

Valuing Type and Scope of Conservation: A Meta-Analysis

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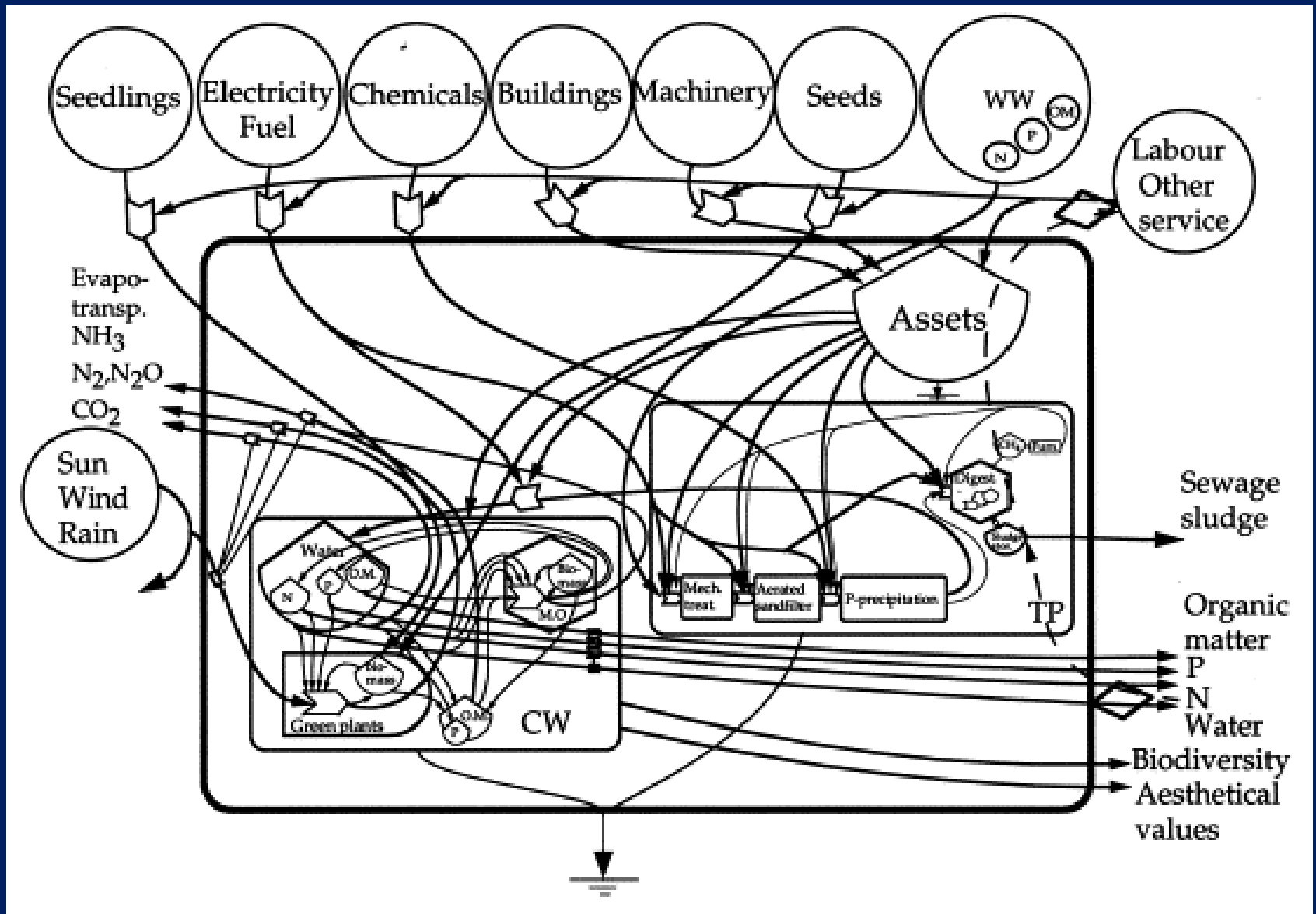


Ecosystem Conservation

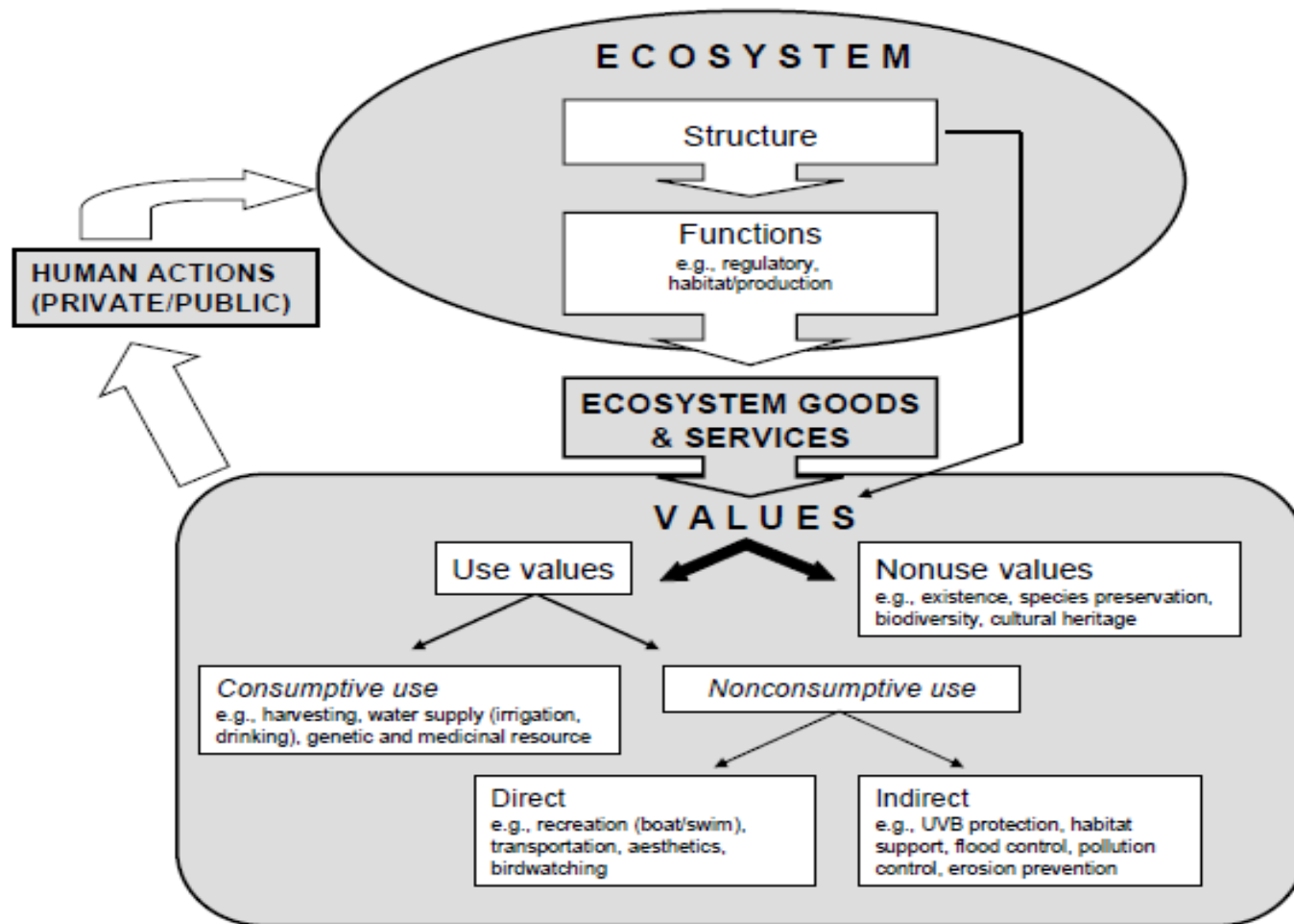
- ❖ Holistic approach: Preservation *and* Ecological Restoration
- ❖ Improves ecosystem services, but how do we value them?



Simple Diagram of Ecosystem Service Values



Ecosystem Service Values



Source: National Research Council of the National Academies (2004)

Non-Market Valuation

- ❖ Revealed and Stated Preference Methods
- ❖ Contingent Valuation (WTP)
- ❖ Evolution to Choice Modeling



Meta Hypotheses

❖ Conservation Type:

H_{01} : $\beta_1 = \beta_2 = \beta_3$; where β_x = coefficient for WTP for three types of conservation (forest restoration, freshwater restoration, and preservation)

❖ Conservation amount, or Scope:

H_{02} : $\beta_4 < \beta_5 < \beta_6$; where β_x = coefficient for WTP for three levels of conservation (attribute-specific, program low, program high)



Conservation Scope?

- ❖ Scope and Embedding Effects
- ❖ Commodity and Temporal Scope Effects
- ❖ Primary argument against CVM validation
- ❖ Ideological values vs. utility maximization



Model Specification

❖ Model Specification:

$$\text{❖ } WTP_{ij} = F([ESS_1 - ESS_0], C, V) \quad \text{Eq.- 1}$$

$$\text{❖ } WTP_{ij} = F(T, S, C, V) \quad \text{Eq.- 2}$$

❖ Type, Scope, Context, and Valuation of Conservation



Data Selection

- ❖ Data Heterogeneity
 - ❖ Commodity consistency
 - ❖ Welfare change measure consistency
- ❖ Limited to preservation and/or restoration on:
 - ❖ Forest and freshwater ecosystems
 - ❖ Primarily on public lands
- ❖ Elicitation format = DCCV, CE, and CR
- ❖ Mean or median WTP per household or individual.



Independent Variables

- ❖ Type (preservation, forest restoration, freshwater restoration)
- ❖ Scope (attribute-specific, program low, program high)
- ❖ Context (time trend, country, income)
- ❖ Valuation (sample size, elicitation format, payment vehicle, payment frequency)



WTP Primary Data

- ❖ 127 WTP estimates collected from 22 primary studies using DCCV, CR, and CE
- ❖ Studies from Europe, Canada, and US from 1987 to 2013
- ❖ WTP in \$2010 US equivalent prices, using country-specific CPI and Penn purchasing power parity



Meta-Regression Estimation

- ❖ Correlated data due to multiple observations (nested) from same authors
- ❖ Required a multilevel model (MLM)
- ❖ Competing models based on fit criteria of R-squared, AIC, BIC, and log-likelihood
- ❖ Semilog and log linear were final models



Meta-Regression Results

	Semilog			Log linear		
	Coef.	Robust Std. Err.	P> z	Coef.	Robust Std. Err.	P> z
<i>Conservation type (T)</i>						
Forest restoration (β_1)	-1.083	0.363	0.003	-1.054	0.388	0.007
Freshwater restoration (β_2)	-0.642	0.335	0.055	-0.557	0.329	0.091
<i>Conservation scope (S)</i>						
Program low (β_5)	1.348	0.356	0.000	1.382	0.388	0.000
Program high (β_6)	1.703	0.618	0.006	1.764	0.654	0.007

Within-Sample Predictions (Mean WTP and 95% CIs)

Type of conservation effort (T)	Scope of effort (S)	Levels		
		Mean	Low	High
Forest restoration	Attribute	\$11.54	5.18	25.72
	Program low	\$44.41	26.76	73.69
	Program high	\$63.33	29.06	138.02
Freshwater restoration	Attribute	\$17.94	8.54	37.67
	Program low	\$69.03	30.90	154.19
	Program high	\$98.45	34.33	282.33
Preservation	Attribute	\$34.07	21.92	52.96
	Program low	\$131.12	80.93	212.44
	Program high	\$187.01	64.48	542.37

Conservation Type

- ❖ Starting point bias?
- ❖ Endowment effects?
- ❖ Scarcity?
- ❖ Intervention level?
- ❖ Differing opportunity costs?
- ❖ And why freshwater restoration over forest restoration?



Conservation Scope

- ❖ Scope effects and the evolution of Choice Modeling in economics
- ❖ Absolute versus relative measures of scope



Conclusions

- ❖ Systematic variation in WTP for Type of conservation
- ❖ Conservation WTP is sensitive to Scope
- ❖ “Moral Satisfaction” and Ideological...still adhering to utility maximization and neoclassical economics
- ❖ Value transfer and policy implications



Recommendations

- ❖ Conservation values behaving similarly to marketed goods
- ❖ Future research:
 - ❖ Relative measures for benefit transfer
 - ❖ Boosting sample size
 - ❖ Choice experiment features



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Thank you. Questions?

