Collaboratory for Coastal Adaptation over Space and Time
Annual Report – April 15, 2021

Project Goals

The major goal of the Collaboratory for Coastal Adaptation over Space and Time (C-CoAST) Research Coordination Network (RCN) is to integrate researcher, stakeholder and practitioner expertise to build the interdisciplinary collaborative capacity necessary to address the following Grand Challenge Questions (GCQs):

- How does the event/recovery-driven coupling between human and natural dynamics cascade through decades to alter risks and the resilience of communities, ecosystems, and landscapes?
- What levers—actions of individuals, communities, governments, and other civil society groups–enable mutual resilience of communities, ecosystems, and landscapes?

Major Activities – Year 1

Network Building

A primary goal of C-CoAST is to build a network of established and newly emerging coastal researchers, stakeholders and practitioners. To facilitate network building we have constructed a comprehensive website (c-coast.org) that includes a professionally produced video introduction to C-CoAST (in lieu of an introductory workshop/meeting), a fact sheet, our NSF proposal summary as well as one page focused on each of the following (i) C-CoAST mission and goals; (ii) network activities, (iii) a calendar; (iv) the C-CoAST leadership team; (v) member directory; and (vi) news. Through the C-CoAST network activities (D101s and Listening Sessions), we have encouraged researchers, practitioners, and stakeholders to join our network by filling out a brief survey on the website, which populates a listing in the Member Directory (c-coast.org/directory/). Our website has been live for eight months. To date C-CoAST has 154 registered members with 115 of these members opting to be included in the Member Directory (88 researchers, 27 stakeholders/practitioners). The C-CoAST network extends beyond the NC border: Of the 115 members listed in the directory, 18 members are from other states (TN, ME, FL, MD, NY, PA, AK, VA, DE, CO, AR, TX, MA, CA) and 5 other countries (Portugal, Sweden, Netherlands, Turkey, UK). To facilitate connections across members, disciplines, and regions, users can search the Member Directory by name, "expertise", or other keywords. In addition to the website, we advertise all activities via our listserv (154 participants), slack group (65 participants), and on social media platforms (Facebook: facebook.com/ccoastnc and Twitter: @c_coast_nc).

Discipline 101 Seminars (D101s)

The Disciplines 101 Seminars (D101) are bi-weekly gatherings in which researchers with a wide range of disciplinary expertise take turns teaching each other about the fundamental concepts, perspectives, tools, and analytical approaches used in their disciplines. Inspired by the transdisciplinary successes our leadership team has experienced, the idea is to spend time getting to know each other's disciplinary language and approaches in the deep way necessary to catalyze

transdisciplinary collaboration. D101s are intended to provide the opportunity to think about common foci through different lenses, with emphasis on the time- and spatial-scale aspects of those lenses. Initially, we imagined that the "teacher" for each session would summarize key data sets and models used in coastal research in their sub-discipline and assess data, model, and conceptual gaps and opportunities. This has happened in some seminars, but not all of the disciplinary perspectives represented fit this model and way of thinking.

To date, we have focused primarily on learning key disciplinary fundamentals (concepts and theories) most relevant to coastal research and illustrating discipline-specific methodologies used in coastal research. We have also had seminars highlighting research projects and connections to other applications that are highly relevant to coastal research. Although many of the D101s serve multiple functions, they can loosely be categorized as theoretical/conceptual, methodological, and topical.

The D101, "Positive and Normative Theory," exemplifies the theoretical/conceptual focus. Megan Mullin (a political scientist) and Martin Smith (an economist) provided theoretical scaffolding on positive and normative theories in the social sciences and then used the application of beach nourishment to highlight the different disciplinary approaches and types of questions posed by political scientists and economists.

The pair of D101 seminars, "Modeling extreme water levels in NC" and "Compound Flood Hazards" illustrate the methodological seminar type. During this seminar, Rick Luettich (Engineering) and Antonia Sebastian (Hydrology) described the physical principles and processes involved in coastal, riverine, and compound flooding, as well as their representation in models.

The D101, "History of environmental justice, and housing market discrimination," illustrates a topical seminar. Environmental justice is an interdisciplinary line of inquiry for which having topical background is essential. In his talk, Chris Timmins (Economics) presented the history of the environmental justice movement and how scholarship evolved to engage with it. He then illustrated contemporary environmental justice work with an application of housing market discrimination from his own research.

We originally envisioned a combination of remote and in-person participation in each seminar, with researchers gathering in person at multiple universities in rooms equipped for AV links so that the multiple groups could meet as one. We anticipated that the seminars initially would involve mostly academic participants, but community partners would be encouraged to join. As a result of COVID-19, the seminars have been held entirely remotely. We also reconfigured the length of each presentation to facilitate more discussion in the remote platform and to provide more content in a shorter amount of time. The pivot to a remote format has had benefits: the seminars have brought together a larger audience than initially envisioned, including participants from other regions and countries, and because we have been able to record the seminars via Zoom, they continue to be viewable on our website, further broadening their reach.

There has been broad participation in D101s with 208 individuals from 16 states and 8 countries participating, many of whom have attended multiple seminars. Individual D101 gatherings have

attracted an average of 57 attendees. There has been consistent participation of C-CoAST RCN Principal Investigators and Senior Personnel throughout the year and a high level of participation from the remainder of the C-CoAST RCN Steering Committee and Advisory Board. We have seen discussion and questions initiated by core RCN participants (PIs and Steering Committee) as well new members of C-CoAST, including students and researchers outside our initial network. The first year of C-CoAST D101s consisted of 10 sessions (five held in Fall 2021 five in Spring 2021):

#1a - Positive and Normative Theory, Megan Mullin (Political Science, Duke) and Martin D. Smith (Resource Economics, Duke); #1b - Nonlinear Dynamics, Dylan McNamara (Physics, UNC Wilmington); Total attendees for 1a and 1b: 98, 86 YouTube views

#2a - Geomorphology of Sandy Coastlines – Cross-shore Dynamics, Laura Moore (Geomorphology, UNC Chapel Hill); #2b - Geomorphology of Sandy Coastlines – Alongshore Dynamics, Brad Murray (Geomorphology, Duke); Total attendees for 2a and 2b: 83, 98 YouTube views

#3a - Natural Resource Economics and Coastal Resources, Martin D. Smith (Resource Economics, Duke); #3b - Economics of Coastal Real Estate Markets, Sathya Gopalakrishnan (Resource Economics, Ohio State); Total attendees for 3a and 3b: 64, 42 YouTube views

#4a - Oyster Restoration and Nearshore and Estuarine Ecology, Dave Eggleston (Ecology, NC State); # 4b - Climate Change and Fisheries Ecology, Janet Nye (Ecology, UNC Chapel Hill); Total attendees for 4a and 4b: 38, 23 YouTube views

#5a - Political Science and the Coast, Megan Mullin (Political Science, Duke); #5b - Public Policy and the Coast, Andy Keeler (Economics, East Carolina University); #5c - Coastal Planning, Phil Berke (Planning, UNC Chapel Hill); Total attendees for 5a, 5b, and 5c: 46, 22 YouTube views

#6 - History of environmental justice, and housing market discrimination, Chris Timmins (Economics, Duke); Total attendees for #6: 54, 17 YouTube views

#7a - Environmental justice and local government, Danielle Purifoy (Geography, UNC Chapel Hill); #7b - Environmental anthropology and human migration, David Griffith (Anthropology, East Carolina University); Total attendees for 7a and 7b: 39, 11 YouTube views

#8 - The economic impacts of climate hazards, Miyuki Hino (Behavioral Science, UNC Chapel Hill); Total attendees for #8: 52, 3 YouTube views

#9a - Modeling extreme water levels in NC, Rick Luettich (Engineering, UNC Chapel Hill); #9b - Compound Flood Hazards, Antonia Sebastian (Hydrology, UNC Chapel Hill); Total attendees for #9: 43.

#10a - Storm Impacts and Development - Part I: Geomorphology Eli Lazarus (Geomorphology, University of Southampton) and Evan Goldstein (UNC Greensboro); #10b - Storm Impacts and Development - Part I: Engineering (NCSU/UNC Chapel Hill); Total attendees for #10: 40

Here we evaluate our progress with respect the metrics of success and deliverables we described in our proposal:

Metric: Consistent seminar format and structure that meet the needs of in-person and remote participants working across different scales and disciplines, as evaluated with a midyear survey in each year. Progress: We have had a consistent format that has crystallized into the three main types of D101s as described above. We decided not to conduct a formal survey but instead have solicited feedback from diverse participants and discussed ways to refine and improve in regular Steering Committee Meetings.

Metric: Biweekly Discipline 101 Seminars (16 total) delivered during each academic year. Progress: We have held 17 total seminars spanning 9 bi-weekly sessions with two additional sessions planned for the remainder of the spring semester.

Metric: At least 18 researchers (on average) participating in each seminar. Progress: We have exceeded this average in every session.

Metric: At least 2 interested community members attending each seminar by year 2. Progress: We are reporting on year 1 but have had multiple community members participating in the D101s, many from the Steering Committee.

With respect to our proposed deliverables:

Deliverable: Established format for seminars that encourages and enhances transdisciplinary learning. Progress: We have a general format that is consistent across seminars and, as described above, have three general types of seminars: theory/conceptual, methodological, and topical. These three types cover our needs for transdisciplinary research moving forward.

Deliverable: Catalog of key existing data and models used in coastal research as well as a list of gaps and opportunities, to be shared on the C-CoAST website and used in research agenda co-production. Progress: This work is ongoing. Some of the D101s reported on existing models for which code is available, while others used conceptual models that need customization for integration.

Deliverable: A draft analysis (evolving over the two years) comparing and contrasting the space and time scales considered by different disciplines with respect to coastal environmental issues, and how these perspectives might be usefully integrated or synthesized in future research. This ongoing analysis will inform the guiding questions that are used in Listening Sessions and Gallery Walks. Progress: This work is in progress.

Listening Sessions

Listening Sessions are interactive meetings that facilitate exchange of information among researchers, coastal stakeholders, and coastal residents. Sessions were designed with two goals: 1) to develop shared understanding of long-term areas of concern for

coastal communities, and 2) to collaboratively identify barriers that make it difficult to consider and plan for potential long-term outcomes when making short-term coastal management decisions.

Our original plan was to conduct listening sessions in person within three counties. In response to COVID-19, we redesigned the sessions to a virtual format. In cooperation with project partners at North Carolina's Division of Coastal Management (DCM), we used the information gleaned from workshops and a coastal summit hosted by DCM in 2019 as a launching point for a pre-survey of registered participants to assess their long-term areas of concern. The 90-minute listening session events opened with reporting of results from the pre-survey, followed by a set of interactive activities conducted in Zoom breakout rooms designed to promote discussion about connections between short-term decisions and long-term outcomes related to identified areas of concern. Sessions used interactive whiteboards to engage participants in both written and oral formats; whiteboards also serve as documentation of group discussions. Session recordings, including breakout rooms, currently are being transcribed, and whiteboard output is being converted into a usable data format.

Despite the challenges of the last year, the listening sessions attracted broad participation: 76 participants across five sessions, including residents, elected officials, town and county government staff, consultants, state and local agency personnel, and representatives from non-profit organizations. Registration for the five sessions was approximately double that number. Participation per session ranged from 7 to 29, but most of the time was spent in breakout rooms with no more than six participants per room. A total of 12 people served as facilitators for listening session breakout rooms, including researchers and practitioners who are part of the C-CoAST network as well as 4 students and 1 community resident volunteer.

The sessions attracted participation from eleven coastal counties, including all of the counties on North Carolina's outer coast: Carteret County, Brunswick County, Dare County, Currituck County, Onslow County, New Hanover County, Pamlico County, Pender County, Beaufort County, Hyde County, and Craven County.

Despite COVID we have met or nearly met each of the three measures of success that we set for ourselves in our proposal:

Metric: Workable format, questions, and activities for the sessions, revised in response to semi-structured debriefing interviews with participants of early. Progress: Completed. Used interactive whiteboard feedback as well as informal feedback through our network and steering committee to revise session format and logistics as we went along.

Metric: Three Listening Sessions delivered in each county (total of 9). Progress: We held five virtual sessions but reached more counties as a result.

Metric: Average of 5 researchers and 10-12 community members in attendance at each session. Progress: Total participation only slightly short of original goal even during COVID! Active student participation in facilitating breakout rooms.

With respect to our proposed deliverables:

Deliverable: Summary of communities' interests with respect to issues of scale, research on coupled human-natural systems, and decision making. Progress: Survey results compiled; to be analyzed this summer.

Deliverable: List of identified barriers to considering long-term outcomes in short-term decision making. Progress: Recordings are being transcribed; whiteboard data has been translated into spreadsheet format and will be analyzed this summer.

Data/Model Catalog

Rather than generating a general "data and model" catalog, going forward we will take two complementary approaches. (1) We will identify existing data, models and conceptual frameworks that researchers can employ to address co-produced research questions. This initial work will lay the groundwork for identifying knowledge gaps and which research questions require new data/ models or interdisciplinary approaches to address them. (2) We will communicate feedback from the Listening Sessions, and upcoming Gallery Walks, to a broad audience of stakeholders, through our C-C-CoAST website. We will also provide links to readily accessible sources of information, e.g., flood risk maps that address many stakeholder concerns and questions.

Other Achievements

Becoming a CoPe Hub, that draws experts from within the mid-Atlantic region and beyond is a key aspiration of C-CoAST as described in the RCN proposal. In October 2020 we submitted a Large-scale CoPe Hub proposal that includes 5 interrelated research teams/themes encompassing an interconnected web of 17 interdisciplinary projects involving participation from 30 researchers spanning 16 distinct disciplines as well as a total of 81 individuals overall; 14 institutions of higher education; 4 federal agencies; 12 state and local agencies; and 23 non-governmental organizations. A key outcome of the C-CoAST RCN thus far, then, is that we have attracted a great amount of interest, participation and enthusiasm that has allowed us to organize, develop and plan a Large-Scale CoPe Hub research effort that integrates coastal researchers and stakeholders in a meaningful way to address hypotheses derived from our RCN Grand Challenge Questions. As part of the C-CoAST Large-scale Hub proposal we also developed a suite of network activities to directly expand on the work of the C-CoAST RCN including integrative activities to facilitate interaction among research teams, each of which have a physical scientist, social scientist and stakeholder lead; data and model sharing; mentoring and training opportunities; and public engagement and learning activities to build awareness and understanding of connections between short-term decisions and long-term outcomes at the coast.

Opportunities for Training and Professional Development Provided by the Project

- D101 seminars have been viewed by researchers (including graduate students, postdocs and early career faculty) from other regions in the U.S. and from around the world (see record of YouTube views to date above). C-CoAST itself served as a model to teach 2nd year Duke Marine Science graduate students about interdisciplinary research (Fall 2020: 10 PhD students). And, since we had to pivot to an online format and thus the seminars have been recorded and shared on our website, we know of several instances in which they have been adopted by university instructors in the U.S. and in other countries as required course

material, including Coastal Watershed Science and Policy (Duke Spring 2021; 21 undergraduate/ masters students).

- Four graduate students (from Duke and UNC-CH) were recruited and trained as Listening Session facilitators. These students gained valuable experience leading small breakout groups of stakeholders and practitioners in discussions about long-term coastal priorities.

- Six early career faculty have presented D101 seminars, and two have held leadership roles in the RCN (as Project Manager and Listening Session organizers). In these roles, early career faculty participate in a way that promotes development of their career and partake in network opportunities.

Dissemination of Results

Though most project results are forthcoming, we have used our website, email listservs, slack workspace, Facebook, Twitter, and advertising through other coastal organizations' listserv and social media channels to share news and products to date (C-CoAST introductory video, C-CoAST factsheet, and D101 Seminar recordings).

Goals for Year 2

Network Building

We will continue to grow the C-CoAST network in North Carolina and beyond, and the searchable, online C-CoAST directory, by encouraging broad participation in each of the activities listed below, and by advertising these activities on our social media channels, website, and media coverage in the region. All C-CoAST participants will be encouraged to attend the Research Agenda Workshop, which we expect to be an important culminating network-building event. C-CoAST representatives will also participate in regional conferences and events (e.g., the 2021 Carolina's Climate Resilience Conference), which will provide visibility for C-CoAST at a regional level.

Discipline 101 Seminars (D101s)

During the second year of the project, we will finish the spring series of D101s with seminars presenting the perspectives of geomorphology, engineering, and climatology. We will also host our first gathering focused on discussing connections between subsets of previous D101 seminar topics. This summer we will organize the D101 Seminar series for the fall, which will include an increasing number of sessions devoted to synthetic discussion. We will continue the same combination of D101 Seminars and synthetic discussion into the spring semester of 2022.

Listening Sessions

During the Summer of 2021, a graduate student assistant will work together with Co-PI Mullin and Senior Personnel DeMattia to analyze and synthesize Listening Session data, organizing findings and participant insights into a poster format for presentation during Gallery Walks (see below). The synthesis will also allow us to determine whether additional listening sessions should be held with the hope of increasing participation by stakeholder groups and communities that had lower rates of participation in the sessions held this year, or whether we can achieve a similar goal through gallery walks, which will provide an additional opportunity for broad stakeholder and practitioner participation and insights.

Data/Model Catalog

We will develop small working groups organized as potential research projects to focus on identifying existing resources as well as resource and knowledge gaps that can be addressed in a CoPE Hub research agenda. A synthesis of listening session and gallery walks will generate online materials that are accessible to a broad range of stakeholder groups. Existing resources that address some stakeholder needs: e.g., flooding risk maps will be linked to this material.

Gallery Walks

During the first half of year two, community perspectives and experiences from across all counties, as heard by the C-CoAST team during Listening Sessions, will be summarized and shared with communities (hopefully in person, COVID willing) during Gallery Walks. These gatherings will be designed to interactively elicit community feedback on the findings, which will be presented in poster format. During a gallery walk, community members will interact with the posters, one another, and the C-CoAST team. Gallery Walk participants will be encouraged to respond to the findings synthesized from the Listening Sessions—to confirm, refine, correct, expand, or add to them. Individual comments will be gathered using a mixture of small group discussions, feedback forms, and protocols that are engaging and straightforward to implement. After the Gallery Walks are complete, we will bundle and synthesize the feedback provided. The format of the Gallery Walks will be revised in response to a survey and semi-structured debriefing interviews with participants of early sessions to ensure that the format is engaging, accessible, and productive. Findings will inform design of the Research Agenda Workshop.

Research Agenda Workshop

We will hold the culminating C-CoAST RCN activity--the Research Agenda Workshop-- toward the end of the Fall of 2021 (hopefully in person). The workshop will bring together the research network (i.e., all participating researchers and actively engaged stakeholders and practitioners) to integrate disciplinary perspectives and community insights, co-producing a science research agenda that addresses our Grand Challenge Questions regarding cascading dynamics and levers that may enable mutual resilience of coastal communities, ecosystems, and landscapes. During this workshop, C-CoAST participants will work together to identify and prioritize specific scientific research questions, build new collaborative, transdisciplinary research teams, and to develop a plan for moving the research agenda forward. This workshop and the resulting research agenda will be informed both by the other C-CoAST RCN activities and by the initial research plan presented in our large-scale Hub proposal. During the workshop, we will carry out activities aimed at defining success for our research agenda, assessing our network's current capabilities, and identifying areas in which we need to further extend our network and infrastructure to maximize impact. During an optional third day, a subset of participants, including the C-CoAST Leadership Team, will work together to draft two reports (white papers): one articulating the research agenda, and the other summarizing lessons learned from the co-production process.

Products

C-CoAST website - The C-CoAST website includes a homepage that C-CoAST goals and partners and includes a 3-min video introduction. Additional pages include: A leadership page lists members of the C-CoAST Steering Committee and Advisory Board; an activities page that describes our Listening Sessions and Disciplines 101 activities; a page for each of our activities

that introduces the activity and includes links to register (and hosts recordings in the case of Disciplines 101 Seminars); a calendar that lists our activities, including steering committee and advisory board meetings; a news page that includes announcements of Disciplines 101 and media coverage of C-CoAST; and a page with contact information. The website also hosts the C-CoAST Member Directory (see below).

C-CoAST Twitter – In Spring 2021 we established a Twitter account. We have used Twitter to announce upcoming activities and plan to begin retweeting tweets posted by C-CoAST members to support their efforts and extend the reach of C-CoAST at the same time.

C-CoAST Facebook Page - In Spring 2021 we established a Facebook account. We were advised that websites and listservs are more commonly used by academics than stakeholders. It came to our attention it is important to have a presence on Facebook an important means for broadening our network. So far, we have used it to announce upcoming activities and news items. We hope to expand our social media presence and connections going forward.

C-CoAST Introductory Video - Because we were not able to hold an in-person kickoff gathering (Due to COVID) to introduce C-CoAST and we felt a large kickoff via zoom would not be very effective, we produced a short introductory video (< 3min) that includes researcher and stakeholder voices and provides a sense of what C-CoAST is and what the network aims to do.

C-CoAST Fact Sheet -This is a one-page fact sheet that we share through email and our website, and when we could, in person, to inform other researchers, stakeholders and practitioners of the C-CoAST network, its mission and how to join.

C-CoAST Member Directory - When one joins the C-CoAST network using our "Join Now" button, they have the option to include themselves in the Member Directory, which includes their name; affiliation; title; area of expertise; website if desired; and C-CoAST role as well as primary identification as a stakeholder, practitioner or researcher. The directory currently includes 115 of C-CoAST 154 members. It is searchable by last name, area of expertise and other keywords.

C-CoAST Discipline 101 Seminar (D101) Recordings - Each of the 9 Discipline 101 seminar sessions, representing 17 different D101 Seminars has been recorded on Zoom, uploaded to YouTube and shared via the C-CoAST website.

Individuals who have Worked on the Project

Name	Institution/Affiliation	Role	Contribution to Project
Laura Moore	UNC Chapel Hill	PD/PI	Moore has overseen all C-CoAST activities and development of website, directory and social media presence; conducted regular outreach to recruit new partners; supervised the project manager and event coordinator; delivered a Disciplines 101 seminar; participated in the Disciplines 101 seminar series; and has worked

			closely with the Listening Session team, including serving facilitator.
Richard Luettich	UNC Chapel Hill	Co-PD/PI	Co-PI Luettich served on the C-CoAST Steering Committee, delivered a Disciplines 101 Seminar and participated in the D101 Seminar Series, and and contributed to the large-scale hub proposal as an investigator.
Dylan McNamara	UNC Wilmington	Co-PD/PI	Co-PI McNamara Served on the C-CoAST Steering Committee, delivered a Disciplines 101 Seminar and participated in the D101 Seminar Series.
Megan Mullin	Duke University	Co-PD/PI	Co-PI Mullin co-led development of the Listening Sessions, served as a primary facilitator for Listening Sessions, delivered two Disciplines 101 Seminars, participated in the Disciplines 101 Seminar Series, served on the Steering Committee and contributed to the large-scale hub proposal as an investigator.
Martin Smith	Duke University	Co-PD/PI	Co-PI Smith has co-led the organization and development of the Disciplines 101 Seminar series, delivered two discipline 101 seminars, served on the Steering Committee, and contributed to the large-scale hub proposal as an investigator.
Liz Demattia	Duke University	Co-Investigator	Senior Personnel Demattia co-led development of the Listening Sessions, served as a primary facilitator for Listening Sessions, served on the Steering Committee, and contributed to the large-scale hub proposal as an investigator.
Brad Murray	Duke University	Co-Investigator	Senior Personnel Murray co-led organization and development of the Disciplines 101 Seminar Series, delivered a Disciplines 101 seminar, served on the Steering Committee, and is a key contributor (CoPI) for the CoPe Hub proposal submitted by C-CoAST.
Elizabeth Chen	UNC Chapel Hill	Faculty	Elizabeth Chen is an expert in human-centered design. During the Summer of 2020 she assisted in planning and development of the Listening Sessions.
Reide Corbett	East Carolina University	Faculty	Reide Corbett serves on the Steering Committee, has conducted stakeholder outreach for the C-CoAST RCN, and is a key contributor (Co-PI) for the CoPe Hub proposal submitted by C-CoAST.
Elizabeth Frankenberg	UNC Chapel Hill	Faculty	Elizabeth Frankenberg serves on the Steering Committee and contributed to the large-scale hub proposal as an investigator.
Sathya Gopalakrishnan	Ohio State University	Faculty	Sathya Gopalakrishnan is an active Advisory Board Member, delivered a Disciplines 101 seminar and is a key contributor (Co-PI) for the CoPe Hub proposal submitted by C-CoAST.

Miyuki Hino	UNC Chapel Hill	Faculty	Hino participated in the development of the listening session format, served as a listening session facilitator, delivered, delivered Disciplines 101 Seminar and contributed to the large-scale hub proposal as an investigator.
Dana Hunt	Duke University	Faculty	Hunt has organized the data/model catalog effort, taught a course at Duke in Fall 2020 based on the Disciplines 101 Seminar Series, served on the Steering Committee and contributed to the large-scale hub proposal as an investigator.
Henry McKoy	NC Central University	Faculty	Henry McKoy serves on the Steering Committee and is a key contributor (senior personnel) to the C-CoAST Hub proposal.
Mary Watzin	NC State University	Faculty	Mary Watzin serves on the Steering Committee, assisted with development and facilitation of the Listening Sessions and is a key contributor (Co-PI) for the CoPe Hub proposal submitted by C-CoAST.
Katherine Anarde	UNC Chapel Hill	Other Professional	Anarde has served as C-CoAST Project Manager, assisting Moore with day-to-day management of the project, network building and overseeing our event coordinator. She also contributed to the largescale hub proposal as an investigator.
Don Kirkman	Carteret County	Other Professional	County Development Director Don Kirkman serves on the Steering Committee, conducts stakeholder outreach and is a key contributor (stakeholder lead) for the CoPe Hub proposal submitted by C-CoAST.
Christine Wei	UNC Chapel Hill	Other Professional	Wei was hired recently to serve as the event coordinator for this project, assisting with organization, registration, advertising, outreach, posting of documents, transfer of data, etc. for listening sessions and disciplines 101.
Holly White	Town of Nags Head	Other Professional	Holly White serves on the Steering Committee, conducts stakeholder outreach, assisted with listening session facilitiation and is a key contributor (stakeholder lead) for the CoPe Hub proposal submitted by C-CoAST.
Greg Williams	US Army Corps of Engineers	Other Professional	Greg Williams serves on the Steering Committee
Dana Baker	Duke University	Graduate Student	Dana Baker facilitated Listening Sessions.
Julia Bingham	Duke University	Graduate Student	Julia Bingham facilitated Listening Sessions.
Dana Grieco	Duke University	Graduate Student	Dana Grieco facilitated Listening Sessions
Emory Wellman		Graduate Student	Emory Wellman facilitated Listening Sessions.
Meghan Gill		Other	Meghan Gill facilitated Listening Sessions.

Other Organizations Involved as Partners

Name	Location
Army Corps of Engineers	Wilmington, NC
Carteret County	Morehead City, NC
Division of Coastal Management	Morehead City, NC
East Carolina University	Greenville, NC
NC Central University	Durham, NC
North Carolina State University	Raleigh, NC
Ohio State University	Columbus, OH
Town of Nags Head	Nags Head, NC
UNC Chapel Hill	Chapel Hill, NC
Duke University	Durham, NC
UNC Wilmington	Wilmington, NC

Other Collaborators Involved in the Project

Advisory Board Members: Elizabeth Albright (Duke U.); Phillip Berke (UNC_CH); K.C. Busch (NC State U.); Jaye Cable (UNC_CH); John Day (Town of Beaufort); Andrew Fox (NC State U.); David Gessner (UNC- Wilmington); Sathya Gopalakrishnan (The Ohio State U.); Frank Lopez (NC Sea Grant); Tancred Miller (NC Division of Coastal Management); Grant Murray (Duke U); Everette Newton (Town of Beaufort); Michael Piehler (UNC-CH); Britt Raubenheimer (Woods Hole Oceanographic Institution); Jessica Whitehead (NC Office of Recovery and Resilience).

Preparing the C-CoAST CoPe Large-Scale Hub proposal has led to the following additional C-CoAST partnerships including representatives from: Oregon State University; Skidaway Institute of Oceanography; University of Central Florida; University of Colorado at Boulder; University of Georgia; University of Virginia, National Park Service; United States Geological Survey - Coastal and Marine Geology Program; United States Fish and Wildlife Service - Alligator River National Wildlife Refuge; Albemarle-Pamlico National Estuary Partnership; Currituck County Government - Department of Economic Development; Dare County Government, NC; North Carolina Department of Environmental Quality - Division of Coastal Management; North Carolina Department of Environmental Quality - Division of Marine Fisheries; North Carolina Department of Public Instruction; North Carolina Department of Public Safety - Office of Recovery and Resiliency; North Carolina Department of Transportation; North Carolina State Climate Office; Coastal Carolina Riverwatch; Community Surface Dynamics Modeling System; Georgia Coastal Ecosystems – LTER; Mississippi-Alabama Sea Grant Consortium; NC Museum of Life and Science; NCGrowth-SmartUP; NC Aquarium Society; NC League of Municipalities; NC Rural Center; North Carolina Conservation Network; North Carolina Environmental Justice Network; North Carolina Museum of Natural Sciences; North Carolina Science, Mathematics, and Technology Education

Center; North Carolina Sea Grant; North Carolina Water Resources Research Institute; Outer Banks Association of Realtors; Outer Banks Chamber of Commerce; STEM EAST; STEM SENC; The Nature Conservancy; UNC-TV Public Media North Carolina; and Virginia Coast Reserve - LTER.

Impact

Impact of the Project on the Development of the Principal Discipline(s) involved and on Other Disciplines

One of the central goals of this RCN is to bring together researchers across multiple, typically disparate disciplines to facilitate integration of different disciplinary lenses to build the capacity needed to address the Grand Challenge Questions (see project goals above). Hence, this project encompasses a broad array of disciplines. So far, the C-CoAST Discipline 101 Seminar series has provided--to practitioners, stakeholders, graduate students, postdocs, early career faculty, and those who are established scholars in their fields--introductions to the basics of positive versus normative theory in social science, nonlinear dynamics; coastal geomorphology; resource economics; fisheries ecology; political science, planning and public policy; environmental justice; econometrics; and hydrology. Question and discussion periods following each talk have allowed new discourse across disciplines that is leading to greater understanding and laying the groundwork for new cross-disciplinary efforts. Insights and questions that emerge from this cross-fertilization process has the potential to foster new interdisciplinary career paths for early career researchers, and to broaden the career paths and areas of inquiry for established researchers, perhaps leading to new disciplines that fall at the intersection of traditional ones. We will finish this Spring Discipline 101 Seminar series with a facilitated discussion about how to catalyze radically, transdisciplinary efforts.

Impact on the Development of Human Resources

The C-CoAST RCN has been providing basic training in an array of disciplines and topics relating to coastal resilience for researchers, stakeholders, and practitioners from a range of backgrounds and expertise, thus enhancing their development as human resources. Through participation in Listening Sessions, graduate students are gaining experience in social sciences research enhancing their development as scientists. For all C-CoAST participants, interactions across disciplinary boundaries and across sectors (e.g., academia, town/county staff, state agencies, community members, non-profit representatives) will enhance their ability to work across sectors to address challenges of coastal resilience.

Impact on Educational Resources

Though not an anticipated long-term benefit of this project, the pivot to an online forum for delivery of C-CoAST Disciplines 101 Seminars has led to their use as required viewing in classes at UNC-CH, Duke University and overseas (University College of London). In addition, Duke University used the first semester of Discipline 101 Seminars as the basis for a graduate course on interdisciplinary topics relating to coastal science. Thus, the recorded products arising from this project are providing new resources for interdisciplinary teaching, which is beneficial both to students and to instructors. When we (hopefully) pivot back to in-person Discipline 101 Seminars, we will continue to offer them in webinar style format as well so that we can continue sharing them broadly and creating an archive for future use.

Impact on Information the forms Infrastructure

The C-CoAST website which hosts our directory, the archived Disciplines 101 Seminars -- and that will later host our Listening Session, Gallery Walk, and Research Agenda Workshop results, as well as our Data/Model Catalog -- is an information resource that forms infrastructure. The C-CoAST Directory is already being used by participants to locate experts who can provide assistance on topics and issues relating to coastal resilience. As the C-CoAST network and directory grow over time we anticipate this will become a critically important means for coastal researchers, stakeholders and practitioners in the region to find and connect with new collaborators who can provide needed expertise, guidance and resources. The value of the Disciplines 101 Seminars as an information resource is already discussed above.

Impact on Society Beyond Science and Technology

By integrating researcher, stakeholder and practitioner expertise through Discipline 101 Seminars and Listening Sessions (and the Gallery Walks and the Research Agenda to come) C-CoAST is building a network that will have the new capacity needed to address how short-term decisions in coastal communities either support, or inadvertently undermine long-term resilience of coastal communities, ecosystems and landscapes; and what levers might be able to influence decision making so that it can be supportive of the long-term outcomes that communities desire. Integrating coastal expertise and experience in this way has the potential to enhance the translation of research into practice and to catalyze new solutions to current and future challenges that could assist coastal communities, coastal states and the federal government in reducing vulnerability and losses due to the impacts of climate change on coastal regions. In addition to building capacity and integrating expertise, we are also building awareness, particularly among stakeholders, of the connections between short-term decisions and long-term outcomes in the coupled human-natural coastal system. Greater awareness has the potential to inspire better informed future actions at the individual and collective level.