Deliberative Multicriteria Analysis: An Application in the Great Bay Watershed

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Plymouth State University

DARTMOUTH

UMASS BOSTON

Duke UNIVERSITY

NH Extension

Introduction

- Valuing ecosystem services plays a critical (if contested) role in environmental policy analysis
- In the United States, EPA employs nonmarket valuation in two key ways
    1. New and revised regulations are subject to ***Regulatory Impact Analysis***, which (by executive order) requires the application of cost-benefit analysis
    2. Documenting the benefits of air and water quality programs that have major economic costs
- In the context of watersheds, "benefits" are associated with a wide array of ecosystem services that affect diverse stakeholders in complex ways
- Non-use values loom large, necessitating reliance on ***stated preference methods***

Concerns about Stated Preferences Methods

- Stated preference methods are controversial in ecological economics. One concern is that they conflate personal preferences with social and political values
- Mark Sagoff's critique (1988) – reliance on contingent valuation can be like a criminal trial in which the judge:
    1. Asks each juror to assess the defendant's guilt or innocence after hearing just a brief summary of the evidence
    2. Reaches a verdict by summing up the "votes" cast by each juror
- Sagoff worries that this is "crazy"

Deliberative Valuation

- Deliberative valuation provides a potential alternative to CBA (Gregory & Wellman, 2001; Proctor & Dreschler, 2006). General idea:

    1. Communities need to decide whether to commit economic resources (tax $$$) to achieve valued social ends (watershed conservation)

    2. Such decisions should (a) be grounded in "good" science while (b) reflecting community values

    3. Methodology – stakeholder workshops that combine science communication with small-group deliberation → consensus on social preferences (Wilson & Howarth, 2002; Howarth & Wilson, 2006)

- This talk will describe an application of deliberative valuation in the Great Bay Watershed

Our EPA Project:

Assessing the contribution of small streams to use and non-use water quality values using modeling, stakeholder participation, and decision theory

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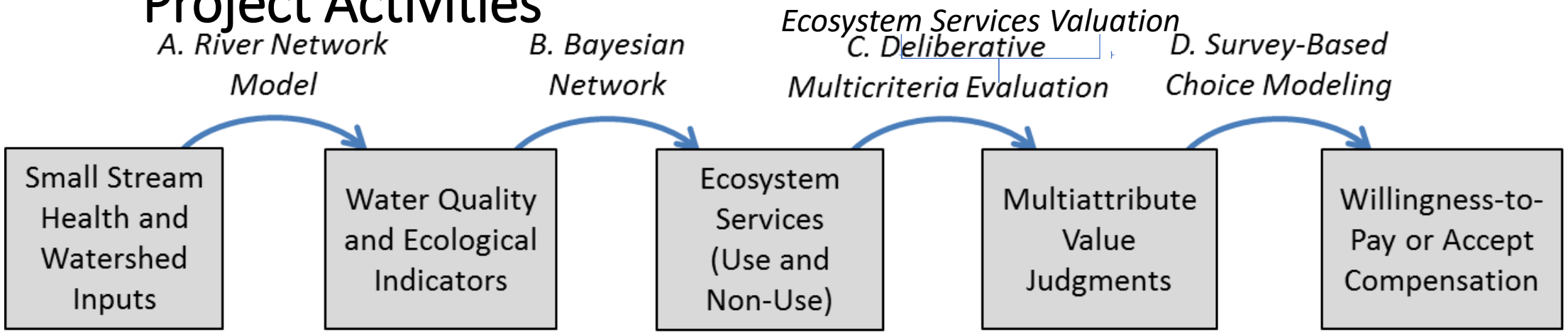
Project Activities



A&B. Relate the outputs of a spatially-distributed biogeochemical river network model to water quality attributes, including ecosystem services, that people recognize and fundamentally value. FrAMES & BN

C. Structure and elicit the multiattribute value judgments of upstream and downstream water resource users and non-users in a way that accounts for the many contributors to value and the complex tradeoffs among them. DMCE

D. Translate multiattribute value judgments into transferable estimates of willingness-to-pay and willingness-to-accept-compensation for changes in water quality. Choice Modeling Survey

Project Locations

Three sub-watersheds of Great Bay:

	Size	N Load (tN/y)	Sources	Dev. (%)	Other
Cocheco	large	291	Both	17	
Oyster	small	22	Point	22	High TSS
Lamprey	large	190	Non-Point	12	High Conductance

- Home to almost 25% of NH's population

Attributes Considered in our Study

1. Swimming Days per Year

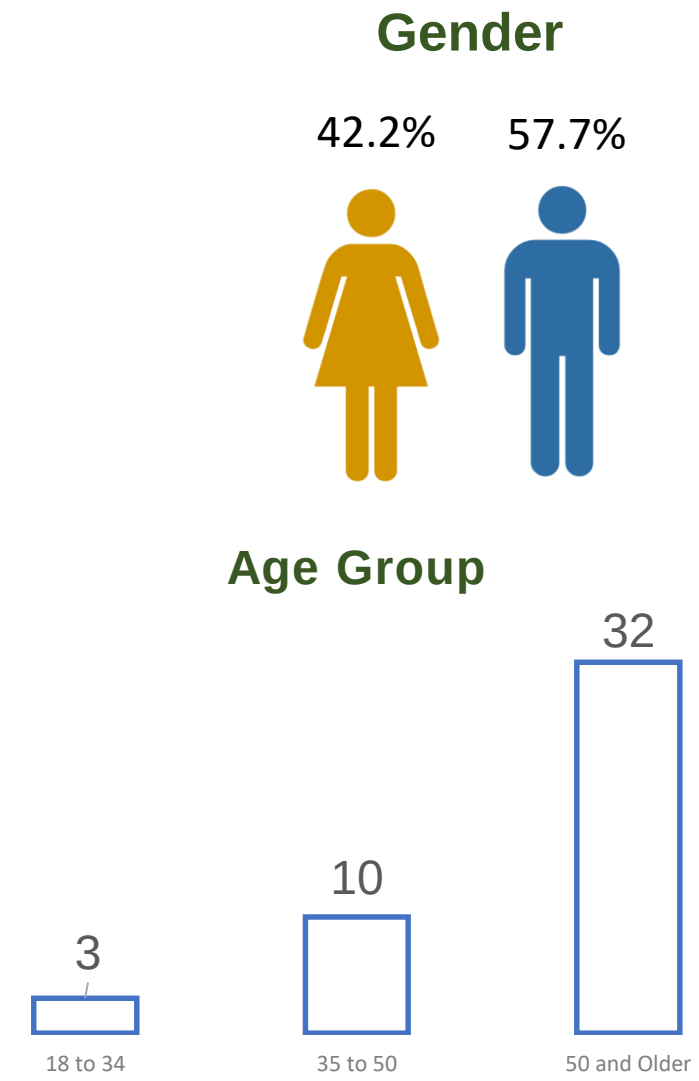
2. Risk of Flooding (%)

3. River Health (% miles impaired)

4. Water Quality Costs ($ per household per year – change relative to status quo)

Participant Demographics

- The Survey Center of the University of New Hampshire conducted the participants recruitment
- The recruitment process was based on a questionnaire survey to better understand participants attitudes towards the environment
- 104 residents invited
- 45 residents showed up for the four workshops (downstream and upstream users)



Workshops Structure

Workshop Number	Sub-watershed	Treatment Method
Workshop 1	Cocheco	Upstream and Downstream users: 4 groups upstream users and 4 groups downstream users
Workshop 2	Cocheco	
Workshop 3	Lamprey	
Workshop 4	Lamprey	

We organized 4 workshops.
Workshop Implementation

Step 1:

Preparing the participants

Step 2:Individual Pre-Deliberation Surveys

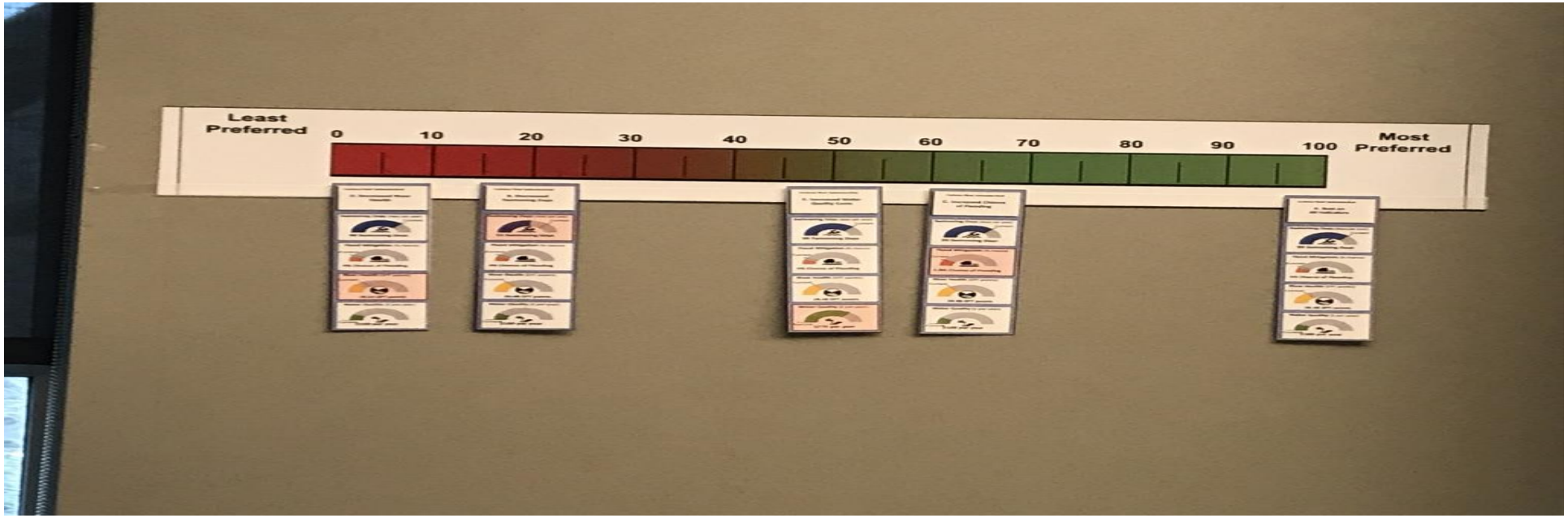
Step 3: Group Deliberative Evaluations

Step 4: Individual Post-Deliberation Surveys

Attribute Bundles Used in the workshop – Cocheco River

Assessment Task

- Participants were asked to arrange cards representing different “bundles” of ecosystem service levels along a meter stick.

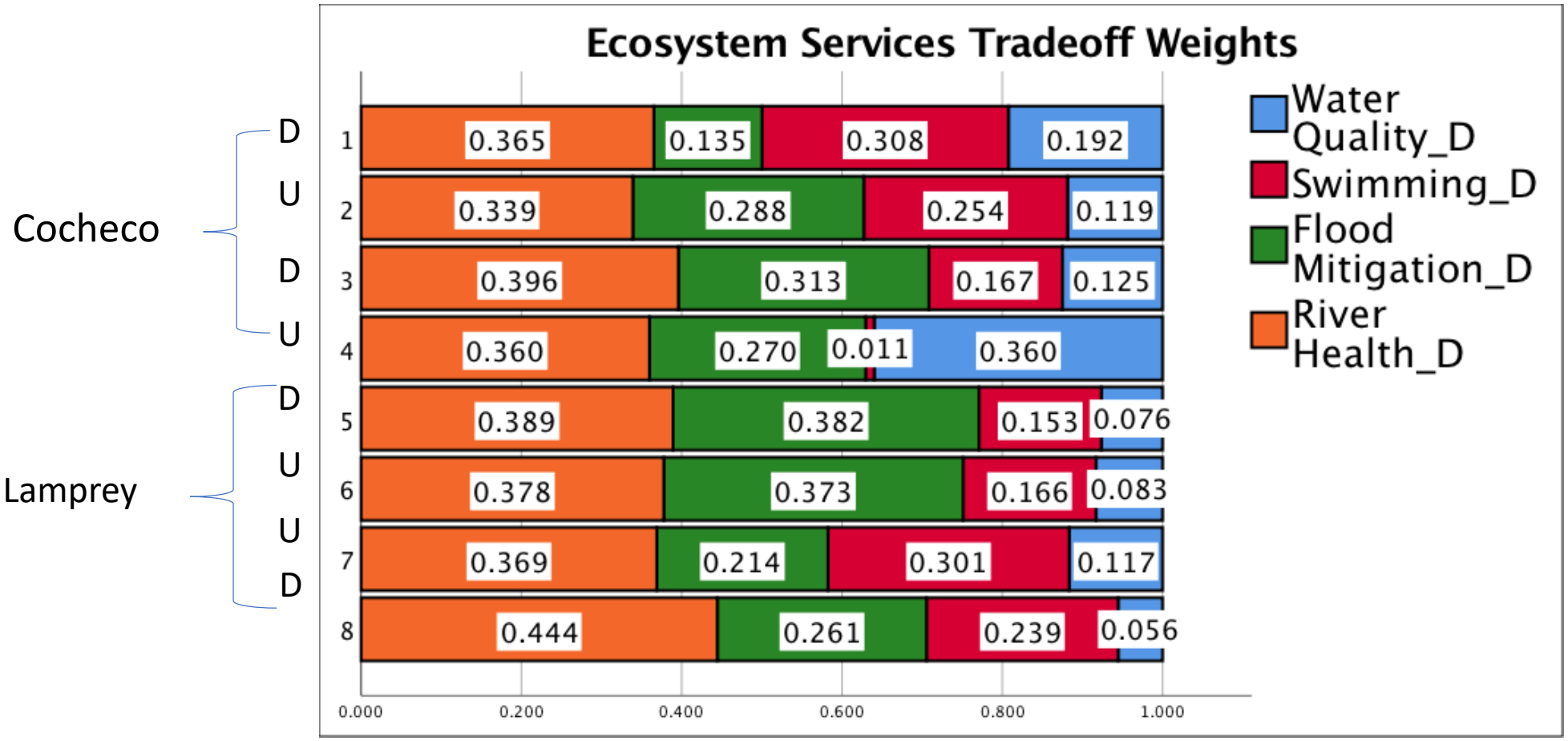


  - Order represents preference ordering and relative spacing represents the relative difference in preferences.
  - Ratings could then be read off the meter stick.

→ In the deliberative framework, preferences are not <u>personal</u> but are <u>socially constructed</u>.

Results

D: group of downstream users
U: group of upstream users



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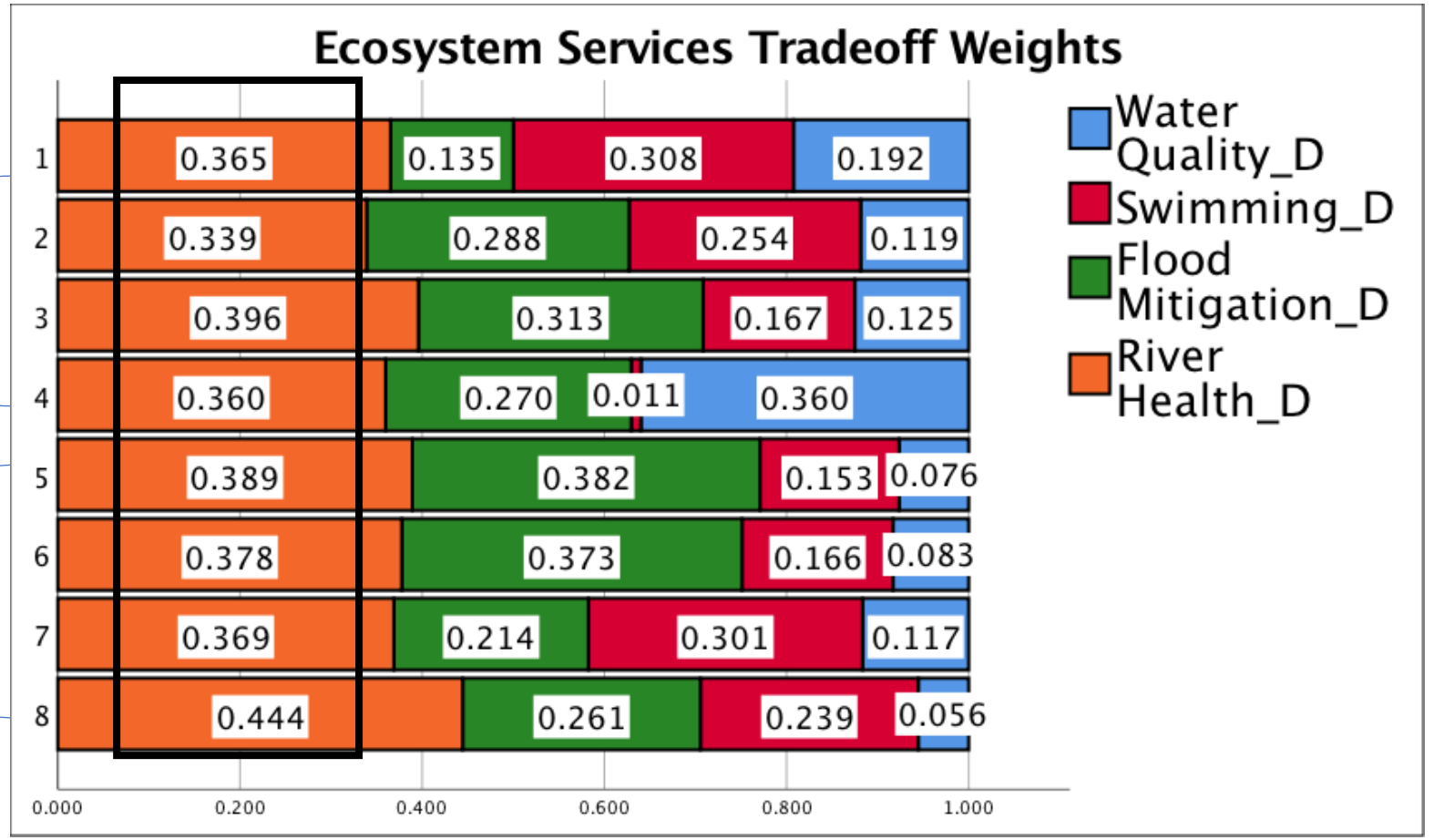

- Overall River Health received the **greatest** weight

Results

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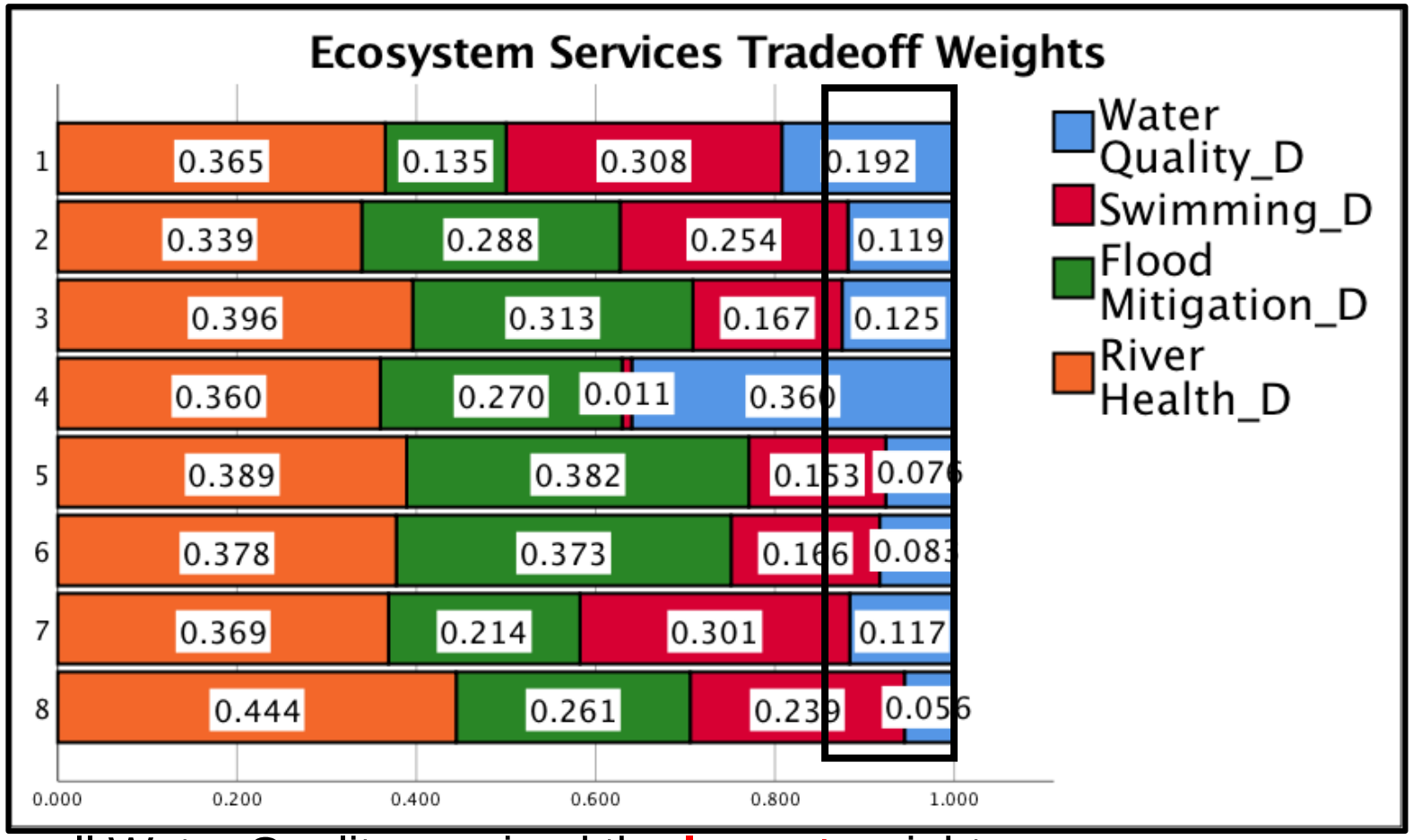
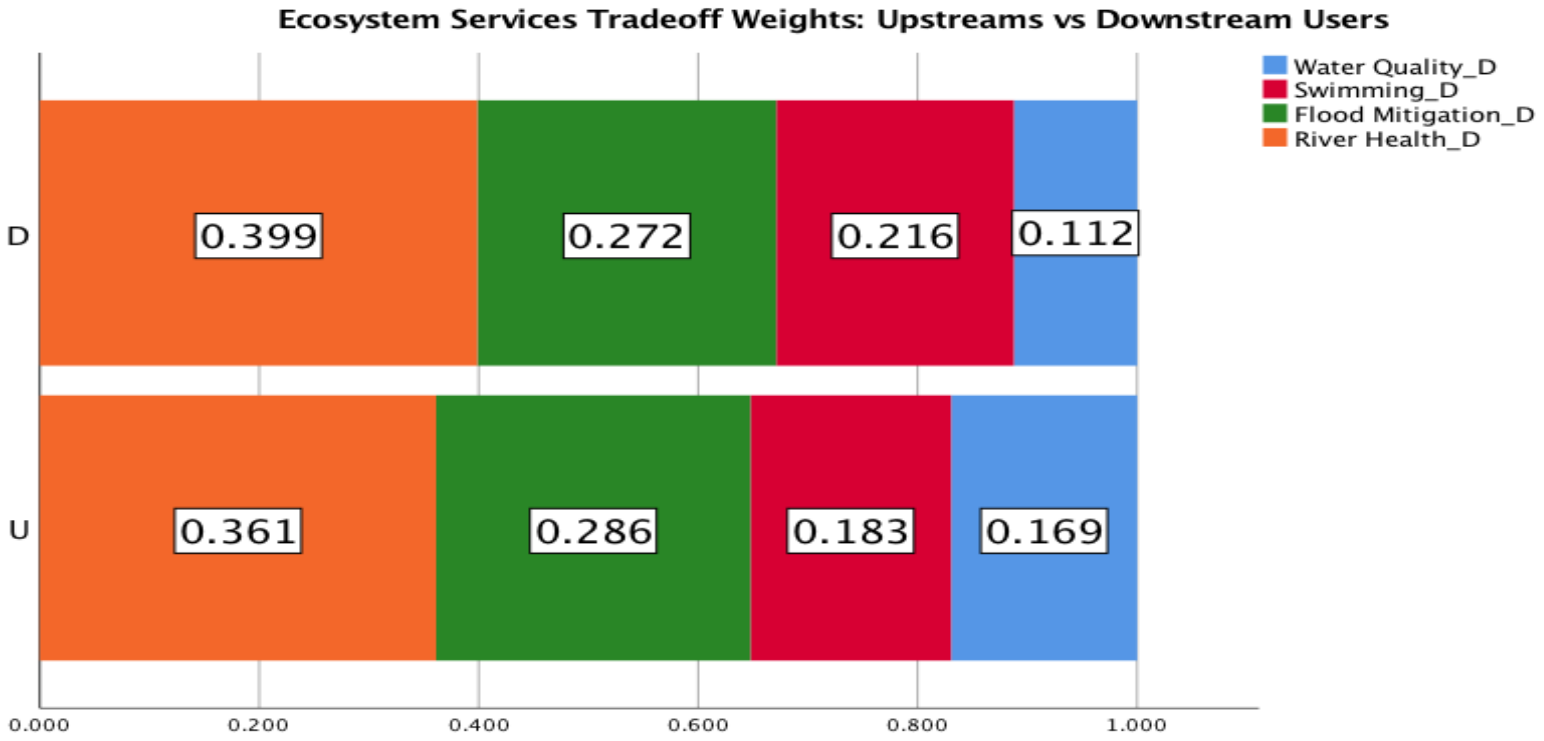


- Overall Water Quality received the **lowest** weight

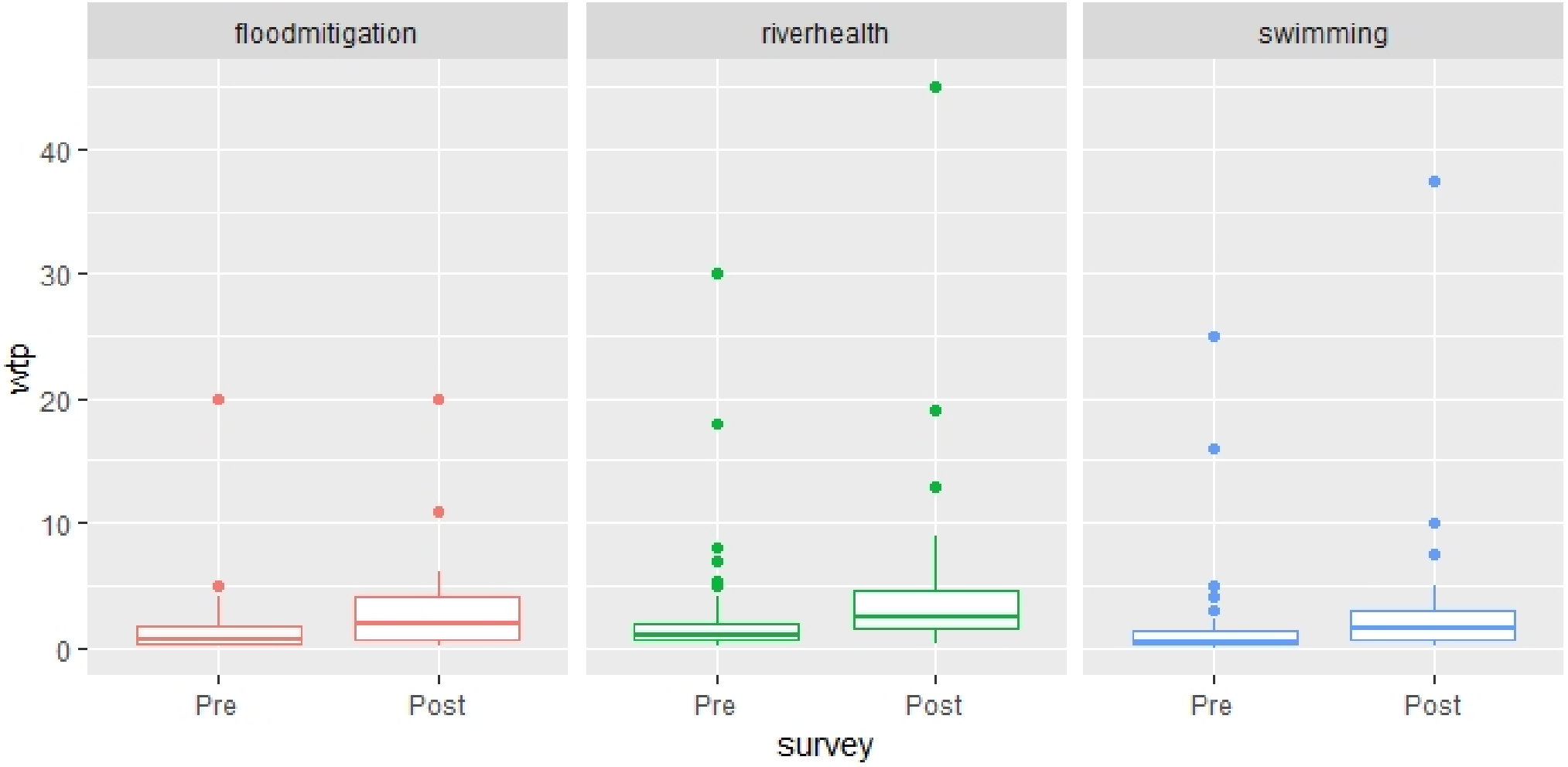
Is there spatial variability of social preferences?



We found no statistically significant effect of participants characterization (upstream vs downstream users) across ecosystem services (p=0.663 Swimming, p=0.831 Flood mitigation, p=0.09 River Health, p=0.45 Water Quality)

→ Why? We are conducting qualitative analysis to address this question

How Does Deliberation Affect Monetary Values?



MANOVA: $p = 0.012$

Conclusions

- **In terms of the process**:

➢ Participant recruitment is challenging. Should deliberative approaches focus on "stakeholders" who represent different interests and communities given the problem of inclusion and representation in the process?

➢ Deliberative methods build social knowledge

- **In terms of the results:**

➢ River Health (a non use value) was weighted as the most important ecosystem service.

➢ Cultural values prevail in the deliberative context

➢ Deliberation → large increase in monetary values

Acknowledgements

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Questions?