

**SUPPORTING STATEMENT**  
**Evaluating the Economic and Social Benefits of Nutrient Reductions in**  
**Coastal New England Waters**  
**Focus Groups and Interviews**  
**May 11, 2016**

**(1) Title of the Information Collection**

Evaluating the Economic and Social Benefits of Nutrient Reductions in Coastal New England Waters. EPA ICR # 2205.17, OMB # 2090-0028, Generic Coastal New England Focus Group.

**(2) Short Characterization/Abstract**

New England's coastal social-ecological systems are subject to chronic environmental problems, including water quality degradation. Researchers at EPA's Office of Research and Development (ORD) Atlantic Ecology Division (AED) are piloting an effort to further understand how reduced water quality due to nutrient enrichment is affecting and may affect the economic prosperity, social capacity, and ecological integrity of coastal New England communities. This research is part of task 4.61 of ORD's Sustainable and Healthy Communities Research Program (Integrated Solutions for Sustainable Communities: Social-Ecological Systems for Resilience and Adaptive Management in Communities - A Cape Cod Case Study).

Concurrent with this effort, AED researchers are participating in EPA's three-office effort (Office of Research and Development, Office of Policy, and Office of Water) to quantify and monetize the benefits of water quality improvements across the Nation. AED's effort is a case study of changes in recreation demand and use values due to changes in nutrients in Northeastern estuaries and freshwater ponds. This work is part of task 3.04A of the Safe and Sustainable Waters Research Program (National Water Quality Benefits: Economic Case Studies of Water Quality Benefits).

Because of the complementarity between the two projects, this Supporting Statement describes and requests hours for focus groups and interviews for both of these research efforts. Our initial focus for both efforts will be Cape Cod, Massachusetts ("the Cape"; Barnstable County), but may expand to the New England coastal area.

Although there are a number of water quality concerns on Cape Cod, one of the key concerns is nonpoint sources of nitrogen, which leads to ecological impairments to fresh water ponds and estuaries, with resultant socio-economic impacts. The towns on the Cape are currently in the process of creating plans to address their total maximum daily load (TMDL) thresholds for nitrogen-impaired coastal embayments. There are over 40 coastal embayments and subembayments on the Cape. The EPA has approved 12 TMDLs for embayments on Cape Cod with a few pending review (Cape Cod Commission, 2015). The Massachusetts Estuaries Project estimates that wastewater accounts for 65 percent of the nitrogen sources on the Cape (Cape Cod Commission, 2015). Because Cape Cod's wastewater is primarily handled by onsite septic systems (85% of total Cape wastewater flows), the main sources are spread across the Cape

and are affected by individual household-level decisions as well as community-level decisions. Coordinated through the Cape Cod Commission and based on the Cape's Clean Water Act Section 208 Plan, communities across the Cape have been tasked with developing a watershed-based approach for addressing water quality to improve valued socio-economic and ecological conditions. The decisions needed to meet water quality standards are highly complex and involve significant cross-disciplinary challenges in identifying, implementing, and monitoring social and ecological management needs.

The Cape comprises 15 towns, each of which has unique freshwater ponds, small estuaries, and open-water beaches that are important drivers of the economy. Cape Cod has a year-round population of about 215,000 residents and a large seasonal population, estimated at more than 500,000, with around one-third of the housing stock owned by seasonal residents. The Cape's economy is primarily tourism-based, with around 6 million tourists visiting each year and 41% of all jobs directly related to the tourist industry (Cape Cod Commission, 2014).

Little is known about important water-dependent recreational values, and in particular, how water quality affects those values. Even less is known about how values and attitudes differ across year-round residents, seasonal residents, and tourists. Understanding the values and attitudes of these distinct groups of people will be important to determining the types of management actions that are likely to be most successful in addressing nutrient problems while maintaining the Cape's economic vitality and maximizing social welfare.

Part of our work will focus on the influences of nutrient enrichment on the uses of and attitudes towards the Cape's waterbodies by four populations: year-round residents, seasonal residents, second-home owners who do not live in the home, and tourists. These populations influence the Cape's economy in different ways and differ in their ability to affect decisions, in how decisions will affect their well-being, and in their willingness and ability to substitute away from the Cape in the face of declining water quality.

Our research will begin by identifying critical ecosystem services in the different waterbodies that are important to the four types of community members, how nutrient enrichment is affecting those services, potential mixes of management actions (including established technologies such as sewerage or nitrogen-removing septic systems; emerging technologies such as composting toilets and permeable reactive barriers; and "green" technologies such as living shorelines, wetlands, oyster reefs, and rain gardens), and potential improvements expected to result from implementing the TMDLs (to be done in collaboration with natural scientists on AED's research team, EPA Region 1 staff, the Cape Cod Commission, and other partner researchers on the Cape).

Based on this information, we will evaluate both economic values for potential improvements and public attitudes towards and acceptance of the different proposed technologies. We will focus on understanding recreational uses as valued commodities on the Cape (beach going, swimming, fishing and shellfishing, boating, for example). Additionally, we plan to compare the potential benefits of and barriers to adopting different types of technologies for nutrient abatement. Although there are many innovative and potentially less costly technologies available for nutrient abatement, little is understood about people's support for and willingness to adopt alternative technologies. This research will allow us to better understand the

possibilities for reducing potential economic and ecological impacts, the acceptability of different technologies, and the benefits of reduced community exposure to nutrient enrichment through recreation. Together, these research efforts seek to identify components of vulnerability and opportunities for improvement in a tourism-based social-ecological system threatened by nutrient enrichment and climate change.

This Supporting Statement provides background material for a request to conduct 20 focus groups and 60 one-on-one interviews. The results from these activities will inform the design of a revealed preference survey instrument, but will not produce results that can be statistically analyzed. Additionally, these activities are an important first step in understanding recreational uses and attitudes of different groups of community members towards waterbodies on the Cape and the greater New England area, and exploratory analysis of the barriers and opportunities for alternative technologies for nutrient abatement.

The interviews will provide more in-depth information from experts and engaged community members with various viewpoints. The interviews will be focused on 1) understanding barriers and opportunities for the adoption of alternative technologies for wastewater treatment on Cape Cod, 2) understanding the critical components of people's sense of place in coastal communities, and 3) why specific waterbodies are chosen for recreational use. These interviews will provide valuable qualitative information to support the findings from the focus groups and surveys. Initial draft sample questionnaires for focus groups and interviews are attached. Additional materials for subsequent focus groups and a survey instrument will be developed based on initial responses.

### **(3) Need for the Collection**

The goal of this research is to improve EPA's ability to characterize recreational benefits of improved water quality in coastal communities and to understand barriers and opportunities for the implementation of alternative technologies for nutrient abatement. Currently, very little is known about recreational uses and values for and community-level attitudes towards waterbodies in New England's coastal communities that, like Cape Cod and Suffolk County, Long Island (New York), are facing problems of nutrient enrichment primarily driven by non-agricultural nonpoint sources. This limits the EPA's ability to assess the full economic and social impacts of nutrient enrichment.

The first set of focus groups and one-on-one interviews will be important steps towards the appropriate framing of survey questions to capture uses of, economic values for, and attitudes and perceptions regarding water quality and water-contact recreation. Specifically, the proposed data collection will help establish a viable survey instrument for later quantitative assessment to elicit the non-market economic values associated with recreational uses of coastal and estuarine waterbodies for different types of residents, homeowners, and tourists and the related attitudes towards those waterbodies that could affect their elasticity of demand and future uses. Data obtained by the survey are intended to be used in the development of a recreation participation model and a random-utility model for valuing water-contact recreation.

We will integrate the economic model with information about the differences in the sense of place of the different groups of people, in order to better understand how these different

populations are likely to respond to and benefit from nutrient reductions, and why different means of reducing nutrients are likely to be more or less successful in terms of public support. Sense of place is the imbuement of meaning into a physical setting. This is often characterized for a particular setting in terms of a) physical characteristics, b) patterns of interactions and behaviors, c) non-evaluative descriptive meaning, and d) evaluative meaning of attachment, dependence, satisfaction, and identity (Stedman et al., 2006). By combining valuation methods from environmental economics with social science approaches, sense of place specifically, we seek to characterize the social-ecological system in a richer fashion, as well as test the sense of place elicitation methods in explaining differences in economic values associated with changes in water quality.

A second set of focus groups and interviews will provide valuable complementary qualitative information to support a general understanding of the beliefs, values, and attitudes of year-round and seasonal residents, second homeowners, part-time residents and tourists about the waterbodies and their recreational benefits. In analyzing the focus group and interview data, we plan to use content analysis, which relies on a process that includes design, unitizing, sampling, coding, drawing inferences, and validation to analyze discursive data about residents' and managers' own contexts (Krippendorff, 2012) to identify relevant themes, arguments, and phrases. This second set of focus groups and interviews could lead to testing new survey questions and may provide information that can be incorporated into quantitative analysis (for example, using an attitude scale or index) of costs and tradeoffs of nutrient reduction strategies.

A final set of focus groups and interviews will provide important insights on barriers and opportunities for the use of alternative technologies in nutrient mitigation. Collectively, the proposed focus groups will provide critical information for the EPA and regional stakeholders about the value of water quality and characterization of some nutrient management options for coastal communities, thereby approaching the problem of water quality from both the supply and demand perspectives. As part of the SHC 4.61 project, alternative nutrient abatement technologies will be evaluated based on their physical effectiveness as well as their barriers to implementation, including cost as well as social acceptance. These final focus groups are designed to capture qualitative information to support a general understanding of the beliefs, values, and attitudes of residents, second homeowners, and practitioners about the particular technologies of interest to the communities as spelled out in the 208 plan (Cape Cod Commission, 2015).

#### **(4) Non-duplication**

To the best of our knowledge, this study is unique and does not duplicate other efforts. This is the first revealed preference recreational use study related to water quality for Cape Cod, and the research will be important to address similar issues on other coastal communities (e.g., Long Island, NY). This research intends to design a survey for developing a random-utility model

for recreation site choice in New England waterbodies that integrates the differences in sense of place for the different community members. Additionally, although some research has been done at the individual household level to understand attitudes towards and adoption of alternative toilets for nutrient abatement on Cape Cod (Wood et al., 2015), no research exists on alternative treatments that function at a neighborhood or community scale such as permeable reactive barriers, rain gardens, living shorelines, and oyster reefs.

While this research is unique, there is available research to inform the general design of the survey. Past research for measuring recreation benefits in aquatic systems include understanding the variation in recreational values as a function of water quality (Bockstael et al. 1987; Kaoru, 1995; Opaluch et al., 1998; Egan et al. 2004; Hilger and Hanemann 2006). The proposed valuation study adds to this literature by filling an important gap related to coastal recreational water quality benefits for the Northeast, as the most recent literature on the subject (Opaluch et al., 1998) is nearly 18 years old. In addition to filling in an important data gap with a fine-tuned application, we seek to advance the understanding of what explains heterogeneous preferences for improvements in water quality by integrating social science concepts of sense of place. Costs and benefits of water quality improvements/impairments will accrue to different populations. While statistical methods exist to handle these issues in theory, mixed logit and latent variable techniques, for example, using sense of place methods to test the differences in demand for the varying populations of a community in a policy-relevant application would allow us to quantify the disparate impacts of water quality on non-market benefits in a formal way. This location-specific study will be compared to benefit transfer, functional benefit transfer and other higher level approximation methods in water quality benefit estimation in order to address the appropriateness and transferability of these methods.

There have been studies in other locations investigating the sense of place or place attachment of different communities related to natural resources, including work done for permanent and seasonal residents in Utah (Matarrita-Cascante et al., 2010), second home owners in northern Wisconsin (Jorgenson and Stedman, 2001), and users in wilderness areas (Williams et al., 1992) and the Appalachian Trail (Kyle et al., 2004). This body of work provides important insights for survey design and the use of sense of place for improving the understanding of attitudes towards natural resources, but none of this past research provides a synthesis of the different types of communities for analysis nor do they focus on coastal communities, which are of a different socio-economic and ecological typology. In particular, there has also been no effort to connect sense of place with recreational use. The only related, Cape Cod-specific work is that of Cuba and Hummon (1993a, 1993b) who focused their research on understanding how Cape Cod residents who had recently moved constructed a sense of home based on their dwelling, community, and region. While this work provides important context for some of the user groups, it does not connect with the Cape's waterbodies, water quality, or other valued commodities.

## **(5) Consultations**

Preliminary consultations have been conducted with several stakeholder organizations related to this effort. Information collected with the proposed focus groups and the resulting survey instrument may be of interest to other federal, state, and local agencies that regulate water quality, promote tourism, and engage with coastal communities. Further, the collection may be of interest to non-profit organizations and other researchers focused on the economy, communities, and environment of Cape Cod and the greater New England area. AED has made concerted efforts to keep interested parties informed of the progress of this project and to solicit feedback and will continue to do so going forward.

## **(6) Peer Review Plans**

Interim products such as focus group and interview scripts and draft survey questions developed during this project will be subject to routine internal review by EPA staff within ORD and by members of the recreation sub-group of EPA's three-office effort. A report summarizing the main findings from the focus groups and one-on-one interviews will accompany the survey draft. External peer review is beyond the scope of this initial effort, but both the survey instrument and interview and focus group report will be reviewed prior to any comprehensive field study.

## **(7) Confidentiality**

The focus group or interview questions and framework will fully conform to federal regulations, specifically the Privacy Act of 1974 (5 U.S.C. 552a), the Hawkins-Stafford Amendments of 1988 (P.L 100-297), and the Computer Security Act of 1987. Each prospective respondent will be informed that their participation in the exercise is voluntary. The identities of the individuals will be kept confidential by the investigators and not associated with their responses in any report.

## **(8) Sensitive Questions**

There are no questions included in the survey materials on sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private or sensitive material.

## **(9) Respondents**

Respondents will be members of the general public volunteering to participate in focus groups and interviews. Participants will include tourists, year-round residents, seasonal residents, and second-home owners in coastal New England. They will be recruited so as to provide adequate representation of the target population.

## **(10) Collection Schedule**

The project timeline depends on the results of the focus groups and interviews, as well as external constraints. The associated projects, SHC 4.61 and SSWR 3.04A continue through FY19. We plan to complete the focus groups and interviews during this time period. The focus groups for the survey design will happen as soon as practical during the summer of 2016, following OMB approval, as the process moves forward to develop the survey instrument. Some of these focus groups will include draft survey questions to develop the survey instrument, progressing towards a draft instrument.

The second set of focus on recreational use and sense of place are also planned to begin in the summer of 2016. These focus groups will need to be conducted across time (i.e., some must be conducted in the summer to capture seasonal populations, and others can be conducted during the off-season) to get a sample of the relevant populations. These focus groups will likely be continued through the summer of 2017.

The third set of focus groups are planned to begin in the fall of 2016 and again will have to occur throughout multiple seasons and years to capture the relevant groups, in this case residents and practitioners. The interviews will be conducted starting this summer 2016 and continue through the end of our project FY19.

Recruitment for the focus groups and interviews will vary depending on the target population. Focus group recruitment will be conducted by a professional survey group under contract. They will also arrange for locations and payment of honoraria to participants. We will recruit interview subjects ourselves, using stakeholder lists along with the snowball method (Biernacki and Waldorf, 1981). We recognize that second homeowners will be more challenging to recruit, but there are number of community groups representing and consisting of a high percentage of non-resident owners, such as recreation clubs, where recruitment will be more fruitful. Many of the non-resident owners spend a considerable amount of time on the Cape in the summer and should be available during those months at those addresses. In addition, the Cape Cod Commission has previously surveyed non-resident homeowners and has a database of contacts that could be used in coordination with the commission. Tourists will be screened from a wider general population within common travel distance to the Cape.

## **(11) Respondent Burden**

Participants for focus groups and individual interviews will consist of residents from the coastal communities on Cape Cod, Massachusetts, including: Barnstable, Chatham, Dennis, Falmouth, Harwich, Mashpee, and Yarmouth. Additional populations may consist of those from several coastal areas, including the communities between southern New Hampshire, Rhode Island, and Suffolk County (Long Island), NY. We plan to conduct a maximum of 20 two-hour, voluntary focus groups of approximately 10 people each. The respondent burden is 400 hours. We also plan to conduct 60 two-hour, one-on-one interviews with a respondent burden of 120 hours. The total burden is therefore 520 hours.

In summary, the total burden consists of:

Focus groups: 20 groups \* 10 people/group \* 2 hours/person = 400 hours

One-on-one interviews: 60 people \* 2 hours/person = 120 hours

For a total burden of 520 hours.

## REFERENCES

Bazerman C and Prior P. (Eds.). 2003. What writing does and how it does it: an introduction to analyzing texts and textual practices. London: Routledge.

Bockstael, N. E., et al. 1987. Estimating the value of water quality improvements in a recreational demand framework. *Water Resources Research* 23(5): 951-960.

Biernacki, P. and D. Waldorf. 1981. Snowball sampling: problems and techniques of chain referral sampling. *Sociological Methods & Research*. 10(2): 141-163.

Cape Cod Commission. 2013. Cape Cod Regional Wastewater Management Plan: Environmental Assessment-Water Quality. March 2013. Available online: [http://www.capecodcommission.org/resources/RWMP/RWMP\\_ea\\_water.pdf](http://www.capecodcommission.org/resources/RWMP/RWMP_ea_water.pdf) Accessed: January 12, 2016.

Cape Cod Commission. 2015. Cape Cod Area Wide Water Quality Management Plan Update. June 2015: Available online: [https://sp.barnstablecounty.org/ccc/public/Documents/208%20Final/Cape\\_Cod\\_Area\\_Wide\\_Water\\_Quality\\_Management\\_Plan\\_Update\\_June\\_15\\_2015-Printable.pdf](https://sp.barnstablecounty.org/ccc/public/Documents/208%20Final/Cape_Cod_Area_Wide_Water_Quality_Management_Plan_Update_June_15_2015-Printable.pdf) Accessed: February 4, 2016

Cape Cod Commission. 2014. Cape Cod Commission Comprehensive Economic Development Strategy (CEDS). June 2014: Available online: [http://www.capecodcommission.org/resources/economicdevelopment/2014CEDS/CEDS\\_FULLDOCUMENT-FINAL-sm.pdf](http://www.capecodcommission.org/resources/economicdevelopment/2014CEDS/CEDS_FULLDOCUMENT-FINAL-sm.pdf) Accessed: February 4, 2016

Cuba, L., and D.M. Hummon. 1993a. Constructing a sense of home: place affiliation and migration across the life cycle. *Sociological Forum*. 8(4): 547-572.

Cuba, L. and D.M. Hummon. 1993b. A place to call home: identification with dwelling, community, and region. *The Sociological Quarterly*. 34(1):111-131.

Egan, K. J., et al. 2004. Recreation demand using physical measures of water quality. Iowa State University, Department of Economics, Staff General Research Papers.



Krippendorff, K. 1989. Content analysis. In E. Barnouw, G. Gerbner, W. Schramm, T. L. Worth, & L. Gross (Eds.), *International encyclopedia of communication* (Vol. 1, pp. 403-407). New York, NY: Oxford University Press.

Hilger, J. and M. Hanemann. 2006. Heterogeneous preferences for water quality: a finite mixture model of beach recreation in Southern California. California Sea Grant College Program.

Jorgenson, B.S., and R.C. Stedman. 2001. Sense of place as an attitude: lakeshore owners' attitudes toward their properties. *Journal of Environmental Psychology*. 21:233-248.

Kaoru, Y. 1995. Measuring marine recreation benefits of water quality improvement by the nested random utility model. *Resource and Energy Economics*. 17(2):119-136.

Krippendorff, K. 2012. *Content Analysis: An Introduction to its Methodology*. Sage Publications.

Kyle, G., A. Graefe, R. Manning, and J. Bacon. 2004. Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. 24:213-225.

Matarrita-Cascante, D., R. Stedman, and A.E. Luloff. 2010. Permanent and seasonal residents' community attachment in natural amenity-rich areas. *Environment and Behavior*. 42(2):197-220.

Opaluch, J. J., T. Grigalunas, M.J. Mazzotta, J. Diamantides, and R. Johnston. 1998. Resource and recreational economic values for the Peconic Estuary. Economic Analysis, Inc., Peace Dale, Rhode Island. Report prepared for Peconic Estuary Program, Suffolk County Department of Health Services, Riverhead, NY.

Stedman, R., B.L. Amsden, and L. Kruger. 2006. Sense of place and community: points of intersection with implications for leisure research. *Leisure*. 30(2):393-404.

Williams, D.R., M.E. Patterson, J.W. Roggenbuck, and A.E. Watson. 1992. Beyond the commodity metaphor: examining emotional and symbolic attachment to place. *Leisure Sciences*. 14:29-46.

Wood, A., M. Blackhurst, T. Hawkins, X. Xue, N. Ashbolt, and J. Garland. 2015. Cost-effectiveness of nitrogen mitigation by alternative household wastewater management technologies. *Journal of Environmental Management*. 150:344-354.