



UNIVERSITY OF
GUAM

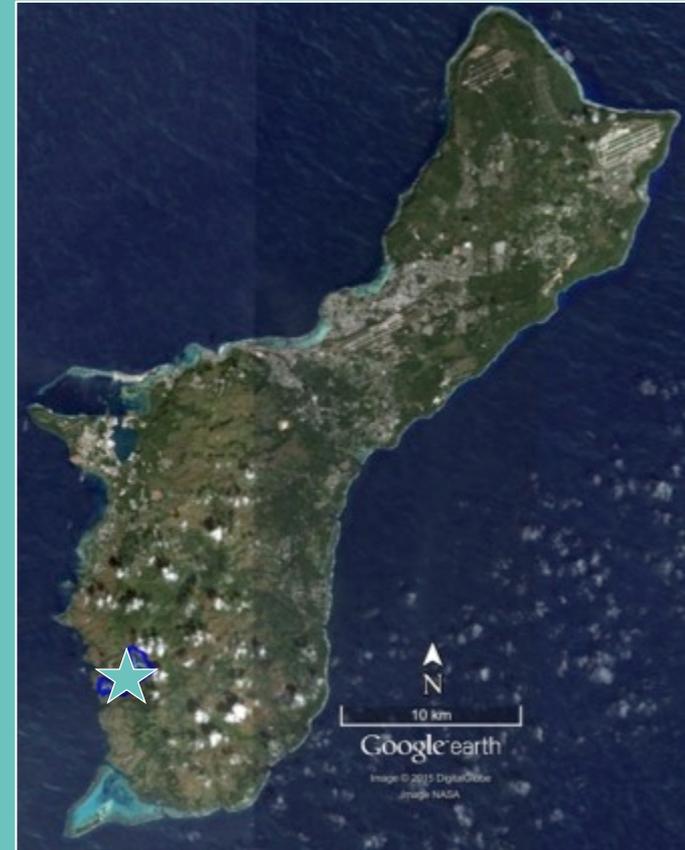




HUMÅTAK WATERSHED

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University of Guam
Sea Grant Program





Humåtak GUAM

LA SA FU'A watershed



Center for
Sponsored Coastal
Ocean Research



Starting at Fouha Bay, where our ancestors tell us civilization began, we are committed to reviving the once fruitful watersheds, vibrant coral reefs, and abundant fisheries of Guam.

HUMĀTAK PROJECT







1970 Agat-Umatac Road
Bart Lawrence Collection





BEFORE rain



AFTER rain







COMMUNITY engagement

A group of children are sitting at long white tables in a room, engaged in a hands-on educational activity. They are using colorful modeling clay to create coral reef structures. In the foreground, a boy in a dark shirt is smiling at the camera while working on a small pink coral piece. Behind him, a girl in a light blue shirt with a cartoon character on it is also smiling and holding a pink piece. Further back, other children are focused on their work. On the table in the lower left, there is a tray filled with many completed coral models in various colors like red, blue, yellow, and pink. The atmosphere is bright and educational.

EDUCATIONAL
outreach

HUMÅTAK

watershed
adventures









COMMUNITY
meetings





science of **WATERSHED**
restoration

A group of approximately 30 people, including students and staff, are standing in a line holding a long, dark log. Behind them are large, conical piles of brown sediment. The background shows a wooded area and a simple building.

SEDIMENT filter socks

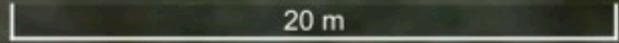
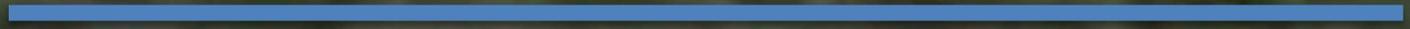


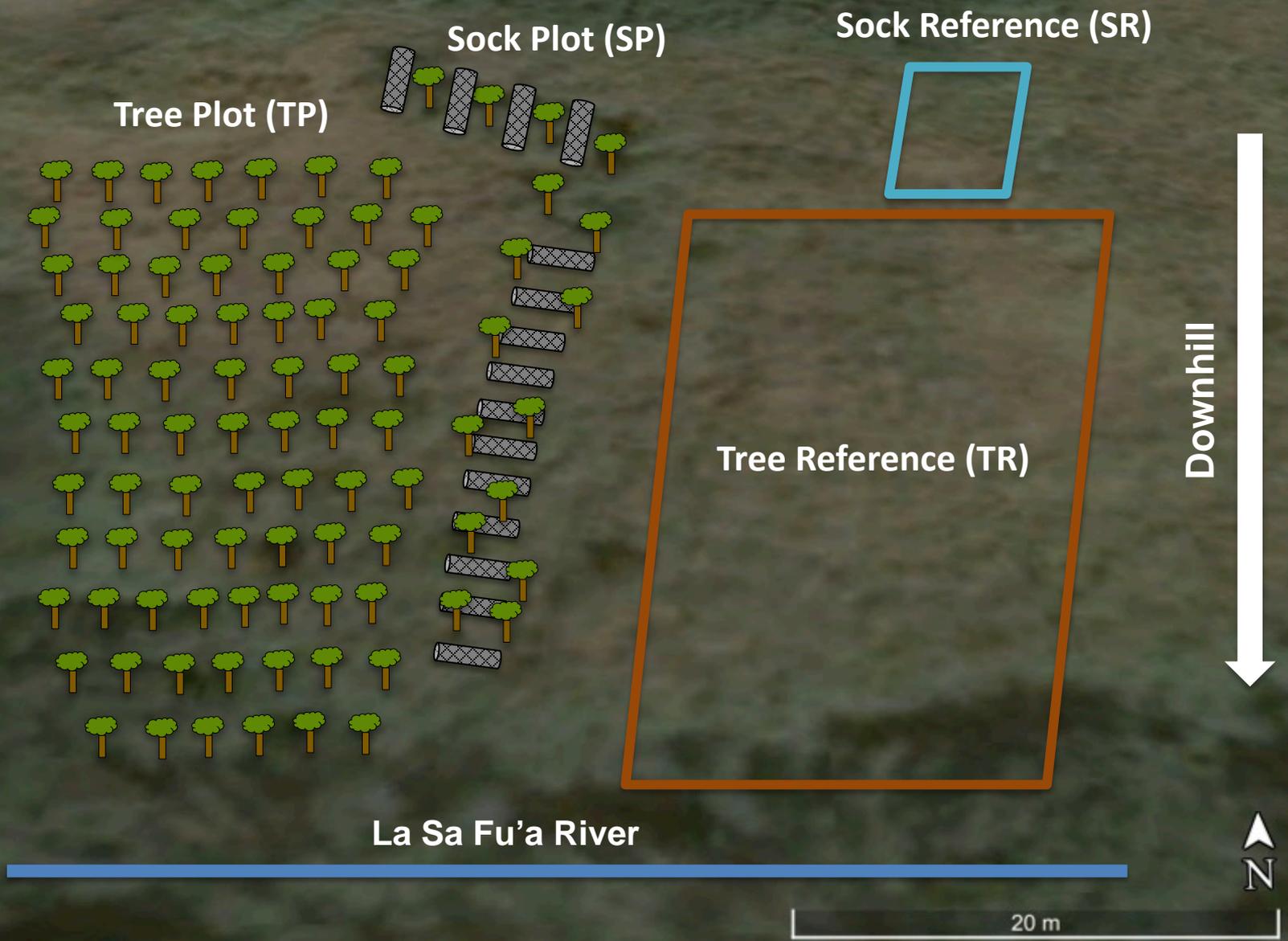
TREE seedlings





La Sa Fu'a River





MONTH 1



MONTH 2



MONTH 11



MONTH 30



Month 1



Month 21

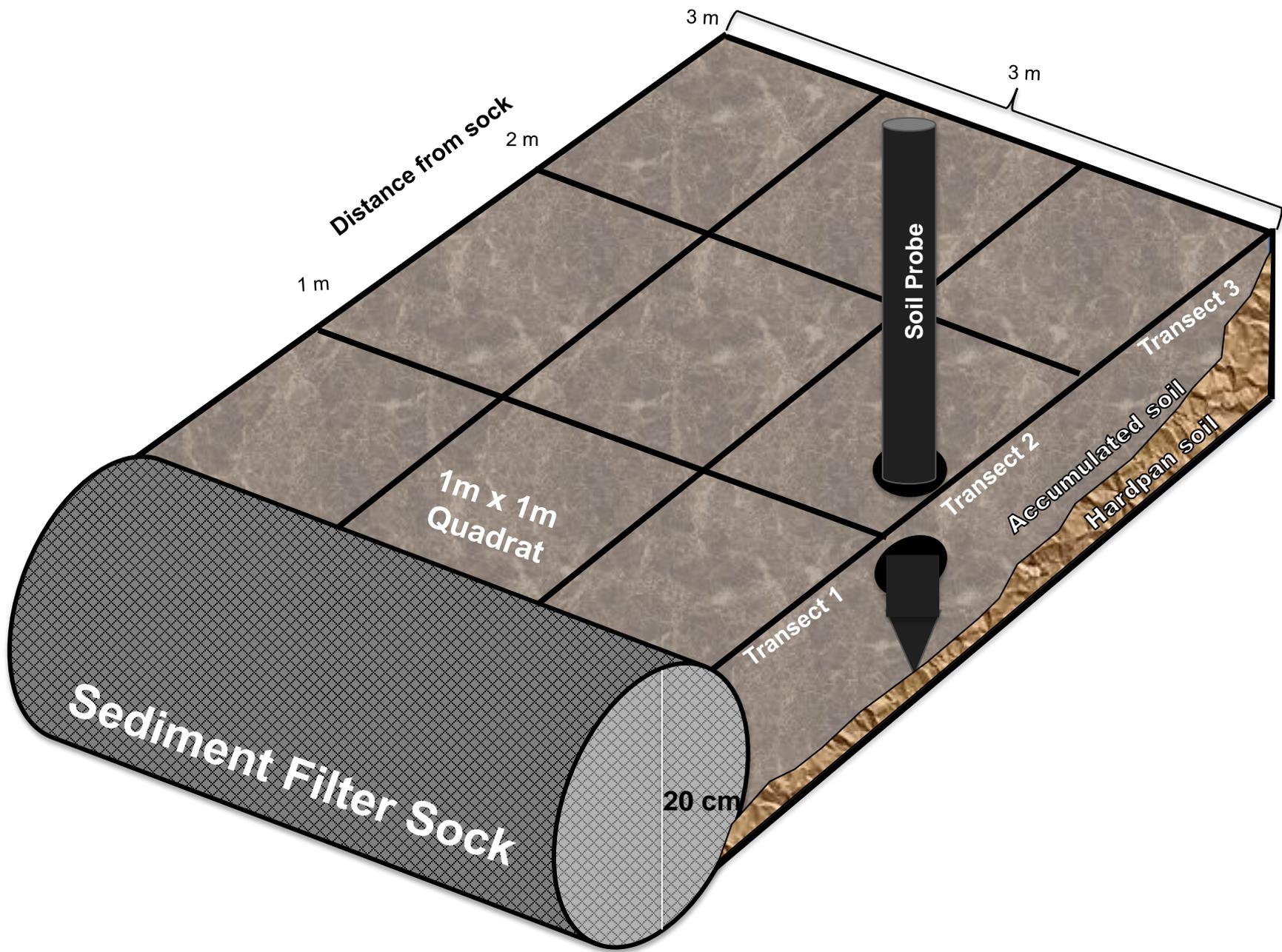


Month 1



Month 21



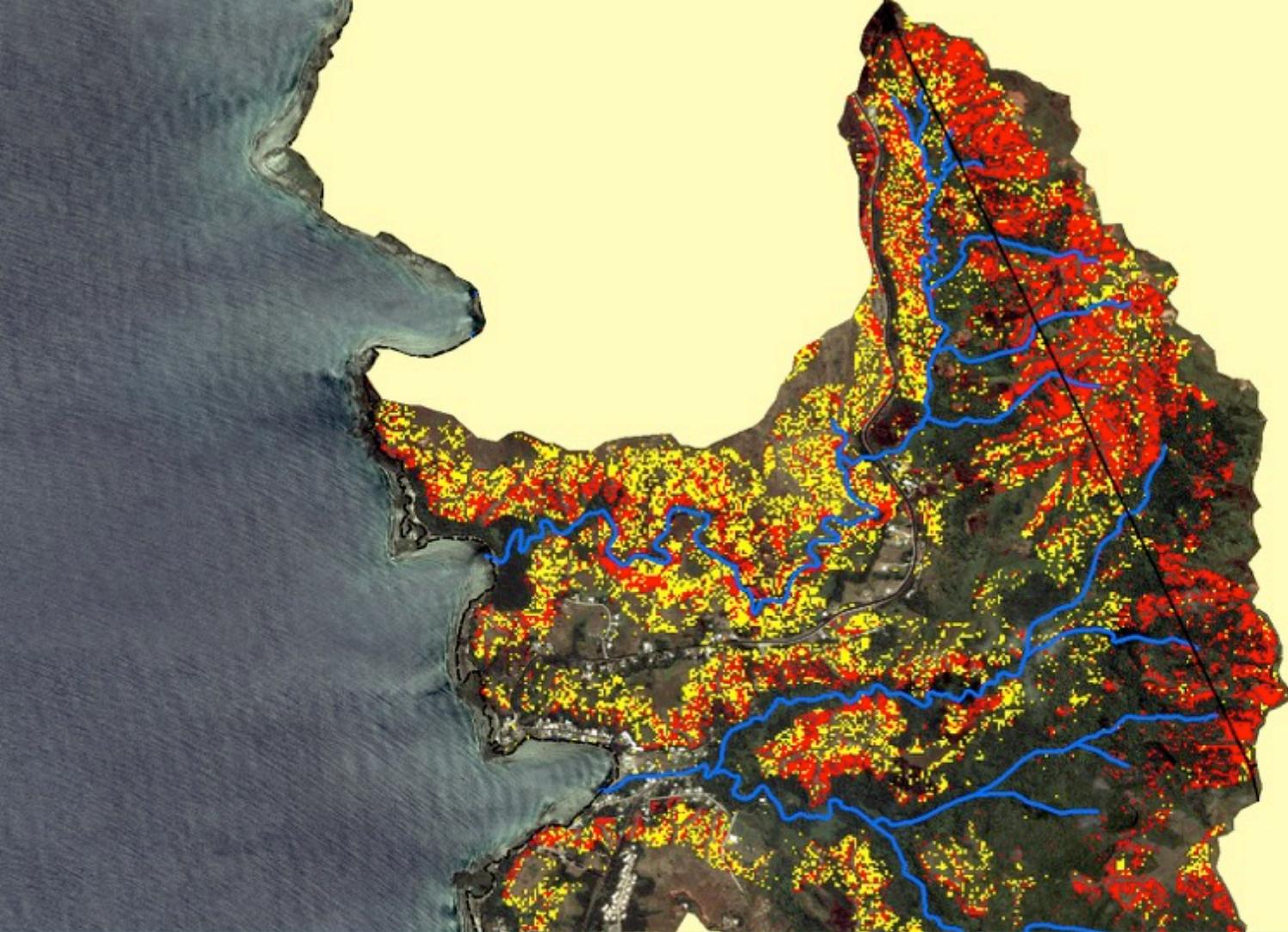






La Sa Fu'a River





MANAGEMENT applications

Andall and Birkeland (1978)
Rongo (2004)
Minton (2015)

1,714 tons yr⁻¹
sediment yield

Diversity ↑
Rongo (2004)

Richness ↑

Colony size ↑

Cover ↑

Sedimentation rate decreases

84 coral species
<10 mg cm⁻² d⁻¹

1 coral species
@ 100 mg cm⁻² d⁻¹

164 mg cm⁻² d⁻¹
shore



Storok and Bilyard (1985)
Rongo (2004)
Minton (2015)

Sedimentation Rate ($\text{mg cm}^{-2} \text{day}^{-1}$)

< 5

< 5

LIGHT

245m

5

LIGHT
MODERATE

194m

148m

10

MODERATE
SEVERE

95m
84m

34m

414

75%

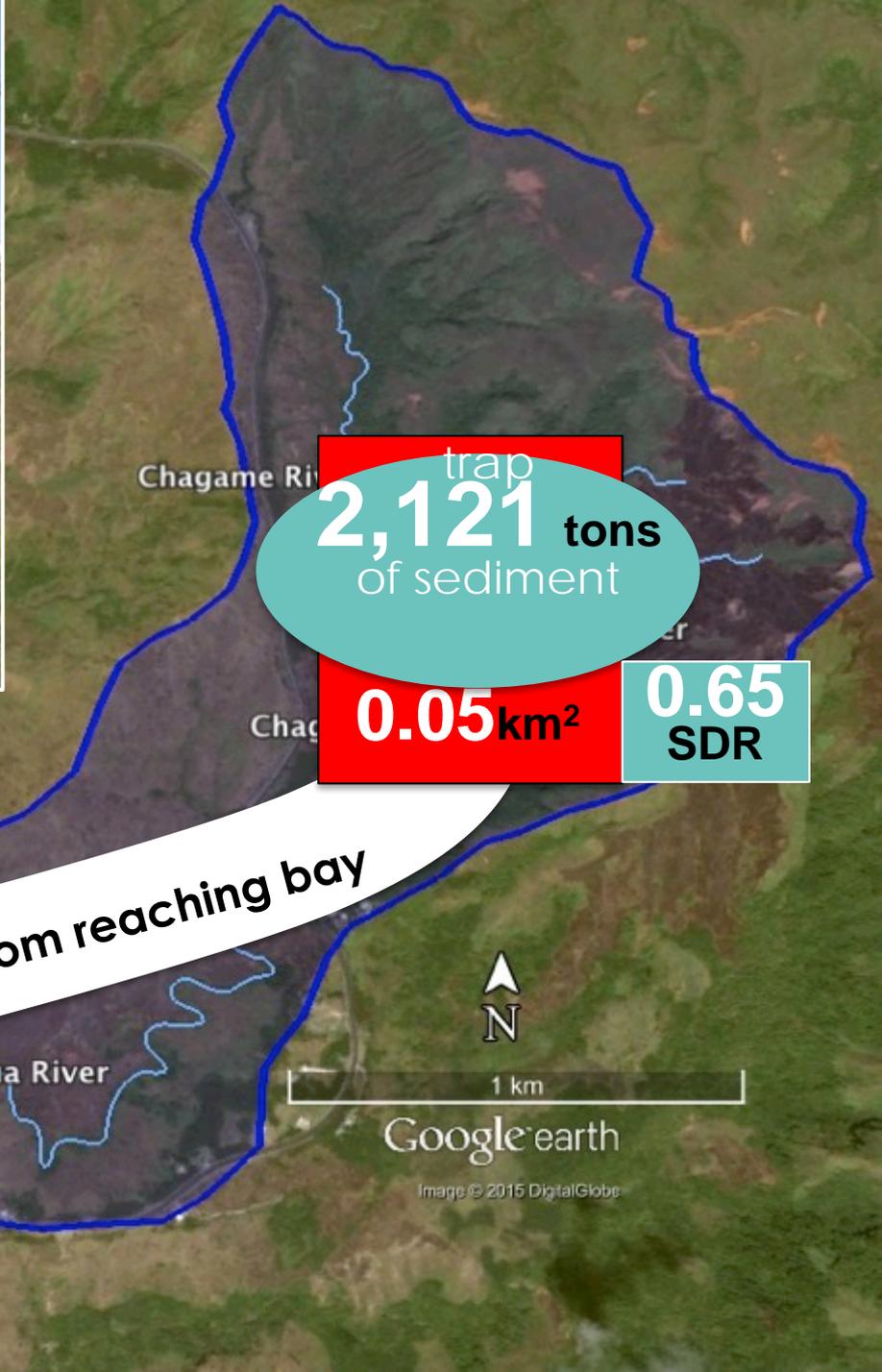
sedimentation
rate reduction

Minton (2015)





44 kg m⁻² yr⁻¹
trapping
efficiency



trap
2,121 tons
of sediment

0.05 km²

0.65 SDR

Prevent **1379 tons** from reaching bay

75%
sedimentation
rate reduction
Minton (2015)



11

thousand trees

Shelton AJ, Richmond RH (2016) **Watershed restoration as a tool for improving coral reef resilience against climate change and other human impacts.** *Estuarine, Coastal and Shelf Science*, *in press*



4.3 years
sediment
residence time

Wolanski et al. (2003)





KAUA`I, Hawai`i

2001 impacts



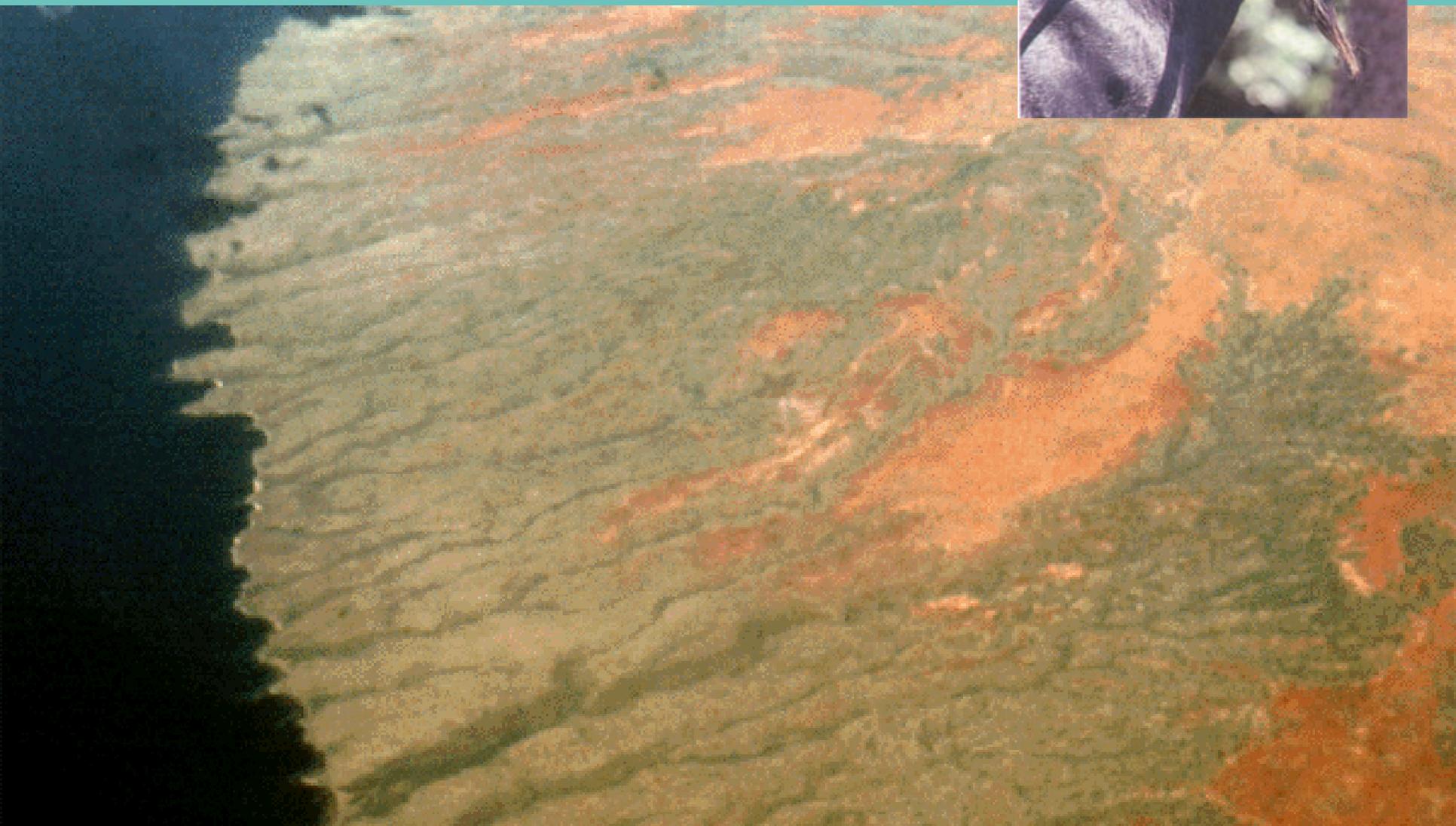


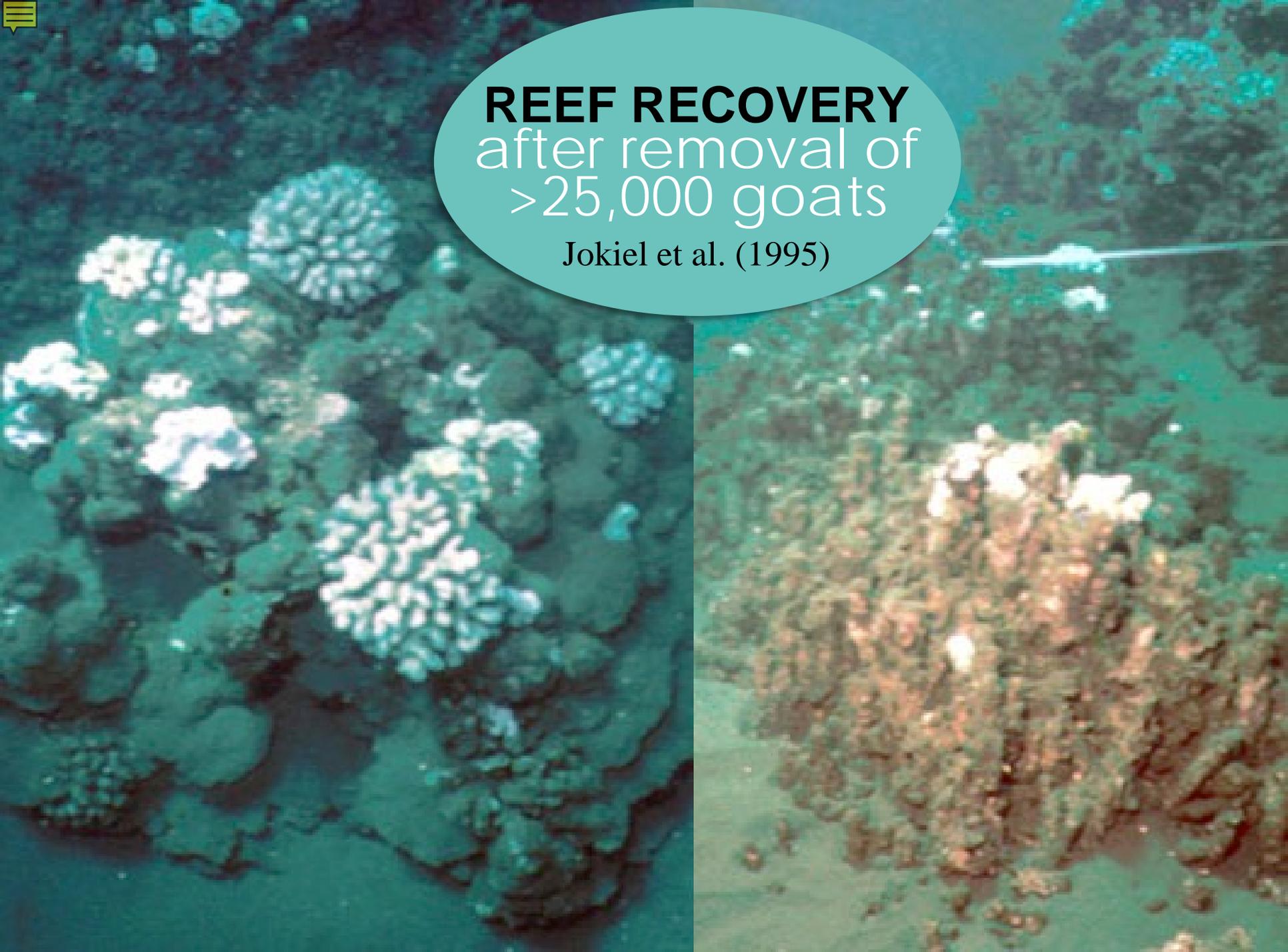
CORAL
colonies doubled
after series of
high surf events

Jokiel and Brown (2004)



KAHO`OLAWA, Hawai`i



An aerial photograph of a coral reef, split vertically to show two different stages of recovery. The left side shows a healthy reef with large, white, branching coral structures. The right side shows a reef that has been heavily degraded, with a large area of brown, dead coral and a significant loss of the white branching structures. A white arrow points from the text in the center towards the right side of the image.

REEF RECOVERY
after removal of
>25,000 goats

Jokiel et al. (1995)

AIRAI BAY, Palau





**REEF
RECOVERY**
after mangrove
clearing ban

Richmond et al. (2007)





WEST MAUI, Hawai`i

WMR2R



FAGA`ALU, American Samoa

Alex Messina

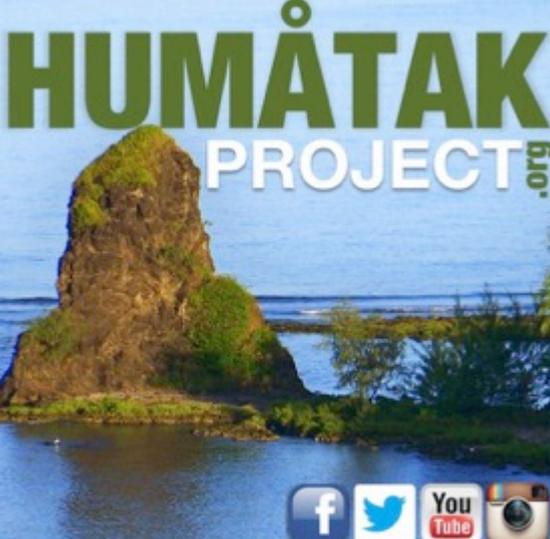


GUANICA, Puerto Rico

Roberto Viqueira Rios



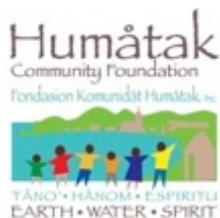
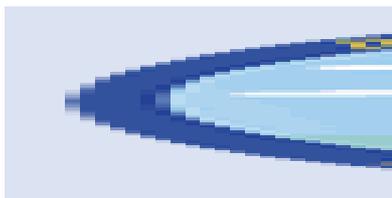
the volunteers of
HUMĀTAK PROJECT



Reviving Guam, One Bay At A Time



Center for
Sponsored Coastal
Ocean Research



Center for Island Sustainability
UOG Green
AmeriCorps UOG
Western Pacific Coral Reef Initiative
UOG Environmental Biology

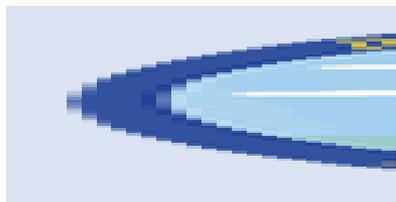




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Center for Sponsored Coastal Ocean Research



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RESTORATION challenges



