

Climate Change and Water Quality

FSA Summer Conference
Pre-Conference Workshop on Resiliency Planning

June 19, 2019

Tony Janicki, PhD
President

The logo for Janicki Environmental, Inc. features a stylized, wavy shape in shades of blue and green, resembling a leaf or a water droplet. The text "Janicki Environmental, Inc." is written in a dark blue, sans-serif font across the center of this shape.

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Letting Science Tell the Story: Practical and Powerful Resiliency Planning

Climate Change and Water Quality

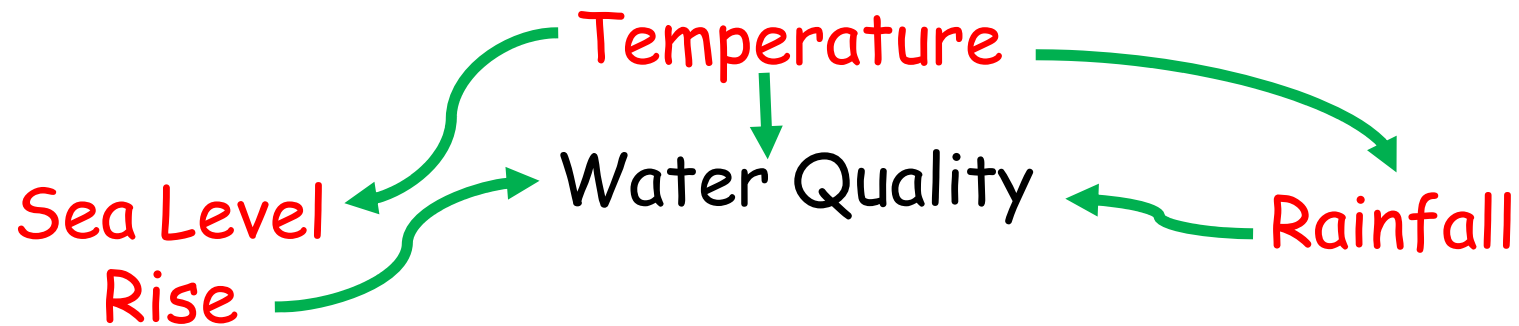
In Memoriam
Karl Havens



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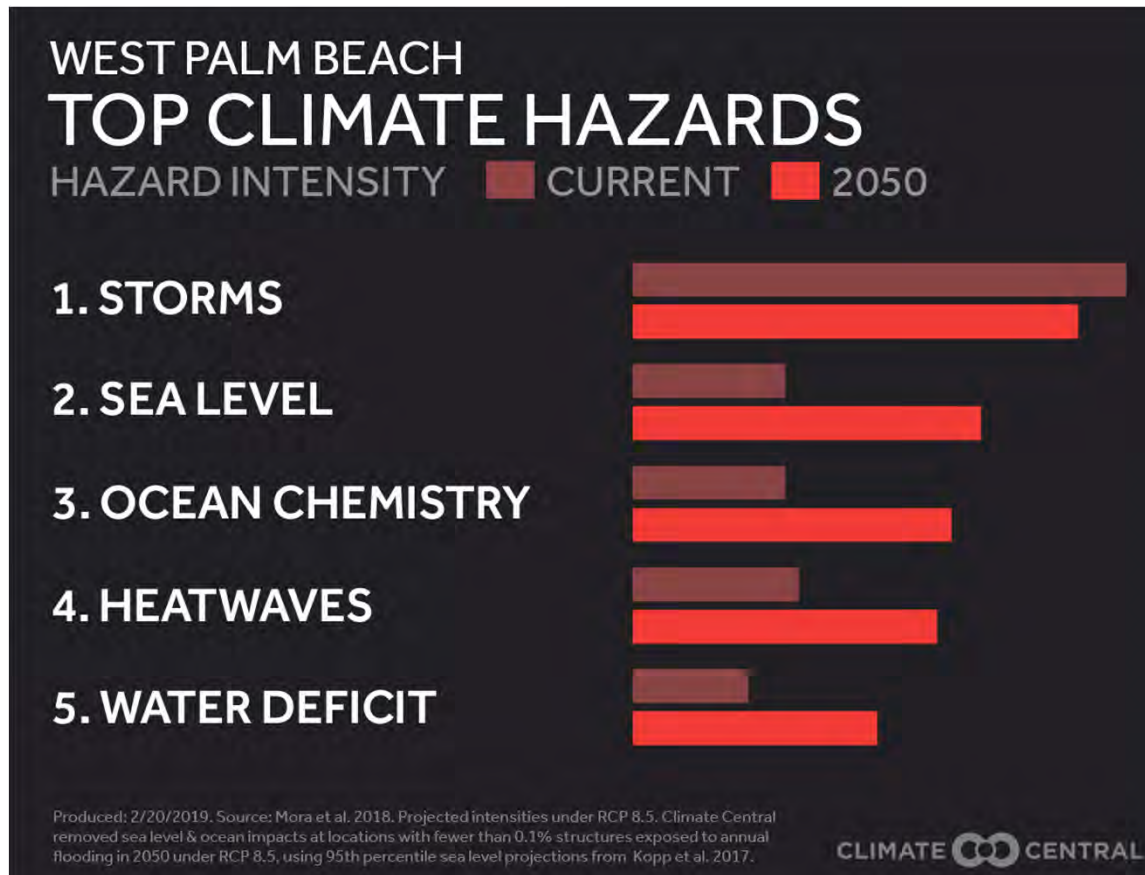
Climate Change and Water Quality



- ✓ Rising temperature
- ✓ Changes in seasonality
- ✓ Increased frequency and magnitude of extreme events
- ✓ Acceleration of the hydrologic cycle

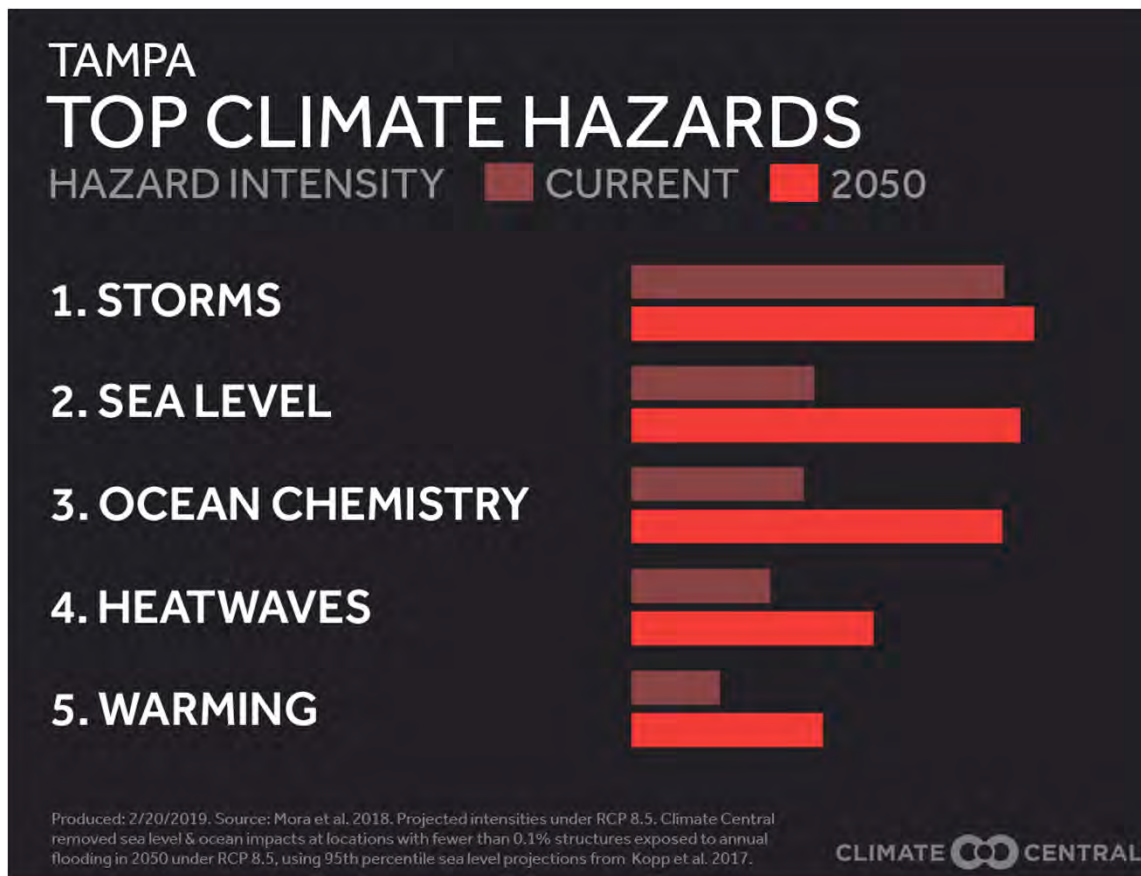
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Location, Location, Location



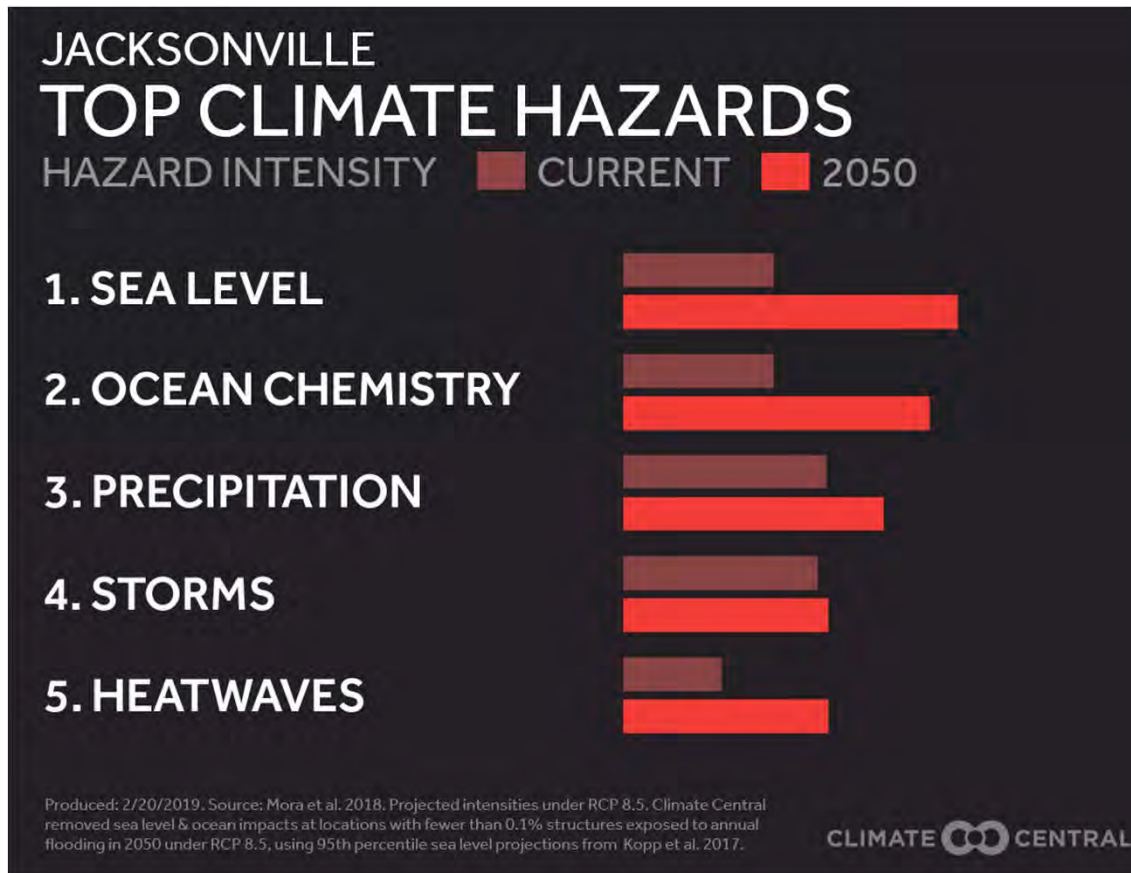
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Location, Location, Location



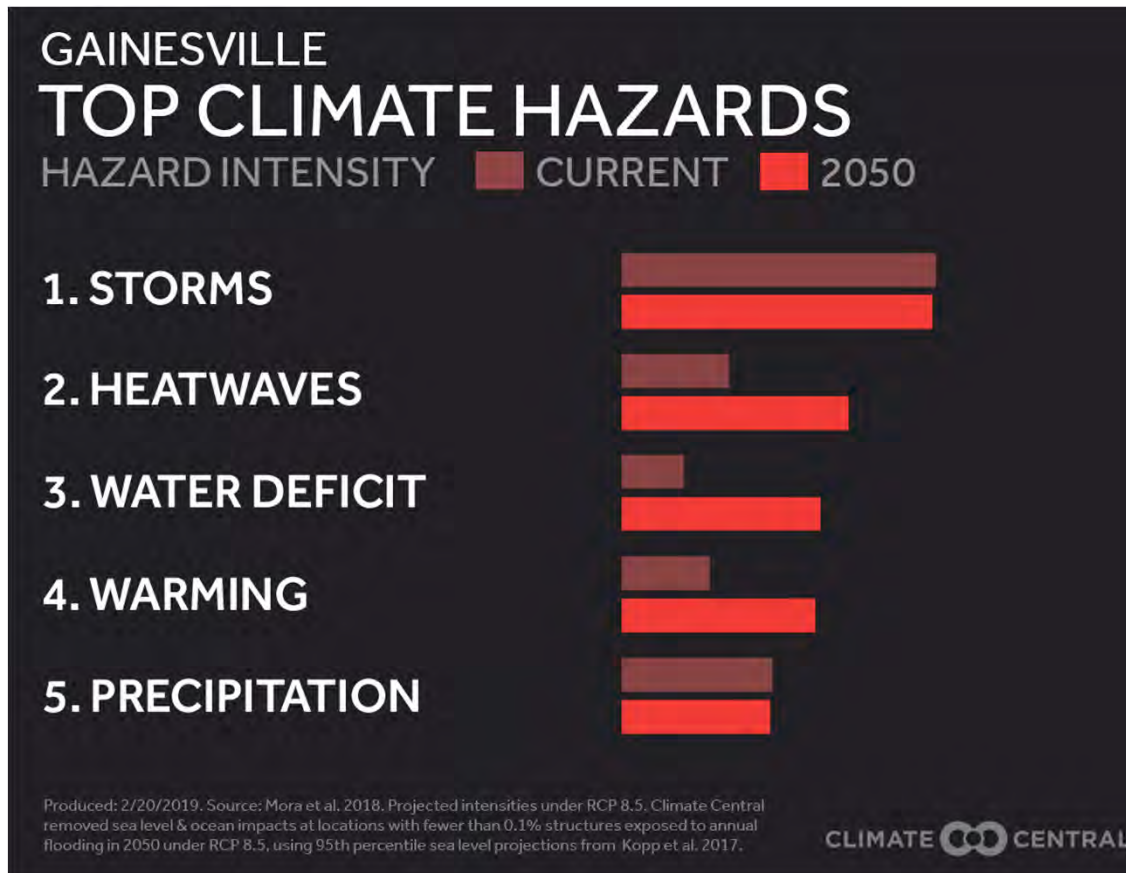
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Location, Location, Location



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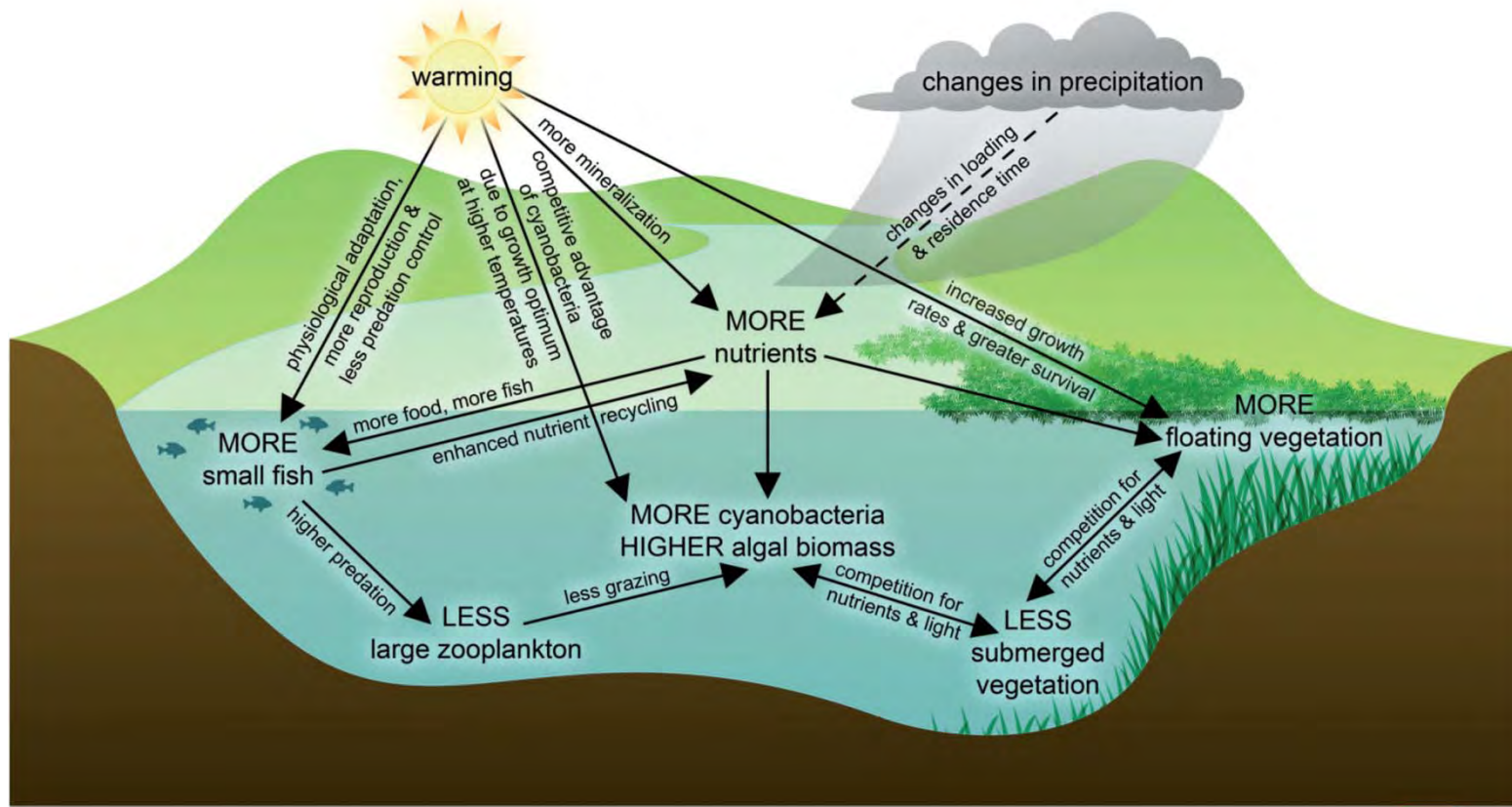
Declining Water Quality-The New Norm?

- Water quality problems appear to be more frequent - locally and globally
- Critical questions about the role of changes in temperature and hydrologic regimes need to be addressed
- These changes affect both inland and coastal water bodies
- The effects go beyond ecological concerns as water supplies are also at risk



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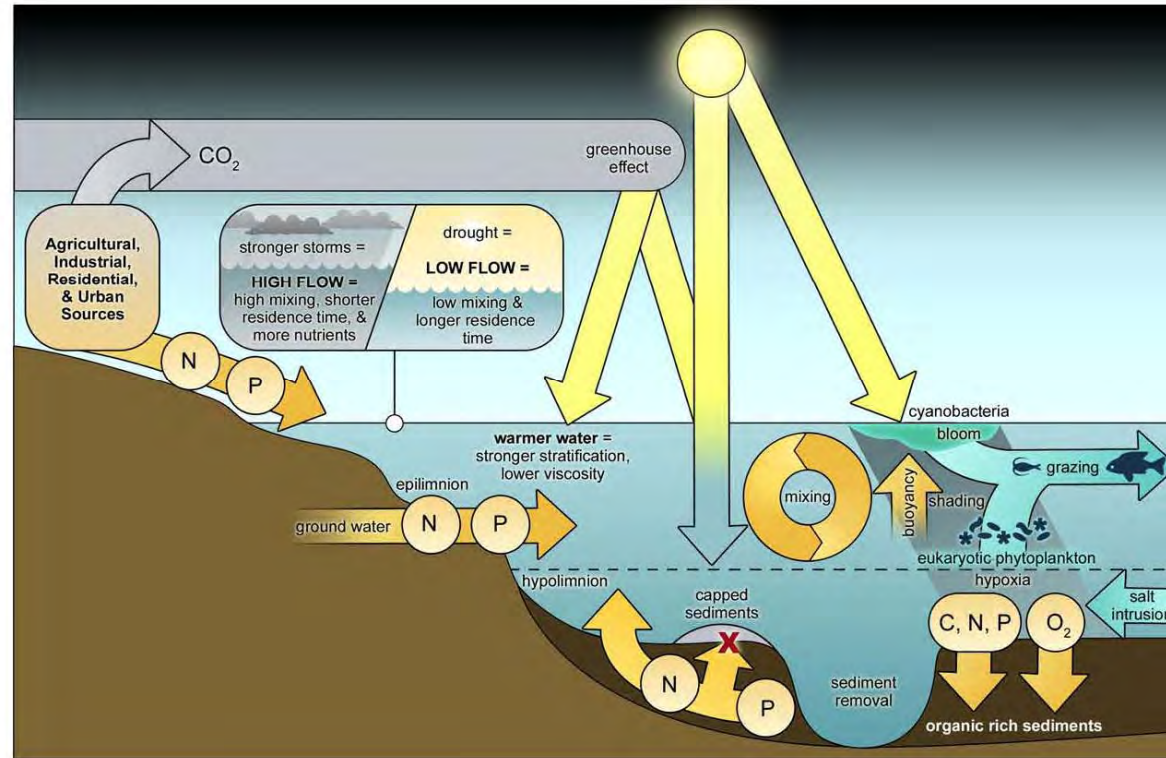
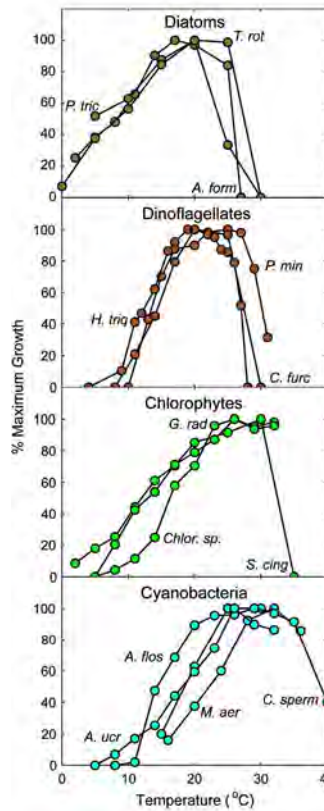
Inland Waters



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Harmful Algal Blooms

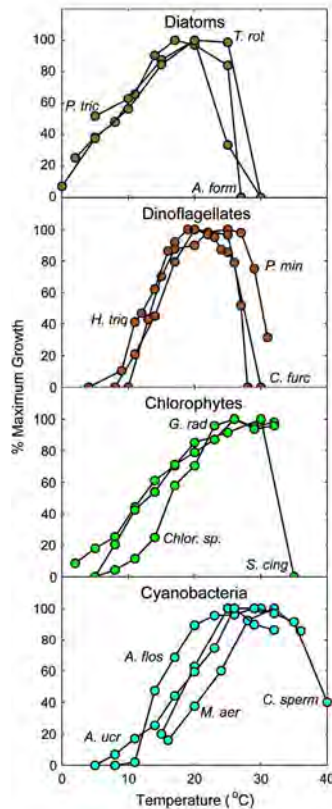


Paerl et al., 2016



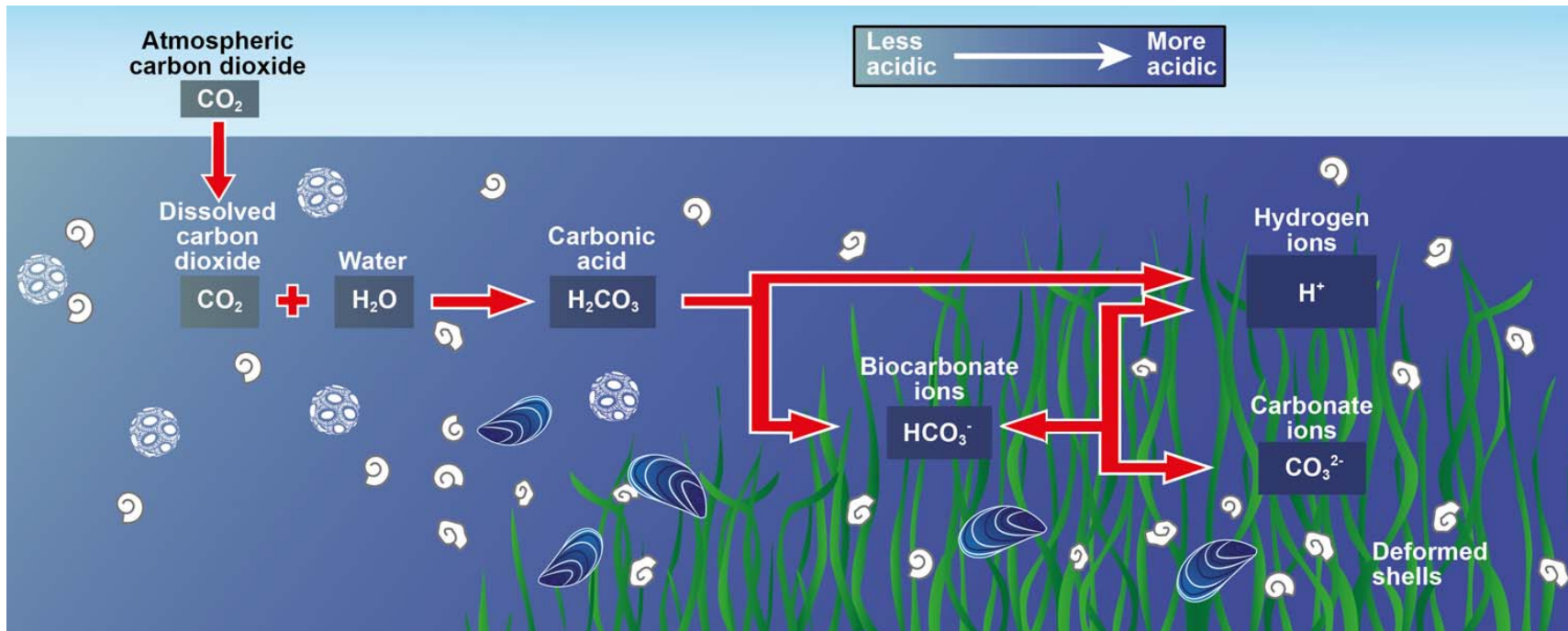
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Harmful Algal Blooms



- Warmer waters - physical and physiological effects
- Increased freshwater runoff - increase nutrient supply & salinity effects
- Increased nutrient loads lead to reduced CO_2 which in turn favors blue-green algae

Coastal Waters – it's not all about SLR

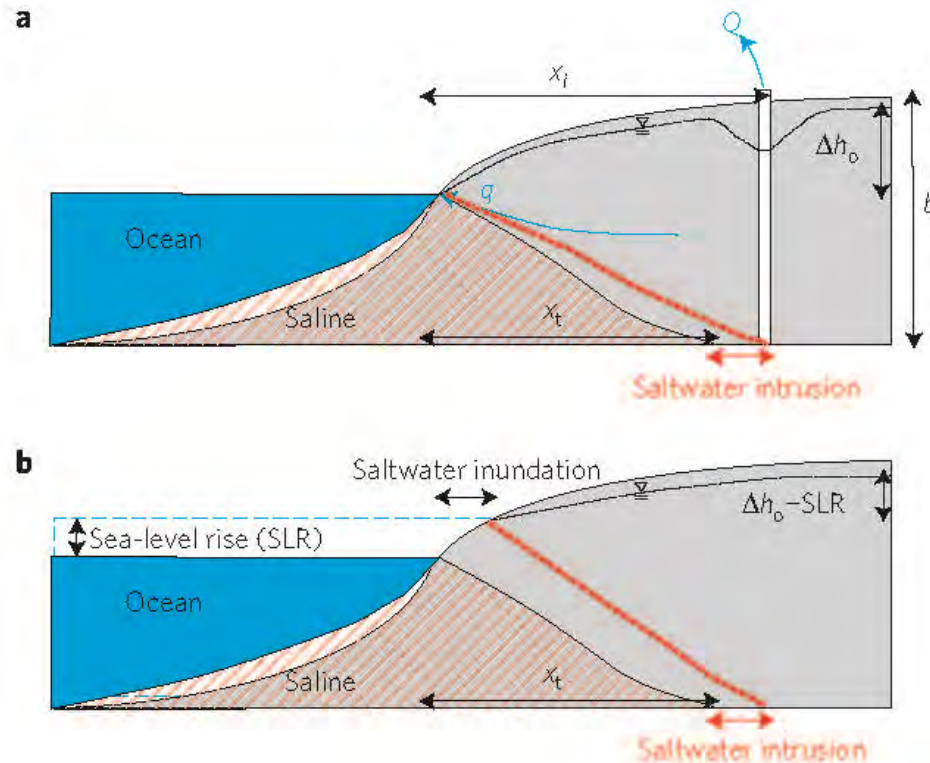


Plymouth Marine Lab



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Groundwater Quality is also at Risk



Two stressors

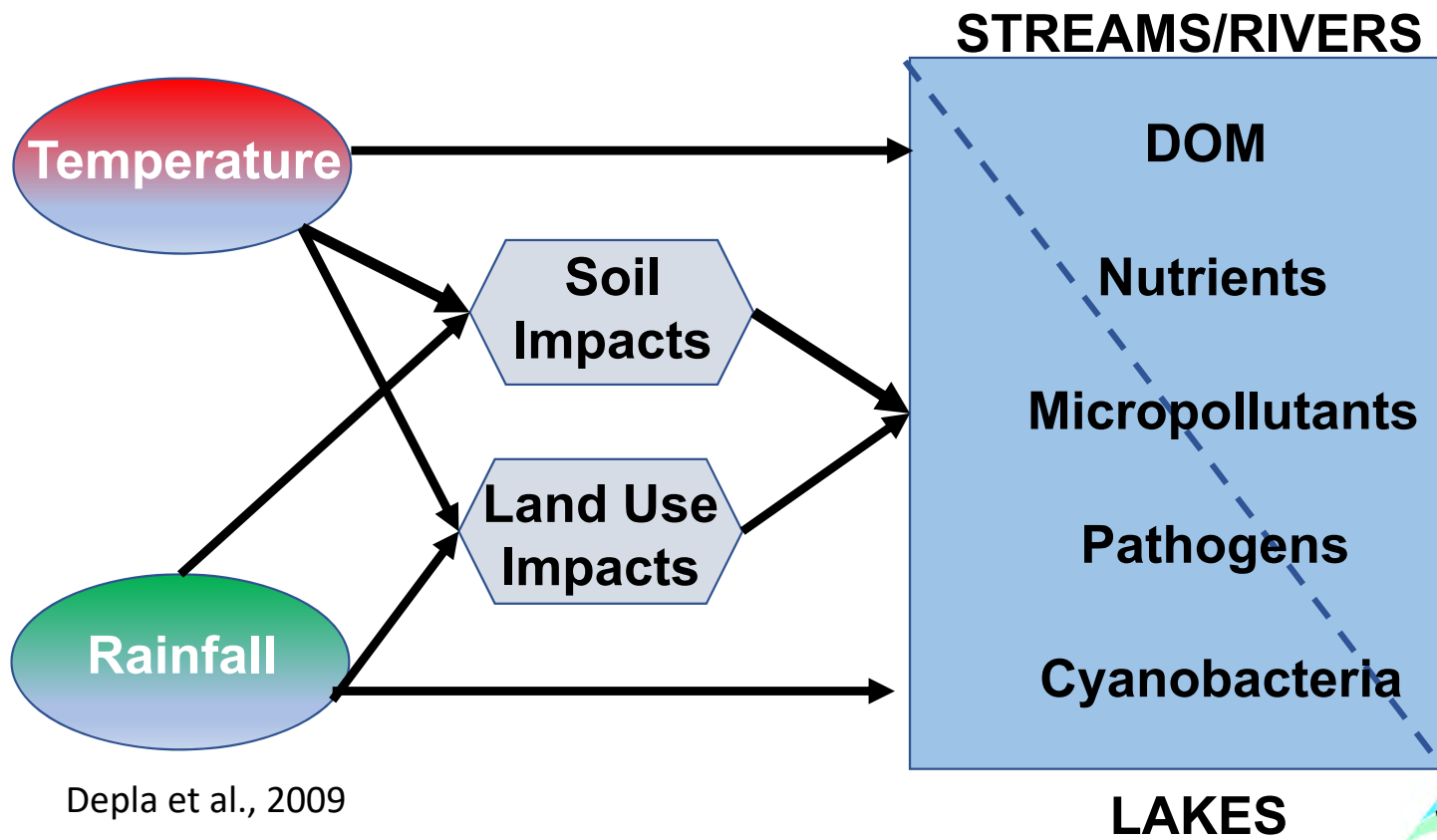
- Saltwater Intrusion
- Saltwater Inundation

Ferguson and Gleeson, 2012



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When Your Water Comes from Surface Waters...



Depla et al., 2009

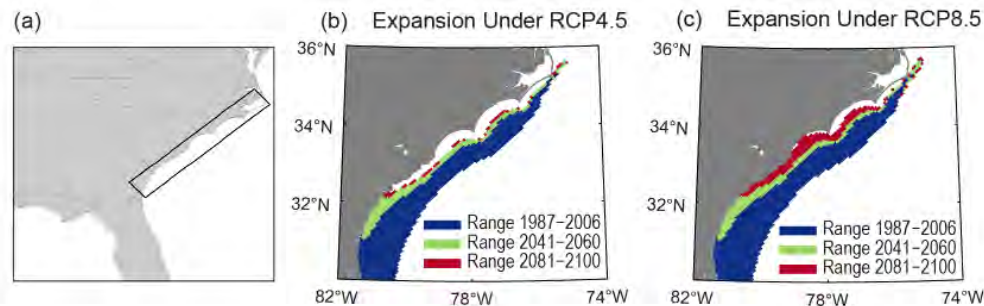


Practical Steps for Florida Stormwater Managers

- **Get your “hydrologic house in order”**
Water quality cannot be added as a threat to these types of assessments unless it is prepared for analysis - this can take YEARS
- **Talk to your water supply counterparts - supply is changing and new tools/data are needed**
- **Get your monitoring equipment in order**
Monitoring equipment should be prepared for severe events and higher variability
- **Emphasize the importance of monitoring - build effective reporting like report cards for decision-makers**
- **Adapt stormwater practices (i.e., BMPs, ordinances) for a wider hydrologic regime**

Some Ecological Effects of Climate Change

- Northward movement of tropical species
- Bleaching of coral reefs, in addition to acidification
- Timing of biological activity
- Growth rates
- Relative abundance of species
- Risk of disturbance from fire, insects, and invasive species



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Climate Change Impacts

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Climate Impacts on Ecosystems



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- [Pathogens, Parasites, and Disease](#)
- [Extinction Risks](#)