Developing a Drought Early Warning Information System for Coastal Ecosystems in the Carolinas

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The National Integrated Drought Information System (NIDIS) and the Carolinas Integrated Sciences and Assessments (CISA) are partnering to develop and support a Carolinas Drought Early Warning System (DEWS) pilot program. This is one of nine regional DEWS pilot programs supported by NIDIS, designed to explore a variety of early warning and drought risk reduction strategies in partnership with drought information users and decision makers. CISA is one of eleven Regional Integrated Sciences and Assessments (RISA) research teams funded by the National Oceanic and Atmospheric Administration to expand and build the nation’s capacity to prepare for and adapt to climate variability and change. CISA’s interdisciplinary team works with a variety of stakeholders across the Carolinas on topics related to drought, water resources management, coastal climate, public health, and adaptation.

Research and projects for the Carolinas DEWS pilot program focus on the unique coastal ecosystems in North and South Carolina. In the Carolinas, drought effects on environmental resources, particularly in coastal areas, are not as well-understood, or as well-integrated into existing drought planning and response processes, as other impacts and resources (e.g., agriculture, surface water supplies). Key concerns related to drought and coastal ecosystems focus on impacts to water quality and quantity, habitats, species, and estuarine processes. Drought contributes to increased salinity and saltwater intrusion, reduced flushing and assimilation of pollutants, and overall water quality changes. Ecosystem impact concerns center on habitat loss or conversion and consequent effects on recruitment, distribution, and migration patterns as well as on primary and secondary production. Saltwater intrusion, low stream flows, and low water levels contribute to impacts and are attributed to both drought and human actions (e.g. changes in dam releases due to drought).

This presentation will highlight current activities to develop a drought early warning information system in the Carolinas to include:

- Development of a coastal drought index based on U.S. Geological Survey (USGS) real-time salinity data
- Assessment of ecological indicators of drought in southeastern coastal ecosystems
- Development of an ‘Atlas of Hydroclimate Extremes’ for the Carolinas
- Assessment of drought indicators for coastal zone fire risk
- Forecasting the SC blue crab fishery using real-time freshwater flow data
- Increasing observations of local conditions affected by precipitation through citizen science and the Community Collaborative Rain, Hail, & Snow Network (CoCoRaHS)

Collectively, these projects improve understanding of drought impacts on social and environmental systems in the coastal Carolinas and will be used to advance regional and local capacity to cope with drought. Additionally, tools developed and lessons learned will be transferred through NIDIS to move the nation from a reactive to a more proactive approach to drought planning and response.