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Balancing Substance and Style on a Budget: How North Carolina Sea Grant Communicates Science (Part 1)

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ABSTRACT: North Carolina Sea Grant College Program coastal extension and communication specialists share a strong belief in applied science and pursue outreach much like agricultural extension agents. These papers document the challenges inherent in communicating science by this community of practice through 12 months of participant observation and in-depth interviews.

KEYWORDS: boundary organization, communities of practice, discourse analysis, science communication.

1. INTRODUCTION

Sea Grant’s mission statement reads, “NOAA’s National Sea Grant College Program enhances the practical use and conservation of coastal, marine and Great Lakes resources to create a sustainable economy and environment.” Congress established the program in 1966, administered through the National Oceanic and Atmospheric Administration (NOAA) within the U.S. Department of Commerce. In some ways, ‘Sea’ Grant resembles the ‘Land’ Grant program, created in 1862 to accelerate U.S. agricultural development.

Today, thirty-two Sea Grant programs exist in every coastal and Great Lake state and Puerto Rico. The national program headquarters is in Silver Spring, Maryland. Each program is a unique partnership between federal and state government, participating universities and community colleges, and private organizations. Research funding and extension priorities reflect NOAA’s national priorities as well as state interests. Areas of concern common to all the state programs include rapid coastal population growth, habitat degradation, limited coastal literacy, impacts from climate change, stressed fisheries, the loss of maritime cultures, and how to incorporate science into decision-making processes at all levels of government.

In recent years, the National Sea Grant’s College Program’s annual federal appropriation ranged from 55 to 65 million dollars. The non-profit Sea Grant Association, whose membership is comprised from academic institutions that participate in the program, lobbied Congress for $72 million dollars in the fiscal year 2009 Commerce, Justice, Science Appropriations Act (SGA 2012).

North Carolina Sea Grant (NCSG) became the nation’s 12th National Sea Grant College Program in 1976 and is an inter-institutional center within the University of North Carolina (UNC) system. Scientists from 16 UNC campuses and any college, university, or community college in the state may apply for research grants. The administrative headquarters is at North Carolina State University in Raleigh. Extension specialists also work out of the Coastal Studies Institute in Manteo (administered by East Carolina University), NC State’s Center for Marine Sciences and Technology (CMAST) in Morehead City, and UNC-Wilmington’s Center for Marine Sciences (CMS). Coastal Carolina University in Conway,
South Carolina hosts a regional climate extension specialist, shared with South Carolina’s Sea Grant program.

NCSG’s total annual budget (state and federal) was around $3 million at the time of this research. Several extension specialists come to NCSG with partial “special purpose” funding from outside organizations, such as the N.C. Division of Environment and Natural Resources and Cooperative Extension Service.

2. COMMUNITIES OF PRACTICE AND CLAIMSMAKERS

This analysis considers North Carolina Sea Grant as a ‘community of practice’ and extension agents as important, yet under-analyzed social mediators and scientific ‘claims-makers.’ This paper is the first in a series documenting the challenges inherent in communicating science and the coping strategies of this community of practice through 12 months of participant observation and in-depth interviews. This first paper aims in particular to deliver a thick description of NCSG activities and discuss identity. How does this community of practice define itself institutionally and how do individual communication and extension specialists see their roles in communicating science? Subsequent studies will discuss specific communication and outreach techniques, knowledge production, clientele perceptions and overall communication effectiveness.

The sustained pursuit of a shared enterprise creates ‘communities of practice’ (Wenger, 1998) everywhere. Schoolteachers, military members, and North Carolina Sea Grant officials find meaning together and practice their trade in ways that distinguish them from other groups. Members do work in a historic and social context that offers both identity and structure. Community members engage in ‘joint enterprise’ and share a ‘repertoire’ of language, tools and regulations (Wenger, 1998, pp. 72–85), but more importantly embedded and often hidden understandings—shared sensitivities, worldviews and rarely questioned assumptions about what counts as knowledge. Communities of practice are not always benign or ‘benevolent’ (Wenger, 1998, p. 132). They also can become exclusionary with reactionary tendencies that create tension between newcomers and old-timers (Jewson, 2007, p. 72).

Casual conversations with Sea Grant coastal extension specialists and communicators suggest that they face a wide variety of communication challenges. They need to quickly grasp complicated scientific concepts, then translate and package that information for multiple audiences that include the general public, fishermen and crabbers, small business owners, government regulators, educators, and local elected officials. They must maintain relationships with researchers and the media and often mitigate disputes between environmental advocates, property owners, and commercial interests. Applied scientific research like that practiced by NCSG goes through a process of mutual construction and negotiation as researchers, policymakers, bureaucrats and coastal citizens interact and challenge each other’s evidence and perspectives. North Carolina Sea Grant’s scientific discourse shapes perceptions of North Carolina’s coast through grant awards, articles in the organization’s flagship magazine, Coastwatch, and the presentation of research results to state agencies and other groups.

Contemporary geographers are interested in critically evaluating the processes and politics that produce environmental knowledge (Meindl, 2002, p. 684) and “the notion of claims-making is a useful way of conceptualizing the influence that applied scientists wield in constructing and disseminating environmental knowledge” (Meindl, 2002, p. 685). NCSG researchers and extension specialists make ‘cognitive’ and ‘interpretive’ claims as a matter of
course, both describing reality and establishing the relevance of research findings to other experts, decision-makers and the public (Aronson, 1984, p. 14; Meindl, 2002, p. 685).

Applied science in particular is a social enterprise and research is needed both to better understand how scientific information is constructed and communicated and to improve information dissemination from scientist to citizen and vice versa. Yet, little mention is made in academic literature of coastal extension services and nowhere a thick description of coastal extension, education, and outreach activities. Case studies about coastal and ocean policymaking are few and far between. Those that discuss communication processes are even rarer. The ability of coastal managers and related academics to generalize and build grand theory will improve as more case studies are investigated, documented, and compiled.

3. DATA AND ANALYTIC METHODS

This paper makes use of information collected during the author’s one-year service as the science communications fellow at NCSG between June 2007 and June 2008. The fellowship is ideal for scientists interested in learning to communicate their work to audiences outside academia or for aspiring science writers. The fellow summarizes and promotes research projects funded by North Carolina General Assembly’s Blue Crab and Fishery Resource Grant programs and writes articles for NCSG’s flagship publication, Coastwatch magazine.

3.1 Research Questions

Primary research questions included:

1. How do coastal extension agents perceive their role and the purpose of the organization?
2. What philosophy underpins educational, outreach, and extension work?
3. How do NCSG officials define coastal extension, education and outreach services?
4. What clients and audiences do they serve?
5. What concepts do extension specialists consider the most important to convey to the public, fishers, teachers, and other clients?
6. What outcomes do they desire for coastal communities and public policy, if appropriate?
7. Does NCSG see itself as a boundary organization? What problems and opportunities does this present?
8. What are the communication challenges? Are any unique to coastal extension?
9. What techniques are most useful in advancing their efforts? What additional tools and training are desired?

3.2 Data Set and Collection Methods

In-depth, personal interviews with NCSG extension specialists and communicators followed six months of participant observation. The survey instrument was tested in advance of the interviews with the cooperation of two extension specialists and two communicators outside of NCSG, but within the national Sea Grant network. Interview questions included:
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(1) What do you see as North Carolina Sea Grant’s (NCSG) purpose (or mission)?
(2) What are the values of this organization? Has the organization determined these values, or are they subjective?
(3) What is the role of an extension specialist/communicator? Institutional or personal definition?
(4) Who are your major clientele groups or audiences?
(5) How did you determine these?
(6) What percentage of time do you spend working with them?
(7) What are the particular challenges in communicating with each group?
(8) What are your desired outcomes?
(9) What clientele behaviors most need to change?
(10) What techniques and tools do you find most useful in overcoming these communication challenges and advancing your efforts?
(11) Have you received any particularly useful training (from govt agency, university training, other group)?
(12) What additional training or tools would help you do your job more effectively?
(13) Do you ever find yourself wanting to express a stronger opinion?
(14) What is the greatest obstacle to your success?
(15) Does the public or your clientele possess any misperceptions about your role? If so, describe them.
(16) What are some challenges that may affect how you interact with audiences in the future?
(17) How have email and Internet communication techniques changed your job, if at all?
(18) Tell me a success story. What are you most proud of in your time with Sea Grant? Have you had the opportunity to follow up on these efforts?

Pat Corcoran, an extension specialist with Oregon Sea Grant, helped the author create a Communication Success Continuum. The Continuum is a matrix on an Excel spreadsheet. The X-axis displays science communication goals beginning with ‘Awareness’ → ‘Buzz’ → ‘Advocacy’ → ‘Engagement’ → ‘Understanding’ → ‘Using Products and Tools’ → ‘Adoption’ → ‘Policy Change’ → through ‘Behavior Change.’ Respondents highlighted communication tools listed within the matrix that they used routinely, such as ‘posters,’ blogs ‘workshops,’ ‘public comment sessions,’ or ‘commission recommendations.’

Textual data collected included NCSG’s strategic plan and other planning documents, director and staff meeting notes, research proposals and list of awards granted, a content analysis of Coastwatch articles from 2000 to 2007, a sampling of NCSG products, and monthly reports submitted by extension specialists and communicators.

3.3 Analytic Techniques: Discourse Analysis and Thick Description

Findings here are informed by the field of discourse analysis. Discourse analysis identifies the ideas that count as knowledge or are privileged as ‘truth’ within communities and investigates ‘discursive structures’—the unwritten assumptions that produce an individual or group’s authoritative account of the world. The validity of discourse analysis depends on the richness of the information collected and the analytical skills of the researchers rather than numerical validity (Patton, 1990).
Discourse analysis focuses on the situational and contextual nature of communication as it happens in the environments that shape it and are shaped by it. Theories and techniques from several types of discourse analysis are borrowed and applied to this case study, including social discourse analysis (Van Dijk, 1997b) and Fairclough’s (2001) critical discourse analysis. Social discourse analysis is an appropriate method here because the techniques work at various scales and target interactions, the more general ‘discourse-society interface.’ According to Van Dijk (1997b), discourse should be studied as action, showing the social, political and cultural functions of discourse within institutions, groups or society writ large. In social discourse analysis,

we find that social reality may be constituted and analysed anywhere between a more micro and a more macro level of description, for instance as (details of) acts and interaction of social actors, and as what whole institutions or groups ‘do,’ and how both thus contribute to the production and reproduction (or challenge) of social structure. (Van Dijk, 1997b, p. 6)

According to Fairclough (2001, p. 91), DA occurs in three stages: “description of text, interpretation of the relationship between text and interaction, and explanation of the relationship between interaction and social context.” Interpretation through discourse analysis is a complicated and intuitive process. Underlying relationships, institutional characteristics and key ideas only emerge when the researcher becomes absorbed in the ‘texts’ fully, and then reviews the material several times over with fresh eyes and ears. Below are fundamental discourse analysis considerations used to approach this case study’s data set, organized according to Fairclough’s three stages, and derived from Chilton and Schaffner (2002), Fairclough (2001), Foucault (1980), Scollon (2008), Van Dijk (1997a) and others:

Stage 1: Description of Text
- Contents: activity, purpose, units of analysis
- Subjects: Who are the actors, stakeholders, voices, or identities?
- Role of Language: audience, communicative function, media
- Genealogy: How did this discourse come about, institutionally or culturally?

Stage 2: Interpretation of Interactions
- Interests of Participants: agendas and perceptions
- Networks
- Argumentation or Persuasive Methods
- Institutional Constraints
- Routines and Rituals
- Dominant Discourses
- Mechanisms that Silence
- Validity and Knowledge Claims
- Regimes of Truth
- Tactics and Strategies

Stage 3: Explanation and Effects
- Social Context
- Action-Forcing Devices
- Relationships: between texts and actions taken by social actors
- Episteme or Paradigm
- Beliefs, Values or Underlying Ideologies
- Policy Outcomes
Ideally, common principles or a paradigm will emerge from the collected data and comparisons, inspired by Glaser and Strauss’s grounded theory (1967). The case study first offers a ‘thick description’ of a particular social activity along the lines of Gilbert Ryle’s (1968) explanation of a wink in his essay *The Thinking of Thoughts* or Clifford Geertz’s (1973) description of a Balinese cockfight in *The Interpretation of Cultures*. The intent of much research is to generalize from the particular, but case study methods are often criticized because sampling sizes are small and results tied to specific temporal and spatial contexts. The overarching goal in this initial phase of analysis is to generate necessary particulars.

4. RESULTS

4.1 Participant Observation Notes

Sea Grant extension and communication specialists engage a broad range of publics, make plain trade-offs faced by coastal decision-makers, and work to generate practical solutions in particular places. Sea Grant clientele includes academic researchers, fishermen and women, industry representatives, coastal managers, local elected officials, city and environmental planners, and non-profits and concerned citizens. Extension specialists do original research and monitor collaborative research projects. They conduct training workshops, facilitate technology transfer, and alongside Sea Grant communicators, perform education and outreach. Communicators inform Sea Grant clientele about scientific results and marine and coastal issues using any means possible—magazines, targeted brochures and newsletters, video productions, education and outreach workshops, and, whenever affordable, short radio and television spots.

NCSG’s *Associate Director* manages the state’s Fishery Resource Grant (FRG) program. The defining principle behind the program is that people in fisheries-related activities possess compelling ideas for improving and protecting fisheries, but may lack the financial resources or scientific background to conduct experiments, collect data, and analyze results. Sea Grant administrators require academic researchers, members of the fishing community, and occasionally non-governmental groups to collaborate on proposal submission, research design and study execution.

Additional ‘core’ research projects fall within NOAA and Sea Grant National Office chosen themes and priority areas. Five categories of grants were in place at the time of this research—aquaculture, coastal communities and economies, coastal hazards, urban coasts, and ecosystems and habitats. The four 2009-2013 national focus areas are: safe and sustainable seafood supply, sustainable coastal development, healthy coastal ecosystems, and hazard resilient coastal communities (NSGCP, 2012). NCSG’s advisory boards evaluate grant proposals using a competitive, peer-reviewed process that additionally tries to balance awards between coastal regions and state universities. Mini-grants are smaller and more flexible.

NCSG’s 15-member extension team manages a multitude of diverse research and outreach efforts from Raleigh and along the coast. The Extension Director organizes specialists by topics, including commercial and recreational fisheries and habitats, seafood technology, coastal hazards, water quality, law and policy, community development and marine education. Programs in other states adopt different structures, depending on their needs and state structures. Florida Sea Grant, for example, works more closely with the state’s Cooperative
Extension Service and many of their county marine extension agents operate out of agricultural centers.

Extension highlights from 2007:

- Two Water Quality Specialists work to improve coastal waters through land-use planning and urban stream restoration. One is collaborating with other agencies and the University of North Carolina School of Government to develop a training program for local officials on water science and coastal growth strategies. The other is developing an evaluation matrix to help engineers and funding agencies make informed stream restoration design choices and was invited recently to India to help develop their stream restoration program.

- The Coastal Construction and Erosion Specialist helps communities understand and resolve issues related to erosion, inlet maintenance, dune enhancement, and weather-resistant construction techniques. He is on a National Academy of Sciences special committee to recommend improvements for Federal Emergency Management Agency flood maps and on a national task force seeking bridge designs that can withstand storm events.

- The Marine Education Specialist is developing educational materials and workshops for teachers in all of North Carolina’s regions, based on a coastal literacy survey. She runs a 3-credit online graduate oceanography course for teachers, coordinates curriculum materials for Coastwatch on NC Now, and works with NOAA’s Coastal Services Center on the Southeast Phytoplankton Monitoring Network that involves students in water sampling.

- The Fisheries Specialists occasionally mediate disputes between watermen, regulators, and scientists. One “collaborative learning” demonstration project in the Albemarle Sound region brought together all of these groups to design more innovative management strategies. Specialists helped design and implement the North Carolina Coastal Ocean Observation System (NCCOOS) and co-authored a booklet designed to demystify state fisheries management processes for the public.

- The Law, Policy and Community Development Specialist is collaborating with the N.C. Division of Coastal Management to study North Carolina’s ocean policy and propose revisions. The Coastal Law, Planning and Policy Center is a partnership between NCSG, the UNC School of Law and UNC’s Department of City and Regional Planning. Development pressure raises issues that cross federal, state, and local boundaries. The center’s biannual newsletter and research papers provide balanced analyses of complicated legal and planning issues.

- Blue crab shedding operations bring millions into the coastal economy. In addition to running the state’s Blue Crab Research Program, NCSG’s Blue Crab and Mariculture Specialist authored Closed Blue Crab Shedding Systems: Understanding Water Quality. The pamphlet explains the importance of maintaining and monitoring water quality in tanks that must absorb large numbers of peeler crabs over a short time period.

- The Seafood Technology and Marketing Specialist helped to coordinate the Carteret Catch campaign. Commercial fishing families, seafood distributors, restaurant owners, scientists, tourism experts and educators teamed to develop a logo and theme to promote local seafood. He also helps deliver Hazard Analysis and Critical Control
Point (HACCP) training and assistance to small seafood dealers, packers and processors in North Carolina.

- The Coastal Resource and Enterprise Specialist helped to change the dynamic between regulatory agencies and industry from conflict to cooperation through the NC Clean Marina Partnership. Pressure washing vessels in marinas introduces a lot of pollution to coastal waters. Seventy gallons of water are needed to clean a 25-foot vessel and some marinas clean 150 to 175 vessels in a season.

- Sea Grant staff provide scientific reports and expertise to state advisory boards and committees in the Department of Environment and Natural Resources, the Marine Fisheries Commission, and the N.C. Coastal Resources Commission, among others.

**The Communicator’s Role**

North Carolina Sea Grant’s communication specialists help people understand marine and coastal policy issues, including state policymakers, academics and secondary school educators, students, coastal business leaders, marine resource users, local elected officials and the public. NOAA and Sea Grant research opportunities and results are publicized and new technologies and fishing techniques promoted. The subject matter is complex and the audience broad, perhaps too broad.

In 2007, NCSG’s communications staff consists of a director, two full-time communicators, and one administrative support associate/distribution manager. The Fisheries Resource Grant and Blue Crab Research Programs support one science communications fellow, replaced yearly. The communication’s budget supports one undergraduate intern per semester. Freelance designers and photographers work on an “as needed” basis.

The office maintains a publications database, produces and distributes informational brochures, pamphlets and books, creates public exhibits and responds to media inquiries about Sea Grant-sponsored research and activities. A Web site provides a template for soliciting research proposals and publishing results. News releases announce scientific findings, workshops and products.

The Communications Director supervises the development, editing, and production of all publications, facilitates all education and outreach efforts, supervises media relations, mentors communication staff and interns, and puts together annual reports for NOAA, the N.C. General Assembly and Congress. As a member of the management team, the director works with NCSG’s Advisory Board to identify statewide outreach and education needs and to develop partnerships with state agencies and non-governmental groups. With the help of two writer-editors and extension specialists, the director applies for grants that support communications-related research and innovative projects.

North Carolina Sea Grant Communicators are not only experts in translating scientific information for the general public, but are necessarily multidisciplinary. Each communicator is assigned extension specialists and university investigators to “cover.” They keep track of research topics and progress and, much like journalists, try to choose the most interesting and compelling stories. Communicators are keenly aware of the role the media plays in shaping public policy and bend over backwards not to favor particular universities or state regions and to avoid the appearance of advocacy on the side of commercial fishermen, government regulators, or environmental groups.

The communicators also produce Coastwatch magazine, a 32-page, self-cover magazine published six times a year. North Carolina Sea Grant’s flagship publication
emphasizes the organization’s research and outreach efforts, highlighting not only the natural environment, but also the people, places, and culture that define North Carolina’s coast.

NCSG’s communications director wants to increase the subscriber base to cover more operational costs and expand the transfer of knowledge, especially to educators and policymakers. The magazine has about 1,200 paid subscribers ($15/year) and consistently earns top honors in writing and communication competitions. Some 1400 complimentary copies are distributed to state and local officials, libraries, state welcome centers, and museums. The staff is formulating a marketing and business plan for the magazine and considering branding and social marketing approaches.

*North Carolina Sea Grant and UNC-TV are teaming up to present Coastwatch on North Carolina Now.* The first segment—focusing on the Rocky Branch stream restoration project—aired in December as part of statewide public television network’s nightly newsmagazine. A companion print story appeared in the holiday issue of the magazine. UNC-TV’s television spot that corresponds to the Winter 2008 *Coastwatch* story “Finding Fish in Lots of Water” aired in March 2008. North Carolina State University’s Office of Extension, Engagement and Economic Development provided a grant for three pilot segments.

Recent communication efforts included:

- An online informational kiosk—www.ncseagrant.org/waterfronts—kept the Waterfront Access Committee, legislators and the public apprised of ongoing discussions, including presentations by members of the N.C. Coastal Resources Law, Planning and Policy Center.
- Consumers seeking seasonal North Carolina seafood can turn to new wallet-size cards. Local Catch: North Carolina Seafood availability cards, developed by North Carolina Sea Grant and the North Carolina Aquariums premiered at the October North Carolina Seafood Festival in Morehead City. The cards highlight commercial fisheries by season, reveal how and where North Carolina seafood is harvested and offer “Quality Counts” tips for selecting seasonal fresh seafood.
- The *Break the Grip of the Rip* public information campaign is a continuing partnership between Sea Grant communicators and the National Weather Service, beach communities, and the National Park Service on the Outer Banks. NCSG’s communications director represented the national Sea Grant network, reviewed message content and publication designs, and coordinated the logistics for the national news kickoff in 2004.

Sea Grant communication and extension efforts extend overseas as well. NCSG sponsored a N.C. State engineering/coastal policy graduate student from Indonesia 15 years ago. He is now secretary general for the country’s Ministry of Marine Affairs and responsible in part for passage of coastal zone legislation, a new tsunami warning system, and a Sea Partnership Program, modeled after Sea Grant. The communications director performed as a coastal ambassador, visiting Indonesia to support their fledgling program in 2005.
4.2 Interview Results—Identity

What follows are answers to four interview questions (1, 2, 3, and 8) intended to reveal institutional identity and individual perceptions of roles within the organization and as communicators of science.

What do you see as North Carolina Sea Grant’s (NCSG) purpose or mission?

NCSG extension and communication specialists define their purpose broadly, but consistently. They “serve coastal communities” by “funding research” and “translating the science for constituencies.” Several emphasized the applied nature of their work. One remarked, “Research and outreach, but not from an ivory tower.” Another said, “We solve problems through science.” Respondents listed multiple and diverse audiences—“fishermen, seafood dealers, property owners, K-12 educators, graduate students, anyone interested in using coastal resources,”—and multiple areas of expertise. “I give advice on a variety of minefields, engineering, marine construction, coastal processes and erosion control alternatives, pointing out boundaries and encouraging best practices.” Education proved another common theme. “We expose students to the Sea Grant model and train the next generation of researchers to get outside the lab.”

What are the values of the organization? Has the organization determined these values or are they subjective?

Science is the preeminent discourse within coastal management circles, considered the most reliable source of knowledge, and NCSG proved no exception to this rule. 10 of 14 respondents said that it was important to remain “unbiased,” “honest,” or “neutral” and many married this ability to scientific method. “We promote honest, open discussion, and sound science and practices that are replicable with no bias.”

• “Your individual expertise may have drawn you to a conclusion. We remain neutral and present the verifiable facts through science, not the way we’d like it to be. It is not our job to make our clientele environmentalists.”
• “I work around regulatory processes and get at the edges of trouble. My work is often open to criticism, so I stick with the science. Comforting.”

Most attributed this value to the institution and its leadership. “We check our facts and I was told to be empathetic not sympathetic. We’re not taking up the causes of coastal communities, but we want to establish a personal connection.” In only one case, did there appear to be any tension between objectivity, resource use, and environmental advocacy. The respondent remarked, “I want to minimize human impact as much as possible,” “turn out good stewards,” and “affect positive change on the coast.”

Several used this question to remark on how well their values coincided with those of the organization. “NCSG is nice for a self-propelled, motivated individual.” Or, “Teamwork; I don’t think I’d find another worksite where I’d feel so comfortable.”

What is the role of an extension or communications specialist?

Every extension and communication specialist answered this question similarly and most said that defining their role was a personal choice not an institutional mandate. All said that their role was to “distribute information,” to “translate research for different constituent groups” in terms “anyone can understand,” or “get knowledge to state agencies and coastal communities.” Respondents used words such as “liaison,” “connecting piece,” “dialogue,”

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“conduit,” or “to be the bridge between science and users, industry, the university, and the public” to describe their role. A few argued that their role involved “identifying emerging issues” and to “Do a plan of work that is proactive, not reactive.” Several respondents remarked on their role “translating science” and “bringing researchers back down to earth,” adding we are “more in touch with public notions of science.”

**What are your desired outcomes?**

Desired outcomes varied somewhat because each specialist is assigned different areas of responsibilities, however several common themes emerged, notably visibility and sustainability. Four specialists mentioned a desire to increase NCSG’s visibility. “I want more people to know what Sea Grant is.” “We are judged on publications out the door, new product development and promotional programs to gain visibility.” “My goal is broader exposure and greater knowledge of our work so that we get more interesting research proposals and projects.” Some of this emphasis could be blamed on concurrent staff meetings to discuss branding and website upgrades. However, many specialists expressed a seemingly sincere desire to be an “information center” or an “objective organization to help.” One hoped to be recognized as the ‘go to’ person in their area of expertise. “I want to be a resource for whatever coastal, marine, or aquatic information they need,” said another.

Balancing the needs of fishing communities against coastal ecosystems also figured prominently in respondents answers. “I want to have an impact on the continuance of North Carolina’s fishing industry. NC as it was, is, and should be with more money and earnings for those folks.” Another aimed to preserve a “sustainable economy without impacting the environment.”

**4.3 Communication Success Continuum**

Respondents were asked to complete the Continuum at the conclusion of the interview while reflections on their activities remained fresh. After highlighting communication tools that they used within the matrix, five respondents chose ‘Understanding’ as their overarching communication goal, located exactly in the center of the Continuum. Three chose ‘Awareness’ at the very beginning of the Continuum and presumably the easiest communication goal to achieve. Two selected ‘Engagement’ and one chose ‘Using Products and Tools.’ Two respondents chose ‘Behavior Change’ at the far end of the Continuum, but did not indicate that they used any of the tools within the column below. Arguably, ‘Behavior Change’ is the most difficult communication goal to achieve. Two respondents also added, “We do all of these things.” Most respondents highlighted tools underneath goals at the beginning or middle of the Continuum, such as ‘brochures,’ ‘workshops,’ teacher curricula,’ ‘conferences and training,’ ‘gray press,’ ‘event calendar,’ ‘publicize scientific reports’ or ‘press releases.’

**5. DISCUSSION**

Sea Grant could be described as a boundary or bridging organization, attempting to narrow the divide between science and public policy as well as academic research and local practical knowledge. Sea Grant encourages the sustainable development of marine resources informed by scientific research. The organization aims to facilitate the transfer of useful knowledge between academic researchers, decision-makers, and the coastal public, improving policymaking by doing and publicizing applied research relevant to local and state
communities. Associated education and extension efforts attempt to temper and mitigate ever-increasing development pressures in the coastal zone, reminding the public of the economic and environmental importance of the region’s fragile ecosystems.

That North Carolina Sea Grant is a community of practice is clear from the analysis of the first few interview questions. The group shares three characteristics of a community of practice—mutual engagement, joint enterprise, and a shared repertoire (Wenger, 1998, p. 73). All are mutually engaged and share a spirit of belonging. Extension specialists and communicators understood the mission or purpose of the organization in much the same way as the national organization’s definition that emphasizes practical use of the coast and a balance between sustainable economies and the environment. They are engaged in and held accountable by a joint enterprise that is defined by the participants even as they pursue their goals (Wenger, 1998, p. 77). Finally, the respondents clearly share a repertoire. All took great pains to frame their role as ‘bridging,’ rather than ‘advocacy,’ proponents of ‘applied research’ drawing on ‘sound science.’ The repertoire of a community of practice includes processes, tools, words, and concepts produced or adopted by the group and incorporated into their practice (Wenger, 1998, p. 83).

Similarly, discourse analysis proved a helpful analytical tool. Sea Grant officials take pride in their role as “honest brokers” in coastal communities because their organization is non-regulatory and science-based. The language of several specialists further demonstrates that they wield public perceptions of this role for tactical advantage. One specialist encouraged locals to get involved in research and gather their own data, “rather than allow government regulators to control all of the science.” Reiterating NCSG’s goal to fund research driven by societal need ahead of researcher curiosity encourages demand for scientific information and coastal extension services. Terms, such as ‘unbiased,’ ‘honest,’ or ‘bridging’ become points of focus around which meaning is negotiated both inside and outside the organization.

Additional analysis of interview questions should shed light on a few emergent questions and suggest ways to improve NCSG’s science communication. Lack of visibility is a recurring theme. Extension and communication specialists listed a plethora of audiences/clients, casting doubt on how effective they can be accommodating the needs of such diverse groups.

Participant observation, however, revealed specific priority clientele. The groups the extension specialists work with are in line with the talents and interests of the specialist combined with the organization’s goal to support applied coastal research. Academics and Principal Investigators (PIs) are important clientele, followed by targeted groups—seafood dealers, marina owners, city managers, coastal homebuyers, landscape architects, law students, and educators and so on.

The lack of visibility and need to serve specific clientele suggest several possible changes in how NCSG communicates science.

1. Modify Coastwatch’s format to free up time and talent for other avenues of communication and make the publication a more effective tool for the organization. Extension specialists love the look of the magazine, but expressed doubt about how useful it is to their specific clientele. Because the magazine targets the general public and broad geographic areas, they do not find a compelling reason to distribute any one particular issue widely in their communities.

Consider publishing four times a year—three regional editions (Upper Coastal, Southeast, and an Island issue) and a 4th ‘Emerging Issues’ edition. This format involves the
extension specialists more fully in determining Coastwatch content, makes planning articles ahead of time easier, and frees up time for communication tasks beyond writing. Free issues could be distributed in featured regions and saturate state agencies and the legislature with an annual forward-looking Emerging Issues edition. Corporate or group sponsorships will be easier to obtain with a regional focus as well, if that ever becomes a funding necessity.

Each regional edition would highlight NCSG-sponsored research conducted in the area or about the area and feature the local coastal extension specialist—their projects, role as an unbiased community resource, and contact information. Once a year, every specialist could use their regional Coastwatch issue as a calling card in the community, ‘working’ that region to enhance visibility immediately after the issue is delivered.

The ‘Emerging Issues’ edition would cover broader state-wide concerns, target the legislative and policy audiences and feature Raleigh-based specialists and Triangle and Sandhill projects. Municipal and county officials and the public will look forward to their region’s issue each year. Crafting the ‘Emerging Issues’ edition forces NCSG to think well forward about the coast once a year, serving in a way as an organizational planning tool. It will allow the revamped NCSG website to handle more time-sensitive topics. Paying subscribers from the general public will enjoy the geography tour. Providing more in-depth local details will better connect them to their place and people and, when their region is not the focus, inspire travel.

2. Create an ‘outreach communications’ position—someone in the field explaining what North Carolina Sea Grant does and why science-based knowledge matters to relevant constituencies. This position would be dedicated fully toward boosting the organization’s visibility, canvassing one region at a time and policymakers once yearly—an ongoing roadshow with NCSG’s flagship publication in hand.

The outreach communicator’s work plan would bridge communications and extension and marry publications to extension work plans. He or she will operate in the coastal area most recently featured in a regional Coastwatch edition and work with extension specialists to determine content for the regional Coastwatch editions and write four articles yearly. The outreach communicator would visit target audiences—identified by extension specialists and the NCSG management team—to explain and promote NCSG applied research opportunities and to present research results at public meetings, in universities, and to state agencies. The position could conduct science communication scholarship and monitor similar NCSG-funded research projects.

3. Over time, locate a communication specialist at every NCSG coastal office (Manteo, Morehead and Wilmington) to work closely with the extension specialists. Relationships, inspiration, writing and communicating about coastal issues will flow more smoothly ‘in place.’

All of the above would likely build momentum and access to groups that most reliably support NCSG research and outreach and go a long way toward alleviating the visibility problem identified by the extension specialists. Face-to-face outreach communication efforts alongside upgrades to the website and a proven publication create marketing synergies and a powerful campaign. Visiting policymakers, academic departments, and non-profits regularly will generate more impressive research proposals to choose from, higher quality results, and ongoing demand for NCSG scientific expertise and extension services.
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