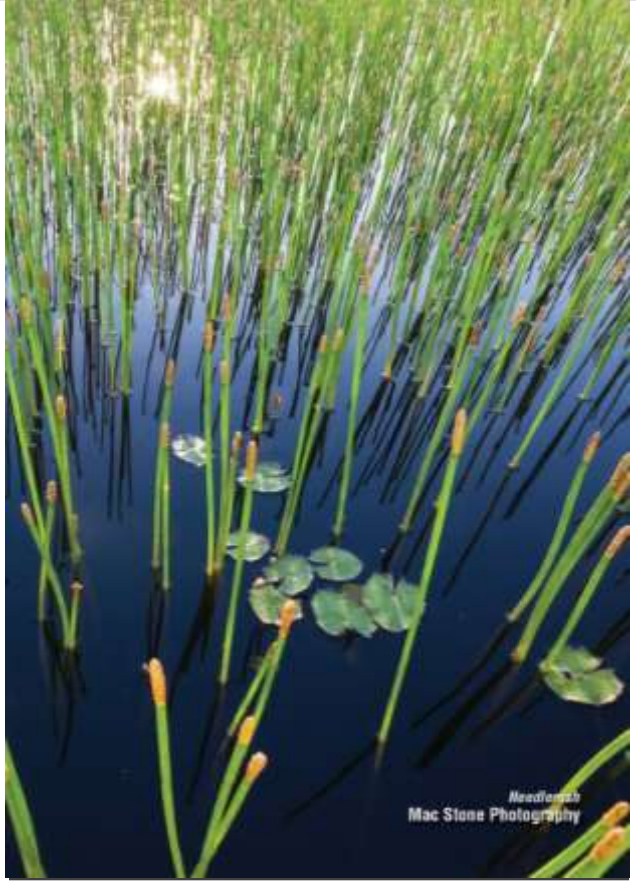
Vivian Young, AICP
1000 Friends of Florida




John Moran Photography

Dr. John M. DeGrove Webinar Series:
Advancing Nature-Based Solutions for Hazard Mitigation

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1000 Friends of Florida

Building Better Communities & Saving Special Places

Florida's leading nonprofit advocate for sustainable development

Work with citizens, community and state leaders,
conservation and business groups

Educate, advocate and negotiate
to protect Florida's high quality of life

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Dr. John M. DeGrove

May 4, 1924 – April 13, 2012

Icon of comprehensive planning both in Florida and across the nation

Co-founder of 1000 Friends of Florida

To find out more, please visit: www.1000friendsofflorida.org/dr-degrove/

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This webinar has been approved for:

Planners (1.5 AICP CM #9192437)

Florida attorneys (2 CLE #1909795N)

Florida Certified Environmental Health Professionals (.10 CEUs)

Florida Certified Floodplain Managers (1 CEC)

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A link to a brief survey to help us improve future webinars

A certificate of attendance

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For Landscape Architects:

1000 Friends has not yet received certification information from the DBPR. We will post an update at https://1000fof.org/upcoming-webinars/credits/

If credits are approved, 1000 Friends only provides certificates of attendance for those who attend the live webinar

1. In the follow up email sent an hour after the live webinar you will receive a certificate of attendance
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3. Add the course number, provider number and your number to the certificate
4. Submit the certificate yourself to DBPR

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Dr. John M. DeGrove Webinar Series

- February 19 – 2020 Florida Legislative Update
- March 11 – The Economics of Development in Florida
- April 15 – 2020 Florida Legislative Wrap Up

All webinars are from noon – 1:30 Eastern Time unless otherwise noted.

1000 Friends has applied for credits for planners (AICP CM), Florida attorneys (CLE), Florida landscape architects (DBPR), Florida Certified Floodplain Managers (CLE), and Florida Certified Environmental Health Professionals (CEHP), but cannot guarantee that credits will be approved.

Register at: www.1000friendsofflorida.org/webinar/

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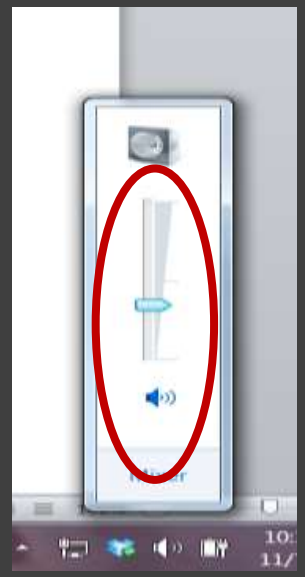

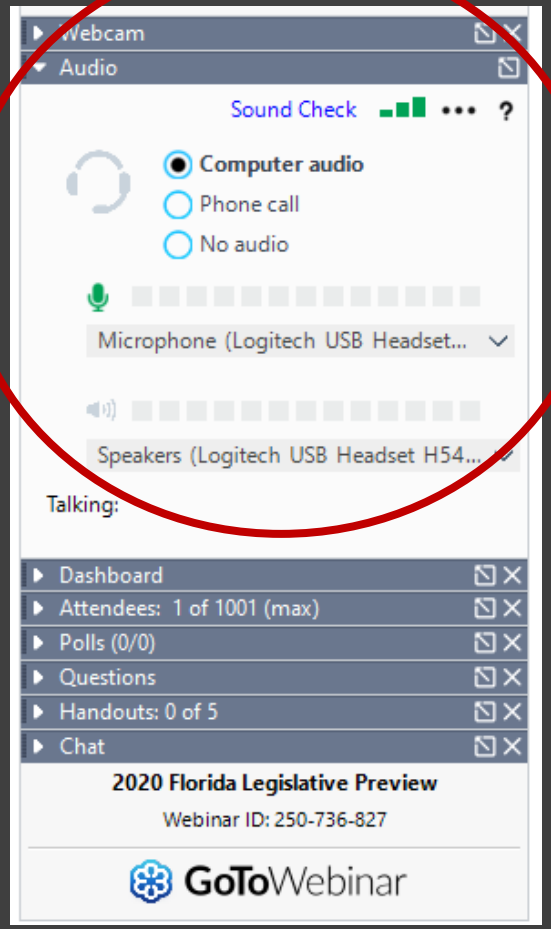

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OR

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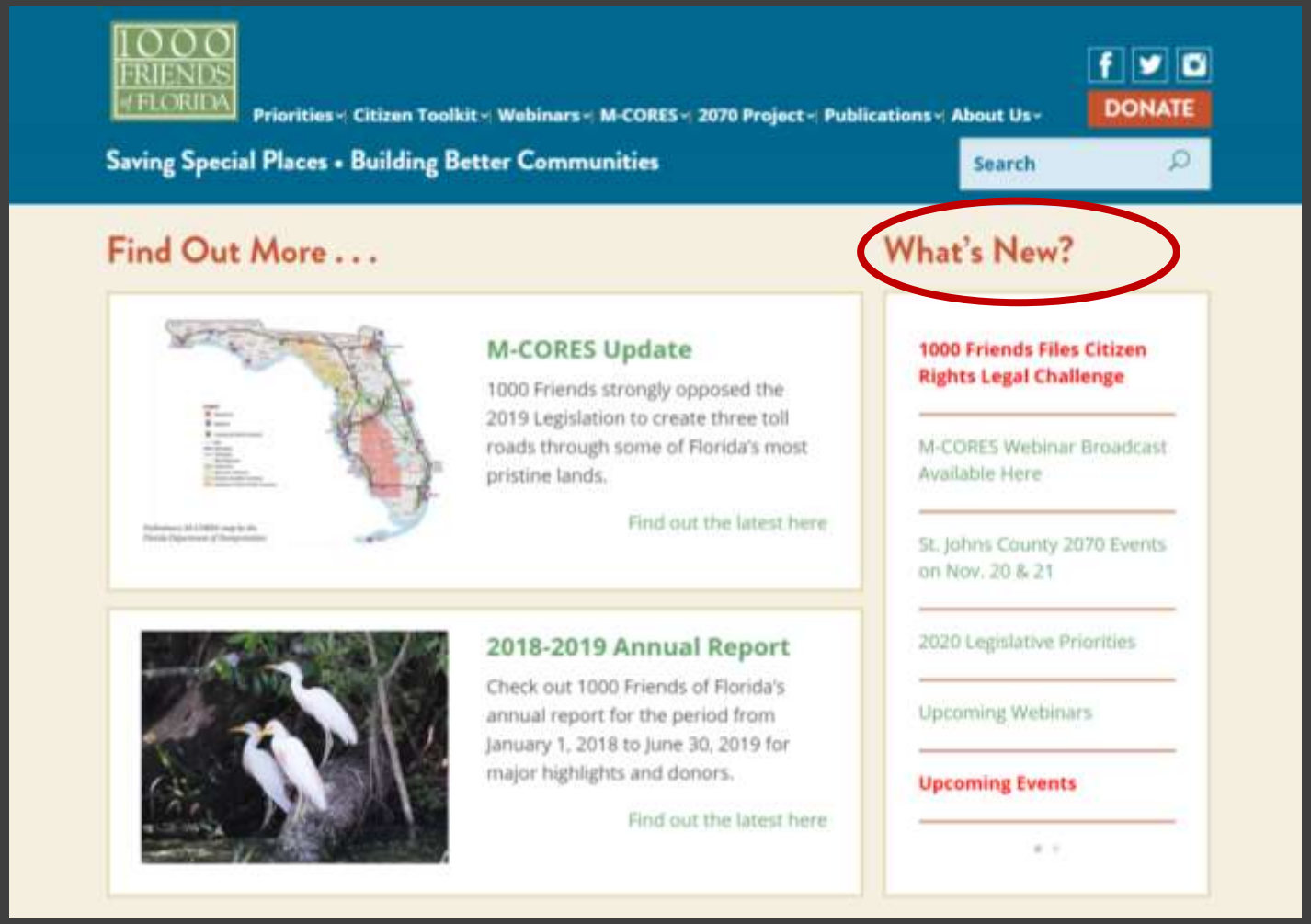
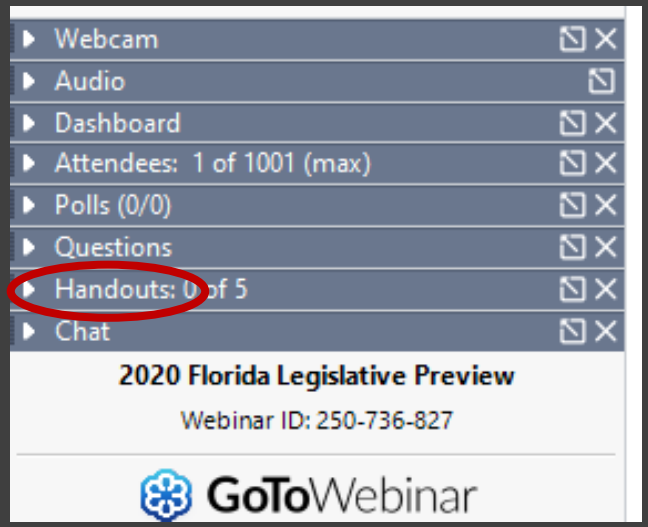
The PowerPoint is available under "What's New" at www.1000fof.org





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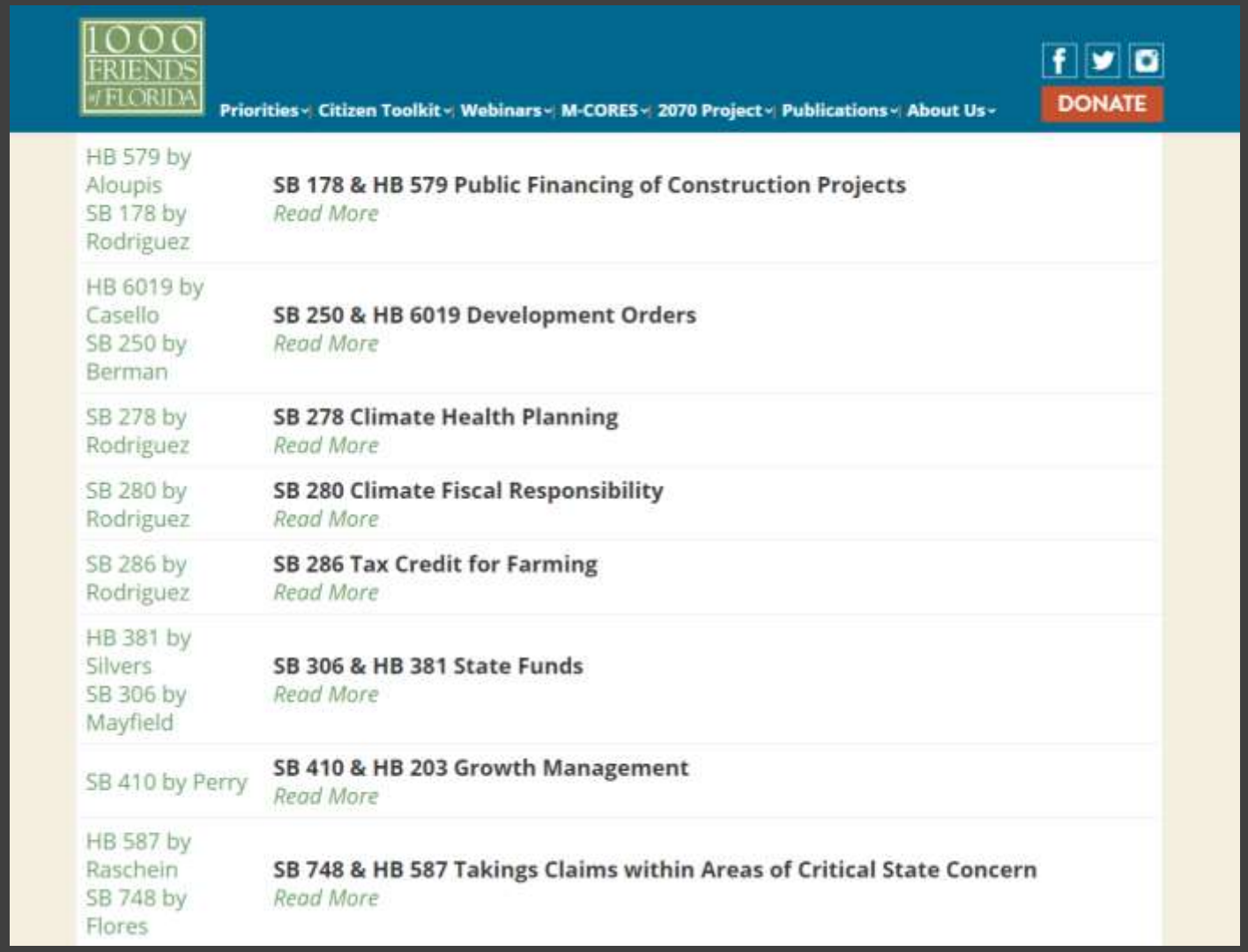
Check out our 2020 Florida Legislative Update page at www.1000fof.org/legis/legis-2020/



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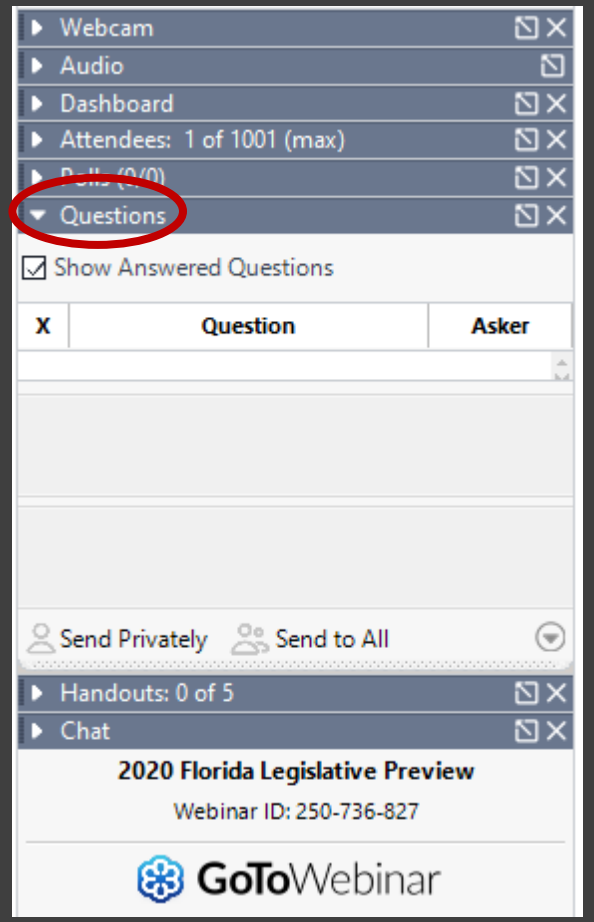
- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- Please keep your questions succinct!
- Staff will ask the presenters questions, as time permits



Presenters

Rowan Schmidt

Program Director for Earth Economics

Part of the Earth Economics team since 2010, serving as a strategic leader and managing projects and partner relationships.

Leads Earth Economics' efforts to advance policy and expand funding mechanisms for investments in green infrastructure.

Core focus areas include developing policy and case studies that leverage federal funding for implementing nature-based solutions that mitigate hazards such as flood, fire, drought, and heat, and identifying ways that national accounting standards can better incorporate the value of natural assets in capital budgets.

Passionate about identifying funding mechanisms and policy levers that drive investment toward cost-effective and equitable projects that benefit communities.

Laura Geselbracht

Senior Marine Scientist with The Nature Conservancy in Florida

Advancing coastal resilience in Florida, the Gulf of Mexico and along the U.S. South Atlantic Coast by improving knowledge about sea level rise impacts on coastal ecosystems and adjacent developed areas for coastal resilience; designing, implementing and monitoring coastal ecosystem restoration projects to improve community resilience; identifying areas of resilient coastal ecosystems; and educating local government and community leaders about climate change risks and opportunities for adaptation.

In 2015, was awarded the Sam D. Hamilton Award for Transformational Conservation Science for her contributions to the Gulf Coast Vulnerability Assessment. Led the assessment of mangrove forest risk to climate change effects.

Also supports TNC Florida's coastal habitat restoration efforts through design, implementation and review of restoration monitoring plans.

Leveraging FEMA Funding for Nature-Based Solutions to Support Hazard Mitigation

Rowan Schmidt, Program Director, Earth Economics

1000 FRIENDS of FLORIDA

Leveraging FEMA Funding for Nature-Based Solutions to Support Hazard Mitigation

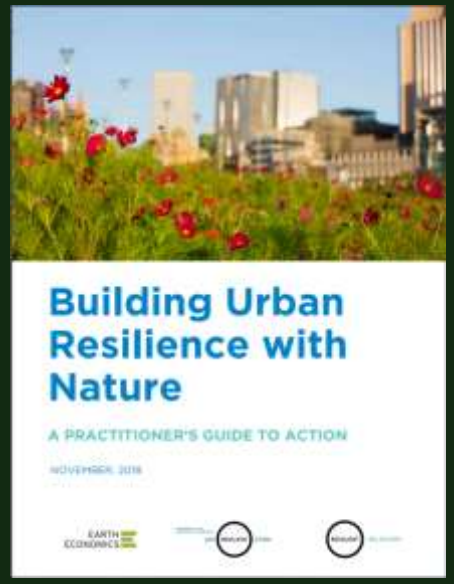
Rowan Schmidt | Earth Economics

January 29th, 2020

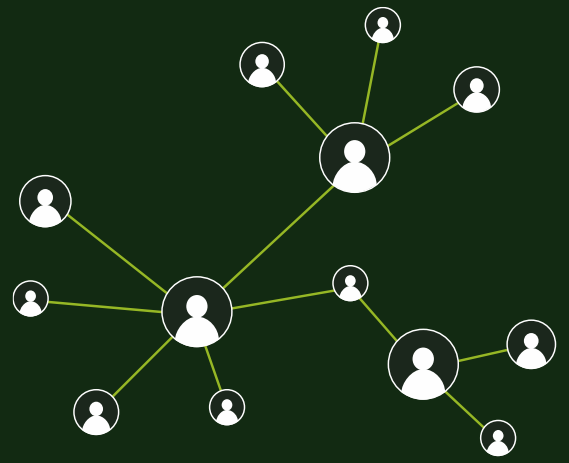
Agenda

- The big picture
- Hazard mitigation
- Recent FEMA policy advances
- Case studies:
  - Wildfire
  - Flood
  - Drought
  - Heat Island
- How Earth Economics can help

Taking Nature into Account

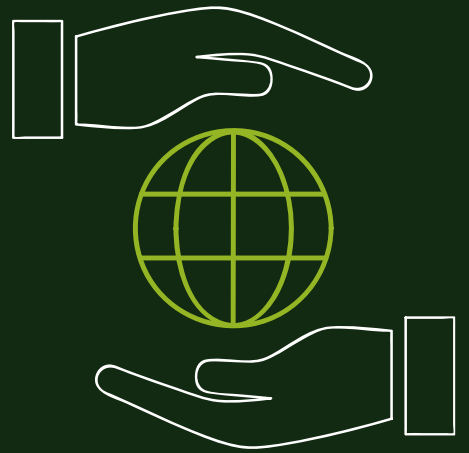


Our Approach



Awareness Building

Place-Based Analysis



Policy and Finance

WHAT HAS VALUE?

How do we measure it?

How do we fund it?


OLD THINKING
Nature as an accessory

NEW THINKING

Nature as the big picture

PERMEABLE PAVEMENT

Stormwater Treatment
Water Supply
Less Severe Heat Waves
Quieter Neighborhoods
Educational Opportunities

GREEN ROOFS

Lower Utility Bills
Stormwater Treatment
Cooler Cities
Cleaner Air
Neighborhood Beautification

Image Source: Brooklyn Grange

URBAN TREES

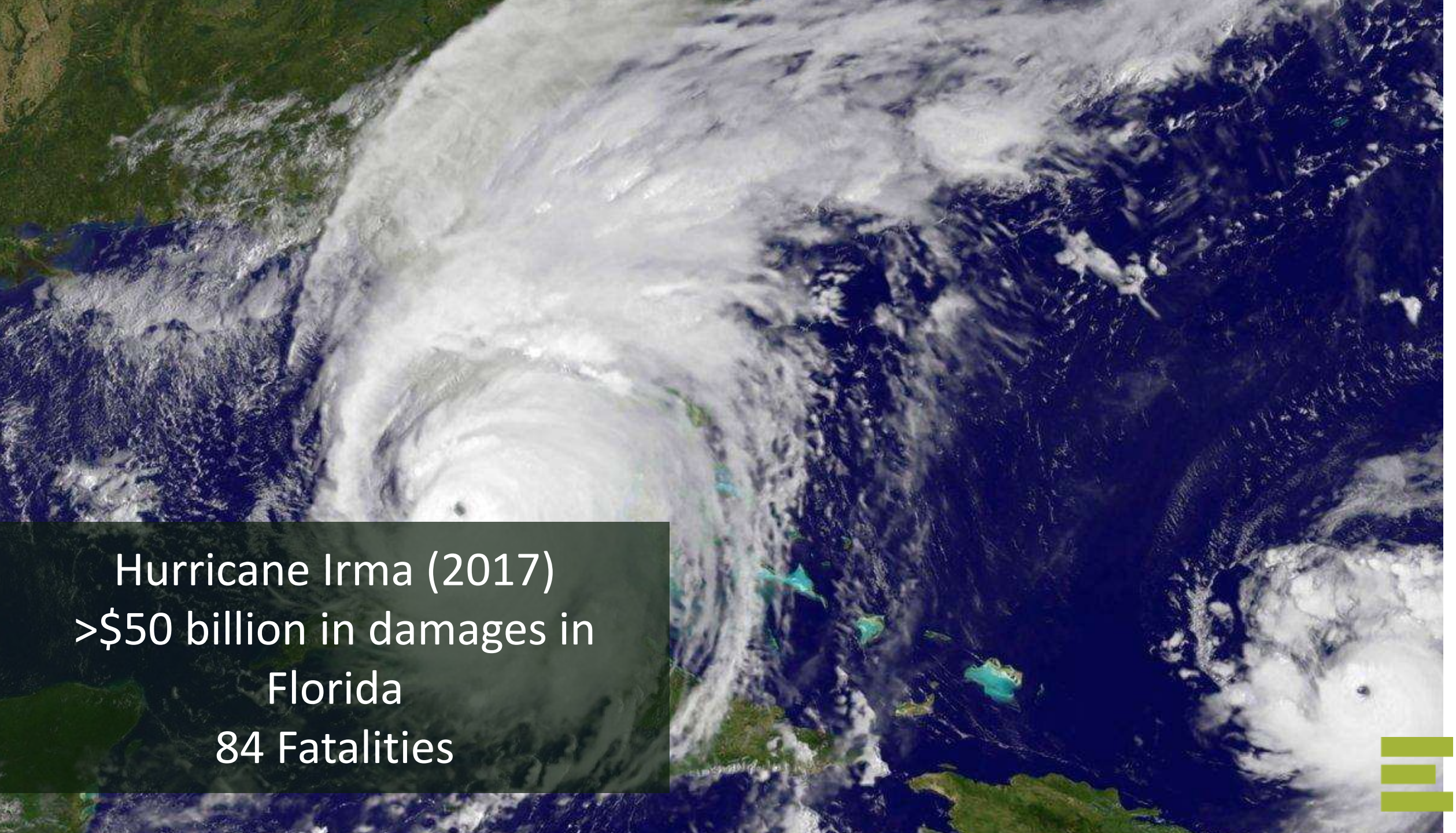
Lower Asthma Rates
Better Quality of Life
Lower Temperatures
Social Interaction
Walkable Cities

Image Source: OLIN

NATURAL DISASTERS COST THE UNITED STATES A RECORD **$306 BILLION** IN 2017.

THE PREVIOUS RECORD WAS $215 BILLION IN 2005.


Hurricane Harvey (2017)
$200 billion in damages


Hurricane Irma (2017)
>$50 billion in damages in Florida
84 Fatalities

California Wildfires (2017)
>$18 billion in costs

HAZARD MITIGATION

Any action taken to reduce or eliminate long term risk to people and property from natural disasters.

Land/Water Associates

Project Cost-Effectiveness

Projects must be cost effective. A benefit-to-cost ratio of 1.0 or more is required.

i.e., the benefits of the project must outweigh the costs in a Benefit-Cost Analysis (BCA)

FEMA Policy Advances

2013: Environmental Benefits Policy

- Applies to all flood acquisition

2016: Policy expansion, new eligible project types

- Post-wildfire mitigation
- Aquifer storage & recovery (drought mitigation)
- Floodplain and stream restoration
- Flood diversion and storage
- Green infrastructure

FEMA

MITIGATION POLICY – FP-108-024-01

I. TITLE:

Consideration of Environmental Benefits in the Evaluation of Acquisition Projects under the Hazard Mitigation Assistance (HMA) Programs

II. DATE OF ISSUANCE:

JUN 18 2013

III. POLICY STATEMENT:

FEMA will allow the inclusion of environmental benefits in benefit-cost analyses (BCA) to determine cost effectiveness of acquisition projects.

IV. PURPOSE:

The purpose of this policy is to identify and quantify the types of environmental benefits that FEMA will consider in the BCA for acquisition projects.

U.S. Department of Homeland Security
Washington, DC 20472

FEMA

May 12, 2016

MEMORANDUM FOR: Mitigation Division Directors
FEMA Regions I-X

FROM: Michael M. Grimm
Assistant Administrator for Mitigation
Federal Insurance and Mitigation Administration

SUBJECT: Benefit Cost Analysis Tools for Drought, Ecosystem Services, and Post-Wildfire Mitigation for Hazard Mitigation Assistance

In September 2015, FEMA released three new activities eligible for the Hazard Mitigation Assistance (HMA) programs: Aquifer Storage and Recovery, Floodplain and Stream Restoration, and Flood Diversion and Storage, known as the Climate Resilient Mitigation Activities (CRMA). These activities can be used for any hazard when appropriate and leverage traditional risk reduction benefits and applicable ecosystem services. Additionally, FEMA developed pre-calculated benefits for cost effectiveness evaluation of soil stabilization, flood diversion, and reforestation projects in wildfire impacted areas to support expedient implementation of post-wildfire mitigation actions. With this memorandum, FEMA is releasing the following additions

Flood Protection


Flood Protection+

Infrastructure: A Continuum

Natural Infrastructure

Green Infrastructure

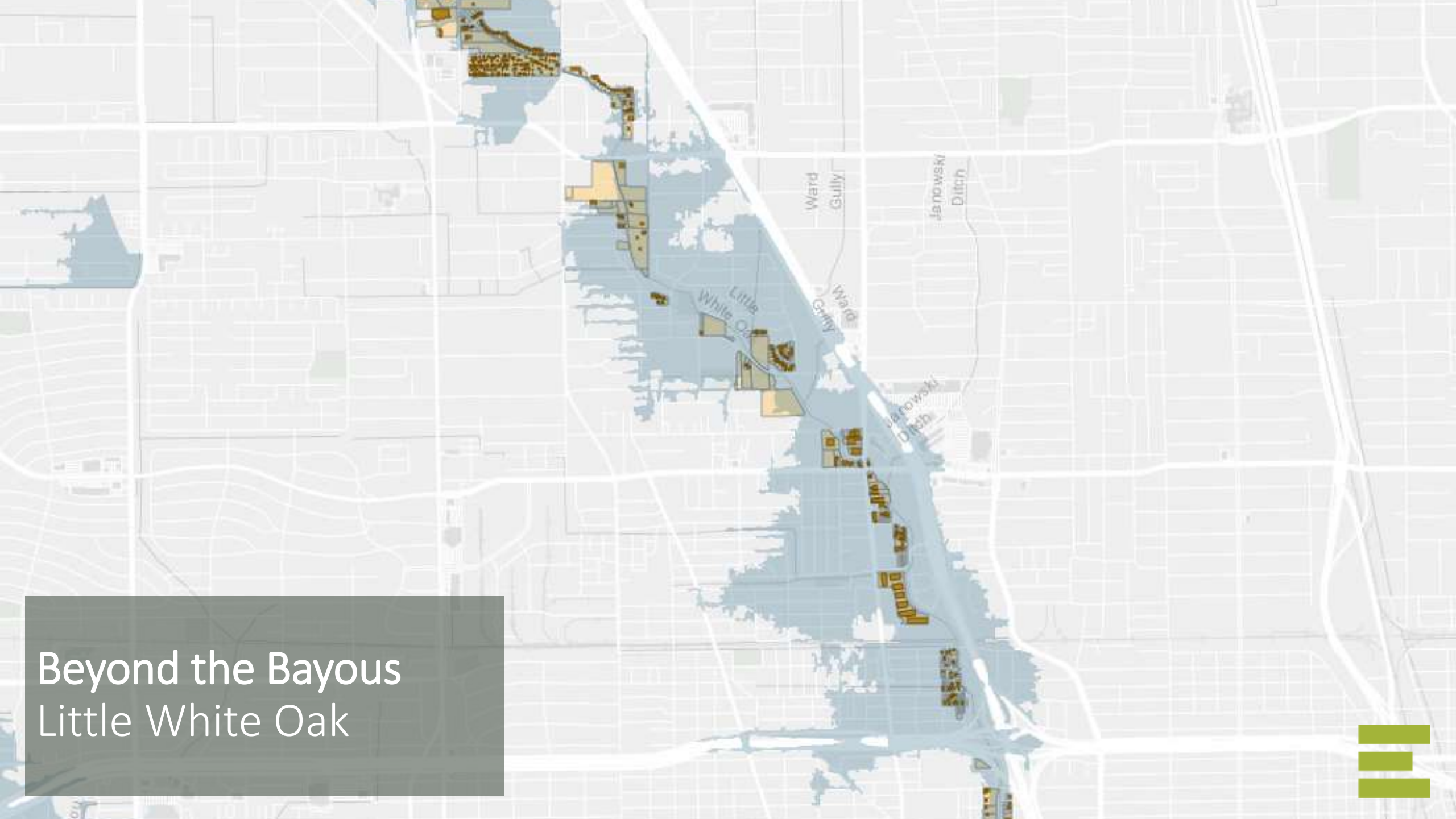
Gray Infrastructure

Case Studies

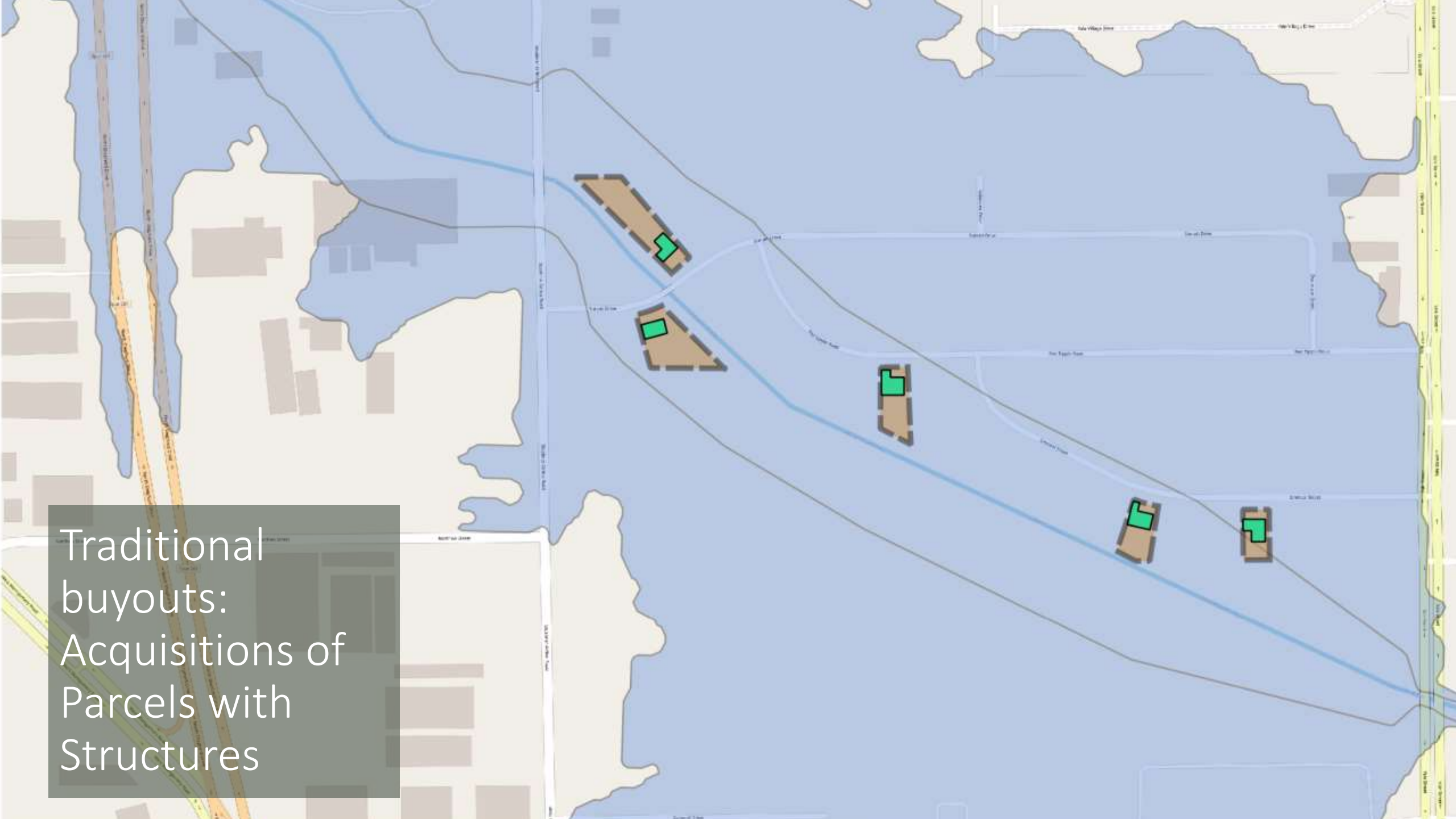
Nature-Based Solutions

FLOOD

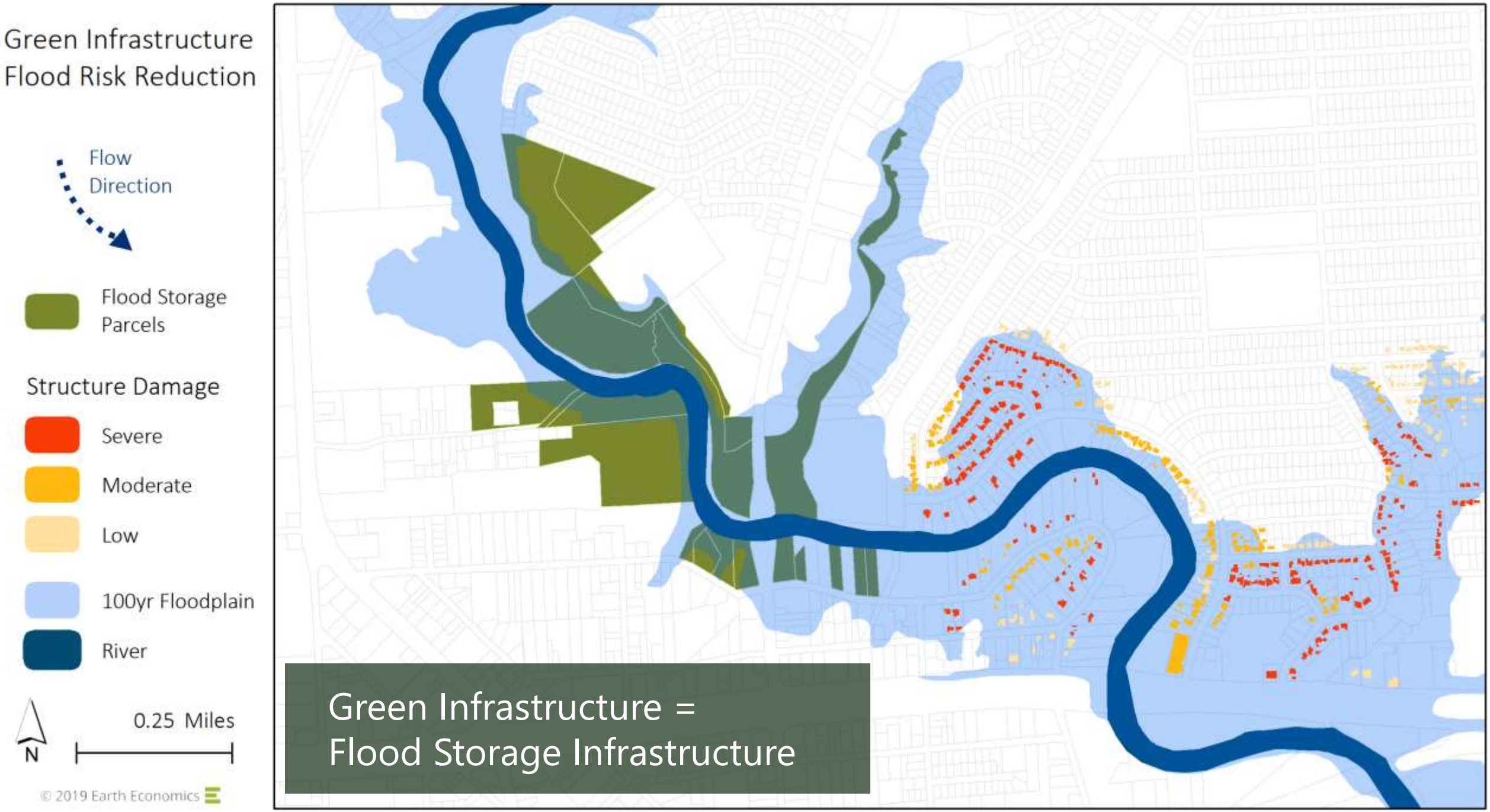

Hurricane Harvey



Beyond the Bayous
Little White Oak



Traditional buyouts: Acquisitions of Parcels with Structures


Green Infrastructure
Flood Risk Reduction
Flow
Direction
Flood Storage
Parcels
Structure Damage
Severe
Moderate
Low
100yr Floodplain
River
N
0.25 Miles
© 2019 Earth Economics
Green Infrastructure =
Flood Storage Infrastructure

WILDFIRE

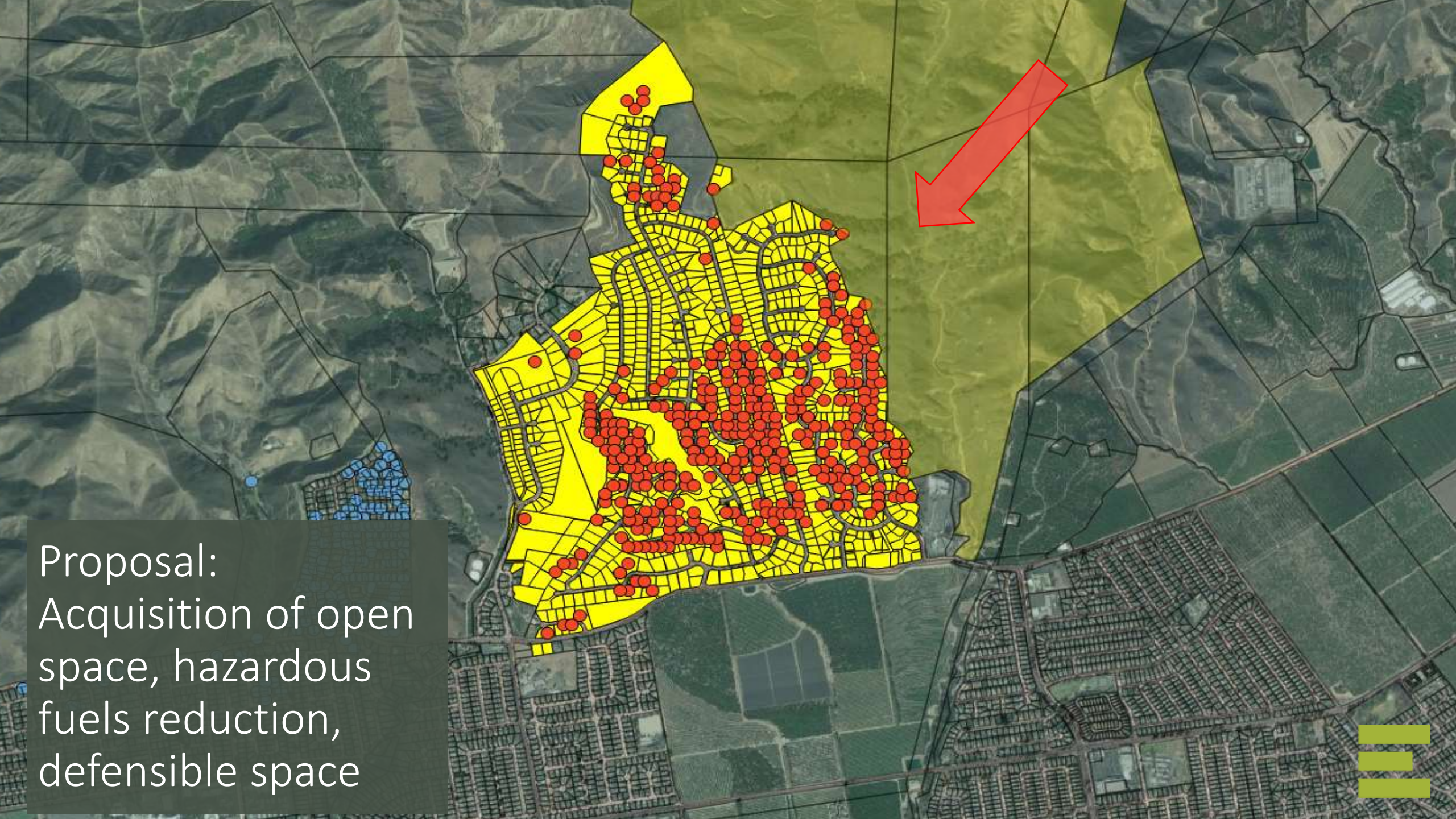
California Wildfires

Post-Wildfire Mitigation

FEMA developed pre-calculated benefits to streamline implementation of mitigation actions in wildfire impacted areas to reduce risk from related hazards such as flood, drought, and slide.

Soil stabilization, flood diversion, and reforestation projects under the cost of $5,250 per acre are determined cost effective and no further BCA is required

Wildfire Mitigation


Proposal:
Acquisition of open space, hazardous fuels reduction, defensible space

DROUGHT

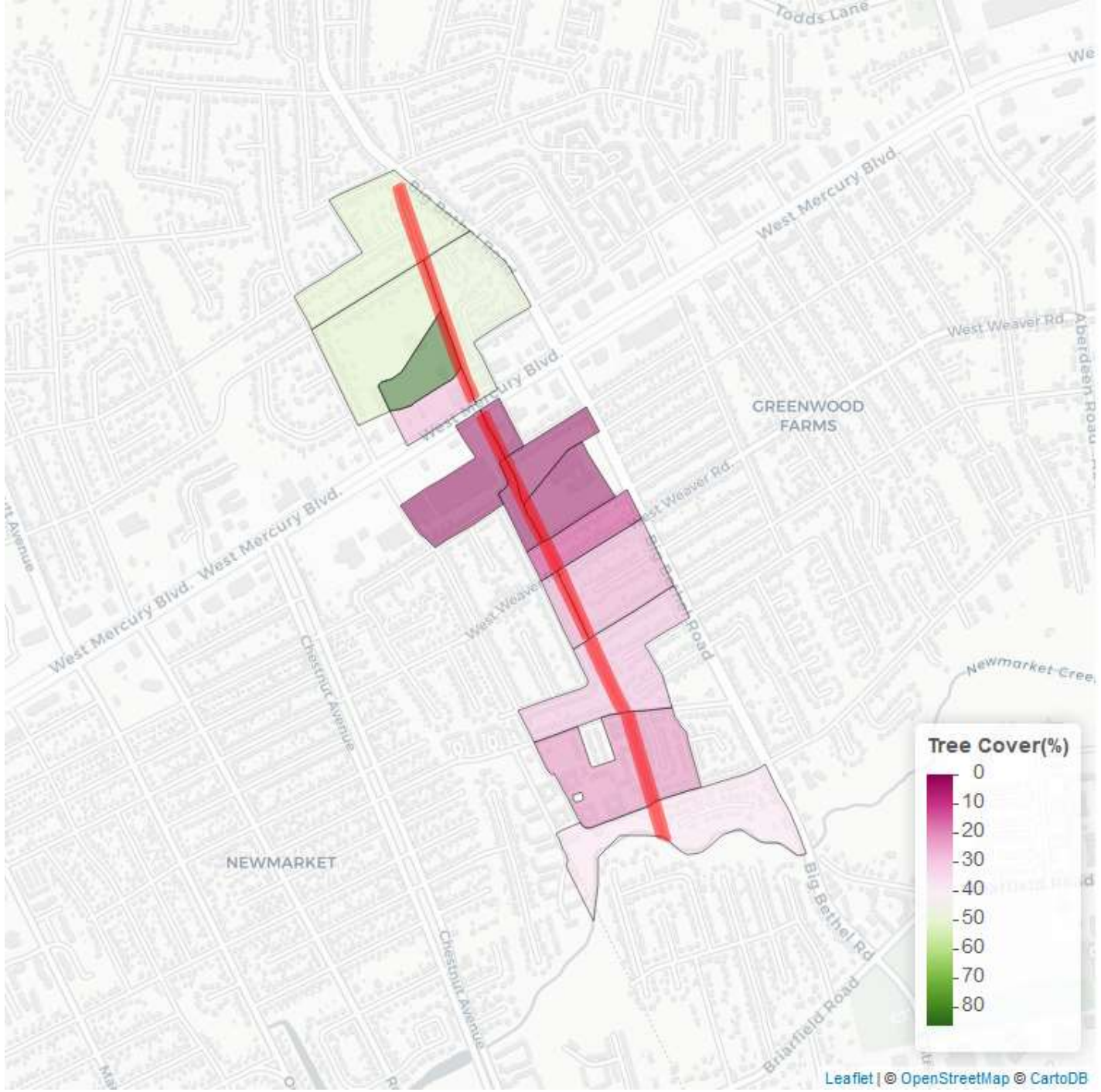

Sequim
Dungeness River
HW-101
2.5 to 5 cfs
5 cfs
Proposed
Infiltration
Area
Flow Direction


Sequim
Dungeness River
HW-101
5 cfs
Proposed Infiltration Area
2.5 to 5 cfs
Flow Direction
Stormwater Conveyance
2.5 to 5 cfs
Incoming Stormwater Flow

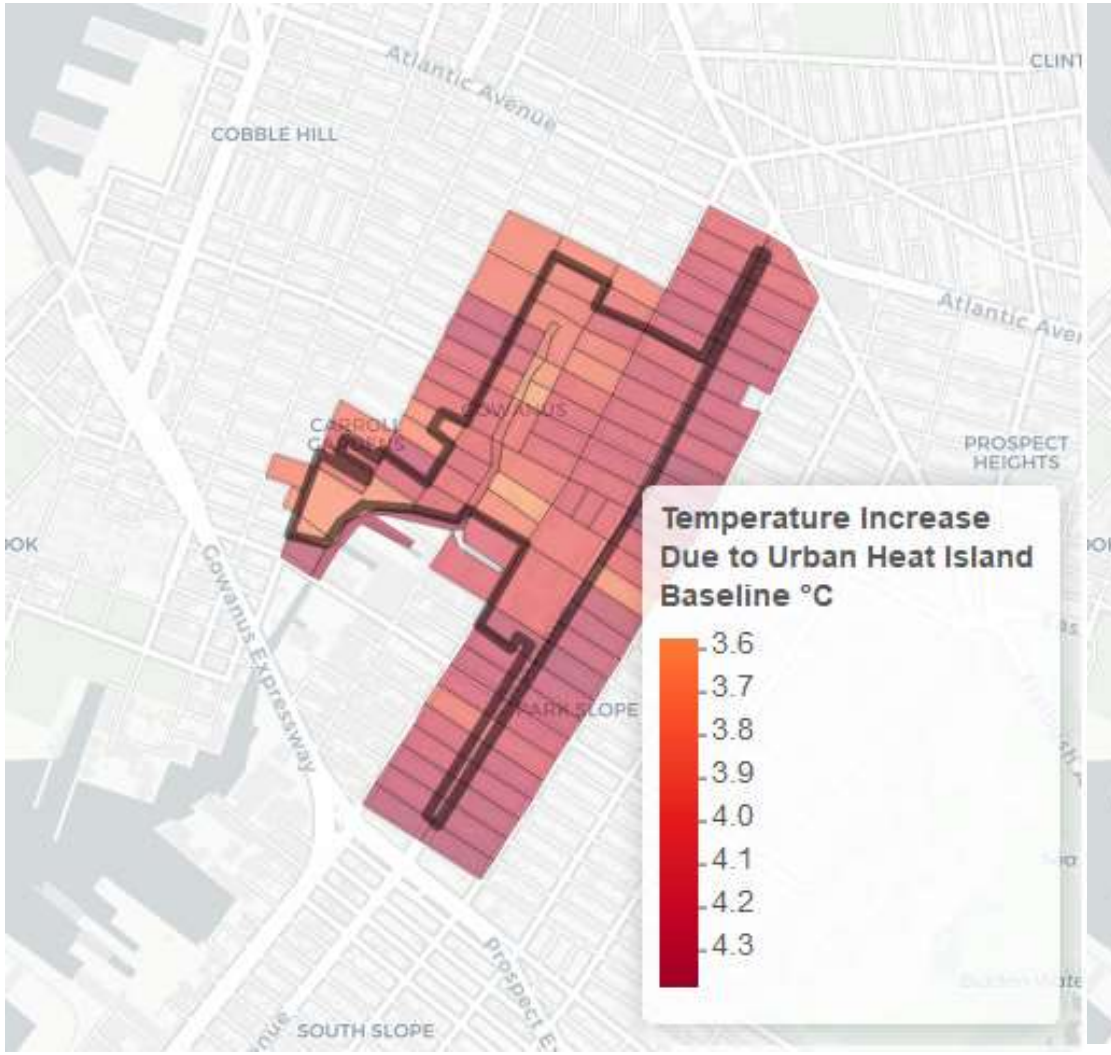
URBAN HEAT ISLAND

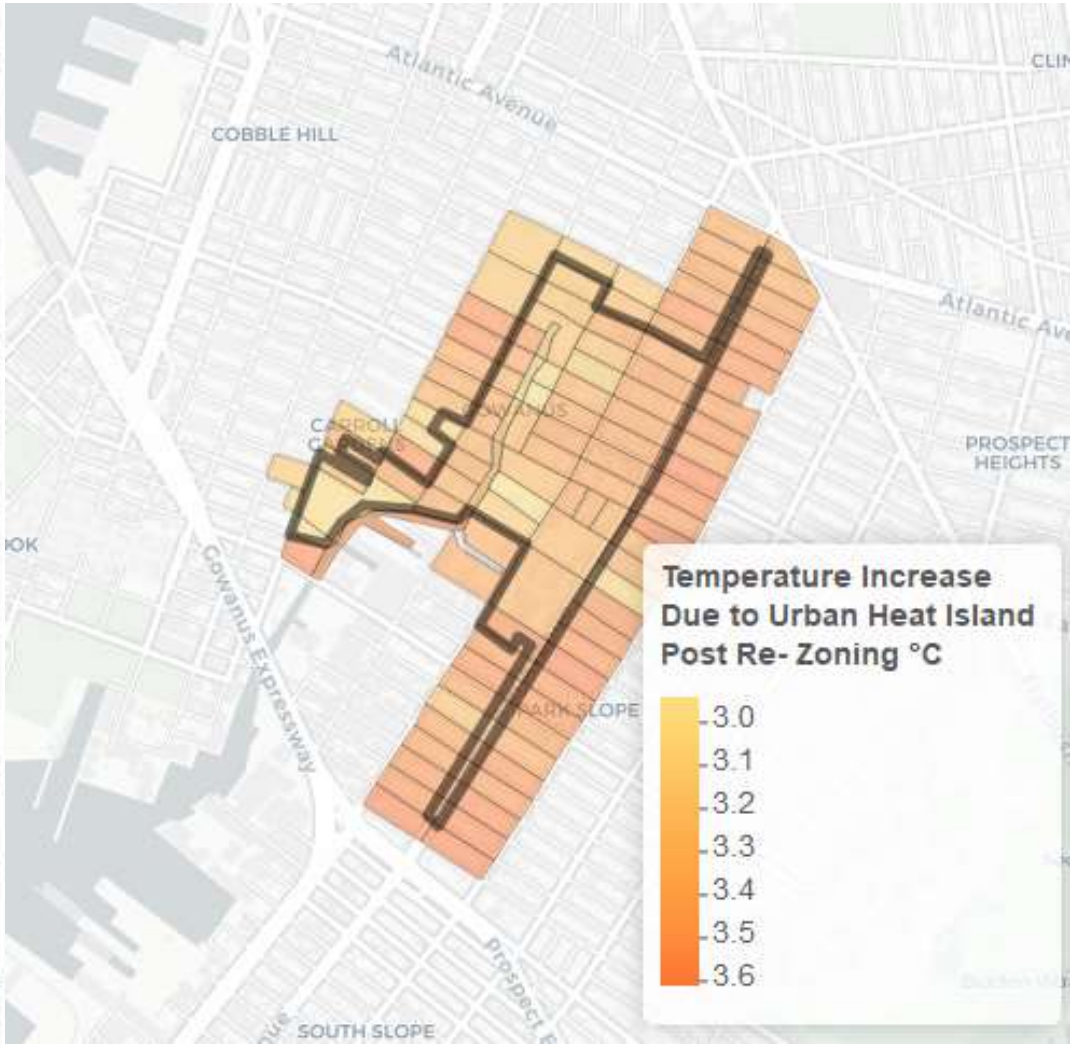
Earth Economics' Heat Island Prototype Tool

- Estimate Urban Heat Island severity (in degrees)
- Estimate heat reduction associated with replacing impervious surfaces with tree cover and vegetation (in degrees)
- Value this reduction via reduced mortality (in dollars)



"The Urban Heat Island effect is currently causing approximately **$24,456.99** in mortality-related damages in the Hampton area per year."





"We estimate that the proposed re-zoning will reduce the health costs of the urban heat island effect in the project area by **$323,249 - $631,117 annually**"

Potential Uses

- Project level (without specific mortality attribution)
- Neighborhood level (with conservative range of mortality attribution)
- City/County level (with more precise mortality attribution)

FEMA funding programs

- Hazard Mitigation Grant Program (HMGP)
  - Post-disaster
  - Up to 15% of total disaster assistance
    - E.g. Hurricane Harvey (2017) >$1 billion
    - E.g. California Wildfires (2017) >$200 million
- Pre-Disaster Mitigation Program (PDM)
  - Similar project types to HMGP
  - Annual, nationally competitive
  - ~$250 million in FY 2018, could increase significantly in FY2020 (BRIC)
- Flood Mitigation Assistance (FMA)

Building Resilient Infrastructure and Communities (BRIC)

- Prioritizes building resilient infrastructure and community capacity
- BRIC is expected to favor projects that have whole community partnerships and look at the bigger picture
- 6 percent set-aside of FEMA's disaster recovery programs' obligations of the previous year from the Disaster Relief Fund
- PDM funding was ~$250 million in FY 2018, could increase significantly (~$900m?) in FY 2020, then average ~$300-500m per year

Who is eligible?

- Certain Private Nonprofits (“PNPs”)
- State Agencies
- Tribes
- Local Governments

What's the process?

1. Project scoping
2. Submit Notice of Intent to state emergency management agency (e.g. CalOES). NOI is reviewed for eligibility.
3. Submit full application to state emergency management agency
4. State agency reviews and submits to FEMA in certain order based on their criteria
5. FEMA approves funding

How Earth Economics can help

- Support discussions with your local agencies to advance specific projects
- Support discussions with your State Hazard Mitigation Officers and FEMA Regional staff
- Support initial project scoping and eligibility questions
- Benefit-Cost Analysis for project applications
- FEMA application review

FEMA BCA Toolkit Update

- Excel-based platform (which means you can use on mac)
- Simpler to use
- Damage Frequency Assessment available in all modules
- Fewer manual input fields


Thank You
rschmidt@eartheconomics.org
EARTH
ECONOMICS

Coping with Rising Seas: The Critical Role of Nature

Laura Geselbracht, Senior Marine Scientist, The Nature Conservancy in Florida

January 2020

Coping with Rising Seas: The Critical Role of Nature

Laura Geselbracht
Senior Marine Science
lgeselbracht@tnc.org

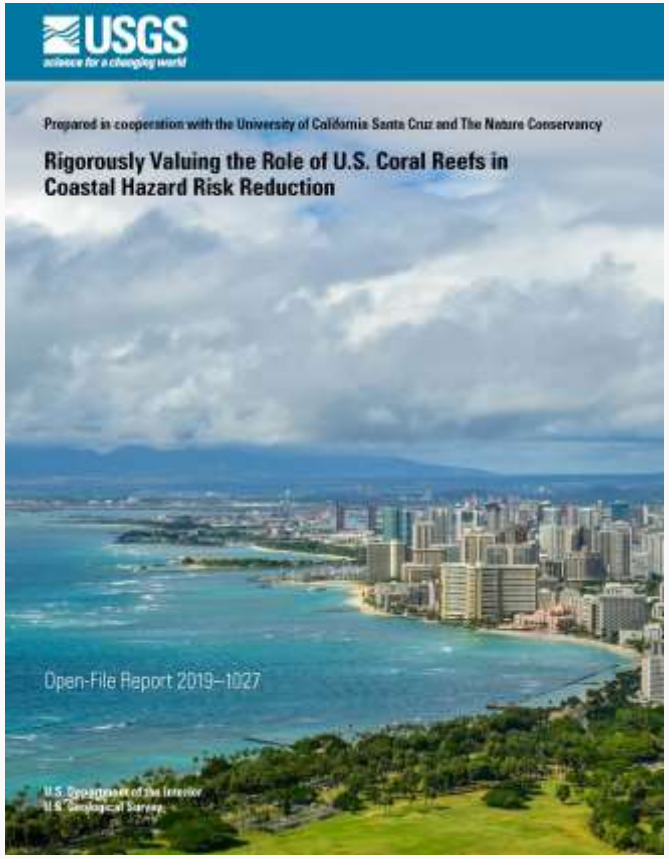
The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends.

The Nature Conservancy

Protecting nature. Preserving life.

Nature/Nature-based Solutions Protect Coastal Communities From Tropical Storms including Hurricanes, Storm Surge and Excessive Rainfall

The Nature Conservancy



2019 report: U.S. coral reefs provide flood protection worth $1.8 billion annually

https://pubs.usgs.gov/of/2019/1027/ofr20191027.pdf

Assessing the role of mangrove forest in reducing coastal inundation during major hurricanes

Post Andrew Modeling Analysis of South Miami-Dade County: "the removal of vegetation (mangroves and marshes) from the model leads to massive flooding with increased total inundation volume and total inundation area in the highly populated low-lying area behind the Biscayne Bay."

"…the vegetation dissipation potential of the mangrove forest is on the order of 66% which is significantly higher than the 40% estimated for marshes (Sheng et al., 2012)."

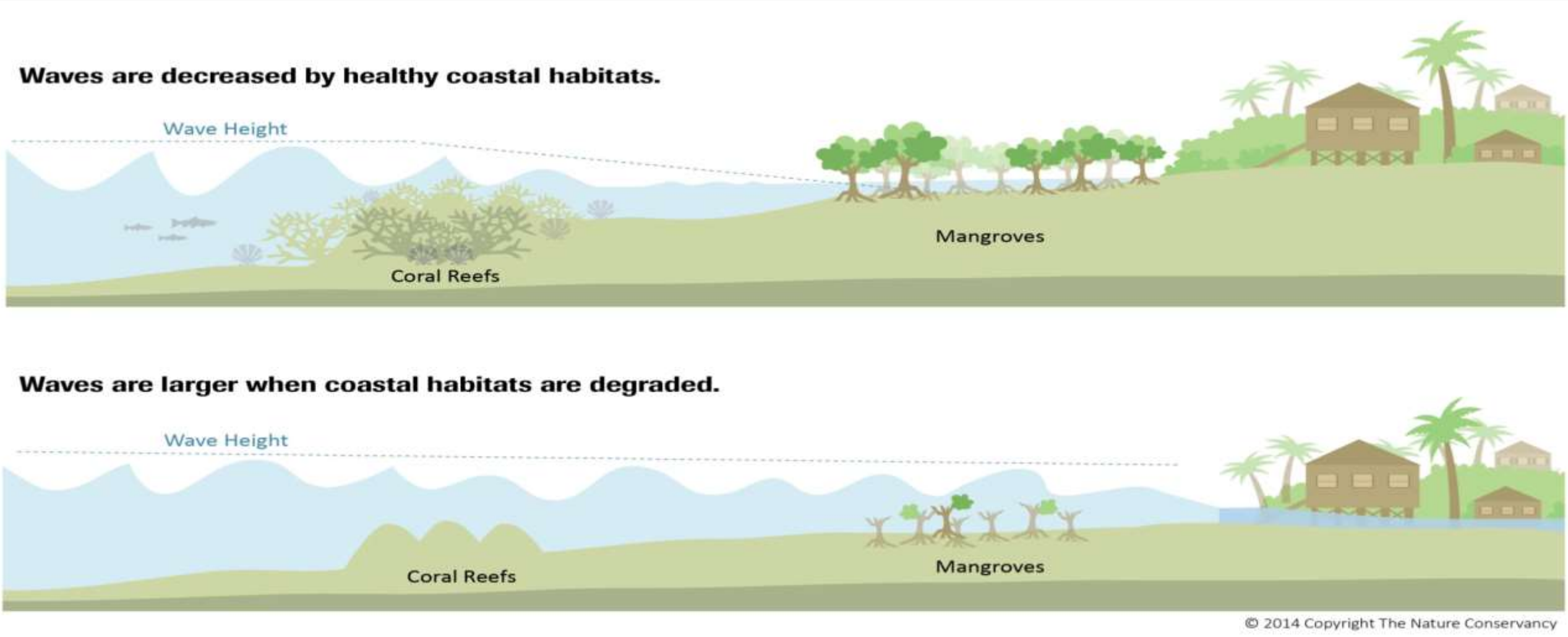
Y. Peter Sheng · Ruizhi Zou, Hydrobiologia (2017) 803:87–103

"…initial degradation of oyster beds following European settlement of the area coincides with a significant increase in wave-derived overwash deposition".

Simulations of Hurricane Sandy and another severe winter storm with and without oyster beds showed that "removal of these oyster beds increases wave energy directly off-shore of our field sites (in New York Harbor) by between 30% and 200%".

Brandon C, Woodruff J, Orton P, Donnelly JP. 2016. Evidence for Elevated Coastal Vulnerability Following Large-Scale Historical Oyster Bed Harvesting Earth Surface Processes and Landforms. Earth Surface Processes and Landforms. DOI: 10.1002/esp.3931

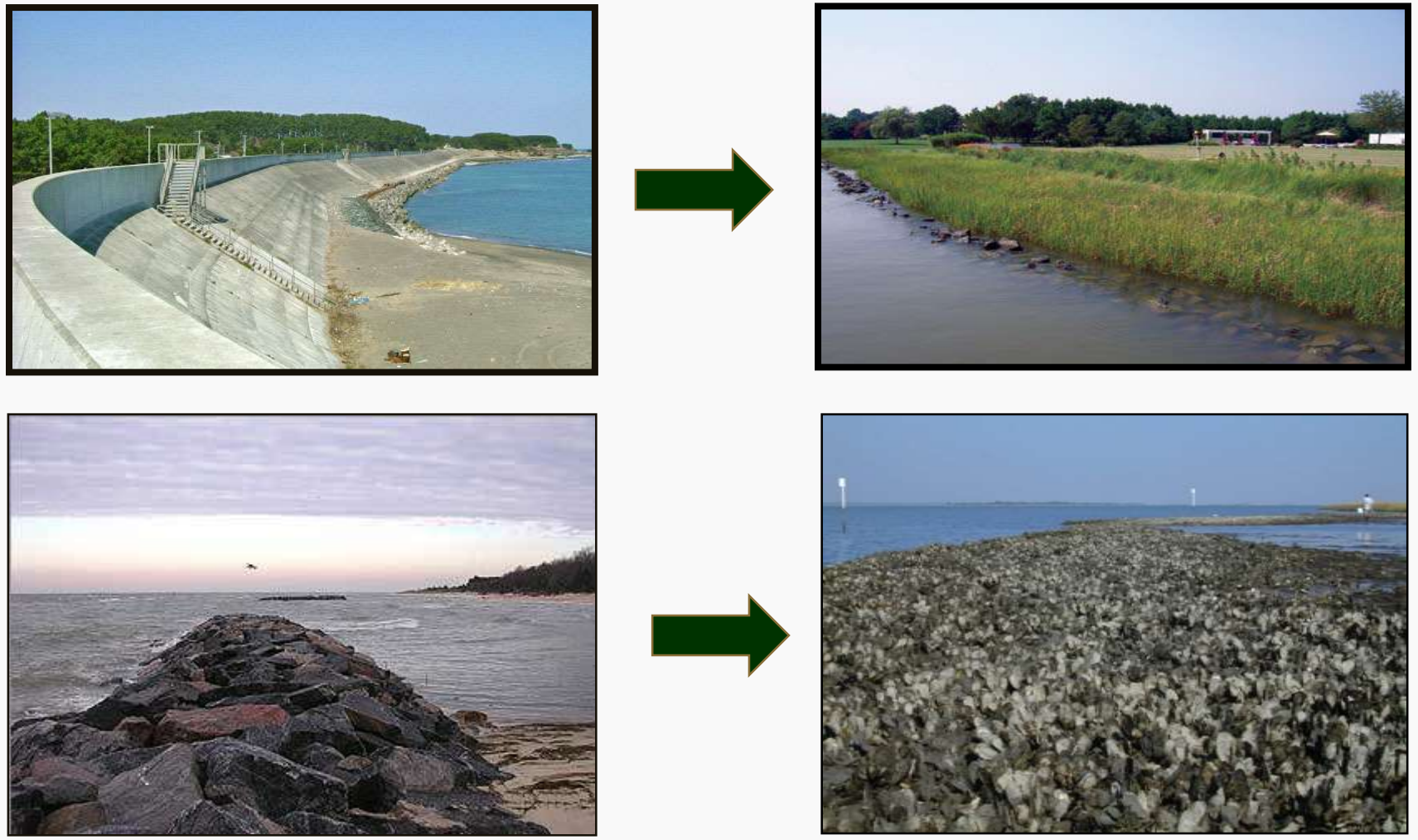
Coastal ecosystems – coral reefs, mangroves, dunes – absorb wave energy & provide numerous co-benefits for south Floridians



Riding the Waves: Working with Nature to Reduce Risk and Adapt to Climate Change

The Nature Conservancy
Protecting nature. Preserving life.

Default vs. natural infrastructure solutions



How TNC Advances the Protection, Restoration and Application of Nature-Based Solutions to Coastal Resilience Strategies in South Florida and Beyond

www.coastalresilience.org

Assessing Risk: Quantifying Avoided Losses due to Coastal Ecosystems

The Nature Conservancy

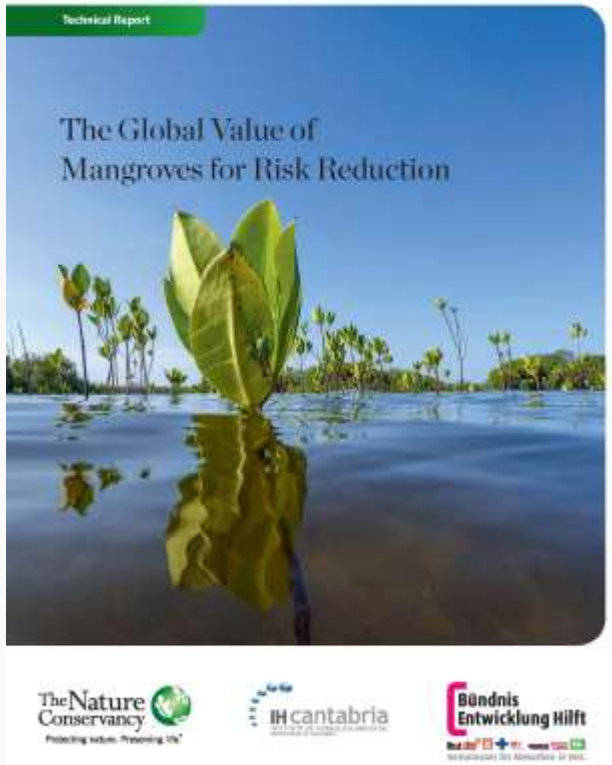
PLoS One RESEARCH ARTICLE 2018

Comparing the cost effectiveness of nature-based and coastal adaptation: A case study from the Gulf Coast of the United States

Borja G. Reguero, Michael W. Beck, David N. Bresch, Juliano Calil, Imen Meliane

- By 2030 flooding will cost $134 – 176 billion due to more development in risk prone areas;
- cost-effective adaptation measures could prevent up to $57 billion in losses (43%) over the next 20 years.
- Nature-based adaptation options could avert more than 36.6% of these costs (annualized portfolio) with an average benefit to cost ratio above 3.7.
- Wetland and oyster reef restoration were found to be particularly cost-effective.

https:// doi.org/10.1371/journal.pone.0192132



"Without mangroves 39% more people (globally) would be flooded annually, and flood damages would increase by more than 16% and US $82 billion annually."

Losada, I. J., P. Menéndez, A. Espejo, S. Torres, P. Díaz-Simal, and others. 2018. Technical Report. The Nature Conservancy, Berlin.

ARTICLE

DOI: 10.1038/s41467-018-04568-z OPEN

The global flood protection savings provided by coral reefs

Michael W. Beck[1,2], Iñigo J. Losada[3], Pelayo Menéndez[3], Borja G. Reguero[1,2], Pedro Díaz-Simal[3] & Felipe Fernández[3]

2018

"…annual expected damages from flooding would double, and costs from frequent storms would triple without reefs.

For 100-year storm events, flood damages would increase by 91% to $US 272 billion without reefs."

REGUERO *ET AL.* PAPER (FROM PREVIOUS PAGE)

Nature-Based Solutions are in Blue

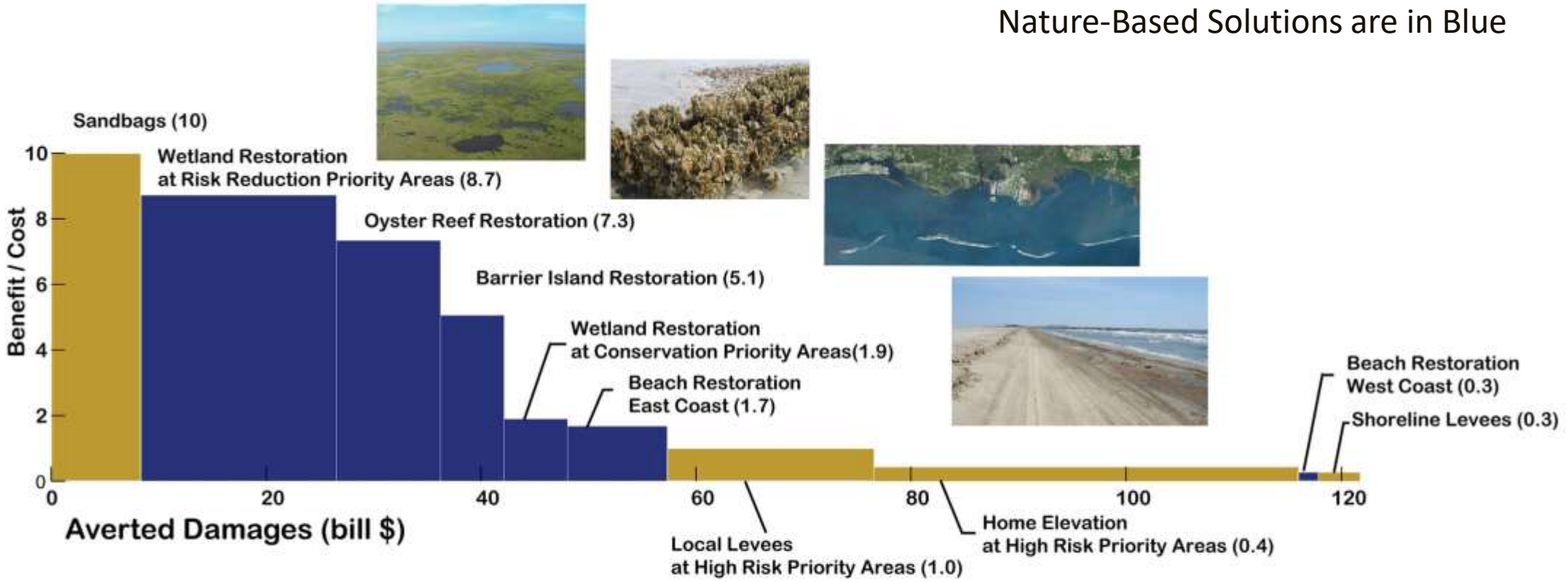
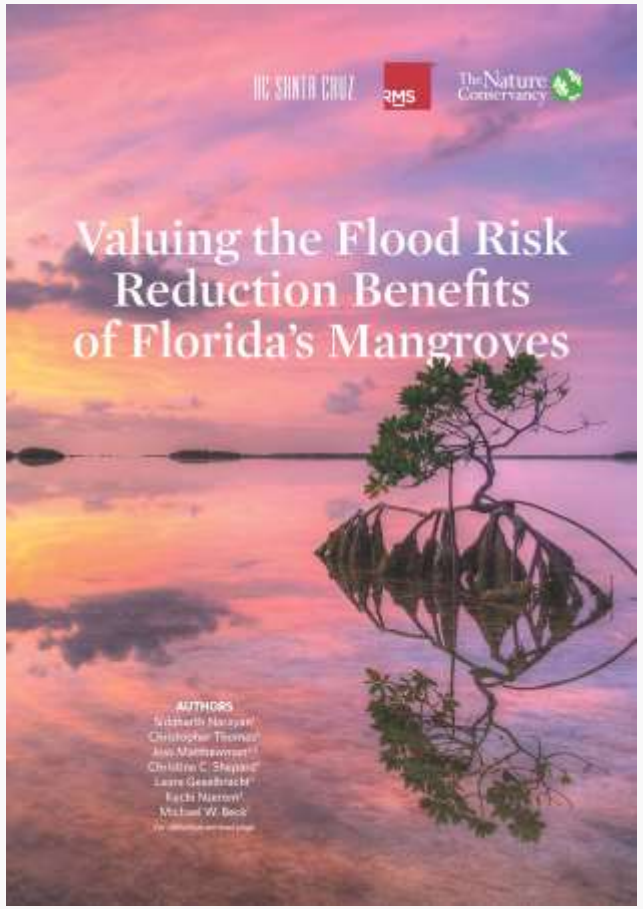
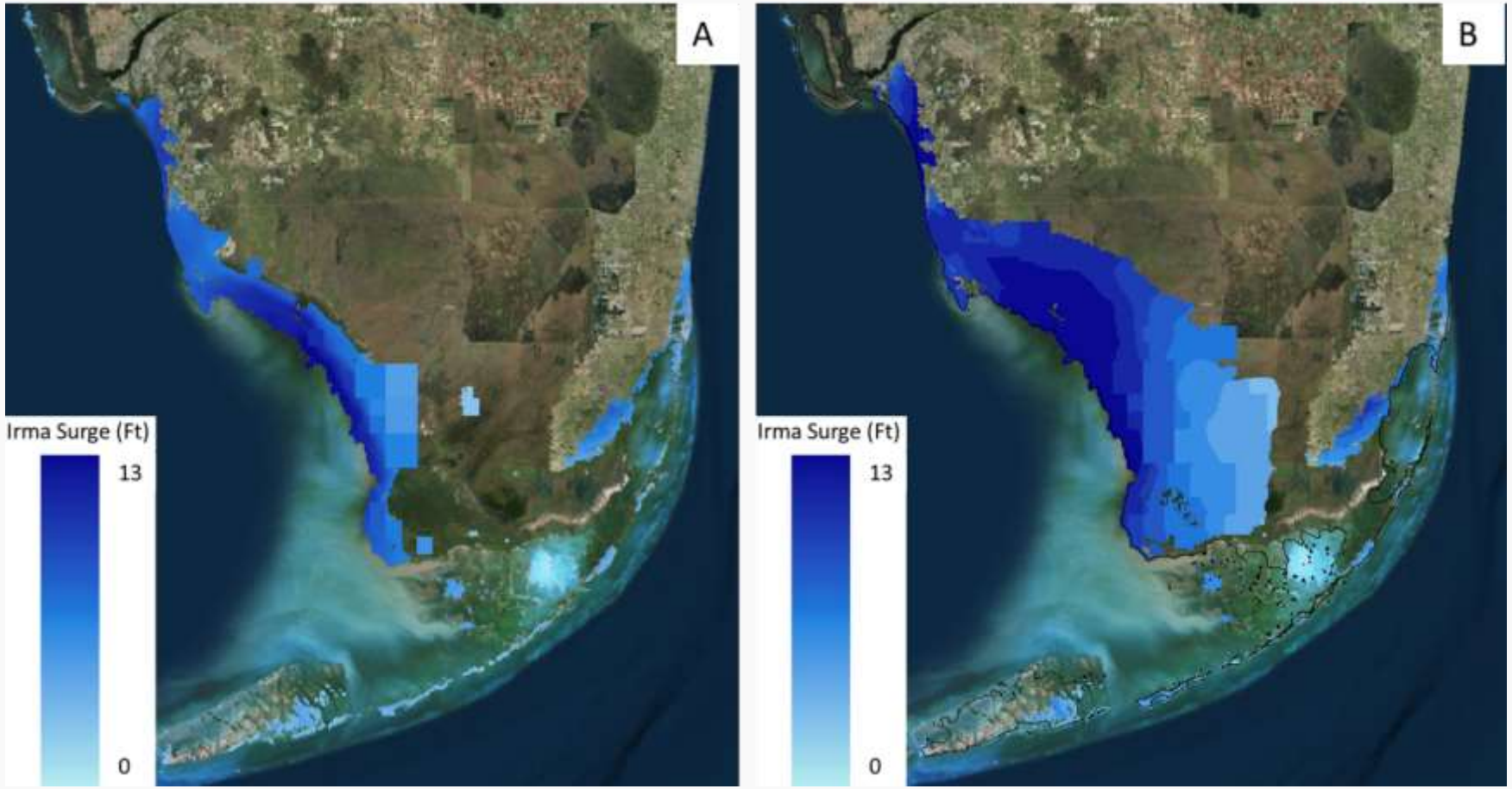


Fig 6. Cost-benefit analysis. Comparison of the costs and benefits of the adaptation measures. Benefit to cost ratios are represented in the vertical axis (height of the bars), with the horizontal axis noting the aggregated benefit (i.e. total averted damage), and the width of the bars the individual benefit from each measure. The blue bars identify nature-based adaptation measures, while the brown color represent the remaining adaptation measures. The values correspond to net present values with a 2% discount rate, for low future economic exposure growth and an implementation period of 20 years. Sources of images: flickr from U.S. Geological Survey, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, and U.S. Geological Survey LandSat imagery.

https://doi.org/10.1371/journal.pone.0192132.g006

Collaboration with Risk Management Solutions (RMS)
Value of Mangroves for Storm Loss Reduction, Hurricane Irma





Modelled flood extents during Hurricane Irma. A: With Mangroves, B: Without Mangroves. Base-map from ©ArcGIS Online.

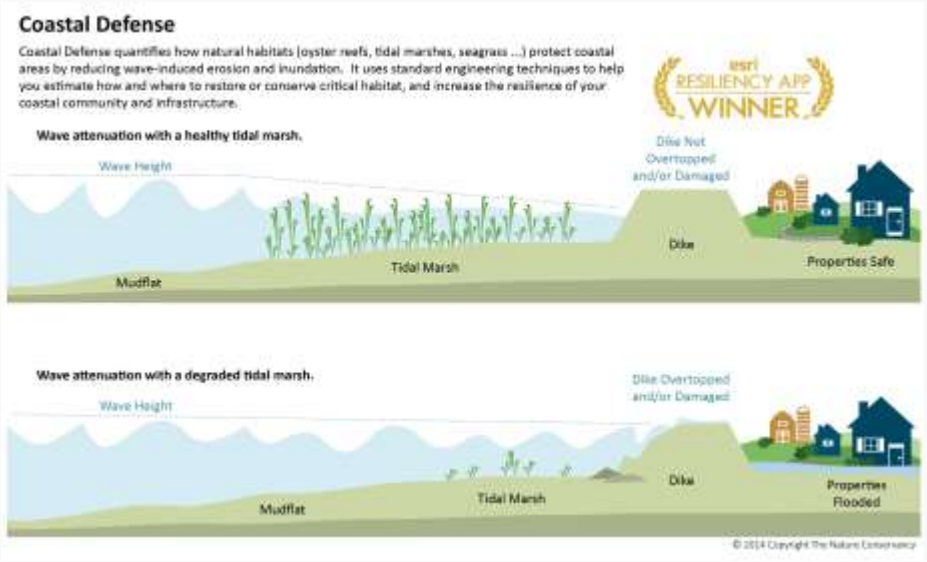
Narayan, S., C. Thomas, J. Matthewman, C. C. Shepard, A. Birch, L. Geselbracht, M. W. Beck. 2019. The Flood Risk Reduction Benefits of Florida's Mangroves During Hurricane Irma And Beyond. The Nature Conservancy, Washington, DC.

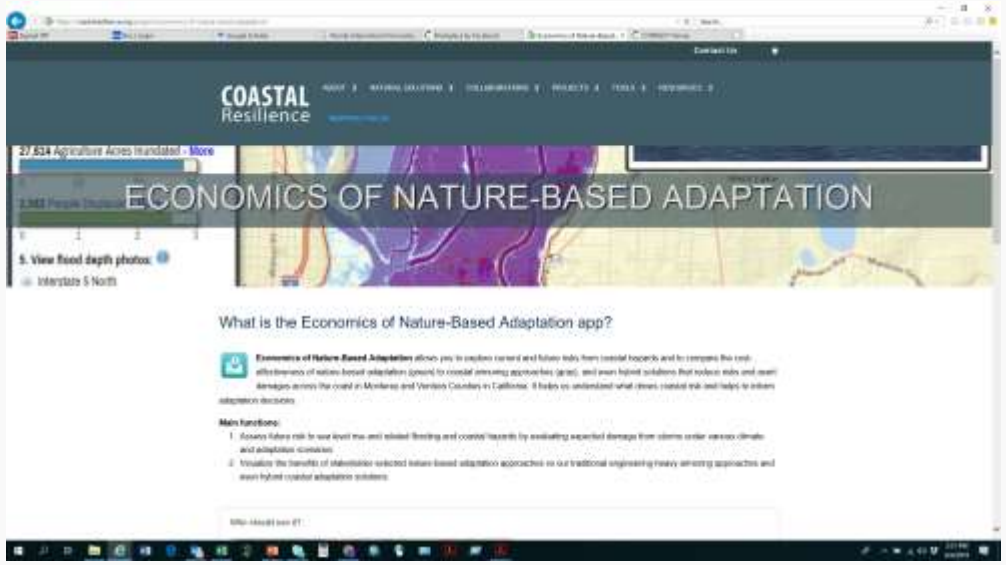
How TNC Advances the Protection, Restoration and Application of Nature-Based Solutions to Coastal Resilience Strategies in South Florida and Beyond

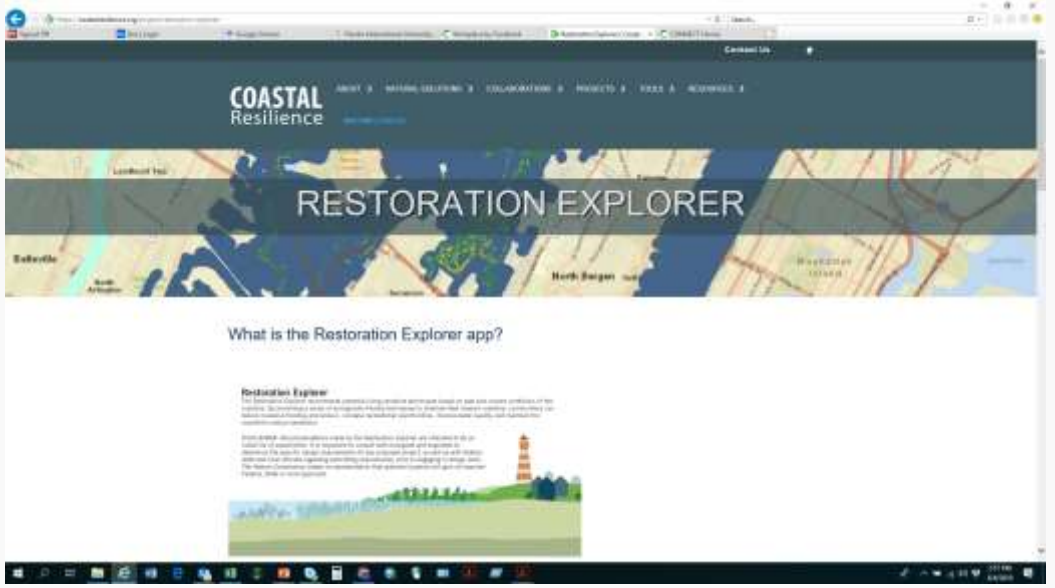
www.coastalresilience.org

Identifying Solutions through the use of decision support tools (coastalresilience.org)

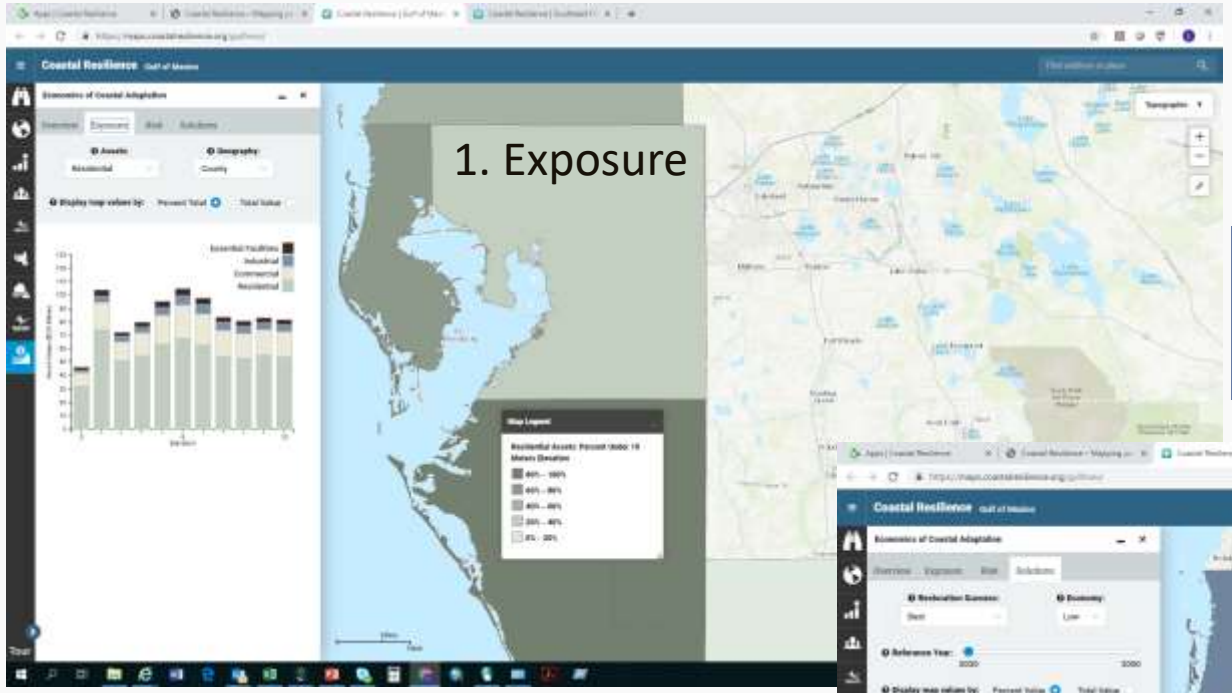
The Nature Conservancy

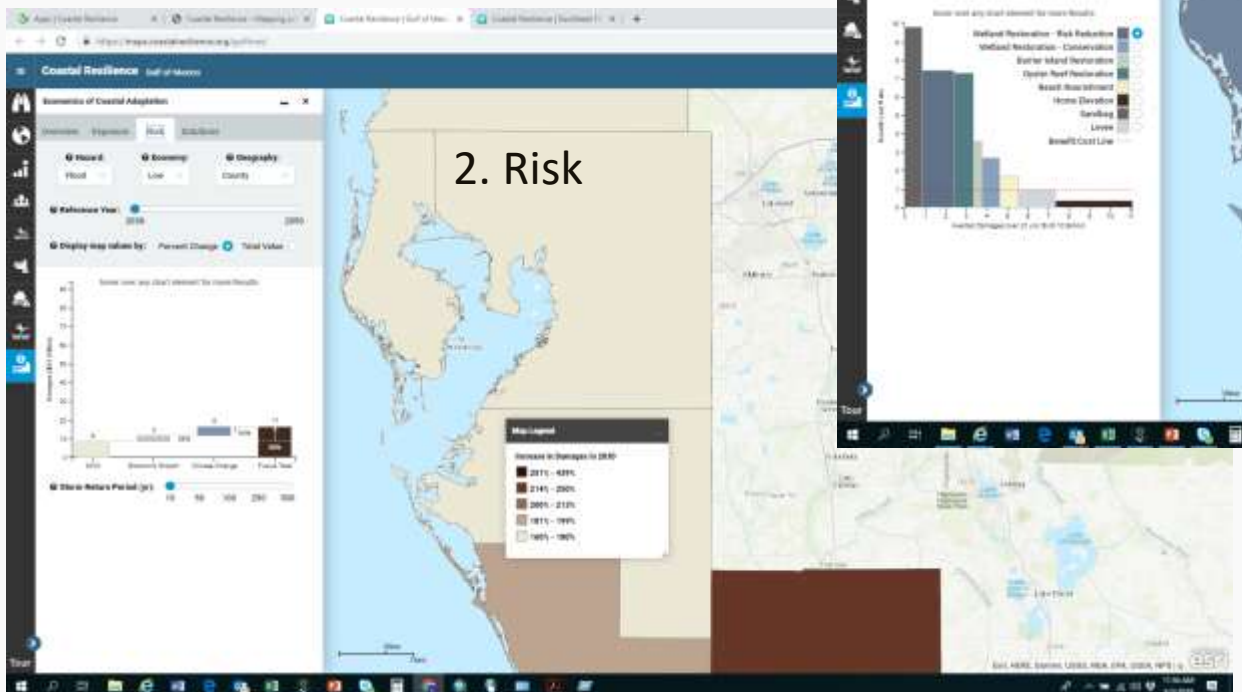


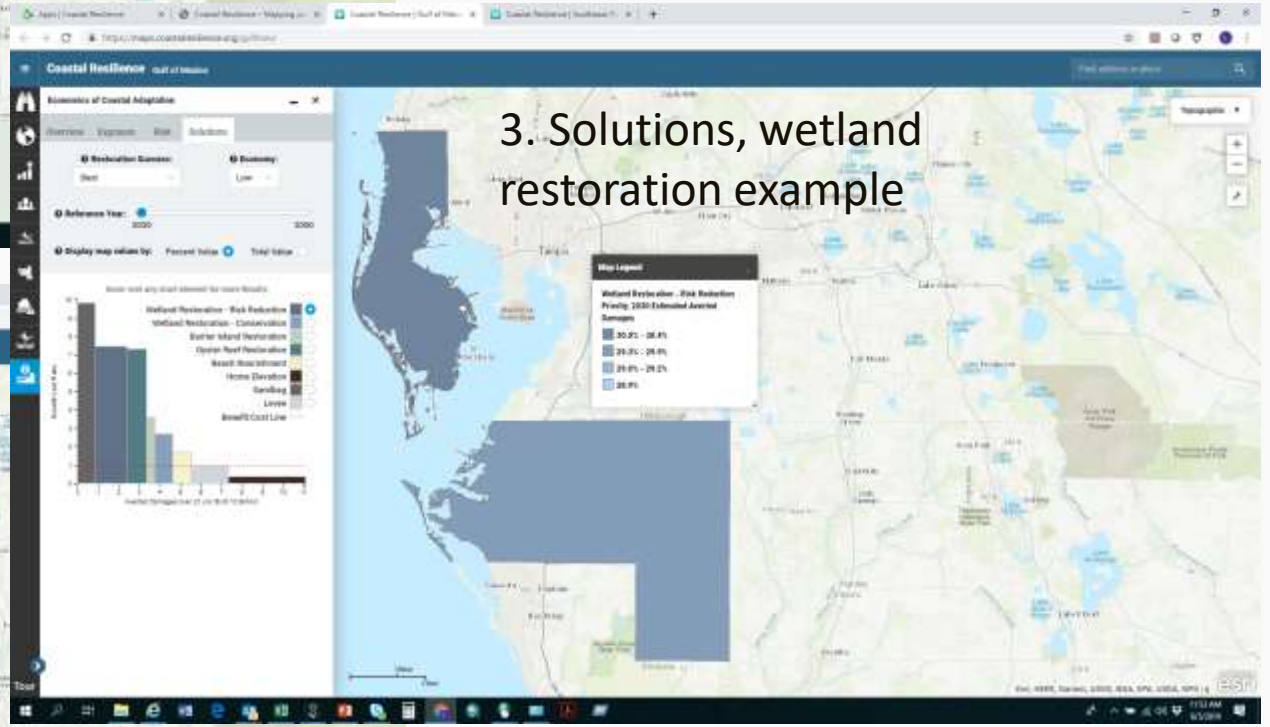




Economics of Coastal Adaptation App (CoastalResilience.org)





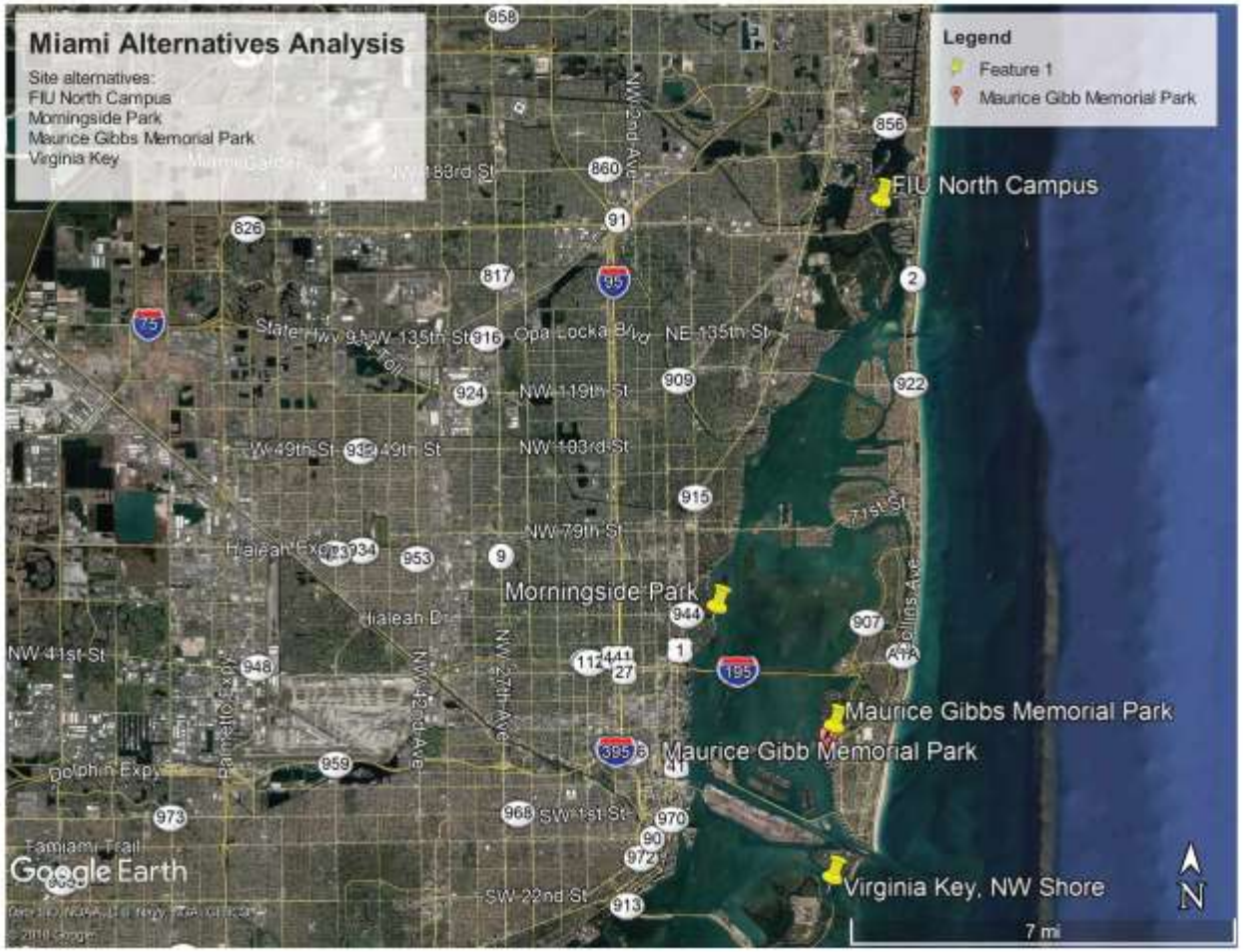


Based on analyses done in the Reguero *et al.* 2018 paper

Take Action: Local Projects to Reduce Flooding Risks and Losses

Collaboration with Chubb

Miami Demonstration Project



Considering cost-effective solutions using mangrove stands, oyster reef, raised berms and offshore islands, breakwaters

Recap: Reducing Losses Will Require

- Minimizing exposure of coastal infrastructure
- Preserving existing coastal ecosystems
- Restoring coastal ecosystems
- Utilizing nature-based solutions combined with grey infrastructure where warranted.

Take Action: Innovative Funding Solutions to Increase Coastal Resilience – Coral Reefs

- Coral reefs, first line of defense protecting coastal populations from storms
- In Florida, $675 m in annual avoided losses
- Corals increasingly vulnerable to bleaching and disease.
- Loss of 1 m of reef could double the cost of storm damage

In Mexico:

- TNC partnered with government of Quintana Roo, Swiss Re, tourism industry and local community in Cancun area
- Mexico Solution: A Fee paid by beachfront property owners to a trust fund will pay for ongoing reef management and for an insurance policy to repair the reef after large-scale storm damage

In US: We are currently examining if a similar approach could work in Florida and Hawaii. If feasible, we will work with partners to establish an insurance policy by 2022.

Thank You!

For more information contact Laura Geselbracht at lgeselbracht@tnc.org

Questions and answers

Please ask questions!

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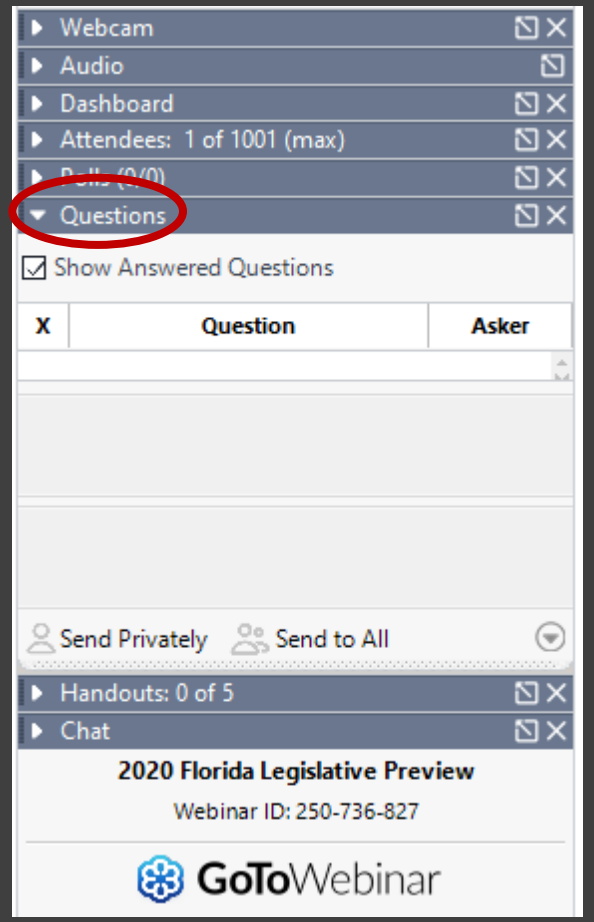
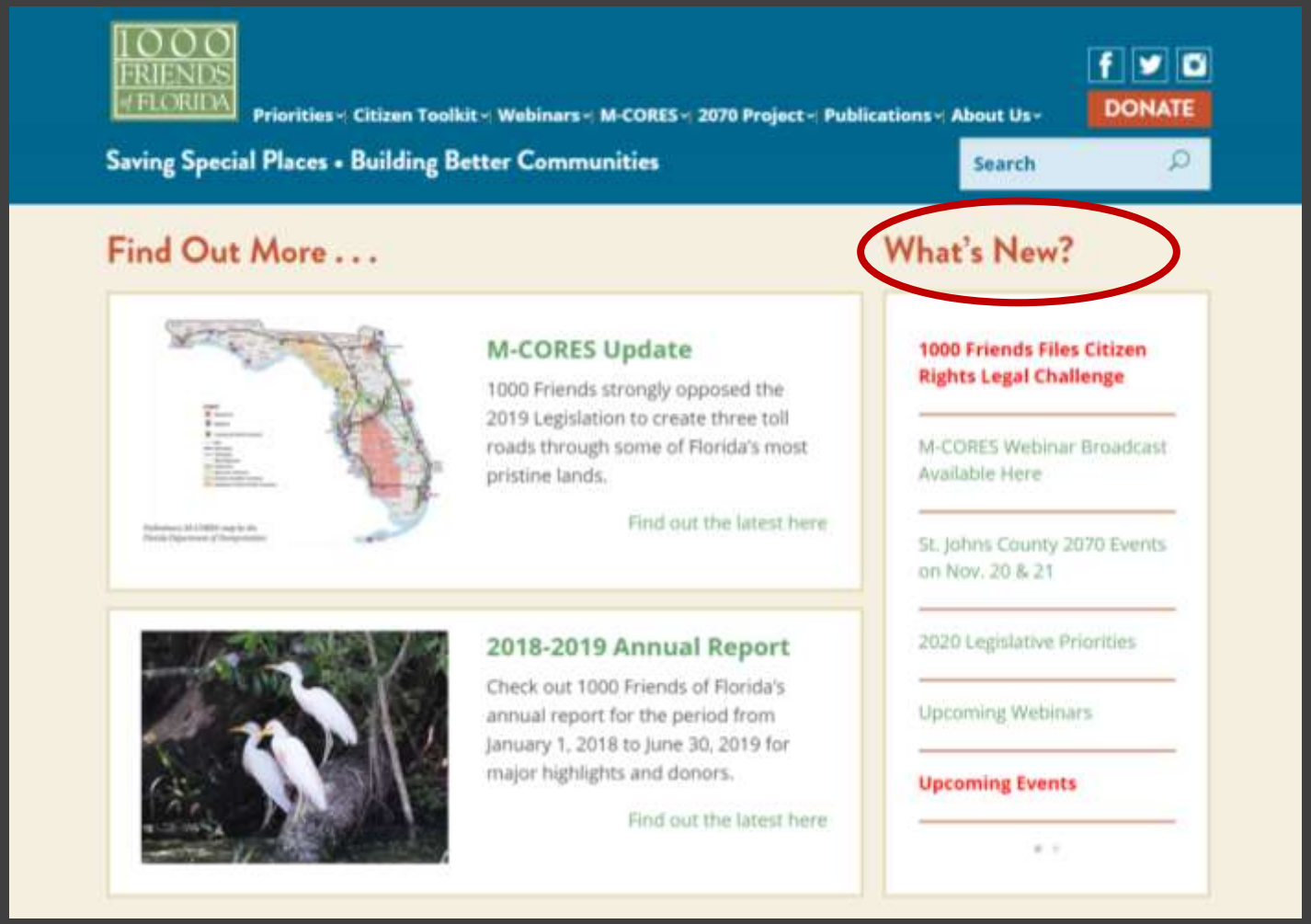
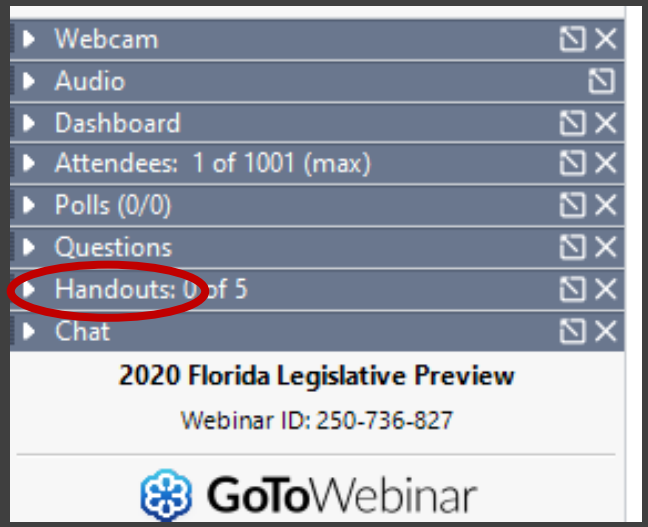


The PowerPoint is available under "What's New" at www.1000fof.org





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This webinar has been approved for:

Planners (1.5 AICP CM #9192437)

Florida attorneys (2 CLE #1909795N)

Florida Certified Environmental Health Professionals (.10 CEUs)

Florida Certified Floodplain Managers (1 CEC)

In the follow up email for the LIVE WEBINAR you will receive:

A link to a brief survey to help us improve future webinars

A certificate of attendance

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For Landscape Architects:

1000 Friends has not yet received certification information from the DBPR. We will post an update at https://1000fof.org/upcoming-webinars/credits/

If credits are approved, 1000 Friends only provides certificates of attendance for those who attend the live webinar

1. In the follow up email sent an hour after the live webinar you will receive a certificate of attendance
2. Use Google Chrome to download the certificate
3. Add the course number, provider number and your number to the certificate
4. Submit the certificate yourself to DBPR

Florida landscape architects (1000 Friends' provider # PVD151)

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- March 11 – The Economics of Development in Florida
- April 15 – 2020 Florida Legislative Wrap Up

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1000 Friends has applied for credits for planners (AICP CM), Florida attorneys (CLE), Florida landscape architects (DBPR), Florida Certified Floodplain Managers (CLE), and Florida Certified Environmental Health Professionals (CEHP), but cannot guarantee that credits will be approved.

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