RESEARCH/PD ANNUAL REPORT - FINAL REPORT

2015 annual report - final
Amy Snover
Successful Adaptation: Identifying Effective Process and Outcome Characteristics and Practice-Relevant Metrics
R/COCC/SS-3
Submitted On: 05/29/2016 05:38:33 PM

METRICS & MEASURES

Metric/Measure	Value	Note
Acres of coastal habitat	0	
Fishermen and seafood industry personnel	0	
Communities - economic and environmental development	7	Estimate based on 10% of 50 (a conservative estimate of the number of independent communities participating in our Successful Adaptation presentations and training workshops who were ready to implement changes in their approaches to climate change risk assessment and adaptation efforts), plus two communities with whom we're currently working to include this framing in their approach to planning.
Stakeholders - sustainable approaches	0	
Informal education programs	0	
Stakeholders who receive information	233	presentations (1/3 - b/c regional)
Volunteer hours	0	
P-12 students reached	0	
P-12 educators	0	

REQUESTED INFORMATION

Publications

No **Publications** information reported

Students Supported

No **Students Supported** information reported

Narratives

Snover_Successful Adaptation_ final report narrative
Uploaded File: Snover_Successful_Adaptation__final_report_narrative.pdf

Partners This Period

California Sea Grant
Types: Sea Grant Program
Scale: STATE
Notes:

Institute for Sustainable Communities
Types: Other
Scale: Unknown
Notes:

Oregon Sea Grant
Types: Sea Grant Program
Scale: STATE
Notes:

Oregon State University (OSU)
Types: Academic Institution
Scale: STATE
Notes:

Stanford University
Types: Academic Institution
Scale: STATE
Notes:

STANDARD QUESTIONS

Community Hazard Resilience

(1)

Name of Community	San Francisco Bay
County	Alameda County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(2)

Name of Community	San Francisco Bay
County	Contra Costa County
Number of trainings/technical assistance services provided	1
	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing,

Description	measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(3)

Name of Community	San Francisco Bay
County	Marin County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(4)

Name of Community	San Francisco Bay
County	Napa County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(5)

Name of Community	San Francisco Bay
County	San Francisco County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(6)

Name of Community	San Francisco Bay
County	San Mateo County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(7)

Name of Community	San Francisco Bay
County	Santa Clara County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(8)

Name of Community	San Francisco Bay
County	Solano County
Number of trainings/technical assistance services provided	1
Description	training/assistance with hazards resiliency practices (i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(9)

Name of Community	San Francisco Bay
County	Sonoma County
Number of trainings/technical assistance services provided	1
	training/assistance with hazards resiliency practices

Description	(i.e., successfully building (defining, implementing, measuring) ongoing resilience to hazards such as temporary and permanent inundation caused by coastal and river flooding, erosion, landslides
Was hazard resilience improved?	No

(10)

Name of Community	Santa Clara Valley Water District
County	Santa Clara County
Number of trainings/technical assistance services provided	1
Description	Training on adaptation to climate change to 15 engineers, biologists, planners, hazard specialists, etc.
Was hazard resilience improved?	No

(11)

Name of Community	Port Authority of New York and New Jersey
County	New York County
Number of trainings/technical assistance services provided	1
Description	training session at 2016 Climate Leadership Conference
Was hazard resilience improved?	No

(12)

Name of Community	King County
County	King County
Number of trainings/technical assistance services provided	1
Description	training session at 2016 Climate Leadership Conference
Was hazard resilience improved?	No

(13)

Name of Community	City of Seattle
County	King County
Number of trainings/technical assistance services provided	1

Description	training session at 2016 Climate Leadership Conference
Was hazard resilience improved?	No

(14)

Name of Community	Sacramento Metropolitan Air Quality Management District
County	Sacramento County
Number of trainings/technical assistance services provided	1
Description	training session at 2016 Climate Leadership Conference
Was hazard resilience improved?	No

(15)

Name of Community	Stillaguamish Tribe
County	Snohomish County
Number of trainings/technical assistance services provided	1
Description	Launch of climate change adaptation planning effort for the Stillaguamish Tribe (WA), supported by the UW Climate Impacts Group that included a discussion of the framing and approach to defining and achieving successful adaptation; the plan is still in development.
Was hazard resilience improved?	No

Economic Impacts

No **Economic Impacts** information reported

Impacts and Accomplishments

(1)

Type	accomplishment
Title	Sea Grant-supported researchers develop a comprehensive framework for evaluating climate change adaptation efforts
Relevance	As governments, institutions, communities and businesses struggle to adapt to a changing climate, they also struggle with a persistent, elusive question that can seem overwhelming: What would successful adaptation look like? How can we tell whether what we're doing is working? There is no

	ready-made scale for measuring success against such an unprecedented challenge.
Response	With support from the West Coast Sea Grant programs, researchers completed a years-long project developing guidance on the characteristics of successful adaptation in the coastal environment in terms both of outcomes and of processes, governance and social mechanisms. They brought leading scientists and practitioners together and synthesized insights from workshops, interviews, policy and planning documents and the scientific literature.
Results	The synthesis yielded a framework for evaluating specific climate-resilience efforts based on the key characteristics of multiple dimensions of success. It included strategies for developing indicators and metrics for measuring success. The framework was tested by researchers in multiple training sessions for state environmental, health and resource officials, and it is now widely employed in regional discussions of climate change adaptation.
Recap	Washington Sea Grant-funded researchers developed, tested and deployed a comprehensive framework for describing and evaluating climate change adaptation measures, which will help stakeholders better understand what successful adaptation should look like.
Comments	
Primary Focus Area	Healthy Coastal Ecosystems
Secondary Focus Areas	
Goals	Communities prepare, respond and adapt to coastal hazards and climate change.
Partners	Washington Sea Grant-funded researchers developed, tested and deployed a comprehensive framework for describing and evaluating climate change adaptation measures, which will help stakeholders better understand what successful adaptation should look like.
PI Draft	

Leveraged Funds

No **Leveraged Funds** information reported

Meetings, Workshops, Presentations

(1)

Type of Event	Public or professional presentation

Description	Successful Adaptation to Climate Change: geographic, temporal and process dimensions - Colloquium for Geography and Center for Climate Adaptation Science and Solutions, University of Arizona (Tucson, AZ)
Event Date	02-06-2015
Number of Attendees	80

(2)

Type of Event	Public or professional presentation
Description	Successfully Safeguarding California: Research, Framework, Applications - Safeguarding California Implementation Collaborative
Event Date	04-09-2015
Number of Attendees	25

(3)

Type of Event	Public or professional presentation
Description	Successful Adaptation: Research, Framework, Applications - UNFCCC, National Adaptation Program Expo 2015 (Bonn, Germany)
Event Date	04-15-2015
Number of Attendees	100

(4)

Type of Event	Public or professional presentation
Description	Successful Adaptation: Research, Framework, Communication - San Francisco Bay Conservation and Development Commission (BCDC) SLR Working Group
Event Date	05-07-2015
Number of Attendees	15

(5)

Type of Event	Public or professional presentation
Description	Successful Adaptation: Framework and the search for Meaningful Indicators - US Urban Sustainability Directors Network working group meeting (St. Louis)
Event Date	05-15-2015
Number of Attendees	20

(6)

Type of Event	Public or professional presentation
Description	"Successful Adaptation to Coastal Climate Change: Use-Inspired Research with Far-Reaching Applications and Outcomes" - USC Sea Grant Site Review
Event Date	06-10-2015
Number of Attendees	50

(7)

Type of Event	Public or professional presentation
Description	Tracking Progress and Measuring Adaptation Success: Framework, indicators, metrics - Wells NERR
Event Date	06-22-2015
Number of Attendees	25

(8)

Type of Event	Public or professional presentation
Description	Successful Adaptation in the Tijuana River Valley: Framework - Tijuana NERR
Event Date	08-29-2015
Number of Attendees	25

(9)

Type of Event	Public or professional presentation
Description	Successful Adaptation in the Hudson River Valley: Framework - Hudson River NERR
Event Date	09-25-2015
Number of Attendees	25

(10)

Type of Event	Public or professional presentation
Description	Successful Transdisciplinarity: Framing and Tracking Successful Adaptation to Coastal Climate Change - CERF 2015
Event Date	11-10-2015
Number of Attendees	60

(11)

Type of Event	Public or professional presentation
Description	Framing and Measuring Adaptation Success - DOI/USGS Sandy Recovery Team
Event Date	01-08-2016
Number of Attendees	15

(12)

Type of Event	Public or professional presentation
Description	Visioning Successful Adaptation in Coastal California - Training to Ocean Protection Council
Event Date	02-24-2015
Number of Attendees	40

(13)

Type of Event	Public or professional presentation
Description	Training on Adaptation to Climate Change - Santa Clara Valley Water District (San Jose, CA)
Event Date	05-15-2015
Number of Attendees	15

(14)

Type of Event	Public or professional presentation
Description	Successful Adaptation to Climate Change: Framework • Indicators • Metrics - National Adaptation Forum 2015
Event Date	05-12-2015
Number of Attendees	100

(15)

Type of Event	Public or professional presentation
Description	Training Session: Successful Adaptation to Climate Change - Measuring and Tracking Effectiveness - NW Climate Conference
Event Date	11-05-2015
Number of Attendees	50

(16)

Type of Event	Public or professional presentation
Description	Defining and Measuring Success When Planning for Resilience - Climate Leadership Conference (national conference sponsored by C2ES and the EPA)
Event Date	03-08-2016
Number of Attendees	54

Tools, Technologies, Information Services / Sea Grant Products

(1)

Description	Framework for developing indicators of successful adaptation to climate change, based on the six dimensions of success
Developed (in the reporting period)?	No
Used (in the reporting period)?	Yes
Used for EBM?	Yes
ELWD product?	No
Number of managers	33
Description/Names of managers	Ecology, WDFW, DOH, DOT, DNR, tribes; US Urban Sustainability Directors' Network; 100 - estimate of managers from trainings - KL estimate 25% use; Stillaguamish Tribe
Reported in previous year?	

Successful Adaptation to Climate Change: Actionable insights from science and practice

FINAL REPORT NARRATIVE
Project: *Successful Adaptation in Coastal Environments (*R/COCC/SS-3*)*
Project team:
Co-PIs: Dr. Amy Snover (University of Washington), Dr. Susanne Moser and Dr. Pamela Matson (Stanford University) and Dr. Hannah Gosnell (Oregon State University)

Additional Project Personnel: Lara Whitely Binder (University of Washington), Adina Abeles (Stanford University, Center for Ocean Solutions), Steve Adams (Institute for Sustainable Communities)

Project Synopsis
Climate change will have widespread environmental, economic and social impacts, forcing coastal communities to face increasingly difficult choices and trade-offs. Managing the consequences for coastal resources is a major concern in all three West Coast states; climate change adaptation is increasingly recognized as an important climate risk management strategy, and on-the-ground adaptation planning activities are emerging across the region. In this context, practitioners increasingly ask one big and difficult question: What would *successful* adaptation to climate change look like? Arguably, rather little has been said to date that would satisfactorily answer this question, leaving resource managers and planners with little clear guidance as to what to aim for or how to evaluate their efforts.

In the Successful Adaptation project, a collaborative team of researchers from Washington, Oregon and California addressed these questions by engaging leading scientists and coastal practitioners in an iterative, collaborative exploration of adaptation outcomes, processes and mechanisms, and the metrics with which to measure success in coastal communities in California, Oregon and Washington. A scientifically-grounded, practice-relevant conceptualization of adaptation success was developed using a variety of research approaches – literature and policy reviews, practitioner interviews, and workshops with both scientists and practitioners, separately and combined.

As a result of this work, leading scientists and West Coast coastal practitioners enhanced their networks and learning related to the state-of-the art in building coastal resilience to a changing climate. We developed and tested a transferable framework for defining and evaluating the processes and outcomes associated with successful adaptation to climate change, and have disseminated this approach to nearly 4000 individuals, influencing climate change risk assessment and response efforts across the nation.

The project contributed to Sea Grant's cross-cutting goals by integrating multi-disciplinary scientific and practitioner expertise to facilitate social learning and improve the management of coastal human-natural systems under rapidly changing conditions. The insights developed in this project are essential for the success of existing and future adaptation efforts at the local to national scales, and for the success of Sea Grant's core vision of *people living along our coasts in harmony with the natural resources that attracted and sustain them*. This work will inform West Coast state efforts to develop regionally consistent *and* state-based adaptation strategies, as well as inform the guidance states are developing for local coastal practitioners across the region. Project beneficiaries include regional policymakers, coastal practitioners

and stakeholders; national coastal stakeholders and adaptation professionals; local, state, federal and tribal policymakers; National Climate Assessment and other adaptation groups.

Project Objectives

The Successful Adaptation project aimed to develop science-based and practice-relevant guidance for coastal practitioners[1] on the characteristics of successful adaptation[2] to climate change in the coastal environment, in terms of (1) outcomes and (2) processes, governance and social mechanisms.

Rationale

State of Knowledge

Climate change will have widespread environmental, economic and social impacts, forcing coastal communities to face difficult choices and trade-offs in the decades ahead. Managing the impacts of climate change and sea-level rise on coastal resources is a major concern in all three West Coast states; state agencies and governors have publicly acknowledged the need for adaptation and begun to develop strategies to manage the effects of climate change, as have many local, tribal and federal entities. In this context, practitioners increasingly ask one big and difficult question: What would successful adaptation to climate change look like? Arguably, rather little has been said to date that would satisfactorily answer it, partly due to the long neglect of adaptation science, partly due to the relative novelty of the topic in practice, such that few empirical situations exist within which one could explore the question of adaptation success (NRC 2010b).

Evaluative research on adaptation success either (a) reviews adaptation frameworks (Preston et al. 2011) and processes (Smith et al. 1996), or (b) makes commonsense, if normative, suggestions such as what elements to include (e.g., downscaled climate information, vulnerability assessments, careful options assessment, stakeholder engagement to foster buy in, sufficient resources) or what principles should guide it (e.g., avoid actions that foreclose future adaptation options, work in partnership, focus on the highest-rated risks, make it sustainable, ensure fair outcomes) (Adger et al. 2006; Smith et al. 2009, Eriksen et al. 2011). Some work has focused on adaptation policies or actions, some on the skills of individuals and functionality of organizations that have to carry out the work of adaptation (Moser 2009).

In light of the early stage of climate adaptation, a number of guidebooks have appeared in the literature (including one prepared under the leadership of one of the co-PIs, Snover), some specifically for the coastal sector (CRC-URI and IRG 2009; Marine Law Institute et al. 1995). These guides assist practitioners in developing "best practice" processes and strategies but do not usually define adaptation success explicitly or with any specificity (UKCIP 2010; Bizikova et al. 2008; Snover et al. 2007; USAID 2007; Mehdi et al. 2006; Lim et al. 2005). We have yet to find an actual adaptation plan or policy that defines success explicitly. With few exceptions (Bizikova et al. 2008), guides and actual plans focus on establishing the need for adaptation, the "how to" of adaptation planning and specific strategies (including the need for evaluation of effectiveness and adjustments over time), but do not specify endpoints or

[1] Practitioners are all those individuals (inside and outside of government) who are involved in various ways in coastal resource management, conservation, and protection from coastal hazards.

[2] Adaptation involves proactive and reactive changes in social-ecological systems in response to actual and expected impacts of climate change in the context of interacting nonclimatic changes. Adaptation strategies and actions can range from short-term coping to longer-term, deeper transformations, aim to meet more than climate change goals alone, and may or may not succeed in moderating harm or exploiting beneficial opportunities (modified from Moser and Ekstrom 2011).

criteria for success. They provide little in the way of setting expectations for outcomes or establishing performance measures. Our project, to the best of our knowledge, will be the first to do so.

Problem Difficulty

Determining success of adaptation is made difficult by the fact that adaptation is typically to multiple interacting risks (e.g., across geographic scales, spatial and sectoral boundaries, ecological systems, social strata, jurisdictions and levels of authority), rarely motivated by just one policy goal (e.g., NRC 2010a,b; IPCC 2007), and seldom easily attributed to specific actions. Complications arise from the mismatch between the timescales of adaptation and of management activities: climate change adaptation presents a multi-decade challenge; management, and claiming success, typically focus on shorter time scales. Risks and vulnerabilities are dynamic: climate risks will not be managed by a one-time set of decisions. In addition, risk avoidance (the avoidance of negative consequences) can be less tangible than positive outcomes, yet it pervades resilience discussions. Climate change impacts and adaptation research to date has raised the issue of distributional and interactive effects among impacts and the adaptive responses, only some of which a local actor has control over. Perspective is influential: Whose success are we talking about? And measured by whose criteria?

More pragmatic challenges to evaluating adaptation success include the fact that few climate change adaptation projects set clear goals or establish a baseline against which change can be measured. Few projects are far enough along to be assessed, and even fewer include monitoring and evaluation components.

Persistent and Growing Challenges in Coastal Management

Defining successful climate change adaptation in the coastal context has significant implications for societal response strategies. If the goal is to maintain functionality in place, i.e., keep what we built and what we do in the coastal zone (or what influential groups in society value most), then the emphasis will be on protection measures, and loss of the status quo would be experienced as failure. At the same time, being able to "hold the line" may turn out to be maladaptive over longer timeframes, i.e. increase vulnerability overall or for some groups, or reduce resilience of the social-ecological system over time (Brown et al. 2002). Yet, managing for overall system resilience would imply a different set of winners and losers – setting the stage for difficult adaptation planning discussions, policy decisions, and possibly compensation needs (Beatley 2009; Leichenko & O'Brien 2006).

In many ways, these vexing challenges are by no means new to coastal management (The Heinz Center 2002, 2000; Tierney et al. 2001; Mileti 1999; Platt 1999; Burby 1998), but climate change will make them ever more acute (Beatley 2009). For example, to the extent society decides it cannot afford continued defense of the coast in its current position against a relentlessly rising sea, the notion of "success" is a challenging one given the eventual and irreversible letting-go of previously occupied and used land, resources, and ecosystems to the forces of the sea. This is particularly challenging for Tribal peoples (e.g., along the West Coast) whose sovereign territory is spatially and legally confined, but is bound to also cause psychological, social, and economic hardship for other individuals, organizations, and local governments (Adger et al. 2011; Mishra et al. 2010; Scannell and Gifford 2010; Agyeman et al. 2009; Houser et al. 2000; ICCWG 2009).

Methodology

A scientifically-grounded, practice-relevant conceptualization of adaptation success was developed using a variety of research approaches – literature and policy reviews, practitioner interviews, and workshops with both scientists and practitioners, separately and combined. The qualitative, multi-stage, transdisciplinary approach is reflective of the early state of understanding of adaptation success and of our commitment to policy- and practice-relevant science. It draws on existing knowledge, resting in science, policy documents, and in the experience of coastal practitioners to produce results, including a sophisticated articulation of what types of outcomes and process characteristics would be desirable (generically, or for particular stakeholders), and why; guiding principles on evaluating adaptation options; and practical success metrics.

Literature review. The first stage of research involved the identification of dimensions and criteria for successful adaptation to climate change via a review of the relevant scientific and gray literature. Specifically, we developed a comprehensive literature review of scientific publications between ca. 1995 and early 2013 using Web of Science and Google Scholar search engines for basic search terms such as "adaptation evaluation", "adaptation success", "adaptation effectiveness", "maladaptation", "adaptation outcomes" (and their derivatives). Syntheses such as those prepared by the Intergovernmental Panel on Climate Change and seminal works laying the foundation for much of current adaptation thinking were also included. A complementary search focused on "grey" literature from nongovernmental and development assistance organizations, and government agencies in the US, Europe, and Australia, using the same terms as well as the common phrase "M&E" (Monitoring and Evaluation). Various syntheses prepared by such organizations also lead to relevant additional documents in a "snowball sampling" manner. This review resulted in a white paper ("Successful Adaptation in Coastal Environments: Project Rationale, Key Issues and Preliminary Literature Review") used as a briefing paper for all five workshops and currently being reworked by the authors (Moser and Snover) for publication in a peer-reviewed journal (we have an expression of interest from the editor of *Global Environmental Change*).

Workshops and Interviews: To elicit current evolving understanding of adaptation success in research and practice, we held a series of five workshops that logically built on each other. Participant selection criteria included interest and proven experience in communicating and interacting across disciplinary boundaries, and thinking through complex systems challenges. All workshops began with the development of common language via presentations on projected regionally- or locally-specific climate impacts, current management challenges and adaptation efforts in the coastal zone, and insights gained from the project to-date (i.e., literature review, interviews, and previous workshops) on mechanisms and outcomes associated with successful adaptation, and included facilitated discussions and highly interactive activities designed to elicit desirable process traits and outcomes of adaptation. The workshops and interviews were recorded and transcribed, and student note takers recorded key points made during group discussions. To ensure the free exchange of ideas in all workshops, workshop transcripts will not be made publicly available, but will serve as a basis for an integrative synthesis of both the scientists' and practitioners' suggestions about successful adaptation. Short videos of individual participants commenting on their perceptions of adaptation success were taken at each state workshop and the capstone workshop for use in developing outreach materials related to project results.

Science Workshop. The first workshop brought together about 20 scientists and scholars from a diverse range of fields from the three states and outside the region to a conference facility near Stanford on October 15-16, 2012, with the objective of identifying desirable outcomes (at different times and different scales) and mechanisms of successful adaptation using insights from diverse scholarly approaches. Invited participants included individuals from academia, government and non-profits with expertise in policy sciences, economics, geoengineering and coastal hazards, conservation, climate change adaptation, risk management, rural development, urban planning, communications, ecology, natural resource management, law, economics, environmental psychology, conflict resolution. Other criteria in selecting participants included interest and proven experience in communicating and interacting across disciplinary boundaries, and an ability to think through complex systems challenges. All workshops began with the development of common language via presentations on (1) projected climate change, climate impacts, and current management challenges in the coastal zone (to raise the specter of adaptation challenges), and (2) outcomes of the literature review on mechanisms and outcomes associated with successful adaptation. Additional activities included visioning exercises, sequential paired discussions on identifying trade-offs, and a world café-style discussion of mechanisms.

Practitioner workshops: The science workshop was followed by three practitioner workshops, one in each state, to ground the conceptual framework of successful adaptation developed in the science workshop in the practical context of coastal management and adaptation planning; illuminate similarities and differences within and between the states; enable examination of cross-scale implications of adaptation efforts; and support participant learning about ongoing adaptation efforts and development of a community of practice. These workshops brought together approximately 15-20 (depending on the state) coastal management professionals from local, regional, state and federal agencies working on adaptation in each state, as well as individuals who otherwise understood the challenges associated with balancing multiple coastal objectives. Criteria for selection of practitioner invitees included (1) being leaders and champions of adaptation; (2) being ready to engage on the issue of adaptation success; (3) representing different levels of governance; (4) having experience with different types of coastal environments and complex management challenges; and (5) representing a range of job descriptions (e.g., local planners; wetland, emergency, natural resource, and tribal managers; conservation professionals).

To support concrete and context-specific discussion of adaptation success, three case studies of adaptation activities within each state were presented at each state workshop (ADD TABLE). Case presenters (in each case, the practitioner most familiar with the case) described and evaluated the project's success, in relationship to its goals, motivation, process, and participants. A mix of tabletop and interactive exercises (e.g., visioning exercises, concept mapping, problem-specific work stations, rating exercises) and group discussions were used to elicit participants' desired adaptation outcomes, existing strategies for addressing core coastal management challenges and tradeoffs and to harness the creativity of their collective expertise in imagining alternative mechanisms for successful adaptation. Participants discussed the degree to which (explicit and implicit) performance measures to which practitioners are accountable (1) could be used to measure successful adaptation to climate change, or (2) hinder successful adaptation to climate change, and discuss how they could be improved.

Practitioner interviews: The practitioner workshops were preceded by short, semi-structured telephone interviews with each participant to learn about existing adaptation efforts, successes and

challenges, as well as participant's existing conceptualization of adaptation success, in order to successfully frame the workshop to meet participants' interests, needs, and experience. Interviews were conducted by project team members in each state with their respective workshop participants, following a common protocol, and qualitatively analyzed.

Capstone workshop with scientists and practitioners:
A capstone workshop at Stanford on July 22-23, 2013 brought together a selected subset of scientists and practitioners from the first four workshops, along with some key individuals who were unable to attend earlier workshops. The 27 participants (along with the project team) enthusiastically engaged in two days of diverse and highly interactive activities aimed at:

- building bridges between what were relatively abstract or generic desirable principles and outcomes developed in the science workshop and the more practice-oriented frameworks and measures of success required or desirable for decision-making developed in the three practitioner workshops
- Enabling and facilitating exchange and networking among West Coast coastal managers and between scientists and coastal practitioners
- Exploring ways to track and measure adaptation success, including the types, benefits and limits of indicators and metrics of effectiveness

To stimulate conversation at the capstone workshop, a state overview and three short adaptation case studies specific to each state were presented. The state overviews summarized the physical, human, economic, and cultural geography of each state's coastline(s); projected climate change impacts on coastal areas; and state, regional, and local adaptation activities. Each case study provided a brief summary of the adaptation effort, identified ways in which the effort was successful in the context of the successful adaptation framework (e.g., adaptation process, decision making, implementation), and identified challenges, barriers, and questions relevant to the concept of successful adaptation that emerged from the case study.

See Appendix A for a list of organizations represented at the workshops.

Tri-state project team:
During the Successful Adaptation project, the research team met via phone at least monthly and in-person seven times: for a project launch planning meeting (Portland, March 2012), for project meetings in conjunction with each of the project workshops, and for an analysis meeting (Portland, January 2014). Each workshop was collaboratively planned and implemented by the co-PIs to ensure an effective and comparable approach – allowing for comparison between the scientists' and practitioner workshops and integration across geographies and scales.

Major Findings

The definition of "success" depends on the interpretation of "adaptation"

Numerous authors have pointed out that a variety of interpretations of climate change "adaptation" exist in the literature and in practice, which vary significantly in their underlying – often implicit – theoretical and normative assumptions. At a fundamental level, how one defines success, who to involve, and which

trade-offs need to be addressed depends on how one interprets the goals of adaptation. Are adaptation actions, for example, intended to:

- Maintain physical and social integrity "as is" by maximizing loss reduction at minimal cost (i.e., a structural adaptation framework that tends to be sector-focused, prioritizing structures and infrastructure over the short- and medium term);
- Create a better world for all by protecting the most vulnerable, minimizing social inequity, and increasing adaptive capacity (i.e., a vulnerability framework in which adaptation efforts tend to be community-focused, place-based and people-centered); or
- Enhance overall system capacity to persist and minimize risk of collapse (i.e., a resilience framework concerned with the long-term future of large-scale coupled ecological-social systems)?

These distinct frameworks are described within adaptation literature. While practitioners' framing of adaptation actions and goals are driven largely by job descriptions, agency missions, and personal values, they were largely consistent with one of these three framings of adaptation.

Practical definitions of "success" focus on the next step

Practitioners focused on defining success as whatever's next on their to-do list, reflecting their in-the-trenches perspective, the varying degrees of advancement of the issue and the widespread difficulty of climate change adaptation at this point. For example, some were focused on entraining key political leaders, others on implementing statewide requirements for local governments, or working with their planning department. Nevertheless, common themes emerged, including the following categories for evaluating success:

- Capacity – getting to a place to start
- Actions – that something gets done
- Approaches – how something gets done
- People – those who get it done
- Process – break it down & keep at it
- Outcomes – how it'll look, what we want

Overall, there was a stronger focus on successful *processes* ("doing" adaptation) than on barriers to success or to the ultimate outcomes of those actions.

Reasons for thinking about success

There are multiple reasons for thinking about, defining, communicating and measuring successful adaptation to climate change, in addition to the fundamental objectives of adapting "well" (e.g., minimizing risks or costs (structural approach), protecting the most vulnerable and supporting social equity (vulnerability approach), or ensuring an ability for "all" or important systems to thrive in the long-term (resilience approach). These include:

- *Communication and public engagement*. Climate change can easily become a threat so big and unwieldy that people find it difficult to hold on to a positive outlook and hope for the future. Focusing on "success" allows practitioners to communicate a positive vision and invite stakeholders into becoming part of a co-creative process of success that is thought to be a more effective approach to public engagement.

- *Coordination and integration:* A joint vision of success supports coordination and integration of disparate efforts, especially across sectors and jurisdictions unaccustomed to collaborating.
- *Deliberate planning and decision-making*. Internal consistency in planning and decision-making, e.g., by setting clear goals, identifying metrics of success, developing decision criteria, aligning means and ends, establishing timelines, and setting up appropriate decision processes, are all aided by a clear articulation of the desired result of the effort. Similarly, improved fit with other policy goals (external consistency) can arise from the act of articulating a clear vision for climate change adaptation efforts.
- *Justification of expenditures.* Most planning and implementation of adaptation requires funding, which often competes with other policy priorities for decision makers' attention. Adaptation proponents can develop more persuasive arguments by demonstrating prospects of success or achievements of specified objectives and criteria.
- *Accountability (e.g., fiscal, governance, due diligence).* Clear definitions of success, and ability to measure relevant progress will be important for meeting the growing demand for accountability, both in the public and private sector, for one-time or repeated expenditures.
- *Supporting learning and adaptive management.* Because adaptation is an ongoing, iterative process of managing climate risks, monitoring and evaluating effectiveness against the goals and metrics set initially will be essential to enable learning and to support ongoing adjustments.

Practitioners especially raised reasons ***not*** to think about adaptation success, including political and fiscal sensitivities, and the amount of work involved to do it well (defining and measuring success requires capacity, and funding that many practitioners felt they did not possess.

Adaptation success is multi-dimensional

Science raised concerns/framings that never showed up in practice. Practitioners raised dimensions that were never addressed in the literature. Integrating the insights from researchers and practitioners provides a much richer conceptualization of successful adaptation to climate change than arises from either community alone. Taken together the key dimensions of adaptation success are: the quality of the adaptation (planning) process, the choice as to which adaptation option to pursue, implementation (delivery) of adaptation actions, near- and longer-term outcomes of adaptation activities, degree to which adaptation barriers are overcome, development of adaptive capacity, and learning and adjustment over time (Figure 1). Success in each of these dimensions depends on – and can be supported by – sufficient capacity for action and the ability to eliminate or overcome barriers to adaptation. Indicators & metrics for success are specific to each dimension. This framework provides clarity to discussion that typically blurs these dimensions together.

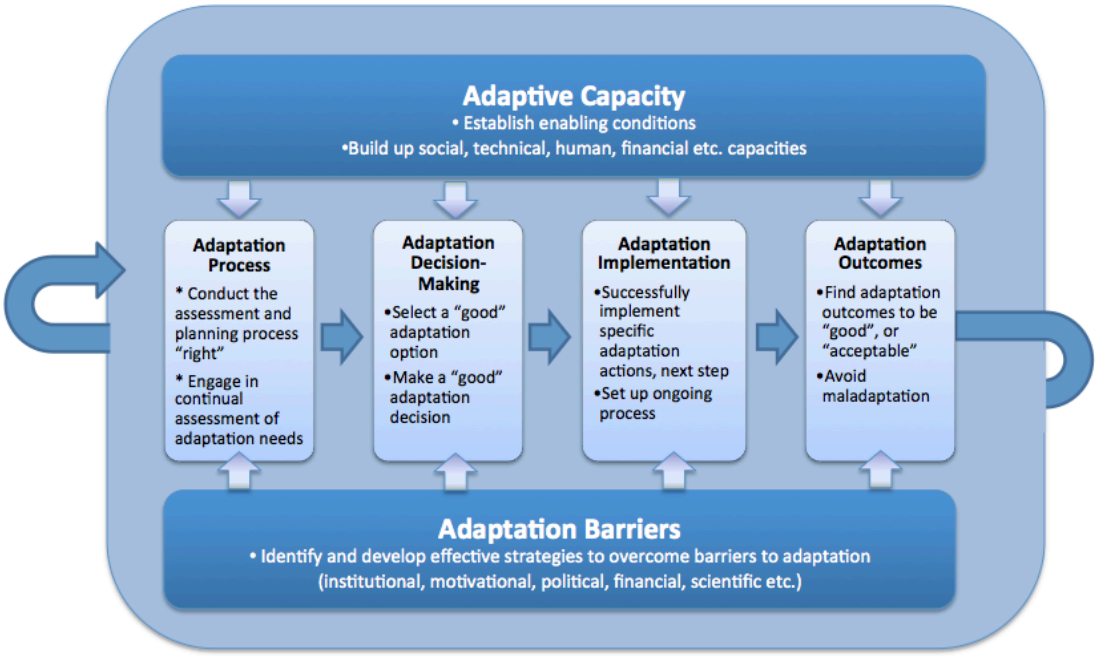

Figure 1 – Six key dimensions of adaptation success.

There is no endpoint

The dynamic nature of climate change, other stressors, social conditions, mores and objectives and, therefore, of adaptation are central to the challenge of defining adaptation success. Since the projected magnitude and uncertainty of climate change and related impacts increase into the future, adaptation needs and, likely, success will evolve over time and might reasonably be evaluated on the basis of both ability to address today's climate risks and the concurrent extent of preparation for tomorrow's. Against the backdrop of a continually changing climate and environment (as well as contextual, unrelated societal changes), therefore, there is no "one" adaptation option to implement, and thus no one action to judge successful or otherwise, for all time. In fact, adaptation is broadly recognized as a long-term, iterative evolving process of change (Stafford-Smith et al. 2011; World Bank 2010; Dobes 2008; Eales 2006), much like adaptive management in the natural resource management and conservation communities (e.g., Brunner and Nordgren 2012; Hess et al. 2011; Tompkins and Adger 2004; Walters 1986).

In a series of adaptive actions, one action no longer working "effectively" does not necessarily mean that it failed (e.g., beach nourishment may be cost effective and preferable on a number of dimensions for some time, but beyond a certain amount or rate of sea-level rise, retreat is the more cost-effective approach). Clearly, this is pragmatically difficult to implement in a context of short-term funding, delivery pressure, and financial and political accountability and would have important implications for the notion of adaptation success: for effectiveness to be assessed, clear targets, as well as spatial and temporal bounds are required. Moreover, periodic review and clear thresholds need to be identified beyond which previous actions are reviewed and revisited. If, moreover, one assumes that different adaptation actions have different lead times (including time to develop, decide upon, and implement a particular strategy or action), the question arises how soon actors need to know when to repeat, upgrade, augment, or

completely change previously taken adaptation actions to remain on a generally "successful" adaptation pathway. Moving toward such a concept of adaptation pathways with intermediate benchmarks and targets, and an expectation of continued change may be in and of itself transformational for funders, policy-makers, and affected stakeholders.

As a result of the need to see adaptation as an evolutionary effort, successful adaptation requires attention to process as much as outcomes. More specifically, successful adaptation requires ensuring processes that are transparent, fair, accountable, iterative, compensatory, and able to support the need to process loss and grief when impacts cannot be avoided (e.g., loss of culturally significant site or personally important places or activities).

Significance of the Results

Similar to previous findings, the relatively "easy" dimensions of success to discuss included characteristics of adaptation process, decision making, implementation, capacity building and identification and elimination of barriers were relatively "easy" dimensions of success to discuss; a focus on these dimensions is much in evidence in many of today's adaptation efforts. However, for practitioners and scholars alike, *outcomes* of a successful adaptation effort proved extremely difficult to define with any specificity – in contrast to "failure" – reflecting the fact that success is context-sensitive, multi-dimensional, and a matter of degree and contestation. Because successful management of changing climate risks may be greatest when invisible, the challenges of defining success mirror difficulties in other fields, such as emergency management or disaster risk reduction, of measuring program impact when success is defined as the absence (or reduction) of impacts compared to a hypothetical status quo. As a result, participants tended to emphasize the other, i.e., process-related, dimensions of success, emphasizing that success is not only about outcomes but at least as much about process, building capacity and a pathway for change.

Success cannot be expected from one-time actions working indefinitely, but requires that timeframes and geographic scales be determined within which particular expectation of effectiveness of any action (or inaction) can be judged. Moreover, adaptation is taken in the face of considerable uncertainty, which points to the importance of adequate information for decision making (Keller et al. 2008), flexibility to change those decisions (Fankhauser et al.1999; Smith et al. 2009), and the desirability of so-called "robust" adaptation choices that achieve intended, desirable outcomes over a range of future climate scenarios (Lempert et al. 2003).

Summary of Outreach and Information/Technology Transfer

Practitioner Workshops

Engagement of a particular set of coastal stakeholders was built directly into the design of the Successful Adaptation project, i.e., scientists and practitioners who have distinct perspectives and interests in finding an answer to the question of successful adaptation to climate change in the coastal context. Scientists and practitioners were chosen to participate in this project due to their high levels of expertise, responsibilities and roles as communicators and influentials to wider publics. The most direct and active engagement of coastal practitioners occurred in the three state practitioner workshops, and in the capstone workshop that involved both scientists and practitioners, fulfilling an important social learning function (see Appendix A).

Innovators in research and practice found the opportunity to interact around the challenging issues regarding successful adaptation highly stimulating, informative, and rewarding. Often isolated, these "early engagers" benefitted directly from the networking and learning opportunities afforded by the workshops; they will also serve as critical thought leaders, innovators, and trusted role models for others in the wider coastal management landscape and take the insights gained out to others. Workshop participants received updates on the most recent coastal climate change science and briefings on existing work on successful adaptation including insights on disaster resilience and resource sustainability; learned from each other about their adaptation efforts; and worked collaboratively on a challenge they all face: defining and measuring successful adaptation to climate change in ways that allow them to make better decisions.

Broader Dissemination

In addition, we used a variety of mechanisms to connect project findings to a variety of stakeholders and policy processes after the workshops. The participating institutions on the project team (the CA-based Center for Ocean Solutions, the OR-based Pacific Northwest RISA, the WA-based Climate Impacts Group, which per their mission are "boundary organizations" that link the worlds of science and practice, along with the Institute for Sustainable Communities that works across the nation on climate resilience) bring a wealth of connections are being leveraged for further dissemination of project results at the local, state, tribal and federal level – with both coastal and cross-sectoral application. The project team has reached over 3500 people across a wide variety of audiences (practitioner, academic, regional, national, international) with Successful Adaptation project-related presentations (see Appendix B). The overall feedback has been extraordinarily positive, suggesting that the dimensions of success identified through this project are helpful in framing the complex question of success for practitioners in coastal and other sectors.

Practitioner trainings

Around the country a handful of professional trainings for decision-makers related to coastal climate change adaptation have begun to emerge. While these education and training opportunities are in their infancy, there is a tremendous opportunity to influence the content and efficacy of these educational programs. Through the project team's connections, the findings of this project have been connected to, and integrated into, professional development venues for over 250 practitioners not directly involved in the workshops. See Appendix C for Successful Adaptation training sessions held to-date.

Publications

We are developing a peer-reviewed journal article (to be submitted to, e.g., Global Environmental Change, Mitigation and Adaptation Strategies for Global Change, WIREs Climate Change, Environmental Science & Policy, Environment & Planning A) describing the project approach and findings. It will present the results of our Project in a comprehensive way to an audience of scholars with expertise on and interest in the topic, with some findings generic and others specific to adaptation in the coastal environment. The paper will cover the following:

1. Successful Adaptation to Climate Change in Coastal Environments: An Introduction
2. Successful Adaptation: Insights from the Scientific Literature

3. Methodology: Transdisciplinary, multi-methods approach to project
4. Results
   4.1 Deepening Interdisciplinary Perspectives on Success: Insights from Scientists
   4.2 Successful Adaptation in Coastal California
   4.3 Successful Adaptation in Coastal Washington
   4.4 Successful Adaptation in Coastal Oregon
   4.5 Integrating Scientific and Practitioner Perspectives
   4.6 Discussion: Limitations of our study
5. Synthesis
   5.1 Reasons to Think about Adaptation "Success"
   5.2 Key Dimensions of Adaptation Success: Each Necessary, but Insufficient Components
   5.3 Toward Meaningful Measures of "Success"
   5.4 Conclusions and Path Forward

Additional related publications include:

- An Op-Ed in *SciDev.net* on the difficulty of defining meaningful, impactful indicators of adaptation success (http://www.scidev.net/global/climate-change/opinion/better-climate-change-adaptation-indicators.html)
- A book chapter on successful adaptation indicators (authored by Moser, to appear in Kasperson et al, *Risk Conundrums*, forthcoming from Earthscan).
- While the Successful Adaptation Project was going on, Moser and Boykoff finalized the edited volume on successful adaptation (Routledge 2013). The book and this project's literature review influenced each other. The book has been awarded the Outstanding Academic Publication of 2014 award by *Choice Reviews*.

P/Vodcasts

Video interviews filmed during the 2012-13 workshops were reviewed. Use of the material for the project website and continued education and outreach related to the project is being discussed by the project team. As noted in the following section, some of the video material gathered during project workshops has been used by Joe Cone for three other videos. See: http://blogs.oregonstate.edu/breakingwaves/?p=3177 (project partners are featured).

Spin offs and other efforts where the Successful Adaptation project is making a difference

While the project team is currently focusing on preparation of the final manuscript, the Successful Adaptation project is already making a difference in coastal resilience planning, as illustrated in the following examples (in addition to the trainings and presentations, noted above, that have reached over 3500 people):

1. PI Susi Moser is working on several other projects where the framework is proving helpful:
   a. Work with the Pacific Islands Climate Change Cooperative (PICCC, one of USFWS's Landscape Cooperatives), which is trying to define success for its cultural-ecological adaptation efforts in Hawaii and the Pacific Islands

b. Work with the Pacific Regional Integrated Sciences and Assessment (RISA) center, which is trying to assess its impact on making Hawaii more resilient to climate change impacts, particularly in the water sector

c. Work with the University of Michigan-based Science Collaborative of the National Estuarine Research Reserve System, which has a 5-year grant from NOAA to support the NERRS across the country. Part of the success in getting the grant was Moser's collaboration with the University of Michigan team. Moser is leading a multi-reserve, comparative project focused on identifying and tracking indicators and metrics of adaptation success.

d. Moser is serving as a technical advisor to a Kresge-funded project conducted by Stratus Consulting looking at community-based adaptation across the US, to identify what helps/hinders them in progressing. The framework was presented to the research team to help shape their thinking. Adams serves as the chair of the Project Advisory Committee for this project.

e. Moser also serves as an advisor to another Kresge-funded project conducted by NDGAIN on urban adaptation indicators.

2. Moser has urged the State of California (through presentations and review comments on document drafts) to consider – in its 5-year strategic research plan, as well as in the scope of its fourth climate change assessment – conducting research on adaptation success indicators.

3. Adams presented project outcomes at an Institute for Sustainable Communities (ISC) Climate Leadership Academy "Think Resiliently, Act Locally" event in Alexandria, VA on October 14-16, 2014. The event brought together teams from the five existing metro-regional collaboratives (San Diego, Los Angeles, Bay Area, Sacramento, Southeast Florida) along with seven other aspiring regional collaboratives (Puget Sound, Boston, Washington, DC, Twin Cities, Jacksonville, FL, California Sierra Nevada and the New England states) to build capacity and explore best practices through peer learning on the state of the art in metro-regional climate adaptation governance, including how to define and measure success in adaptation. (http://sustainablecommunitiesleadershipacademy.org/workshops/act-regionally).

4. The project's synopsis of components of successful adaptation and how to consider an evolutionary approach were used by a consortium of U.S. Urban Sustainability Directors' Network members (led by Washington D.C.) to frame their USDN-funded cross-jurisdictional project to help USDN cities develop adaptation-related metrics and indicators for their projects. (http://usdn.org/uploads/cms/documents/usdn_innovation_fund_urban_adaptation_indicators_products.zip)

5. Under the direction of PI Snover, the UW Climate Impacts Group is beginning several efforts that will include this framework:

    a. A review of Washington State Agency Adaptation Planning, including the development of a Maturity Model that state agencies can use to guide future adaptation efforts, based in part on the successful adaptation framework.

b. Supporting Cambridge (Massachusetts) application of the successful adaptation framework in the development of their climate change preparedness plan.

6. The Climate Impacts Group is integrating the successful adaptation framework into its ongoing outreach, engagement and partnerships around climate change adaptation and resilience, including dozens of presentations per year, reaching many hundreds of individuals.

7. The Climate Impacts Group is working with the Stillaguamish Tribe to consider multiple dimensions of adaptation success in their (current) development of a tribal climate change adaptation plan for natural resources, including specific high priority species and habitats.

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APPENDIX A
Successful Adaptation Workshops: Participants by Sector

Sector	Workshop				
	Scientists Workshop October 15-16, 2012	**California Workshop** January 28-29, 2013	**Washington Workshop** March 20, 2013	**Oregon Workshop** March 21-22, 2013	**Capstone Workshop** July 22-23, 2013
Federal		Coastal Training Program Coordinator, Tijuana National Estuarine Research Reserve Director, Sea Grant, University of Southern California Regional Division Chief, NOAA Coastal Services Center Planner, Sea Grant, University of Southern California Engineer/Program Specialist, Hazard Mitigation Branch, FEMA, Region 9	Regional Environmental Officer, FEMA Science Coordinator, North Pacific Landscape Conservation Cooperative Coastal Hazards Specialist, Olympic Peninsula, Washington Sea Grant	Lead Scientist & Research Coordinator, South Slough NERR NFIP Coordinator, Oregon DLCD	Regional Environmental Officer, FEMA Regional Division Chief, NOAA Coastal Services Center Director, Sea Grant, University of Southern California Planner, Sea Grant, University of Southern California Assistant Director and Communications Leader, Oregon Sea Grant Director, Washington Sea Grant
State		Deputy Secretary for Energy and Climate, California Natural Resources Agency Deputy Secretary for Emergency Preparedness, CalEMA Chief Deputy Director, California Coastal Commission	Senior Policy Advisor, Washington Department of Ecology Manager, Washington State Emergency Management Division, Planning, Analysis & Logistics Section Chief Scientist, Washington Department	Assistant State Climatologist, Oregon Climate Change Research Institute – Oregon State University Floodplain Mapping, Oregon Department of Land Conservation & Development Sustainability Director,	Chief Deputy Director, California Coastal Commission Coastal Conservation Coordinator, OR Department of Land Conservation & Development Environmental Program Manager, Oregon

Appendix A (cont.)

		Senior Planner, California Office of Planning and Research Climate Change Advisor, California Department for Fish and Game Deputy Director, California Coastal Conservancy	of Fish and Wildlife Energy & Climate Policy Specialist, Washington Department of Natural Resources Environmental Policy Branch Manager, Washington Department of Transportation Senior Policy Analyst, Property & Casualty, Washington State Office of the Insurance Commissioner	Oregon Department of Transportation Director, Oregon Partnership for Disaster Resilience Executive Director, Oregon Shores Conservation Coalition Outreach Specialist, Coastal Hazards – Oregon State University Extension Coastal Conservation Coordinator, Oregon Coastal Management Program, Oregon Department of Land Conservation & Development	Department of Transportation Director, Oregon Partnership for Disaster Resilience Coastal Geologist, WA Department of Ecology Climate Change Coordinator, Washington Department of Fish and Wildlife
Regional		Chief Deputy Director, Bay Conservation & Development Commission Senior Planner, Bay Conservation & Development Commission, ART Project Associate Director, Local Government Commission Consultant, Joint Policy Committee	Chair, Leadership Council, Puget Sound Partnership		Consultant, Joint Policy Committee (CA) Associate Director, Local Government Commission Chair, Leadership Council, Puget Sound Partnership
Local		Chief Planner, City of Santa Cruz	Environmental Analyst, Port of Bellingham	Planning Director, Clatsop County	Policy Advisor, City of Seattle Office of

Appendix A (cont.)

		Senior Environmental Specialist, Environment and Land Use Management, Port of San Diego Director of Sustainability, City of Los Angeles Principal Planner, Marin County Environmental Resource Manager, City of Chula Vista	Planning and Engineering Manager, City of Olympia Public Works Department Policy Advisor, City of Seattle Office of Sustainability & Environment Clallam County Commissioner, 3rd District, Clallam County Environmental Health Specialist, Grays Harbor County Environmental Health Division Senior Climate Change Specialist, King County Department of Natural Resources and Parks Program Manager, Snohomish County Department of Emergency Management	Chair, Tillamook County Board of Commissioners	Sustainability & Environment Commissioner, Clallam County (WA) Principal Planner, Marin County (CA) Program Manager, Snohomish County Department of Emergency Management (WA) Chair, Tillamook County Commission (OR)
Tribal		Executive Director, InterTribal Sinkyone Wilderness Council President, California Indian Water Commission, member of the Cahto Tribe of Laytonville	Fisheries Scientist, Quinault Indian Nation Senior Planner, Swinomish Indian Tribal Community Office of Planning & Community Development		Executive Director, InterTribal Sinkyone Wilderness Council President, California Indian Water Commission, member of the Cahto Tribe of Laytonville
Academic	Policy Sciences, University of				Professor Emeritus,

Appendix A (cont.)

	Colorado, Boulder Institute for Environmental Studies, University of Toronto Center for Ocean Solutions, Stanford University Economics, San Francisco State University Woods Institute for the Environment, Stanford University College of Earth, Ocean, and Atmospheric Sciences, Oregon State University Philosophy, State University of New York, Buffalo				Department of Political Science, University of Colorado-Boulder Executive Director, Center for Ocean Solutions, Stanford University
Non-profit	EcoAdapt Environmental Defense Fund World Resources Institute		Landscape Ecologist, The Nature Conservancy Conservation Director, Pacific NW, Ducks Unlimited	Directing Scientist, EcoAdapt	Co-Director, Vulnerability and Adaptation Initiative, World Resources Institute
Private		Senior Director, Environmental Analysis & Strategy, San Diego Foundation		Ecola Architects, PA (Public Member – OSSPAC) Oregon Director of Coastal & Marine Conservation, Nature Conservancy	Sea Level Rise Program Manager, Environmental Science Associates Senior Director, Environmental Analysis & Strategy, San Diego Foundation
Other	ESA (Environmental Science and Planning firm), San				

Appendix A (cont.)

	Francisco Technical Support Unit for Working Group II (Impacts, Adaptation, and Vulnerability) of the Intergovernmental Panel on Climate Change (IPCC) RAND Corporation Stratus Consulting White House Office of Science and Technology Policy				

APPENDIX B

Successful Adaptation project-related presentations, audience and number served for each. Over the course of the project, we have reached nearly 3500 people (3480) with presentations about defining, evaluating and measuring successful adaptation to climate change. An additional several hundred received information about successful adaptation woven in to ongoing Climate Impacts Group outreach and engagement around assessing and reducing climate risks.

Date	Title/Topic	Audience	Approx. Number
3/1/12	Project Introduction/overview	OR Sea Grant staff	20
2/16/13	Project findings to date	AAAS annual meeting, Boston	25
3/12/13	Threats, Vulnerabilities, Tough Choices…. Oh My! Research and Action for Adaptation Success	Human Dimensions and Ocean Health in a Changing Climate Symposium, University of Southern California, Los Angeles	100
3/26/13	Our Once and Future Coast: Rising to the Challenge of Successfully Adapting to Climate Change	University of New Hampshire faculty and graduate students	50
4/4/13	Project overview/introduction	National Adaptation Forum (Denver)	50
4/4/13	Project findings to date (CA)	National Adaptation Forum (Denver)	50
4/4/13	Project findings to date (WA)	National Adaptation Forum (Denver)	50
4/4/13	Project findings to date (OR)	National Adaptation Forum (Denver)	50
4/18/13	Successful Adaptation: How would we know?	Hamburg, Germany (scientists and practitioners)	35
9/5/13	Successful Adaptation to Coastal Climate Change	PNW Climate Science Conference (Portland, OR)	300
10/24/13	Successful Adaptation to Climate Change	Special Webinar for California Climate Action Team (CAT)	50
10/31/13	Successful Adaptation to Climate Change: Ideals and Practical Challenges	Invited Presentation, Sustainability Solutions Seminar Series, Arizona State University (Tempe, AZ)	60
1/16/14	Successful Adaptation to Climate Change	Webinar for the American Society of Adaptation Professionals (ASAP)	80

Appendix B (cont.)

1/29/14	Panel on Lessons learned and Future Directions of the National Climate Assessment (and how to evaluate adaptation effectiveness)	NCSE Annual Conference - Building Climate Solutions	30
2/19/14	Climate Change in Paradise: Communicating Adaptation (included challenge of communicating success)	Social Coast Forum	50
3/4/15	Preparing for a changing climate in Washington – what can we expect? (included discussion of benefits of defining success)	Seattle Metropolitan Chamber of Commerce Community Development Roundtable	35
4/8/14	The Geography of Success: Successfully Adapting to Climate Change (and the End of Football)	Presidential Plenary, Annual meeting of American Association of Geographers (Tampa, FL)	1000
4/9/14	Successful Adaptation to Ensure Sustainability: The Scale and Cross-Scale Dimensions	Annual meeting of American Association of Geographers (Tampa, FL)	50
5/2/14	Successful Adaptation to Coastal Climate Change: Insights from science and practice	Salish Sea Ecosystem Conference (Seattle)	45
5/12/14	In Search for a Few Good Indicators: If you were asked to develop measures of "successful" adaptation to climate change …	Roger E. Kasperson Honorary Symposium (Tilghman Island, MD)	25
5/27/14	A Compass for Shifting Sands: Key Dimensions of Successful Adaptation to Coastal Climate Change	Keynote address, H2O conference (San Diego)	100
6/3/14	Coping with Climate Change: Parsing responsibility for urban adaptation	Lincoln Institute of Land Policy 9th Annual Land Policy Conference, "Land and the City" (Cambridge, MA)	40
6/4/14	Anticipating and Preparing for Climate Change in the Pacific Northwest (included national security dimensions of successful adaptation for the region)	The Intersection of National Security and Climate Change – What do Decision-makers Need to be Prepared? (Symposium hosted by the Henry M. Jackson Foundation and Pacific Northwest National Laboratory)	35
8/1/14	A Compass for Changing Times: Key Dimensions of Adaptation Success	California Adaptation Forum	80

Appendix B (cont.)

10/22/14	Shifting the Paradigm: Working Across Boundaries in a World of Certain Uncertainty	Invited presentation for Executive Seminar Program, “Fire and Water: Implications of Climate Change for the Northwest”, hosted by Portland State University (Yakima, WA)	35
10/24/14	Successful Adaptation to Coastal Climate Change: Framework and Lessons from Across the Seas	Keynote address at Coast to Coast conference, Western Australia	200
10/28/14	What Does Climate Change Mean for the NW? Science, impacts, preparation and resilience.	Invited presentation at "Climate Change in the Northwest” sponsored by the Sustainable Path Foundation (Town Hall, Seattle)	150
11/3/14	Coast in the Crosshairs of Climate Change and SLR: Successful Adaptation in a World of Constraints and Tradeoffs	Joint conference of Restore America's Estuaries and The Coastal Society, Washington, DC	150
12/8/14	Projected Climate Change Impacts in the PNW: Implications for Legislators (including a timeline and dimensions of successful adaptation)	Northwest Legislators Climate Policy Forum (Leavenworth, WA)	25
12/14/14	Climate Change Adaptation Success: Special focus of the NERRS Science Collaborative	Webinar to NEERs	35
12/16/14	Climate Change Adaptation Success: Special focus of the NERRS Science Collaborative	Webinar to NEERs	35
2/6/15	Successful Adaptation to Climate Change: geographic, temporal and process dimensions	Colloquium for Geography and Center for Climate Adaptation Science and Solutions, University of Arizona (Tucson, AZ)	80
4/9/15	Successfully Safeguarding California: Research, Framework, Applications	Safeguarding California Implementation Collaborative (state agency leads)	25
4/15/15	Successful Adaptation: Research, Framework, Applications	UNFCCC, National Adaptation Program Expo 2015 (Bonn, Germany)	100
5/7/15	Successful Adaptation: Research, Framework, Communication	San Francisco Bay Conservation and Development Commission (BCDC) SLR Working Group	15

Appendix B (cont.)

5/15/15	Successful Adaptation: Framework and the search for Meaningful Indicators	US Urban Sustainability Directors Network working group meeting (St. Louis)	20
6/10/15	Successful Adaptation to Coastal Climate Change: Use-Inspired Research with Far-Reaching Applications and Outcomes	USC Sea Grant Site Review	50
6/22/15	Tracking Progress and Measuring Adaptation Success: Framework, indicators, metrics	Wells NERR	25
8/29/15	Successful Adaptation in the Tijuana River Valley: Framework	Tijuana NERR	25
9/29/15	Successful Adaptation in the Hudson River Valley: Framework	Hudson River NERR	25
11/10/15	Successful Transdisciplinarity: Framing and Tracking Successful Adaptation to Coastal Climate Change	CERF 2015	60
1/8/16	Framing and Measuring Adaptation Success	DOI/USGS Sandy Recovery Team	15

APPENDIX C

Successful adaptation project-related trainings, audience and number served for each. Over the course of the project, over 250 people (259) were trained on defining, evaluating and measuring successful adaptation to climate change.

Date	Title/Topic	Audience	Approx. Number
2/24/15	Visioning Successful Adaptation in Coastal California	Training to Ocean Protection Council (leaders and lead staff of state agencies involved in CA coastal management) (Oakland, CA)	40
5/5/15	Training on Adaptation to Climate Change	Santa Clara Valley Water District staff (San Jose, CA)	15
5/12/15	Successful Adaptation to Climate Change: Framework • Indicators • Metrics	National Adaptation Forum 2015	100
11/5/15	Training Session: Successful Adaptation to Climate Change - Measuring and Tracking Effectiveness	NW Climate Conference	50
3/8/16	Defining and Measuring Success When Planning for Resilience	Climate Leadership Conference (national conference sponsored by C2ES and the EPA)	54