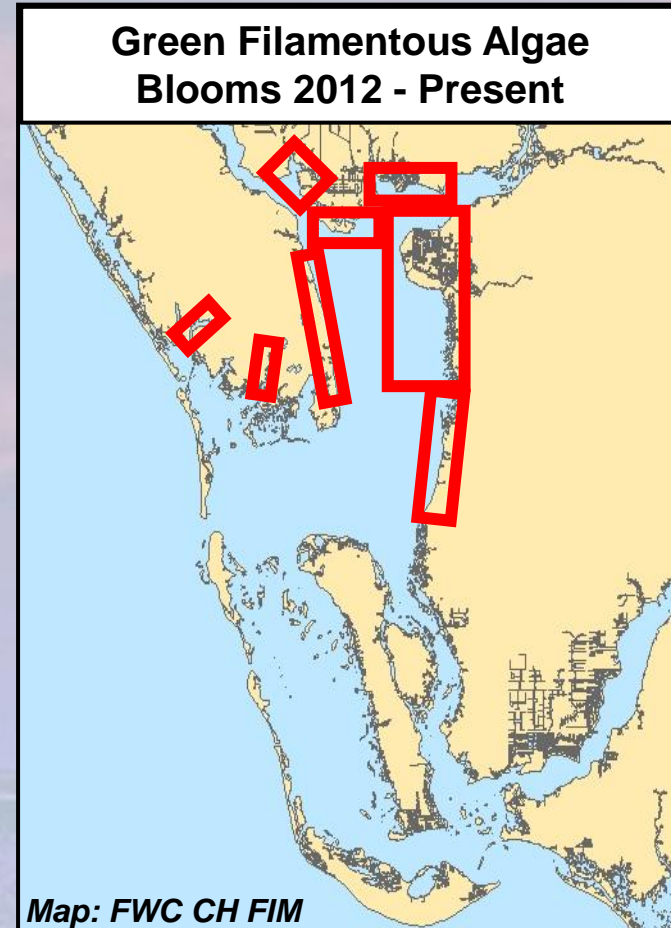


Water Quality – It's Not Just Nutrients: How Climate Change is Necessitating New Restoration Strategies

**CHNEP Watershed Summit – June 1, 2020
Dr. William Coty Keller, Local Ecologist
Capt. Judy Ott, Estuary Escapes, LLC**

We are Observing a “Boom in Blooms” – Algae

- **Past Studies:** Water quality decline mostly caused by excess nutrients from human activities.
- **Nutrient Sources:** Primarily inadequate wastewater treatment & stormwater management.
- **New Studies:** Climate change is also fueling harmful algae blooms.
- **Climate Change Impacts:** Warming waters & intensifying rainfall.
- **Solutions:** Comprehensive water quality monitoring & reporting, managing nutrients to below state standards, revising water treatment regulations & designs, & mitigating climate change.



Climate Change Adaptation is Vital, but Mitigation is Crucial to Avoid “Boom in Blooms”

- Adaptation = Process of adjusting to climate change.
- Mitigation = Human intervention to reduce heat-trapping emissions &/or remove C from atmosphere.
- Adaptive Mitigation = Adapt + Mitigate Climate Change.

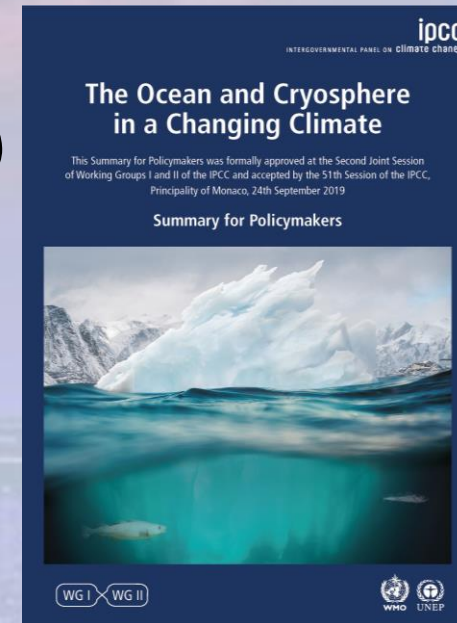


Photo: Sean Rayford, Getty Images

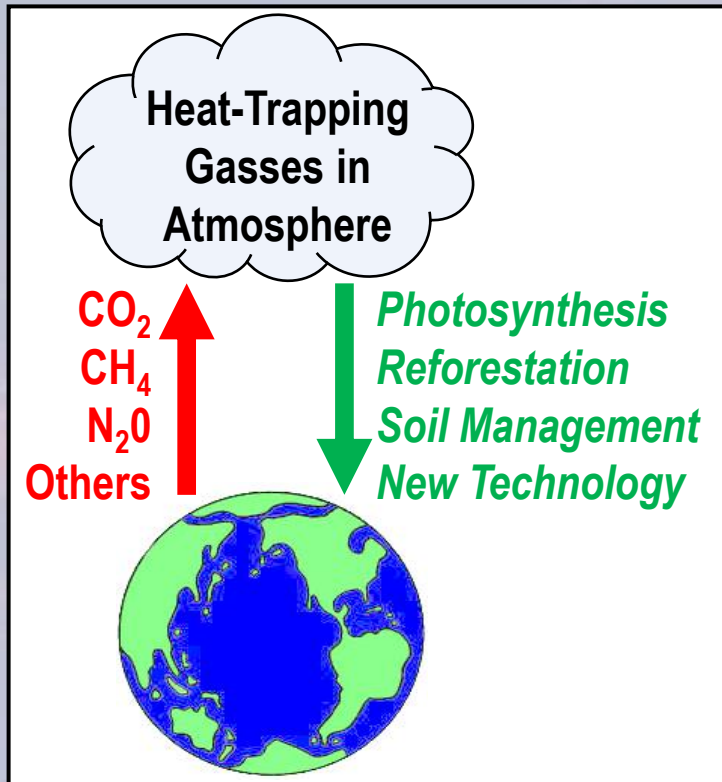
- Resiliency & adaptation alone will allow climate change to continue; long-term impacts will be unmanageable.
- Reducing algae blooms requires bold mitigation.

Our Mitigation Efforts Must be Huge & Immediate

- **Agreement Among International Scientists:**
 - ~ *UN/IPCC Special Report on Global Warming 1.5° (2018)*
 - ~ *US Fourth Climate Assessment (2018)*
 - ~ *Intergovernmental Panel on Biodiversity & Ecosystems Services (2019)*
 - ~ *Special Report on the Ocean & Cryosphere in a Changing Climate (2019)*
 - ~ *UN Emissions Gap Report (2019)*
- **Mitigation Imperative: Reduce emissions 70-100% in 10 years \leq 8% per year.**
- **Mitigation Strategies:**
 - ~ *Enhance conservation.*
 - ~ *Replace fossil fuels with 0 emission energy sources (solar, wind, nuclear, hydro, geothermal).*
 - ~ *Remove C from atmosphere via reforestation, soil management & emerging technologies.*



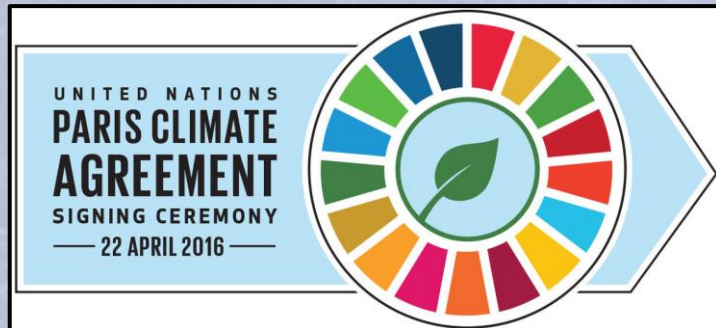
Our Fastest Route to Mitigation is Leveraging



- **If: Goal = reducing greenhouse gases > 80% in 10 years...**
- **Then: Success depends on global mitigation & cooperation.**
- **Global cooperators includes:**
 - ~ **Governments & agencies**
 - ~ **Businesses & non-profits**
 - ~ **Individuals & others**
- **Global mitigation is a huge challenge.**
- **This challenge is most effectively met by leveraging:**
 - ~ **Policy, science, economics & regulations.**
 - ~ **National, state & local government initiatives.**

From the Top: Federal Government Leverage

- US climate change action is sorely needed: Together with China we contribute 40% of global emissions.
- Global Action: Rejoin Paris Climate Agreement – initiated in 2016 by US & China & signed by 186 countries – but US withdrew in 2019.
- Domestic Action: Enact legislation putting a price on C & returning revenues to households – HR 763 initiated in Jan. 2019.
- Pandemic Action: Incorporate clean energy initiatives & economic strategies in pandemic recovery plans.



116TH CONGRESS
1ST SESSION

H. R. 763

To create a Carbon Dividend Trust Fund for the American people in order to encourage market-driven innovation of clean energy technologies and market efficiencies which will reduce harmful pollution and leave a healthier, more stable, and more prosperous nation for future generations.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 24, 2019

State Government Strategies for Leverage

- **Given: States regulate utilities & electric power generation causes 1/3 of our emissions...**
- **We must: Revise state utility regulations to foster energy conservation & clean energy production.**
- **Florida strategies:**
 - ~ **Require utilities to establish energy portfolios leading to 0 emission electricity generation by 2030.**
 - ~ **Require energy conservation – break the link between more profits from more energy production.**
 - ~ **Implement incentives for energy efficiency, clean generation, & conservation.**
 - ~ **Eliminate barriers to roof top solar & legalize community & shared solar programs.**



Photo: Coastal Living

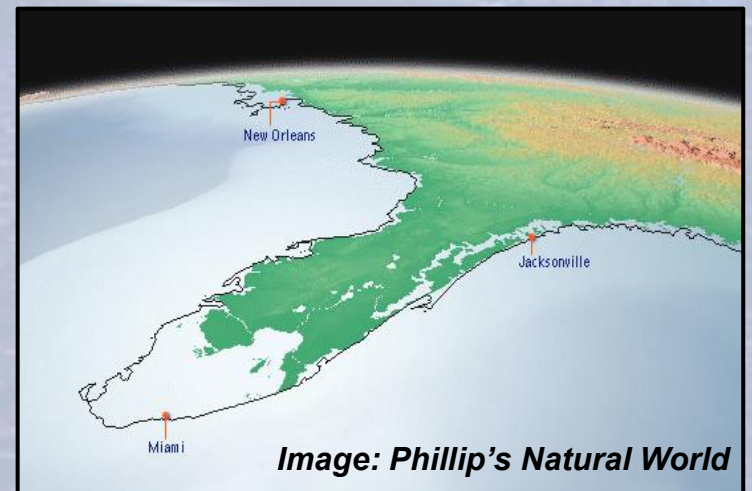
Local Government Leverage Strategies

- Locals oversee: water quality treatment, building, landscaping, farming, transportation & comp plans.
- Local opportunities include: water quality improvement, energy efficiency & C sequestration.
- Local 2021 Comp Plans must address climate change.
- Local water quality & climate change tactics include:
 - ~ Include *Adaptation & Mitigation* in 2021 Comp Plans.
 - ~ Set 2030 goals for emission reduction >79% & energy conservation >40%.
 - ~ Upgrade building & stormwater infrastructure.
 - ~ Improve wastewater & stormwater treatment.
 - ~ Revise building, landscaping & farming codes.
 - ~ Implement energy efficient public transportation.



Take Home Messages

- **Climate change & excess nutrients contribute to water quality decline.**
- **Need to *Adapt & Mitigate* climate change impacts to fully restore water quality & global sustainability.**
- **Need to revise wastewater & stormwater regulations & design for increasing temperatures & storm intensity.**
- **Adaptation/resiliency alone – without mitigation – will allow climate change to rapidly become irreversible.**
- **Successful mitigation requires huge global reductions in emissions & atmospheric C.**
- **Leveraging global, national, state & local policies is the most effective & efficient mitigation strategy.**



More Information is Available From:

- Reports & Presentations <https://ecopapak.org>
- Dr. Coty Keller wckeller@earthlink.net
- Capt. Judy Ott judyott@embarqmail.com

Thank You & Any Questions?