

NATIONAL WATER EXTENSION STAKEHOLDER COMMITTEE MEETING OUTCOMES

January 2020

The content in this paper was informed by input provided by the National Water Extension Stakeholder Committee (NWESC) in June 2019 and reflects additional consideration of Sea Grant, National Weather Service (NWS), and other partner priorities as they relate to the committee's recommendations. This paper lays out the direction of the National Water Extension Program (NWEP) for the last half of 2019, through 2022.

BACKGROUND

In the United States and around the world, water security is at risk. Too much water, too little water, or water of poor quality endangers life, property, economies, and ecosystems. People—individuals, companies, organizations, and government—need information to accurately and efficiently make vital short- and long-term planning decisions regarding the safety and security of their citizens and water resources.

No one entity has all the information, or the capacity, to provide water information to everyone. Integration across boundaries and between federal agencies, universities, organizations, and end users of water information is critical. As part of a growing effort for collaboration and integration, the National Oceanic and Atmospheric Administration's (NOAA) National Sea Grant College Program (Sea Grant) and the NWS's Office of Water Prediction, The University of Alabama's Alabama Water Institute, and the Mississippi-Alabama Sea Grant Consortium combined efforts to create the NWEP, a Sea Grant program based at the National Water Center (NWC) in Tuscaloosa, Alabama. The goal of the NWEP is to facilitate the delivery of resources that will allow communities and organizations to accurately and efficiently make vital short- and long-term planning decisions regarding the safety and security of their citizens and water resources. The National Water Extension Liaison position (NWEL) builds linkages to the Sea Grant network and creates partnerships to facilitate the information exchange among organizations, communities, and stakeholders in need of timely water data and tools in order to support decision-making processes.

In 2016, the Sea Grant Planning, Implementation, and Evaluation Resources (PIER) national reporting database was evaluated to gauge Sea Grant's investment in water resources and water-related hazards research. In the 2014-2015 and 2016-2017 funding cycles 176 research projects, representing an investment of over \$33,918,441, were documented.¹ As part of the NOAA Sea Grant Liaison Program, the NWEP will need to leverage Sea Grant's work to be effective by ensuring new and relevant science is provided to community stakeholders through a multi-way exchange of information that includes scientists, modelers, tool developers, water professionals, and end users. The NWEP has been working with a variety of entities for more than two years (see Appendix B), to build relationships, understand goals, and look for areas of overlap between program activities and priorities. To date, the NWEL has provided 31 presentations reaching more than 830 water and natural resources managers, planners, coastal resilience practitioners, Sea Grant professionals, and a variety of NOAA personnel. Of the roles and responsibilities for the NWEL, leadership contributions to the 10-Year Sea Grant Water Resources Vision core team, the Sea Grant and the United States Geological Survey (USGS) Water Resources Research Act (WRRA) institutes and centers engagement team, the NOAA Gulf of Mexico Regional Collaboration Team, and two objective teams of the NOAA Water Initiative (NWI), have helped identify the needs of stakeholders and to communicate those needs to other water-related programs.

NATIONAL WATER EXTENSION STAKEHOLDER COMMITTEE

A key aspect to extension is “boots-on-ground” program development, implementation, and evaluation. An important component is the formation of a committee to offer a neutral platform to guide program implementation. The NWESC is a non-Federal committee designed to provide programmatic input in the development of the outreach components of the NWEP and offer outside feedback regarding stakeholder

¹ Forance, K. unpublished data. These data were analyzed by Kyrstin Forance for use in internal Sea Grant planning.

needs and perspectives. The inaugural in-person meeting of the NWESC was held on June 26-27, 2019 at the NWC. (The meeting objectives, and a list of committee members and funders are provided in Appendix C.) At this meeting, members of the NWESC were asked to actively participate in the conception and planning of the future of the NWEF.

FUTURE DIRECTION OF THE NWEF

The NWEF is structured to create high-impact products and services and to leverage the capabilities, knowledge, and resources of key partners. As such, the NWEF's overarching priority is to develop national water extension programs and to streamline and facilitate effective service delivery through existing channels. In doing so, the NWEF leverages the technical capabilities of the NWS, the Sea Grant Network, and the multiple NOAA Line Offices. The NWEF will continue to function as a hub, by providing leadership in developing high-impact national programs and connecting the various elements of the greater water enterprise inclusive of ensuring the efficient multi-way flow of information, products, and services.

The recommendations received from the NWESC are summarized below according to where they fit within the primary responsibilities of the NWEF. Some activities contribute to multiple responsibilities. Table 1 (page 7) simplifies this information using a table that identifies which responsibilities each action contributes towards, while Table 2 (pages 8-10) shows the timing of each action.

NWESC Recommendations for 2019-2022

NWEF Primary Responsibilities

1. **Serve as the point of contact between the National Water Center (NWC), the University of Alabama Water Institute (AWI) and the Sea Grant Network** by providing two-way communication between each program. (10% effort)

Activities recommended by the NWESC:

- **Create a “National Water Network”** to facilitate collaboration and help provide actionable information to guide decision-making. This will include conducting professional extension and provide leadership nationally, including inreach across Sea Grant, to further develop and codify Sea Grant's water-related portfolio and recognize this work as a fundamental component relevant to all Sea Grant programing (this includes supporting the implementation of the Sea Grant water-related visions). The network is anticipated to function as a national, informal community of practice to foster communication and promote cross-line office, agency, and university efforts to plan for, respond, and address water-related issues. The network will serve as a multi-way conduit of information for needs and resources related to water issues. Specific projects include:
 - **Develop a NWEF Website** (Spring 2020). Establish a website for the Sea Grant Extension Network and other key partners to access information, data, and other resources. Site will eventually offer a link to allow people to reach back regarding key water needs.
 - **Develop a regularly disseminated external communications publication** (First installment expected by Feb. 2020). Publication will be an electronic update distributed via a water network list serve that people can join. Updates will present water-related information as it is relevant to stakeholders including topics from the National Water Extension Program, National Water Model, and beyond. The communication update will be distributed at a minimum, twice per calendar year.
 - **Develop a process to receive and adjudicate feedback from partners regarding key water needs** which can help to inform future NWEF and other Sea Grant programing (Aug. 2020). Once the process is developed, it will be tested and revised to maximize the quality of information received while managing the effort required to analyze and process the data.
- **Facilitate increased engagement between the Sea Grant network and the NWS River Forecast Centers and Weather Forecast Offices.** Possible activities could include:

- Encourage increased collaboration between Sea Grant Programs and River Forecast Center Service Coordination Hydrologists and Weather Forecast Office Warning Coordination Meteorologists in order to expand the capacity of both entities to help local communities plan for, respond to, and recover from water-related events.
 - Encourage Sea Grant programs to actively join and support the Weather-Ready Nation Program by becoming Weather-Ready Nation Ambassadors.
 - Encourage Sea Grant programs to install weather stations at offices that provide precipitation data to the local Weather Forecast Office—this information can be used to help tweak the water forecasts, fed to the River Forecast Centers, and ultimately benefit the NWM. (Citizen Science project that provides more precipitation data to NWS.)
 - Work with Sea Grant and the NWS to develop a system which would allow Sea Grant Programs to upload local georeferenced photos for use by NWS to validate inundation maps.
2. **Collect stakeholder input** through the National Water Extension Stakeholder Committee (NWESC), workshops, surveys and other means to assist the NWEL, NWC, AWI and the Sea Grant Network in planning and to ensure the relevance of products and services provided by the Liaison. (15% effort)

Activities recommended by the NWESC:

- **Develop white paper describing the outcomes from the NWESC meeting.** Founded in the NWESC meeting, the document utilizes input regarding stakeholder needs and identifies the future direction of the NWEP (Spring 2020). The target audience is the NWEP funding organizations, NWESC members, NWI, Sea Grant, and the future National Water Network.
- **Solicit and process feedback regarding water-related needs.** Utilize NWEP communication channels and engagement opportunities to solicit information about water-related challenges and what is needed (e.g. specific types of data, tools, services) to address challenges (ongoing). Contributions will eventually include, but not be limited to, information received from surveys, facilitated discussions, the NWEP website, the external communications publication, etc. Data will be analyzed and used to help inform future products and needs. A summary of the information received will be included as a part of the NWEP annual report delivered to the funding organizations and the NWESC. Process will be developed in 2020 (drafted August 2020) to receive and adjudicate feedback from partners regarding key water needs from the website and a link provided within the external communications mechanism. That process will then be tested and revised to maximize the quality of information received while managing the effort required.

3. **Implement an outreach and engagement program** for target audiences based on prioritized needs of the NWC, AWI and the Sea Grant Network. (50% effort – see breakdown below.) This includes the **development and delivery of outreach and communications products in collaboration with staff at the NWC and partners** (e.g. Sea Grant Water and Flooding Visioning teams and the Land Grant Water Extension Network)

- a. **Create at least two relevant water-related scholarly extension products** (e.g. publications, needs assessments, videos, newsletters, website/blogs) per year. (15% effort). (*Informational products*)

Activities recommended by the NWESC:

- **Develop an interpretation document about NWC data, products, and services: How to access and use NWM data** (August 2020). Document will be a concise fact-sheet (two to four pages in length) providing information on how to access, interpret, and use NWM data that is publicly available. The publication will target the Sea Grant Extension Network and other partners.

Additional Activities that will be pursued by the NWEP:

- **Support coordination and development of content for NWC publications and outreach materials** (ongoing).
 - **Develop an extension publication summarizing the methods and results utilized to develop the new coast models of the Watershed Game** (Spring 2020).
- b. **Convene at least three science seminars/workshops** (e.g. hosting science seminars and/or theme-based workshops) per year. (20% effort) (*productive gatherings*)

Activities recommended by the NWESC:

- **Coordinate sessions at meetings and conferences** that provide an opportunity to inform attendees about ongoing efforts to address key water issues, and whenever possible, include two-way learning to enable feedback regarding locally critical water-related challenges and what is needed (e.g. specific kinds of data, tools, services) to address the challenges. Possible venues include:
 - Sea Grant Extension Assembly Business Meeting (Oct. 16-18, 2019, Savannah, GA). Presentation will be the National Water Extension Liaison position, program successes and challenges. Presentation given on October 16 with ~50 attendees.
 - Regional Sea Grant Meetings (as possible).
 - Hydropower Conference (CEATI-HOPIG (Center for Energy Advancement through Technological Innovation, Hydro Operations and Planning), Spring 2020).
 - American Planning Association National Conference (Apr. 25-28, 2020, Houston, TX). Abstract submitted, but not accepted.
- **Continue partnership with Hawaii Sea Grant to host regional meetings for the Sea Grant and USGS WRRRA institute and center directors** in order to build connectivity and synergy among the Sea Grant and WRRRA programs (Oct. 17, & Dec. 5-6, 2019). The South Atlantic and North Atlantic meetings were held and work is underway to formalize next steps.
- **Partner with the NOAA Regional Collaboration Team, Gulf and Central Water Quality Working Group to host a Mississippi River Basin Runoff Risk Meeting** to bring key partners together to consider how to best integrate efforts to address water quality (specifically runoff risk) issues across the basin (Summer/Fall 2020). Meeting will help connect Sea Grant and Land Grant Extension, the USGS WRRRA institutes and centers, other partners, and will offer a pilot opportunity to connect water-activities at a river basin level.

- c. **Contribute to other outreach activities** supported by NWC and Sea Grant where appropriate (10% effort).

Activities recommended by the NWESC:

- **Facilitate increased engagement between the Sea Grant network and the NWS** (*details provided above*). Possible activities could include:
 - Encourage increased collaboration between Sea Grant Programs and River Forecast Center Service Coordination Hydrologists and Weather Forecast Office Warning Coordination Meteorologists (*details provided above*).
- **Partner with the NOAA Regional Collaboration Team, Gulf and Central Water Quality Working Group to host a Mississippi River Basin Runoff Risk Meeting** (*details provided above*).

Additional Activities that will be pursued by the NWEP:

- **Support NWC 2020 Spring Flood Outlook outreach needs** (March 19, 2020).
 - **Develop draft coast models for the Local Leader and Classroom versions of the Watershed Game Program** (Winter 2020). The new models, designed to address the needs, land uses, management methods and water resource issues in coastal environments, will be piloted along the Gulf coast. Project is a collaboration with representatives from Minnesota Sea Grant, NOAA's Office for Coastal Management, and the Dauphin Island Sea Lab.
4. **Provide a leadership role to increase collaboration** with the NWC, AWI, the Sea Grant Extension Network, U.S. Department of Agriculture Cooperative Extension, U.S. Geological Survey Water Resources Research Institutes, NOAA Regional Collaboration Teams, and other relevant programs. (20% effort)

Activities recommended by the NWESC:

- **Conduct professional extension and provide leadership nationally**, including inreach across Sea Grant, to further develop and codify Sea Grant's water-related portfolio and recognize this work as a fundamental component relevant to all Sea Grant programming (this includes supporting the implementation of the Sea Grant water-related visions) (ongoing).
- **Continue partnership with Hawaii Sea Grant to build connectivity and synergy among the Sea Grant and USGS WRRRA institutes and centers** (*details provided above*). Regional Meetings completed in December 2019, work is underway to formalize next steps.
- **Partner with the NOAA Regional Collaboration Team, Gulf and Central Water Quality Working Group to host a Mississippi River Basin Runoff Risk Meeting** (*details provided above*).
- **Actively engage these entities in the "National Water Network."** The network is anticipated to function as a national, informal community of practice to foster communication and promote cross-line office, agency, and university efforts to plan for, respond, and address water-related issues. The network will serve as a multi-way conduit of information for needs and resources related to water issues. Specific efforts will be made to bring each of the groups identified in this responsibility into the network (*details provided above*).
- **Facilitate increased engagement between the Sea Grant network and the NWS River Forecast Centers and Weather Forecast Offices.** Possible activities could include:
 - Encourage increased collaboration between Sea Grant Programs and River Forecast Center Service Coordination Hydrologists and Weather Forecast Office Warning Coordination Meteorologists (*details provided above*).
 - Encourage Sea Grant programs to actively join and support the Weather-Ready Nation Program (*details provided above*).
 - Encourage Sea Grant programs to install weather stations at offices (*details provided above*).
 - Work with Sea Grant and the NWS to develop a system which would allow Sea Grant Programs to upload local georeferenced photos (*details provided above*).

Additional Activities that will be pursued by the NWEP:

- **Participate in NOAA Water Team activities** to foster collaboration and progress in meeting the objectives of the NOAA Water Initiative. This includes actively engaging with the Service Delivery and Decision Support Objective Teams.
 - In collaboration with the Sea Grant Water Resources Vision Leadership team, **develop a strawman proposal on how to raise awareness about the critical role of water across all Sea Grant programming, and to support implementation of the Sea Grant water-related visions.**
5. Fulfill Mississippi-Alabama Sea Grant Consortium and the AWI administrative responsibilities as a grantee including an annual plan of work and semi-annual reports. (5% effort) (Appendix E identifies the Sea Grant reporting metrics applicable to the NWEL.)

This responsibilities has no associated recommendations from the NWESC. Appendix D identifies the Sea Grant reporting metrics that are maintained by the NWEF.

Other requested activities currently beyond the scope and capacity of the NWEF:

- Host **hackathon** type activities that focus students on a specific problem that needs to be addressed (e.g. looping dam releases into the NWM).
 - Could be sponsored or run by the Alabama Water Institute or Sea Grant.
- **Build web services that enable anyone to use publicly available NWM data** to build applications for specific needs. These web services can enable more technical users to mix and match information to create tools/services that are relevant to local community needs.

CONCLUSION

The NWEF is a key partner and engages with NOAA, other federal agencies, and a variety of partners in order to serve communities in addressing critical water challenges and opportunities. This enables and empowers communities to make locally relevant, science-based decisions to build resilience to water challenges by bridging the broader network of data and service providers with decision-makers. The NWEF leverages the Sea Grant Network and other partners, to foster multi-way communication that identifies critical water-related tool, resource, and information needs; and gets existing water tools and information into the hands of the people who need them, while encouraging the use of these resources in creating additional tools and services to advance knowledge and capabilities. In these efforts the NWEF champions diversity, equity, and inclusion, and the use of local knowledge to direct research, outreach, and education that facilitates knowledge-based solutions and collaborative decision-making in ocean, coastal, and Great Lakes communities and on behalf of ecosystems and economies.

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Table 1. Cross-walk of NWESC recommended activities to NWEL Primary Responsibilities.

NWESC Recommended Activities	NWEL Primary Responsibilities					
	1. Point of contact between NWC, UA AWI, & Sea Grant	2. Collect stakeholder input	3.a. Create extension products	3.b. Convene science seminars/workshops	3.c. Contribute to other outreach activities	4. Leadership role in increasing collaboration
Create a “National Water Network”	●	●				●
Develop a NWEF Website	●	●				●
Develop external communications mechanism	●	●				●
Develop process to receive and adjudicate feedback	●	●				●
Facilitate increased engagement between Sea Grant and NWS	●				●	●
Encourage increased collaboration between Sea Grant Programs and River Forecast Center Service Coordination Hydrologists and Weather Forecast Office Warning Coordination Meteorologists (<i>possible activity</i>)	●				●	●
Encourage Sea Grant programs to actively join and support the Weather-Ready Nation Program (<i>possible activity</i>)	●					●
Encourage Sea Grant programs to install weather stations at offices (<i>possible activity</i>)	●					●
Work to support the development of a system allowing Sea Grant Programs to upload local georeferenced photos to validate inundation maps (<i>possible activity</i>)	●				●	●
Develop white paper describing NWESC meeting outcomes	●	●				●
Solicit and process feedback regarding water-related needs	●	●				●
Develop an interpretation document about how to access and use NWM data	●		●		●	
Coordinate sessions at meetings and conferences	●	●		●		●
Partner with the NOAA Regional Collaboration Team, Gulf and Central Water Quality Working Group to host a Mississippi River Basin Water Quality Meeting		●		●	●	●
Conduct professional extension and provide leadership nationally	●			●	●	●
Continue partnership with Hawaii Sea Grant to build connectivity and synergy among Sea Grant and WRRRA institutes and centers		●		●		●

Table 2. Gantt chart of NWEL activities, July 2019 through December 2020.

Activities	2019						2020												
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Create a “National Water Network”																			
Develop a NWEF Website																			
Develop external communications mechanism																			
Develop process to receive and adjudicate feedback																			
Facilitate increased engagement between Sea Grant and NWS																			
Encourage collaboration between Sea Grant Programs and WFO Warning Coordination Meteorologists (<i>anticipated timing of possible activity</i>)																			
Encourage Sea Grant programs to actively join and support the Weather-Ready Nation Program (<i>anticipated timing of possible activity</i>)																			
Encourage Sea Grant programs to install weather stations at offices (<i>anticipated timing of possible activity</i>)																			
Support development of system to share georeferenced photos to validate inundation maps (<i>anticipated timing of possible activity</i>)																			
Develop white paper describing NWESC meeting outcomes																			
Solicit and process feedback regarding water-related needs																			
Develop process to receive and adjudicate feedback																			
Test and revise process																			
Summary included in NWEF annual report																			
Develop extension products																			
Develop interpretation document: <i>How to access and use NWM data</i>																			
Support development of content for NWC																			
Summary document of methods and results used in development of coast models of the Watershed Game																			
Convene science seminars/workshops																			
Coordinate sessions at meetings and conferences																			
Continue partnership with Hawaii Sea Grant to build connectivity and synergy among Sea Grant and WRRRA institutes and centers																			
Partner with NOAA Regional Collaboration Teams (Gulf and Central) to host a Mississippi River Basin Runoff Risk Meeting																			
Contribute to other outreach activities (<i>items not previously listed</i>)																			
Support NWC Spring Flood Outreach Needs																			
Develop coast models of Watershed Game																			
Conduct professional extension and provide leadership nationally																			
Raising awareness of critical role of water across Sea Grant programing																			
Participate in NOAA Water Team activities																			
Legend:																			

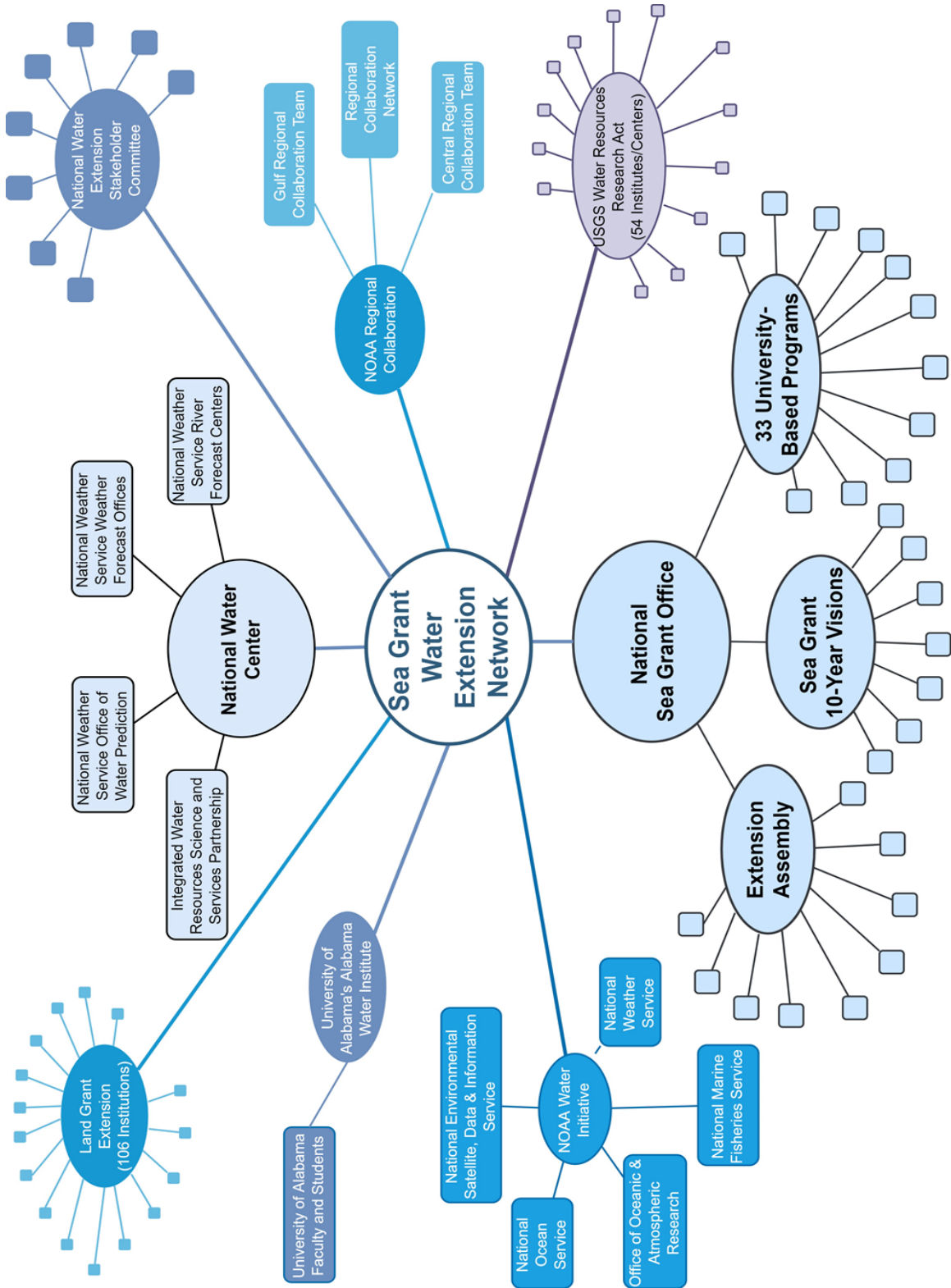
Table 3. Gantt chart of NWEL activities, January through December 2021.

Activities	J	F	M	A	M	J	J	A	S	O	N	D
Create a “National Water Network”												
Develop a NWEF Website												
Develop external communications mechanism												
Develop process to receive and adjudicate feedback												
Facilitate increased engagement between Sea Grant and NWS												
Encourage collaboration between Sea Grant Programs and RFC Service Coordination Hydrologists and WFO Warning Coordination Meteorologists (<i>anticipated timing of possible activity</i>)												
Encourage Sea Grant programs to actively join and support the Weather-Ready Nation Program (<i>anticipated timing of possible activity</i>)												
Encourage Sea Grant programs to install weather stations at offices (<i>anticipated timing of possible activity</i>)												
Support development of system to share georeferenced photos to validate inundation maps (<i>anticipated timing of possible activity</i>)												
Develop white paper describing NWESC meeting outcomes												
Solicit and process feedback regarding water-related needs												
Develop process to receive and adjudicate feedback												
Test and revise process												
Summary included in NWEF annual report												
Develop extension products												
Develop interpretation document: <i>How to access and use NWM data</i>												
Support development of content for NWC												
Summary document of methods and results used in development of coast models of the Watershed Game												
Convene science seminars/workshops												
Coordinate sessions at meetings and conferences												
Continue partnership with Hawaii Sea Grant to build connectivity and synergy among Sea Grant and WRRRA institutes and centers												
Partner with NOAA Regional Collaboration Teams (Gulf and Central) to host a Mississippi River Basin Runoff Risk Meeting												
Contribute to other outreach activities (<i>items not previously listed</i>)												
Support NWC Spring Flood Outreach Needs												
Develop coast models of Watershed Game												
Conduct professional extension and provide leadership nationally												
Raising awareness of critical role of water across Sea Grant programing												
Participate in NOAA Water Team activities												
Legend:												

APPENDIX A ACRONYMS

APA	American Planning Association
ASFPM	Association of State Floodplain Managers
HAB	Harmful Algal Bloom
IDSS	Impact-Based Decision Support Services
NACo	National Association of Counties
NEMA	National Emergency Management Association
NOAA	National Oceanic and Atmospheric Administration
NWC	National Water Center
NWEL	National Water Extension Liaison
NWEP	National Water Extension Program
NWESC	National Water Extension Stakeholder Committee
NWI	NOAA Water Initiative
NWM	National Water Model
NWS	National Weather Service
PIER	Planning, Implementation, and Evaluation Resources
RFC	River Forecast Center
TVA	Tennessee Valley Authority
USGS	United States Geological Survey
WFO	Weather Forecast Office
WRRRA	Water Resources Research Act

**APPENDIX B
NATIONAL WATER EXTENSION PROGRAM HUB DIAGRAM**



APPENDIX C
JUNE 2019 NATIONAL WATER EXTENSION STAKEHOLDER COMMITTEE
MEETING MATERIALS

In June, 2019 the National Water Extension Program (NWEP) conducted the inaugural in-person meeting of the National Water Extension Stakeholder Committee (NWESC) at the National Water Center (June 26-27, 2019). The meeting was attended by each of the committee members, most of the NWEP funders, the National Water Extension Liaison, and a dedicated facilitator. The meeting objectives and attendees are listed below.

NWESC MEETING OBJECTIVES

- Introduce the committee to the NWEP, the funding organizations, and Office of Water Prediction programs (establish the funders and the committee collectively as representative of the NWEP “stakeholders”)
- Understand where water issues and needs align, in order to inform priorities and to conceptualize the long-term goals of the NWEP
- Gather input in the development of the outreach components of the NWEP and identify key steps to deliver water-related information to stakeholders (informational products and productive gatherings to inform the development of end user “packages”)
- Gather input and commitments on key actions for the NWEP during the next 18-24 months

NWESC COMMITTEE MEMBERS

- Lisa Davis, PhD, UA, Associate Professor, Geography (University of Alabama Representative)
- Chris Ellis, PhD, Social Scientist, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office for Coastal Management (NOAA Service Delivery Representative)
- David Hansen, PhD, Extension Outreach & Engagement Leader, Oregon Sea Grant (Sea Grant Extension Assembly Representative)
- Curt Jawdy, PE, Tennessee Valley Authority (TVA), River Analysis Group (hydroelectric) (Industry Representative)
- Darren Lerner, PhD, Director, Hawaii Sea Grant & Interim Director, Hawaii Water Resources Research Center (Sea Grant and United States Geological Survey Water Resources Research Center Director)
- Bethany Perry, Coordinator, NOAA Central Region Collaboration Team (NOAA Regional Collaboration Teams Representative)
- David Vallee, Hydrologist in Charge, Northeast River Forecast Center (National Weather Service Hydrology Program Representative)

NWEP FUNDERS

- Patty Sobacky, PhD, University of Alabama, Alabama Water Institute
- LaDon Swann, PhD, Mississippi-Alabama Sea Grant Consortium
- Ed Clark, National Water Center (not in attendance)
- Elizabeth Rohring, National Sea Grant Office
- Jen Sprague, National Weather Service (not in attendance)
- Steve Sempier, PhD, Mississippi-Alabama Sea Grant Consortium

ALSO IN ATTENDANCE

Karen Bareford, PhD, National Water Extension Liaison

Brenna Sweetman, Social Scientist, NOAA, National Ocean Service, Office for Coastal Management,
Facilitator

NWESC MEETING “CONVERSATIONAL GAP ANALYSIS”

As a part of the meeting, the NWESC and funders engaged in a “conversational gap analysis” activity to explore pressing water concerns, how the organizations engage with stakeholders on these issues, and types of assistance and activities desired. During this activity small breakout groups moved among four stations where they were presented with a list of questions framed within specific applications of water information (Local Community Applications, Commercial/Industrial Applications, Academic Community (Education and Research) Applications, Public Health and Safety Applications). The activity produced a plethora of data that was used to frame the type of activities the NWEP should pursue in the future.

Questions Asked

1. **How does your work help support** local communities; commercial/industrial entities; academia (education and research); the public health and safety sector make **water decisions**?
2. **What are the most pressing water concerns** for the local communities; commercial/industrial entities; academia (education and research); the public health and safety sector that you serve (what keeps them up at night/what are the most critical water issues/challenges they face)?
3. **Who are the individuals you interact with in your efforts to provide support** to local communities; commercial/industrial entities; academia (education and research); the public health and safety sector for water decisions?
4. **What actions do you take (or information do you provide) to offer support** to local communities; commercial/industrial entities; academia (education and research); the public health and safety sector?
5. **What do you need to provide better support** to these local communities; commercial/industrial entities; academia (education and research); the public health and safety sector?
6. What information do you need now, in six months, in 1 year, in 5 years (for each of these type of stakeholders/end users)?
7. What other timescales are critical (for each of these type of stakeholders/end users)?

General Summary of Identified Needs:

- Enhanced communication to stakeholders and other end users regarding what data are available and how to access available data. It is vital that clear, consistent interpretation be used in messaging. Innovative communication methods are needed to better inform the NWS, Sea Grant, other NOAA offices, academia, and the general public. (Need relates to the topics of Service Delivery & Technical Analysis, identified in the analysis of data section below.)
 - Communication is needed regarding:
 - Water Quality
 - Floods (including storm and other surge)
 - Drought (including water availability)
- *May be good to interact with communities of practice to ensure information exchange
- Enhanced models and visualizations of data to enable evidence-based decision-making (Need relates to the topic of Technical Analysis, see Appendix C for additional information.)

- Identification of traditional and non-traditional opportunities for funding, conferences, and publishing peer-reviewed and gray literature (Need relates to the topic of Resources, see Appendix C for additional information.)

Additional Key Concepts:

- Some needs identified are presently beyond the scope of the NWEF, but may be supported by the NWEF and the NWEF via a catalytic role or through future programmatic foci.
- Laypersons require data translation and interpretation appropriate to their skill and knowledge; simply making data available is helpful to technical users, but for widespread use and adoption, data must be interpreted and provided in a manner that people want to use.
- People are experiencing information overload; data and other information must be provided in “digestible” pieces that are specific and informative at local community levels.
- The world is now operating in the domain of applications (apps); information should be provided to users via apps, as models are often difficult to use and interpret to most users.
- Tools and apps must be driven from local problems; Sea Grant offers a nexus from which to serve local communities as Sea Grant programs and associated outreach and extension professionals are trusted in their communities and knowledgeable about local issues.
- The NWEF can assist extension professionals in creating and accessing the information, tools, and apps that can help inform their communities around water-related issues.
- Geo-visualization tools can be used to automatically generate data and products from the National Water Model (NWM) data—automatically serving specific identified needs.
- All elements identified have implications on traditionally underserved and underrepresented (diverse and low socioeconomic) communities, which often have limited resources impacting their access to information, and their ability to respond, adapt, and recover.

ANALYSIS OF DATA COLLECTED

The activity produced a plethora of data, which was coded for qualitative analysis. This analysis depicts the items raised by one group, in one exercise, on one given day. In total, the analysis produced 500 codes, using 161 unique identifiers (topics) which were grouped into 16 categories. Each category of information is summarized below (see Table C.1). In addition, a list of all the codes included in each category and the number of times they were identified is provided. It is evident from this analysis that service delivery, the need for technical capacity and assistance, and planning are critical needs in the effort to address water-related issues.

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Table C.1. List of categories identified in qualitative analysis.

Category	Number of Codes in Category	Total Times Identified
Service Delivery	24	117
Service Delivery-Special Products	7	21
Technical Analysis, Resources, Challenges	21	56
Planning	21	50
Government	11	44
Industry	12	18
NGOs	3	8
Public	2	4
Academia	5	26
Water Quality	16	47
Flooding	9	20
Drought	5	18
Resources	7	42
Climate	3	5
Timescales	10	18
Other	5	6
Totals	161	500

Service Delivery Category

Service delivery is “the continuous process of engaging with users, in the right way, in order to provide relevant and timely information via appropriate mechanisms”²

Service delivery lies at the heart of NOAA’s mission and is a critical component of what NOAA does. To best serve people, NOAA must coordinate a unified decision support and service delivery mechanism that carefully leverages partnerships and informs the development of use-inspired products and services. To achieve this, user needs must be fully understood; the existing products and services from NOAA must be known; and the ongoing, frequent engagement for capacity building and response to needs must be regularly evaluated.³

Service delivery is a critical part of extension, and of the NWEF. Service delivery includes providing information, tools, and services in ways that they can and will be used to help individuals and groups make informed decisions. In this analysis the “service delivery” category captured items that are integral in providing the highest quality service delivery to NWEF stakeholders and end users. As the analysis progressed a sub-category emerged that included specific types of tools, products, and services needed. Table C2 shows the list of the 24 service delivery codes (identified a total of 117 times) and the sub-listing of the 7 specific products codes (identified a total of 21 times). When combined, these categories include 31 codes, which were identified a total of 138 times.

² NOAA Water Initiative Draft Definitions, working document.

³ NOAA Water Initiative Draft Service Delivery Strategic Plan, working document.

Table C2: Service Delivery Category Topics.

Service Delivery Category Topics	Times Identified
Education and outreach (teach/train/workforce development/etc.)	23
Service delivery	13
Access to information/data (clearing house)	10
Connecting researchers to end users (dissemination)	10
Interpretation of data	9
Decision support tools	7
Collaboration	6
Social science (behaviors, etc.)	5
Consistent messages (clear)	4
Impact-Based Decision Support Services (IDSS)	4
Partnerships	4
Collaboration with academia	3
Extension (Sea Grant and Cooperative Extension)	3
Documenting research problems and needs	2
Identification of needs/deficiencies/etc.	2
National Water Extension Liaison	2
Present (at conferences)	2
Prioritization of needs	2
Sea Grant	2
Identification of resources (knowledge, tools)	1
Awareness of research (getting information out to the public)	1
Science-based water decisions and management	1
Technical support	1
Total Times Service Delivery Topics Identified	117
Specific Products Identified	Times Identified
Meetings (incl. workshops, seminars)	9
Education documents	6
Websites	2
Email	1
Tools to predict impacts to natural systems	1
Tools to predict impacts on private property	1
Webinars	1
Total Times Service Delivery Topics Identified	21
Total Times Service Delivery Topics (Including Specific Products) Identified	138

Technical Analysis, Resources, Challenges Category

There are many complexities when dealing with water-related issues which require highly technical skills, analysis, and resources to address. The Technical Analysis, Resources, and Challenges Category captured 21 codes (identified a total of 56 times) that reflect specific jobs (e.g. engineers and hydrologists), types of technical analysis or products (e.g. water or flood forecasts, risk analysis, models, and scenarios), locations or facilities where technical work is done (e.g. the National Water Center), or particular challenges which require specific expertise to address (e.g. understanding climatic trends, and big data) (see Table C2). It is beyond the scope of the NWEF to address these technical issues; however, the program is uniquely positioned to work with groups who can provide critical information and those who need specific resources to inform their actions.

Table C2: Technical Analysis, Resources, and Challenges Category Topics.

Technical Analysis, Resources, and Challenges Category Topics	Times Identified
Water forecasting	8
Inundation (Mapping)	7
Models (coupling, joining, etc.)	6
River release schedules	5
Flood forecasts	4
Climatic trends	3
Engineers (coastal, civil)	3
Risk of flood	2
Hydrologists	2
Risk of drought	2
Data accuracy	1
Big data	1
Consulting	1
Flood frequency analyses	1
Flood probability	1
Flood warnings	1
Longer rainfall time series	1
Modelers	1
National Water Center	1
Proving ground for research to operations (R2O)	1
River Forecast Centers	1
Risk (risk analysis)	1
Scenarios	1
Weather Forecast Offices	1
Total Times Technical Analysis, Resources, and Challenges Topics Identified	56

Planning Category

Planning is a critical component in dealing with water-related challenges. Planning can help increase the ability of a community to respond to events, and increase their resilience to events. Further, there are many types of plans and actions associated with planning. The Planning Category includes 21 codes (identified a total of 50 times) which capture these concepts (see Table C3).

Table C3: Planning Category Topics.

Planning Category Topics	Times Identified
Planning (incl. city planning)	9
Infrastructure concerns (failure, aging)	8
Stormwater/wastewater	4
Drought planning	3
Floodplain Mgrs.	3
Monitoring	3
Watershed plan	3
Floodplain planning & development	2
Resilience	2
Assess vulnerabilities	2
Coastal resilience index	1
Emergency Action Plans	1
Response to floods	1
Water conservation	1
Infrastructure planning	1
Land use changes	1
Mitigation	1
Community water planner	1
Recovery (from floods)	1
Sewage	1
Capitalizing on waterfront	1
Total Times Planning Topics Identified	50

The next four categories identify different types of entities.

Government Category

The Government Category includes 11 codes (identified a total of 44 times). This category includes different levels and types of governmental entities (see Table C4). The majority of these codes (38 of 44) were identified in question three which asked who the participants interact with in their efforts to provide support regarding the different applications of water information.

Industry Category

The Industry Category includes 12 codes (identified a total of 18 times). This category includes different types of industries (see Table C5). The majority of these codes (17 of 18) were identified in question three which asked who the participants interact with in their efforts to provide support regarding the different applications of water information.

Table C4: Government Category Topics.

Government Category Topics	Times Identified
State agencies	13
Federal agencies (partners)	11
Emergency managers	5
Local agencies	5
Departments of health	2
Policy (& policy makers)	2
State climatologists	2
Agencies	1
Legislators	1
TVA police	1
Regulators	1
Total Times Government Topics Identified	44

Table C5: Industry Category Topics.

Industry Category Topics	Times Identified
Fisheries (commercial and recreational)	3
Industry	3
Tourism associates	2
Water utilities	2
Aquaculture	1
Barge industry	1
Boaters	1
Water managers	1
Hydropower	1
Reservoir operators	1
Shipping	1
Electrical utility	1
Total Times Industry Topics Identified	18

NGOs Category

The NGOs Category includes 3 codes (identified a total of 8 times). All of these codes were identified in question three which asked who the participants interact with in their efforts to provide support regarding the different applications of water information (see Table C6).

Public Category

The Public Category includes 2 codes (identified a total of 4 times). All of these codes were identified in question three which asked who the participants interact with in their efforts to provide support regarding the different applications of water information (see Table C7).

Table C6: NGOs Category Topics.

NGOs Category Topics	Times Identified
National Organizations (NACo, APA, NEMA, ASFPM)	5
Non-profits	2
Watershed associations	1
Total Times NGOs Topics Identified	8

Table C7: Public Category Topics.

Public Category Topics	Times Identified
Land owners	2
General public (stakeholders)	2
Total Times Public Topics Identified	4

Academia Category

Academia plays a critical role in offering research and workforce development that contribute to the ability of society to address water-related issues (see Table C8). The Academia Category includes 5 codes (identified a total of 26 times). The codes captured in this category are all relevant to the greater university enterprise.

Table C8: Academia Category Topics.

Academia Category Topics	Times Identified
Research(ers)	16
University (academia, all levels)	4
Universities that deal with water	3
Students	2
University leadership	1
Total Times Government Topics Identified	26

The next three categories address specific types of water threats, too much water, too little water, and water of poor quality. The information below shows that in this exercise, water quality topics were identified more than items regarding too much or too little water. This information cannot be said to represent that water quality changes are more important or pressing, but it does suggest that there are a variety of unmet data and tools required to properly address water quality issues.

Water Quality Category

The Water Quality Category includes 16 codes (identified a total of 47 times). The codes in the water quality category predominantly fall into two groups: items that impact water quality, or impacts of water quality (see Table C9).

Table C9: Water Quality Category Topics.

Water Quality Category Topics	Times Identified
Water quality	15
Harmful Algal Blooms (HABs)	9
Bacteria (expansion, vibrio, etc.)	5
Freshwater inputs	3
Ecological impacts	2
Hypoxia	2
Sediment (loss, impact on SAV, erosion)	2
Micro plastics	1
Heath issues related to water	1
Saltwater intrusion	1
Marine debris	1
Oil spill	1
Seafood	1
Sediment increase	1
Shellfish closures	1
Species loss	1
Total Times Water Quality Topics Identified	47

Flooding Category

The Flooding Category includes 9 codes (identified a total of 20 times). The codes in this category include types of flooding and impacts from floods (i.e. dam breaches and the needed for water rescues) (see Table C10).

Drought Category

The Drought Category includes 4 codes (identified a total of 18 times). The codes in this category are items directly related to drought (e.g. water scarcity and groundwater) (see Table B11).

Table C10: Flooding Category Topics.

Flooding Category Topics	Times Identified
Flood	7
Large floods (extreme flooding)	5
Flash flood	2
Nuisance flooding	2
Dam breaches	1
Nuclear plant flooding	1
Surge	1
Water rescues	1
Total Times Flooding Topics Identified	20

Table C11: Drought Category Topics.

Drought Category Topics	Times Identified
Water scarcity	8
Drought	6
Water quantity	3
Ground water	1
Total Times Drought Topics Identified	18

Resources Category

The Resources Category includes 7 codes (identified a total of 42 times). The codes in this category identify types of resources that are required to address water-related issues (see Table C12). Over half (22 of 42) of these codes were identified in question five which asked what the participants need in order to provide better support regarding the different applications of water information.

Climate Category

The Climate Category includes 3 codes (identified a total of 5 times) (see Table C13). While climate change and associated impacts were not specifically identified a lot in this activity, the subsequent conversation raised an overwhelming agreement that climate change has a ripple effect that compounds all of the other issues identified in this activity.

Table C12: Resources Category Topics.

Resources Category Topics	Times Identified
Money	16
Funding for research	9
Staff	8
Support students	5
Phone lines	2
Interns	1
Time	1
Total Times Resources Topics Identified	42

Table C13: Climate Category Topics.

Climate Category Topics	Times Identified
Climate change	3
Acidification	1
Sea level rise	1
Total Times Climate Topics Identified	5

Timescales Category

The Timescales Category includes 10 codes (identified a total of 18 times) (see Table C14). All of these codes were used in relation to question seven which asked what timescales of information are critical in regards to the water issues the participants address.

Table C14: Timescales Category Topics.

Timescales Category Topics	Times Identified
Long-term (timescales)	4
50 years (more than 50 yrs.)	3
Minutes	3
Decades	2
10 years	1
Centuries	1
Millennia	1
Paleo data	1
Seasonal	1
Short-term (<3 yrs.)	1
Total Times Timescales Category Topics Identified	18

Other Category

The Other Category includes 5 codes (identified a total of 6 times). This category includes the five codes that did not fit well in any of the other areas (see Table C15).

Table C15: Other Category Topics.

Other Category Topics	Times Identified
Enabling river recreation	2
Drinking water	1
Liability	1
Media	1
Water wars	1
Total Times Other Topics Identified	6

APPENDIX D
SEA GRANT REPORTING METRICS FOR THE NATIONAL WATER EXTENSION LIAISON
(as of August 2019)

Number of presentations made

Number of publications [2 required]

Partners

Events (professional meetings, conferences, and workshops organized or sponsored) [3 required]