

SUPPORTING STATEMENT
Identifying Perceived Benefits and Disadvantages
of Restoration Adoption in an Urbanizing Watershed
FOCUS GROUPS & INTERVIEWS

Part A

Section 1. Identification of the Information Collection

1(a) Title of the Information Collection:

Identifying Perceived Benefits and Disadvantages of Restoration Adoption in an Urbanizing Watershed.

1(b) Short Characterization/Abstract:

Degraded urban streams are not only characterized by poor local water quality and quantity, but also can export excess nutrients and sediments to sensitive downstream estuarine systems. Restoration of wetlands and riparian areas is one of a suite of “green infrastructure” practices to help reduce velocity of overland flows and bank erosion and increase nutrient retention. Much current research at EPA is focused on gains in sustainability that may be provided by green infrastructure approaches over engineered “gray” approaches (see <http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm>). Green approaches are sometimes less expensive, and also provide many co-benefits in the form of ecosystem services, and thus may lower the total social costs of environmental improvements (U. S. EPA., 2012). Also, where water quality impairments are significant, traditional gray approaches alone may not achieve the necessary level of water quality improvements, or their costs may approach levels that are not affordable by the urban populations required to pay for them. This is an issue in the Providence, Rhode Island area, which includes the Woonasquatucket watershed, where the costs of combined sewage overflow and tertiary treatment methods required to meet nutrient targets for Narragansett Bay are projected to reach levels that could exceed 2 percent of median income for sewer rate-payers (Uva, 2012). Thus, green approaches are becoming more popular as part of a whole-systems approach to achieving needed environmental improvements.

EPA regional offices often work with states, municipalities, and NGOs to assist them in developing strategies to meet water quality objectives in particular watersheds. EPA regional offices and their state partners are actively encouraging green infrastructure approaches to supplement increasingly costly gray approaches (NYC DEP 2010, Pickering et al. 2012, Uva et al. 2012). An understanding of the full range of benefits and co-benefits from green infrastructure approaches can support decisions regarding whether and how to spend public funds on restoration within a watershed. Evaluation of co-benefits will also help local or regional resource managers and NGOs obtain increasingly scarce funding for restoration projects. Most urban watershed managers and regional EPA offices do not have the resources to conduct dollar valuation to evaluate implementation of green infrastructure. Yet, understanding the economic benefits of restoration within a watershed, even in qualitative terms, can add important information to evaluation of policies and actions. Our research aims to provide an approach to developing non-dollar benefit indicators of the ecosystem services provided by urban wetlands and riparian buffers.

In the overall project—A Decision Support Approach for Evaluating the Ecosystem Services and Social Benefits from Urban Wetland and Stream Buffer Restoration—we will develop an indicator-based approach to evaluating ecosystem services and benefits provided by freshwater wetlands restoration, which links to a functional wetlands assessment methodology initially developed for RI state managers (Golet et al., 2003; Miller and Golet, 2001). While there are many existing wetlands functional assessment tools (e.g, Wetland Evaluation Technique (WET), Habitat Evaluation Procedures (HEP), Hydrogeomorphic Method (HGM)), they typically do not estimate ecosystem services and benefits explicitly. Furthermore, neither the available wetlands functional assessment tools nor the tools available for environmental cost-benefit analyses are routinely used at the state or local level, because of their complex data requirements. The approach will relate the wetlands functions in the Miller and Golet tool to categories of ecosystem services produced or supported by those functions, and will provide criteria for developing indicators of the social benefits from those ecosystem services. The goal of the overall study is to develop a practical approach to be used by managers or other decision makers when evaluating restoration potential, benefits, and feasibility.

A primary objective of the research is to advance methods for developing and applying non-monetary indicators of non-market economic values, and thus will build on existing approaches in the literature (Banzhaf and Boyd, 2005; Boyd and Wainger, 2002; King et al., 2000; Wainger et al., 2010; Wainger et al., 2001). The criteria for these benefit indicators will be based on economic welfare theory, and will incorporate aspects of the various factors that affect economic value: scarcity, availability and cost of substitutes, availability and cost of complements, diminishing marginal utility, elasticity of demand, extent of the market, and expected value over time. Working out how to incorporate these factors into value indicators in a theoretically sound manner is an important part of the overall project, and this work is in progress. In general, we are working on formulating a consistent approach to developing non-market value indicators that is grounded in the economic theory of non-market valuation. We will combine our theoretical model with information from reviews of empirical studies which evaluate factors that contribute to higher values for the ecosystem services of interest in our project. Based on this information, we will develop a set of value indicators for our project, and also a theory-based approach for developing non-market value indicators in other contexts.

Yet, understanding benefits alone does not ensure that projects will be implemented. Implementation of these projects, on both private and public lands, often depends upon public buy-in and support. Research has shown that the adoption of restoration practices on private land and support for restoration on public land is influenced by a number of technical, financial, and social factors (Hersha et al., 2012; van Marwijk et al., 2012). And while the social barriers to riparian restoration have been well-studied in rural agricultural settings, less is known about social barriers in suburban and urban settings (Armstrong and Stedman, 2012; Dutcher et al., 2004; Wagner, 2008). Current work shows that perceptions vary, both from place to place (Asah et al., 2012; Brierley et al., 2006; Wagner, 2008) and by land use type (agricultural, urban, suburban) (Barbosa et al., 2012; U.S. EPA, 1994).

Therefore, to support the broader project of developing an indicator-based approach to evaluating ecosystem services and benefits provided by freshwater wetlands restoration, this sub-project uses interviews and focus groups to explore public perceptions of services and disservices associated with restoration of riparian areas and wetlands in an urban setting on public land, focusing on the Woonasquatucket

Watershed in Rhode Island. The process of indicator development includes a number of steps, including:

1. Reviewing economic theory of demand and non-market values, and developing the theoretical basis for ecosystem service demand and benefit indicators (using household production theory).
2. Reviewing existing ES value indicators approaches and applications, relating those to our theoretical model, and revising or augmenting them as appropriate to develop a theoretically-consistent indicator framework.
3. Devising and testing ways to implement such a framework, using examples from the Woonasquatucket Watershed.

Step 3 is where this research fits with the overall project. A further breakdown of this step includes:

- a. Reviewing literature to collect existing empirical information required to implement an indicator approach (e.g., empirical evidence from valuation studies of the factors that increase or decrease demand and values for each of the important ES).
- b. Using input from these interviews and focus groups to fill gaps in the literature, particularly as related to values and preferences in urban watersheds. We've a few areas of particular interest where focus groups will provide needed information. These include perceptions of the effects of restoration on flood risks; aesthetic values and tradeoffs between aesthetic values and other possible benefits from restoration; and spatial issues related to the "service-shed" vs. the "benefits-shed" for ecosystem services (e.g., ecologists can measure the spatial trajectory of *potential* service flows, but these do not always match people's perceptions of trajectories or extent of the market for benefits).

These initial interviews and focus groups provide an important first step to better understanding public perceptions regarding riparian restoration efforts and may inform future collection efforts. We anticipate that these initial interviews will provide useful information on how best to collect information on potential public barriers for these types of projects that would help fill knowledge gaps that become apparent as investment in the development of the indicators progresses. We hope to extend the project (as FY14 and 15 funding allows) to incorporate decision analysis methods, combined with Bayesian belief networks as methods of combining and comparing non-dollar indicators. The focus group and interview research will provide a first step towards informing such efforts.

The Woonasquatucket River watershed is a small basin (HUC-12, ~50 square miles) that flows from mixed suburban and agricultural settings in its headwaters into highly urbanized neighborhoods downstream. It encompasses portions of eight municipalities, whose residents comprise a wide range of demographics. A very active watershed organization (the Woonasquatucket River Watershed Council) has helped to implement a number of riparian restoration projects throughout the watershed, but these have met with varying degrees of community support. Some efforts to re-vegetate denuded stream banks in the watershed have met with resistance from local citizens.

Often, in an urban area, public green spaces are scarce, and different ways of managing these spaces can provide different mixes of ecosystem services. The ecosystem services provided by public lands are subject to conflicting preferences by members of the public. For example, a vegetated buffer along a public waterway may provide water quality and flood risk reduction benefits, which are likely to be highly valued in areas where water quality is impaired and flooding has occurred in the past, such as the Woonasquatucket Watershed. Yet, local residents may also hold conflicting preferences, or some benefits may accrue to downstream residents while those upstream may perceive a disamenity. Watershed residents have, in at least one case—regarding the Pleasant Valley stream—expressed a preference for mowed grass along the riverbank rather than a vegetated buffer, perceiving vegetated buffers as providing disamenities. In the Pleasant Valley case, some residents expressed opposition to a vegetated buffer because they felt that vegetated buffers may become an eyesore by collecting trash and may also be habitat for vermin. These same people, however, may value flood protection and water quality benefits, though they may not be fully aware of the tradeoffs they are expressing in their opposition to vegetated riparian areas.

This study will examine public perceptions of the economic, social, and aesthetic benefits and perceived drawbacks of restoration efforts in the Woonasquatucket watershed. A primary purpose of this portion of the overall project is to better understand public preferences for vegetated buffers on public land in an urban area, including the public's understanding of and values for flood risk reduction and water quality benefits, and how these may or may not conflict with aesthetic preferences and other perceived services and disservices. This research will apply methods from other social sciences, e.g., communication and human geography, to inform the overall economic analysis of ecosystem service benefit indicators for wetland and riparian restoration. By combining and coordinating approaches, we hope to inform the indicator development by providing a better understanding of how people perceive and value the tradeoffs involved in urban wetlands and buffer restoration, and how spatial factors (e.g., local effects on downstream areas) factor into their preferences. Taken in total, our research will provide a more complete picture of both the factors that make restoration socially beneficial and the public's attitudes and preferences (including behavioral barriers and supports) toward restoration.

We will begin by conducting one-on-one or small group interviews of natural resource managers and organizational stakeholders about the watershed and their impressions of public attitudes toward restoration efforts. We will then conduct focus groups with members of the general public to better understand their attitudes towards and perceptions of restoration efforts on public land. The goal of these interactions will be to better understand how people define services and disservices resulting from restoration, the socio-cultural drivers of support for or opposition to implementation of restoration, and community members' perceived benefits from restoration. The information collected will be analyzed using standard methods of qualitative data analysis (Lindlof and Taylor, 2011; Patton, 2002; Saldana, 2009).

The preference information gathered from these focus groups will be incorporated into the larger project in two main ways. First, it will inform the creation of ecosystem service categories included in the indicator approach and the measures selected as indicators of benefits from those services. Second, it will inform the research objective of combining economics and other social science approaches to better understand the barriers to successful implementation of restoration strategies, through exploring how watershed citizens perceive the range of services and benefits, including the more apparent and easily recognized services such as aesthetics and the less apparent but also valuable services such as downstream

water quality improvements. The results of this study will be submitted for publication in a peer-reviewed journal (e.g., *Journal of Environmental Planning and Management*). We further expect that this project will add to the understanding of social factors that influence restoration potential and feasibility -- information that will hopefully be useful to state and local decision makers.

Section 2. Need for and use of the Collection

2(a) Need/Authority for the Collection

Need for the collection

Revegetating buffer areas is a primary focus of riparian restoration in the Woonasquatucket watershed. Several studies have specifically addressed the perception of benefits and aesthetics of practices resulting in the presence or absence of vegetation in a riparian zone, with conflicting results. Some studies show that the presence of vegetation in the riparian area is favored by residents, specifically that there is a preference for vegetated or 'natural-appearing' landscapes (Wagner, 2008). However, a strong preference for mowing right up to the edge of a stream has also been shown, based on a preference for perceived 'neatness', and cultural norms (Dutcher et al., 2004). This research will add to the existing literature, by further examining these divergent findings about aesthetic preferences, as well as research into the public perception of restoration benefits.

In an adaptive ecosystem-based management framework, it is important to understand not only the biophysical need for ecosystem restoration, but also the benefits to the community, and the capacity of the community to adopt these changes. All ecosystem-based management priorities are influenced by societal values (Lackey, 1998). From a technical point of view, there are many biophysical benefits to be gained from riparian and wetland restoration ranging from improved wildlife habitat and downstream water quality to flood abatement (Zedler and Kercher, 2005). Yet, although the biophysical benefits may be clear, local residents may not perceive, understand, or value those benefits; or they may be motivated by other factors. For example, a study of local resistance toward management of neighboring protected areas found that the presence or lack of opposition from local residents depended upon several factors, including their trust in park managers, their attitudes towards the neighboring park and their perceptions of the attitudes of their peers, and their environmental attitudes (Stern, 2008). These social attributes influenced their assessment of the benefits and disadvantages of different alternatives and their trust of the managers (Stern, 2008). Better understanding of these types of social factors will enhance our understanding of public preferences related to urban restoration as well as perceived tradeoffs. This understanding will inform the larger project: the development of a framework for using qualitative information to estimate ecosystem service benefits from urban restoration. These interviews and focus groups will provide important information for this larger effort regarding social and behavioral factors relating to urban restoration, an area that has not been well-studied.

An important anticipated outcome of our research will be the demonstration of how economic approaches, combined with approaches from other social sciences, can more fully inform watershed-scale management decisions. Current ecosystem services research at EPA and elsewhere is emphasizing trans-disciplinary approaches, but has primarily focused on combining economics and biophysical sciences. In this project, we hope to show how approaches from economics, communication, and human geography can be coordinated in a single project and linked to existing

ecological approaches, to provide an approach that could lead to more informed decisions that are more easily implemented.

Authority for the collection

This data collection is conducted for research purposes; there are no legal requirements. The materials prepared for these discussions 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.

2(b) Practical Utility/Users of the Data

As mentioned above, the social dimensions of adoption of restoration practices in agricultural settings have been reasonably well-studied, but fewer studies have looked at these issues in urban or suburban settings. We hope to help fill that knowledge gap.

Primarily, we intend that the research results will contribute to the development of trans-disciplinary approaches related to people's preferences for and tradeoffs around ecosystem services, and also be useful to practitioners who are attempting to implement riparian and wetland restoration in an urban or suburban setting. We are working with several local and regional natural resource managers who have already expressed interest in the results of the research. These include managers at the Rhode Island Department of Environmental Management and the Narragansett Bay Estuary Program, EPA Region 1 staff, and local NGOs(see Section 3c for a list of those with whom we have already been in contact). Users of the data from this proposed study also include the community of researchers, both inside and outside of the EPA, interested in understanding the social barriers to restoration practices and, more generally, those interested in understanding the social, economic, and institutional aspects of ecosystem-based adaptive management.

We intend that the information on preferences and the social dimensions of support or barriers to restoration will help managers understand the tradeoffs involved in trying to restore wetlands and buffers in urban areas, and to better understand the factors that will lead to successful implementation of restoration. This focus group and interview research will inform the overall indicator approach by illuminating potential tradeoffs between services that may be more readily apparent to the public (aesthetics, perceived protection from vermin) and services that may be less well-understood (how vegetation improves flood protection and water quality.) We may also, in the course of the interviews, discover other services or disservices that we are unaware of.

Section 3. Non duplication, Consultations, and Other Collection Criteria

3(a) Non duplication

It is not expected that any of the information to be submitted to the EPA during these interview and focus group studies is duplicative or is already in the possession of the Federal Government. The proposed focus groups and interviews will address the needs of the Agency and our partners, and will contribute to the literature, by providing information on community preferences for restoration in urban areas where there is significant opportunity to provide both environmental improvements and public benefits by restoring riparian areas and wetlands.

3(b) Public Notice Required Prior to ICR Submission to OMB

Public notice is not required for an information collection under the existing generic approval.

3(c) Consultations

This is a new collection so no periodic consultations have been conducted related to this effort.

Every effort will be made to incorporate best practices guidance for focus group and individual interviews for this study through consultations with experts in the field and an ongoing literature review that is already underway and will be completed prior to commencing the one-on-one interviews and subsequent focus groups. We have ongoing communication with a number of professionals inside and outside the Agency who have experience with qualitative research, riparian restoration in the state, or local experience in the Woonasquatucket. We have selected an ORISE fellow (Caroline Gottschalk Druschke, PhD, Assistant Professor, University of Rhode Island) for this project who is skilled in social science methods, and who has experience applying qualitative research approaches to environmental issues in collaboration with economists and ecologists as part of a trans-disciplinary IGERT training program (Druschke, 2013). She began working on the project part-time in mid-February 2013, and will be participating on a full-time basis over the summer of 2013.

Names and affiliations of persons with whom consultation relevant to this project has occurred, either in-person, via email, or over the phone, are:

- Matt Weber, PhD, Economist US EPA ORD, WED;
- Margarita Pryor, Environmental Programs Specialist, US EPA, Region I;
- Patricia Bradley, Environmental Program Manager, US EPA ORD, AED;
- John Carriger, Ecologist, US EPA ORD, GED;
- Marilyn TenBrink, Special Assistant to the Director, US EPA ORD, AED;
- Alicia Lehrer, Executive Director, Woonasquatucket River Watershed Council;
- Tiffany Smythe, PhD, Social Scientist, U.S. Coast Guard Academy;
- Erika Washburn, PhD, Social Scientist, Coastal Conservation Planner, The Nature Conservancy;
- Tom Ardito, Restoration Program Manager, Narragansett Bay Estuary Program; and
- Carol Murphy, Wetlands Program, Water Resources Division, Rhode Island Department of Environmental Management.

We will be working closely with many of these individuals and groups as the project progresses, to get their feedback on our efforts and also to ensure that our outcomes will be most useful for their policy and decision needs. Several of those listed here—EPA Region 1, the RIDEM wetlands program, the Narragansett Bay Estuary Program, and the Woonasquatucket River Watershed Council—are intended final users of our approach and thus will be consulted more frequently as we progress. We are also actively participating in the Rhode Island Habitat Restoration team, a group of representatives from state and federal agencies and non-profit organizations coordinated by the RI Coastal Resources Management Council. The Team's purpose is to improve Rhode Island's environment by facilitating restoration of the state's habitats. This includes restoration planning and prioritization, project implementation, technical assistance, public outreach and education, monitoring, research and leveraging resources. We will be presenting updates of our work and soliciting feedback at regularly scheduled meetings of the team.

We will request comments on our research protocol and focus group/interview questions from EPA and URI researchers with experience in interview and focus group methods. The protocol and questions will also be subject to University of Rhode Island Institutional Review Board approval, because of Dr. Druschke's participation in the project and her status as a faculty member at University of Rhode Island. Prior to implementing focus groups with the public, we will conduct a practice focus group with several federal employees at the Atlantic Ecology Division in Narragansett, Rhode Island, to further develop the focus group questions and to gain feedback from a participant perspective. Manuscripts, presentations, and reports will undergo internal peer review prior to publication, according to AED's and US EPA's SOP regarding scientific products (outlined in U.S. Environmental Protection Agency Peer Review Handbook (3rd Edition) (EPA/100/B-06/002)). Any manuscripts based on this work will be submitted to peer-reviewed journals, and thus subject to external peer review prior to publication.

3(d) Effects of Less Frequent Collection

Each focus group or interview will be a one-time collection exercise for the enrolled participants.

3(e) General Guidelines

This collection does not violate any of OMB's general guidelines for information collections.

Information will be collected according to the guidelines in 5 CFR 1320. Respondents will be asked to participate in one focus group or interview and their participation will be voluntary. The collection will be a one-time event and there will be no need for participants to maintain records or submit documents or proprietary trade secrets. There will be complete protection of any demographic information collected from participants—full names, phone numbers and addresses will not be associated with responses. Identifying information will be removed from all transcribed data. Each participant will be given a coded identifier and that code will be kept separately from the transcriptions.

EPA has developed EPA Information Quality Guidelines (2002) to ensure the utility, objectivity and integrity of information that is disseminated by the Agency. It is EPA's intention that collection of information under this ICR will result in information that will be collected, maintained, and used in ways consistent with both the EPA Information Quality Guidelines (2002) and the OMB Information Quality Guidelines (2002).

3(f) Confidentiality

Each focus group and interview 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. Participation in the interviews and focus groups will be voluntary and the identity of the participants will be kept confidential by the investigators and not associated with their responses in any report. When stakeholder groups or managers are engaged, only the names of the stakeholder groups or agencies will be reported and, in that case, only with the participants' permission: the identity of the participants themselves will remain confidential.

3(g) Sensitive Questions

No questions will be asked that are of a personal or sensitive nature.

Section 4. The Respondents and the Information Requested

4(a) Respondents/SIC Codes

One-on-one or small group interviews will be conducted with natural resource managers and organizational stakeholders involved in decision-making about or the practice of restoration efforts in the Woonasquatucket watershed. (Note: we may interview managers and stakeholders in small groups of 2-4 individuals, for example if we are talking with more than one person from the same office). These one-on-one or small group interviews will be conducted and completed before the focus group portion of the study gets underway. The one-on-one or small group interviews will be used to gather information about past restoration efforts and both positive and negative interactions with the general public on the subject of restoration. This information will be used to generate and refine questions posed to the focus groups. It will also be used as an object of analysis as we consider ecosystem services indicators for the broader project. Managers and organizational stakeholders will be representing their own views, rather than officially representing the views of their employers.

The target population for focus group discussions will include participants who reside in the Woonasquatucket River watershed. Focus group participants will be members of the general public willing to participate, and will be recruited using non-probability purposive sampling (further described below) to provide adequate representation of a variety of viewpoints about restoration efforts in the watershed.

4(b) Information Requested

Respondents will be asked to participate in a moderated focus group discussion or a one-on-one or small group interview regarding Woonasquatucket River restoration based on whether they are a natural resource manager or organizational stakeholder (interview), or a member of the general public (focus group). These sessions will be held in multiple locations including government offices and community centers to minimize travel requirements for respondents. Interview respondents will be asked about restoration efforts in the watershed and about their dealings with the general public. Focus group participants will be asked about their thoughts, perceptions and beliefs in relationship to riparian and wetland restoration in the watershed; and their perceptions of and preferences related to services and disservices. When possible, the moderator/interviewer will ask participants to ground their responses with their experiences with the river and watershed. Draft scripts can be found in Appendix 1. These draft scripts are preliminary and are subject to change based on further preparatory research, consultations with the people listed above, internal review, and initial discussions with managers in the watershed.

Section 5. The Information Collected - Agency Activities, Collection Methodology, and Information Management

5(a) Agency Activities

Agency activities associated with this information collection will include:

- Revising focus groups and interview scripts and accompanying materials. See Appendix 1 for draft scripts for the initial interviews and focus groups.
- Moderating focus groups and conducting one-on-one interviews.
- Transcribing, analyzing, and summarizing focus group & interview results.

5(b) Collection Methodology and Management

We have elected to use a combination of semi-structured focus groups and one-on-one or small group interviews. These methods are flexible: they allow the investigator to adapt the questions along the way to incorporate information learned from earlier focus groups and interviews. Focus group and interview studies are directed group discussions that do not produce quantitative data. Rather, they enable skilled observers to understand more about the underlying views and assumptions of participating groups or individuals. To facilitate interpretation, discussions will be recorded and subsequently transcribed. Participants will be informed in advance that the sessions will be recorded. Transcripts and recordings will be maintained in the individual project files over the appropriate time frame under ORD's records management procedures.

We plan to employ a combination of mental model and rhetorical approaches for our data collection and coding. Mental models are the structures of understanding and beliefs by a person about a set of issues (Morgan et al., 2002). They have been used to help compare the understanding between different groups about environmental issues and planning efforts (López-Marrero and Tschakert, 2011; Smythe, 2011). Hersha, et al. (2012) developed a mental model of barriers to voluntary action in citizen decision making regarding streams and watershed stewardship, based on 20 expert interviews (Figure 1). This model categorized the barriers according to a set of influential factors: ecosystem knowledge, individual and social influences, policy and outreach, and perceived risk and decision making. While Hersha, et al. (2012) focused on the decision-making of private landowners (versus the general public) in regards to restoration practices, our approach would adapt this lens for investigating barriers to restoration efforts on public land. We will use the Hersha et al. (2012) mental model (figure 1) to generate the questions we ask of managers, organizational stakeholders, and members of the public and to aid in the coding of relevant themes from transcribed interviews and focus groups. Targeting both managers and local decision makers will allow us to compare the perceptions of restoration efforts across natural resource managers, organizational stakeholders, and diverse members of the general public. This mental model approach complements a rhetorical approach to data collection and analysis that places emphasis on the discursive aspects of participants' mental models. Rhetorical approaches attend to the ways that competing mental models play out through communication; they attend to the arguments that various stakeholders identify with and adhere to. This rhetorical approach has been used to investigate the competing concerns of managers and the general public (Peterson and Horton, 1995), the negative and positive associations that stakeholders bring to efforts for sustainability (Herndl et al., 2011), and the ways that members of the public identify with the watershed itself as a motivator for pro-conservation attitudes and behaviors (Druschke, 2013).

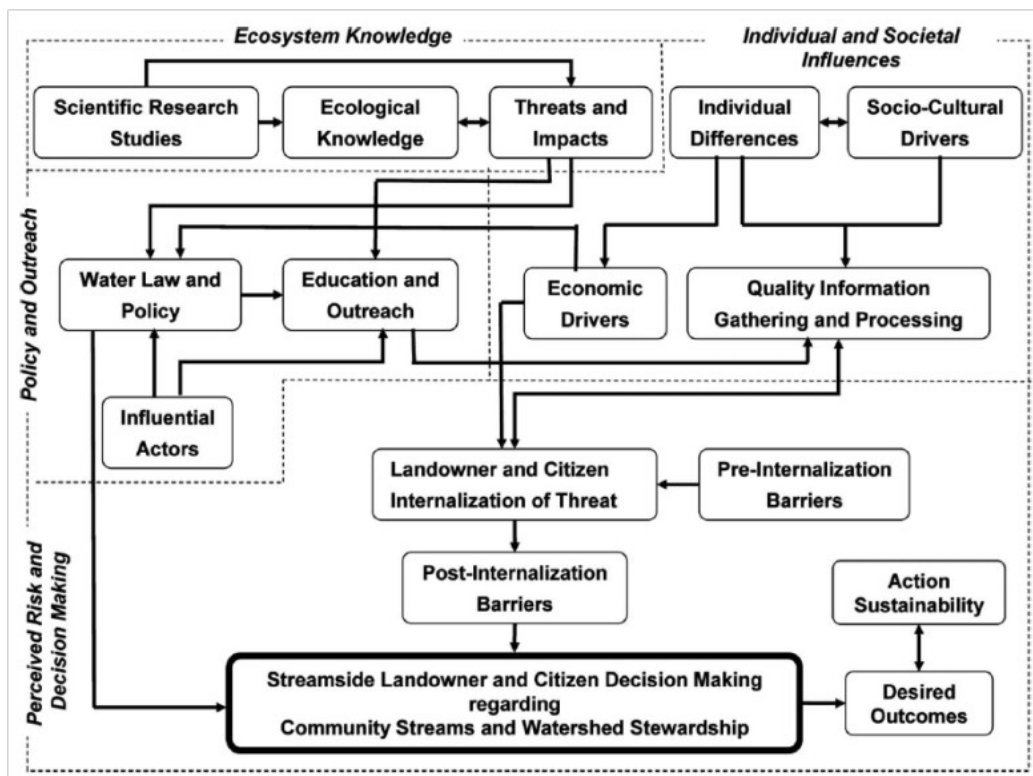


Figure 1. Simplified expert mental model of the factors influencing citizens decision-making about stream and watershed stewardship (Hersha et al. 2012).

Focus groups with local residents will gather information relating to their individual mental models, including: their levels of ecosystem understanding, the socio-cultural drivers influencing their decision to support or oppose restoration actions, and how aspects of each of these influence their perceptions of benefits and disservices associated with riparian and wetland restoration in their immediate area and in the watershed in general, as well as gathering information about the arguments they employ for and against restoration and the discursive frames they employ. Also, based on its importance in a number of previous studies, we may ask about trust in management (Januchowski-Hartley et al., 2012; Stern, 2008; U.S. EPA, 1994).

In general, we will be collecting information from members of the public to improve our understanding of the following topics as they pertain to the Woonasquatucket watershed:

- The types of preferences people have for urban wetlands and buffers, and what services people see them as providing;
- How people value aesthetics as compared to or in combination with other services;
- The attributes of places that matter, i.e. what factors make a place more preferred or valuable and why; and
- Whether there is general support or opposition to restoration, or whether it is based on specific outcomes or services.

We will conduct up to 20 interviews with natural resource managers and organizational representatives and up to 10 focus groups with 6-8 members of the

general public per group. We will employ snowball sampling for individual interview recruiting. We will begin by contacting high-profile managers and organizational representatives who have been involved in restoration efforts in the watershed for interviews. We will then ask these participants to recommend other interviewees who are managers or organizational stakeholders who have been involved in restoration efforts in the watershed.

We will use a combination of heterogeneity and non-proportional quota sampling (methods of non-probability purposive sampling, as is snowball sampling) for focus group participation selection (Lindlof and Taylor, 2011; Oliver, 2006; Patton, 2002). Heterogeneity sampling encourages the inclusion of a broad spectrum of views and opinions on an issue. Non-proportional quota sampling ensures that even small groups are well-represented in the sample. This method seems most effective for recruiting a group of participants that will inform us about the possible range of opinions about watershed restoration efforts among a variety of different groups. In general, qualitative research recruiting will not yield a large enough sample to be representative of the population, so we are not attempting to create a random sample. Rather, we hope that focus group participants will represent a range of viewpoints about the Woonasquatucket watershed and wetlands restoration efforts. Members of the general public who reside in or have an interest in the Woonasquatucket watershed will be approached through means that may include: advertising at local school events; advertising in the local paper; random digit dialing in the region; and posting on freely accessible websites frequented by a broad cross-section of persons. We will also use snowball sampling where study participants recommend other possible participants. In particular, we are interested in including participants who oppose restoration efforts, not just those who support them. Once potential participants are contacted, they will be screened based on their location of residence (within the Woonasquatucket watershed) and age (18 or over). Focus group participants will not be expected to match census characteristics for the region because statistically significant inference about the general population will not be possible with small sample sizes. The overall intent is to elicit participants' perceptions of the benefits and disservices of restoration efforts. Focus group participants will have a chance to describe their own perspectives (see the draft script, Appendix 1). They may also be shown maps and photos or illustrations as visual aids or to explore especially valued portions of the watershed (Raymond et al., 2009) or aesthetic preferences for restoration efforts (Nassauer and Corry, 2004). If we should choose to use visual aids, we will carefully screen them within our research team, and through review by partners and colleagues, to avoid details that could bias participants.

5(c) Small Entity Flexibility

As this project has the goal of contacting both members of the general public and representatives of organized stakeholder groups, information may be collected from small businesses, small organizations, or small governmental jurisdictions as a result of this information collection. It will be made clear that participation is completely voluntary and that participants express only their own views rather than the views of their organizations. To reduce burden on representatives of small entities, we will attempt to conduct interviews at their offices. Conducting individual interviews by phone is also a possibility, though face-to-face interviews are preferable.

5(d) Collection Schedule

An ORISE fellow, Caroline Gottschalk Druschke, PhD, was selected for this project and began her participation in mid-February 2013. We also have a student intern, who is

currently conducting an annotated bibliography for the project, which will be completed in April 2013. The project team is currently reviewing existing documents from restoration activities in the watershed (to be completed in April 2013) to prepare for interviews and focus groups. Recruiting for one-on-one interviews of natural resource managers and organizational stakeholders will take place during July 2013 (once this ICR is approved), with interviews scheduled during July 2013. Focus group recruitment will begin in July 2013, with focus groups taking place in July and August 2013. Interview and focus group transcription will begin immediately and continue until the bulk of the recorded interviews and focus groups are transcribed. Transcribed data will then be coded and analyzed by the research team. The research team will then draft their final report on this component of the research. The results of the interviews and focus groups will be combined with other components of the indicator research as the project progresses. The overall project is scheduled for completion at the end of September, 2014.

Section 6. Estimating the Burden and Cost of Collection

This burden statement includes the burden of focus groups and individual interviews for stakeholder groups and members of the general public. The only burden imposed by the interviews on respondents will be the time required to participate in focus group discussions and answer interview questions. It is estimated that this will require an average of 2 hours per respondent (including screening). Up to 10 focus groups with 6 to 8 participants each, and up to 20 interviews with managers and stakeholders (either as individuals or small groups) are expected for a total of up to 100 respondents and a total of 200 hours.

In summary, the total burden for voluntary respondents consists of:
Focus groups:

- Screening: $10 \text{ groups} * 32 \text{ potential people per group} * 5 \text{ minutes per person} = 27 \text{ hours}$.
- Participation: $10 \text{ groups} * 8 \text{ people per group} * 2 \text{ hours per person} = 160 \text{ hours}$.
- Individual/small group interviews: $20 \text{ people} * 2 \text{ hours per person} = 40 \text{ hours}$.

For a total burden of 227 hours.

Literature Cited

- Armstrong, A., Stedman, R.C., 2012. Riparian Landowner Efficacy in an Urbanizing Watershed. *Society & Natural Resources* 25, 1193-1203.
- Asah, S.T., Blahna, D.J., Ryan, C.M., 2012. Involving Forest Communities in Identifying and Constructing Ecosystem Services: Millennium Assessment and Place Specificity. *Journal of Forestry* 110, 149-156.
- Banzhaf, S., Boyd, J.W., 2005. The architecture and measurement of an ecosystem services index, RFF Discussion Paper. *Resources for the Future*, Washington, D.C., p. 57.
- Barbosa, A.E., Fernandes, J.N., David, L.M., 2012. Key issues for sustainable urban stormwater management. *Water Research* 46, 11.
- Boyd, J., Wainger, L.A., 2002. Landscape Indicators of Ecosystem Service Benefits. *American Journal of Agricultural Economics* 84, 1371-1378.
- Brierley, G., Hillman, M., Fryirs, K., 2006. Knowing Your Place: an Australasian perspective on catchment-framed approaches to river repair. *Australian Geographer* 37, 131-145.
- Druschke, C.G., 2013. Watershed as Common-Place: Communicating for Conservation at the Watershed Scale. *Environmental Communication: A Journal of Nature and Culture* 7, 80-96.
- Dutcher, D.D., Finley, J.C., Luloff, A.E., Johnson, J., 2004. Landowner Perceptions of Protecting and Establishing Riparian Forests: A Qualitative Analysis. *Society & Natural Resources* 17, 319-332.
- Golet, F.C., Myshrall, D.H.A., Miller, N.A., 2003. Wetland Restoration Plan for the Woonasquatucket River Watershed, Rhode Island. University of Rhode Island, Kingston, RI 02881, p. 164.
- Herndl, C.G., Goodwin, J., Honeycutt, L., Wilson, G., Graham, S.S., Niedergeses, D., 2011. Talking Sustainability: Identification and Division in an Iowa Community. *Journal of Sustainable Agriculture* 35, 436-461.
- Hersha, D.K., Wilson, R.S., Baird, A.M., 2012. A conceptual model of the citizen stream stewardship decision process in an urbanising Midwestern United States watershed. *Journal of Environmental Planning and Management* 55, 253-270.
- Januchowski-Hartley, S.R., Moon, K., Stoeckl, N., Gray, S., 2012. Social factors and private benefits influence landholders' riverine restoration priorities in tropical Australia. *Journal of Environmental Management* 110, 20-26.
- King, D.M., Wainger, L.A., Bartoldus, C.C., Wakeley, J.S., 2000. Expanding Wetland Assessment Procedures: Linking Indices of Wetland Function with Services and Values, Wetlands Research Program. US Army Corps of Engineers, p. 51.
- Lackey, R.T., 1998. Ecosystem management: paradigms and prattle, people and prizes. *Renewable Resources Journal* 16, 8-13.
- Lindlof, T.R., Taylor, B.C., 2011. *Qualitative Communication Research Methods*, 3rd ed. SAGE Publications, Inc, Thousand Oaks, CA.
- López-Marrero, T., Tschakert, P., 2011. From theory to practice: building more resilient communities in flood-prone areas. *Environment and Urbanization* 23, 229-249.
- Miller, N.A., Golet, F.C., 2001. Development of a Statewide Freshwater Wetland Restoration Strategy, Final Research Report prepared for RI DEM Office of Water Resources and U.S. EPA Region 1. University of Rhode Island, Kingston, RI 02881, p. 161.
- Morgan, M.G., Fischhoff, B., Bostrom, A., Atman, C.J., 2002. *Risk communication: A mental models approach*. Cambridge University Press, Cambridge, UK.
- Nassauer, J.I., Corry, R.C., 2004. Using Normative Scenarios in Landscape Ecology. *Landscape Ecology* 19, 343-356.
- NYC DEP. 2010. *NYC Green Infrastructure Plan: A Sustainable Strategy for Clean Waterways*. New York City Department of Environmental Protection, New York, New York.
- Oliver, P., 2006. Purposive Sampling, in: Jupp, V. (Ed.), *The SAGE Dictionary of Social Research Methods*. SAGE, Thousand Oaks, CA.
- Patton, M.Q., 2002. *Qualitative Research and Evaluation Methods*, 3rd ed. Sage Publications, Thousand Oaks, CA.

- Peterson, T.R., Horton, C.C., 1995. Rooted in the Soil: How Understanding the Perspectives of Landowners Can Enhance the Management of Environmental Disputes. *Quarterly Journal of Speech* 81, 139-166.
- Pickering, N., J. Wood & S. Hsia. 2012. Controlling Combined Sewer Overflows in Chelsea, MA: Analysis of Green vs. Gray Infrastructure. Prepared for City of Chelsea by Charles River Watershed Association, Weston, MA.
- Raymond, C.M., Bryan, B.A., MacDonald, D.H., Cast, A., Strathearn, S., Grandgirard, A., Kalivas, T., 2009. Mapping community values for natural capital and ecosystem services. *Ecological Economics* 68, 1301-1315.
- Saldana, J., 2009. *The Coding Manual for Qualitative Researchers*, 2nd ed. SAGE Publications Ltd, Thousand Oaks, CA.
- Smythe, T., 2011. An Analysis of the Capacity of Coastal Management Practitioners to Develop Coastal Ecosystem-Based Management Plans, Marine Affairs. University of Rhode Island, Kingston, RI, p. 336.
- Stern, M.J., 2008. The Power of Trust: Toward a Theory of Local Opposition to Neighboring Protected Areas. *Society & Natural Resources* 21, 859-875.
- U. S. EPA., 2012. An Optimization Approach to Evaluate the Role of Ecosystem Services in Chesapeake Bay Restoration Strategies.
- U.S. EPA, 1994. Riparian Forest Buffers: Restoring and Maintaining a Vital Chesapeake Resource, in: Program, C.B. (Ed.), Ellicott City, MD.
- Uva, T., 2012. Narragansett Bay Commission Update, NOAA's Coastal Hypoxia Research Program (CHRP) Meeting, URI Coastal Institute.
- Uva, T., J. Motta, J. Kelly, P. Reitsma, C. Comeau & C. Oliver. 2012. Achieving Water Quality Standards by Implementing Sustainable Solutions. Poster by the Narragansett Bay Commission, <http://snapshot.narrabay.com/app/LearnMore/Posters>.
- van Marwijk, R.B.M., Elands, B.H.M., Kampen, J.K., Terlouw, S., Pitt, D.G., Opdam, P., 2012. Public Perceptions of the Attractiveness of Restored Nature. *Restoration Ecology* 20, 773-780.
- Wagner, M.M., 2008. Acceptance by Knowing? The Social Context of Urban Riparian Buffers as a Stormwater Best Management Practice. *Society & Natural Resources* 21, 908-920.
- Wainger, L.A., King, D.M., Mack, R.N., Price, E.W., Maslin, T., 2010. Can the concept of ecosystem services be practically applied to improve natural resource management decisions? *Ecological Economics* 69, 978-987.
- Wainger, L.A., King, D.M., Salzman, J., Boyd, J., 2001. Wetland value indicators for scoring mitigation trades. *Stanford Environmental Law Journal* 20, 413-478.
- Zedler, J.B., Kercher, S., 2005. Wetland Resources: Status, Trends, Ecosystem Services, and Restorability. *Annual Review of Environment and Resources* 30, 39-74.

Appendix 1: Interview and Focus Group Draft Scripts

For Land Managers and Local Decision Makers

Background and informed consent

Introduction:

Thank you for taking the time to talk with me/us. As you know, I'm a social science researcher at the Environmental Protection Agency in Narragansett. With me are my colleagues [insert names]. They will be observing the discussion and taking notes, mostly to help me remember what was said and to help refine our methods, but won't be participating, so please pretend that they're not here.

Our project focuses on the factors that influence whether the public will support riparian and fresh water wetland restoration. We're focusing on the Woonasquatucket watershed, but also on more general approaches that could be applied in other locations.

The purpose of this interview is to get a sense of your perspectives on the most important issues related to public support or opposition to restoring rivers, streams, and fresh water wetlands. We're interested in hearing about both specific locations and projects that you're familiar with, and also your general understanding of these issues. Based on our initial discussions with people like you, we'll be conducting focus groups of the general public, to understand their thoughts and opinions about restoration in the watershed.

[Early interviews] Our plan is to focus on one or two specific locations in the watershed, and we'll be asking you for your input on selecting those locations.

[Later interviews] We are focusing on [name particular location(s) in the watershed], and would like to know more about your experiences there.

The ultimate goal is to provide information and develop approaches that would help people like you better understand public preferences as well as perceived tradeoffs related to restoration in the watershed.

We will keep all interview data confidential to the extent required by law both in terms of your name and the name of any organization you might be affiliated with, unless you prefer otherwise. (Discuss if needed).

I will ask a question and allow you to respond, and I may ask follow-up questions to make sure I understand. There are no right or wrong answers. I just want your thoughts and understanding. The interview should last no more than 1 ½ hours.

I am taking notes, and would like to record our discussion so that I don't miss anything. It can be hard to remember everything that happens, and to make sure that things are remembered in context. Is recording OK with you?

And the last thing I need is your consent - do you consent to being interviewed?

Do you have any questions before we begin?

OK, let's start.

Example Questions

1. What is your involvement with restoration of freshwater systems in the region?
2. What do you see as the key barriers to successful freshwater restoration in the region?

Potential follow ups and focusing questions:

--What factors do you believe most influence public perceptions of restoration efforts?

3. What do you see as the key supporting factors for successful freshwater restoration in the region?

Potential follow ups and focusing questions:

--What factors do you believe most influence public perceptions of restoration efforts?

4. How do you think decisions made by local landowners and residents contribute to the success or failure of restoration efforts?

Potential follow ups and focusing questions:

-- Has this changed over time?

-- Does it vary by location or group of people?

5. What factors do you think would be most likely to facilitate successful restoration in the region?

6. [Early interviews] Are there specific locations or cases where these issues are or have been particularly important?

[Later interviews] What is your experience with public responses to restoration in [specific location]?

General interviewer prompts to use after initial questions:

Anything else? Could you tell me more about that? Can you give any specific examples of that? What causes that?

Why is that important? How does that work? Can you give me an example of that? How does that affect people?

Why was that a problem? Why was that successful?

End with:

Is there anything else you would like to add?

For Local Residents

Background and informed consent

Introduction:

Thank you all for coming. My name is [name], and I'll be facilitating the discussion today. I'm a social science researcher at the Environmental Protection Agency in Narragansett. With me are my colleagues [insert names]. They will be observing the discussion, mostly to take notes and help me remember what was said, but won't be participating. You can just pretend that they're not here.

The purpose of this focus group is to help us to understand your opinions about restoring rivers, streams, and wetlands in your neighborhood and [state specific area]. We are interested in talking with members of the general public [or, alternatively, insert name of a specific stakeholder group], and we hope that what you tell us will help managers make better decisions related to restoration efforts in this area, and better incorporate perspectives of people like you.

I plan to keep all interview data confidential to the extent permitted by law both in terms of your name and the name of any organization you might be affiliated with unless you prefer otherwise. (Discuss if needed).

I will ask a question and allow you to respond, and I may ask follow-up questions to make sure I understand. We're not looking for technical information – we're interested in your thoughts and opinions. There are no right or wrong answers. The discussion should last about an hour and a half. We'll take a short break in the middle, and will be done by [state time, 1.5 hours after start time].

We're taking notes, and would like to record our discussion so that I don't miss anything. It can be hard to remember everything that happens, and to make sure that things are remembered in context. Is recording OK with you?

And the last thing I need is your consent - do you consent to being interviewed?

Do you have any questions before we begin? OK, let's start.

Open-Ended Questions

1. Are you familiar with the Woonasquatucket River? What do you know about the river?
Follow up: how about streams that flow into the Woonasquatucket?
[Show map(s)] This is the area we're talking about.
2. Do you interact with the river or streams that flow into it at all? How? What about the river or its streams are important to you and why?
3. Are you familiar with the term "riparian area"? What does it mean to you?
Follow up: this is how we are defining "riparian area" [give general definition and show pictures of examples]
4. Do you live near a riparian area, or can you think of one in the area? Where, how far?
5. [Show photos of different types of riparian buffers] Looking at these photographs, are these riparian conditions desirable in your neighborhood? Why or why not?
What are your thoughts on riparian areas?
What do you see as the positives? The negatives?

Would you want a riparian area in your neighborhood? Why or why not?

6. Are you familiar with the term “riparian restoration”? What does that mean to you?
Follow up: this is how we are defining “restoration” [give general definition and show pictures of examples]
7. Have you noticed any riparian restoration efforts in your community? Have you been involved in those efforts?
What are your thoughts about those efforts?
8. Do you know of any organizations involved in the management and possibly restoration of public spaces in your community? Are you involved in any of those organizations?
9. Do you trust in these organizations to do a good job? Why or why not?
10. Thinking of a riparian area near you, what are your thoughts about how riparian areas affect streams and rivers?
11. How do you think waters and riparian areas of the Woonasquatucket affect Narragansett Bay?

General interviewer prompts to use after initial questions:

Anything else? Could you tell me more about that? Can you give any specific examples of that? What causes that? Why is that important? How does that work? Can you give me an example of that? How does that affect people? Why was that a problem? Why was that successful?

[Can use a similar set of questions for freshwater wetlands if we decide to focus on both riparian and wetland restoration. We will decide this based on initial interviews and selection of case study site(s)]

End with:

Is there anything else you would like to add?