

GEER 2019

Restoring beauty requires a **beast or two**

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Florida 12,000 years ago



Global loss of vertebrate **biomass**

Source: Bar-On et al. 2018

~0.04 GT Carbon



10,000 years B.P.

~0.007 GT Carbon



83% decline

Today



Mac Stone



Mark Cook



Mark Cook

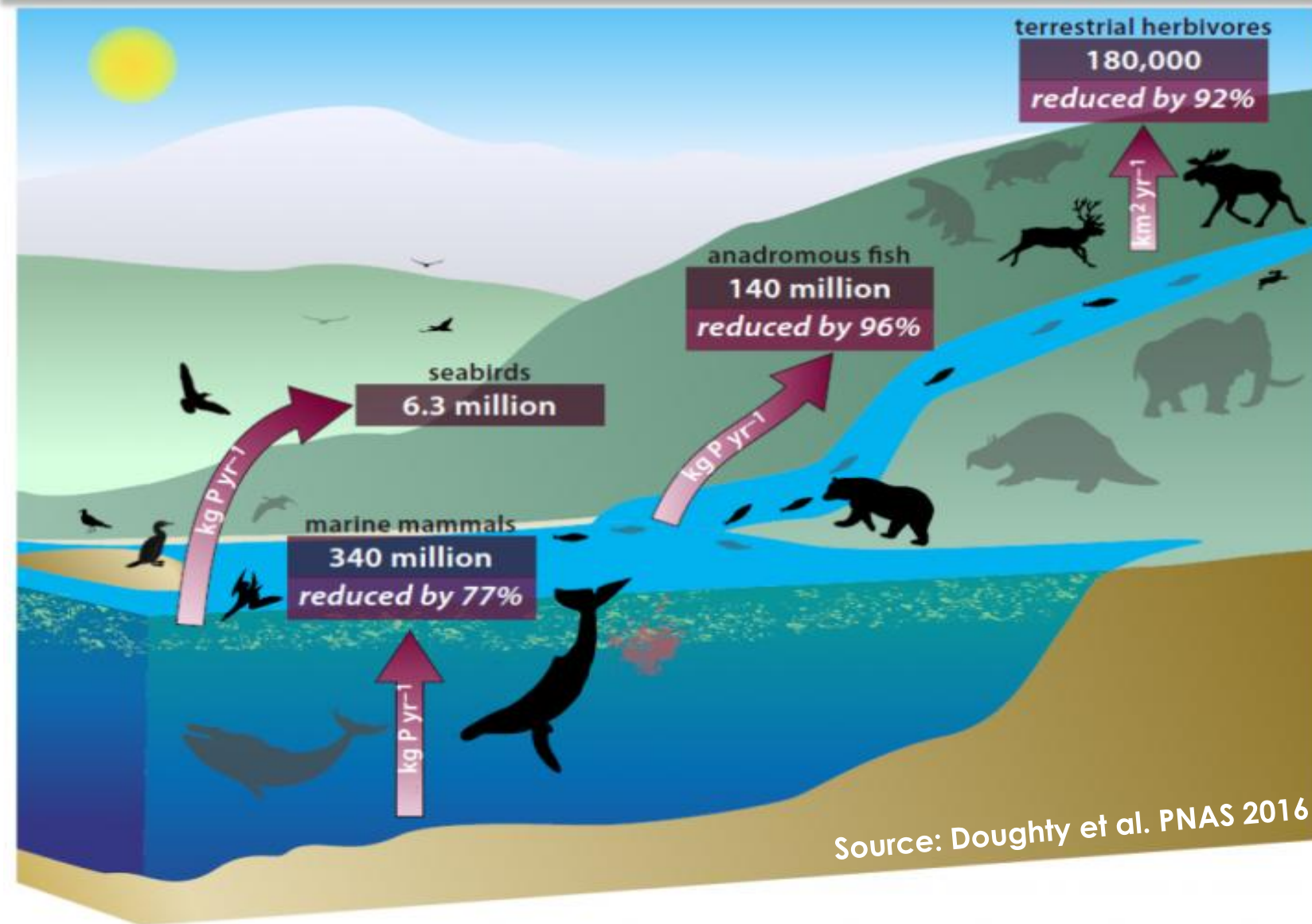


We can't restore the Everglades
unless we recover its **wildlife**



Whales transport **nutrients** from ocean depths to surface waters

A global **wildlife** nutrient-pump from ocean depths to deep inland



In the past, this network of animals transported far greater amounts of nutrients than they do today.



Wildlife populations are much reduced in the freshwater **Everglades**



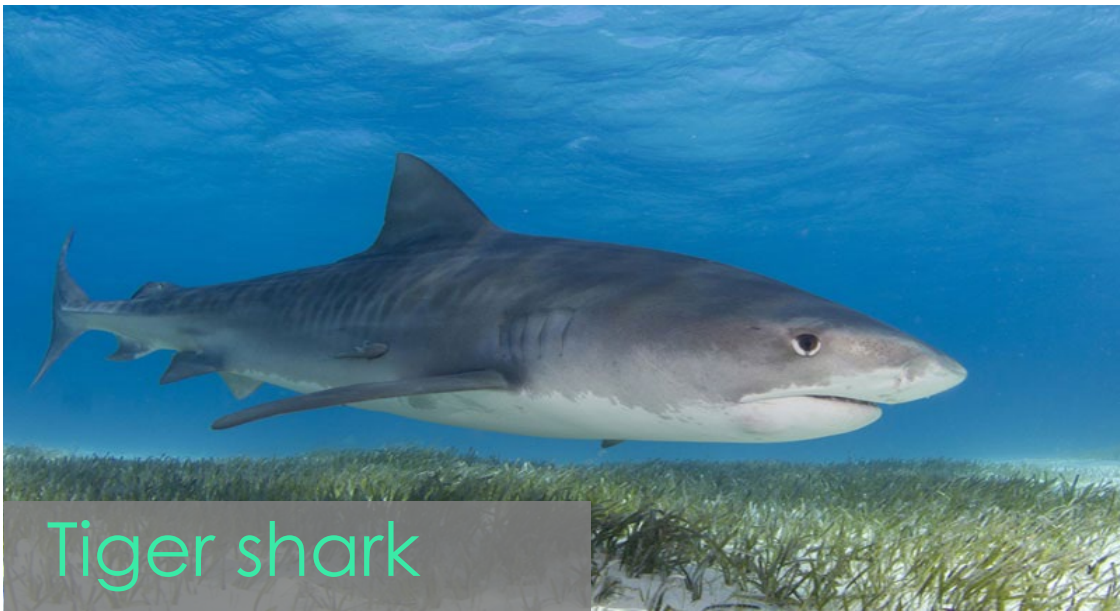
Caribbean monk seal (extinct)



Bottlenose dolphin



....And are also reduced in **Florida Bay**



Tiger shark



West Indian manatee

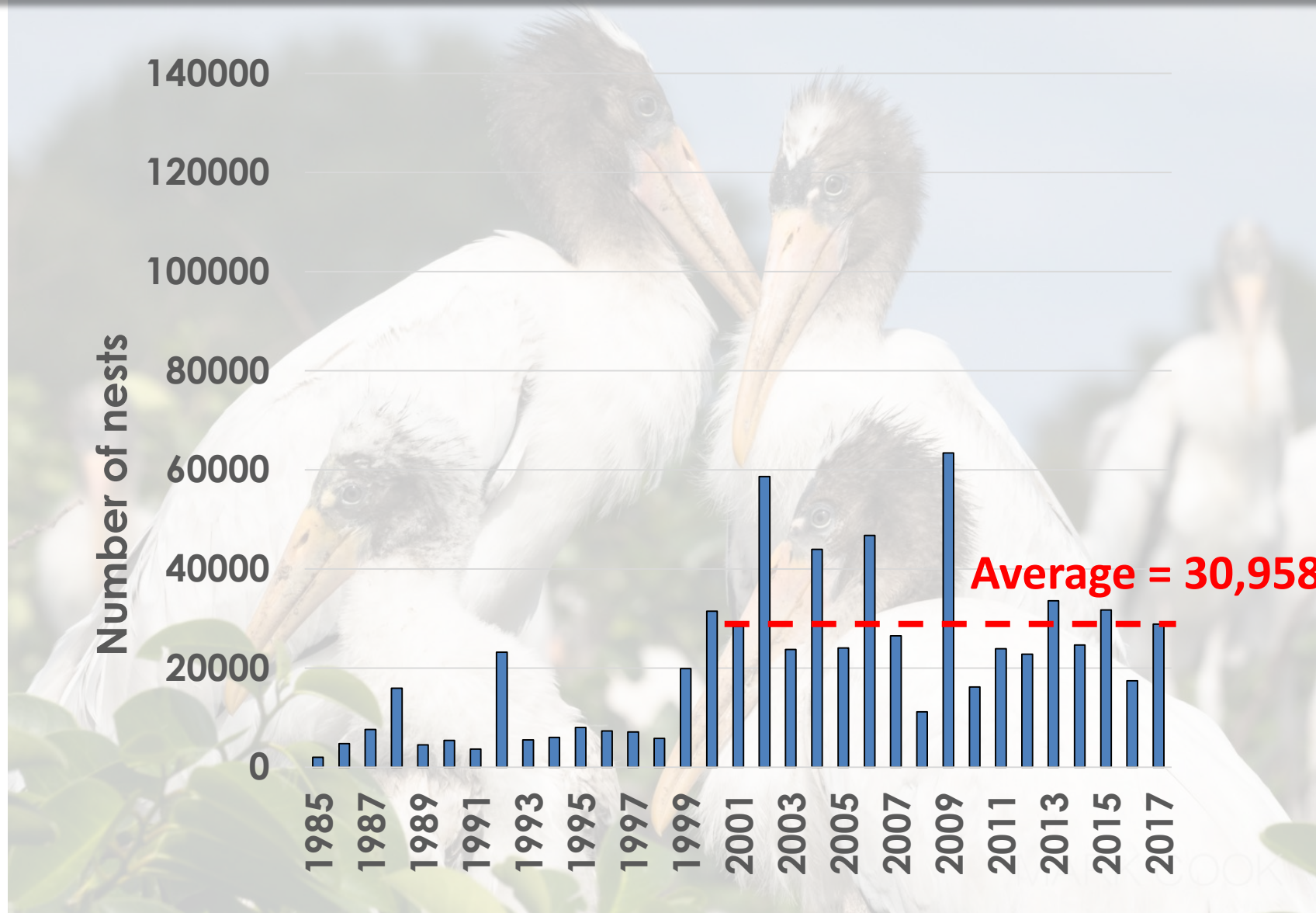
Green turtle: **seagrass grazer & nutrient recycler**



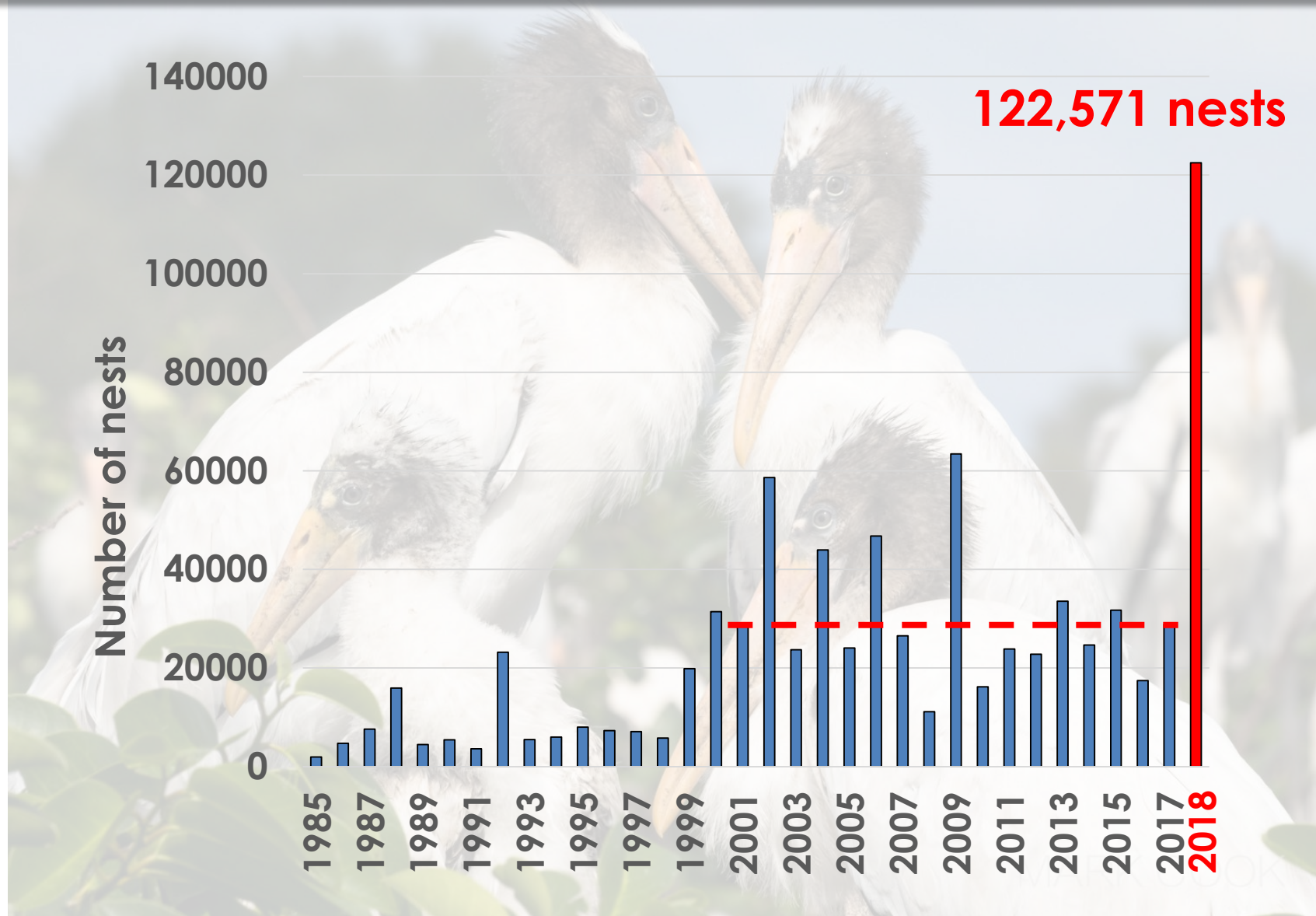
15 - 30 fold **decline** in Caribbean

Source: Jackson 1997, 2001

Recent **wading bird** nesting effort in the Everglades (all species)



Nesting in **2018** was comparable to that of the **1930's!**





Increased nesting will reinforce the keystone functions of alligators



Burrowing & nesting activities

- habitat for multiple species
- aquatic refugia
- prey availability for birds



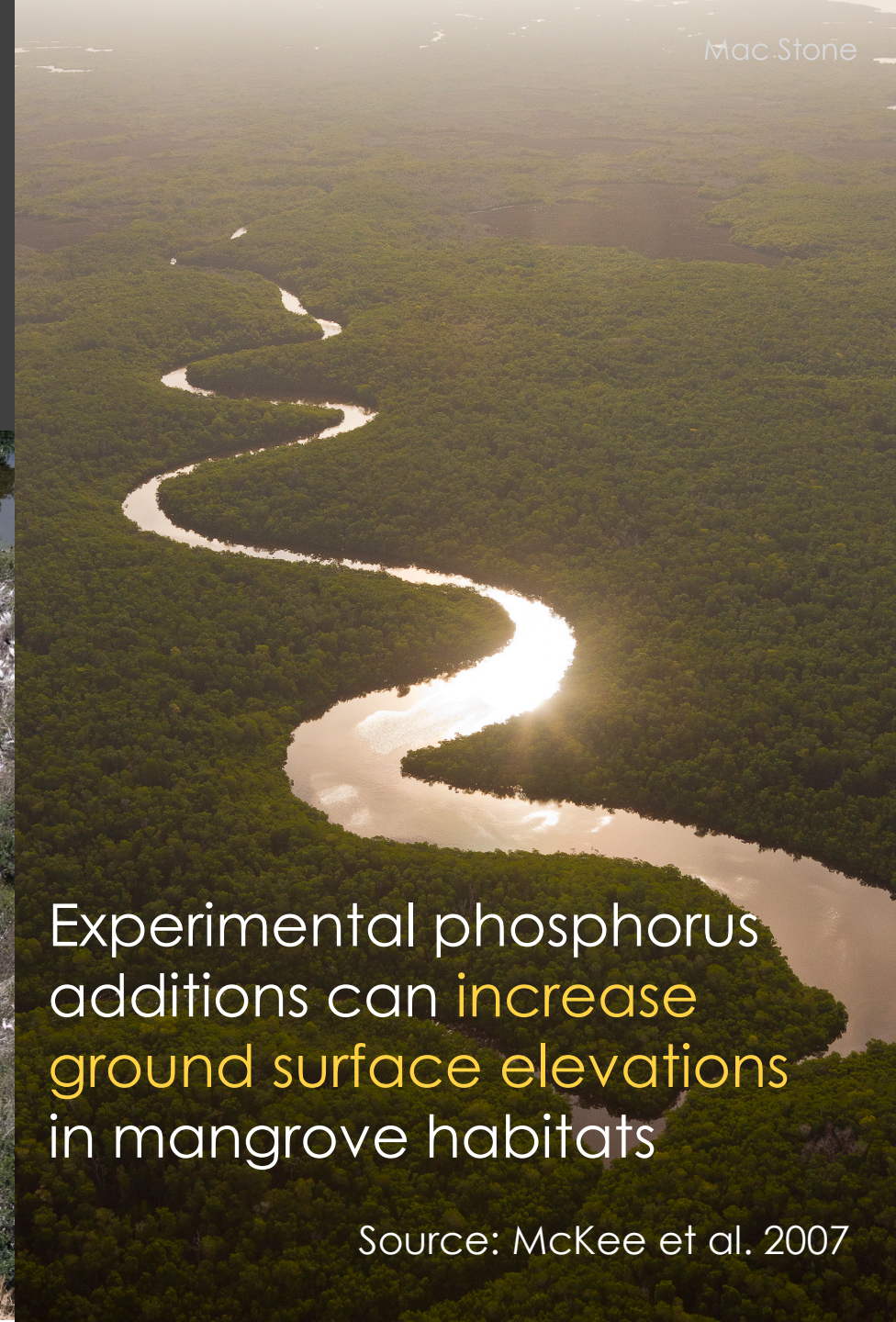
Potential trophic effects

- prey switching
- competitive exclusion
- predator release

Nestlings provide a substantial
source of energy to **alligators**

Nell and Frederick, 2015

Wading bird super-colonies
concentrate large quantities of
nutrients in the marsh-mangrove
ecotone



Mac.Stone

Experimental phosphorus
additions can **increase**
ground surface elevations
in mangrove habitats

Source: McKee et al. 2007

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What is the **true ecosystem value** of our **missing beasts**?

