THE FIU INSTITUTE OF ENVIRONMENT'S SEA LEVEL SOLUTIONS CENTER AND
THE CITY OF MIAMI PRESENT:

SUSTAINING MIAMI'S WATER

Wednesday, July 29th 2020

MIAMI-DADE COUNTY

FIU Institute of Environment
Florida International University

MESAN
Miami Environmental Science Action Network

FIU Journalism + Media
College of Communication, Architecture + The Arts

Tropical Audubon Society

The Little River Conservancy

Miami Waterkeeper

This project is sponsored by the Miami-Dade County Environmental Education grant program

AGENDA

- 12:00-12:03PM – Welcome: Sea Level Solutions Center, FIU Institute of Environment: Marie Trejos and Tiffany Troxler
- 12:03-12:08PM – Quality of Life Survey (Zoom Poll): Alyssa Hernandez
- 12:08-12:18PM – Sustaining Miami's Water: Marie Trejos
- 12:18-12:28PM – Reducing Pollution - Model Fertilizer Ordinance: Rachel Silverstein
- 12:28-12:33PM – How Did We Do? (Zoom Poll): Marie Trejos
- 12:33-12:38PM – MESAN Monitoring Application Demonstration: Dr. Susan Jacobson
- 12:38-12:58PM – Panel Discussion and Q&A: Joe Barros, Kristen McLean, Melissa Hew, Bertha M. Goldenberg, Rachel Silverstein Moderator: Alyssa Hernandez
- 12:58-01:00PM – Satisfaction Survey (Zoom Poll): Alyssa Hernandez

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SPEAKERS

Marie Trejos
Senior Program Assistant, FIU Sea Level Solutions Center, Institute of Environment

Tiffany Troxler
Director of Science, FIU Sea Level Solutions Center; Institute of Environment;
FIU Research Associate Professor

Alyssa Hernandez,
Assistant Programs Coordinator, FIU Sea Level Solutions Center, Institute of Environment

Dr. Susan Jacobson
Assistant Professor, Department of Journalism and Mass Communication, and Steve Cruz Institute for Science, Media and Technology, College of Communications, Architecture and the Arts, FIU

PANELISTS

Rachel Silverstein
Executive Director & Waterkeeper of Miami WaterKeeper

Joe Barros
President of Tropical Audubon Society

Kristen McLean
Co-Founder of The Little River Conservancy

Melissa Hew
Resilience Programs Manager for City of Miami's Office of Resilience & Sustainability

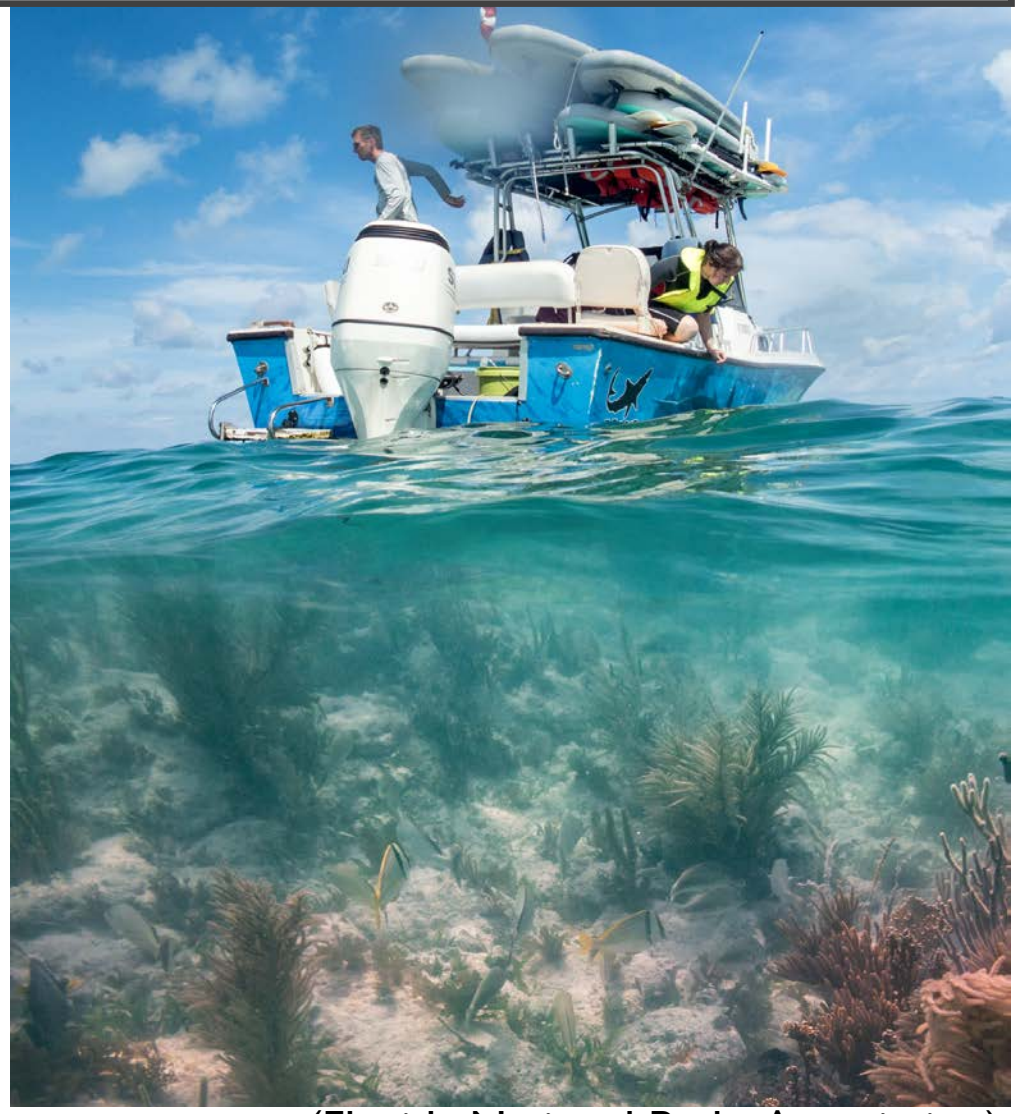
Bertha M. Goldenberg
PE, ENV SP, LEED Green Associate, Former Assistant Director, Planning and Regulatory Compliance Miami-Dade County Water and Sewer Department

QUALITY OF LIFE POLL

This project is sponsored by the Miami-Dade County Environmental Education grant program

WHY IS WATER IMPORTANT TO FLORIDA & MIAMI-DADE CITIZENS?

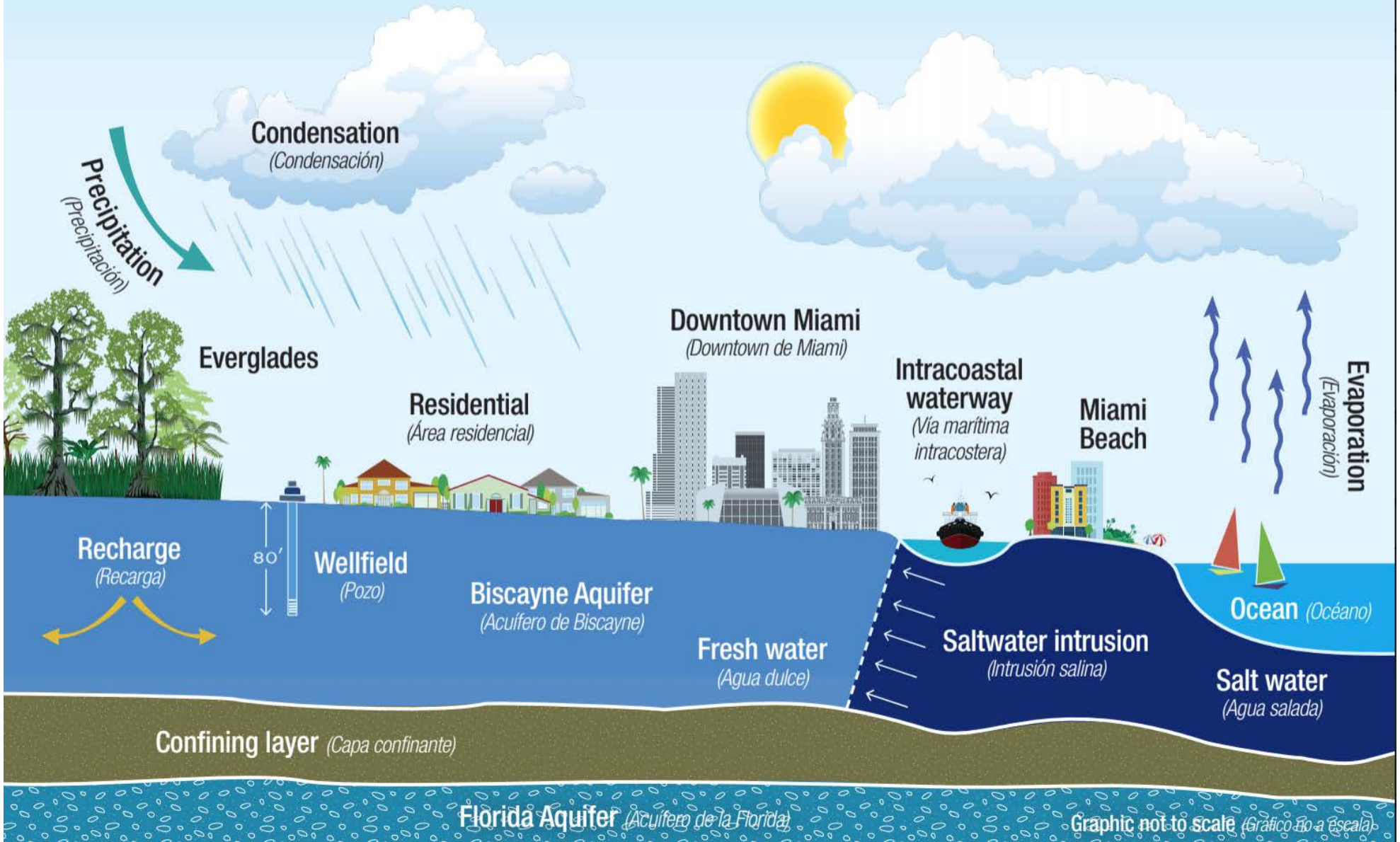
- 90% of Florida's drinking water comes from underground aquifers and supply more than 8 billion gallons of water each day (SFWMD)
- Boating in Florida is a $10.2 billion dollar water intensive industry that includes marinas, boatyards and boaters, according to the Marine Industries Association of Florida (FDEP)
- In Miami-Dade County, nearly all of our drinking water is drawn from the Biscayne Aquifer (SFWMD)
- The restoration of the Everglades helps recharge the Biscayne aquifer and sustain fresh drinking water (SFWMD)



(Florida National Parks Association)

MIAMI-DADE COUNTY WATER RESOURCES

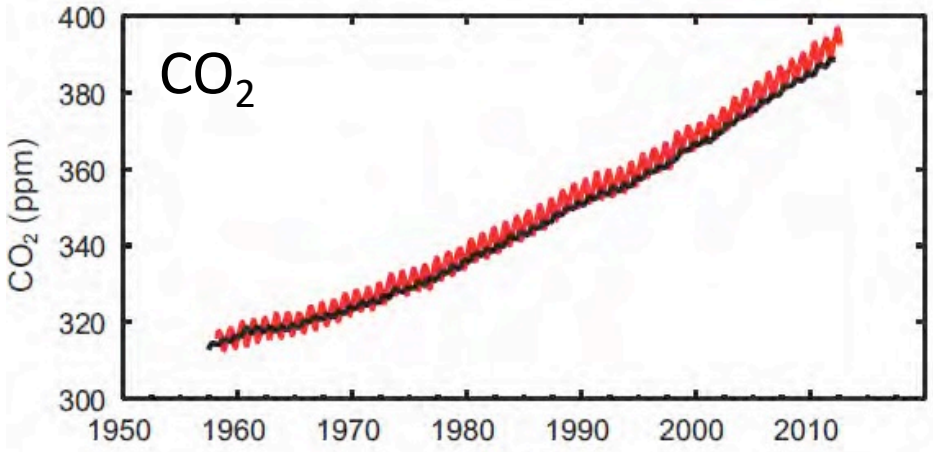
(RECURSOS HÍDRICOS DEL CONDADO DE MIAMI-DADE)

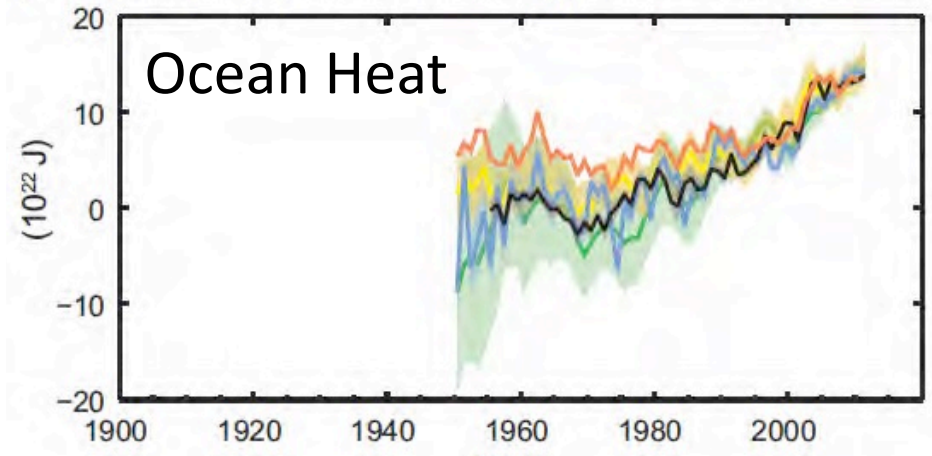


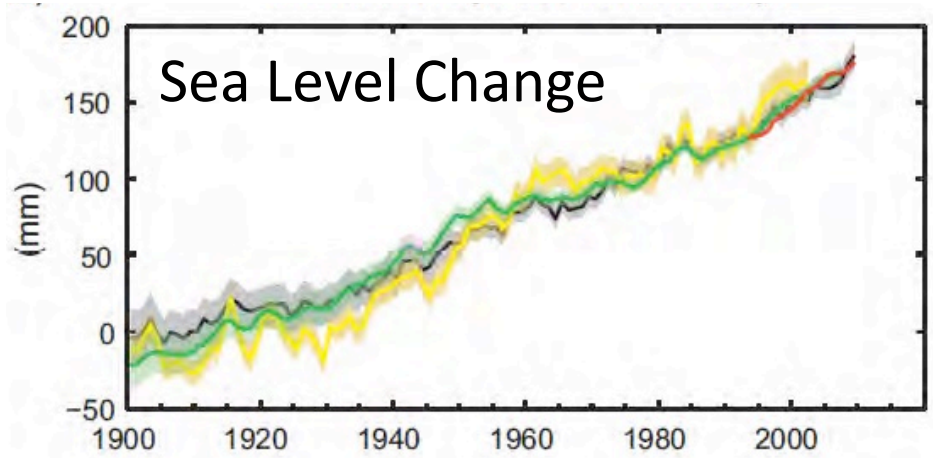
CLIMATE CHANGE

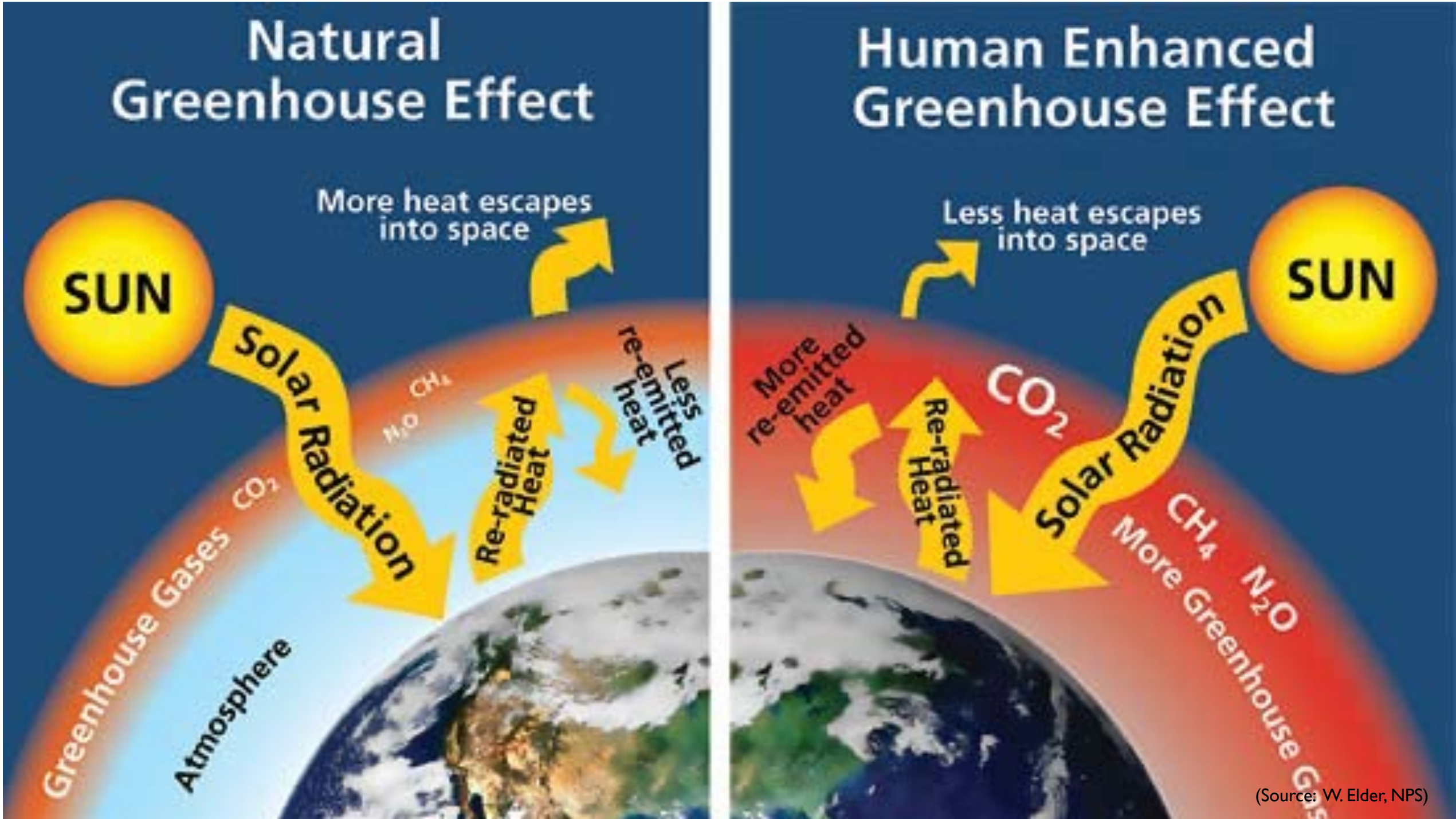
- Greenhouse gases are high and rising
- Oceans are warming
- Sea levels are rising

(Source: Climate Reality)









(Source: W. Elder, NPS)

SEA LEVEL RISE PROJECTIONS

How sea-level rise could affect South Florida in 2100

If the global temperature rises 2° C

If the global temperature rises 4° C

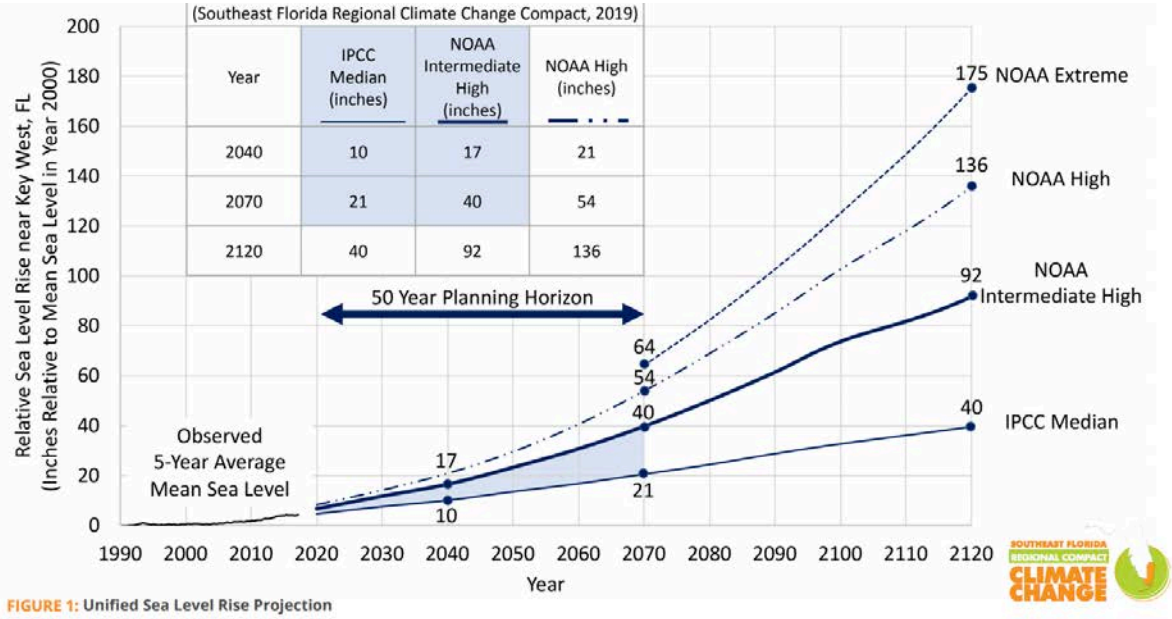
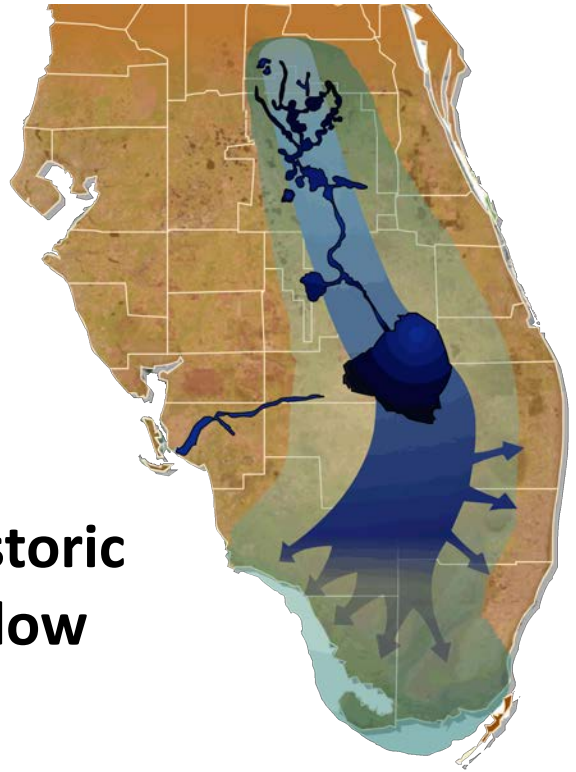


FIGURE 1: Unified Sea Level Rise Projection

rce: Climate Central

FLORIDA WATER FLOW

Historic Flow

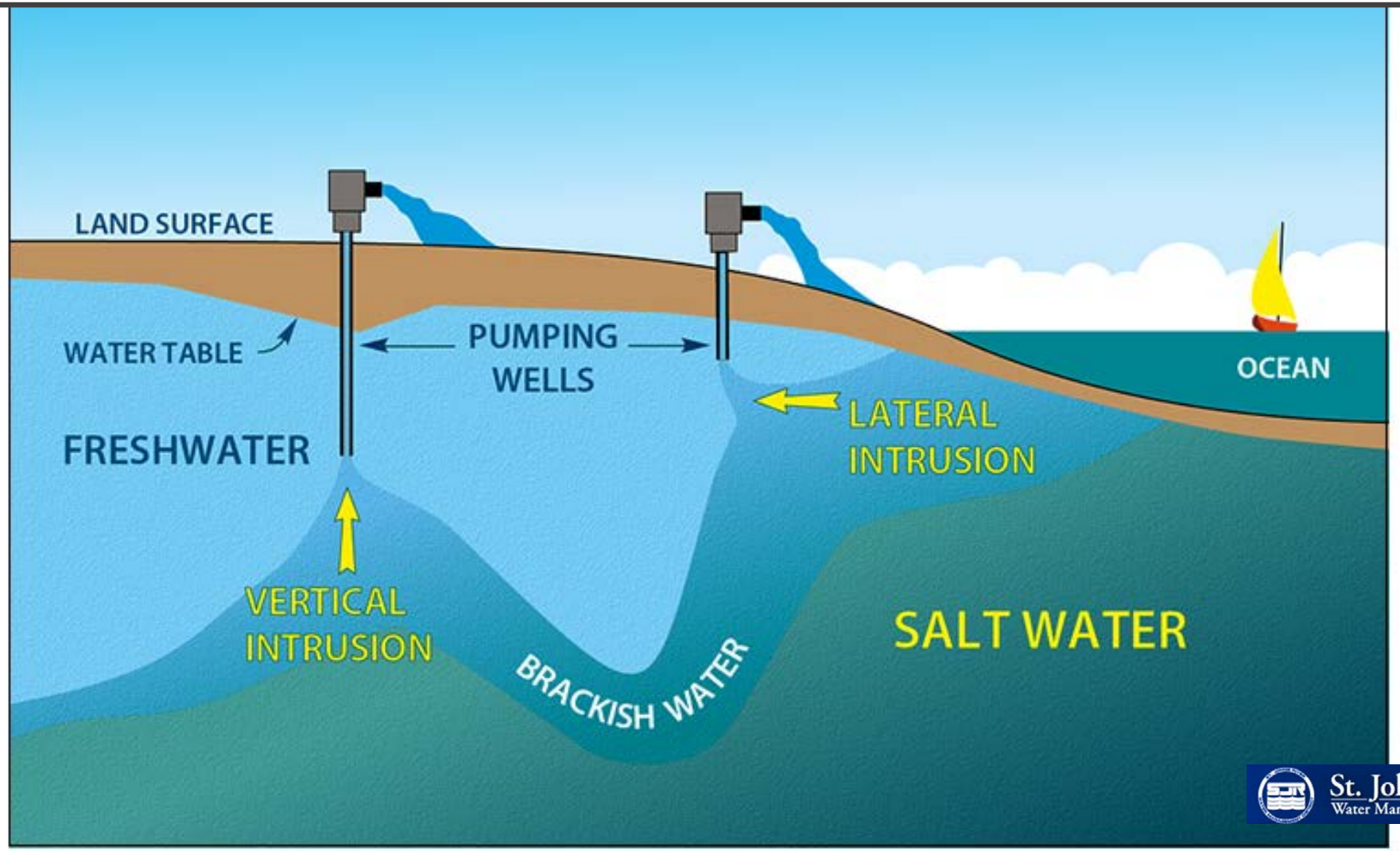


Current Flow

Changes in regional hydrologic system

- Natural freshwater flows replaced by pulsed, point source discharges from canals
- Currently, the Everglades does not get enough clean freshwater

SLR + POPULATION GROWTH = A THREATNED URBAN WATER SUPPLY



St. Johns River Water Management District

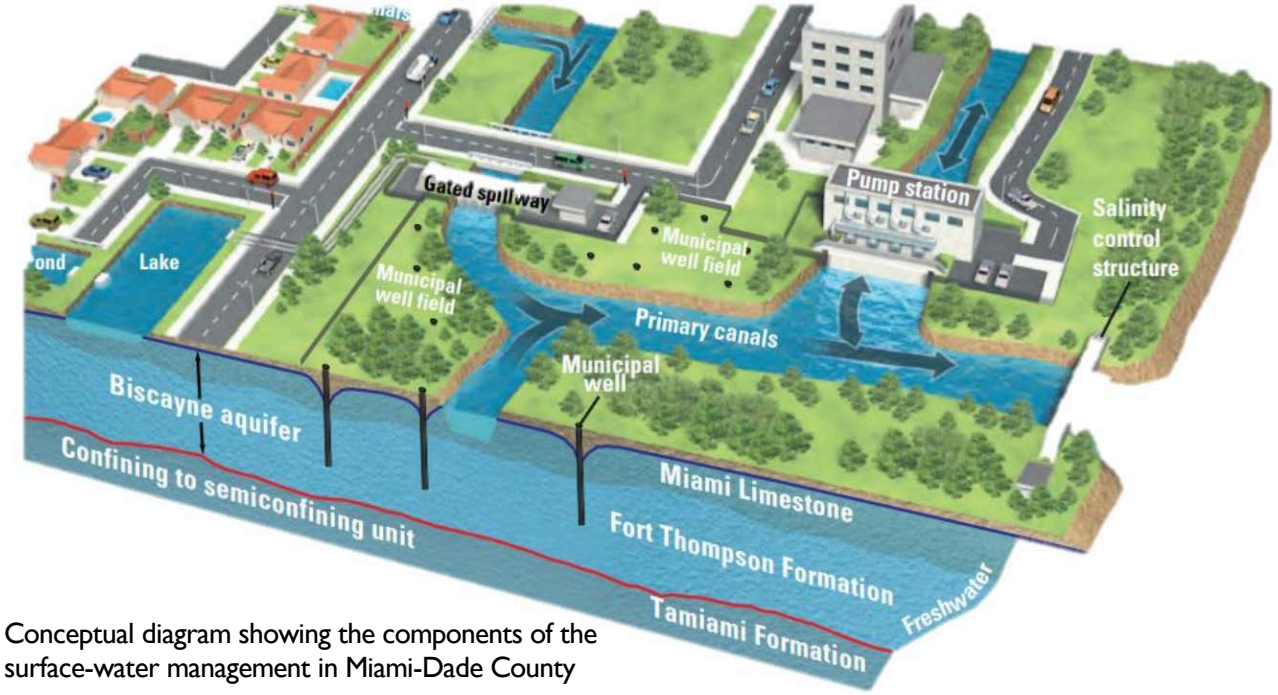
NUTRIENT POLLUTION

- "Nutrient pollution is the process where too many nutrients, mainly nitrogen and phosphorus, are added to bodies of water and can act like fertilizer, causing excessive growth of algae" (NOAA)
- Increasing temperature resulting from increased greenhouse gases causes our ocean to warm
- **Warmer waters can exacerbate the impact of nutrient runoff accelerating the growth of algae**

Source: Southeast Environmental Research Center & Dep. Of Biology, FIU

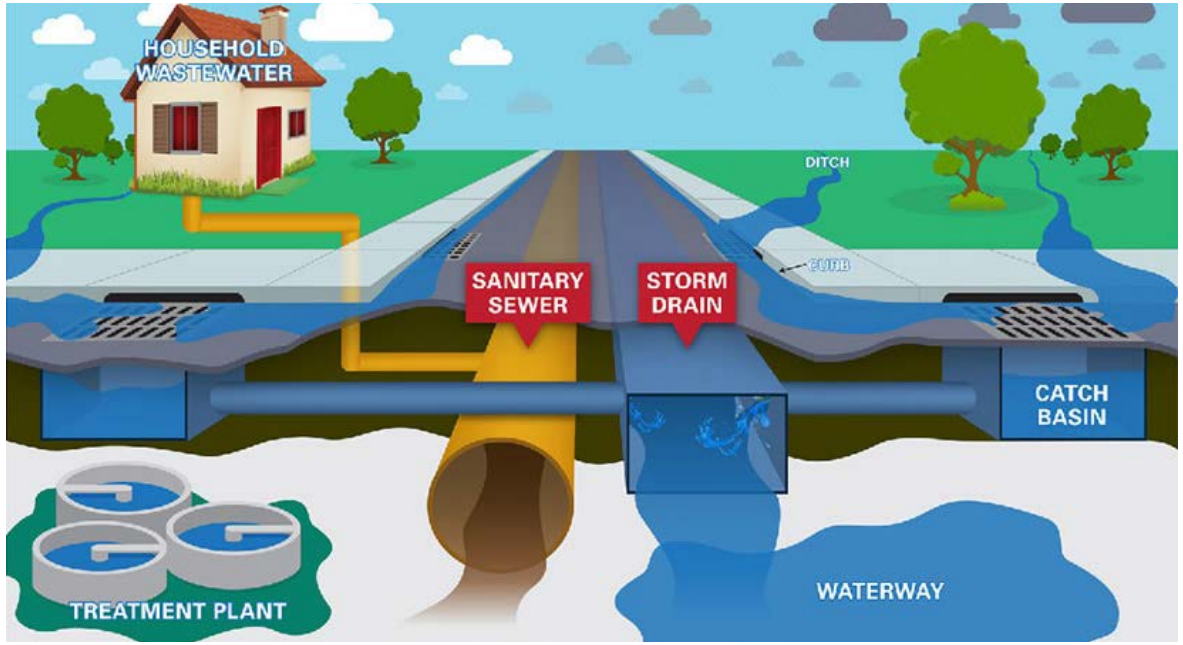
HOW LITTER AND NUTRIENT POLLUTION CAN FLOW INTO MIAMI'S WATER

- Miami's urban water is managed in sanitary sewer, septic, and storm water systems, in addition to our regional flood management system (MDWSD).
- Water runoff from streets and lawns can pick up litter, chemicals, fertilizers, oil, grease and other pollutants and enter our storm drains.
- Storm water runoff is often not treated draining directly in our water ways polluting our oceans, canals, and bay disrupting natural aquatic ecosystems.
- Excess nutrients in runoff can deplete oxygen levels in water ways affecting the growth and reproduction of seagrasses, fish and other aquatic life, sometimes ending in death (EPA)



Conceptual diagram showing the components of the surface-water management in Miami-Dade County

Source: Image modified from South Florida Water Management District, 2010



Litter that clogs storm drains can exacerbate flooding in neighborhoods

(Souce: volunteercleanup.org)

LIVING ON THE EDGE

- Due to high population growth, development, and agricultural needs, sea level rise and saltwater intrusion, , freshwater resources around the State are being impacted.
- Solid waste, nutrients, and other contaminants such as: metals, oils, pesticides, and fertilizers from land practices are entering our water bodies causing water quality issues, economical, public health, and other environmental impacts.
- Climate change is exacerbating these impacts

Source: Florida LambdaRail

ECONOMIC & PUBLIC EFFECTS

- Nutrient pollution can cause harmful algal blooms
  - •Thick green muck has been observed causes severe impacts to water clarity, aquatic life, recreation, businesses and property values.

- Economic Effects
  - Tourism loses
  - Commercial fishing and shellfish losses
  - Real estate losses

- Red Tide Health Effects
  - Ingestion of contaminated shellfish → neurotoxic shellfish poisoning (NSP) and gastrointestinal illnesses
  - Inhalation of aerosolized toxins → respiratory irritation
  - Exposure to brevetoxins → *Potentially* neurological illnesses

(Kirkpatrick, et al., 2003 ; Diaz et al., 2018)

Photo credit: Bill Yates

Too much nitrogen and phosphorus in the water can have diverse and far-reaching impacts on public health, the environment and the economy.

How Your Municipality can Reduce Pollution:

Model Fertilizer Ordinance

MIAMI WATERKEEPER®

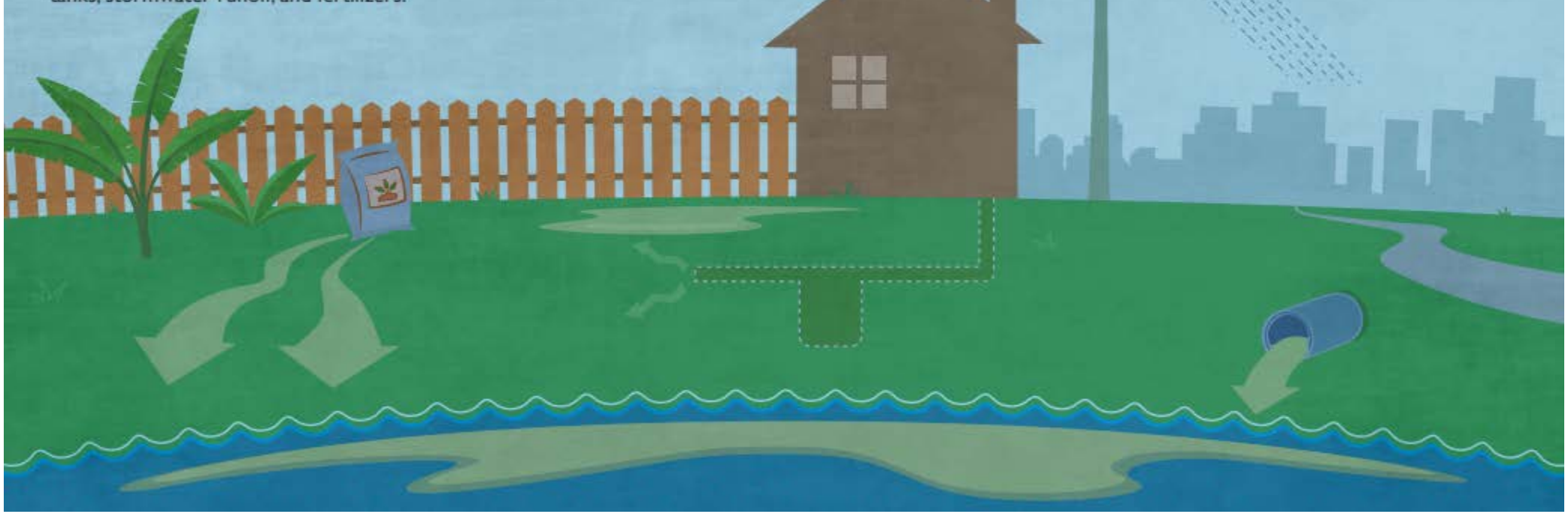
What is Nutrient Pollution?

MIAMI WATERKEEPER

Nutrients, like **nitrogen** and **phosphorus**, are naturally occurring – but can be too much of a good thing when found in high concentrations in our waterways.

These nutrients are very high in sewage, septic tanks, stormwater runoff, and fertilizers.

Nutrient pollution can contribute to algae blooms. **Algae blooms** turn the water **green** and smell terrible, smothering seagrass and killing fish -- they can even be harmful to humans.

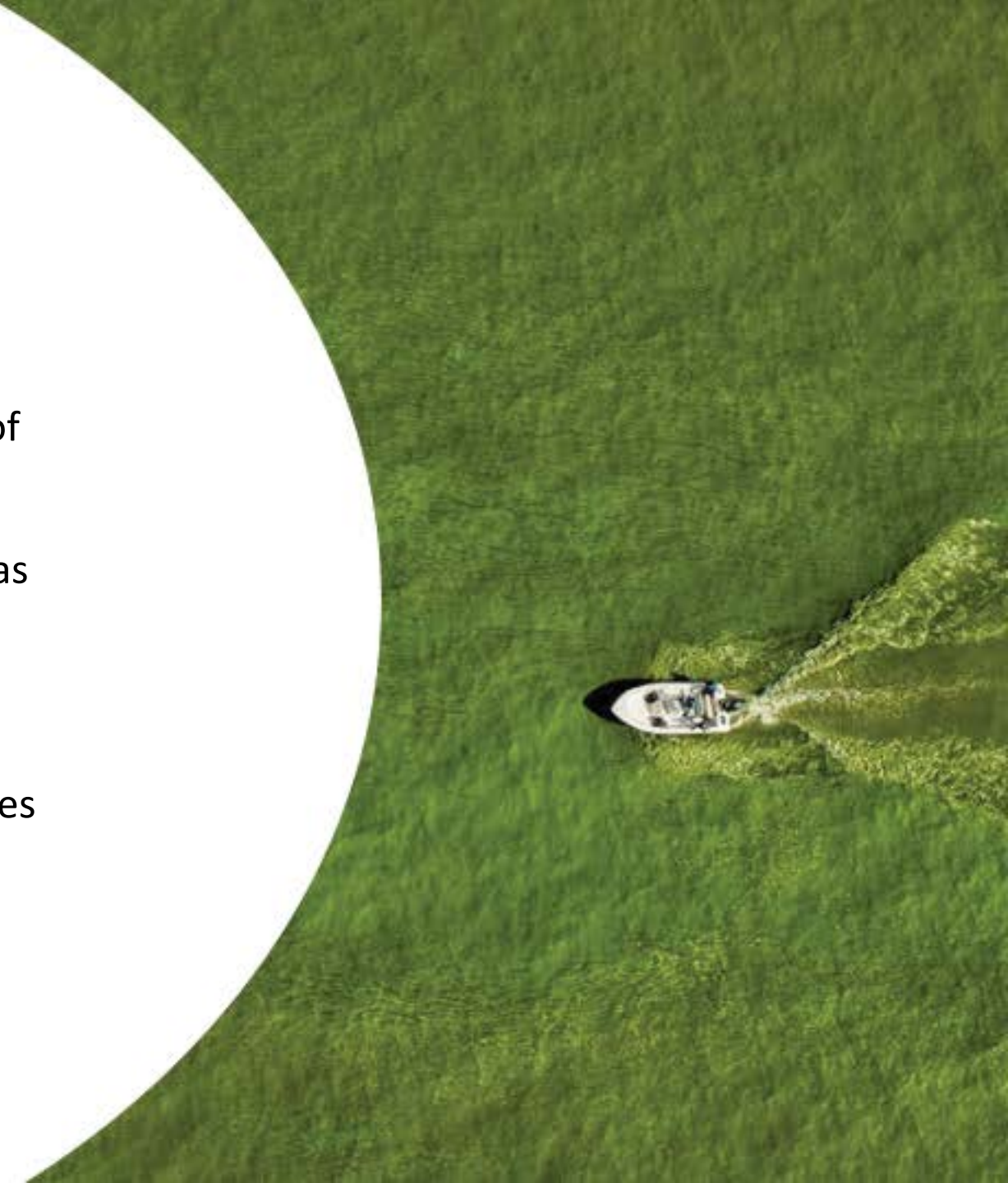


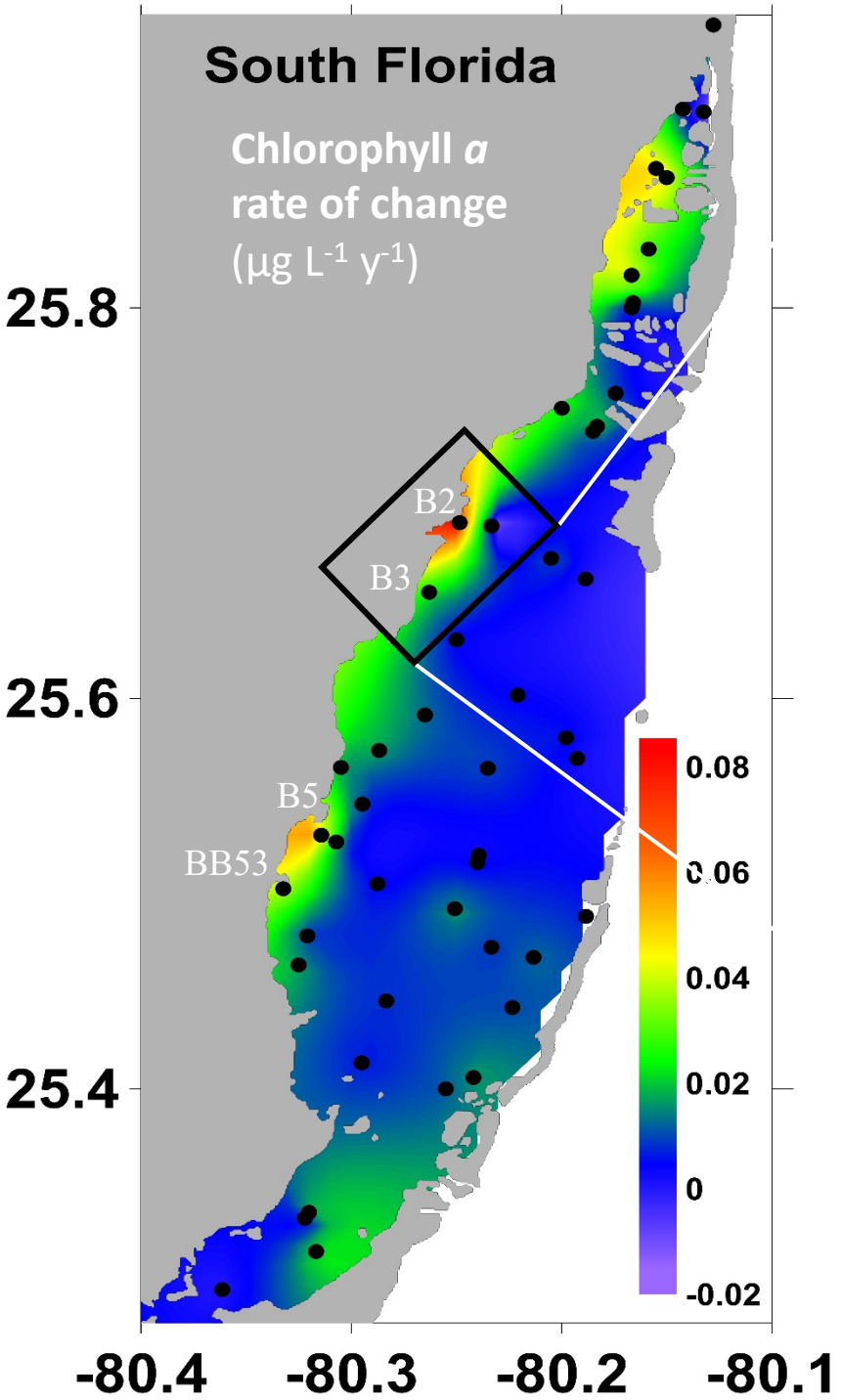
Why is Fertilizer Problematic?

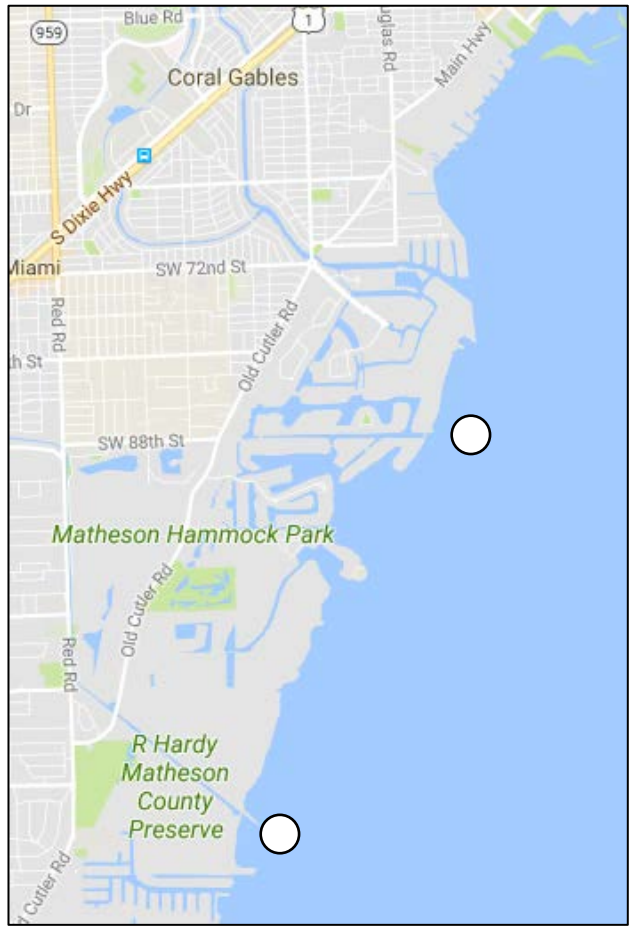
- Fertilizers are full of “nutrients” like nitrogen and phosphorous.
- They are a very good thing for plants, but too much of a good thing can be harmful
- Nutrients might also come from sewage leaks, pet waste, and septic tanks
- South Florida’s waterways are extremely sensitive to nutrient pollution
- When excess nutrients build up in water ways, it can lead to algae blooms
- Algae blooms clog the waterways, leading to fish kills, foul smells, green water, and are a public and wildlife health hazard

Why Is This A Problem In The Biscayne Bay Watershed?

- In 2015, NOAA chose Biscayne Bay as one of 10 locations around the country to focus federal funding on an economically and environmentally important location that was at a ”Tipping Point”
- Biscayne Bay now can’t absorb any more nutrients without algae blooms forming
- We urgently must reduce land-based sources of nutrients which get into waterways





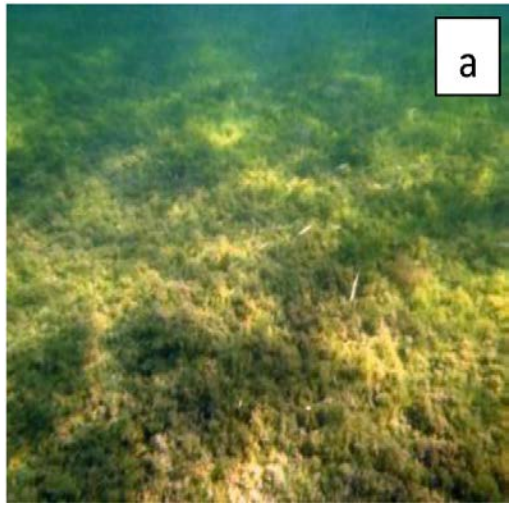


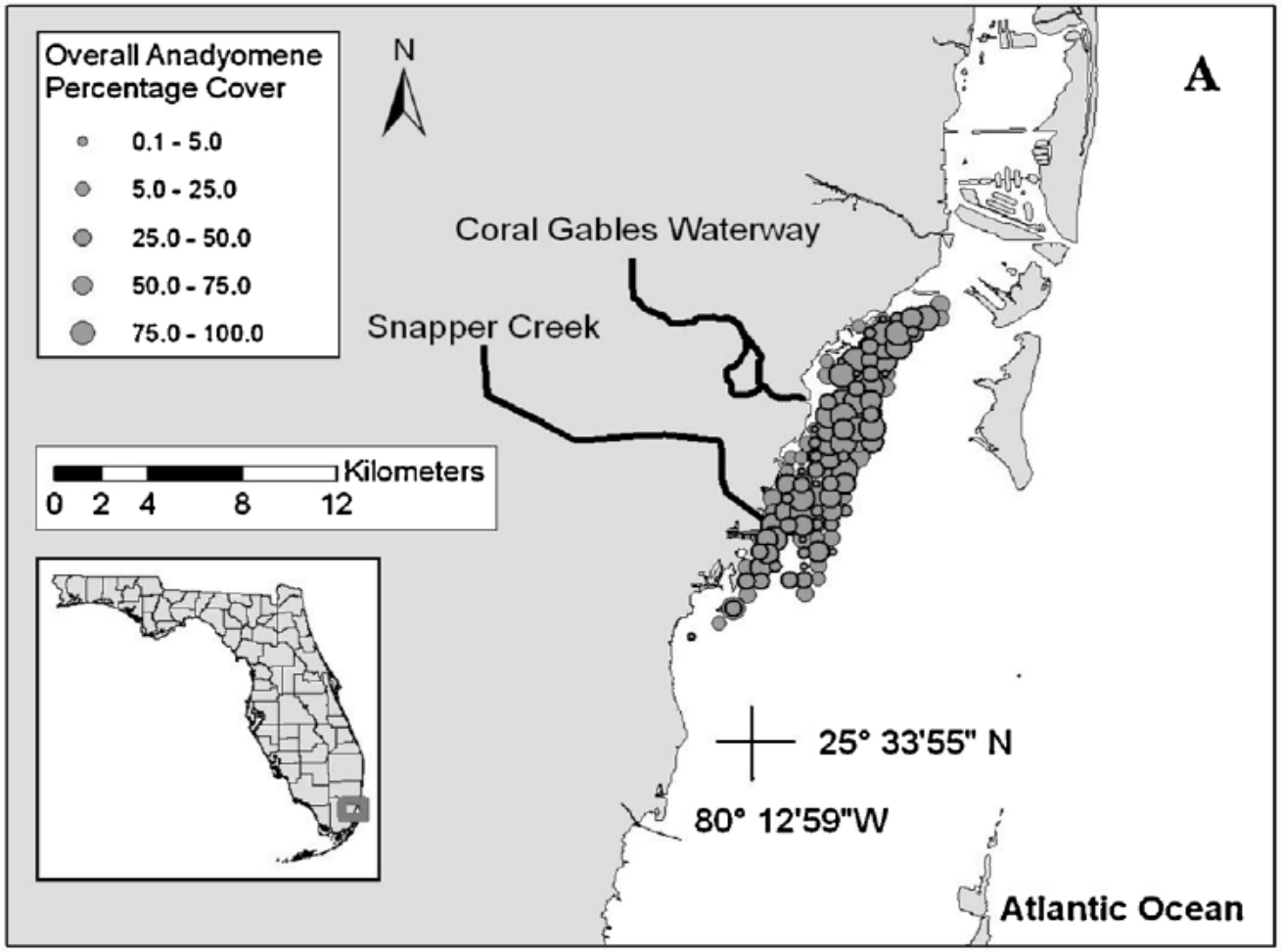
- Chlorophyll *a* – proxy for algae
- Coral Gables Waterway and Snapper Creek Canal
  - Stormwater runoff
  - Septic tanks

Slide from Nicole Millette, NOAA, in review

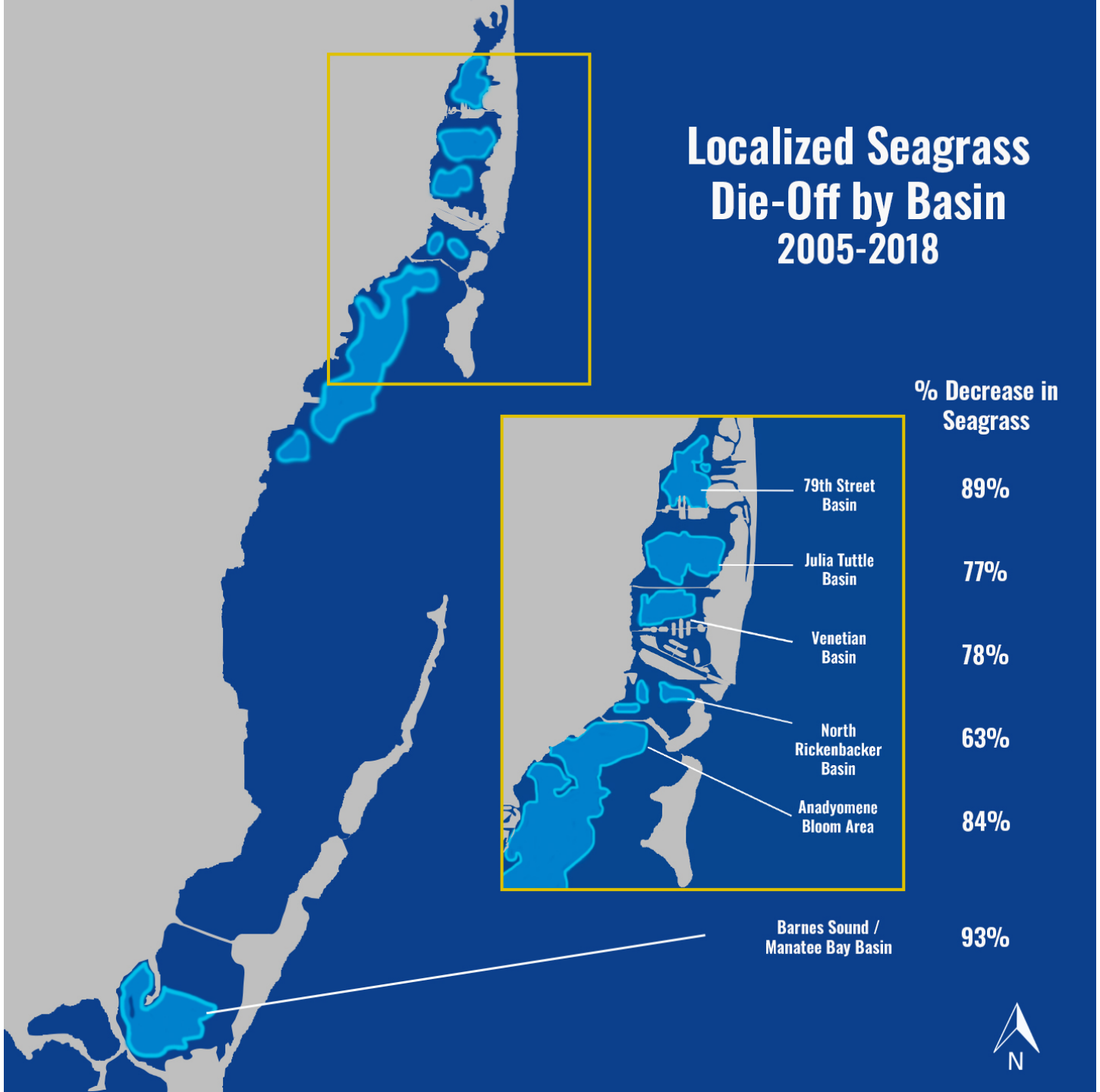
RISK FACTORS

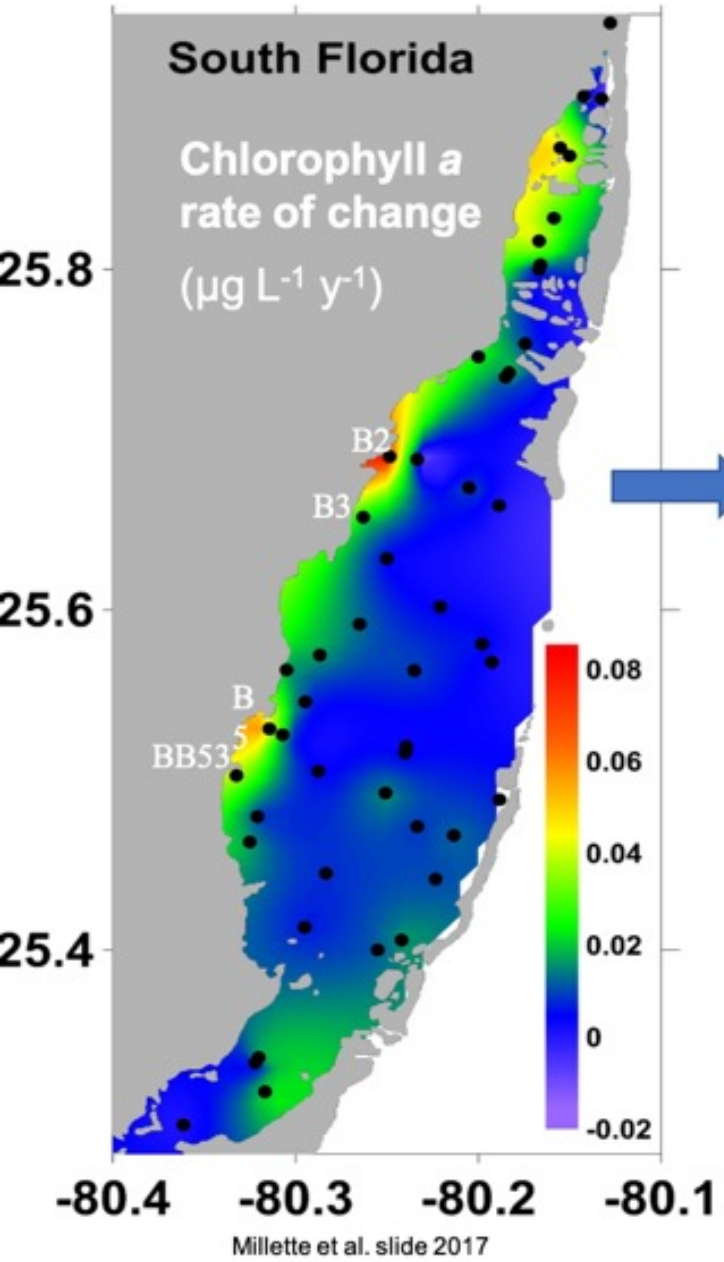
- Anadyomene bloom
- Macroalgae bloom that is smothering and replacing seagrass.
- This is likely linked to nutrient pollution from Snapper Creek and Coral Gables Waterway



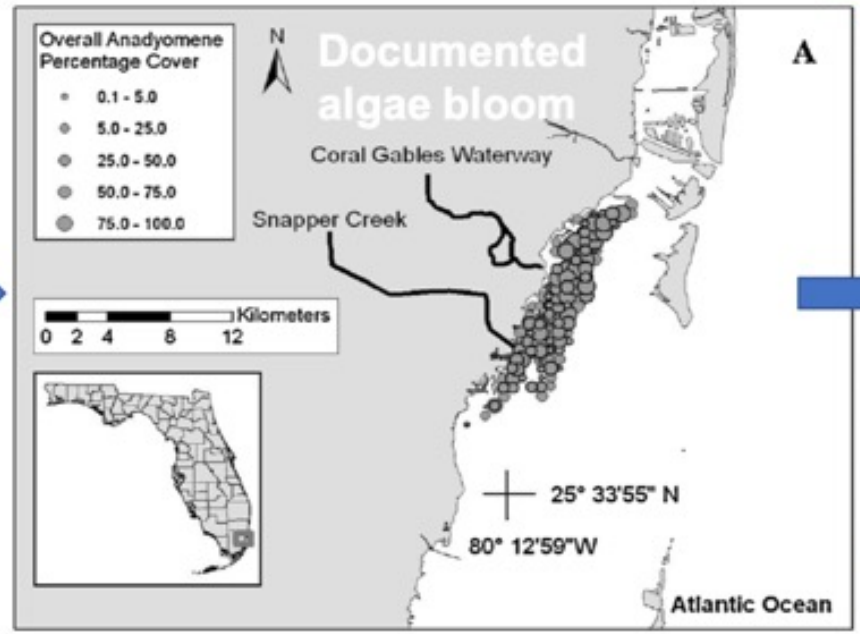


(Figures from Collado-Vides et al. 2013)


Localized Seagrass Die-Off by Basin
2005-2018
% Decrease in Seagrass
79th Street Basin
89%
Julia Tuttle Basin
77%
Venetian Basin
78%
North Rickenbacker Basin
63%
Anadyomene Bloom Area
84%
Barnes Sound / Manatee Bay Basin
93%
N

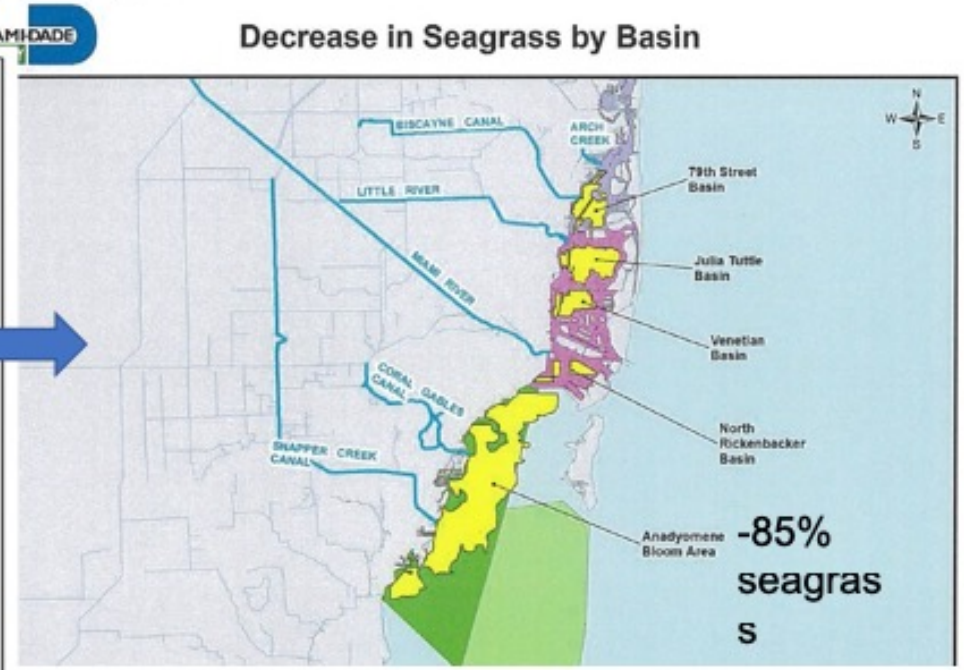


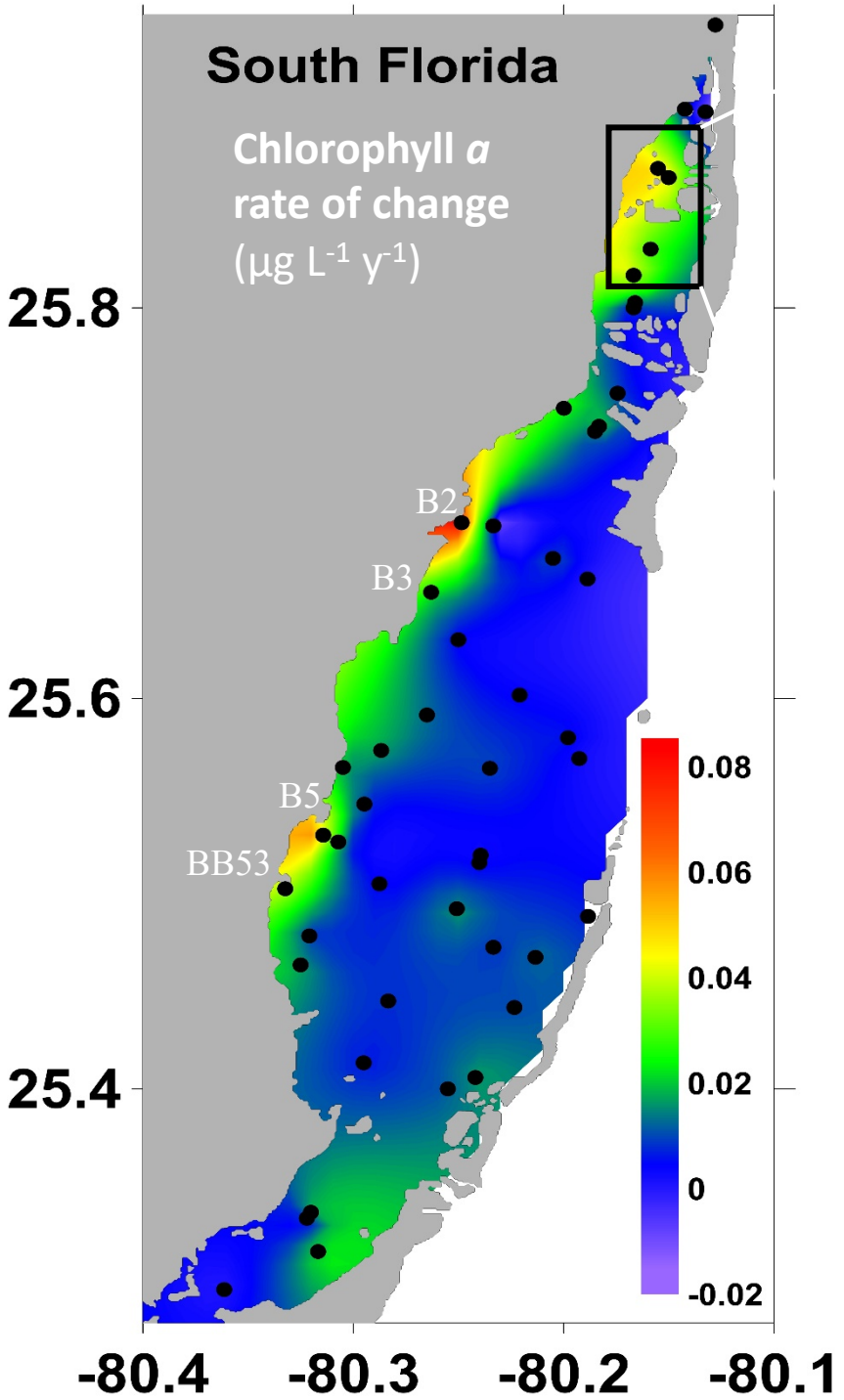
Millette et al. slide 2017

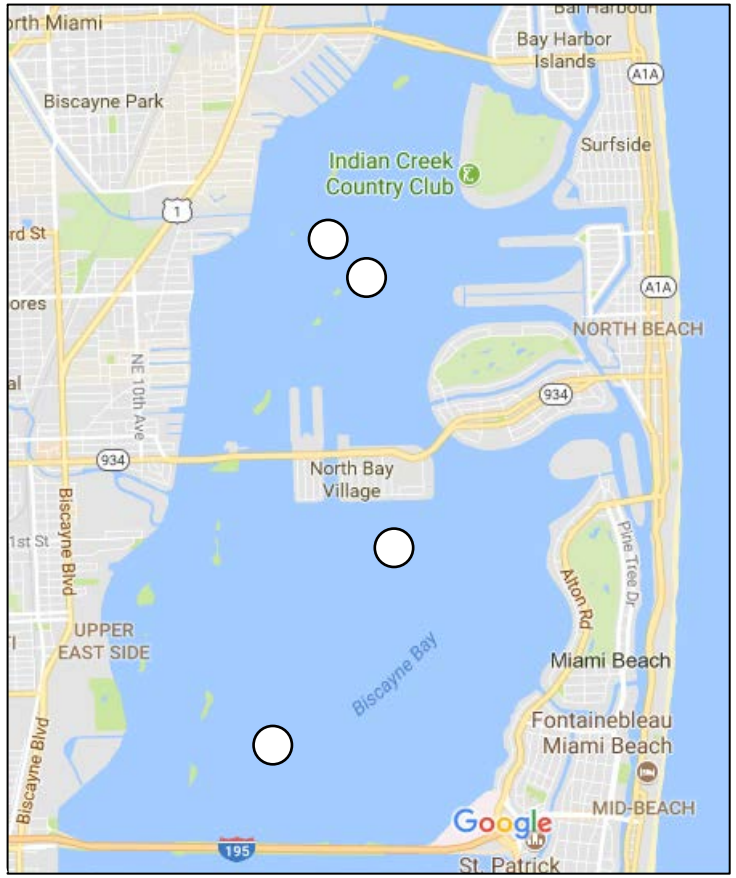


Collado et al. 2013

Figure 6. Study period 2005 - 2018.







- North Biscayne Bay
  - High urbanization
  - Excessive dredging
  - Loss of wetlands
  - Little River and Biscayne Canal
  - Enclosed, less exchange with ocean

Slide from Nicole Millette, NOAA, in review

What Can We Do About It?

- Miami Waterkeeper proposes a municipal ordinance focused on limited fertilizer application
- This is **NOT** a ban on fertilizers
- Most people use too much fertilizer, which means that excess not taken up by plants runs into storm drains, canals, or other waterways during rains
- This ordinance will save municipalities and residents money

Fertilizer Ordinance

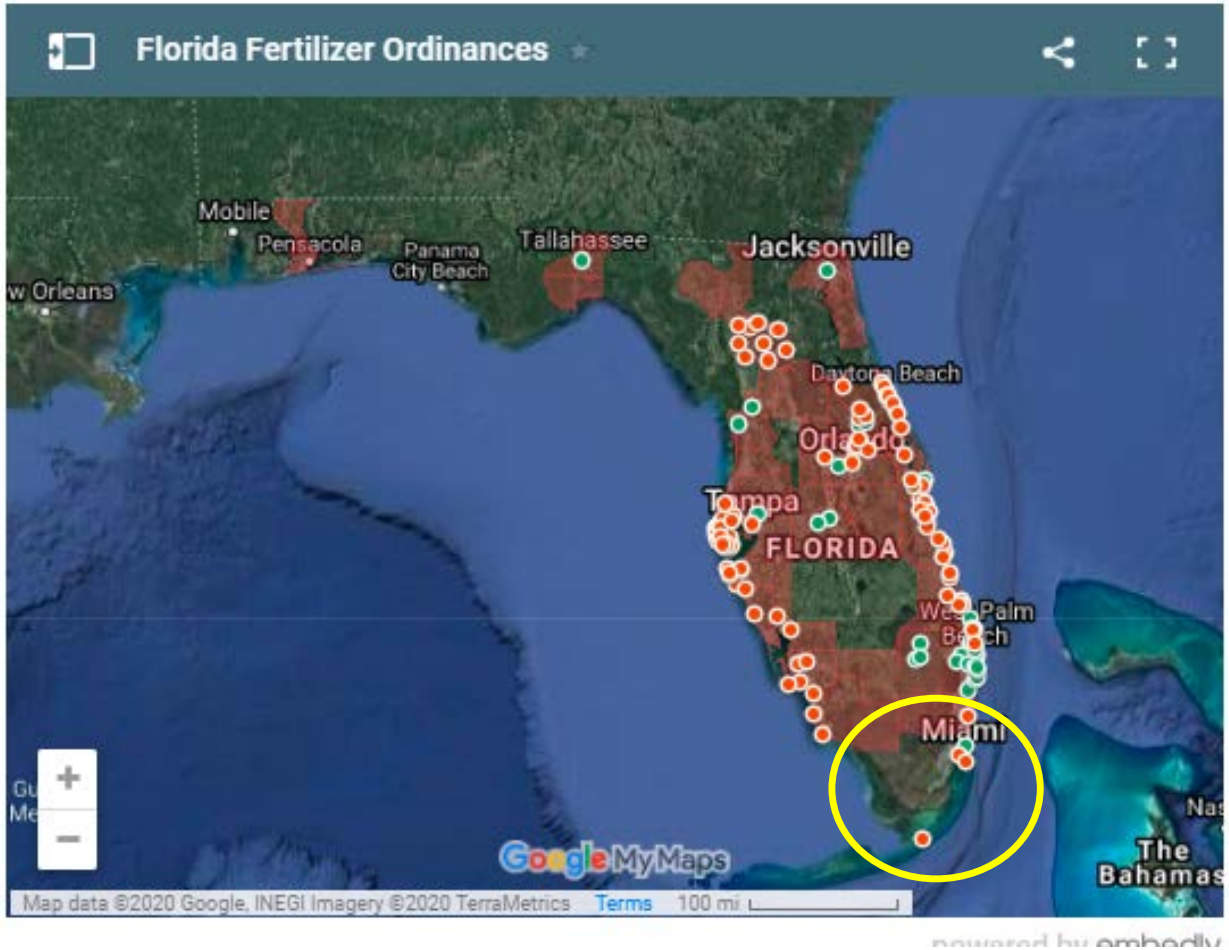
- In short, our ordinance proposes:
  - To limit the amount of fertilizer applied
  - To promote the use of slow release fertilizer to prevent large releases of nitrogen after applications
  - To use 0% phosphorus in fertilizer mix
  - To enforce application **blackout periods** during the summer months when the ground is too saturated to take up fertilizer and runoff is high as well as during heavy rains or when flood, tropical storm, or hurricane warnings are in effect.
  - To enforce a no fertilizer application zone of 15 ft from waterways or storm drains

Example Blackout Date Infographic

Counties & Municipalities with Fertilizer Ordinances

Municipalities with Ordinance

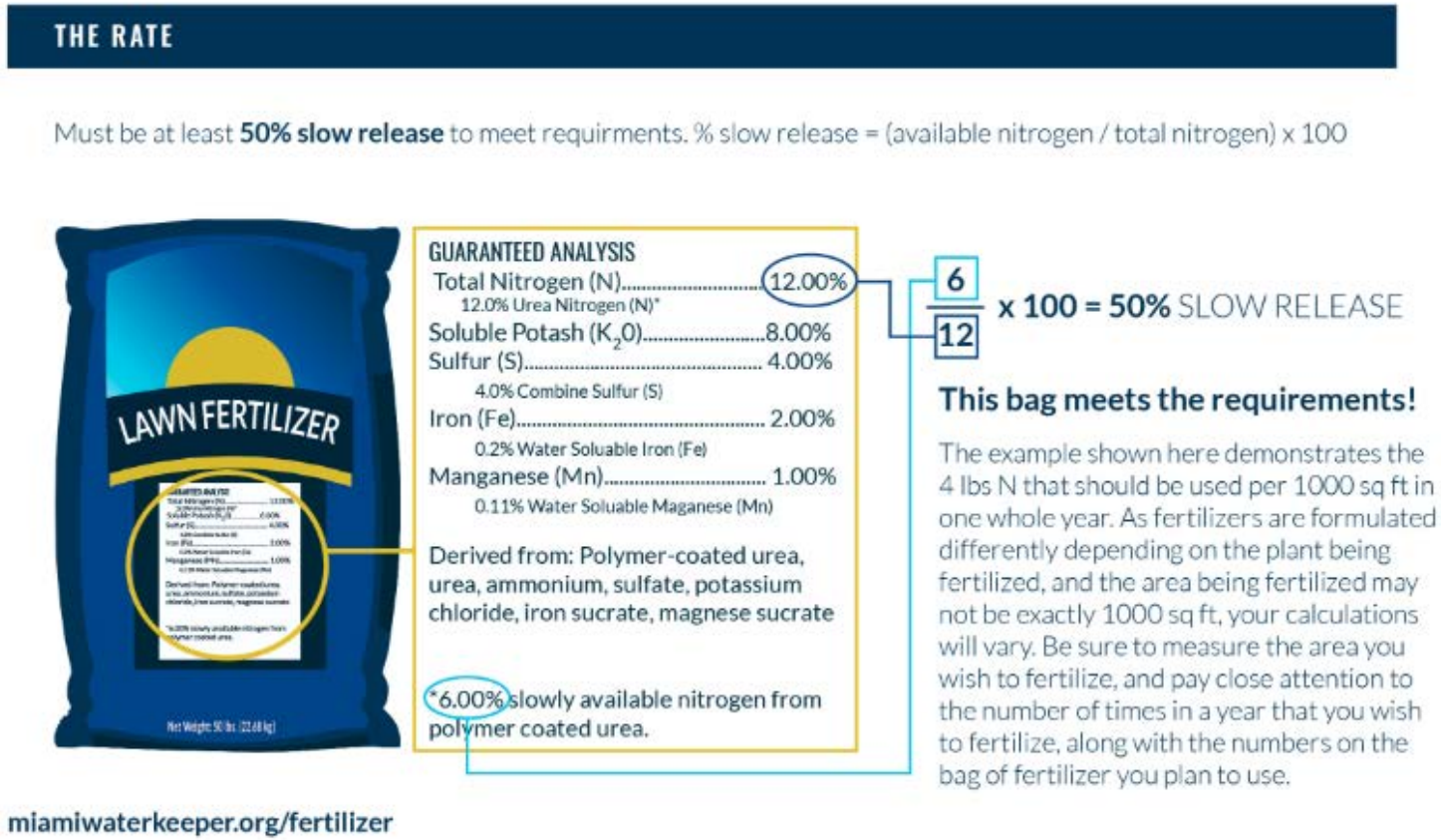
Counties with Ordinance



[Link to Interactive Map]

Go slow!

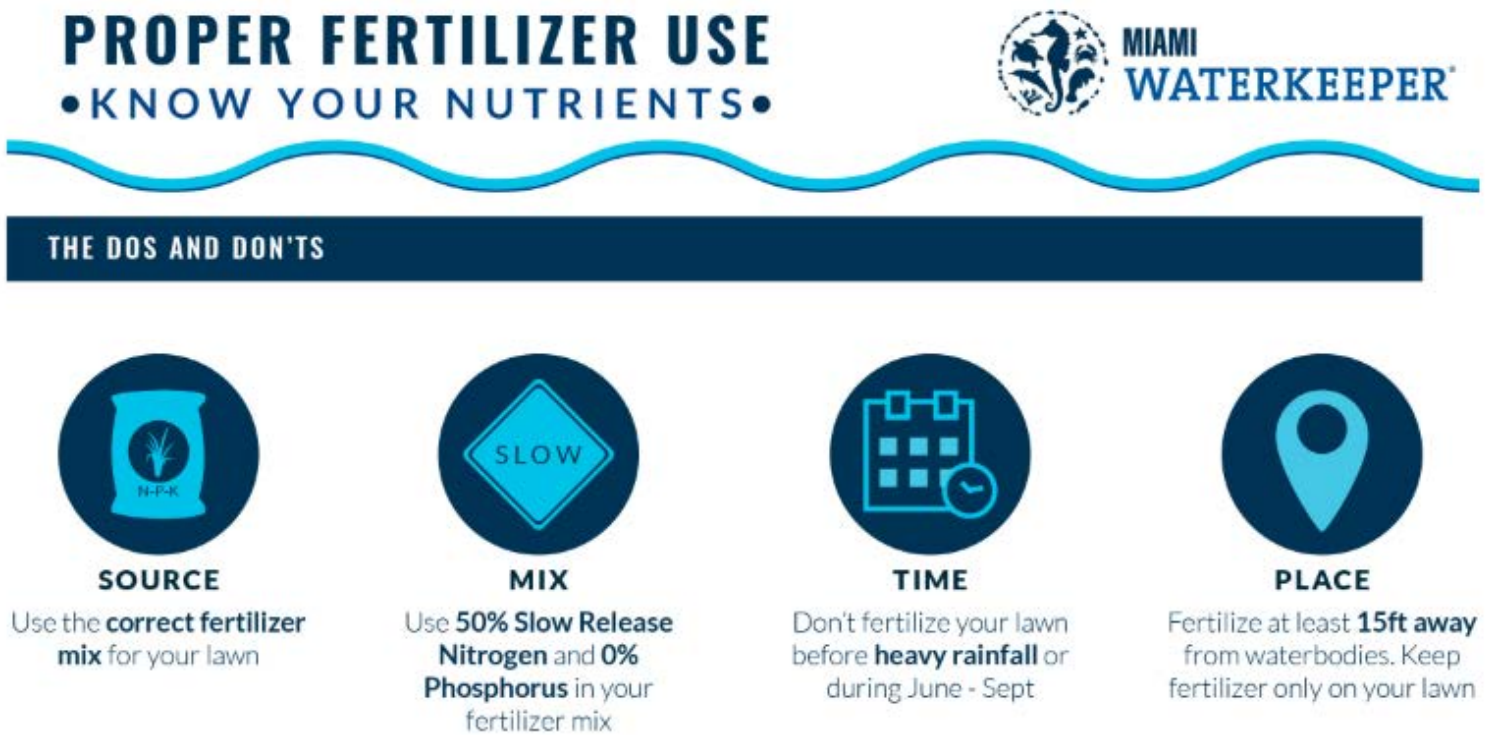
- 50% slow release Nitrogen fertilizer is required under the ordinance



Fertilizer Free & Low Maintenance Zones

- No fertilizer applied within 15ft of a waterbody
- Low maintenance within 10ft of a waterbody

Education and Outreach



For more information visit:

miamiwaterkeeper.org/fertilizer

miamigov.com/Services/Your-Neighborhood/Water-Quality/Fertilizer-Ordinance

Current Resident
12345 Address Address
Miami, Florida 12345

MIAMI WATERKEEPER

KNOW YOUR NUTRIENTS: Fertilizer Regulation in the City of Miami

KNOW YOUR NUTRIENTS: Fertilizer Regulation in the City of Miami

MIAMI WATERKEEPER

Fertilizer: Good for your plants; dangerous for our water

Fertilizer is often over-used in landscaping. Nutrients in fertilizers can run off into waterways and cause algae blooms. Algae blooms are a problem because they clog our waterways, turn the water green, smell bad, can kill fish and wildlife, and can also harm people.

A new City of Miami ordinance addresses this nutrient pollution in our waterways by limiting the amount of nitrogen and phosphorus fertilizer users can apply.

THE DOS AND DON'TS

SOURCE
Use the **correct fertilizer mix** for your lawn

MIX
Use **50% Slow Release Nitrogen** and **0% Phosphorus** in your fertilizer mix (it may say Slow Release on your bag)

TIME
Don't fertilize your lawn **during** the **Blackout Period** (June – September) or **before** a **heavy rainfall**

PLACE
Fertilize at least **15ft away** from waterbodies. Keep fertilizer only on your lawn

THE NUMBERS

The numbers on fertilizer bags indicate the amount of **Nitrogren (N), Phosphorus (P), and Potassium (K)**

N NITROGEN
There is 8% Nitrogren in this bag

P PHOSPHORUS
There is 0% Phosphorus in this bag

K POTASSIUM
There is 24% Potassium in this bag

This ordinance allows for a maximum of **4 pounds of Nitrogen per 1000 sq ft**.

This bag has a nutrient content of 8-0-24

To determine the pounds of Nitrogen per bag, we simply multiply!

Available Nitrogen x Bag Weight = Pounds of Nitrogen

.08 Nitrogen x 50 pounds = 4 Pounds of Nitrogen per bag

This bag meets the requirements!

THE RATE

Must be at least **50% slow release** to meet requirments. % slow release = (available nitrogen / total nitrogen) x 100

6 / 12 **x 100 = 50%** SLOW RELEASE

This bag meets the requirements!

The example shown here demonstrates the 4 lbs N that should be used per 1000 sq ft in one whole year. As fertilizers are formulated differently depending on the plant being fertilized, and the area being fertilized may not be exactly 1000 sq ft, your calculations will vary. Be sure to measure the area you wish to fertilize, and pay close attention to the number of times in a year that you wish to fertilize, along with the numbers on the bag of fertilizer you plan to use.

1000 EYES ON THE WATER

- Signature community outreach program
- Volunteer-based and citizen-led
- Identify, document, and report pollution
- Additional monitoring - watching out for the waterways

GET INVOLVED

- Follow us on Facebook and Instagram
- Attend a future event
- Become a member
- Sponsor a water quality sampling location
- Subscribe
- Spread the word!

MIAMI
WATERKEEPER®

Ensuring swimmable, drinkable, fishable water for all

Facebook: /miamiwaterkeeper
Instagram: @miamiwaterkeeper
Twitter: @miamiwaterkpr
www. miamiwaterkeeper.org

Hello@miamiwaterkeeper.org
(305) 905-0856

HOW DID WE DO?
POLL

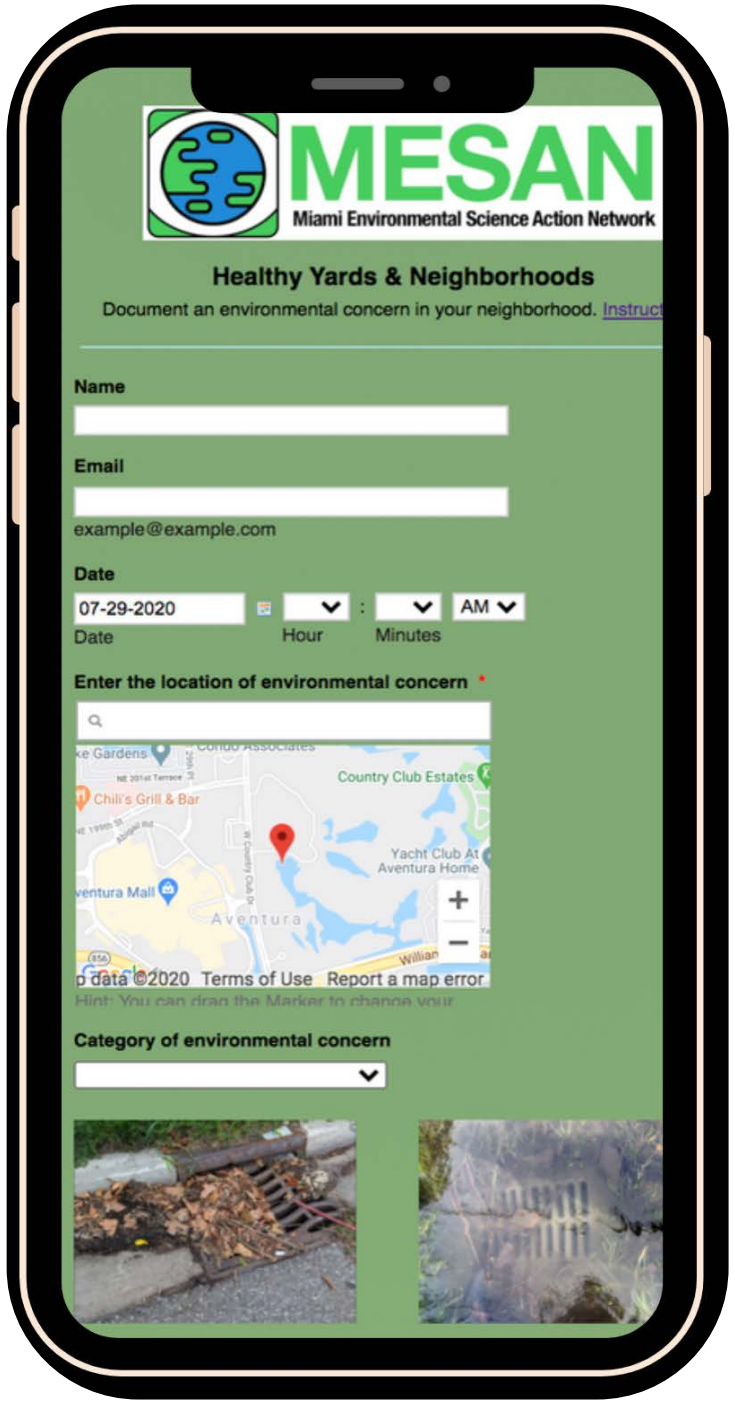
This project is sponsored by the Miami-Dade County Environmental Education grant program

MESAN MONITORING APP

SCAN ME

Web Link:

http://miamistories.net/yards/



PANEL DISCUSSION Q&A

1. What is the current condition of water supply for Southeast Florida and what is projected?
2. What is the difference between a septic system and a sanitary sewer?
3. Can you talk to us about septic vulnerabilities and challenges with sea level rise, and what can residents do to prepare for these challenges?
4. What were some of the concerns raised to the City's Office of Resilience & Sustainability which helped bring upon this ordinance and its passing?
5. What are some alternatives for fertilizers?
6. What are the benefits of using native plants in one's yard and how do these impact our water quality?
7. What is monoculture and why should people avoid it on their properties?
8. How does the City of Miami's administrative offices plan to enforce the fertilizer ordinance?
9. How does the City plan to mitigate against septic system vulnerabilities?
10. How can we mitigate against sea level rise with consideration to SLR projections and urban repair?

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Executive Director & Waterkeeper of Miami WaterKeeper

Joe Barros
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Co-Founder of The Little River Conservancy

Melissa Hew
Resilience Programs Manager for City of Miami's Office of Resilience & Sustainability

Bertha M. Goldenberg
PE, ENV SP, LEED Green Associate, Former Assistant Director, Planning and Regulatory Compliance Miami-Dade County Water and Sewer Department

SIGN-UP TO PARTICIPATE IN UPCOMING CITIZEN SCIENCE EVENTS

JOIN US FOR PART II OF SUSTAINING MIAMI'S WATER WEBINAR SERIES

SCAN ME

bit.ly/mesancitizen

LEARN MORE ABOUT THE MIAMI-DADE ENVIRONMENTAL EDUCATION GRANT

WATCH OUR WEBINAR RECORDINGS HERE:

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bit.ly/mdedufiu