MICROALGAE AND ENTEROCOCCI IN THE LAKE OKEECHOBEE, ST. LUCIE, AND LOXAHATCHEE WATERSHEDS

Elizabeth Kelly, Abess Center for Ecosystem Science and Policy, University of Miami
RECREATIONAL WATER QUALITY IS IMPORTANT TO THE STATE OF FLORIDA

- ECONOMY, PUBLIC HEALTH, AND QUALITY OF LIFE DEPEND UPON HEALTHY BEACHES AND WATERSHEDS
- WATER QUALITY HAS BECOME A MAJOR TOPIC OF CONCERN
- SCIENTIFIC UNDERSTANDING SOUGHT BY RESEARCHERS, AGENCIES, AND THE PUBLIC
ADVISORIES AND EXCEEDANCES

• STATE OF EMERGENCY DECLARED IN SEVEN FLORIDA COUNTIES IN SUMMER 2018 DUE TO BLUE-GREEN ALGAE (CYANOBACTERIA)

• BACTERIAL EXCEEDANCES (ENTEROCOCCI) REPORTED AT RECREATIONAL BEACHES IN THESE COUNTIES AND OTHERS THROUGHOUT THE STATE
STUDY OBJECTIVE

UNDERSTAND THE RELATIONSHIP BETWEEN MICROALGAE AND ENTEROCOCCI AT THREE STUDY SITES
MEASURING CHLOROPHYLL AND ENTEROCOCCI

MICROALGAE MEASURED THROUGH CHLOROPHYLL (µG/L)

BACTERIA MEASURED IS ENTEROCOCCI (CFU)
METHODS
THREE SECTIONS OF STUDY

• LONG-TERM STUDY (2000-2018)
• YEAR-LONG STUDY (SEPTEMBER 2017 – AUGUST 2018)
• MICRO COSM STUDY (4 CONDUCTED DURING YEAR-LONG STUDY)
ANALYSIS

• LONG-TERM DATA
  • MULTIPLE REGRESSION (DBHYDRO AND DOH) - PHYSICAL-CHEMICAL AND HYDROLOGICAL DATA
  • LINEAR REGRESSION AND ANOVA DOH METEOROLOGICAL DATA

• YEAR-LONG FIELD STUDY
  • MULTIPLE REGRESSION PHYSICAL-CHEMICAL AND HYDROLOGICAL DATA
  • TIME-SERIES
  • LINEAR REGRESSION NCEI METEOROLOGICAL DATA

• MICRO COSMS
  • TIME-SERIES
YEAR-LONG FIELD STUDY
MICROCOSMS

MICROCOSM EXPERIMENT 3: WATER AND SEDIMENT FROM LAKE OKEECHOBEE, CHLOROPHYLL-A AND ENTEROCOCCI MEASURED EVERY 12 HOURS.

MICROCOSM EXPERIMENT 4: WATER AND SEDIMENT FROM LAKE OKEECHOBEE AND SEDIMENT FROM DUBOIS PARK, CHLOROPHYLL-A AND ENTEROCOCCI MEASURED EVERY 12 HOURS.

SEDIMENT INFLUENCE, WAVE ACTION, CYCLING?
CONCLUSIONS

• DATABASES ARE IMPORTANT

• IN SOME ENVIRONMENTS, MICROALGAE AND ENTEROCOCCI RESPOND TO THE SAME NUTRIENTS

• NUTRIENTS WERE DIFFERENT SPECIES OF NITROGEN OR PHOSPHORUS

• SEDIMENT MAY HAVE AN IMPACT ON WATER QUALITY

• DATA COLLECTION FOR YEAR-LONG STUDY STARTED ONE WEEK AFTER HURRICANE IRMA – ANOMALY?
THANK YOU

- LEONARD AND JAYNE ABESS CENTER FOR ECOSYSTEM SCIENCE AND POLICY – KENNETH BROAD, GINA MARANTO, ANDEE HOLTZMAN
- HELENA SOLO-GABRIELE, ADVISOR, COMMITTEE CHAIR
- COMMITTEE: NARESH KUMAR, MARIBETH GIDLEY, CHRISTOPHER SINIGALLIANO
- SPECIAL THANKS TO: LARRY BRAND, RSMAS
- WILDPINE LABORATORY AT THE LOXAHATCHEE RIVER DISTRICT - ALBREY ARRINGTON, BUD HOWARD, RACHEL HARRIS, SUSAN NOEL
- FLORIDA DEPARTMENT OF HEALTH – DAVID POLK, SAMIR ELMIR
- EVERGLADES FOUNDATION
- SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Atlantic Oceanographic & Meteorological Laboratory
National Oceanic & Atmospheric Administration