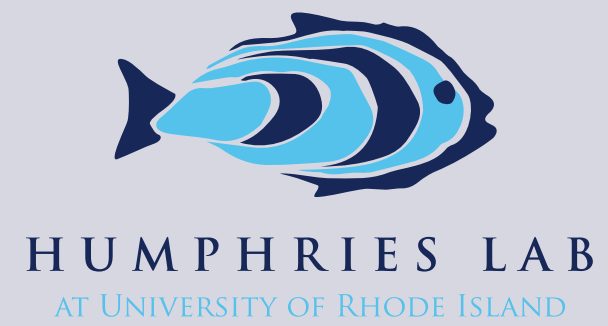


# The Role of Stakeholder Values and Norms in Selecting Ecosystem Services Associated with Living Shorelines Restoration



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Undercutting and erosion of salt marsh on Sengkontacket Pond, MA.

## Restoration Need



Aquaculture & Bioremediation



Sewer & Septic Regulation



Development Restrictions



Breaching of Ponds

## Alternative Restoration Strategies



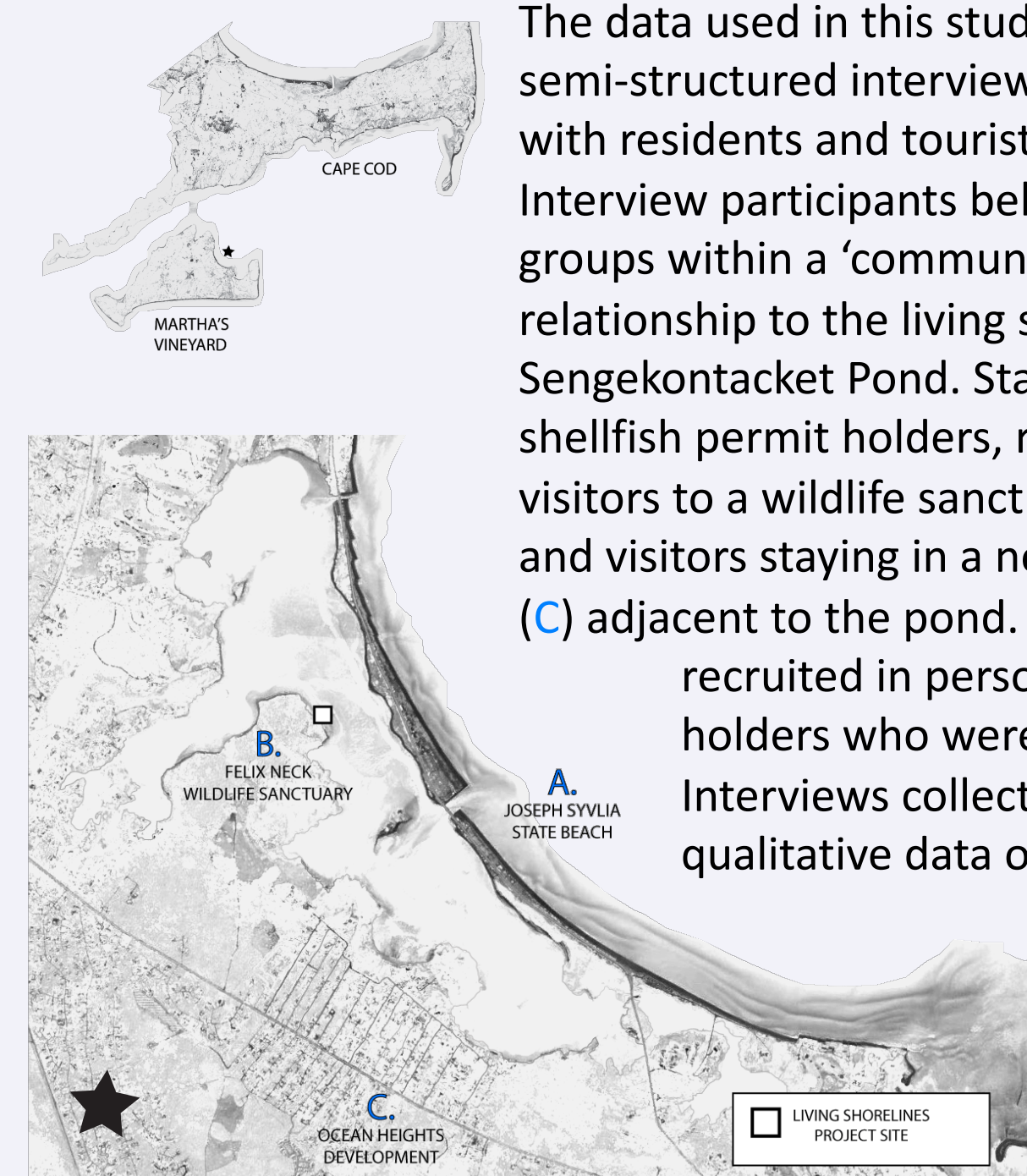
Living shoreline installation on Sengkontacket Pond

## Restoration Solution

This study examines the link between social variables, ecosystem services, and ecological restoration.

Restoration strategies aim to restore different sets of ecosystem services. These targets are not always in line with social preference, creating mismatches that erode resource management efforts. Further conflict may arise if stakeholder groups exhibit differential resource use and/or when trade-offs exist between potential management strategies. This is particularly true of island communities whose economies rely largely on common-pool resources. Understanding the diversity and origin of conservation preferences will work to align social and ecological management goals. Current and future work applies a personal values, beliefs, and norms framework to investigate differences in ecosystem service preferences among stakeholder groups to guide contextually informed improvements for coupled social-ecological management.

## Methods



The data used in this study was gathered through semi-structured interviews conducted in Summer 2016 with residents and tourists in Martha's Vineyard. Interview participants belonged to various stakeholder groups within a 'community of interest' based on their relationship to the living shoreline project site on Sengkontacket Pond. Stakeholder groups included shellfish permit holders, recreational beach-goers (A), visitors to a wildlife sanctuary (B), and island residents and visitors staying in a neighborhood development (C) adjacent to the pond. All participants were recruited in person, excepting shellfish permit holders who were recruited over the phone. Interviews collected quantitative and qualitative data on each participant's values, beliefs, resource use, preferences for pond restoration strategies, and support for the living shoreline project.

## Restoration Priority

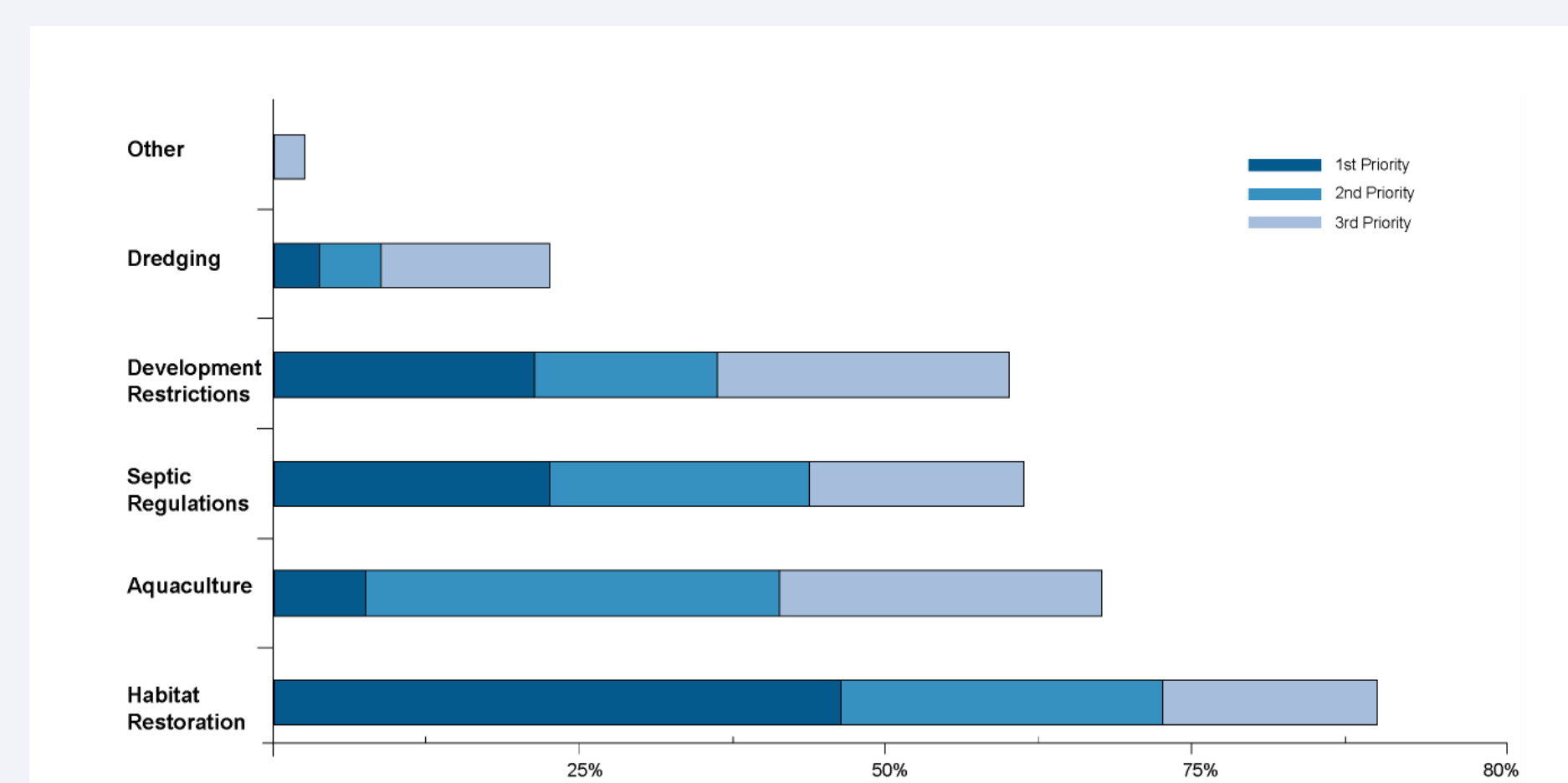


Figure 1. Interview participants were asked "If additional funding was obtained for the restoration of Martha's Vineyard's coastal ponds and their shorelines, in your opinion, where should the funding be prioritized?"

## Ecosystem Service Preference

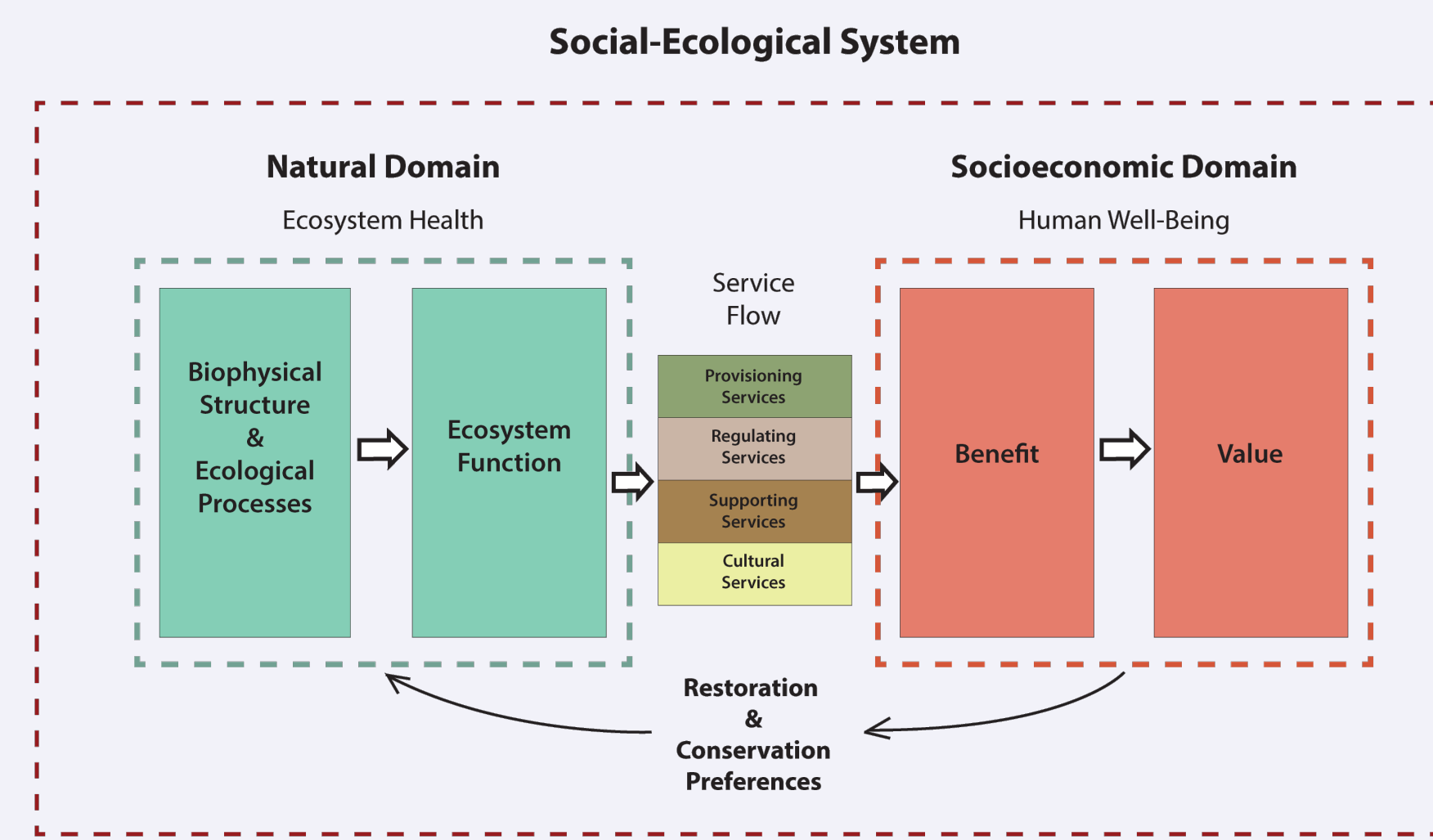


Figure 2. Conceptual framework (adapted from Boulton et al. 2016) shows the relationship between ecological and social variables in social-ecological management

Table 1. Ecosystem services selected by interview participants through definitions of restoration success (Qualitative Assessment), restoration strategy preferences (Quantitative Assessment) and by living shoreline project managers as restoration project goals (Living Shoreline Project).

Service Category	Ecosystem Service	Qualitative Assessment			Quantitative Assessment			Living Shoreline Project
		Full-Time Residents	Seasonal Residents	Visitors	Full-Time Residents	Seasonal Residents	Visitors	
Provisioning	food provision	0.38	0.29	0.00	0.14	0.28	0.20	0.00
	water storage and provision	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	biotic materials and biofuels	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	air quality regulation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Regulating	coastal protection	0.63	1.00	0.95	1.00	1.00	1.00	1.00
	climate regulation	0.00	0.00	0.00	0.00	0.00	0.00	0.67
	weather regulation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	life cycle maintenance	0.63	0.57	0.76	1.00	1.00	1.00	0.00
Supporting	biological regulation	0.00	0.00	0.05	0.00	0.00	0.00	0.00
	water purification	0.88	0.71	0.29	0.75	0.65	0.62	1.00
	nutrient cycling	1.00	0.14	0.10	0.26	0.35	0.21	1.00
	symbolic and aesthetic values	0.25	0.14	0.24	1.00	1.00	1.00	0.33
Cultural	recreation and tourism	0.50	0.29	0.10	0.75	0.88	0.78	0.33
	cognitive effects	0.13	0.14	0.00	0.00	0.00	0.00	0.00
	economic subsistence	0.25	0.14	0.05	0.14	0.28	0.20	0.00

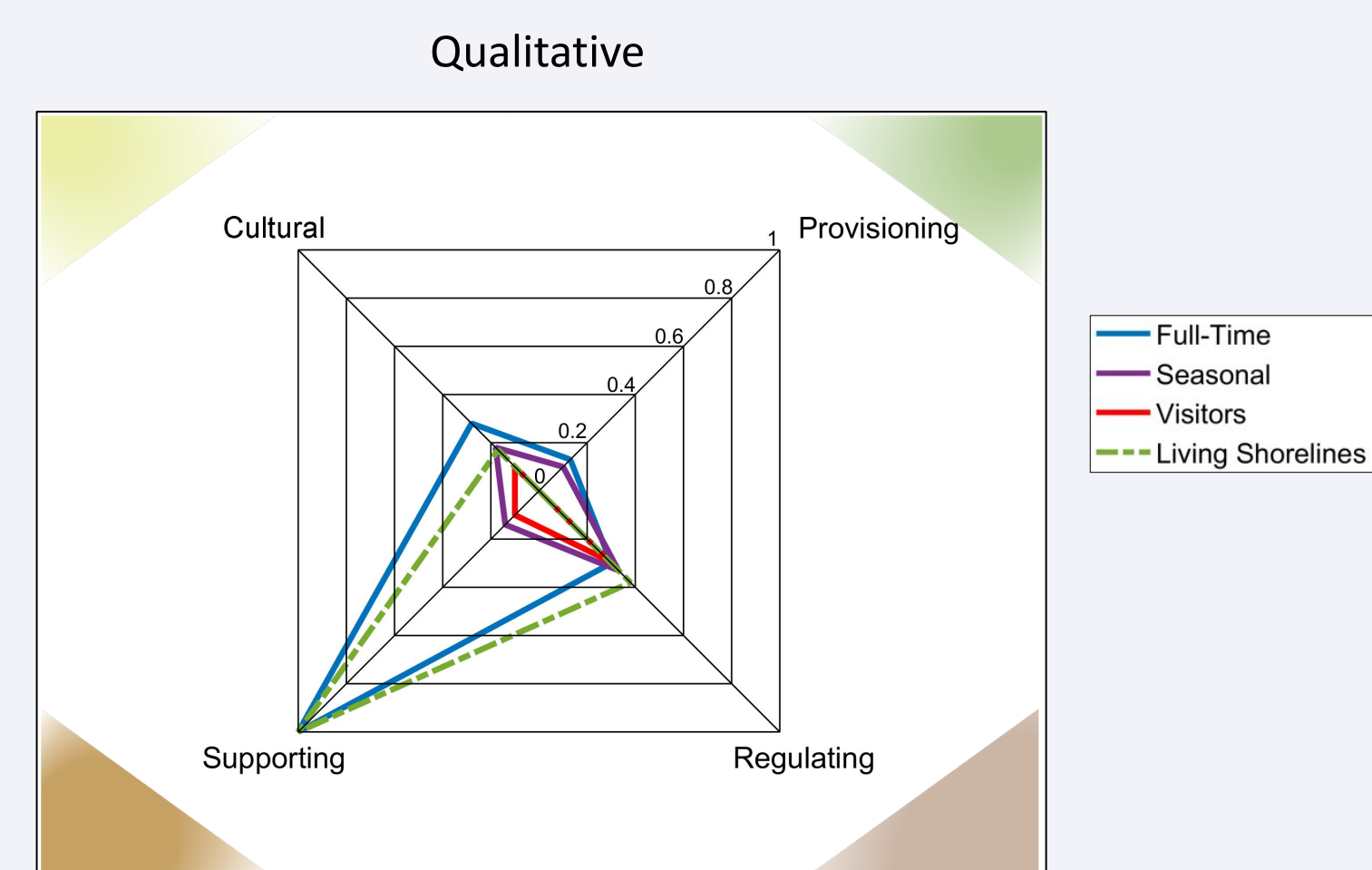


Figure 3. Qualitative assessment of ecosystem service preferences.

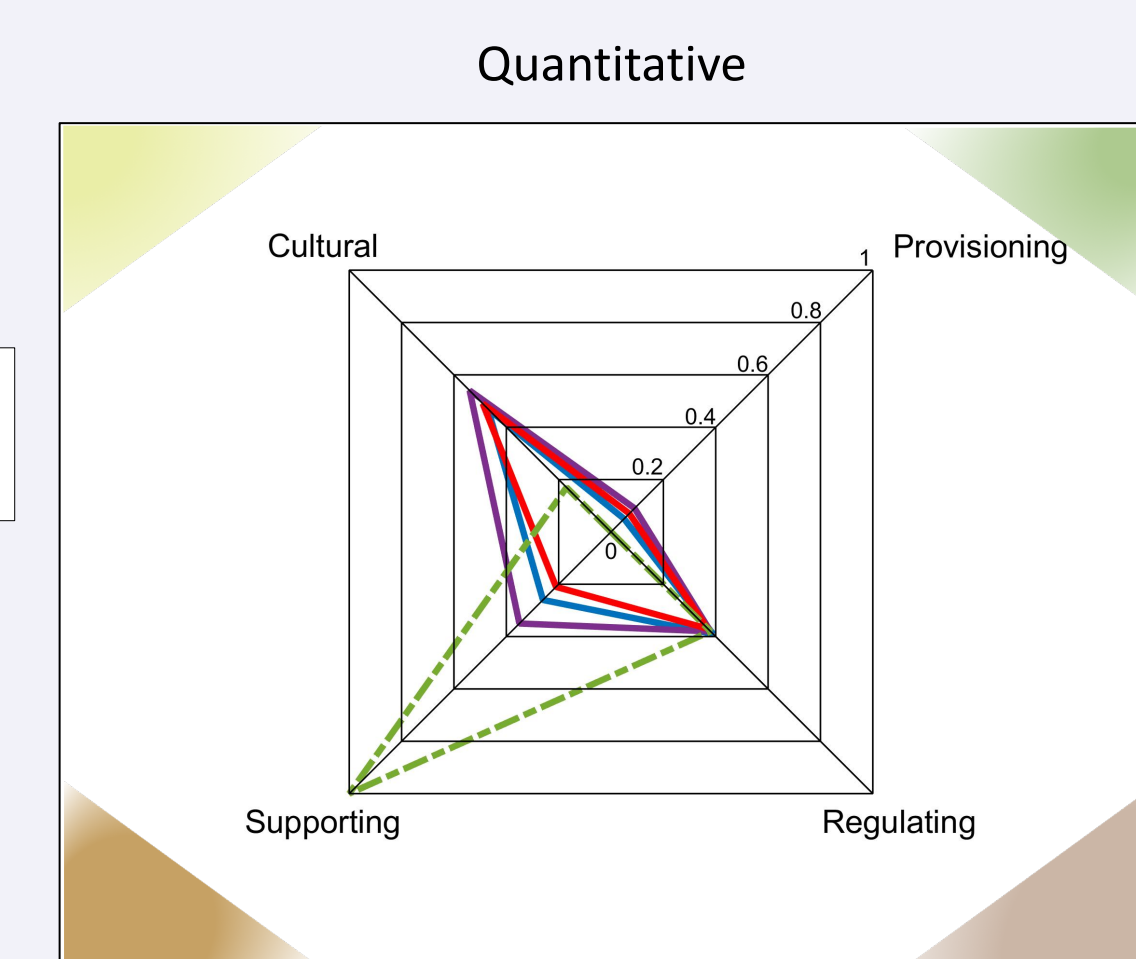


Figure 4. Quantitative assessment of ecosystem service preferences.

## Current Work

Using an adapted Values-Beliefs-Norms framework, we are investigating the ability of social variables to explain the observed variation in preferences associated with ecological restoration. Using path analysis, a straightforward extension of multiple regression, we will test the strength and direction of the effects of multiple explanatory variables suspected to be correlated themselves. Data on personal values follow Schwartz Values Survey methods modified by Stern et al. 1999 to include biospheric values.

Personal beliefs about the environment were measured using a 7-item NEP scale.

A simplified, proposed theoretical model of ecological restoration preference is shown below. Unique personal values, social and group norms are expected to lead to differences in the selection of certain ecosystem services for conservation. These preferences will influence personal definitions of restoration success, which affect prioritization of various restoration strategies and, subsequently, support for the living shoreline project.

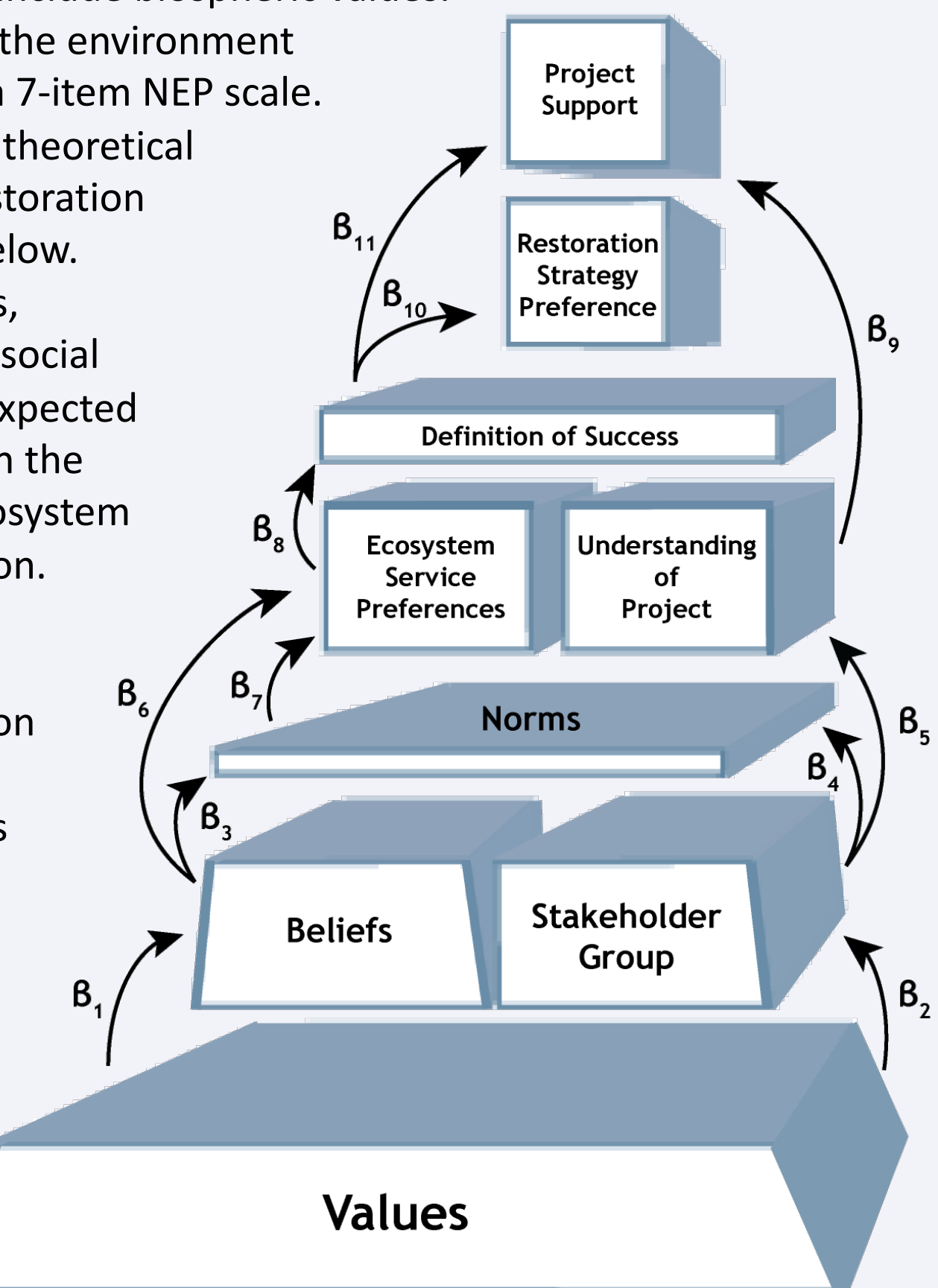


Figure 5. Proposed theoretical model of ecosystem service preference and restoration project support. Beta coefficients will report the strength and valence of the relationships between each variable.

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### Works Cited

- Conceptual framework; AJ Boulton, J Ekeboom, G Mar Gislason, 2016. *Aquatic Conservation: Marine and Freshwater Ecosystems*.
- Alternative Restoration Strategies photographs; Timothy Johnson and Mark Alan Lovell (Vineyard Gazette), Byrne International Realty of Martha's Vineyard, Michael Cummo (MV Times)