

BUILDING CONSENSUS ON FLORIDA'S HARMFUL ALGAL BLOOMS

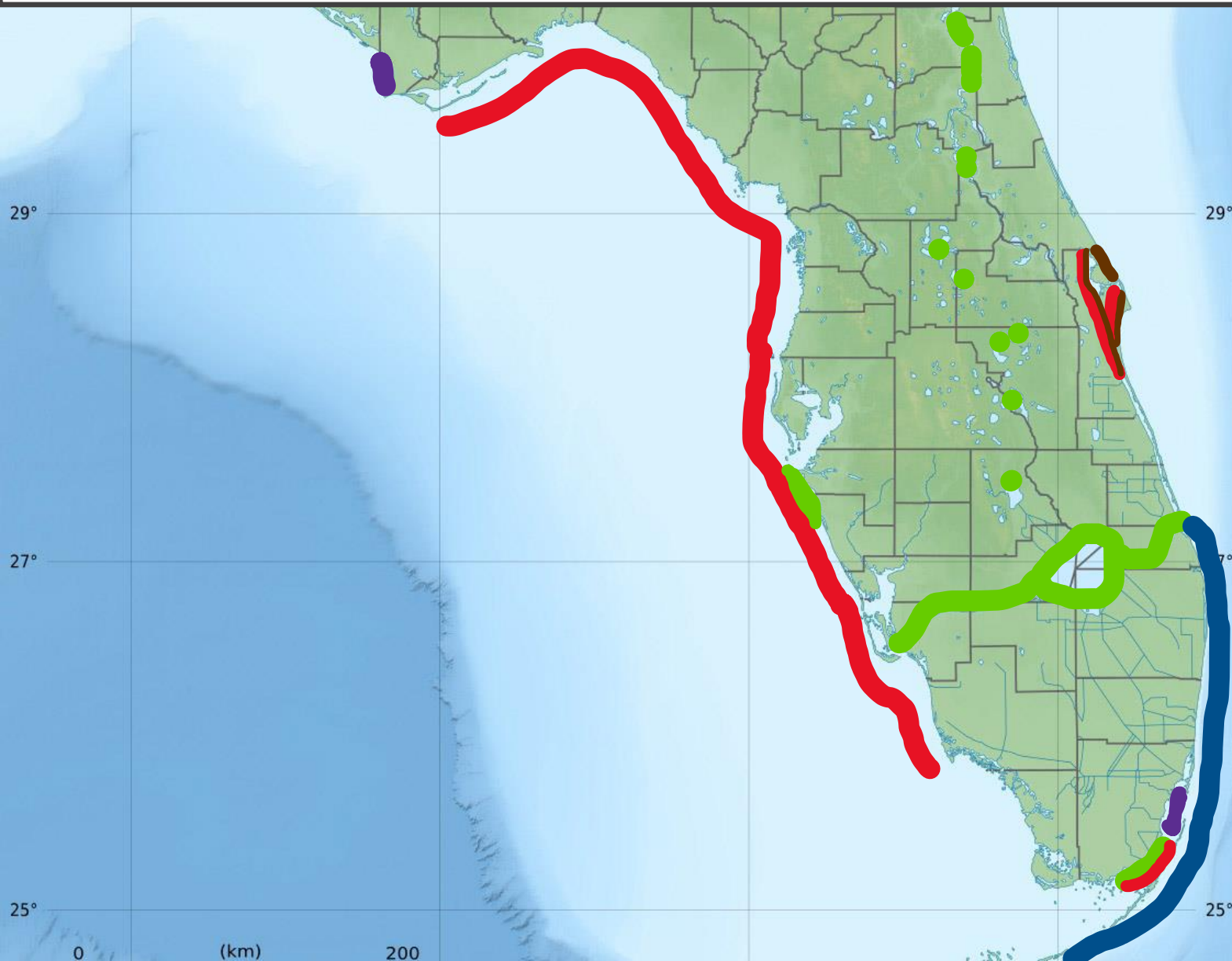
Lisa Krinsky and Betty Staugler

Water Institute Symposium

February 26, 2020



AN OVERVIEW OF HABs IN FLORIDA



Diatoms

Pseudo-Nitzschia
others

Dinoflagellates

Pyrodinium bahamense
Karenia brevis

Cyanobacteria

Microcystis
Lyngbya and *Lyngbya*-like
Synechococcus

Nano & picoplankton

Aureoumbra lagunensis
others

Macroalgae

Sargassum
others

2018 EVENTS

IMPACTS - ENVIRONMENTAL, AESTHETIC, SOCIAL, ECONOMIC, MENTAL HEALTH, PHYSICAL HEALTH...

Microcystis cyanobacteria (Blue-green)



Karenia brevis (Red tide)



EXECUTIVE ORDER 19-12

ACHIEVING MORE NOW FOR FLORIDA'S ENVIRONMENT



Blue-green Algae Task Force

"...expediting progress toward reducing the adverse impacts of blue-green algae blooms now and over the next five years.

...identify priority projects for funding that are based on scientific-data and build upon Basin Management Action Plans to provide the largest and most meaningful nutrient reductions in key waterbodies, as well as make recommendations for regulatory changes."

Harmful Algal Bloom Task Force

"...to provide technical expertise and assistance studying causes and impacts of red tide.

...to help study air quality and human health impacts of red tide."



FLORIDA HARMFUL ALGAL BLOOM STATE OF THE SCIENCE SYMPOSIUM

AUGUST 20 & 21, 2019, USGS ST. PETERSBURG

Objectives

1. Facilitate information exchange and networking opportunities among (Florida's) harmful algal bloom scientists
2. Assess current state of knowledge for Florida's HABs with a focus on *Karenia brevis* and *Microcystis aeruginosa*
3. Identify data gaps and research needs and prioritize high level research priorities for moving the state of the science forward
4. Facilitate better public outreach and communication from the scientific community

WHO

Steering Committee:

L. Flewelling, K. Havens, A. Reich, B. Rosen, R. Stumpf, D. Whiting

Funding Support:

Florida Sea Grant College Program and NOAA National Centers for Coastal Ocean Science

Facilitator:

C. Ellis - NOAA Office for Coastal Management



75 INDIVIDUALS, 27 INSTITUTIONS, 9 STATES



Center for Disease Control, Florida Atlantic University, Florida Department of Environmental Protection, Florida Department of Health, Florida Gulf Coast University, Florida Sea Grant, FWC-FWRI, GCOOS, Indian River Lagoon National Estuary Program, Kenyon College, Mississippi Department of Marine Resources, Mote Marine Laboratory, NOAA, Nova Southeastern University, Ocean Conservancy, Ocean Research & Conservation Association, Ohio EPA, The Ohio State University, Sanibel-Captiva Conservation Foundation, South Florida Water Management District, Southern California Coastal Water Research Project, Tampa Bay Estuary Program, University of Central Florida, University of Florida, University of North Carolina, University of South Florida, Woods Hole Oceanographic Institution

PROCESS

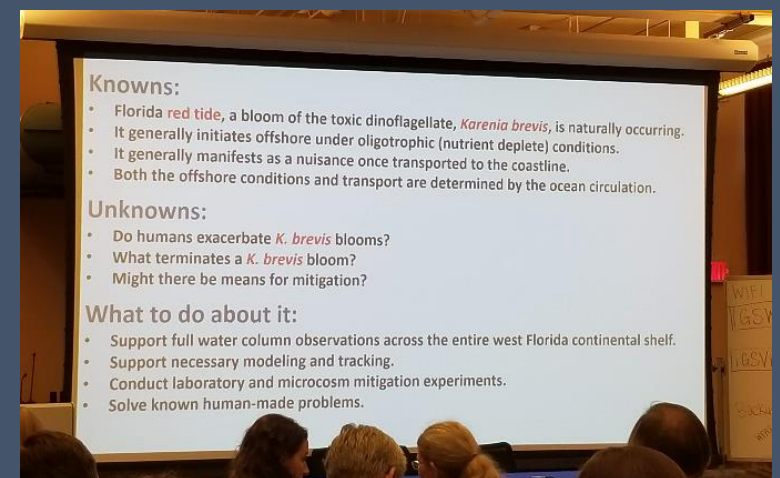
What we know, What we think we know, What we need to know
Introduction to the Harmful Algal Bloom & Blue-Green Algae Task Forces

Sessions for *Karenia brevis* and *Microcystis*

- I. Initiation, Development & Termination
- II. Prediction & Modeling
- III. Detection & Monitoring
- IV. Mitigation & Control
- V. Public Health

Emerging Issues

- Climate Change and HABs
- An Overview of Marine HABs in Florida



PROCESS

15-minute presentations followed by hour long facilitated discussion
What we know, What we think we know, What we need to know

I. Initiation, Development & Termination

C. Heil (Mote) & B. Rosen (USGS/FGCU)

I. Prediction & Modeling

R. Weisberg (USF), R. Stumpf (NOAA), J. Chaffin (OSU)

III. Detection & Monitoring

K. Hubbard (FWRI), B. Kirkpatrick (GCOOS), C. Swanson (FDEP), T. East (SFWMD)

IV. Mitigation & Control

D. Anderson (WHOI), R. Pierce (Mote), D. Laughinghouse (UF)

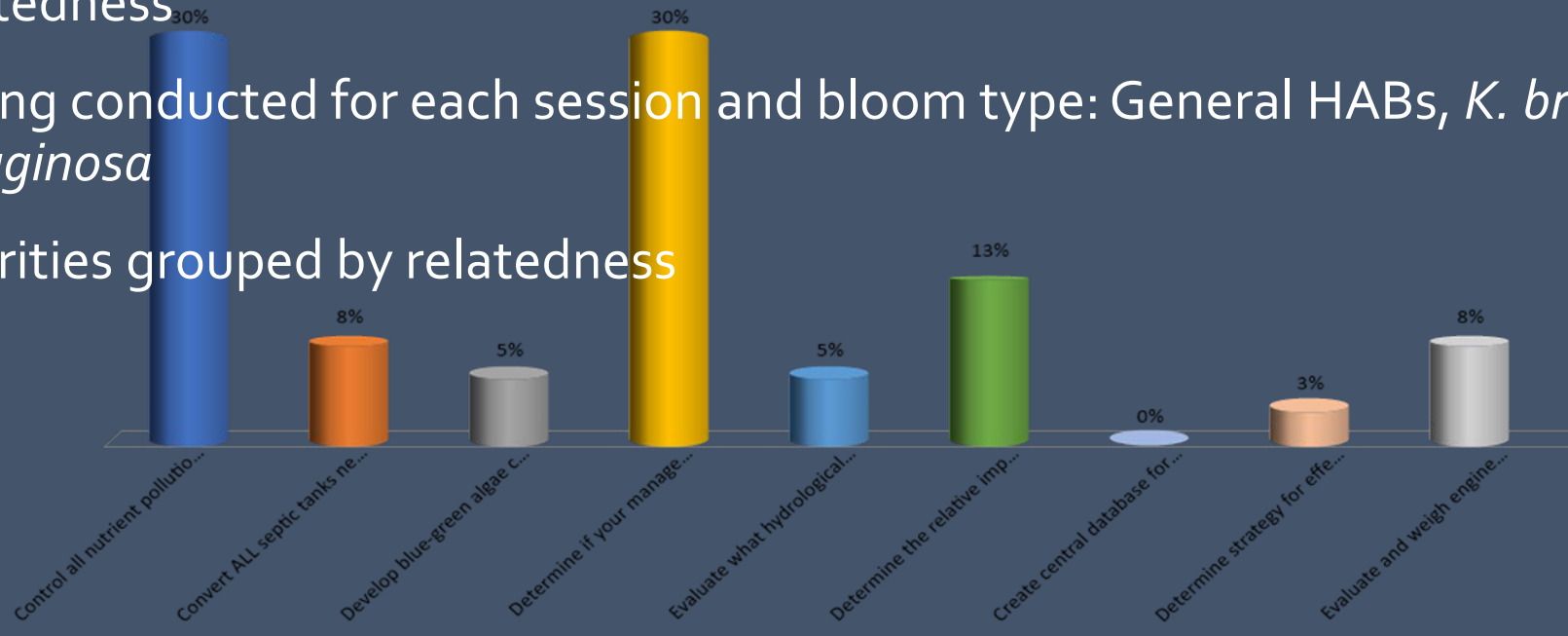
V. Public Health

A. Reich (FDOH), H. Raymond (Ohio EPA) L. Backer (CDC)

RESEARCH PRIORITIES

Defined as high level, broad research needs

- Priorities gathered via 3 separate methods and grouped to eliminate redundancies: Registration, Roaming flip charts, Facilitated discussion
- Voting exercise using Turning Point Technologies & subsequent binning by relatedness
- Voting conducted for each session and bloom type: General HABs, *K. brevis*, *M. aeruginosa*
- Priorities grouped by relatedness



RESEARCH PRIORITIES – *MICROCYSTIS SPP.* EXAMPLE

Research Priorities: Public Health

- | | |
|--|-----|
| 1. Identify all toxins, risk, and levels of toxicity, including microcystin, BMAA, stress <ul style="list-style-type: none">■ Determine longevity of diverse cyanotoxins in biota relevant for human health consumption■ Understand the persistence of microcystins in sediments and the water column, their ability to be remobilized, and how that effects drinking water■ Determine human exposure pathways through the food chain (e.g., beef, seafood, crops, and milk)■ Assess synergistic effects of toxins with other toxic chemicals | 66% |
| <hr/> | |
| 2. Develop more clear diagnostic criteria for health care providers | |
| 3. Evaluate the correlations between hypoxia and nutrient fluxes | |
| 4. Need clinically approved matrix-specific assays for cyanotoxins in biological samples | |
| 5. Establish more effective guidelines for drinking water treatment for all contaminants (i.e., saxitoxin) | |
| 6. Determine the best way to measure toxins in the food web | |

Priorities that received majority votes are displayed by rank percentage with all other research priorities listed below a solid line. Research priorities were grouped by dependency as indicated by bullets.



State of the Science for Harmful Algal Blooms in Florida:

Karenia brevis and *Microcystis* spp.

Produced from:
Florida Harmful Algal Bloom State of the Science Symposium
August 2019

UF IFAS
UNIVERSITY of FLORIDA

CONSENSUS DOCUMENT

- Introduction – Process
- HAB Summary
 - HAB Research Priorities
- *Karenia brevis* consensus statements and research priorities – 5 sessions
- *Microcystis* spp. consensus statements and research priorities – 5 sessions
- Communications summary



State of the Science for Harmful Algal Blooms in Florida:

Karenia brevis and *Microcystis* spp.

Produced from:
Florida Harmful Algal Bloom State of the Science Symposium
August 2019

UF IFAS
UNIVERSITY of FLORIDA

OUTREACH & IMPACTS

- Presentation to the state HAB Task Force (September 2019) – used as the foundation for the TF recommendations
- Draft sent state legislature via Chief Science Officer (October 2019)
- Dissemination of Florida HAB State of the Science Consensus document (January 2020)
- Future summary document for lay audiences (with TESI)
- Document being used by agencies and universities to drive future research projects and funding opportunities
- FSG recognized as a resource for HAB communication in Florida

QUESTIONS?

Lisa Krimsky

Water Resources RSA

UF/IFAS Extension, Florida Sea Grant

lkrimsky@ufl.edu

