

Sustaining Coastal Landscapes – Communication Audit and Mental Mapping Research Summary

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“Sustaining Coastal Landscapes and Community Benefits:

Developing an Interdisciplinary Model for Enhancing the Impact of NERRS Science”

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Introduction: If natural resource managers are to influence positive beliefs and behaviors toward riparian ecosystem services and shoreland protection then a clearer picture of how adults make meaning of these systems and themselves within them is critical (DeLauer 2013). Understanding adult beliefs, perceptions and values increases the opportunity for the Wells National Estuarine Research Reserve science to make the greatest impact with stakeholders and residents. The goals of the communications/mental modeling research stream were to evaluate current communication messages among the Wells Reserve and its partner stakeholders, capture Reserve staff and stakeholder beliefs about shoreland protection, test to see if those same beliefs were prevalent among residents within the Merriland, Branch Brook, and Little River (MBLR) watershed, and reevaluate communication messages and strategies to improve mutual understanding. The overarching research question was: *How should the Wells Reserve and its partner stakeholders communicate messages about shoreland protection and riparian buffers more effectively to build trusting relationships with residents, improve attitudes and change beliefs?*

Methods: A mental model methodology was adapted from Morgan et al’s (2002) work on risk communication and included three data collection techniques: communication audit, mental modeling interviews and a confirmatory questionnaire. First, a communication audit of the Wells Reserve and four other environmental organizations in the MBLR watershed was conducted. A communications audit is an inventory of communication efforts of an organization (Brooks et al 2010). This includes capturing key audiences, messages, techniques, available resources, and program evaluation (Downs and Adrian 2004). The goal of an audit is to identify effective communications and engagement practices, areas of improvement and resource needs. This audit provided baseline information about the ways the Reserve and stakeholders were communicating about shoreland protection and how might the research results improve how they communicate or what they communicate. Workshops and presentations by experts to landowners were the most common engagement methods. Messaging focused on land conservation, viewsheds and how land use affects water quality. Time, financial and staff resources were lacking to increase outreach efforts, evaluate them, and conduct social science research.

Mental modeling interviews were conducted after the communications audit. Mental models, also called cognitive models or mapping, are used in a variety of contexts to assess ways in which people comprehend complex and uncertain environmental issues (CRED 2009; Welp et al. 2006; Morgan et al. 2002). They depict a person’s beliefs about a concept, idea or system, including a representation of how a person interprets and relates disparate pieces of information and experiences.

Purposive and snowball sampling techniques were used to acquire a representative sample of 22 individuals of stakeholders, including municipal officials, developers and realtors, engineers, state officials and NGO staff. The first step in the mental modeling process was to conduct in-depth, open-ended interviews with this

representative sample. The goal of these interviews was to capture patterns of beliefs one has about shoreland protection and riparian buffers. These interviews began with very open-ended questions such as, “Tell me what you know about buffers.” Then questions such as, “You mentioned XX. Can you give me an example?” were asked to provoke participants to elaborate on their beliefs. As widely held or different beliefs became apparent, these patterns and divergences were further explored.

In qualitative research, data coding and analysis happen simultaneously. This involved identifying themes within the data and iteratively testing and retesting them to prove or disprove their salience. NVivo, a qualitative data analysis program, was used to organize the data and perform queries to explore latent connections in the data. Cohen’s Kappa statistic was used to ensure greater than 80% inter-rater reliability between two coders. This process resulted in three themes that described common patterns of inference and belief held by stakeholders: 1. Change perception about regulation; 2. Specifically target new and seasonal residents; and, 3. Communicate with more empathy when working with landowners.

Using these data, individual mental models were created first to explore individual cognitive processes. Next aggregate mental models were created using a program called Vensim to visually depict the beliefs stakeholders’ collectively held about these three themes. The cognitive linkages illustrated in the final models showed shared frames of meaning among 50% or more stakeholders. An example is given at the end of this section.

Using the mental model findings, a set of confirmatory questions were added to the project’s choice experiment survey to confirm whether the patterns of inference and belief found among stakeholders’ mental models were also present among a large population of residents, i.e. $n = 1,126$.

Mental Model Findings

How should the Wells Reserve and its partner stakeholders communicate messages about shoreland protection and riparian buffers more effectively to build trusting relationships with residents, improve attitudes and change beliefs?

There were three collective beliefs that stood out among Wells staff and its stakeholder partners.

1. Perception about regulation must change so that landowners believe regulators are interested in the natural resources on *their* properties and are evaluating them on a case-by-case basis.
2. One’s identity as a “Mainer” only assumes an interest in environmental custodianship if you are a long-time resident; new and seasonal residents are mainly interested in ownership. An effort must be made to target new and seasonal residents with messages that encourage environmental custodianship.
3. To more fully engage landowners, they must be communicated to with empathy so that they believe that their property rights are being considered equally to environmental protection.

Likert scale questions were created related to these three beliefs to test agreement among residents.

1. To maintain a high quality of life in Maine, it is important to balance development with preservation and conservation.
2. I have heard of the Shoreland Protection Act.

3. I understand the goals of the Shoreland Protection Act.
4. There is sound scientific research that supports current zoning regulations on riparian land.
5. I consider myself a custodian of the land.
6. Regulations are needed to protect shoreland and clean water in York County.
7. It is equally important to protect private property rights and clean water. The long-term protection of the environment is more important than the right of an individual property owner to develop his/her property.

Survey Results and Implications by Theme: A correlation matrix was used to identify potential relationships between individual questions and between individual questions and demographic attributes such as age, income, education, and years of residency in Maine. Chi Square analyses were conducted to further test significance.

Mental Model Themes	Shoreland Regulation	Identity & Custodianship among new/seasonal residents	Environmental & Personal Balance
Survey Result	Over 50% of residents were not secure in their understanding of shoreland protection regulations	Over 50% of residents considered themselves custodians of the land regardless of years of residency	Nearly 90% of respondents agreed that private property rights were just as important as environmental protection
Communication Recommendation	Target younger audience; messaging about type of regulation	Strengthen messages about owners of one's land to custodians of one's land.	Messaging about the relationship between protecting one's home and the natural resources on one's property.
Survey Result	As one's income increased, support of		Interest in private property rights

	regulation decreased.		decreased as one's affluence and education increased.
Communication Recommendation	Further research on perception of regulation & of one's rights		Further research on perception of one's rights & of govt. to protect one's rights

Theme 1: Shoreland Regulation: Over 50% of respondents were not secure in their understanding of the Shoreland Protection Act though as age increased, understanding of the act increased. *Communication Tip*: The Reserve could target communications about shoreland regulations to a younger audience who may not currently own land but may do so in the future.

Despite an average knowledge and understanding of the Act, nearly 90% of respondents believed that shoreland regulations were important. *Communication Tip*: The Reserve could conduct further research to learn how residents were making sense of the idea of regulation or they could more strategically define regulation, using the Shoreland Protection Act as one example.

Those who were interested in environmental protection also favored regulation. However, as one's income increased, support of regulation decreased. *Communication Tip*: Further research would be needed to understand why regulation is not as important to more affluent residents. Becoming a steward and taking personal responsibility might be more powerful messages to this audience than a message about following regulations.

Results also indicated that there might not be a clear understanding of the science underlying the Shoreland Protection Act. *Communication Tip*: If the Reserve wanted to increase the impact of their science, more education about their research projects and how they would be useful to residents would be needed.

Theme 2: Targeting new/seasonal residents: Over half of respondents considered themselves custodians of the land. There were not any significant relationships between this and length of residency, age, education, or income. *Communication Tip*: The Reserve could recruit residents involved in stewardship activities to help educate and inform other residents. The Reserve could work with municipal officials to strengthen their messages about community stewardship and changing mindsets from owners of one's land to custodianship of one's land.

Theme 3: Recognizing the balance between private property rights and environmental protection: Nearly 90% of respondents agreed that private property rights were just as important as environmental protection yet these were negatively correlated, as interest in private property rights increased, interest in environmental protection decreased. *Communication Tip*: The Reserve could use messaging that showed a significant relationship between protecting one's home and the natural resources on one's property or in one's community.

Similarly to regulation, interest in private property rights decreased as one's affluence increased.

Communication Tip: More research could be conducted to understand how residents of different socio-economic means perceive private property rights, e.g. do less affluent residents feel their rights are more vulnerable therefore they are more protective of them and possibly see regulation as one way of protecting their rights.

In addition to income, as one's education increased one's interest in private property rights decreased.

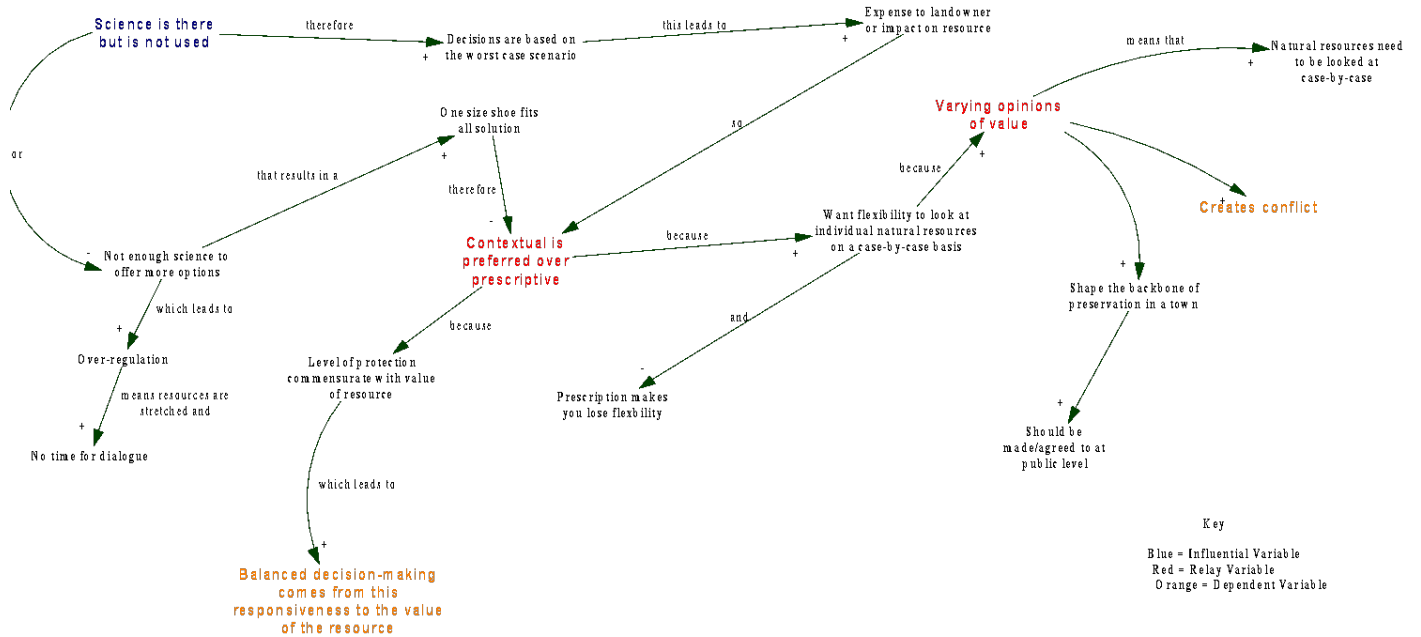
Communication Tip: More research could be conducted to understand whether there are particular educational experiences that contribute to this decreased sense of importance on rights, e.g. do more educated residents feel their rights are less vulnerable to political decisions because they better understand the political process?

Overall, results indicate that the Reserve and its partners could be more strategic in their communication strategies. The mental model results are applicable to the Reserve and its stakeholder partners because they identify common patterns of inference and belief and can be useful toward more strategic collaboration with one another, particularly those who are trying to communicate with similar audiences. The results also suggest the need for much more targeted and nuanced types of communication. The confirmatory questionnaire results could be applicable to the Reserve, its stakeholder partners and other Reserves around the country trying to gain more support of regulation, more interest in stewardship programs, and more balanced discussions about the many trade-offs involved in natural resource decision-making. Some of the recommendations call for further research and the communication audit showed that education and outreach resources were already tight. Inter-organizational collaboration could be useful. This research stream was able to use the existing choice experiment survey to administer a confirmatory questionnaire to a broader population while not expending additional resources. Interdisciplinary collaboration has the potential to be cost effective and mutually supportive.

References and Resources

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- Downs, C.W. and A.D. Adrian. 2004. *Assessing organizations communication: Strategic communication audits.* Guilford Press.
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Mental Model Example from Shoreland Regulation Theme.



Handout Prepared for Ecosystem Valuation in the NERRS Summit April 2015

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Introduction: If natural resource managers are to influence positive beliefs and behaviors toward riparian ecosystem services and shoreland protection then a clearer picture of how adults make meaning of these systems and themselves within them is critical (DeLauer 2013). Understanding adult beliefs, perceptions and values increases the opportunity for the Wells National Estuarine Research Reserve science to make the greatest impact with residents. The goal of the communications/mental mapping research was two-fold: to understand the collective beliefs about riparian buffers among Reserve staff and their stakeholder partners

(e.g. municipal and state government, not-for-profit organizations) and based on those beliefs, to identify which communication and engagement strategies should be collectively prioritized.

Communication Audit: First, a communication audit of the Wells Reserve was conducted. A communications audit is an inventory of communication efforts of an organization (Brooks et al 2010). This includes capturing key audiences, messages, techniques, available resources, and program evaluation (Downs and Adrian 2004). For example, the Wells National Estuarine Research Reserve does not currently have an overarching communication vision. Rather, limited resources are spent promoting Reserve programs and events to attract visitors. The Reserve has specific targeted audiences such as town planners, the planning board, selectmen and landowners. They are interested in connecting with these particular audiences about land use as it relates to riparian ecosystem services.

Geographically, the Reserve staff is focused on messaging relevant to southern Maine. They want to communicate that clean water is a product of a natural landscape and requires greater attention to land conservation, proper riparian buffers and non-point source pollution. The tourism industry in particular causes tension for the Reserve and other environmentally-oriented organizations in Maine because of the economic benefits tourism brings to the State and the environmental impacts tourism has on pristine beaches, lakes and ponds.

The Reserve uses a variety of mechanisms to communicate these messages about clean water and land protection. Workshops, Coastal Training Program events and Rotary events are a few examples. Reserve staff also participates in watershed planning efforts in the region. They try to capitalize on existing opportunities to reach landowners and town planners. The Coastal Training Program, which is situated at the Reserve, is an important resource and support for communications staff. Other community organizations are also important in building and maintaining a network of partners. Reserve staff uses other organizations' newsletters, for example, to communicate with their targeted audiences.

At present, there are limited resources for thorough, ongoing evaluation of their communication efforts. They do evaluate some of their workshops but do not have an evaluation plan in place for their other work. Overall, due to very little, if any, financial resources, communications staff takes advantages of opportunities to reach targeted audiences. Because of the lack of resources, communication planning is opportunistic rather than an integral process to further the NERRS mission.

Mental Mapping: Mental mapping interviews were conducted after the communications audit. Mental maps are used in a variety of contexts to assess ways in which people comprehend complex and uncertain environmental issues (CRED 2009; Welp et al. 2006; Morgan et al. 2002). Mental mapping was a useful methodology to understand how Reserve staff and stakeholder partners comprehend the complexity of riparian buffers.

Purposive and snowball sampling techniques were used to acquire a representative sample of 22 individuals, including Reserve staff, municipal officials, developers and realtors, engineers, state officials and NGO staff. The first step in the mental mapping process was to conduct in-depth, open-ended interviews with this representative sample. The goal of these interviews was to capture patterns of beliefs one has about shoreland protection and riparian buffers. These interviews began with very open-ended questions such as, "Tell me what you know about buffers." Then questions such as, "You mentioned XX. Can you give me an

example?” were asked to provoke participants to elaborate on their beliefs. As widely held or different beliefs became apparent, these patterns and divergences were further explored.

In qualitative research, data coding and analysis happen simultaneously. This involved identifying themes within the data and iteratively testing and retesting them to prove or disprove their salience. NVivo, a qualitative data analysis program, was used to organize the data and perform queries to explore latent connections in the data. Kohen’s Kappa statistic was used to ensure greater than 80% inter-rater reliability between two coders. We mapped what the research participants believed to be true about York County residents and riparian buffers. Using these data, individual mental models were created first to explore individual cognitive processes. Next aggregate mental models were created using a program called Vensim to visually depict the collective beliefs held about these three themes.

Mental Mapping Results: There were three collective beliefs that stood out among Wells staff and its stakeholder partners.

1. Perception about regulation must change so that landowners believe regulators are interested in the natural resources on *their* properties and are evaluating them on a case-by-case basis.
2. One’s identity as a “Mainer” only assumes an interest in environmental custodianship if you are a long-time resident; new and seasonal residents are mainly interested in ownership. An effort must be made to target new and seasonal residents with messages that encourage environmental custodianship.
3. To more fully engage landowners, they must be communicated to with empathy so that they believe that their property rights are being considered *equally* to environmental protection.

Survey: To explore the relevance of the mental mapping results to residents, seven questions were added to an existing survey that was administered to nearly 1200 residents within the watershed. A correlation matrix was used to identify potential relationships between individual questions and between individual questions and demographic attributes such as age, income, education, and years of residency in Maine. Chi Square analyses were conducted to further test significance.

What Reserve staff and stakeholder partners believed	How residents responded
Residents see regulation as negative.	<p>Over 50% of (particularly younger) residents did not understand shoreland protection regulations.</p> <p>Residents with higher incomes felt more mistrust for regulation than those with lower incomes.</p>
Long-time residents care about environmental protection more than new/seasonal residents	There was no correlation between length or type of residency and caring about environmental protection
Residents believe individual rights <i>and</i> environmental protection must be balanced.	90% of residents, particularly those with lower income and less formal education believe private property rights are <i>as</i> important as environmental protection

Communication Goals: First and foremost, it is important for the Reserve and the stakeholders who participated in this research to discuss results and generate a collective plan for better educating and communicating with residents about riparian buffers. The communication audit for the Reserve identified the challenges they face in fully addressing their communication needs. The collective mental mapping results identified the communication priorities among the Reserve and its partners. The survey results tested the relevance of the mental maps with a larger population. Based on these results, the following strategies are recommended:

1. Target communications about shoreland regulations to a younger audience who may not currently own land but may do so in the future.
2. Further research is needed to understand why regulation is not as important to more affluent residents. Becoming a steward and taking personal responsibility might be more powerful messages for this audience rather than messaging about rules and regulations.
3. Specifically communicate the usefulness of the Reserve’s research to residents, e.g. how is a particular research project or outcome beneficial to a specific segment of the population.
4. Recruit residents involved in stewardship activities (particularly long-term residents) to help educate and inform other residents. The Reserve could work with municipal officials to strengthen their messages about community stewardship.

5. Use messaging that shows an integral relationship between protecting one's home and the natural resources on one's property or in one's community.
6. Further research is needed to understand why less affluent and less educated residents are particularly interested in protecting the balance between their property rights and environmental protection.
7. Communicate with landowners in ways that promote protection of riparian ecosystem services while simultaneously honoring their property rights.

References and Resources

- Brooks, K., J. Callicot and G. Siegerdt. 2010. The ICA communication audit and perceived communication effectiveness changes in 16 audited organizations. *Human Communication Research*, Vol. 5, Issue 2: 130-137.
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