

BE WHAT YOU WANT TO BE

Assessing national values to protect the health of the Great Barrier Reef

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Background

- Large project valuing environmental protection of the Great Barrier Reef (GBR)
- Funded through the Environmental Economics Research Hub under the Commonwealth Environment Research Facility.
 - A range of different issues have been explored using choice experiments
 - In this paper the public values for improvements in the health of the GBR are assessed across different Australian populations.
 - The extent of distance decay is examined









Do public values for improving the health of the GBR decline with distance?

- Why should they?
 - ✓ further away – the less it is used
 - ✓ further away – more substitutes
 - ✓ further away – less feeling of responsibility or connectedness
 - ✓ further away – less knowledge and awareness
- Choice Modelling experiments
 - ✓ 1919 surveys
 - ✓ 2 survey formats
 - ✓ 6 population samples
 - Townsville (local GBR)
 - Brisbane – distant state capital
 - Sydney, Melbourne, Adelaide, Perth (increasing distance, out of state)



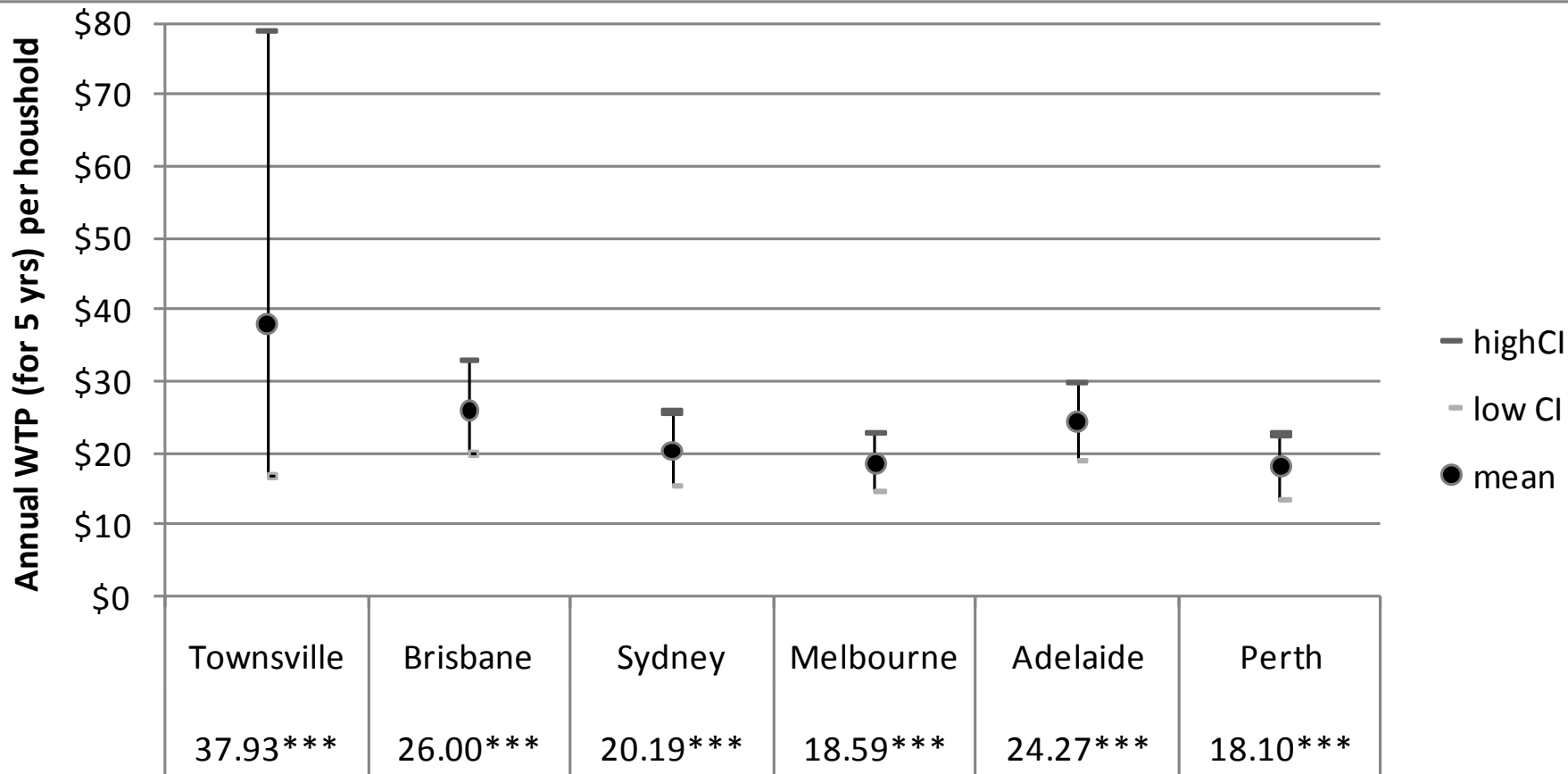
Choice sets – single GBR attribute

Whole GBR					
	Management  Option for particular focus	Amount of GBR in good condition  Current condition: 90% in good condition (311,000 sq km) Condition in 25 years time	Will it happen?  Level of certainty	Cost  How much you pay each year (5 years)	Your choice  Select one option only
<i>Option A</i>	Current trends	65% in good condition (225,000 sq km)	80%	\$0	<input type="checkbox"/>
<i>Option B</i>	Improve water quality	68% (235,000 sq km) = 3% improvement	60%	\$100	<input type="checkbox"/>
<i>Option C</i>	Increase conservation zones	66% (228,000 sq km) = 1% improvement	75%	\$50	<input type="checkbox"/>
<i>Option D</i>	Reduce greenhouse gases*	85% (294,000 sq km) = 20% improvement	40%	\$100	<input type="checkbox"/>

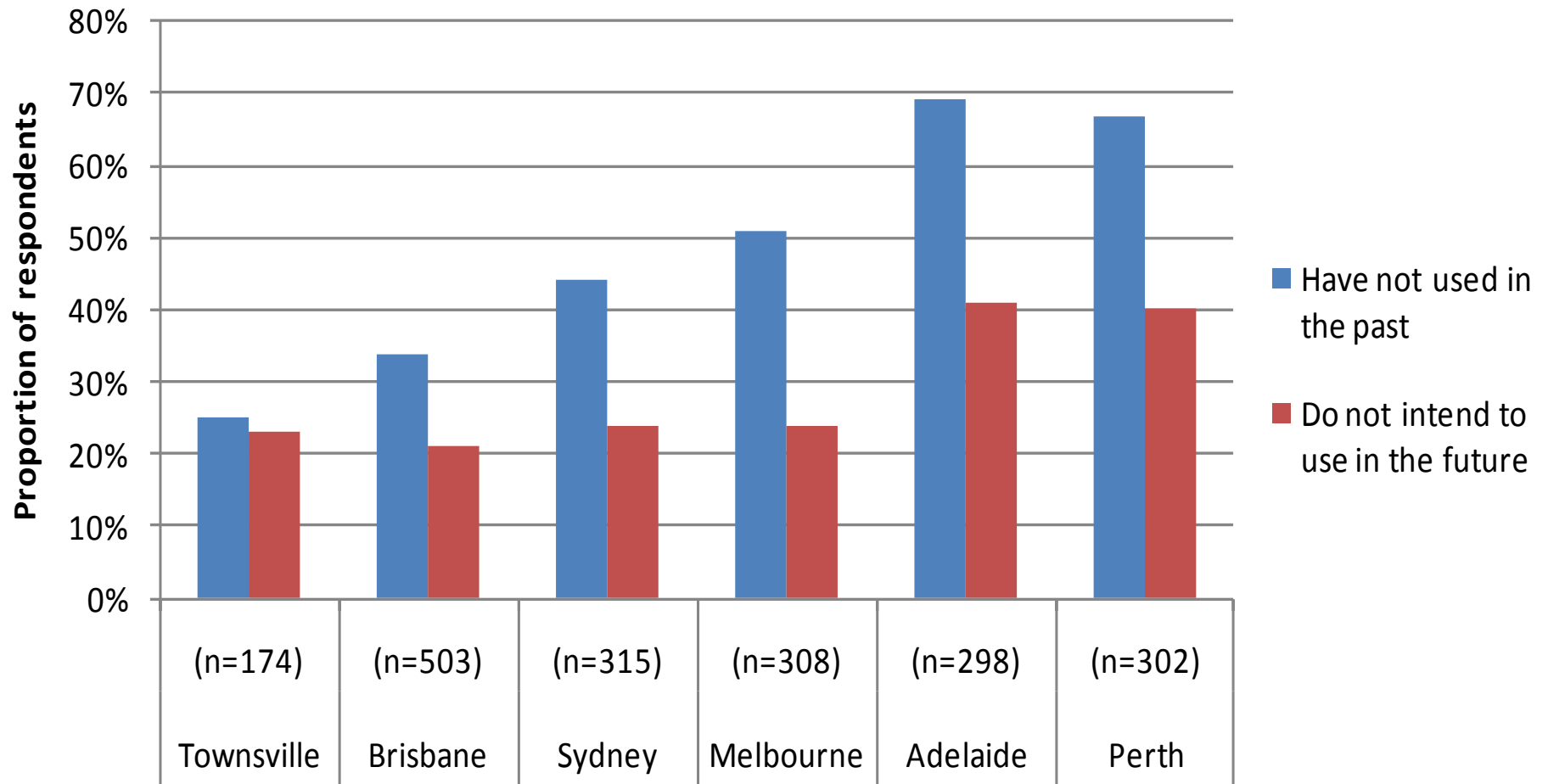
Mixed logit models

	Townsville	Brisbane	Sydney	Melbourne	Adelaide	Perth
<i>Random parameters in utility functions</i>						
WQ_ASC	-9.69***	-3.74***	-1.17	0.62	-3.22**	-1.78
CZ_ASC	-10.41***	-3.73***	-0.94	1.47	-3.25**	-1.65
GG_ASC	-12.62***	-5.92***	-2.01*	-0.84	-4.70***	-2.78*
<i>Derived standard deviations of parameter distributions</i>						
WQ_ASC	2.89***	2.19***	1.95***	2.42***	2.27***	2.21***
CZ_ASC	3.95***	2.28***	1.58***	2.25***	1.92***	2.02***
GG_ASC	5.25***	3.15***	2.78***	4.04***	3.39***	3.13***
<i>Non Random parameters in utility functions</i>						
COST	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
GBR CONDITION	0.19***	0.16***	0.13***	0.18***	0.18***	0.14***
CERTAINTY	0.01	0.02***	0.01**	0.02***	0.02***	0.02***
<i>Non random parameters in utility function of the No Control (Status Quo) option</i>						
AGE	-0.07***	-0.01	0.01	0.01	-0.01	-0.01
GENDER	-0.35	-0.52*	0.28	1.10***	-0.60*	0.54*
CHILDREN	-1.68**	-0.38*	-0.04	0.36	0.56	-0.08
EDUCATION	-0.72***	-0.33***	-0.14	-0.29*	-0.78***	-0.41***
INCOME	-0.1-E05	-0.1-E05***	-0.1-E05***	-0.1-E06	-0.1-E05***	-0.1-E05**
Model statistics						
Observations	522	1500	954	924	888	906
Log L	-487	-1580	-1059	-910	-914	-956
AIC	1.92	2.12	2.25	2.00	2.09	2.14
McFadden R-sqrd	0.33	0.24	0.20	0.29	0.26	0.24
Chi Sqrd	473	999	528	741	635	599

WTP estimates for a 1% improvement in GBR condition



Proportion of past and future “non-users” of the GBR



Single attribute WTP estimates for user and non-users groups across locations

	Townsville	Brisbane	Sydney	Melbourne	Adelaide	Perth
All respondents						
No of observations	522	1500	954	924	888	906
WTP_GBR CONDITN	\$37.93***	\$26.00***	\$20.19***	\$18.59***	\$24.27***	\$18.10***
Current users						
No of observations	378	534	102	90	66	84
WTP_GBR CONDITN	\$32.09***	\$18.29***	ns	ns	\$17.26*	ns
Future users						
No of observations	396	1182	738	684	564	528
WTP_GBR CONDITN	\$35.18***	\$24.87***	\$20.46***	\$15.95***	\$27.25***	\$19.31***
Non users						
No of observations	54	120	126	180	240	288
WTP_GBR CONDITN	ns	\$46.49**	\$16.04***	\$21.29***	\$16.14***	\$12.14***
Proportion: current/all						
WTP	0.85	0.70	-	-	0.71	-
Proportion: future/all WTP						
WTP	0.93	0.96	1.01	0.86	1.12	1.07
Proportion: non user/all						
WTP	-	1.79	0.79	1.15	0.67	0.67

RPL Pooled model



Random parameters in utility functions

WQ_ASC	-4.243***
CZ_ASC	-4.076***
GG_ASC	-5.543***

Derived SD of parameter distributions

WQ_ASC	2.234***
CZ_ASC	2.105***
GG_ASC	3.446***

Non-random parameters in utility functions

COST	-0.007***
GBR CONDITION	0.158***
CERTAINTY	0.019***

Non random parameters in utility function (w SQ option)

AGE	-0.006
GENDER	-0.057
CHILDREN	-0.026
EDUCATION	-0.349***
INCOME	-6.0-E06***
QUEENSLAND	-0.583***
FUTURE USE	-0.268***
LOGDISTANCE	-0.179***

Model statistics

Observations	5724
Log L	-5947
AIC	2.10
McFadden R-sqrd	0.24
Chi Sqrd	3842

Multiple attribute survey

Whole GBR



Area of coral reef in good health



18,000 sq km
90%

No. of fish species in good health



1,350 species
90%

Area of seagrass in good health



40,000 sq km
90%

Cost



How much you pay each year (5 years)

I would choose



Select the option you MOST prefer

Condition Now

Condition in 25 years time

	Area of coral reef in good health	No. of fish species in good health	Area of seagrass in good health	Cost	I would choose
<i>Option A</i>	13,000 sq km 65%	975 species 65%	28,000 sq km 65%	\$0	<input type="checkbox"/>
<i>Option B</i>	14,000 sq km 70%	1,050 species 70%	35,000 sq km 80%	\$500	<input type="checkbox"/>
<i>Option C</i>	17,000 sq km 85%	1,050 species 70%	31,000 sq km 70%	\$50	<input type="checkbox"/>
<i>Option D</i>	14,000 sq km 70%	1,275 species 85%	31,000 sq km 70%	\$100	<input type="checkbox"/>

WTP values for a 1% improvement across survey formats

	Single attribute format	Aggregated multiple attribute format
Townsville	\$37.93	\$38.54
Brisbane	\$26.00	\$26.53
Sydney	\$20.19	\$25.85
Melbourne	\$18.59	\$32.32
Adelaide	\$24.27	\$33.62
Perth	\$18.10	\$32.01

Summary

Reasons why values may decline

1. further away – the less it is used
2. further away – more substitutes
3. further away – less knowledge and awareness
4. further away – less feeling of responsibility or connectedness

1. Direct use explains some variation in WTP - higher in Qld
 - Use values did not decline linearly as a function of distance
 - Values of future users were more important - less differences in population compared with current and past use
2. The GBR is unique and iconic - there are no realistic substitutes,
3. There is widespread knowledge and awareness of its condition.
4. Evidence of higher level of connectedness in the home state

Conclusions

- Distance-decay effects appear to be limited for iconic resources
- This means the relevant population base is larger when iconic resources are involved
- Higher values were associated with potential for future use, suggesting option values are an important driver
- No evidence of a different pattern for non-use values
- Disaggregating an environmental good into key attributes alters the range of potential substitutes and may confound the effects of distance decay