

CARY SCIENCE CONVERSATION

VIRTUAL EVENT

Big Trees, Lightning, and the Future of Tropical Forests

Presented by

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www.caryinstitute.org

TROPICAL FOREST FIELD STUDY SITES



Panama

Columbia

Brazil

60%

of Earth's terrestrial carbon is held by the trees and soils of tropical forests



DRC

Uganda

Rwanda



WHY ARE LARGE TREES IMPORTANT?



CARBON STORAGE



TREE SPECIES SURVIVAL



BIODIVERSITY

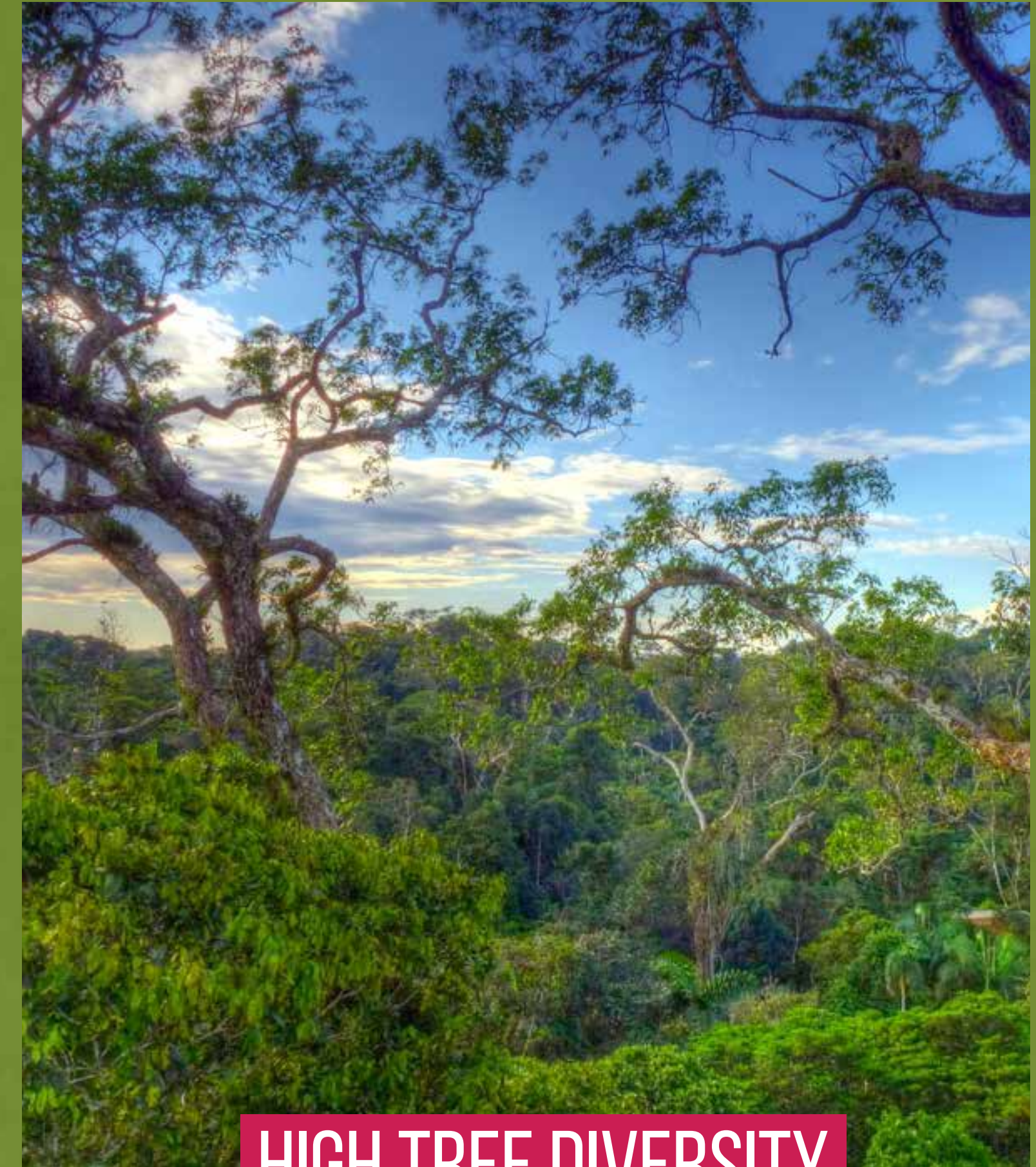
WHAT MAKES BIG TREES SO HARD TO STUDY?



INFREQUENT DEATHS



MULTIPLICITY OF FACTORS



HIGH TREE DIVERSITY

WHY STUDY LIGHTNING?

100M lightning strikes in the tropics per year

CLIMATE CHANGE



The number and frequency of intense storms is increasing



UNDERSTUDIED RESEARCH AREA



WHAT DOES THIS MEAN FOR TROPICAL FORESTS?

LIGHTNING STRIKES & FOREST DYNAMICS



AVERAGE STRIKE

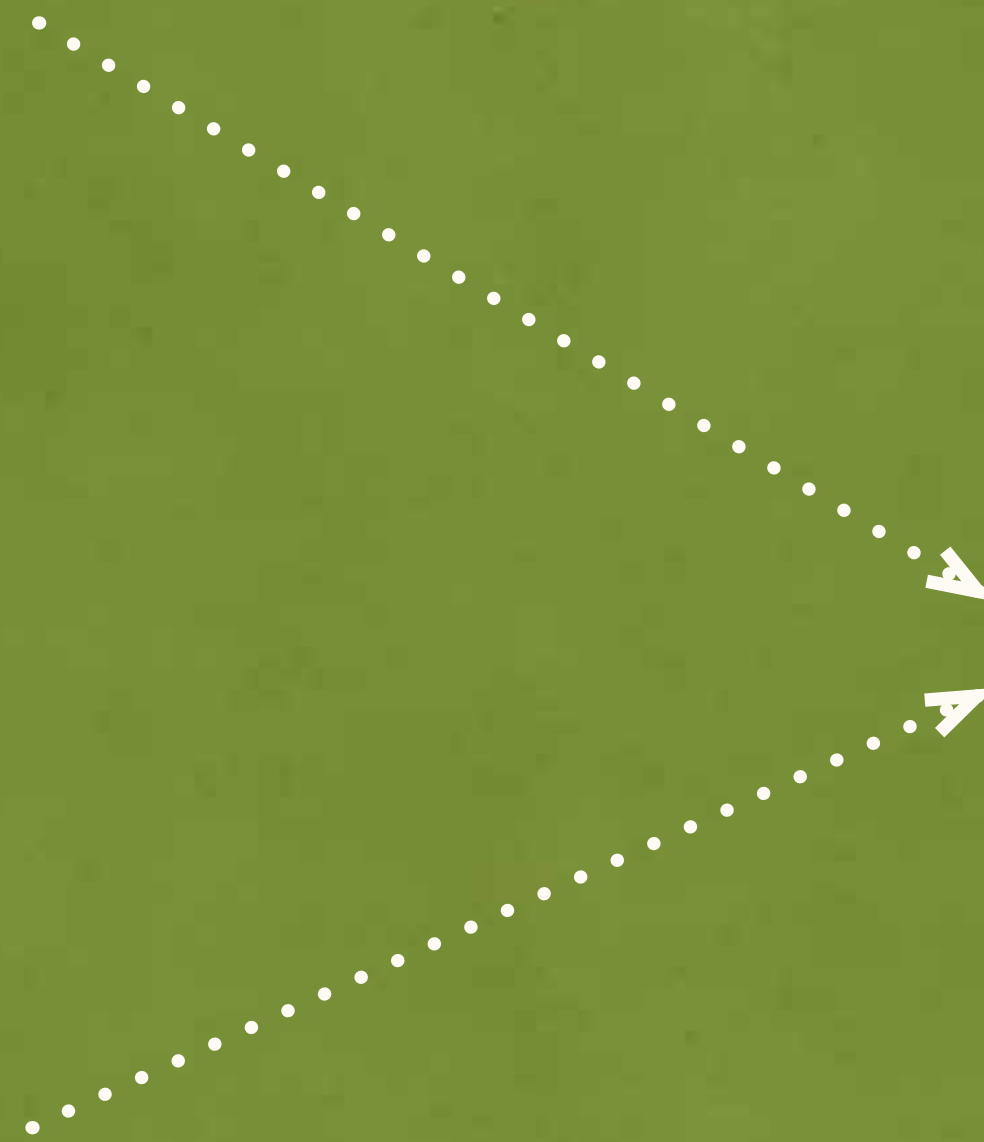
KILLS 5.5 TREES

DAMAGES 18.1 TREES



preferentially hits the largest tree in a patch of forest

a dominant cause of death for the largest trees



LOSS OF CARBON STORAGE

RESEARCH QUESTION

how does lightning control forest function?

TECHNOECOLOGY

RESEARCH CHALLENGES

- strikes are impossible to predict and hard to locate
- evidence of strikes decomposes quickly
- not all strikes look the same

SOLUTIONS

DRONES

ELECTROMAGNETIC SENSOR ARRAYS

SATELLITE SENSORS



LIGHTNING STRIKES: THE GOOD, THE BAD, & THE UNKNOWN

some trees can survive strikes



GOOD more lightning can shift species composition in favor of resistant species

kills tens of millions of large trees annually



BAD tree loss results in lower carbon storage and forests that support less diversity



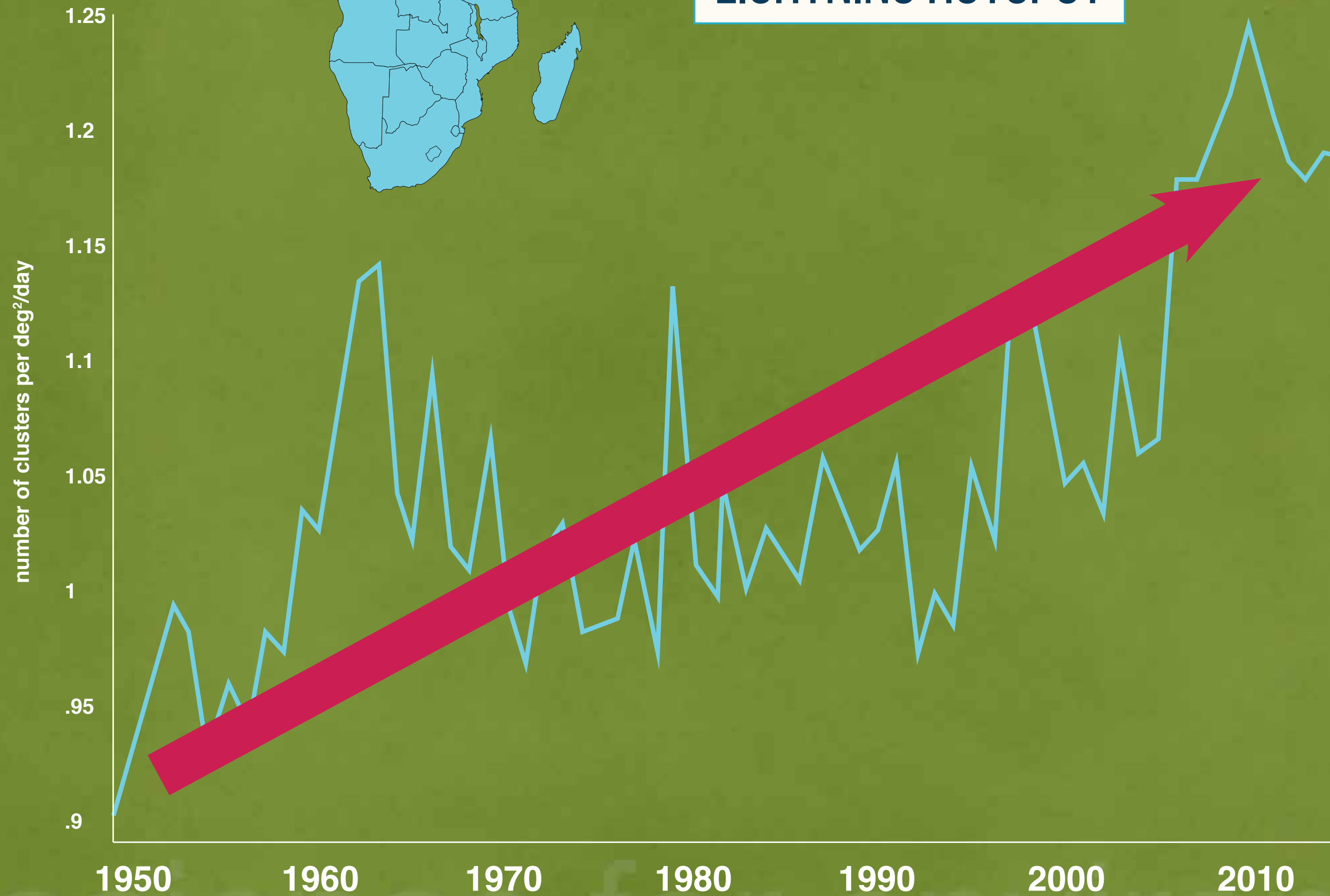
UNKNOWN can forests acclimate to changes in lightning frequency?

LIGHTNING STRIKES: THE FUTURE



LIGHTNING HOTSPOT

BY 2100



50% increase in lightning strikes in the US



WHAT CAN YOU DO?

Minimize Your Impact



Reduce your carbon footprint and offset the rest

Decrease consumption of beef and palm oil

Support Science



Invest in the research needed to guide resilient forest management and reforestation

Use Your Voice



Advocate for the protection of old growth forests