Benefits Transfer, Meta-Analysis, and Beyond: Discussion of Papers Presented and Speculation

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Applications and Potential of Ecosystem Services Valuation Within USDA
Advancing the Science,

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Comments: Drupp and Meya

- Caution: individual-level factors affect benefit transfer
  - A main discomfort as benefit-transfer often heavily a statistical forecast, with less economic foundation

- Adjust – income inequality, environmental inequality, natural capital
  - Not sure how inequality enters utility function, but can address income and environmental condition differences
  - Do adjustments allow policy-driven investment in natural capital?

- Theory details from several references that I presume are undergoing refereed review

- Some endorsement of brief data collection at target (policy application) site
Benefit Transfer: Inherent Adjustment

• Vs targeted, specific studies contributing to literature for Meta-Regression Models (like J&B and G et al.)
• General research funding to incentivize transfer-ready base of primary studies
• *Toward Framework for Transfer-Ready Valuation*
  – Identify main categories of policy-relevant (final) ecosystem services linked to management relevant ecosystem structure and function – *consensus catalogue for agency evaluation*;
  – Water quality - recreation, health, ag/rural competitiveness
  – Farm, forest, open space conservation on urban fringe
  – Biodiversity services of CRP or Wetland Reserve programs
Elements for Transfer Ready Base Studies

• Key service or resource targets (above)
  – Strategic focus on likely significant services by region

• Scope and Scale
  – Local WTP vs Regional vs National value for changes
  – Adaptable for locally substantial changes but regionally nationally small change (averaged out)
  – In Stated Preferences: generic baseline vs locally tailored baseline vs inclusion of larger-than-local effects

• Adaptable to policy context
  – State or national “program” – valued initially for local impacts
  – Program generates non-local (national) impacts implying substitutes

• Sensitive to biogeographic regional patterns
  – Ecosystem structure and function feeding human well-being
Elements (continued)

• Key, general descriptors of human community
  – U.S. Census – age, income, education, etc.
  – Additional data:
    • community attitudes, activity relative to environment
    • Employment pattern relative to natural capital
    • Available substitutes – relevant to local residents
      – Local site versus commonly favored destinations

• High Policy-Value targets
  – Ecosystem Services relevant to ag/rural mission
  – Pollinators, urbanization, GMO-organic-conventional tradeoffs, BMPs for water quality.
Waiting versus Doing or Incentivizing

• Transfer built opportunistically – on studies “someone” funded for targeted reason
• Need *Applied Basic Research*
  – *Fund collection of transfer ready, community level studies*
  – *Guided application complementing broad agency mission*
• Fund incentive add-on for independently motivated studies to record details (meta-data) that facilitate transfer foundation
  – Small research grant add-on for studies likely of use for future transfer regarding High Policy-Value services
  – Professional society to partner build criteria, from existing published guidelines
EPA Water Quality – Transfer Ready Base Study

18 (maybe 25) counties – SP choice experiment
WTP to alter the distribution of Water Quality in mix of river segments

With Pengfei Liu, Charles Towe, Timothy Vadas, Mahesh Dahal, and others
<table>
<thead>
<tr>
<th>Waterways Characteristics</th>
<th>No Action</th>
<th>Program A</th>
<th>Program B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distribution of river and stream miles rated by the Human Use Score</strong></td>
<td><img src="image" alt="Human Use Score" /></td>
<td><img src="image" alt="Human Use Score" /></td>
<td><img src="image" alt="Human Use Score" /></td>
</tr>
<tr>
<td>Scoring system for your reference:</td>
<td>collection of 100 miles</td>
<td>collection of 100 miles</td>
<td>collection of 100 miles</td>
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<tr>
<td><strong>Distribution of river and stream miles rated by the Ecological Integrity Score</strong></td>
<td><img src="image" alt="Ecological Integrity Score" /></td>
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<td>collection of 100 miles</td>
<td>collection of 100 miles</td>
<td>collection of 100 miles</td>
</tr>
<tr>
<td><strong>Your annual cost for 10 years</strong></td>
<td>$000/year</td>
<td>$450/year for 10 yrs</td>
<td>$350/year for 10 yrs</td>
</tr>
<tr>
<td>Other households pay in relation to their circumstances; corporations pay through compliance costs and fines or other taxes</td>
<td>For this program, you pay $450/year for 10 yrs</td>
<td>For this program, you pay $350/year for 10 yrs</td>
<td></td>
</tr>
</tbody>
</table>

Please vote for your preferred program below:

- No Action
- Program A
- Program B

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**Flexible baseline – generic - adaptable to local community**

100 miles of river or stream segments around the county

Versus 100 miles representative in conditions of your county.
• Example transfer
  – Scope, scale, spatial
• Necessarily demonstrates limitations of broad, strong assumptions on functional content
  – Limits from blending multiple independent studies through genericized variables
    • Link to biophysical through aggregated water quality index (contrary to approach Guignet et al. were comfortable with)
    • Link spatial dimensions through relation of study site water resource as share of similar resources in market area targeted
  – Variables to adjust for method choices in original studies
    • Analyst to identify range of values under potential methodologies
Johnston and Bauer 2

• Example limitations
  – Use of ln(.) form can help impose theoretically anticipated properties, such as diminishing WTP
  – But assumes coefficient on the ln(numerator) = negative on ln(denominator)
  – Potential omitted variables biases:
    • Ln_PropAgLand as (partial) proxy for rural or low population density?

• Transfer Ready Base Studies – potential alternative?
  – May avoid such limitations
  – Build from individual-level responses of internally (intra-community) consistent, ecosystem service attributes
  – Flexibility for complements & substitutes
  – Plan for local, regional, national scope of program impacts
Guignet et al. 1

- Elasticity facilitates adjustment to base value of homes
  - Convenient, but how does this connect to water quality impact on utility (well-being)
  - Bought home comes with particular water body(ies), particular level (distribution) of water quality
  - Built asset should not affect value of water quality?
    - Conditional on family size – versus proxy for family size
  - Acreage might affect quantity of use values?

- Does this proxy for income of buyers
  - Studies mostly from rural, vacation-home markets (at least for waterfront)?
  - Is income of local community more relevant for non-waterfront homes, while waterfront brings wealth of non-resident buyers?

- Any implications for sensitivity of transfer estimate?
Guignet et al. 2

• Table 1 expectations – Chlorophyll-a
  – negative impact waterfront vs positive impact non-waterfront
  – This dimension of WQ enters production of recreation and aesthetics (cf., Keeler et al. 2012 PNAS)
  – Waterfront – more direct impact of aesthetics from excess algae production (short of extreme eutrophic)?
  – Non-waterfront – potentially proportionally more effect on recreational fish productivity?

• Table 1 – sensitive to ecosystem function?
  – Include main effect of estuary vs freshwater
  – Nitrogen and Phosphorus limiting factors, respectively
    = different functional role affecting clarity, aesthetics, rec.
Guignet et al. 3

- Clarity regressions – favored Model 3 for transfer
- Consistent with statistical forecast goal
- But appears sensitive to omitted variables
  - Is Model 3 as restricted from Model 5 statistically significant?
  - Appears restrictions could trigger omitted variables bias?
  - Mean (baseline) clarity significant only in absence of both estuary and regional dummies
    - Differential means in clarity for freshwater and saltwater suggest baseline clarity is proxy for estuary vs fresh