project: BCA to determine socio-economically optimal fox and feral cat management strategies in Dryandra Woodland

Thank you!

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Ecological Economics

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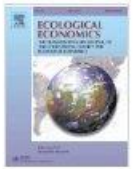

To Bait or Not to Bait: A Discrete Choice Experiment on Public Preferences for Native Wildlife and Conservation Management in Western Australia

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