

Valuing Wetland Ecosystems

Dan Marsh
University of Waikato
Department of Economics

dmarsh@waikato.ac.nz
Presented at
2010 National Wetlands Symposium
5 March 2010




What Do We Mean by Value?

We = Economists

- Value
 - "... the worth of something to its owner; either value in use, or value in exchange" (Barnock et al., 1992).
 - Environmental Economists extend the meaning of value to include 'non-use values'.
- Non-use values can include:-
 - Environmental, social, cultural, spiritual, ancestral **and anything else that people value**
- **Economic** Value is determined by people
 - value is determined by peoples' willingness to make trade-offs.
 - When we spend money (or other resources) on one good, there is less available for other goods. Choices have to be made
- Criticisms
 - Some people dislike the economic notion of value
 - it looks too much like buying goods in the supermarket



"saying that economic value should not count is the same as saying people's preferences should not count.

That is undemocratic and, indeed the main defence of economic valuation is that it embodies a 'democratic presumption'.

What the critics are really saying is that some elite (usually themselves!) possesses the right values and only they should decide what happens to environmental assets"

(Pearce, 2006)




What is the Value of a Wetland?

Why do you want to know?
Value for what?
Value to who?


Ecosystem Services Approach

- How much would it cost to duplicate or replace ecosystem services provided by a wetland? For example:-
 - Flood water storage
 - Game bird hunting
 - Carbon sequestration
 - Removal of nitrogen



Should you value "the whole wetland"?

- Total Value
 - Most relevant if we may completely lose a wetland
- Usually we are interested in **changes**
 - What would be the loss in value if the quality (or size) of the wetland was reduced from condition **a** to condition **b**?
 - Or improved from **b** to **a**



How would an environmental economist tackle some 'typical' wetland valuation issues



What is the value of a wetland 'in the way of' a proposed new road?

- By how much will society be worse off if the wetland is impacted by the road?
- Is this greater than or less than
 - the benefits of the new road
 - Or the extra cost of a road alignment that does not go through the wetland.
- Will winners compensate losers?



Are we spending enough on wetland restoration?

- Non market valuation work may support arguments in favour of increased spending.
 - Benefits from wetland restoration can in principle, be compared with benefits from more tangible spending e.g. roads or schools.
 - Conservation spending < 1% of gov't spending
- Needs to be part of a wider programme
 - Limited usefulness - unless valuation is part of a wider programme of valuation – perhaps to help determine spending priorities

Economic approaches to valuing environmental goods

- Revealed preference methods
 - People reveal how much they value environmental goods through their behaviour
 - e.g. the effort and \$\$s they put into a weekend shooting ducks
- Stated preference methods
 - If the wetland *a* is improved – with the following attributes - would you be willing to pay an extra \$x in rates?

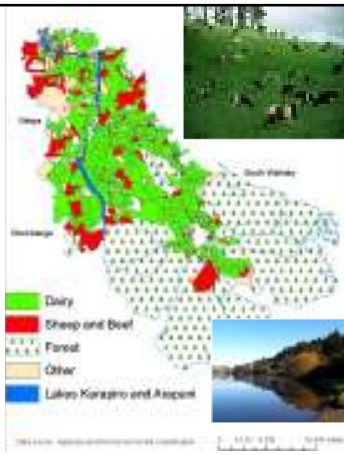
Choice Analysis

- The 'preferred' method of valuation for
 - natural resources and the environment
 - Health economics, Transport economics, Marketing
- Application of quantitative statistical methods to study choices made by individuals and groups
- For example:
 - Would people choose wetland restoration and higher regional council rates or no improvement and no change in rates?



Karapiro Arapuni Catchment

	No of Properties	% of Area
Forestry	6	48
Dairy	370	34
Sheep/ Beef & Drystock	199	13
Lifestyle, bush, deer etc		5



Survey progress

Choice set 1

Please think about the options presented below and select your most preferred choice, followed by the 2nd and 3rd choices.

	Future Situation (within 10 years) <i>Do Nothing</i>	Alternative Option 1	Alternative Option 2
Suitability for Swimming and Recreation:	80% chance of health savings (1 in 2 years)	10% chance of health savings (1 in 10 years)	10% chance of health savings (1 in 10 years)
Water Clarity:	up to 2 metres	1.5 metres	2 metres
Biological Health % Excellent:	less than 40% and excellent	More than 80% and excellent	90% and excellent
Number of jobs in dairying and related industries:	They about the same	Reduce by 70 (30%)	Reduce by 18 (8%)
Cost to you (\$ per year for the next 10 years):	0	0	100

Buttons: [Fast] [Slow] [Next] [Back] [Quit]

Annual WTP per Household

Simulated marginal WTP estimates using SM package in R (EC Mode)

Attribute		1st Quartile	Median	Mean	3rd Quartile
Suitability for Swimming <i>(Probability of algal bloom)</i>	SWIM20***	8	28	39	52
	SWIM10***	44	141	190	260
	SWIM2***	32	102	141	191
Water Clarity <i>You can usually see for ...m Underwater</i>	CLAR1.5				
	CLAR2				
	CLAR4***	18	58	82	110
Ecological Health <i>Percentage of excellent readings</i>	ECO50***	12	37	51	69
	ECO60				
	ECO80***	32	103	136	190
Job Losses in dairying <i>% reduction</i>	JOB5***	-28	-90	-126	-169
	JOB10*	-16	-51	-67	-94
	JOB20***	-57	-177	-241	-328

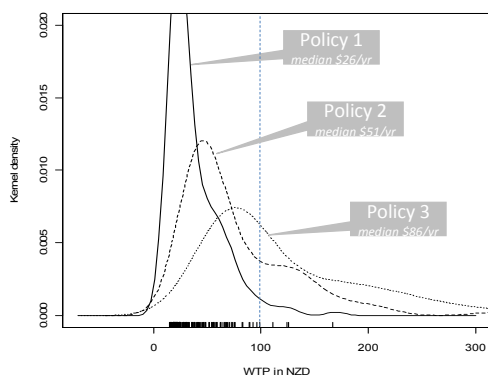
Benefit of Policies

Welfare gain for change from status quo to improved outcome (NZ\$ per household per year over 10 years)

Attribute	Status Quo	Policy 1	Policy 2	Policy 3
SWIM <i>(Chance of Algal Bloom)</i>	50%	20%	10%	2%
CLARITY (metres)	1 m	1.5 m	2 m	4 m
ECOLOGY (% excellent)	40	50	60	80
Median welfare gain <i>no job losses</i>		\$26/yr	\$51/yr	\$86/yr
mean		37	77	126

Note:-
This procedure produces estimates that are conservative. They are also lower than marginal WTP for change in single attributes because we take account of variation in taste across individuals

Median welfare gain *no job losses*



Conclusions

- Economic valuation methods seek to understand the choices that people would make if environmental services could be bought and sold 'in the market'
- Think carefully about why we want to value wetlands
 - Appropriate method depends on purpose
- Valuation methods are very contentious
 - so carefully state what has been measured and why





Waikato Management School
Te Rauapaapa

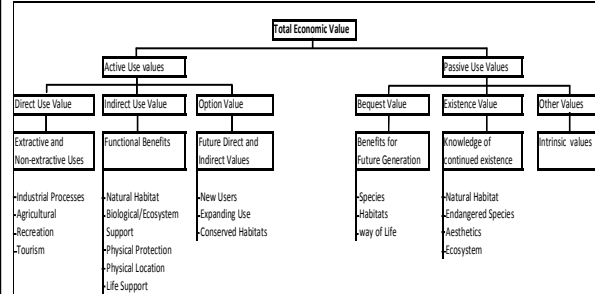
NEW ZEALAND'S
No.1
RESEARCH-LED
BUSINESS
SCHOOL

THANK YOU

ANY QUESTIONS?

Dan Marsh
Department of Economics
University of Waikato
dmarsh@waikato.ac.nz

Components of Value



What is the value of wetland improvement?

	Private	Social (e.g NZ)
Cost	<p>What did the improvements cost you?</p> <p><i>Direct cost to land owner</i></p>	<p>What did they cost 'everyone'?</p> <p><i>Include costs faced by others e.g. taxpayers if subsidised</i></p>
Value (or Benefit)	<p>By how much is the wetland owner better off?</p> <p><i>'Better off' does not have to be in money</i></p>	<p>By how much is society better off?</p>



Government Spending on Conservation

- Should we be spending more (or less)?
- 2008/9 Approx \$\$
 - GDP \$180 billion
 - Gov't Spend \$55 bn
 - Gov't Spend on Conservation \$311 m (0.6%) (2006/7)
 - Up 80% since 1999
 - \$117 m – 'recreational opportunities'
 - \$129 m – 'management of natural heritage'



What do we spend on conservation?

Core Crown expenses year to May 2009		
Social security and welfare	17,356	31%
GSF pension expenses	620	1%
Health	11,216	20%
Education	9,744	18%
Core government services	3,037	5%
Law and order	2,755	5%
Defence	1,594	3%
Transport and communications	2,265	4%
Economic and industrial services	2,763	5%
Primary services	463	1%
Heritage, culture and recreation	943	2%
Housing and community development	253	0%
Other	112	0%
Finance costs	2,246	4%
Total core Crown expenses excluding losses	55,367	