

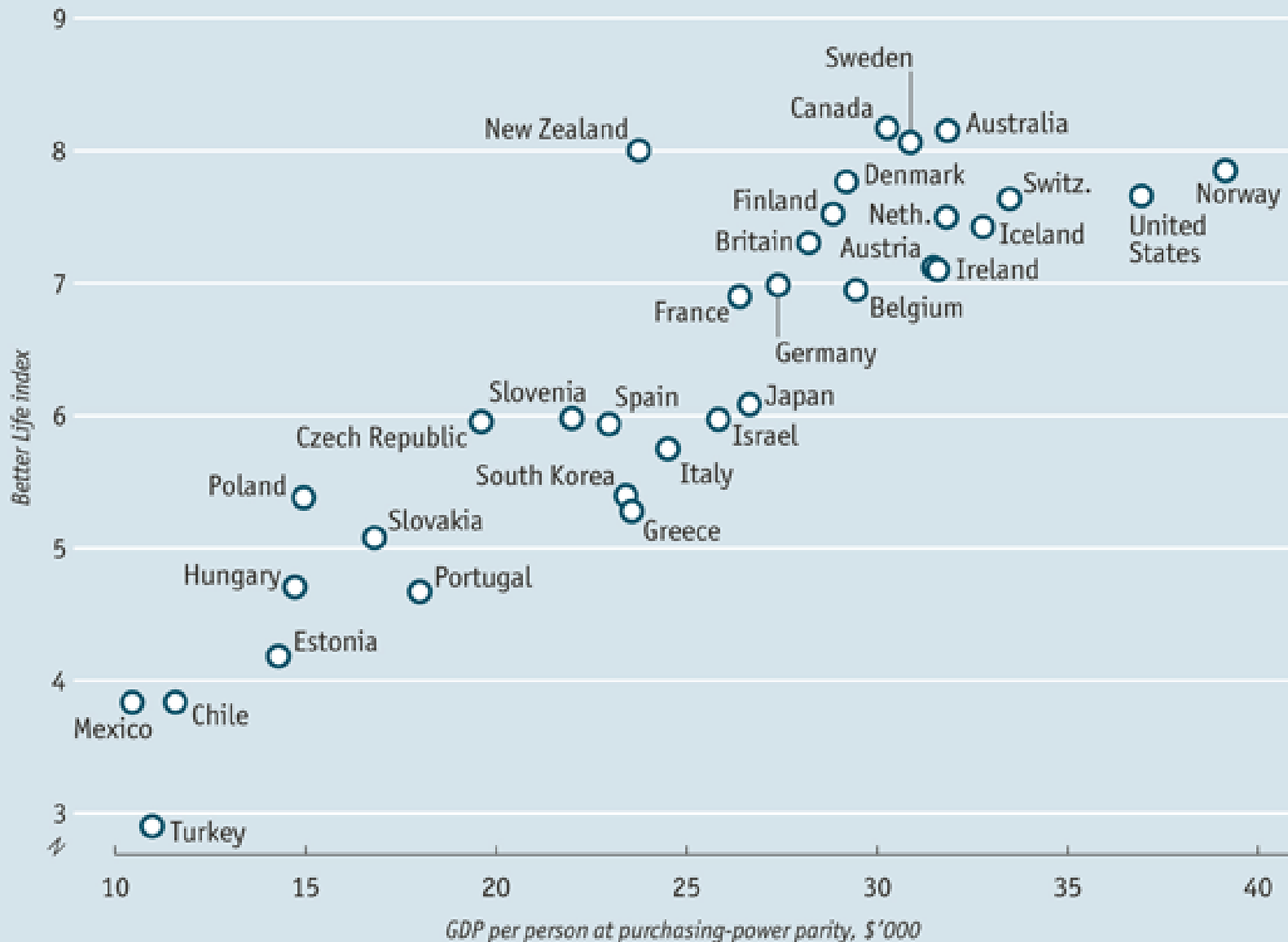
Valuing Forest Ecosystem Services

Richard Yao and Luke Barry



Well-being and wealth

OECD Better Life index (10=best) and GDP per person, 2009*



Source: OECD

*Or latest available year

Overview

- ES contribution to sustained flow of income is substantial
 - natural capital maintenance is important for a thriving ‘green’ economy
- Sound methodologies exist for valuation of most ES flows
- Demand for “valid” estimates of values
- ES valuation fills info gap and guide conservation decisions
- All ES flows make vital contributions to wealth and well-being

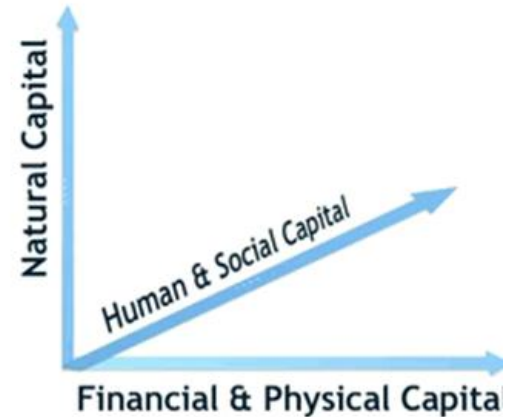


Table 22.27 Summary of UK NEA ecosystem service valuations.

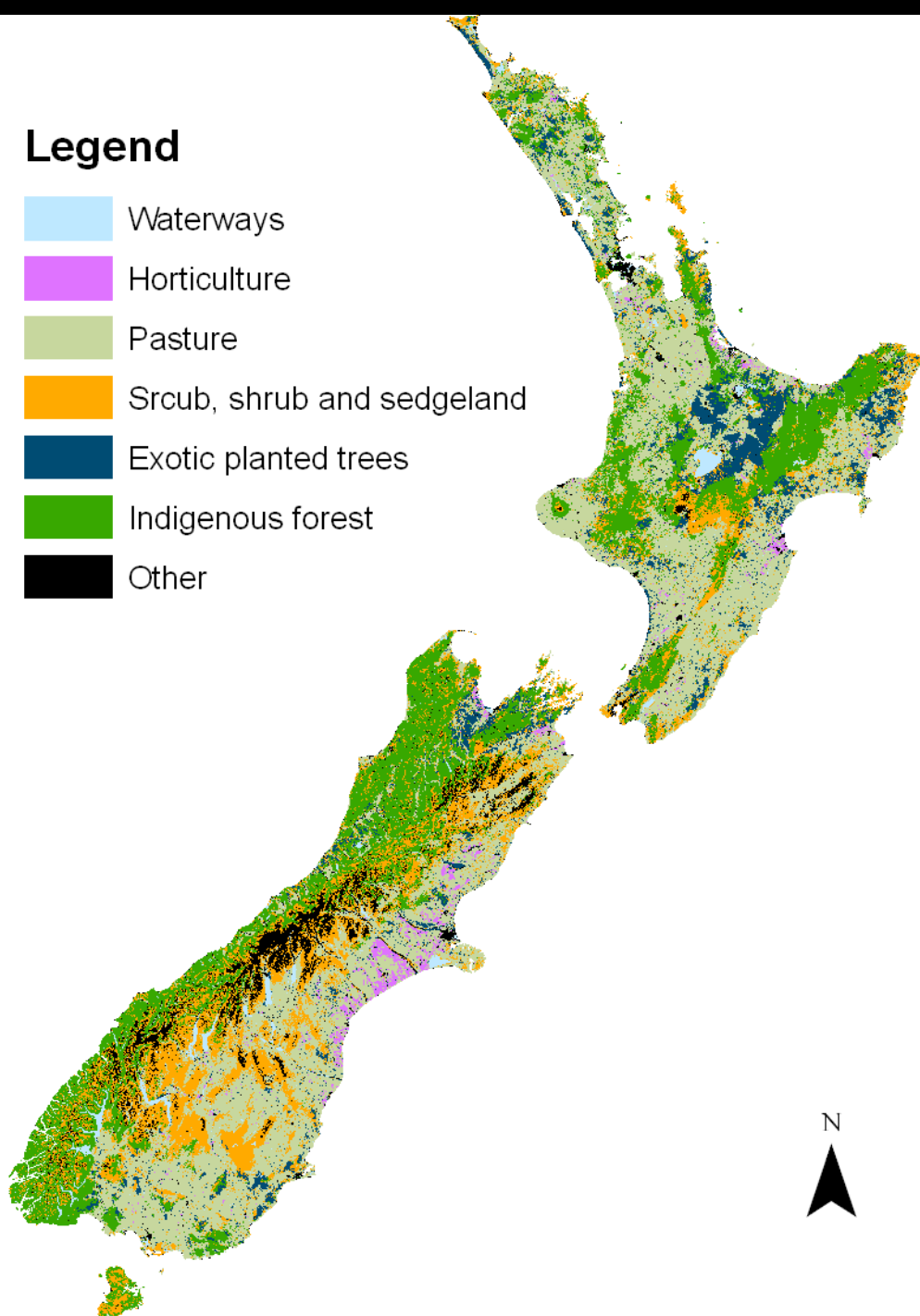
Section	Good	Valuation method*	Valuations
22.3.1.1	Marine food production	Market prices [†]	<ul style="list-style-type: none"> ■ The value of UK fish landings is around £596 million p.a., while that of aquaculture (fish and shellfish farming) is around £350 million annually. However, there is insufficient data to isolate ecosystem contribution from manufactured capital inputs.
22.3.4	Timber production	Market prices	<ul style="list-style-type: none"> ■ 8 million green tonnes p.a. @ £12/tonne = £96 million p.a. ■ Softwood production = £66/ha; hardwood production = £7 to £25/ha. No allowance made for manufactured capital inputs.
22.3.2.1	Pollination services	Production function method	<ul style="list-style-type: none"> ■ £430 million p.a.
	Maintaining genetic diversity	Production function method	<ul style="list-style-type: none"> ■ No values currently available
	Bioprospecting	Production function method	<ul style="list-style-type: none"> ■ No values currently available
22.3.3.1	Biodiversity: non-use values	Stated preference [‡]	<ul style="list-style-type: none"> ■ Terrestrial biodiversity: £540 million to £1,262 million p.a. (mid-range estimate £845 million p.a.) ■ Inland wetlands: £273 million p.a. (marginal value = £304/ha p.a.) ■ Coastal wetlands: £1,275 million p.a. (marginal value = £1,866/ha p.a.) ■ Marine biodiversity: £1,714 million p.a.
22.3.3.2	Biodiversity: non-use values	Revealed preferences (legacy values)	<ul style="list-style-type: none"> ■ £89.7 million p.a.[¶]
22.3.7	Flood protection: inland	Market priced cost savings	<ul style="list-style-type: none"> ■ Climate change induced increases in flooding costs range up to £23 billion p.a. depending upon strategy. ■ Marginal value of flood defence from wetlands = £407/ha p.a.
22.3.8	Flood protection: coastal	Stated preference	<ul style="list-style-type: none"> ■ Marginal value of coastal flood protection by wetlands £2,498/ha p.a. Total value up to £1.5 billion p.a.

Ecosystems and Ecosystem Services

<i>Ecosystem service</i>	<i>Ecosystem</i>									
	<i>Cultivated</i>	<i>Dryland</i>	<i>Forest</i>	<i>Urban</i>	<i>Inland water</i>	<i>Coastal</i>	<i>Marine</i>	<i>Polar</i>	<i>Mountain</i>	<i>Island</i>
Freshwater			•		•	•		•	•	
Food	•	•	•	•	•	•	•	•	•	•
Timber, fuel, and fiber	•		•			•				
Novel products	•	•	•		•		•			
Biodiversity regulation	•	•	•	•	•	•	•	•	•	•
Nutrient cycling	•	•	•		•	•	•			
Air quality and climate	•	•	•	•	•	•	•	•	•	•
Human health		•	•	•	•	•				
Detoxification		•	•	•	•	•	•			
Natural hazard regulation			•		•	•			•	
Cultural and amenity	•	•	•	•	•	•	•	•	•	•

Source: Millennium Ecosystem Assessment

Legend



New Zealand Land Use

Land area – 26.7 M ha

Pasture and arable (43%)

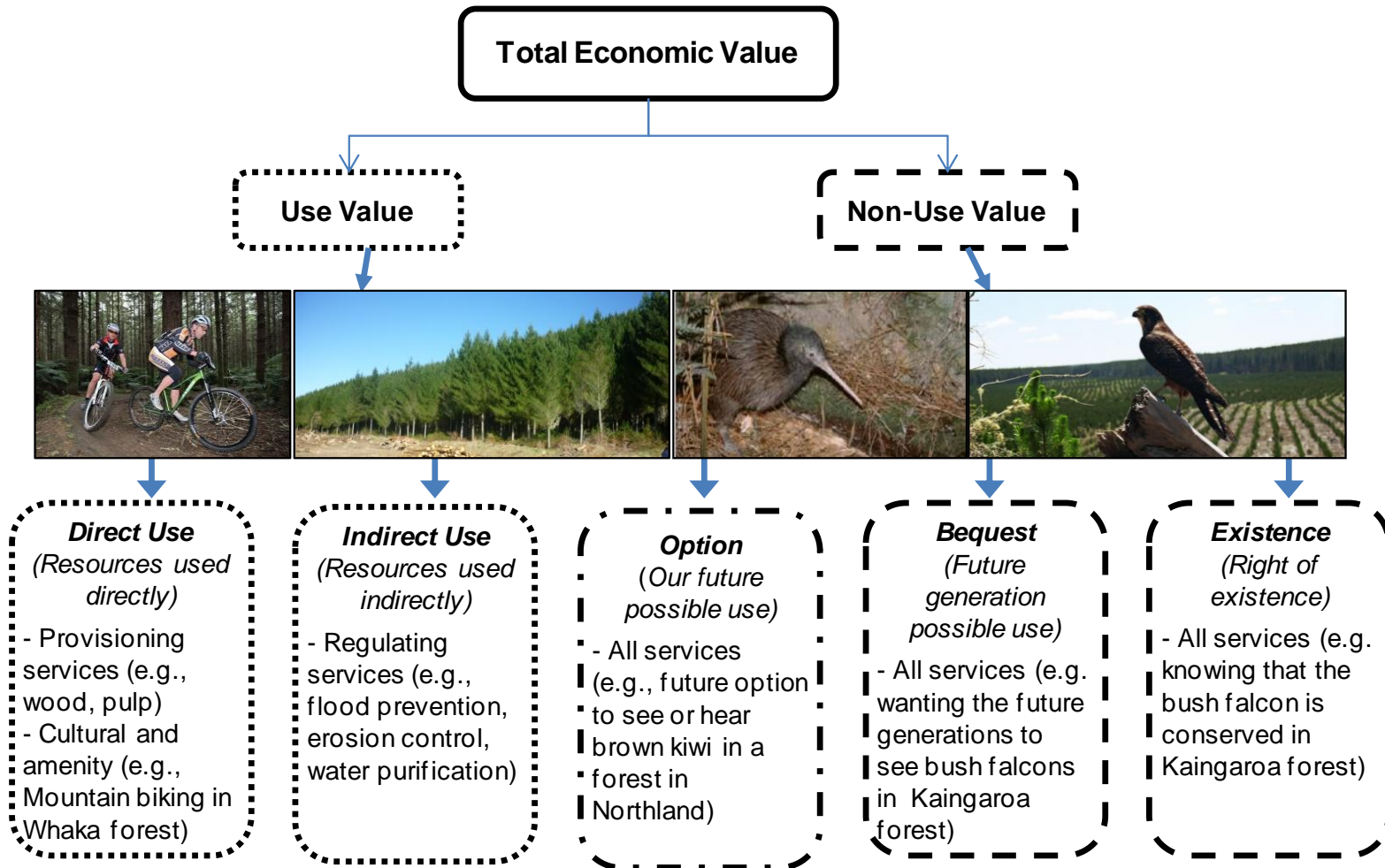
Forest (31%)

▶ Indigenous – 6.5 M ha

▶ Planted – 1.8 M ha

Others (26%)

Total Economic Value approach



An example: Valuing Recreation in Whaka Forest



Valuing Recreation in Whaka Forest

- Value cannot be derived from market prices
 - Travel cost method
 - Cost of travelling to the forest
 - Time spent in the forest
- Economic survey
 - Focus groups
 - Face to face survey of repeat users
 - Developed a survey instrument
 - 366 walkers and 340 mountain bikers

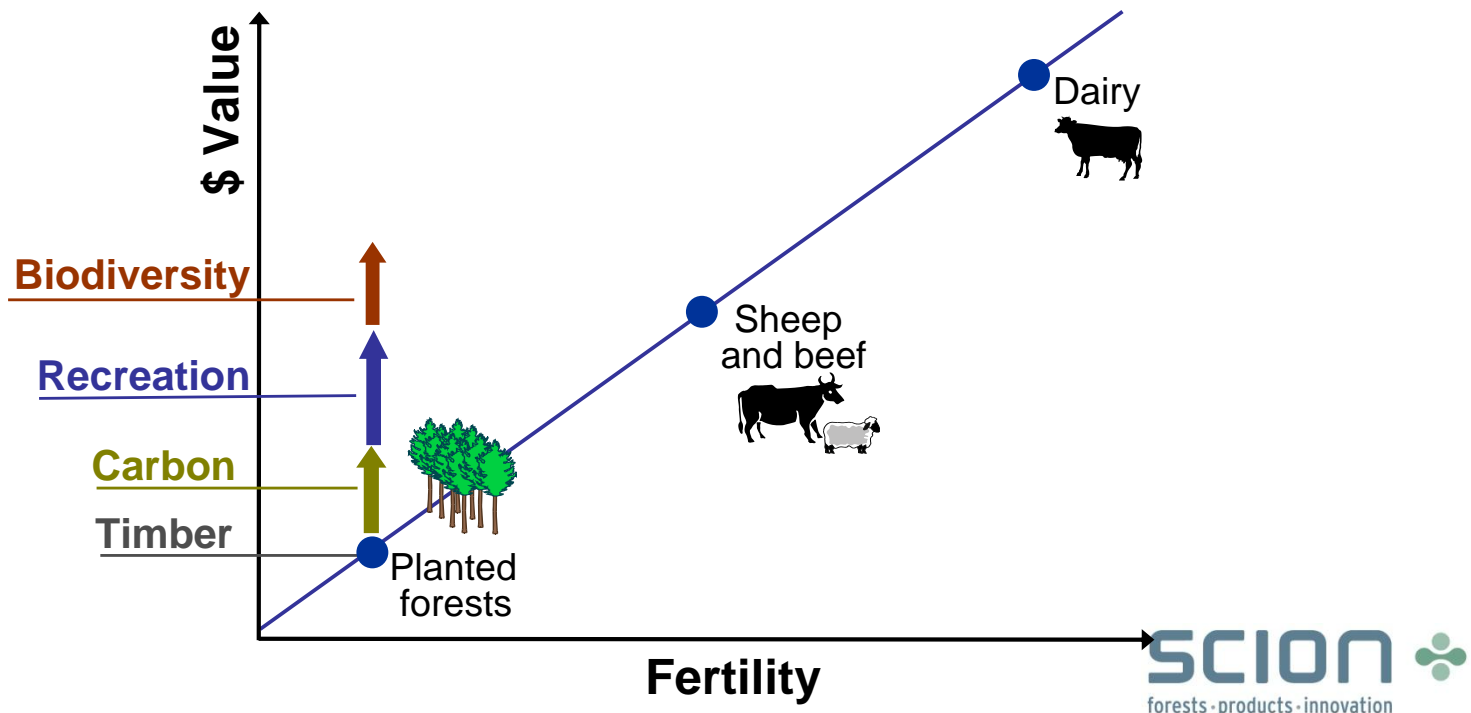


Value, Price and Willingness to Pay (WTP)

- Economic value \neq market price
- Economic value = market price + other values
(use, heritage, flavour)
- Value of recreation = \$0 entrance fee + other values
(use, serenity, scenic)
= \$0 entrance fee + cost of travel
+ opportunity cost of time
- Value of recreation = willingness-to-pay (WTP)

What value do users place on the forest?

- NZ\$8 million per year
 - Mountain biking - \$48 per visit → NZ\$4.9 million per year
 - Walking - \$34 per visit → NZ\$3.1 million per year
- Aiming to provide a “true value” of planted forests

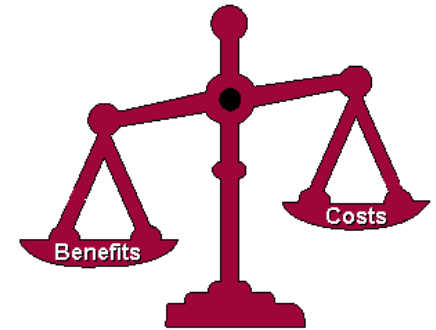


Examples of FES Values in New Zealand

<i>Ecosystem good</i>	<i>Valuation method</i>	<i>Estimates (2012 NZ\$)</i>	<i>Type of document</i>
Walking and Mountain Biking in Whaka Forest	Travel cost method	Walking: \$34/visit MTBiking: \$48/visit	Forest Policy and Economics
Recreation values (entrance fees) at TECT Park	Contingent valuation	Walking: \$4/visit MTBiking: \$7/visit	Report
Biodiversity enhancement in NZ planted forests	Choice experiments	\$66/taxpayer/year	Uni of Waikato seminar paper/PhD thesis
Coromandel Peninsula Forest recreation	Travel cost method	\$32/visitor group/year	New Zealand Journal of Forestry
Kaweka & Kaimanawa forest parks recreation	Travel cost method	\$91/person/visit	Bulletin, Lincoln College
Hanmer Forest Park visits	Travel cost method	\$66/person/visit	New Zealand Economic Papers
Road end camping, Tararua forest park	Contingent valuation	\$9/person/night	Report to DOC
Bottle Lake forest recreation	Contingent valuation	\$51/visit	Report, School of Forestry, UC
Wellington Regional Council parks	Contingent valuation	\$16/person/visit	Report, Wellington Regional Council

Uses of Estimated ES Values in New Zealand

- Cost and benefit analysis
- Council rating policy
 - BOPRC, Wellington CC
- Entrance fee – e.g. TECT Park
- Litigation
 - Local Government Act (2002)
 - Biosecurity Act (1993)
 - Resource Management Act (1991) – sections 32 and 88
 - refer to non-market values (e.g. WTP) as “non-monetary” value



The New Zealanders' Guide to the
RESOURCE MANAGEMENT
ACT 1991

Community Groups • Local Authorities
Landowners • Developers • Planners

eds environmental
development
services

RAEWYN PEART

WTP estimates in NZ environmental courts

- Pre 2001 Judge Jackson rulings supportive of economics and valuation
- 2009 Judge Jackson again!

“Waitaki” [515] estimates of the value of fishing and other recreation in the affected reach of the Waitaki were of interest to the Court. The use of non-market valuation techniques to assess the cost of externalities of proposals is encouraged