

Assessment of adaptation, policy, and capacity building outcomes from 14 processes

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Abstract

In the US alone, there are over 200 tools that support climate adaptation planning, along with a large number of case studies documenting their use. Case studies frequently document positive results. Systematic assessment of processes can provide important benefits, including justification for action and expenditures, promotion of learning and adaptive management, accountability, and ensuring “fit” with other goals. There are very few such assessments in the context of climate adaptation planning, despite of the emphasis on the development and use of planning tools by federal and state agencies, university researchers, and non-profit organizations.

We undertook an effort to assess the outcomes resulting from fourteen applications of the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) process, which we helped develop and implement. VCAPS is designed to facilitate information exchange, co-production of knowledge, and stakeholder collaboration while helping communities appraise climate change-related risks and devise strategies to manage them. Using qualitative interviews we explored the perceived value and the measurable performance outcomes of VCAPS at both individual and community scales occurring 3-10 years after the processes were conducted, allowing participants to take a broader view of “success” and reflect on how different forms of success emerged over time. Although the assessment of each case is based on a small number of interviews, we learned that VCAPS informed plans and decisions of municipalities, informed actions and decisions of other public and private actors, generated broader support for subsequent actions, helped efforts to secure/seek funding for climate adaptation actions, developed material resources to support planning, and promoted learning among participants.

This assessment also reinforces prior work showing that deliberative planning tools/processes are conducive to developing adaptive capacities; processes should be closely coordinated with regular governance activities to impact policy and action; adequate time for deliberation needs to be budgeted; participants need support to “think outside the box” and consider adaptation strategies that are both incremental and transformational as well as highlight potential undesirable consequences of adaptation; and processes, like VCAPS, produce actionable outcomes when participants agree on the immediacy of the issue. We conclude with observations about the need for evaluation of participatory processes and the challenges of defining success of tools to support municipal climate change adaptation planning.

Keywords: VCAPS, adaptation planning, evaluation, analytic-deliberation

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1. Introduction

In the US alone, there are over 200 tools that support climate adaptation planning, along with a large number of case studies documenting their use (<https://toolkit.climate.gov>). These case studies frequently document positive results. Results mentioned include: identifying and prioritizing adaptation strategies, designing adaptation strategies, identifying barriers to implementation, improving and sharing knowledge, enhancing capacities and access to resources for planning, and increasing community support for adaptation actions. Given the increasing emphasis on stakeholder engagement in adaptation planning, it is important to reflect on how well these tools perform.

Yet, what constitutes “success” in the context of climate adaptation is difficult to assess. As Moser and Boykoff (2013) note, “while it is an elegant and straightforward question, it is one that has no easy scientific or political answers” (pg. xxi). Definitions of success are often associated with reducing vulnerability to risk and decisions based on science. de França et al. (2009:810) contend that “successful adaptation is any adjustment that reduces the risks associated with climate change, or vulnerability to climate change impacts, to a predetermined level, without compromising economic, social, and environmental sustainability.” Osbahr et al. (2010) define successful adaptation as a process that “increases system resilience but also, giving explicit treatment to governance, as that which promotes legitimate institutions to generate and sustain collective action.” Cinner et al. (2018) take a different approach by highlighting five types of adaptive capacities that “enable people to anticipate and respond to change, to minimize the consequences, to recover, and take advantage of new opportunities,” which are: assets, flexibility to change strategies, ability to organize, learning to recognize and respond to change, and agency to change or not. Dilling et al. (2019) maintain that the focus should be less on measuring changes in risk and vulnerability and more on measuring resources that support well-being more generally, such as education and housing - the “capabilities that are necessary to pursue a range of resilient futures and adaptation goals” (pg. 572). However, definitions like these still beg complex questions such as how much to reduce risk and vulnerability and at what cost, when, and to whom? Barnett and O’Neill (2010) approach the definitional and measurement challenge from the other side, offering criteria for judging maladaptation.

de França et al. (2009) argue that it is difficult to measure success without a clear consensus on the objectives of adaptation. This is true both with respect to attributing success or failure within specific cases and to comparisons across cases. The diversity of possible adaptation objectives and actions — from fostering understanding of systems to enacting policy to building infrastructure — exacerbates the challenge of passing judgment. Even within a specific context, there may be a diversity of opinions about both processes and outcomes associated with climate adaptation. Dilling et al. (2019) make three related points. First, people may have different ideas about what is at risk and the significance of the risks. What one party thinks of as improving resilience another party might consider as imposing risk. Second, attributing changes to risk and vulnerability from specific actions is difficult because many factors may intervene to influence how adaptations persist or

influence the emergence of subsequent plans and actions. These include funding, varied levels of support at different scales (local, state, national) for proposals, staffing resources, legal constraints, and unanticipated interactions with other plans or events. Third, adaptation is an on-going “forever” process, as individuals and communities react not only to changing climate stressors but shifting social, economic, political, and cultural contexts. What might seem a successful adaptation at one time may not be perceived as such at a different time or for other groups. For example, urban greening can lead to gentrification (Wolch et al. 2014) and construction of drainage canals may facilitate seawater moving inland with higher tides and storm surges (Bhattachan et al. 2019). Atteridge and Remling (2018) caution that the potential for adaptation actions to redistribute risk or vulnerability is not receiving sufficient research or policy attention.

Still, systematic assessment of processes can provide important benefits, including justification for action and expenditures, promotion of learning and adaptive management, accountability, and ensuring “fit” with other goals (Moser and Boykoff 2013). With these considerations in mind, we undertook an effort to assess the outcomes resulting from fourteen applications of one of the tools in the USGCRP Resilience Toolkit: The Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) process. This tool is designed to facilitate information exchange, co-production of knowledge, and stakeholder collaboration while helping communities appraise climate change-related risks and devise strategies to manage them. We selected VCAPS because we developed it and participated in all but two of the fourteen processes. Our past engagement with VCAPS participants was crucial to being able to reconnect with them for this study. We have also been encouraged to share the VCAPS process and other researchers have begun to use it. Our assessment is an attempt to learn and consider ways to improve VCAPS for future uses, deliberative adaptation planning tools more generally, and consider lessons for future assessments. Although the qualitative assessment of each case is based on a small number of interviews, it offers the advantage of occurring 3-10 years after the processes were conducted. This time-lag allowed the participants to take a broader view of “success” and reflect on how impacts of an engagement emerged over time.

2. Overview of the VCAPS process

VCAPS was designed to support local vulnerability assessment and climate adaptation planning (see Kettle et al. 2014, Weblar et al. 2014; see also www.vcapsforplanning.org). Our development of VCAPS drew on the intellectual history of hazard management, climate vulnerability assessment, and analytic-deliberation. We designed VCAPS with the purpose of supporting community adaptation by:

- Informing discussions and promoting learning by integrating climate and related natural and social sciences with local knowledge;
- Summarizing the information, knowledge, and experience that exists within a community;
- Facilitating exploration of local complexities and uncertainties;
- Stimulating discussions about how to manage consequences by taking upstream and downstream actions; and

- Aiding in future community-level decision making.

Figure 1 summarizes the phases in the VCAPS process (See Webler et al. 2014 for more details.) The first and third phases are fairly straightforward and common. The second phase -- scenario-building -- involves participants discussing, exploring, and learning about climate change related risks, vulnerabilities, and adaptation strategies. Here the group defines scenarios and diagrams the pathways through which climate impacts emerge. For example, extreme precipitation produces stormwater runoff which leads to runoff followed by water quality degradation, and then to public health and economic consequences. Integrating and sharing information about local interactions between biophysical and social contexts is key to understanding local phenomena so that competing priorities and values are represented and can be appropriately balanced while managing the coupled human-environment systems (Picketts et al., 2012). Participants are encouraged to discuss trade-offs, to consider strategies of protection, accommodation, and retreat that can be implemented in different time scales, and to think about “no regret” strategies, which offer immediate benefits whether or not projected climate/weather events occur, and “low regret” strategies, which present greater resilience at limited cost.

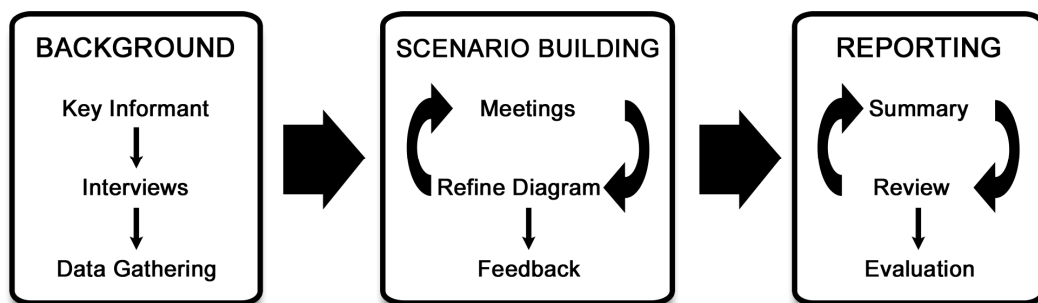


Fig. 1. Three phases of VCAPS

VCAPS can be used to achieve multiple objectives and its application in specific contexts is very flexible. For example, communities have used VCAPS to identify and prioritize specific adaptation actions. In other cases, the priority has been to initiate community discussions about adaptation and provide an opportunity for co-learning and sharing ideas. Such choices can affect how a VCAPS process is designed. For example, processes that emphasize priority setting have been longer in duration, with multiple meetings over a period of months, while processes that emphasize idea generation have been conducted in one or two days of meetings three hours in duration. Such choices also reflect community preferences and available resources.

3. Assessment method

In this multi-case assessment, we were primarily interested in the perceived value and the measurable performance outcomes of VCAPS at both individual and community scales overtime. The goal of the assessment was to identify and characterize:

- *Perceived value*, including what participants thought of the process, which outcomes participants attribute to the VCAPS process as the main causal force, how participants believe the process influenced capabilities to pursue resilient options, and the extent to which they believe it supported subsequent planning efforts and actions.
- *Measurable performance* outcomes of the VCAPS process, including tangible outcomes where the role of the VCAPS process can be directly documented or confidently attributed. Measurable performance outcomes can be outcomes (e.g., changes in perceptions and knowledge) and impacts (e.g., formal management decisions, policy actions) (Wall et al. 2017).

We sought interviews with 1-3 participants in each of the 14 cases (Table 1). We targeted the lead contact / organizer in each community and attempted to arrange additional interviews with participants who played a significant role. In addition, we reviewed case-specific reports as well as post-process interviews and survey responses obtained after completion of some processes.

The overarching question we posed to interviewees was: Have decisions or plans been made in the community to address hazards associated with climate stressors and management concerns that were discussed as part of VCAPS process? We investigated this question more deeply via several probes about planning and decisions, how people are working together on climate-related issues, and participants' learning about climate stressors, management strategies, and the physical, social, political and regulatory system. Probes were intended to focus interviewees' consideration of perceived value in enhancing capacities in addition to tangible outcomes related to managing risk and vulnerability.

Overall, during November 2017 through May 2018, we completed 11 telephone interviews. We also obtained written feedback from nine participants. In only one case (Plymouth, MA), were we unable to locate anyone associated with the process. In four cases, we were only able to obtain feedback from Sea Grant staff or technical advisors: McClellanville; Beaufort (blue crab focus); Dauphin Island; and S. Thomaston. In another case, Sea Grant staff provided feedback about multiple processes.

The challenges of this assessment included those identified by others studying adaptation (de França et al. 2009, Dilling et al. 2019) as well as many of those common to *ex poste* assessments more generally (Patton 2008):

- Finding and reaching individual participants after a process was completed. In some cases, individuals moved or retired, and we were unable to locate them.
- Overcoming loss and muddling of memories after a process was completed.

- Attributing subsequent actions to the VCAPS process as other planning activities and educational events were often part of the overall context for climate adaptation and hazard mitigation planning.

Location	Climate stressors discussed in process	Duration of process	Process details	# of participants in VCAPS meetings	# participants and organizers contacted for feedback
Beaufort, SC (flooding focus)	Sea level rise and extreme rainfall impacts on flooding	2012 - 2014	2 meetings, 1 full day each, over one month, create a spatial vulnerability assessment using GIS, and two public workshops to gather feedback about possible adaptation actions	12	1
Beaufort, SC (blue crab focus)	Drought and extreme rainfall impacts on blue crab fishery	2013	2 meetings, 1 half day each, (separated by 2 months) and systems dynamics model building	5	3
Boston, MA	Winter storms; flooding from precipitation and storm surges; extreme heat	2012-2014	5 meeting, 2 hours each, including breakout sessions on specific stressors to inform Hazard Mitigation Plan revision	Approx. 90	2
Dauphin Island, AL	Severe coastal storms in combination with sea level rise	2012	1 full day	15	1
McClellanville, SC	Heavy precipitation; sea level rise	2011	2 meetings, 1 half day each, (over two consecutive days)	6	1
New Bedford and Fairhaven, MA	Extreme coastal storms	2012	2 meetings, 1 half day each, (separated by 1 week), to inform Hazard Mitigation Plan revision	13	3
Orange Beach, AL	Heavy rainfall; severe coastal storms	2012-2013	1 full day	13	2

Plymouth, MA	Flooding (as result of sea level rise and increased precipitation); coastal erosion (stronger and more frequent storm events)	2011	2 meetings, 1 half day each, (separated by 1 week), to inform Hazard Mitigation Plan revision	6	0
Plymouth, NC	River level rise (as a result of heavy precipitation upland, tropical storms, sea level rise, local major rainfall events)	2010 - 2013	2 meetings, 2.5 hours each (over two consecutive days), in conjunction with creation of flood maps	7	1
South Thomaston, ME	Precipitation, sea level rise, ocean temperature	2013-2016	5 meetings, half to 1 day each, to create multiple GIS reports, and systems dynamics model building, with training workshops	12	1
St. Marys, GA	Hurricanes, storm surge, sea level rise	2013-2016	2 VCAPS meetings, followed by public discussions and workshops	20 (plus up to 350 in all community meetings related to the project)	2
Sullivan's Island, SC	Extreme rainfall; sea level rise; higher high tides	2010	4 meetings, 2 hours each (conducted over 2 months)	9	1
Tybee Island, GA	Sea level rise, coastal flooding	2012-2016	1 Town Hall meeting in combination with additional public discussions and workshops	30-40 participants in the Town Hall meeting (plus up to 200 in all community	2

				meetings related to the project)	
Wellfleet, MA	SLR, coastal storms, water temperatures	2013 - 2015	6 meetings, 2-3 hours each, over the course of 2 years and systems dynamics model building	11	2

Table 1. Implemented VCAPS processes¹

¹ Since this assessment, VCAPS processes were implemented by others in Colorado (Clifford et al. 2018, Ehret et al. 2018) and Hawaii (Spirandelli and Pap 2019).

4. Results

In the following sections, we present how participants we interviewed thought about the value of the process and their assessment of its outcomes. Sections are organized by key themes in participants' responses.

4.1 Informing plans and decisions of municipalities

In several cases, the VCAPS process was tied to a specific community planning process or decision. Therefore, it is not surprising that in multiple instances respondents identified clear and direct links between VCAPS and specific local planning outcomes. Orange Beach, AL revised a beach emergency operations plan and created a template for business and condo emergency preparedness planning with actions identified in the exercises. In the Beaufort County process (flooding focus) participants took the broadest approach by bringing the VCAPS results into the update of their comprehensive plan. In that case, the process led to the identification of 23 adaptation actions. In other cases, interviewees said that VCAPS helped progress planning efforts but was not associated with specific actions either proposed or implemented.

4.2 Informing actions and decisions of other public and private actors

In some cases, interviewees claimed that the plans, actions, or decisions of individuals and businesses were influenced by their participation in a VCAPS process. However, because our interviews targeted the lead contact / organizer in each community our understanding of this kind of outcome is limited. In cases focused on fishing, interviewees reported that fishermen and shellfishermen took away new considerations about how climate would influence how they work. In New Bedford, a city worker reported shifting more attention to flooding and water quality. A municipal staffperson in a different process stated that VCAPS gave her "a little insight, instead of looking always from a regulatory standpoint, to look at it from the other side, and what is important to the actual homeowner or property owner as far as [hazard] mitigation is concerned. And sometimes their interest in mitigation and the interest from the regulatory standpoint are totally different."

4.3 Generating broader support for subsequent actions

A common observation from participants was that VCAPS helped generate support within a community for action to address climate stressors and other hazards. The process provided a forum for municipal staff to discuss challenges and options with elected officials, business owners, residents, and others. For example, a town staffperson claimed that VCAPS sparked an informed discussion about resiliency with staff, the planning commission, and town council members; gave legitimacy to problems; and "gave traction to what we [the staff] believe needed to be done." In another community, a respondent

observed, “Diagramming was useful for developers and council members to understand the importance of new ordinances and why there is a need to build on piles or raise structures by at least two feet.”

In several communities, the VCAPS process planted sparked ideas that carried forward into further discussion of adaptation needs, comprehensive plans, hazard mitigation plans, or proposed ordinances. For example, in Orange Beach the process informed diverse participants about hazards and consequences of climate stressors including potential impacts on city finances. This resulted in support for action from the elected officials and community members who participated. Orange Beach staff reported a plan to put \$30 million in reserve funding for future disaster response.

4.4 Helping efforts to secure/seek funding for climate adaptation actions

Multiple communities explicitly used the results of VCAPS processes to initiate or support efforts to obtain funds for adaptation actions. Directly attributable efforts to seek funding to extend outreach efforts or initiate new activities occurred in seven communities, although not all were successful at acquiring that funding. Communities leveraged the VCAPS effort in proposals for assessing vulnerability, investing in adaptive infrastructure, updating emergency operations plans (Orange Beach), integrating climate change adaptation into local comprehensive planning (Beaufort County), and designing shoreline management and pre-disaster mitigation plans.

4.5 Developing material resources to support planning

In all cases, facilitators provided reports summarizing the process and the information in the diagrams to communities. Reports and diagrams preserve the content of discussions and support institutional memory. For example, the Boston Hazard Mitigation Plan contains an appendix with the VCAPS report. However, the reports and diagrams were not always a resource of lasting value. In particular, many participants did not feel the diagrams were useful for sharing with others who did not participate in the process; they were too complex.

To supplement reports and diagrams, the process prompted thinking about what additional information would be useful or to share with the community, leading to several municipalities seeking out additional resources. These included maps of the spatial distribution of risks, resources for community outreach, and information on potential mitigation options. For example, Wellfleet acquired maps illustrating the impacts of sea level rise on access to oyster harvesting sites and a created a website, linked to the Town webpage, about impacts of climate change on shellfish. St. Marys obtained information about sea level rise. Subsequent use of these resources varied. For example, sea level rise data provided to St. Marys participants were used in later planning efforts. On the other hand, the website link in Wellfleet is largely forgotten as town staff and members of the Shellfish Advisory Board have moved on.

4.6 Promoting learning among participants

VCAPS is designed to stimulate discussions and facilitate exploration to promote learning about how to manage climate stressor impacts. Participants highlighted learning

about, for example, climate stressors, risks, and vulnerabilities in their community. This form of learning resulted from presentations by experts (e.g., about climate stressors) and from opportunities for participants with different perspectives and roles to interact. There was significant value in getting people together with diverse responsibilities and jurisdictions to discuss and learn from each other. In S. Thomaston “participants also learned about ocean acidification and warming waters. The biggest take home lesson: learned a great deal from each other, a very powerful process. They never had the opportunity to talk and learn from each other before.” In Wellfleet, participants reported learning about how sea level rise could impact access to aquaculture areas, the risks of oyster contamination by vibrio, and how state regulators were planning to manage human health risks from vibrio.

5. Discussion

In this section, we discuss what our evaluation uncovered about elements that contribute to valued outcomes from a process. The process itself can be part of building capacities in a community and integrating perspectives in ways that surface options for adaptation as well as potential unintended consequences of adaptation actions. For the process to yield greater benefits, design and timing relative to the goals and to other adaptation processes are important. Facilitation needs to encourage critical examination of options across a spectrum of perceived manageability to open the dialogue on both incremental and transformational adaptation options. In considering success, the long time horizon covered in this research posed challenges but time also provided perspective on impacts of the VCAPS dialogue as some of the significance is best seen in hindsight.

5.1 Deliberative planning tools/processes are conducive to developing capacities for adaptation

Capacity to adapt is based on multiple factors that are “not simply about having the necessary resources at hand, but also about the willingness and capability to convert resources into effective adaptation action” (Cinner et al. 2018, pg. 118). These include knowledge, financial and technical resources, flexibility, trust, social cohesion, information sharing networks, forums for learning, confidence that actions will make a difference, and power to effect change (Cinner et al. 2018, Pahl-Wostl 2009, Huitema et al. 2009). Dilling et al. (2019, pg. 573) argue that “some of the most important critical adaptation-related needs may not directly relate to climate,” but may instead relate to more general needs within a community. Many of these can be developed via participation and knowledge sharing.

The design of VCAPS is informed by research on dialogue-based public stakeholder engagement that has shown strong advantages to collaborative planning processes (Webler & Tuler 2019, Wesselink et al. 2011). Participants gain knowledge and learn skills that enhance planning and decision making (Tuler et al. 2016, Pahl-Wostl 2009). In addition, participants learn the value of conversations among community members about policy actions that can encourage commitment to collaborative decision making and develop a sense of co-ownership in decision outcomes. This supports progress towards

implementation. Our interviews revealed that participants in VCAPS processes learned in all of these ways. For example, in Boston we heard that the process “opened the door to the possibility that we could have found some places where infrastructure improvements -- that might not otherwise have been identified -- were identified because of the human services people there and their particular perspective. Or, maybe, [their perspective] changed how that mitigation action might have been advanced.”

Interviewees also commented that the VCAPS discussion revealed possible secondary and undesired consequences from proposed adaptation actions. Participants were able to flag these issues as needing further exploration, attention to flexibility in planning, and experimentation to assure desired outcomes. The ability to identify the consequences of adaptation actions from different perspectives or anticipate distributional consequences of those actions are key concerns in adaptation planning (Atteridge and Remling 2018, Dilling et al. 2019). Such outcomes speak to the power of deliberative planning tools, such as VCAPS, to develop local capacities for adaptation by getting people together with diverse responsibilities and jurisdictions to discuss and learn from each other.

5.2 Meeting the challenge of designing successful adaptation planning processes

Prior studies have identified a variety of barriers to adaptation planning, involving institutional, social, economic, and other forces (Burch 2010, Moser and Ekstrom 2010, Shi et al. 2015). Our investigation of VCAPS applications highlighted factors that limited adaptation actions while also revealing strategies to address those factors.

Processes should be closely coordinated with regular governance activities to impact policy and action

Linking informal processes like VCAPS with on-going planning activities helps to ensure that information will inform action. In places with this link, VCAPS resulted in outcomes that affected policy because they were closely associated with local government planning efforts and were initiated and lead with clear municipal leadership. High-level directives and leadership have been identified as important to effective adaptation planning (Burch 2010). Of course, this kind of integration was not always possible or achieved. For example, in McClellanville, VCAPS supported participant learning, but the processes had limited influence on policies and actions because it was not closely linked to existing planning or decision processes. The process was proposed and conducted in partnership with the *Climate Change Kitchen Table Group*, which has since disbanded. While some residents were clearly concerned about climate-related hazards and how to better manage possible impacts, the Town did not incorporate climate change into their decision-making processes or policies as a result of the VCAPS exercise. In addition to McClellanville, in two other cases the processes were conducted with volunteer groups that later disbanded and which had no direct influence on local planning (Wellfleet, S. Thomaston).

In two more cases the VCAPS process was initiated by local Sea Grant programs but not connected to any ongoing regulatory or planning activities at the local or state level (Beaufort County (blue crab focus); Dauphin Island). These processes, occurring outside regular planning processes, had limited observable impact on local government agendas or

actions, but our results also suggest that they can play a role in helping to set agendas by building awareness, support organizing by creating new linkages among people and activities, and develop a sense of agency, as suggested by Cinner et al. (2018). For example, in the words of a participant from Wellfleet: “our Town Administrator has asked the Wellfleet Shellfish Advisory Board to update the 2007 Shellfish Management Plan and the new Shellfish Warden asked me to draft a section on climate change to include in the updated plan. Much of the section I wrote resulted from the work of our group and suggestions about management around climate change issues.”

Match process design with planning objectives

VCAPS provides a framework for adaptation planning that can be modified to fit specific contexts, including the number and duration of meetings. Choices reflect local needs and preferences. VCAPS can serve multiple planning purposes, such as initiating discussions, promoting learning, assessing threats, identifying options, and prioritizing actions. For example, in Boston a goal of the process was to provide input to the hazard mitigation plan, and a planner of that process stated “I think the biggest thing we learned was, because we brought together so many city officials and heard so many different perspectives, a lot more about what Boston knew and didn’t know. They were our client.” Processes in Orange Beach, Plymouth, NC, and Beaufort, SC (blue crab process) were aimed at promoting awareness of hazards, their consequences and opportunities for management, and they helped build connections and motivation to plan, which are related to domains of adaptive capacity defined by Cinner et al.(2018). On the other hand, in Beaufort, SC (flooding process) the design was intentionally oriented to identifying and prioritizing actions and in Wellfleet to discussing multiple threats to aquaculture. Consequently these required more meetings and more work to be done inbetween meetings. In another case along the Gulf Coast the design may have even stifled discussions when participants did not want to open a “Pandora’s box” of controversial issues in a process with very limited time to meet.

Participants need support to “think outside the box” and consider adaptation strategies that are both incremental and transformational

Calls for transformational strategies to confront the effects of climate change are growing in governmental reports, scholarly publications, the media, and social movements. However, when it comes to fostering the identification of innovative strategies for adaptation the results from processes that aim to promote adaptation planning are mixed (Butler et al. 2015, Wise et al. 2014). For example, Wise et al. (2014, pg. 327) share the argument of Leach et al. (2010), “that in the face of significant change and uncertainty, the tendency has often been to ‘close down’ too rapidly to a small set of decision alternatives by reconfiguring uncertainty into more manageable, but inappropriately narrow, calculations of risk and cost-benefit equations.”

To counter act this, “thinking outside the box” can be encouraged by a facilitator who asks questions and presentations by those from outside the community, including scientists and non-scientists that challenge the participants to see new connections.

Innovative ideas can also be encouraged by the inclusion of diverse stakeholders where, through a process of iterative dialogue, participants consider consequences of actions and new opportunities for change at different temporal, spatial, and institutional scales. Achieving deeper discussions that may lead to identification of innovative strategies is likely to depend, in part, on the intensity of the process, including number and duration of meetings. For example, the number of meetings in Wellfleet, MA allowed opportunities for discussions that delved into nuance and complexity.

Processes like VCAPS produce actionable outcomes when participants agree on the immediacy of the issue

Scholars have long noted that the urgency of an issue is a primary factor driving collaboration (Dietz and Stern 1998). Recent experience with extreme weather events can propel action. Implementation of processes to supporting adaptation planning, like VCAPS, can build on such contextual factors in ways that strengthen their impacts. Orange Beach has repeatedly experienced impacts from climate change related stressors. Wellfleet had recently experienced closure of aquaculture beds due to a vibrio outbreak. This generated a sense of urgency to develop and implement effective actions to address threats with severe storms and flooding among diverse stakeholders. On the other hand, a lack of perceived urgency can stall a willingness to engage in planning processes like VCAPS. For example, a state resource manager and Alabama sea grant staff member that participated in the Beaufort process with the blue crab focus stated that, “With the return of normal rain for several years now, I don’t think climate is on the mind of the crabbers so much now. I suspect that will change when flow rates change and crabs move up the rivers above the legal harvesting lines...Unfortunately, our history is ‘get to a crisis level’ before we can get anything moving.” Overcoming this kind of barrier is challenging. Processes like VCAPS have a better chance of producing actionable outcomes when they engage local leadership that highlights emerging threats, places emphasis on adaptation planning, and ensure resources for its institutionalization in routine planning activities. Sharing stories from other communities that have faced urgent threats may also help.

5.3 Challenges of defining success

Much has been written about the challenges of making judgments about “success” of participatory planning processes (Webler and Tuler 2019, National Research Council 2008) and our assessment of VCAPS faced these challenges. Discussions adaptation planning processes have also identified challenges to making judgments about success (de França et al. 2009, Moser and Boykoff 2013, Dilling et al. 2019), such as:

- Establishing goals such as what risk reduction to whom, over what time period, and with what cost.
- Reconciling diverse opinions about both processes and outcomes associated with climate adaptation, as well as the objectives of adaptation.
- Attributing changes to risk and vulnerability from specific actions, made difficult because many factors may intervene to influence how adaptations persist or influence the emergence of subsequent plans and actions.

- Ascribing outcomes from adaptation actions as individuals and communities react—not only to changing climate stressors, but also to changing social, economic, political, and cultural contexts.

As part of this assessment, we encountered all of these challenges. Here we elaborate on two challenges associated with attributing success to adaptation planning processes such as VCAPS.

First, outcomes may be significant but not readily apparent as emerging directly from a VCAPS process. As we have noted, VCAPS was at times closely integrated into an existing planning effort. At other times, VCAPS was not integrated into ongoing planning activities. But in nearly all cases, VCAPS (or any climate adaptation planning process) occurs within a broader and longer-term series of activities. This has three, related, implications for appraising the effectiveness of any one process, especially in the short-term:

1. Planning is not a rational, linear process and there are many forces and dynamics at play. Politics, competing agendas, new events (natural and human-caused), and the emergence of new information can intervene. Some can be internal to a community, such as when new officials are elected or staff retire. Other times forces are external, such as a natural disaster (or more recently a pandemic), an economic downturn, or lack of funding opportunities.
2. Adaptation is an ongoing “forever” process. Planning and implementation can occur iteratively. We identified examples in Plymouth, Tybee Island, St. Marys, and Wellfleet, which continue to integrate adaptation strategies into their on-going planning activities. Communities can also learn by doing, and then further adapt what they are doing. According to Maine Sea Grant staff, a lobster marketing council was created and some of the ideas from S. Thomaston VCAPS infused that process via individual participants.
3. Pinpointing causality is a challenge given the complexity of adaptation planning processes. Often it is a confluence of multiple streams of action and thought that lead to a decision or action. While some interviewees were able to identify specific actions resulting from the VCAPS processes, others suggested VCAPS helped “in a general way” or were unable to identify clear causal links between VCAPS and impacts on local plans and decisions. Instead, as one participant put it: “The VCAPS program provided seed ideas to individuals to develop hazard mitigation planning.” Another told us “VCAPS didn’t cause things to happen, but it was a component to help the city do what it was already striving to do.” Sentiments such as these underscore how capacity building among participants is crucial but that near-term assessments may fail to pick up important outcomes, and that perhaps a focus on the integration and synergies among processes would be a more revealing direction for evaluation.

The challenge of identifying outcomes may hinder support for deliberative adaptation planning processes. The challenge is exacerbated when evaluations are conducted soon after a process is completed even though impacts may take time to emerge (Blackstock et al. 2007). Yet, our assessment of the fourteen VCAPS processes demonstrates significant benefits can emerge, even if they are hard to measure or take time to emerge. They are worth doing. Government agencies and private foundations funding adaptation planning

efforts can help to document and share their benefits (and learn from their failings) by giving more attention to their perceived value: what was their role in building awareness and motivating planning to confront the risks and vulnerabilities of climate change? Why do community members feel they were able to rise to the challenge? Positive perceptions of value can help to drive willingness to plan and to adapt, more so perhaps that additional information about direct, tangible impact; more information is not a good predictor of behavior change (Cinner et al. 2018, Suldovsky 2017).

Second, VCAPS processes can inform multiple stages in the evolution of ongoing efforts by municipalities to confront climate stressors. Our work with VCAPS has varied based on *when* the VCAPS process was implemented within a broader context of municipal planning. In some places VCAPS helped a municipality begin to think about climate adaptation. In others it promoted focused, advanced planning. We characterize communities as being predominately oriented toward one of the three stages of adaptation planning:

1. Building greater awareness about climate stressors and the need to act
2. Identifying sets of strategies to manage the impacts of particular climate stressors
3. Garnering support for specific actions

Deliberative adaptation planning tools can play important roles in each stage, as demonstrated by the results of this assessment. Planners, facilitators, and participants need to give careful consideration to the stage of planning when designing a process, including the duration of the process. On the other hand, in Orange Beach, where staff had already laid the foundation for the discussions and people were agreed on the threat that climate change posed, they were motivated to work together and were able to make rapid progress. Processes are more likely to make significant contributions when purposes are clear and oriented to helping a community step through each adaptation stage. This suggests, too, that measures of success will need to vary by stage.

6. Conclusion

VCAPS is one of an increasing number of resources available to communities and planners. It exemplifies how analysis and deliberation can be synthesized in a manner that produces social learning and collaborative planning. Our assessment of fourteen VCAPS applications on the United States East and Gulf coasts provides a rare view of the use of a single climate adaptation planning tool in multiple contexts after many years. There are very few such assessments in the context of climate adaptation planning.

We learned that VCAPS performs better when there is wide community buy-in and municipal leadership, the participants agree on the importance of climate change, knowledgeable stakeholders commit to participate, and the process is designed to meet participant expectations about desired outcomes. We heard that participants viewed adaptation planning as an on-going process. Important outcomes of the VCAPS process and the basis for participants' judgments about its worth were often related to the development of capacities for planning and adaptation, suggesting that assessment of changes in capacities and how community leaders and members perceive the benefits of planning and their agency to effect change should be important considerations in assessments of success.

Significant contributors to capacities emerged from a focus on iterative dialogue and linking of local knowledge with scientific knowledge. If we want to make progress on developing tools to support adaptation more experimentation and evaluation of tangible outcomes and perceived value of participatory planning processes are needed to produce processes that are effective at meeting the needs and expectations of communities striving to be ready for the effects of climate change.

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