

Needs Assessment of Coastal Land Managers for Drought Indicators in the Southeastern U.S.



Casey Nolan¹, Drs. Dan Tufford² & David Chalcraft¹

¹East Carolina University ²University of South Carolina

Background

- Increase in drought occurrence and severity
(Rind et al. 1990, Seager et al. 2009)
- Coastal areas particularly vulnerable to drought impacts
(Gilbert et al. 2012)
 - *Reduced riverine flows/salinity.*
 - *Water table draw-down in upland areas.*
 - *Salinity intrusion into surficial aquifers*
 - *Increased wildfire potential.*



Context of Drought



Drought Indices

- Drought Indicators
 - *Palmer Drought Severity Index*
 - *Keetch-Byram Drought Index*
 - *The U.S. Drought Monitor*
- *Little attention on ecological resources*

Ecological Drought

- Significant for resources that are dependent on patterns of precipitation, salinity, or streamflow
 - *Estuarine species that migrate along coastal rivers*
 - *Depressional wetlands.*
 - *Potential for wildfires*
- **Bottom line:** drought affecting ecosystem structure & function (Sheffield & Wood 2012).



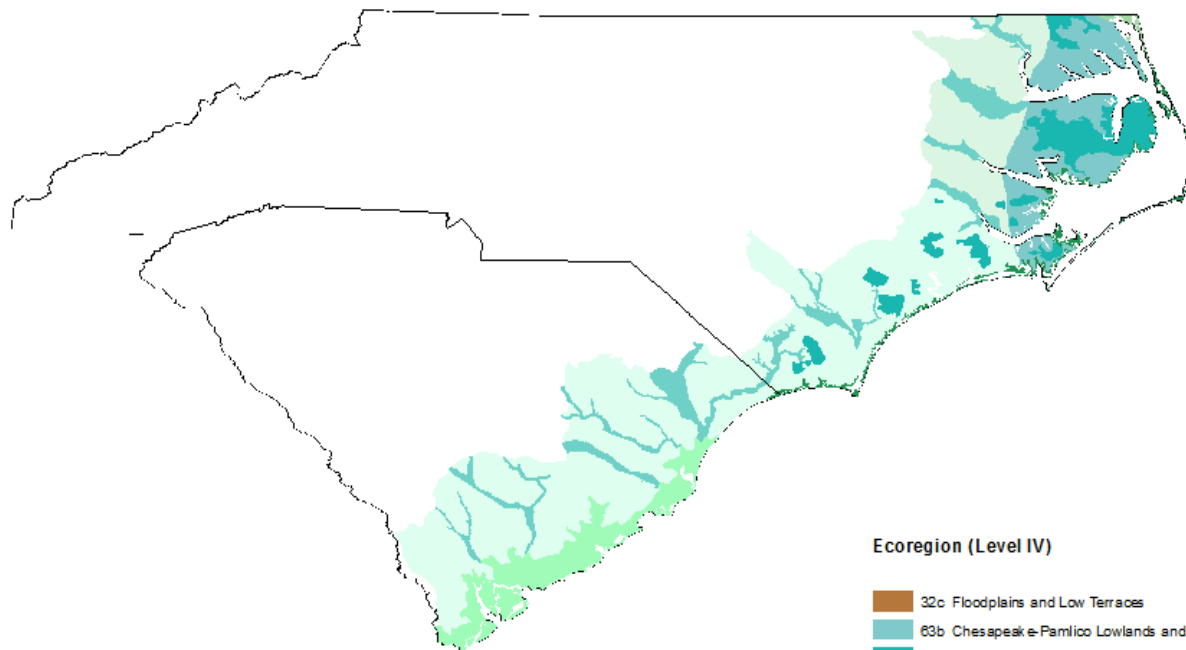
Needs Assessment

- Objectives:
 - *Assess the concerns of drought impacts on coastal ecosystems*
 - *Identify parameters that are useful to managers*
 - *Can an indicator be applicable among coastal habitats.*



National Drought Mitigation Center

Study Area



Ecoregion (Level IV)

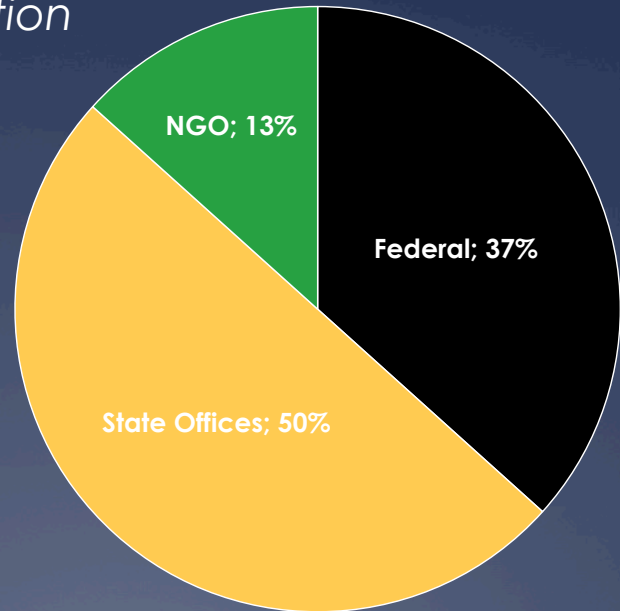
- 32c Floodplains and Low Terraces
- 63b Chesapeake-Pamlico Lowlands and Tidal Marshes
- 63c Swamps and Peatlands
- 63d Virginian Barrier Islands and Coastal Marshes
- 63e Mid-Atlantic Flatwoods
- 63g Carolinian Barrier Islands and Coastal Marshes
- 63h Carolina Flatwoods
- 63n Mid-Atlantic Floodplains and Low Terraces
- 75f Sea Island Flatwoods
- 75j Sea Islands/Coastal Marsh



0 20 40 80 120 160 200 Kilometers

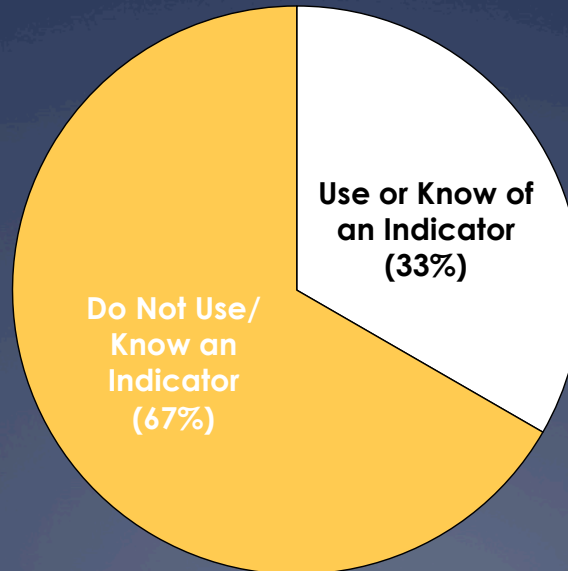
Respondent Demographics

- ***N = 30 participants***
- ***Backgrounds:***
 - *Climate change adaptation*
 - *Fluvial dynamics*
 - *Fire management*
 - *Wetlands*
 - *Plant Ecology*
 - *Silviculture*

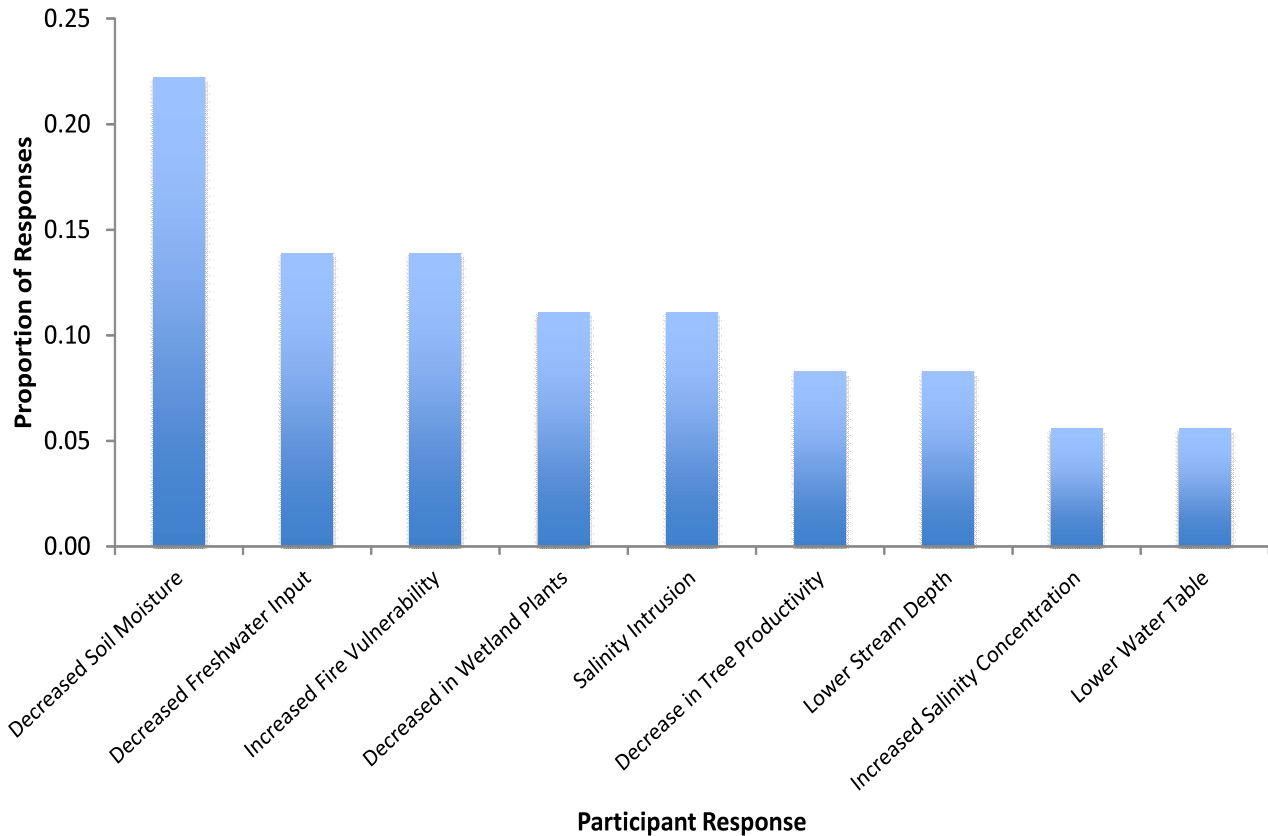


Need & Concern

- 77% - drought is current management concern
- 57% - anticipate a greater future need for ecological drought detection
- 10 of 30 participants knew of an existing indicator
 - *KBDI*



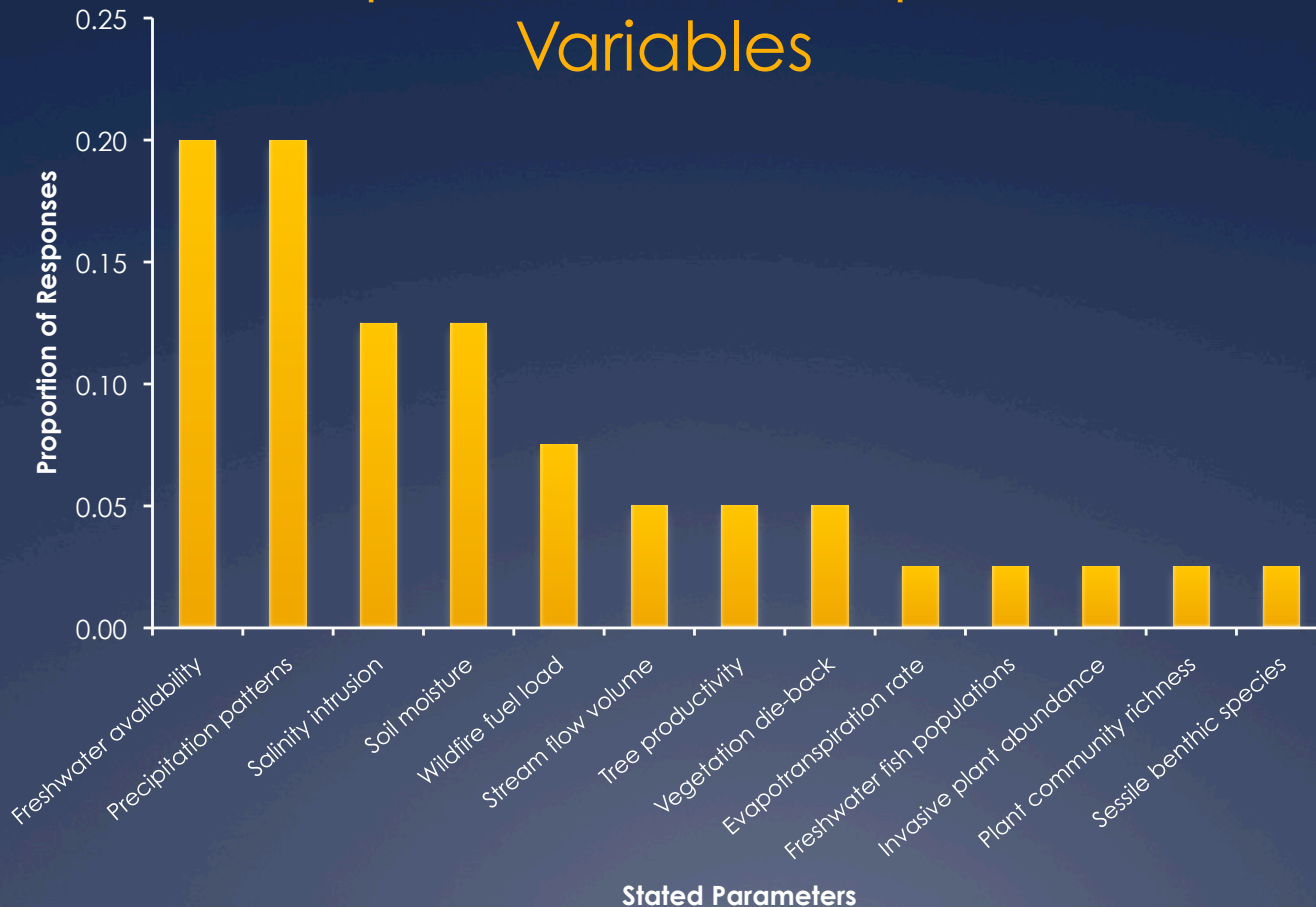
Impact of Drought



Resource Sensitivity

- 83% specified particular vulnerable habitats
 - 76% of which specified wetlands
(salinity intrusion emphasized)
- 7% emphasized riparian or SAV plant communities
- 6% Fisheries and Amphibians
- 4% abiotic resources

Perception of Most Important Variables



Other Variables of Interest

Desired Indicator Variables	No. of Responses
<i>Salinity</i>	9
<i>Organic soil saturation</i>	8
<i>Wetland plants</i>	6
Water table	5
Precip. Patterns	5
Wildfire potential	4

- *Variables related to the stated preference for an emphasis on wetlands and salinity*
- *90% feel an ecological indicator could be applicable among coastal habitats*

Utility & Limitations

- *If an ecological indicator were available today, what would limit your use of it?*
 - 40% manpower
 - 37% funding
 - 23% inability to collect enough data to extrapolate
- There are practical limitations to its use on a broad scale – beyond parameter input.

Take-Home Message

- Drought is a management concern, but few use a formal indicator
- Those that do use an indicator that does not address their stated concerns.
 - *KBDI – specialized toward wildfire potential*
- Managers desire indicators that account for precipitation deficits, but also link to particular habitat impacts
 - Salinity intrusion (terrestrial and aquatic)
 - Wetland plant parameters

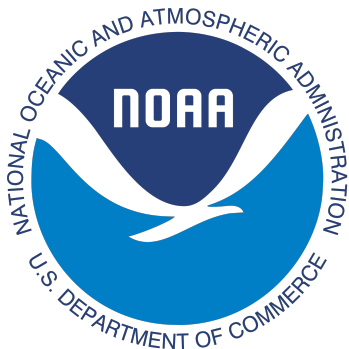
Acknowledgements



Dr. Dan Tufford, PI



Dr. David Chalcraft, Co-P.I.



- 30 Interviewees