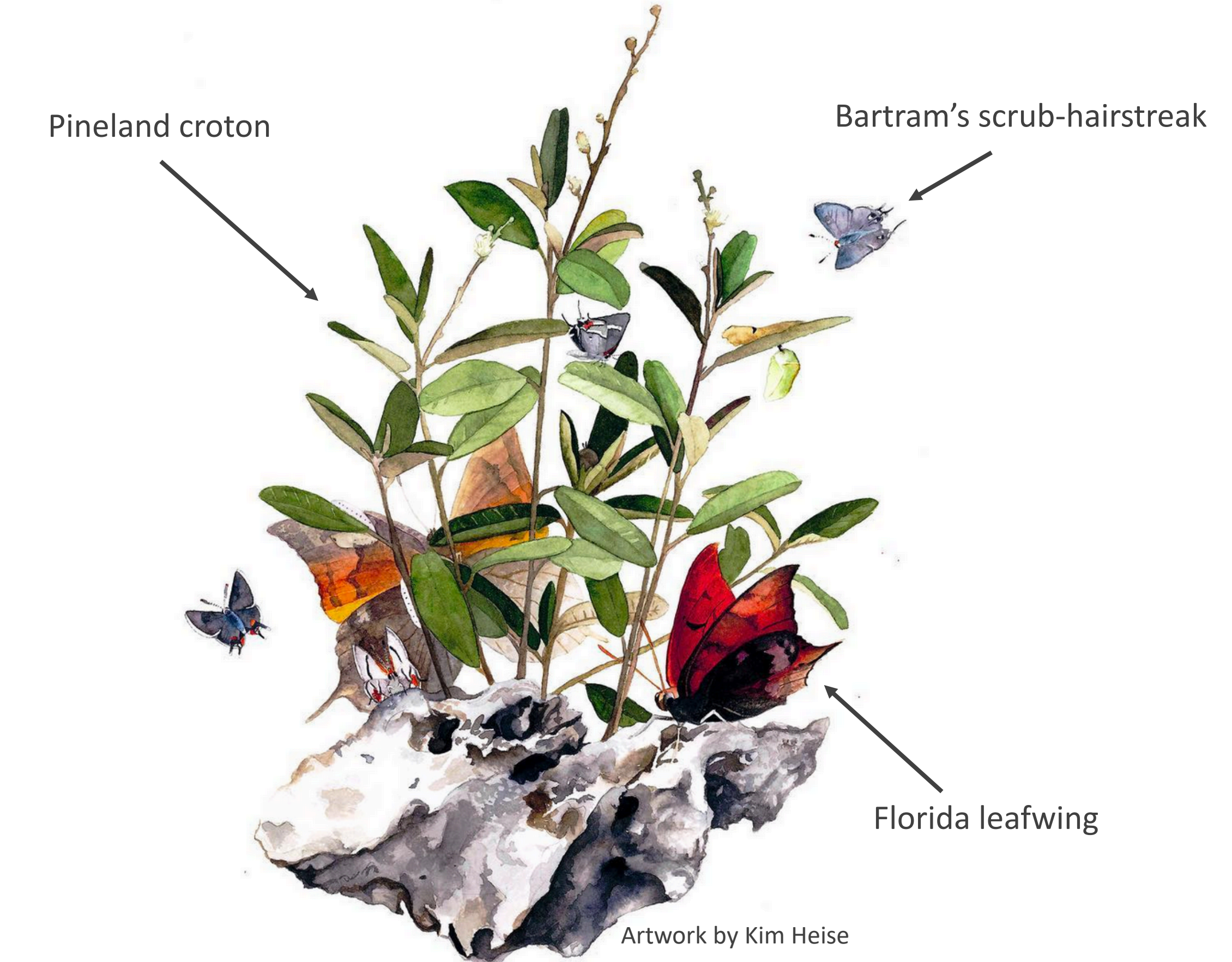


BACKGROUND

As habitat loss and fragmentation, urbanization, and global climate change accelerate, conservation of rare ecosystems increasingly relies on human intervention. However, any conservation strategy is vulnerable to unpredictable, catastrophic events. Whether active management increases or decreases a system’s resilience to these events remains unknown. Following the intense disturbance imposed by Hurricane Irma, we had the unique opportunity to test how habitat management interacted with the hurricane to affect population dynamics of a rare species found exclusively within a global biodiversity hotspot.



STUDY SYSTEM

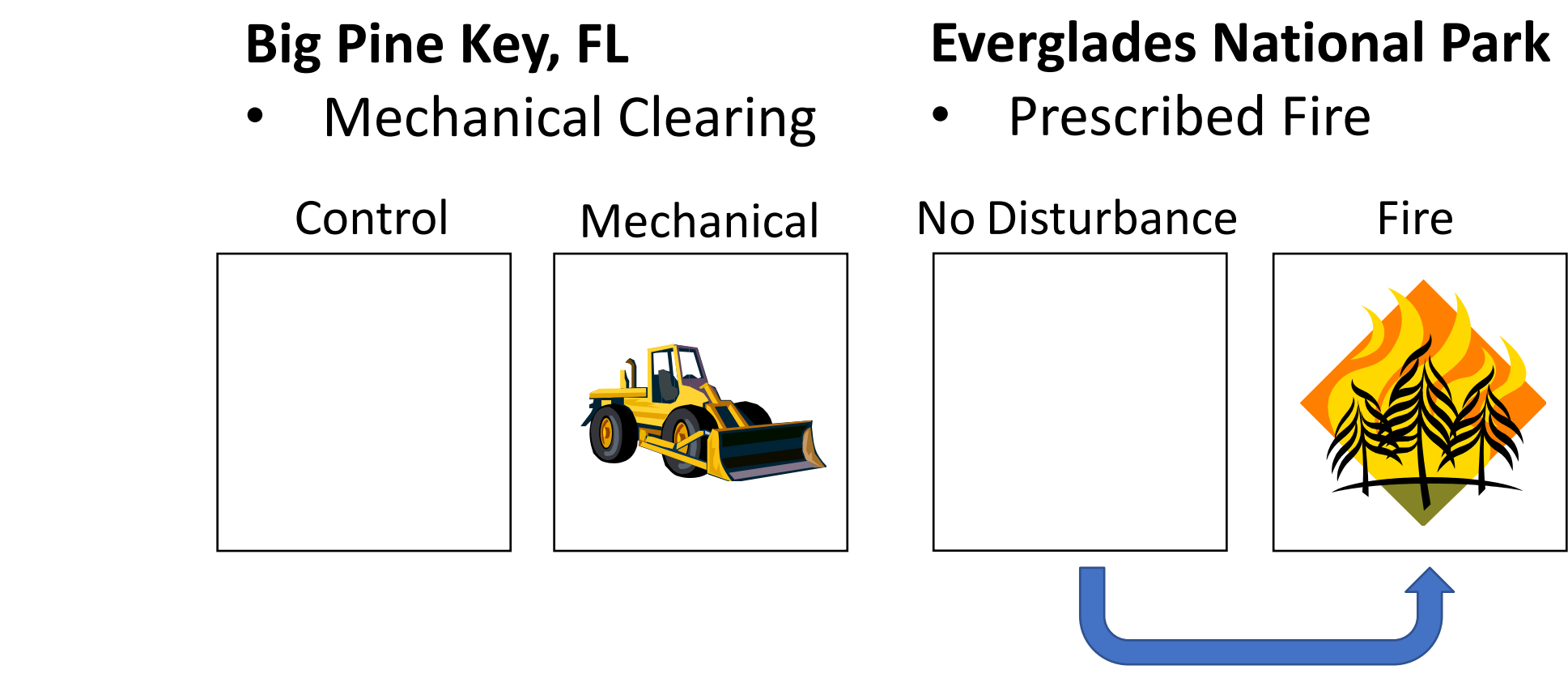
We studied the population dynamics of pineland croton (*Croton linearis*), the sole host for two endangered butterfly species, Bartram’s scrub-hairstreak (*Strymon acis bartrami*) and Florida leafwing (*Anaea troglodyte*). These three species are found in pine rocklands in south Florida and are highly dependent on frequent fires to maintain their populations. Because of increased development and habitat fragmentation it has become increasingly difficult to burn where these species exist.

QUESTIONS

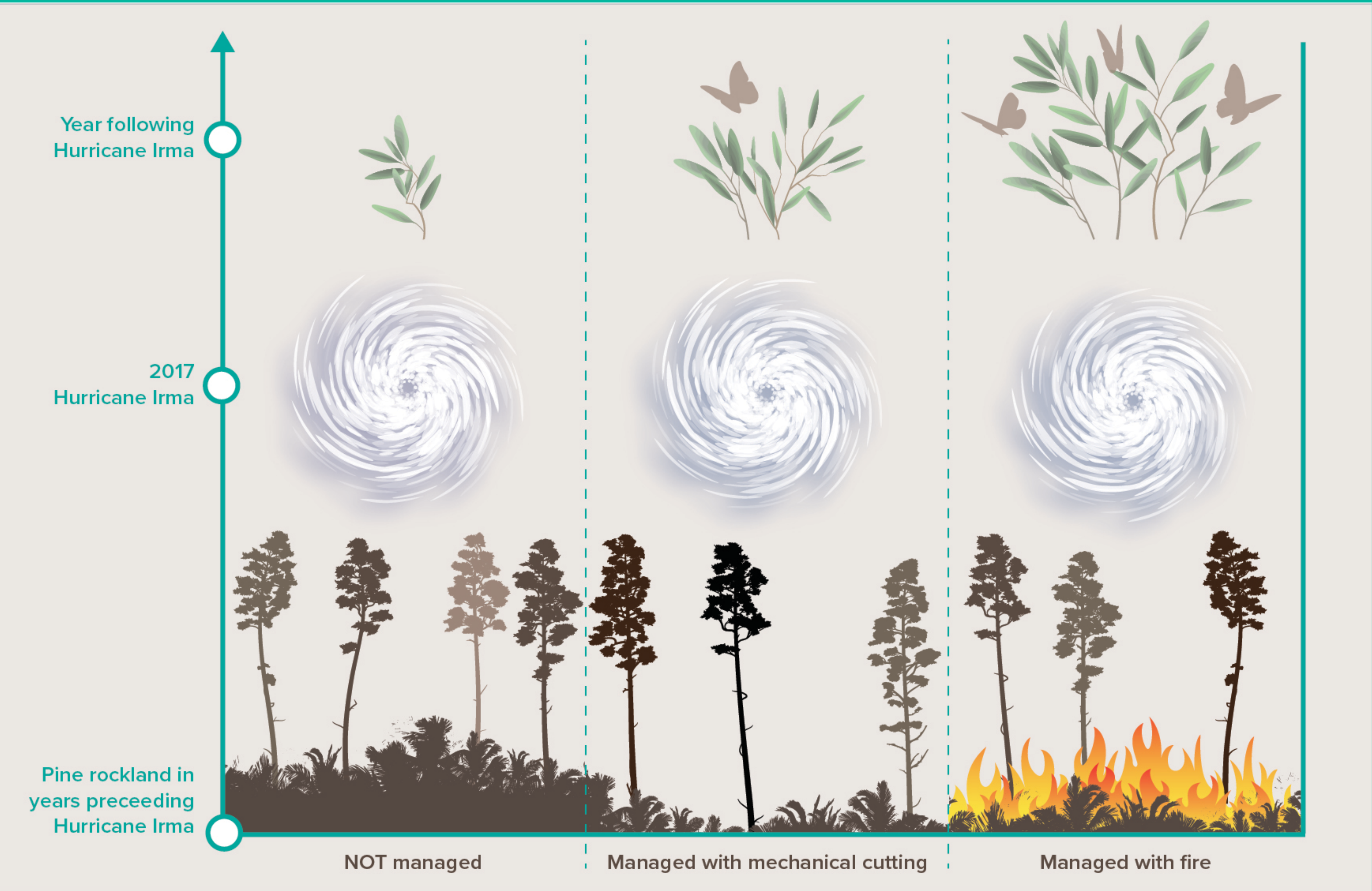
- **How do populations respond to multiple disturbances?**
 - How do different disturbances (prescribed fire, mechanical clearing) affect croton population dynamics?
 - How does previous management interact with hurricane disturbance to affect croton population dynamics?

METHODS

We followed the fate of hundreds of tagged croton within a mechanical clearing experiment on Big Pine Key, FL, and in permanent fire-effects plots in Everglades National Park. We estimated vital rates and population growth rate for each treatment before Hurricane Irma and in the year of the storm.

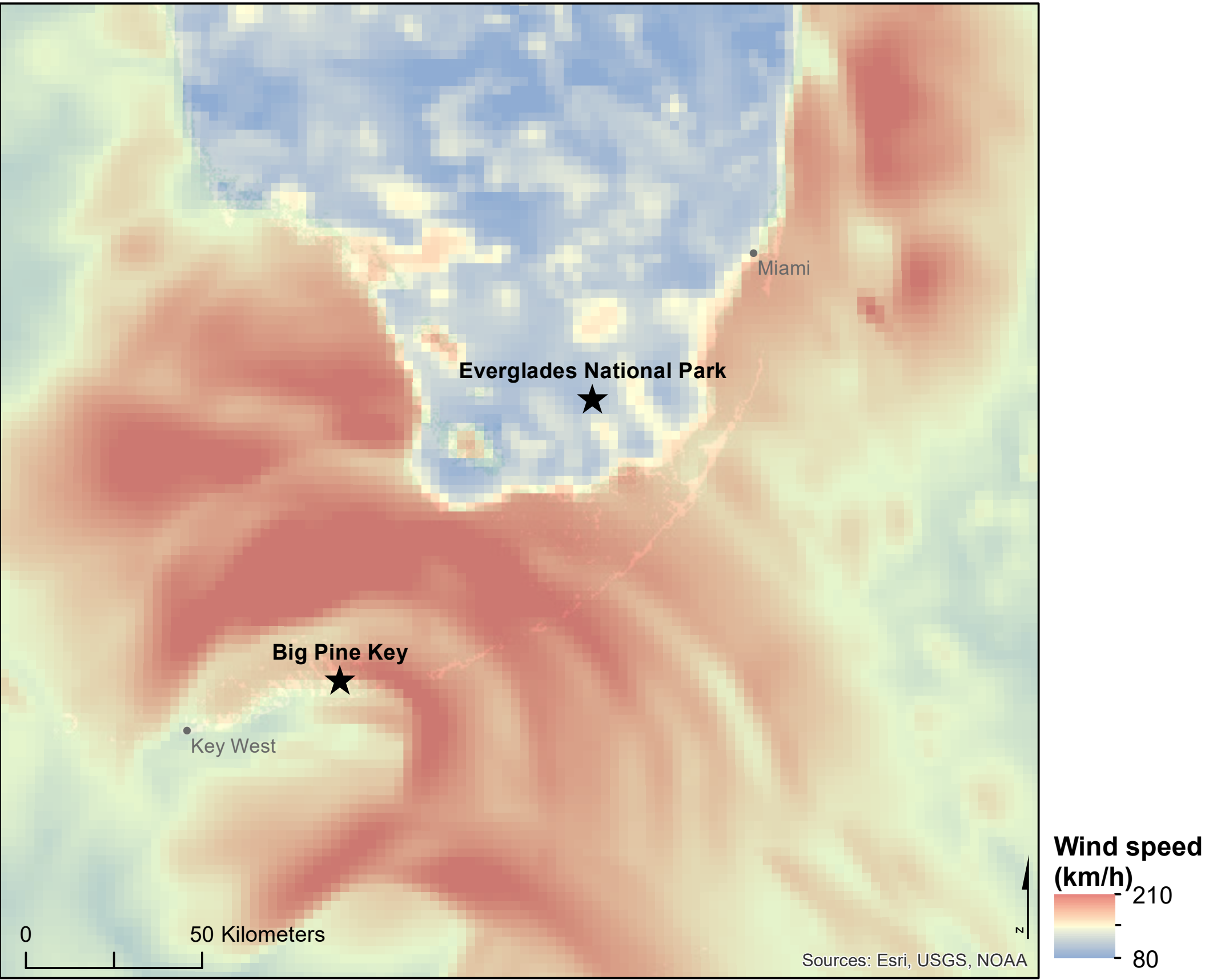


MAINTAINING HISTORIC DISTURBANCE REGIMES INCREASES SPECIES’ RESILIENCE TO CATASTROPHIC HURRICANES



Erica Henry¹, Martha Burford Reiskind¹, Aerin Land², Nick Haddad³

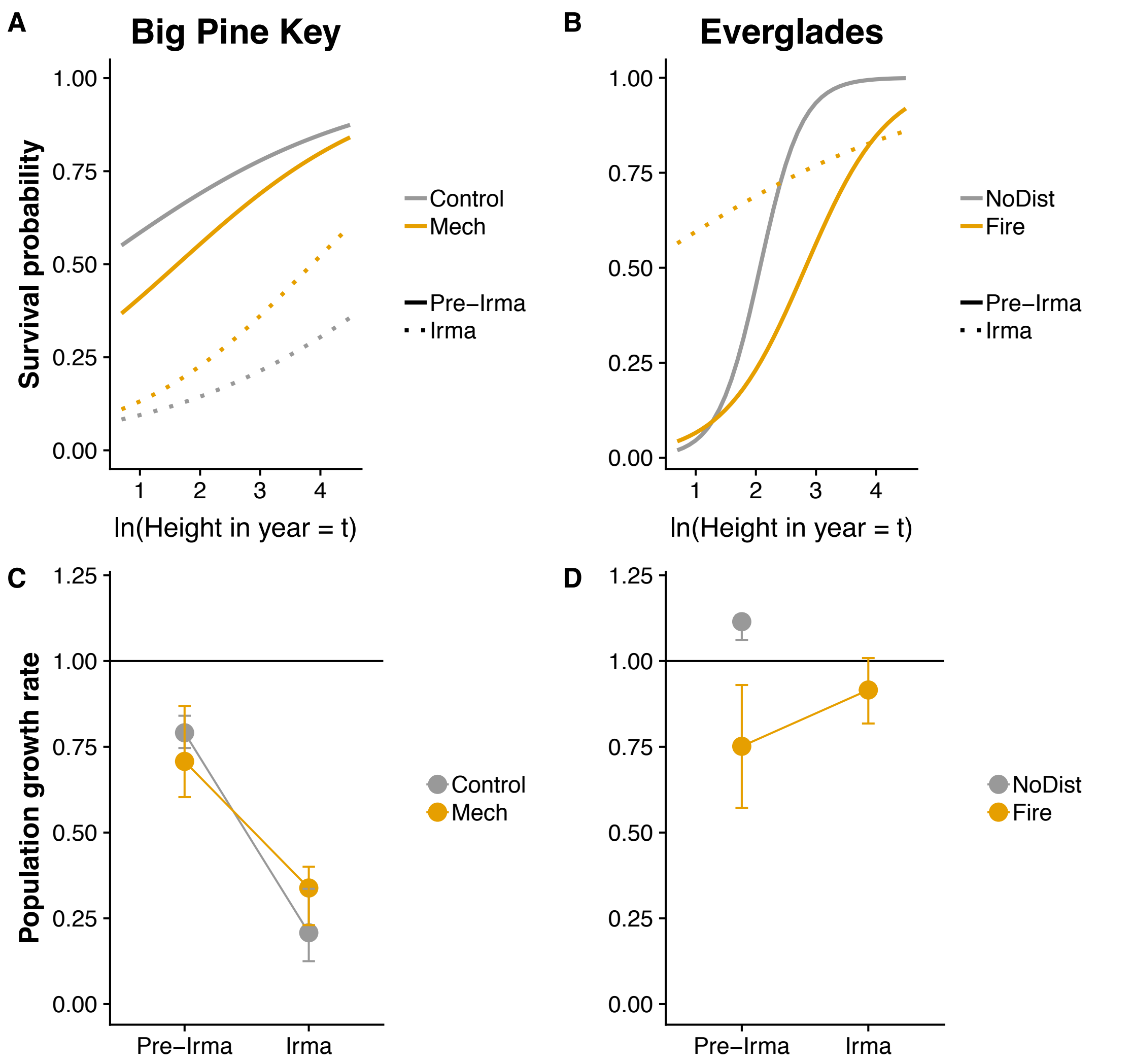
¹North Carolina State University, Biological Sciences
²Everglades National Park
³Michigan State University, Integrative Biology, Kellogg Biological Station



Maximum estimated wind gusts as Hurricane Irma passed through south Florida on Sept 10, 2017

RESULTS

- Both fire and mechanical clearing reduced croton survival and population growth rates in the year of the disturbance.
- Previous management interacted with Hurricane Irma to increase survival and population growth rate in the year of the storm relative to controls.



A, B) Survival probability as a function of plant height for both un-managed and managed populations pre and post Irma. **C, D)** corresponding population growth rates.

CONCLUSIONS

As climate change increases the probability and intensity of severe hurricanes, human management of disturbance-adapted landscapes will become increasingly important for maintaining populations of threatened species in a storm’s path. We have shown that appropriately managing landscapes that harbor rare species has the potential to increase species’ resilience to subsequent storm events. With poor management, stronger hurricanes will accelerate extinction.

