

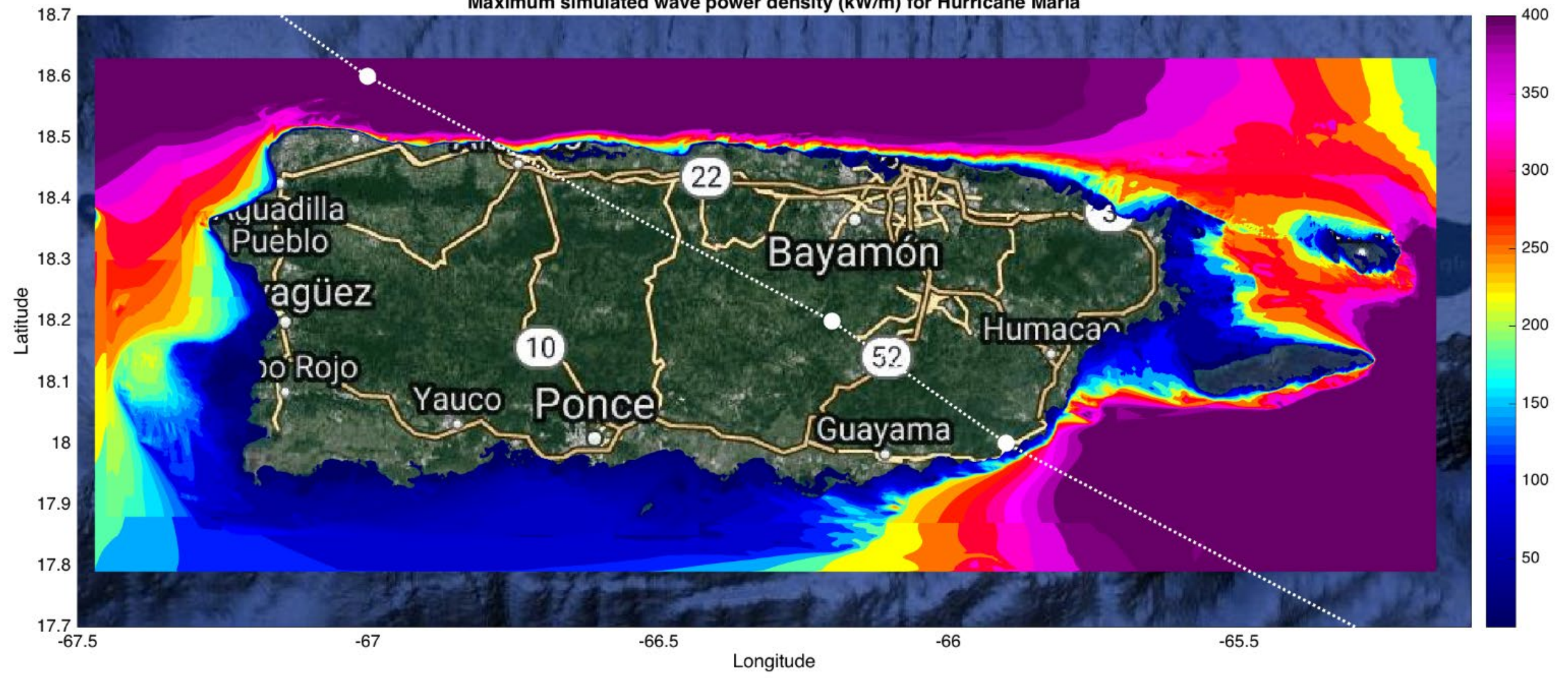
Coral reef assessment and restoration after Hurricanes Maria and Irma

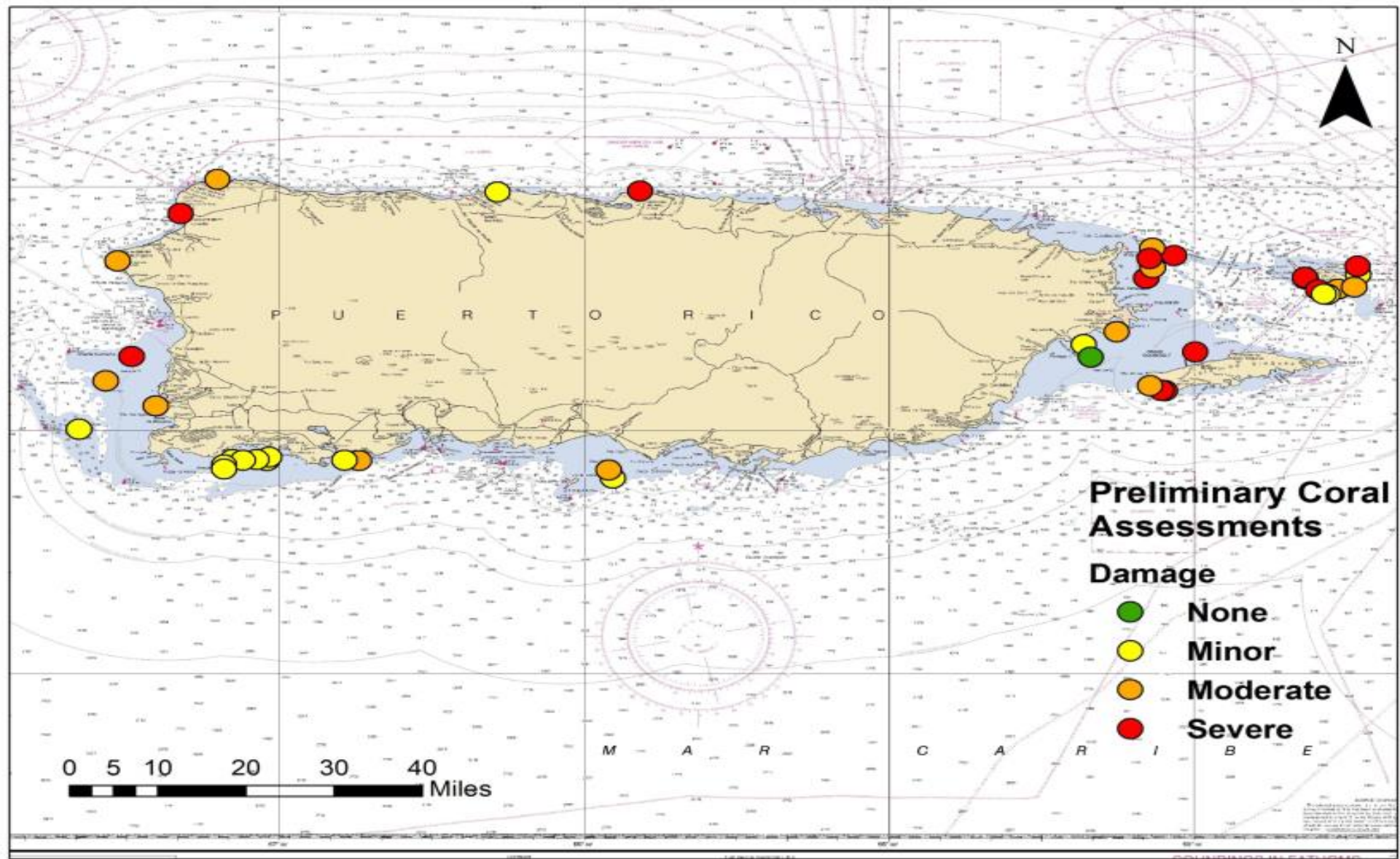


NASA

Michael Nemeth and Sean Griffin
NOAA Restoration Center
CRRT meeting
May 2019

Maximum simulated wave power density (kW/m) for Hurricane María





Preliminary assessment and triage work conducted in the fall of 2017
Funded by NOAA and NFWF



Coral Breakage

Severe damage to Acropora, Dendrogyra and Porites (Branching and Pillar corals)

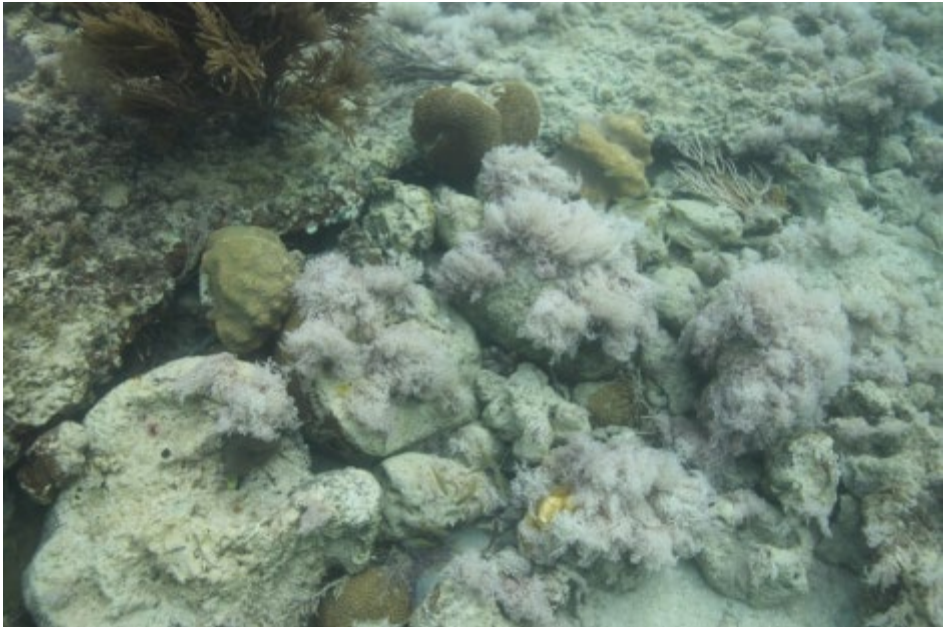


Coral Breakage

Severe damage to *Orbicella annularis*
ESA listed species



Coral Detachment



Coral Burial by Rubble



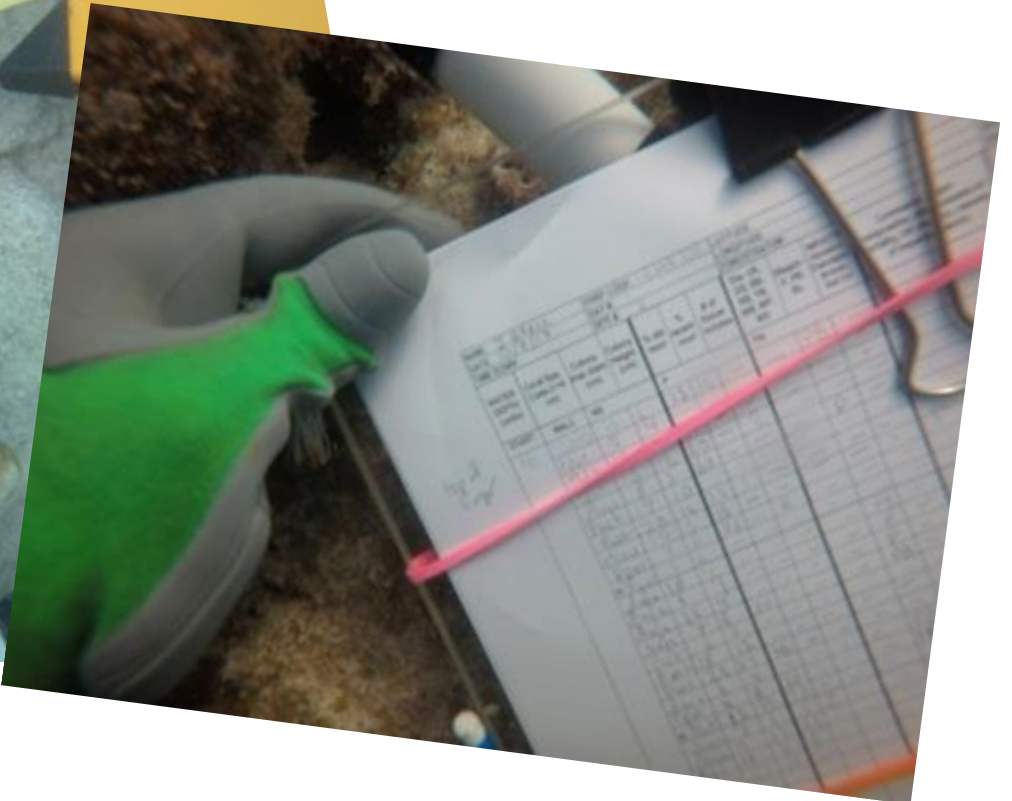
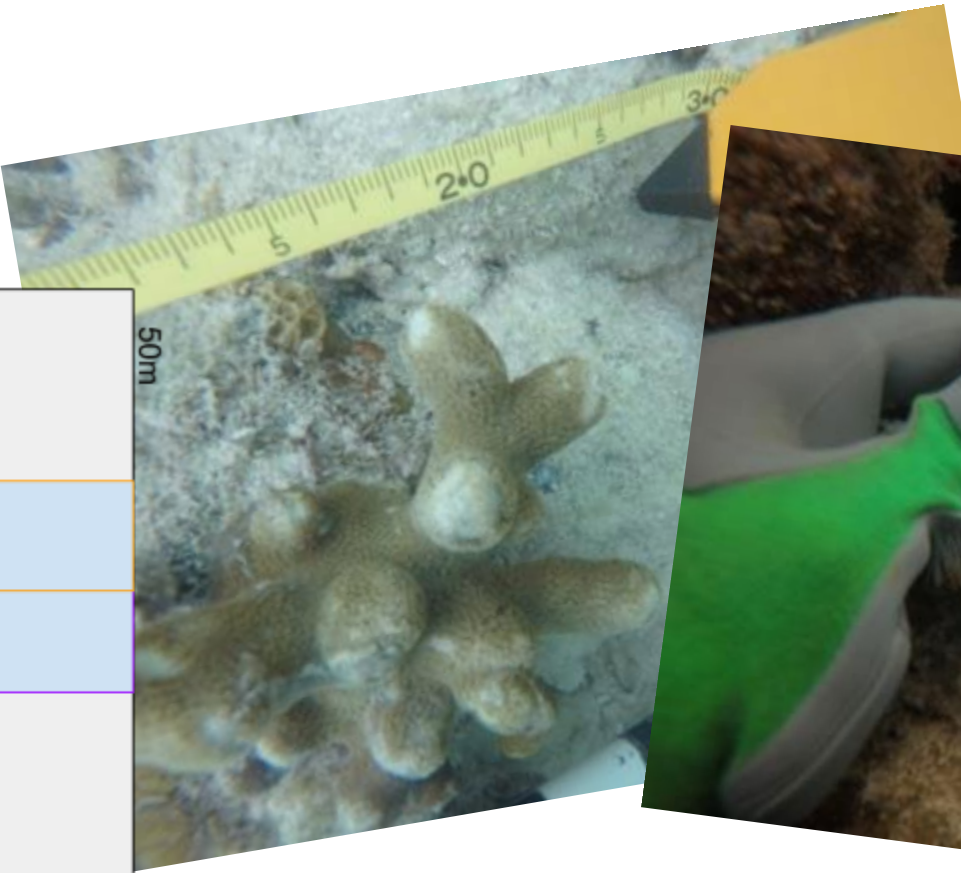
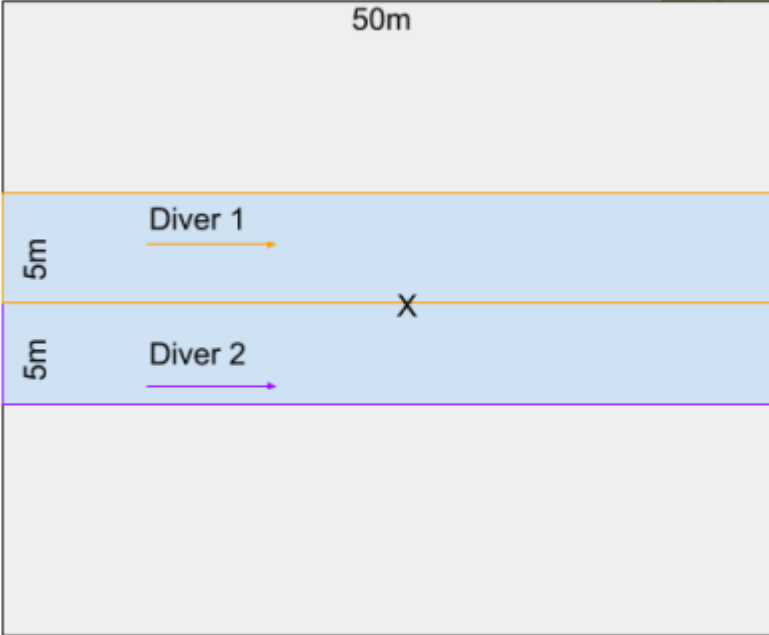
FEMA Mission Assignment

- Describe status of Puerto Rican coral reefs after impacts from Hurricanes Irma and Maria
- Identify sites as candidates for emergency coral triage
- Conduct emergency coral triage
- Identify coral reefs that are potential long-term restoration candidates

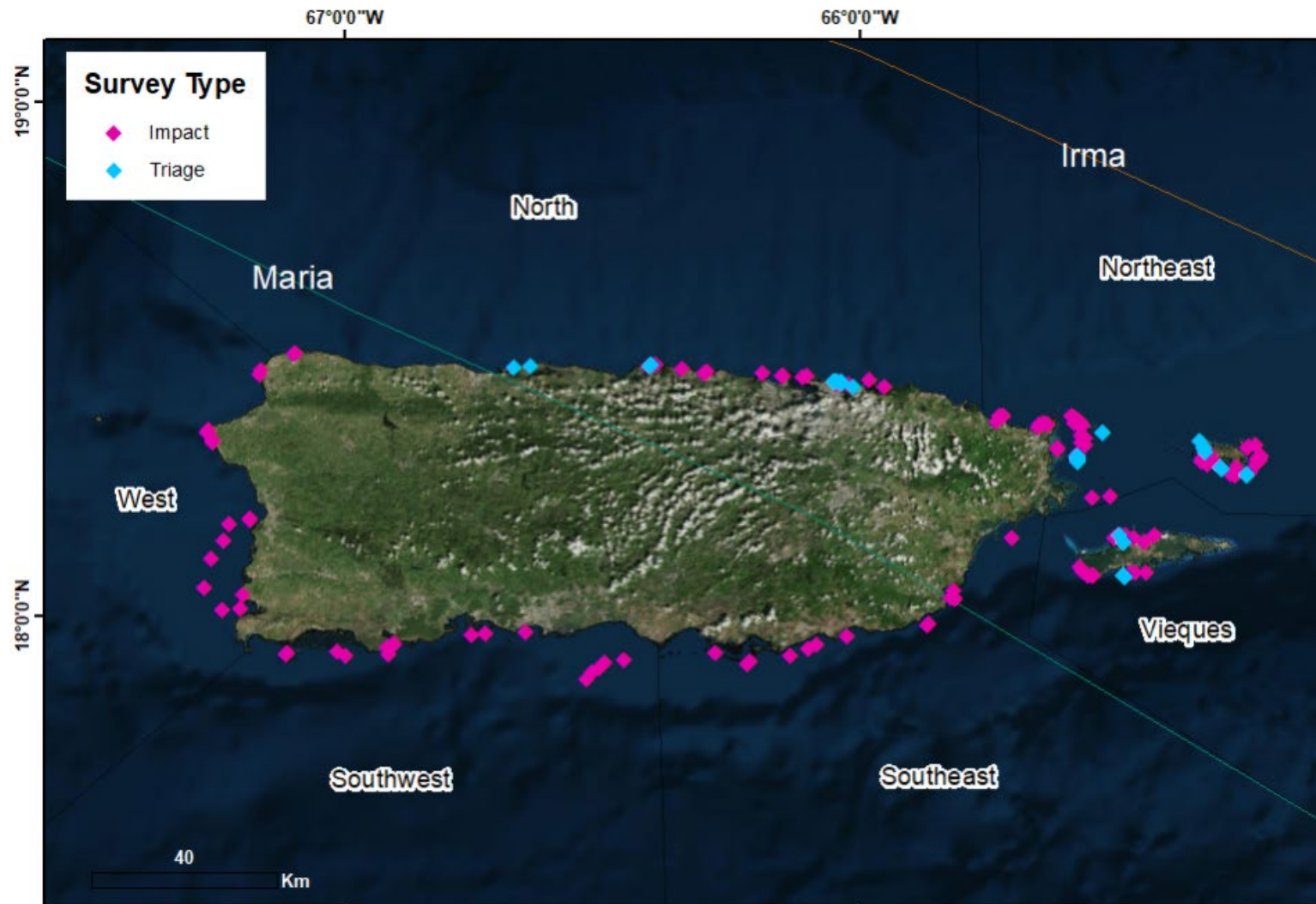


METHODS

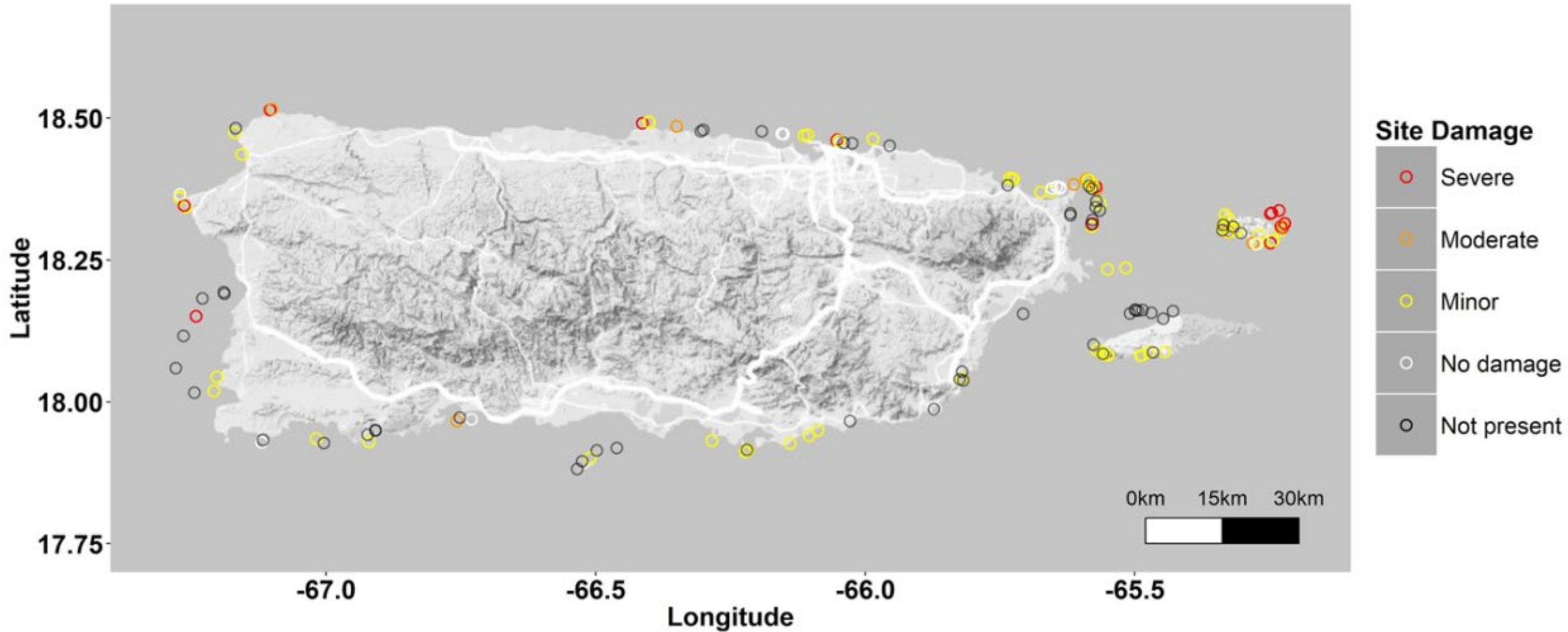
Transect survey to determine damage by species and size class, including photo and video



Survey sites



Status of Puerto Rico's Coral Reefs in the Aftermath of Hurricanes Irma and Maria



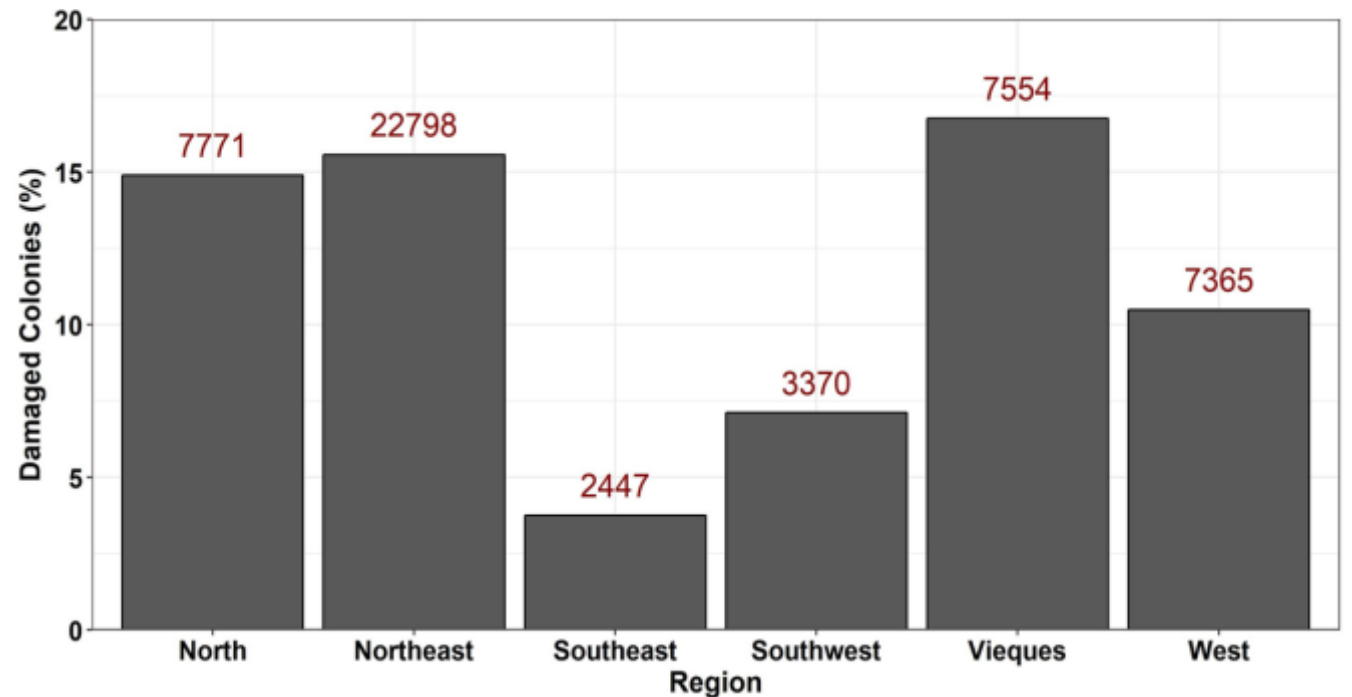
Results

A total of 414,354 m² and more than 80,000 corals sampled at 153 stations.

Overall 11% of corals damaged.

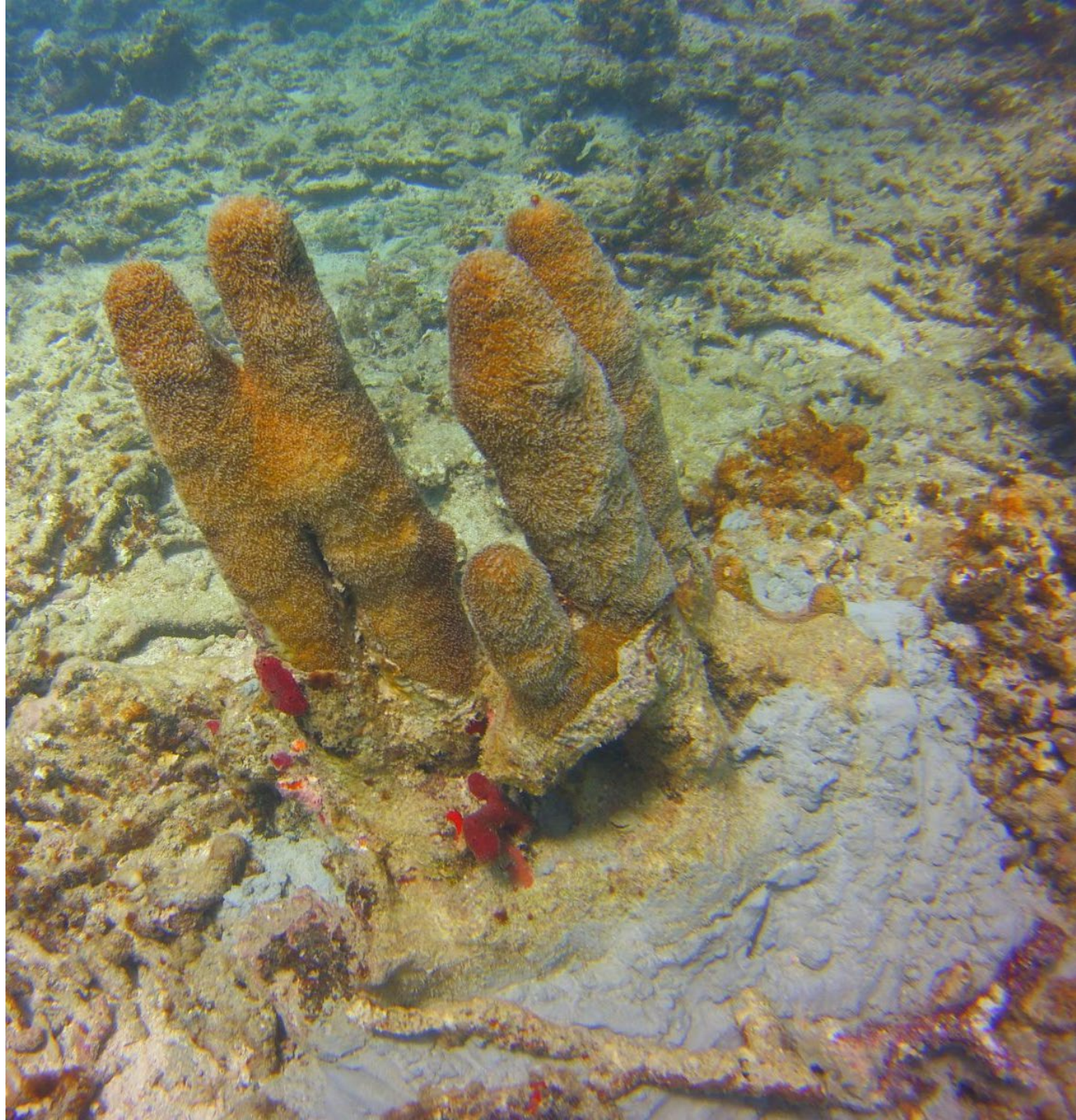
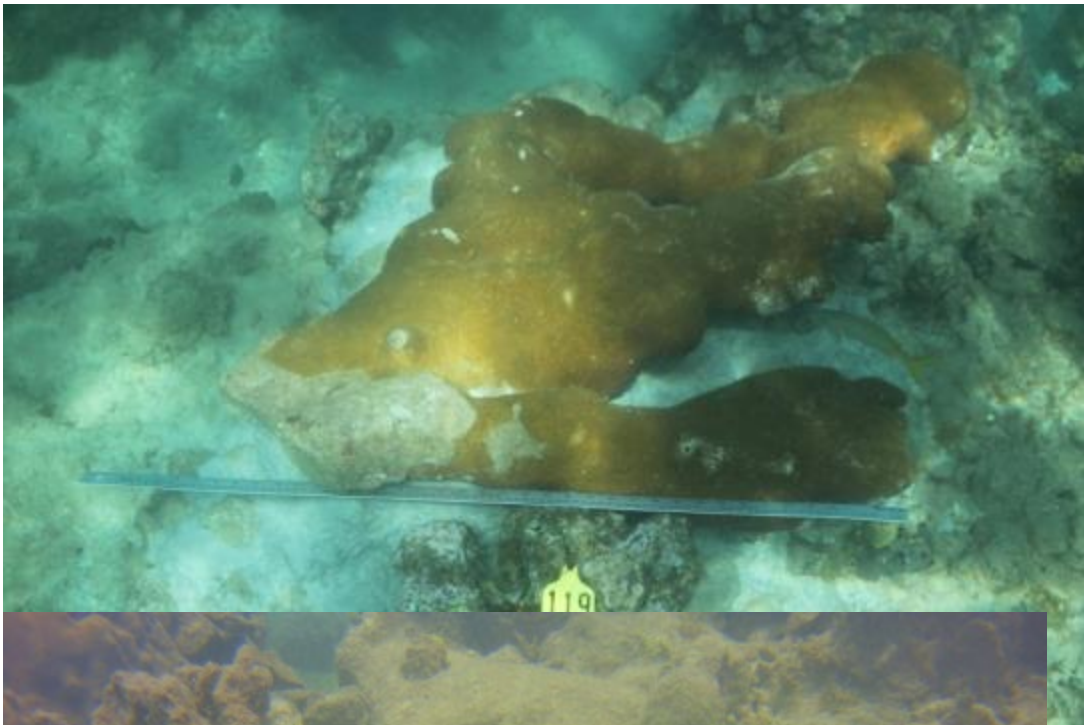
Some reefs 100% damaged.

Most severe impact on Northeast, Culebra, Vieques and North coasts.



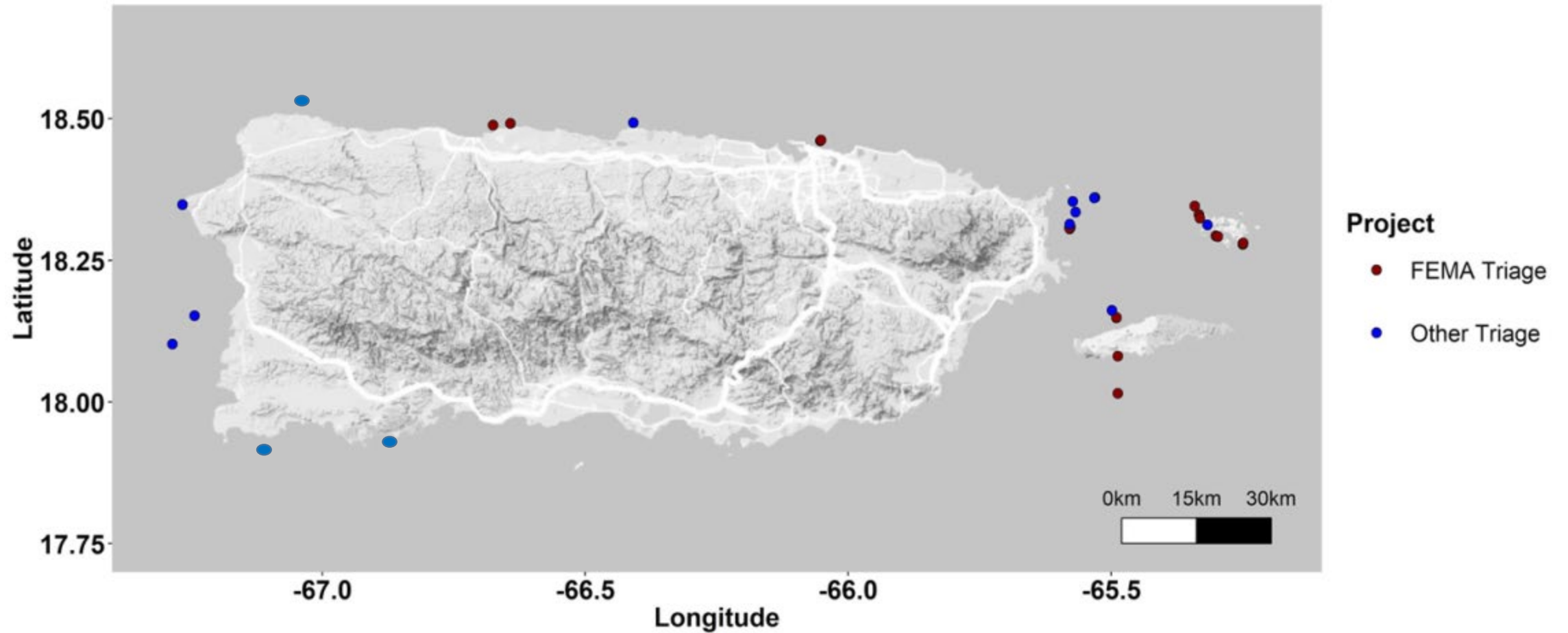
Coral Triage





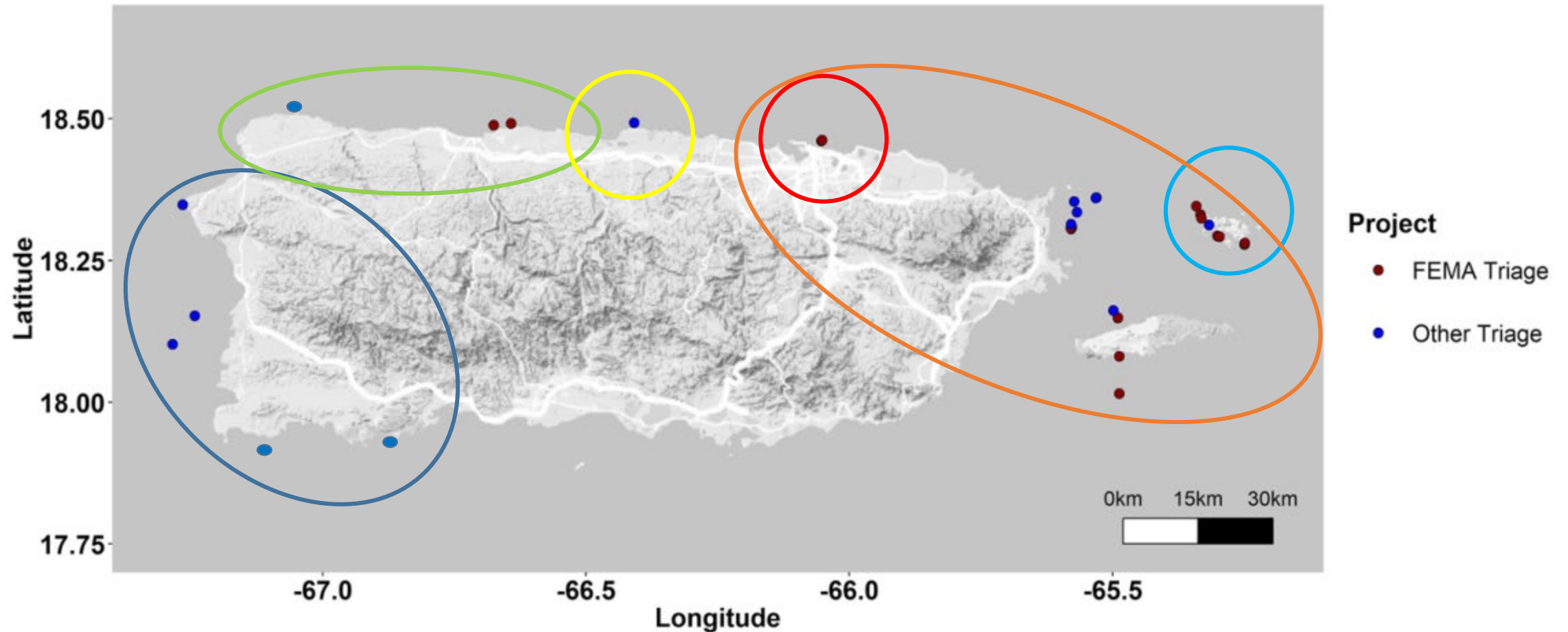
Coral Triage

- Over 17,000 corals rescued at 65 sites.



Coral Triage

- Over 17,000 corals rescued at 65 sites.
- Required multiple groups working in different regions to complete this work





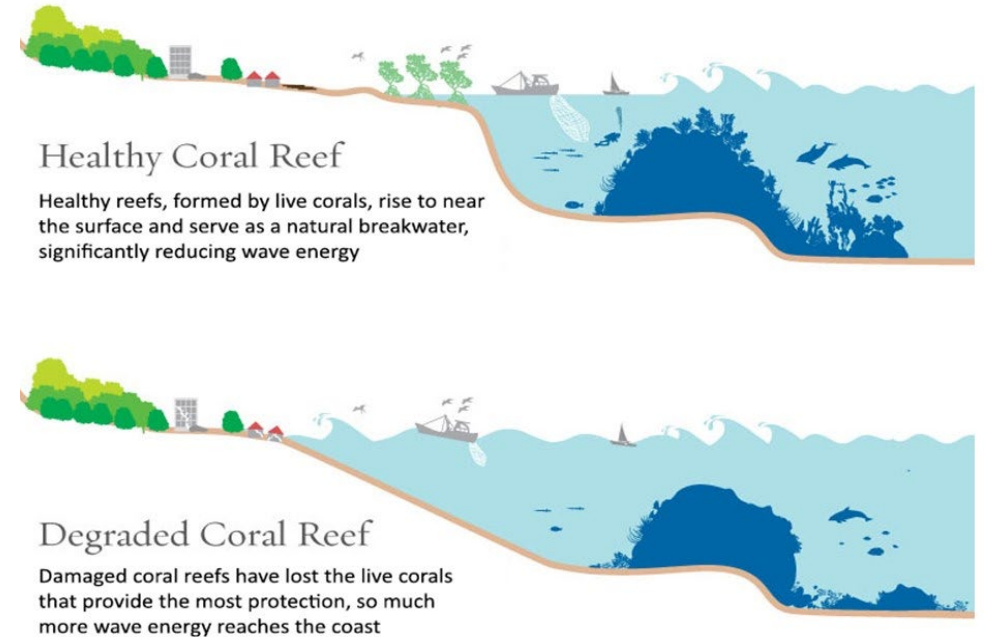
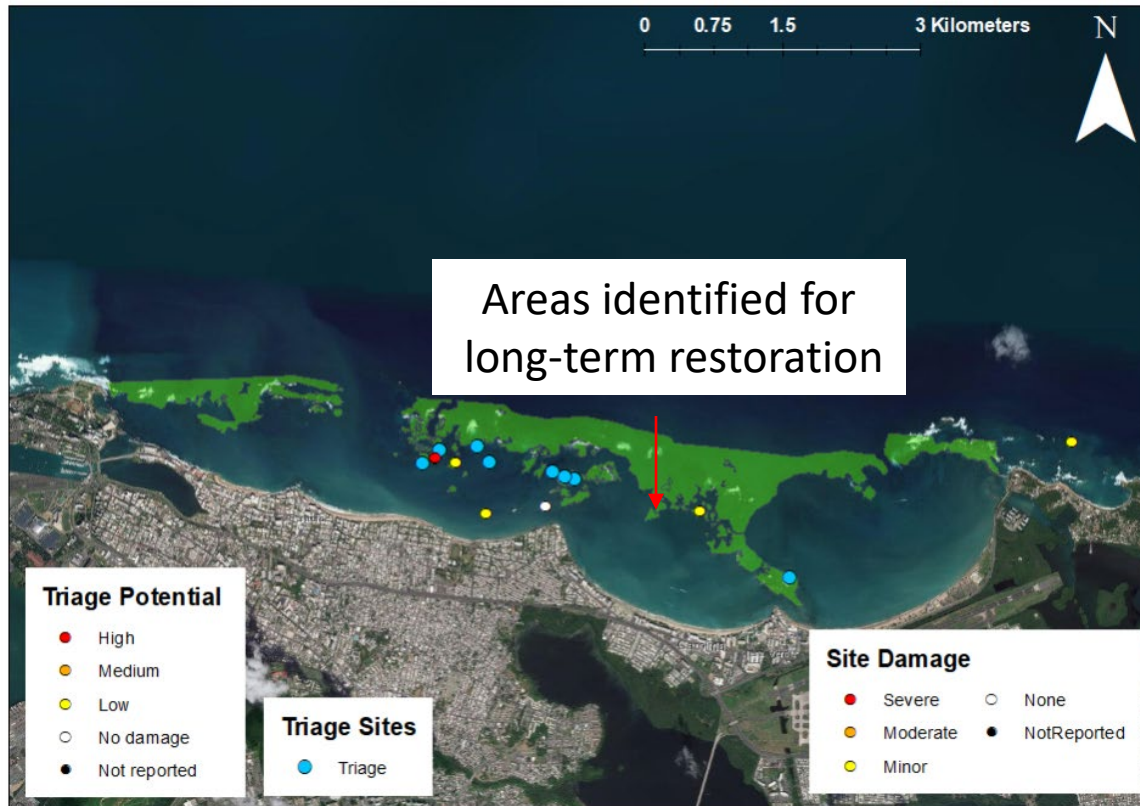


Next Steps: Expand restoration footprint using Cuttings

- After $\approx 1.5 - 2$ years, cut 10-20cm branches from transplants to expand footprint
- Leave half of the branches
- > 2 cuttings/colony
- Only harvest from healthy colonies
- Turn 1,000 colonies into 10,000



Next steps



Adapted from the Nature Conservancy

- Requesting recovery assistance for coral reefs.
- Coastal protection focus - Healthy coral reefs provide more storm protection than degraded reefs.

For more information visit our NCCOS project page:

<https://coastalscience.noaa.gov/project/assessment-of-hurricane-impacts-to-coral-reefs-in-florida-and-puerto-rico/>

Impact assessment:

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Triage efforts:

Acknowledgments



FEMA

