Introduction
The National Oceanic and Atmospheric Administration (NOAA), The University of Alabama, and the Mississippi-Alabama Sea Grant Consortium (MASGC) combined efforts to create the National Water Extension Program, based at the National Water Center (NWC) in Tuscaloosa, Alabama, to foster collaboration among organizations, communities, and stakeholders who need water data and tools to help support their decision-making processes.

The Challenge
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. These threats to water security arise from several factors, including increased water demand from population growth and weather and water-related impacts of climate variability and change. Unfortunately, these threats to water security are intensifying, and risk is difficult to predict when coupled with the already complex natural water cycle.

The Response
NOAA has initiated a variety of efforts to address risks to the nation’s water security. The NOAA Water Initiative (NWI) is designed to give people and governments better access to water information critical to their unique circumstances. Access to this information will advance the nation’s capacity to analyze and link critical data in ways, and at scales, previously not possible.

Key in realizing the NWI is the NWC, a state-of-the-art facility that supports research and enables collaboration across federal water science and management agencies in unprecedented ways. The mission of the NWC includes providing enhanced water resources information, which enhances preparedness for water-related disasters, and informs high-value water decisions in communities, states, regions, and the country. The NWC supports the National Weather Service Hydrology Program and the provision of cutting edge modeling and geospatial data services, and is evolving to enable River Forecast Centers to perform backup operations remotely. The center is responsible for the evolution of short-range Hydrologic Ensemble Forecast Service (HEFS) and the National Water Model (NWM), a continental scale hydrologic model that forecasts streamflow and other elements of the water budget at over 2.7 million river and stream elements. The NWM will ultimately include predictions and data for the entire water budget, including snow water equivalent, snowmelt, precipitation, soil moisture, infiltration, streamflow, flooding, inundation, storm surge, and shallow groundwater levels, among others. The information provided by these programs will facilitate short-term actions and long-term planning to address water-related risks and manage water resources more efficiently and effectively.
National Water Extension Program Goal
The goal of the National Water Extension Program 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.

Such tools will allow individuals, governmental entities, emergency response personnel, resource managers, and businesses to plan for and protect citizens, water resources, property, and the long-term sustainability of public health, the economy, and daily lives.

Other Partners
This partnership between NOAA, The University of Alabama, and MASGC, leverages the strengths of each entity to secure the best possible results.

The MASGC extension network, along with the larger, national Sea Grant extension network, provides experience and a direct link to coastal and Great Lakes stakeholder groups across the country. The national water extension liaison uses the nation’s Sea Grant programs to reach communities, decision-makers, and other stakeholders.

The University of Alabama is home to the Alabama Water Institute (AWI), a unique interdisciplinary research institute engaging in basic and applied research. The AWI is dedicated to seeking innovative solutions and technologies through action-based research for the state, region, and nation’s growing water needs and challenges.

Strength in Numbers
The Sea Grant and university networks are being leveraged to expand the ability of the National Water Extension Program and the NWI to facilitate the development of solutions by learning about critical water issues, what data are needed to address these issues, and what formats for delivering the data will best support decision-making.

Conclusion
Water is the great unifier; it is critical for all life. It connects the most inland agricultural fields and communities to the coast and beyond. A lack of water can lead to increased damage by large fires and result in the collapse of critical fisheries. Too much water can cause devastating floods with the ability to decimate entire communities. At the same time, too much or too little water can contribute to water quality issues that contaminate soils, kill plants and animals, and result in far-reaching economic impacts.

As the country’s water infrastructure continues to age and society’s demand for water increases, water resource management challenges and conflicts are likely to increase. It is critical that communities manage risks and plan for the long-term sustainability and effective stewardship of shared water resources. The National Water Extension Program helps to ensure that the data from the NWM, and the decision support tools it enables, will provide the capacity for individuals and groups to analyze and plan in ways not previously possible.

The National Water Extension Program is a part of Sea Grant, run in coordination with the National Oceanic and Atmospheric Administration, the National Weather Service, the Mississippi-Alabama Sea Grant Consortium, and The University of Alabama.

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