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Engaging Stakeholders in Planning for Sea Level Rise and Resilience

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Abstract: This case study describes a region-wide, multi-sectoral, and whole-of-community stakeholder engagement approach for addressing sea level rise (SLR) and flooding. This approach was implemented through a university-led community engagement event, the Hampton Roads Resilient Region Reality Check (H4RC), which allowed an examination of its effectiveness as a mechanism for capturing community-wide perceptions regarding SLR, flooding, and associated risks; engaging stakeholders in discussion within and across different groups; and assessing community willingness to address flooding and SLR. The results show that the event helped participants broaden their perspectives and understanding of flooding and SLR. In an approach that called for participants to engage in social learning across social networks, the event had some effect on individual efficacy. However, there was little impact on participants' already-established perception that the region does not possess significant willingness to take action.

Keywords: *resilience, sea level rise, flooding, stakeholder engagement, social learning, social capital*

This study describes a stakeholder engagement approach built on three key themes: a *region-wide*, multi-sectoral, and *whole-of-community* approach oriented toward *actions* to address sea level rise (SLR) and flooding. We implemented this approach through a community engagement event – the Hampton Roads Resilient Region Reality Check (H4RC). Stakeholders from government, non-profit, business, and civic organizations from across the Hampton Roads region participated in the event. We assess the effectiveness of the approach for capturing community-wide perceptions regarding SLR, flooding, and associated risks; engaging stakeholders in discussion within and across different groups; and assessing community willingness to address flooding and SLR. More importantly, this article discusses the impact of the H4RC as an engagement approach designed with numerous stakeholders in mind.

The Hampton Roads region comprises 17 localities in southeastern Virginia (USA), including the following core cities: Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Suffolk, and Virginia Beach. Over the last decade, more than 20 studies have analyzed the substantial risk to the region from SLR and associated flooding as well as explored potential solutions (see for example Kleinosky et al. 2007; Hampton Roads Planning District Commission 2012; Li et al. 2012; Hampton Roads Transportation Planning Organization 2013; Virginia Institute of Marine Science 2013; Stiles et al. 2014). The region ranks 10th in the world in the value of assets exposed to increased flooding from storm surges and tidal flooding (Hallegatte et al. 2013). Nuisance flooding happens about nine times annually in the Hampton Roads area and is expected to increase to 182 events per year by 2045 (Spanger-Siegfried et al. 2014). By 2100, SLR could result in direct economic costs estimated between $12 and $87 billion, with up to 877 miles of roads permanently or regularly flooded (Hampton Roads Planning District Commission 2012). In spite of these

factors, the region has struggled to plan, act, and cooperate in a regional fashion (Yusuf and St. John III 2017; Yusuf et al. 2018).

With SLR posing such extensive risks to this region, the H4RC pursued engagement of multiple stakeholders in Hampton Roads as part of efforts to build regional resilience by addressing SLR and flooding. Building on Arnstein's ladder of participation (1969), the International Association for Public Participation (IAP2 2007) categorizes public participation on a spectrum from Inform→ Consult→Involve→Collaborate→Empower. The immediate objectives of the H4RC event fit the first two levels along the IAP2 spectrum – inform and consult – while building a foundation for involvement and collaboration.

Sea Level Rise and Focus on Resilience

Resilience is concerned with how a system, community, or individual deals with disturbance and surprise (Intergovernmental Panel on Climate Change 2012). It reflects the capability to withstand crises or disruptions by anticipating risk, limiting the impacts, and rapidly recovering in the face of changes such as those associated with SLR (Bahadur et al. 2013; White et al. 2015). Becoming resilient encompasses a wide variety of strategies that respond to vulnerabilities or adapt to recent or anticipated risks.

Resilience to SLR relies on a socio-ecological system framework, involving more than the ability to recover and reorganize following a disruption; to include the pursuit of integrated, innovative responses and new trajectories through social learning and adaptation (Adger et al. 2005; Folke 2006; Lloyd et al. 2013). Resilience, therefore, is a dynamic process linked to human actors and human agency. It is reflected in the ability to respond to disturbance; engage with uncertainty and potential change; adapt, cope, learn, and innovate; and develop leadership and capacity (Obrist et al. 2010; Bristow and Healy 2014). This ability to take learning and turn it into adaptive actions is enhanced by *social capital*, or the network of "reciprocal social relations" (Putnam 2000, p. 19) that an actor can turn to as a source for cooperation, mutual support, and effectiveness. Scholars have pointed to social capital as a vital component for developing resilient communities (Woolcock 2001; Putnam et al. 2004; Halpern 2005).

Resilient communities are more likely to persist in the face of acute disruptions and chronic stresses. They assess risks, mitigate impacts, and plan for longevity by adapting, evolving, and making informed short-term and long-term investments. To build resilience, residents, businesses, organizations, and governments must work together to create the capacity to respond and even transform themselves.

A community-wide approach is needed because water and flooding cross jurisdictional boundaries (U.S. Geological Survey 1990; Collier 2008) and affect different types of communities. Governments, businesses, and citizens alone cannot solve the problem but need to work together to build resilience. Building resilience requires a collaborative regional approach involving multiple sectors and spanning municipal boundaries (Adger et al. 2005). A whole-of-community approach respects the value and importance of strengthening existing relationships and communication channels between all community stakeholders (Federal Emergency Management Agency (FEMA) 2011). Addressing SLR and flooding through building community resilience requires significant resources and substantial changes. How public participation is managed, who is included, and how it is conducted, is likely to have significant impacts on success as measured by participants and community leaders (Stern and Dietz 2008). How public participation is thought of, valued, conceived, and incorporated into the decision making process also matters. Engaging with key stakeholders helps ensure that solutions reflect underlying stakeholder preferences (to the extent possible), ensure legitimacy of efforts to address SLR, and gain acceptance and support for solutions (Arvai 2003; Renn and Schweizer 2009; Moser and Ekstrom 2011).

Establishing resilience, therefore, requires multiple sectors across the community be engaged in the process of building capacity in a whole-of-community approach that includes representatives from all levels of government, academia, non-governmental organizations, the private sector, and

citizens. This approach allows better understanding and bridging the different needs and priorities of various stakeholders, and determining how different stakeholders can contribute to improving regional resilience. Creating an authentic, action-oriented dialogue within the community can empower behavior that strengthens cohesion and resilience from the individual and neighborhood level all the way up to the regional level.

Citizen engagement initiatives in New Hampshire and New York illustrate public participation efforts that resulted in solutions satisfactory to participants, while benefitting social, civic, educational, and business communities. Facilitators from New Hampshire Listens brought together community members to elicit solutions focused on the Great Bay National Estuary Research Reserve. Community conversations, experiential activities, workshops, and other activities during a multi-month phased project enabled community members to work with scientists directly to identify community values and "perceived vulnerabilities associated with climate change" (Aytur et al. 2015, p. 87).

In New York City, community engagement efforts conducted as part of the city's Special Initiative for Rebuilding and Resiliency (SIRR) led to specific priorities for areas effected by Hurricane Sandy (The City of New York 2013). SIRR staff consulted officials in more than 80 elected offices and community boards; more than 300 business, civic, community-based, environmental, faith-based, and labor organizations were involved in the planning process. SIRR staff also conducted 11 public workshops and briefed more than 1,000 residents.

Conceptual Approach and Stakeholder Engagement Event

In civic engagement initiatives where one sector (e.g., regional task force or government entity) partners with another sector (e.g., the public), a challenge is to garner attention and foster interest and commitment among all partners. In an era of growing awareness and concern about SLR, involving community stakeholders in setting priorities for resilience action requires outreach, using a combination of traditional methods (e.g., newspapers, newsletters, flyers, radio, television, direct mail, knocking on doors) and social media. Other key concerns to consider in planning a successful engagement event include the physical location of the event, accessibility and proximity to transportation routes, timing of the event, and the use of a fair and respectful process (Tuxill et al. 2009; McCown et al. 2011).

Informed by the literature on stakeholder engagement, the H4RC engagement process was designed to allow for both in-depth conversation among stakeholders with similar backgrounds, and the wider sharing of ideas across the broad spectrum of stakeholder groups. Three key themes underpinned this engagement approach. First, it adopted a multi-sectoral, whole-of-community framework to ensure inclusivity and diversity of stakeholders. This approach *respects the value and importance of strengthening existing relationships and channels of communication* among the full array of community stakeholders (FEMA 2011; Centers for Disease Control and Prevention 2013). Second, the focus was on *prioritizing actions to address SLR and flooding,* including identifying solutions that are considered feasible by local stakeholders and residents and assessing the community's willingness to act. Third, the emphasis was on *engagement on a regional basis*, rather than on a city by city basis.

Public participation processes can change the way people understand and approach resilience issues, especially if the processes facilitate social learning. Social learning, where a group collaborates in a shared experience, has increasingly become a goal of the resource management process (Reed et al. 2010). *Social learning* permits a convergence of goals among participants who may have different interests and promotes the co-creation of knowledge that can build relationships and mutual understanding (Blackmore 2007). A participation process that integrates social learning has the potential to generate new knowledge and increase the technical and social skills of participants, as well as build relationships and trust (Muro and Jeffrey 2008).

The H4RC came about as the result of both push and pull forces. First, there were several area organizations that were interested in engaging stakeholders on the issue of SLR and flooding

resilience. These organizations were willing to combine their resources and expertise to host a region-wide, multi-sectoral public participation event. Second, on the pull side, members of the Hampton Roads community were asking for venues and opportunities to participate in regional efforts to address resilience. The resulting H4RC event was held in March 2015 as a collaboration among multiple organizations: Old Dominion University (ODU), the Urban Land Institute (ULI) Hampton Roads, the Community Engagement Working Group (CEWG) of the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Planning Pilot Project, and Virginia Sea Grant. The Hampton Roads ULI, through its Urban Resiliency Program, brought to the event practice-based expertise related to resilience. ODU provided academic support for the H4RC, bringing expertise that focused on practice-relevant and applied research. It also provided staff to support the event as facilitators and note takers. The CEWG connected the H4RC to an extensive network of civic, nonprofit, and grassroots organizations. The event was held at ODU in an easily accessible and politically-neutral location in a central city in the region, with ample parking and convenient bus stops.

Methodology

H4RC participants were recruited from a broad spectrum of stakeholder groups spanning sectors most influential to resilience response and action. Invitees included leaders of neighborhood and civic league organizations, staff from federal, state, and local governments, non-governmental (NGOs) or faith-based organizations, regional planning organizations, and businesses such as those in the real estate, construction, tourism, utilities, and transportation industries. An initial list of invitees was developed by the organizing committee. As gaps in the invitation list were identified, additional invitees were added primarily through a snowball method. The selection of participants was purposeful, designed not to be representative, but to bring together diverse stakeholders across multiple sectors.

One-hundred and thirty stakeholders participated in the day-long event. Participants were assigned to discussion tables organized by similar sector and interests. The table groupings were: government planners, government emergency managers, infrastructure managers, real estate businesses, tourism and waterfront businesses, neighborhood representatives, environmental nonprofits, and civic engagement nonprofits. Due to logistical constraints, several mixed tables were also formed.

The event was structured around facilitated discussion of three key questions about the risks of flooding, and identification of each participant's top two priorities from this discussion. Participants were given three questions to discuss: 1) How does flooding affect you?, 2) What should we do about flooding?, and 3) What resources are needed to address flooding?

Participants were given 30 minutes to discuss each question at their respective tables. Scribes from each table entered discussion results into an online document (via Google Docs). Results were made available to all attendees by projecting the document onto a large screen. Correspondingly, after the table discussion a facilitator from each group briefly reported out to all participants the key points from the table discussion. The event moderator and facilitator, who was an ODU community engagement liaison and local public radio host, oversaw this process, taking the summary reports from each table and sharing major themes with all attendees. Calling on each of the table facilitators, she further distilled and clarified their two-minute reports by asking the facilitator to expand on or explain the table's reported concerns and solutions. The overall approach allowed for leveraging sector-specific knowledge while ensuring sharing of ideas across multiple sectors.

After the discussions and report outs, participants were given the opportunity to provide direct input, via a multi-voting prioritization activity, on their individual priorities for taking action to address SLR and flooding. Participants were provided a list of the action items resulting from the second discussion question that asked "What should we do about flooding?" Each participant was given five sticker dots to use to vote for the actions he/she would most want to see supported or resourced.

Article authors collected data as members of the planning team for the engagement event, and as facilitators during the H4RC, had access to notes taken by scribes and other facilitators. Event notes were compiled and archived electronically in real time, and were later analyzed to identify consistent themes. Data were also collected through pre- and post-event web surveys of participants; survey results were analyzed to determine pre-event participant perceptions, changes in perceptions, and perceived outcomes of the event.

Results

Pre-Event Survey Responses

Event participants registered in advance and completed a short survey. Survey results point to several key issues regarding SLR and flooding. First, there were high levels of agreement that the impacts will be felt personally and regionally. As shown in Figure 1, 90% of participants agreed that the region will be severely impacted by flooding, and 90% agreed they will be personally impacted. Second, most stakeholders felt knowledgeable about flooding risks and impacts. When asked about their knowledge of the risks and impacts of flooding, 32% of participants strongly agreed and 48% agreed as shown in Figure 2.

At the same time, there was ambivalence about community and individual willingness to take actions necessary to address flooding and becoming more resilient. Participants were asked to indicate their level of agreement with two statements: 1) My community will take the action necessary to deal with flooding in the next 50 years, and 2) I am willing to pay more taxes or fees to make my community more resilient to flooding. In terms of community willingness, of the 161 participants that responded, 63% either agreed (46%) or strongly agreed (17%) that their community will take necessary actions. However, 32% had no opinions about community willingness and another 5% either disagreed (2%) or strongly disagreed (3%). Similarly, when asked about individual willingness, 47% of participants were willing to pay more in taxes or fees to make their community more resilient (46% agreed and 12% strongly agreed), but 21% either disagreed (17%) or strongly disagreed (4%) and 31% had no opinion.

Facilitated Discussions: Perceptions Regarding SLR Impacts, Possible Solutions and Resource Needs

During the H4RC, the first discussion question asked participants to think about how flooding affected them. Economic-related impacts were most commonly identified by participants, including concerns such as property loss and loss of home property value. Transportation was also recognized, as many participants had personal experiences with road flooding causing disruption to their lives or periods of isolation. For example, one table discussion emphasized that flooding can block roads and damage automobiles, making it difficult to get to and from work thus affecting mobility and connectivity. Another table connected the transportation challenge to concerns about the flow of people in and out of the region before and after a storm and for emergency services. Also highlighted was the interconnectedness of social, economic, and ecological impacts. For example, issues related to social equity and quality of life were raised, including concerns about disparate vulnerabilities to and impacts of flooding across the region, and the effect on community cohesion.

The second discussion revolved around what communities should do about flooding and which actions would be the most effective. Consistent across the proposed actions was the idea that regionally-coordinated revision of zoning and land use is the most effective way to build resilience. Specific tools of land use planning raised ranged from changes to zoning policies and creating regional building standards to strategic, managed retreat from areas that experience flooding. Participants also discussed how public education and outreach was crucial, including creating more citizen emergency response teams, increasing the number of flooding signs, and improving homeowner education.

The third discussion focused on resource needs. Participants agreed that financial resources were important, and that regional collaboration to attract funding for investments in mitigation and adaptation was needed. Additionally, a wide range of non-financial resources were identified, including information sharing networks, a cross-regional communications task force, political will, and education about climate change issues.

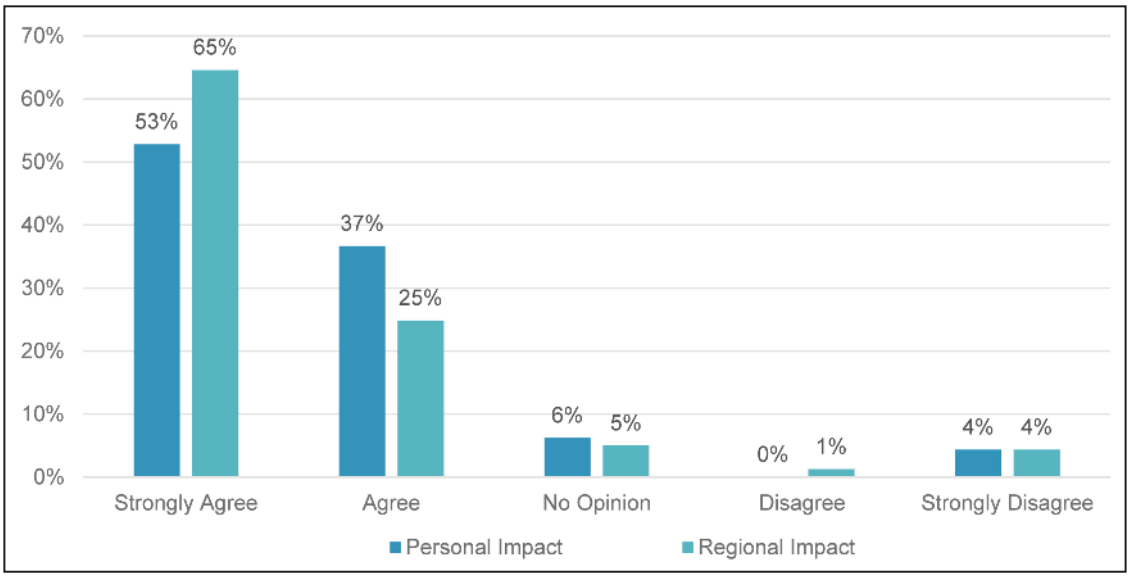

Figure 1. Perceived impacts of flooding (pre-event responses, n=161). Survey questions: 1) Personal Impact: I am likely to be impacted by flooding within the next 50 years. 2) Regional Impact: Hampton Roads will be severely impacted by flooding within the next 50 years unless action is taken.

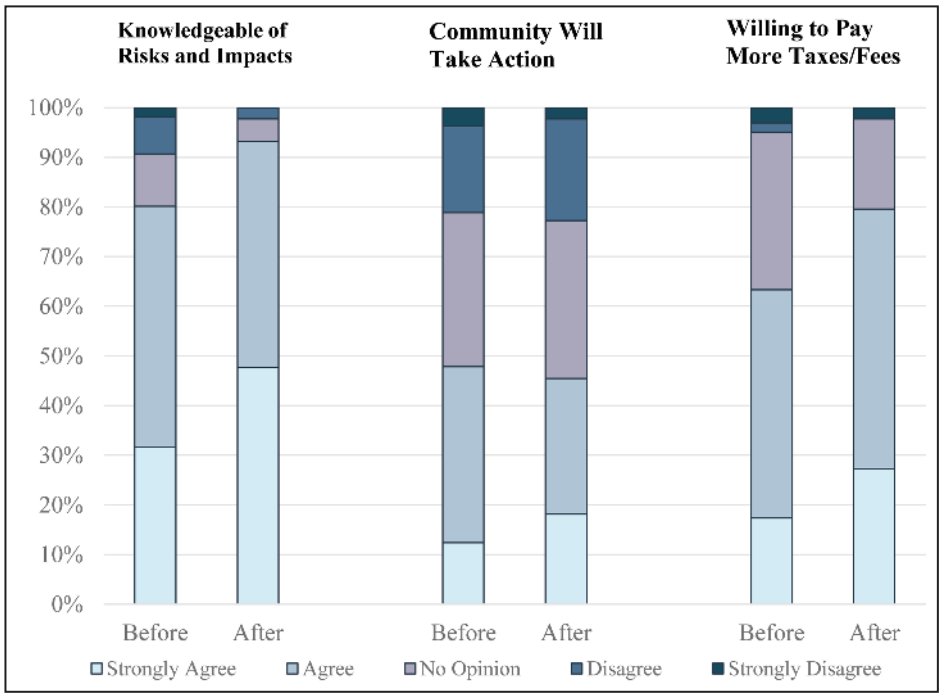

Figure 2. Knowledge of risks and comparison of perceptions before (n=161) and after (n=44) the engagement event.

Multi-voting: Priorities for Action

Table discussions were followed by a multi-voting prioritization exercise. Each participant was given five votes to prioritize the actions he/she identified as most effective for addressing flooding and SLR. The action areas that participants were asked to prioritize were identified during the table discussions. Of the 383 votes that were cast 15% of the votes prioritized regional collaboration to attract funding, 13% public education and outreach, 13% revise zoning and land use, 11% natural solutions, 11% reduce carbon emissions, and 10% living with water designs.

Post-Event Survey Responses: Social Learning and Social Capital

Following the event, participants completed a post-event survey. Responses showed that the H4RC has, to some extent, increased participants' level of knowledge regarding the risks and impacts of flooding. Comparisons of pre- and post-event perceptions are presented in Figure 2. While there was minimal change in participants' perceptions that the community will take the actions necessary to address flooding, there was greater willingness, post-event, among participants to pay more in taxes or fees to make the community more resilient to flooding.

Results suggest that the engagement event affected individual awareness of SLR impact and the need for government response; participants reported higher levels of knowledge about SLR risks and impacts coupled with a greater willingness to pay taxes and fees to build resilience. However, at an aggregate, community-wide level, there was little impact on participants' perception of the community's willingness to act. This result highlights the importance of both social learning and building social capital.

Moreover, participant responses to the post-event survey provided support for the occurrence of *social learning*. In the context of social learning, improved understanding emerges through collaborative processes that enable creation of a shared sense of meaning through interaction with individuals with different perspectives (Weick et al. 2005; Ensor and Harvey 2015). In this sense, the H4RC event can be seen as a process-oriented stakeholder network that offers "an interactive field of discourse occupied by those who share messy (complex, interdependent, emergent) problems and who want/need to talk about them" (Calton and Payne 2003, p. 8). The H4RC offered a collaborative learning environment and facilitated dialogue that prompted distinct concerns of different stakeholder groups, and supported collective sense making by linking and bridging unique perspectives into broader communal meaning. Furthermore, it allowed a wide range of stakeholders to come to some degree of consensus about willingness to take personal action to build resilience. While participants indicated a marked degree of concern regarding whether the region is inclined to take such action, these same participants' willingness to pursue individual measures may portend improvements in collective action as further engagement opportunities develop around the issue of SLR.

Finally, as regards to social learning, our results show that participants were positive about the learning value of the engagement event. For example, over 97% of participants indicated that the engagement event helped them understand perspectives of different stakeholders from different sectors and more than 90% of participants at least agreed that it helped them appreciate the perspectives of different stakeholders (See Table 1).

In addition to social learning, experts have recognized that socio-ecological resilience to environmental shocks and stresses greatly hinges upon the adaptive capacity of their social and ecological systems (Adger et al. 2005). Adaptive capacity of a group or community is intimately tied to their *social capital* – the ability to turn to networks full of "reciprocal social relations" (Putnam 2000, p. 19) – so as to tap the expertise or experience of community members and maximize the usefulness of their social learning (Henly-Shepard et al. 2015). Social capital theories that examine such inclusivity point to the development of *bridging* social capital (or inclusive of many actors) and *linking* social capital (which normally involves ties with centers of power and/or resources) that can promote a healthy, resilient community (Woolcock 2001; Putnam et al. 2004; Halpern 2005). From the perspective of bridging social capital, the physical setup of grouping participants by organizational perspective was a logical approach – allowing

Table 1. Perceptions regarding learning outcomes (n=44).

Helped me…	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Understand the perspectives of different stakeholders from government, business, non-profits, and the community	50.0%	47.7%	2.3%	0.0%	0.0%
Appreciate the perspectives of different stakeholders from government, business, non-profits, and the community	43.2%	47.7%	9.1%	0.0%	0.0%
Understand shared concerns about flooding and SLR	43.2%	45.5%	11.4%	0.0%	0.0%
Understand the challenges the region faces in becoming resilient to flooding and SLR	43.2%	45.5%	11.4%	0.0%	0.0%

participants to meet, face-to-face, with individuals who shared expertise and knowledge that resonated with their backgrounds, therefore affording participants the opportunities to participate in the collaborative social learning process and to extend their networks. Furthermore, the broader report-outs that spanned all stakeholder groups also offered further opportunities for social learning and, therefore, opportunities to improve capacity within their social networks.

As the post-event survey data show, most participants left this event with increased understanding of the challenges of managing SLR and greater inclination to build resilience by a marked willingness to pay more taxes. This suggests that the process used in the H4RC demonstrates the benefits of providing participants opportunities to engage in social learning through an exchange of information and perspectives across a bridging social network, an approach that has built resilience in some post-disaster communities (Storr et al. 2016).

Conclusions and Implications

The premise of our study was that building resilience requires all stakeholder groups be engaged through a whole-of-community approach. Such an approach promotes social learning, allows the different perspectives and knowledge held by various stakeholders to intersect, and therefore results in greater learning and understanding that bridges differences so that stakeholders can contribute to improving regional resilience. Our research found that the H4RC whole-of-community, action-oriented engagement effort at the regional level encouraged such social learning and concurrent social capital that can lead to subsequent efforts to strengthen resilience.

Bringing diverse members of the community together to think about, talk about, and respond to key questions about flooding impacts, possible responses, and resource needs, was an important step in crossing multi-sectoral boundaries to enable knowledge sharing. Indeed, the H4RC demonstrated how multiple stakeholders engage in dialogue about SLR, and begin the process of solidifying, at least to themselves, effective actions to build resilience. Social learning theory maintains that this kind of knowledge acquisition prompts learning and change beyond the individual to the community level, and enables

"new shared ways of knowing to emerge that lead to changes in practice" (Ensor and Harvey 2015, p. 510).

Literature on the strength of social capital within communities suggests that bringing together people who are members of differing groups, but who have similar long-term ends, leads to greater impact than relying on individuals who are linked solely by bonding (or close circle) social networks (Agnitsch et al. 2006; Norris et al. 2008; Smith et al. 2012). Therefore, the cohesion and trust developed in social networks are key to developing resilience in the face of potential threats and crisis (Storr et al. 2016). This broader collective approach builds the capacity to engage with uncertainty and potential change, and to adapt, cope, and innovate, as such communal regard "invites transformation, calling us not only to new facts and theories and values but also to new ways of living our lives" (Palmer 1998, p. 38).

Using a participatory community engagement process of resilience building can result in long-term benefits (National Research Council 2008). There are two crucial aspects of this meso-level and macro-level engagement. First, effective engagement is critical for ensuring that resilience-related solutions reflect the underlying multiple stakeholder preferences, ensuring that resilience efforts are considered legitimate by those across the entire community, allowing for widespread acceptance and support for solutions (Arvai 2003; Renn and Schweizer 2009; Moser and Ekstrom 2011). Second, with a whole-of-community sensibility, outcomes related to learning, improved understanding, and greater cohesiveness not only increase the community's ability to respond to disruptions and stress, but also allow it to transform and innovate.

The H4RC event placed a wide variety of community actors in a situation where they could engage with each other within a scenario that was conducive for social learning. Post-event responses indicate that these participants, by and large, realized the social learning value proposition of the engagement event. Participants manifested learning outcomes consistent with Ensor and Harvey's definition of social learning as the product of "knowledge sharing, joint learning, and co-creation of experiences between stakeholders around a shared purpose" (2015, p. 510).

There were, however, some limitations. While some participants noted that they appreciated being able to hear the perspectives of other stakeholder groups, they commented that time constraints limited the opportunities for in-depth information sharing. In addition, while invitations to participate in the H4RC were sent to a wide range of stakeholder groups, some groups (such as residents, neighborhood organizations, and the construction industry) remained under-represented. Organizers of future stakeholder events will need to recognize and make every effort to identify and "bring to the table" community representatives who were underrepresented on this occasion. Deliberate and concerted outreach to community associations, civic leagues, faith communities, and youth organizations is crucial.

As one event in what was envisioned as a series of engagement sessions with stakeholders, this experience created the groundwork necessary for entering into a long process of building alliances, bridging affinity boundaries, and developing long term, meaningful support and commitment (Picketts et al. 2012; Petzold and Ratter 2015; Sarzynski 2015). The H4RC was the beginning of the multi-event, multi-year participatory process that was incorporated into the Hampton Roads Intergovernmental Sea Level Rise Preparedness and Resilience Pilot Planning Project (the Pilot Project). The mission of the two-year Pilot Project was to develop a regional 'whole of government' and 'whole of community' approach to SLR preparedness and resilience that would span jurisdictional and sectorial boundaries. The Pilot Project was challenged by a lack of clarity of purpose and consensus on objectives and ultimately outcomes (Yusuf et al. 2018), but had success in respect to the development of case studies which revealed the interdependencies of critical infrastructure and the important role of public participation and whole-of-community engagement (Considine et al. 2017). What began as cross-sector engagement among key stakeholders in the H4RC ultimately supported the formation of resilience networks within the region and encouraged localities to engage the community at the broader neighborhood level.

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