

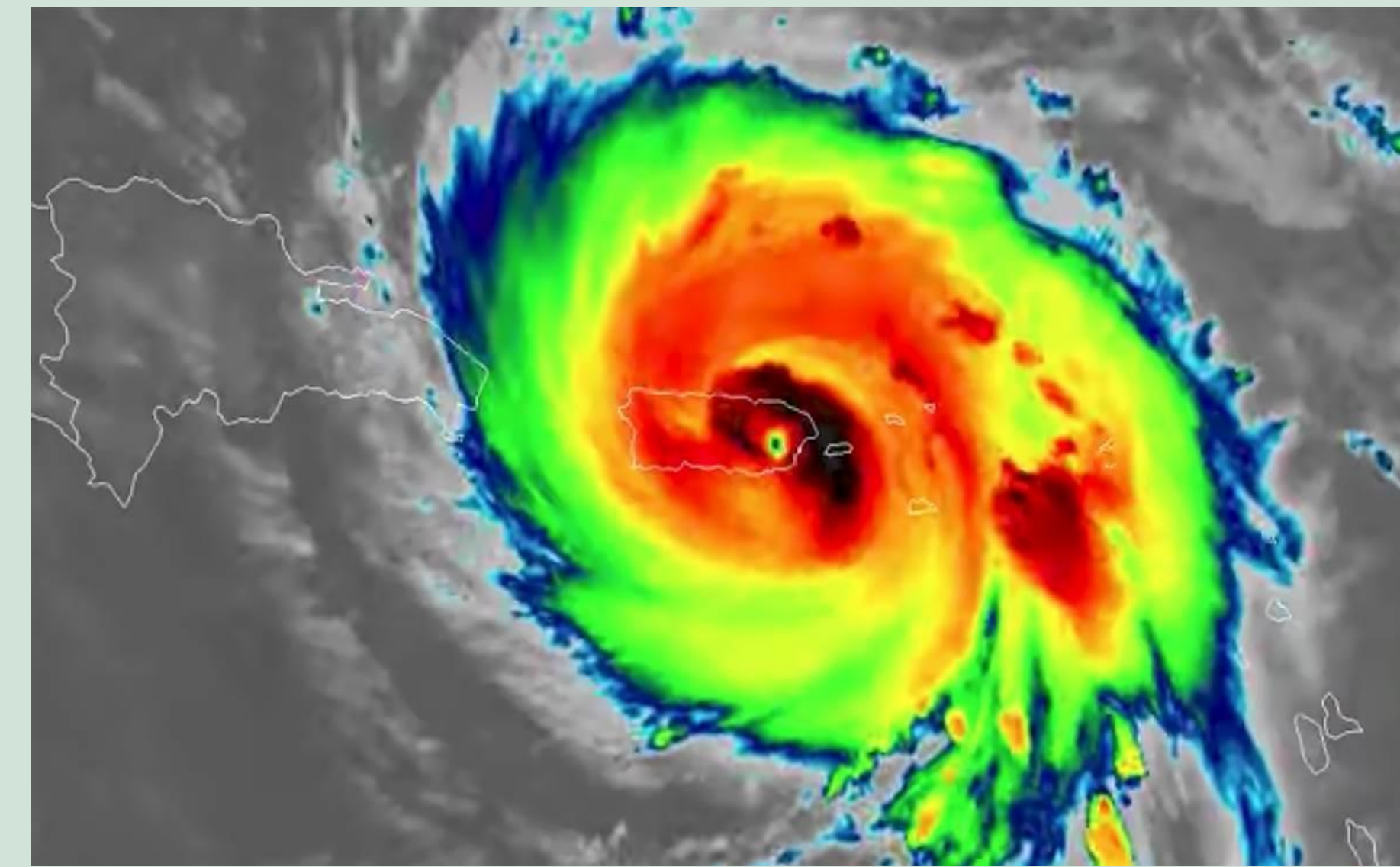
Hurricanes Irma and Maria: Impacts, Aftermath and Island Resiliency

Juriana E. Barboza Sagrero



Hurricane Irma and Hurricane Maria

In 2017, Puerto Rico was struck by hurricanes Irma and Maria. Hurricane Irma — a category 5 storm — passed close to the main island of Puerto Rico on September 7 and then 13 days later on July 20th, Hurricane Maria surprised the island with peak wind speeds of up to 155 miles per hour and was the most intense hurricane to make landfall in the island in over 80 years. The storm's path moved directly across the main island, with the eye passing only 25 miles from the capital of San Juan and directly on Juncos, Caguas and nearby cities. The hurricanes led to wind tunnels, increased rainfall, and flash flooding that ripped residents of their electricity, fresh food, and clean water for a prolonged period, and, with roads impassable, many had limited access to medical care. The effects persisted in the days, weeks, and months that followed: government services and private enterprise could not operate effectively, schools were closed, landslide zones faced flooding hazards, and wastewater polluted marine environments. Maria's devastation caused thousands of Puerto Ricans, who are U.S. citizens, to leave what was once their home between July 2017 and July 2018.



Bioluminescent Bays & Mangroves

Puerto Rico is home to three of just five bioluminescent bays in the world. These rare ecosystems are located in Vieques, Laguna Grande and La Parguera. The other two are in Jamaica and Vietnam. Bioluminescent (bio=life, luminescent = light) bays are bodies of water filled with large quantities of microscopic, motile unicellular algae known as dinoflagellates.

These bays carry dinoflagellates in big enough quantities to produce a "glow-in-the-dark", blue-green color when triggered by mechanical stress or agitation; however, their glow is dependent on various factors.



Puerto Rican Parrot (Amazona vittata)

The Puerto Rican Parrot is a bird in the jungle that also was severely impacted by the hurricanes. The birds were wiped out only leaving a few in various areas of the island. Efforts are continually being made by the US Fisheries and Wildlife Services to ensure that these birds are breeding to maintain the next generation of this species. During this service learning trip, projects with the FWS included searching and capturing the redtail boa, an invasive species that preyed on the parrots as well as monitoring fledgling birds, and the latest releases of captive parrots to ensure they are healthy and well.



Through these efforts, the number of parrots has increased to 250 wild parrots and 469 captive Puerto Rican parrots. According to members in El Yunque, a method of triangulation is being employed to ensure that birds in three sections of the island are able to connect and therefore continue mating to produce the next generation

Integrating Public Health & Agriculture

Prior to this trip, efforts were made to develop a public health project that would address the needs of the communities in Puerto Rico. A GoFundMe page was developed with the intention of creating starter survival kits comprised of flashlights, whistles, first-aid kits, blankets, and masks. With the fundraising efforts and donations received, our public health team was able to assemble more than 50 starter kits and share with partners at the University of Puerto Rico to distribute.

Key Takeaways: After connecting with Dr. Edly Santiago, the University of Puerto Rico Mayaguez, we realized that an essential part of public health in this island was agriculture. Puerto Rico agriculture was severely impacted that food shortage and food insecurity was a big issue. It's important to have a comprehensive understanding of a population prior to initiating programs/projects. We learned that the population did not need starter survival kits, instead they needed educational material on agriculture, specifically regarding nutrition profiles.



Dinoflagellates' glow varies based on water temperature, moon cycles, water currents, and other ecological factors, such as a disturbance in their local environment. One of the main factors that affected these organisms after the hurricanes was their access to nutrients, primarily Vitamin B12.

Because the population of mangrove were heavily impacted by the disasters of the hurricanes, the release of tannins rich in vitamin b12 and other nutrients were reduced severely impacting these organisms. To address this, students and faculty, partnered with Bureau of Natural Protected Areas and others to rid existing mangroves of choking vines and plant new mangrove trees.



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Protecting the Ecosystem

Throughout this services trip, coastal and forest restorations efforts took place to support and protect new life in El Yunque, Northeast Ecological Corridor, and beaches. These efforts included, but were not limited to, beach clean up, mangrove planting, vine cutting, bird surveying, and agricultural production. It's important to maintain ecosystems clean through continual efforts like those mentioned above, as plant and animal life is imperial to the success and sustainability of island communities.