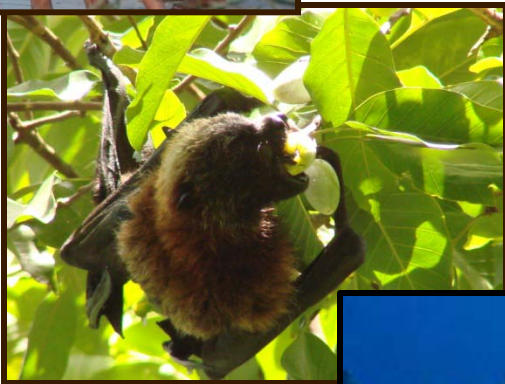


Tracy Johnson, Julie Denslow and Warea Orapa



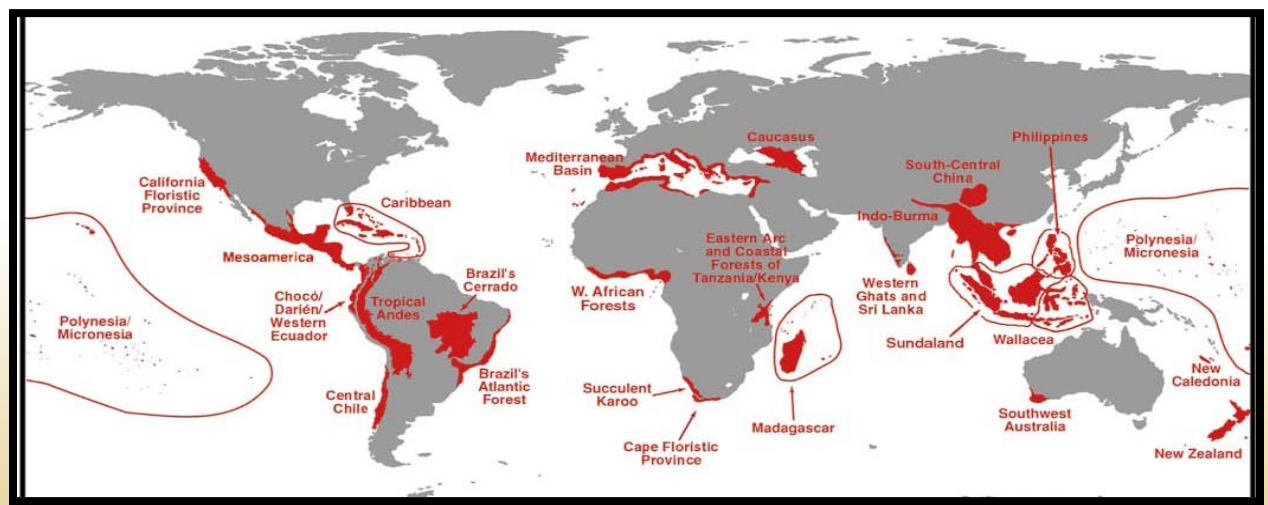
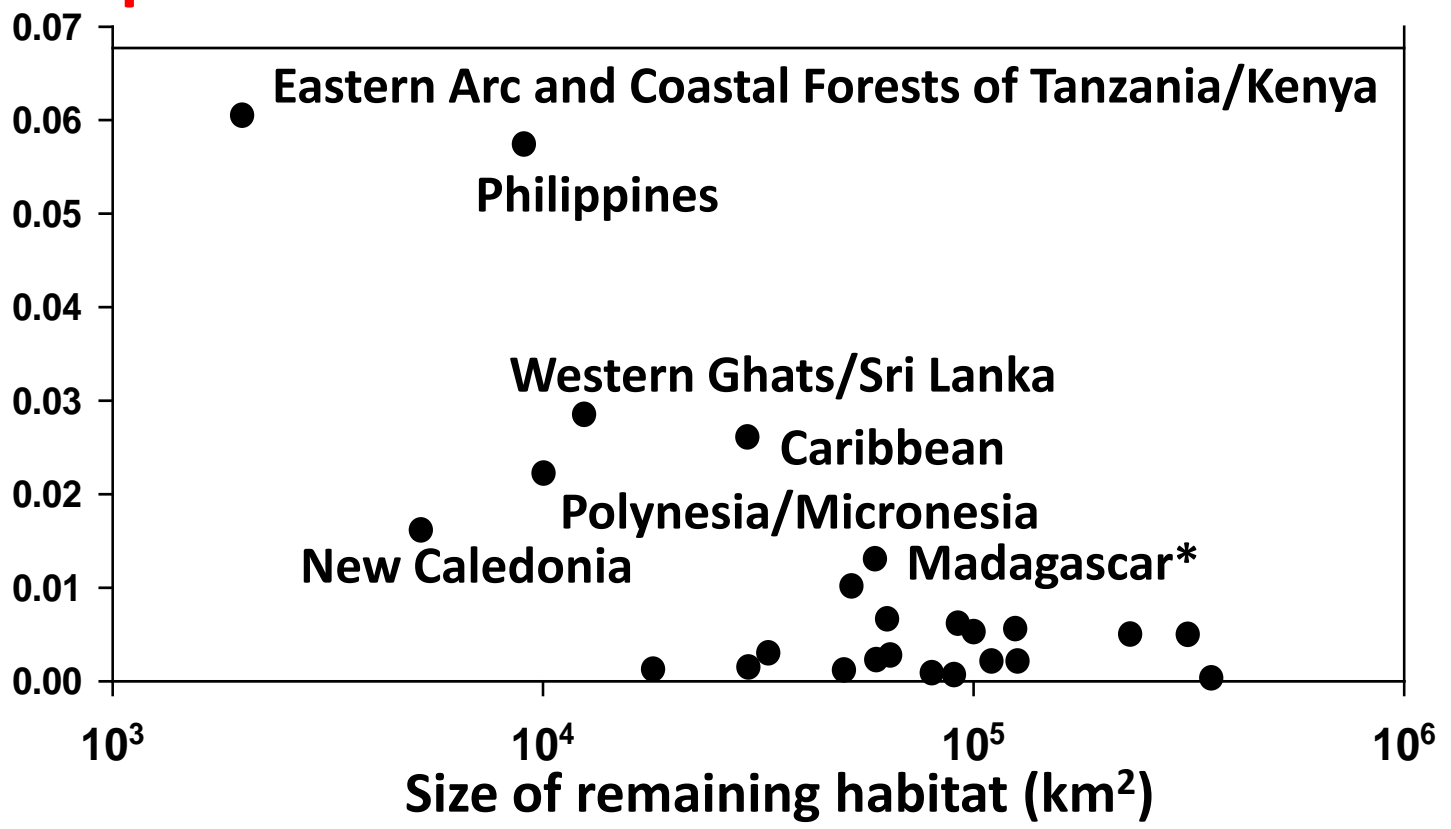


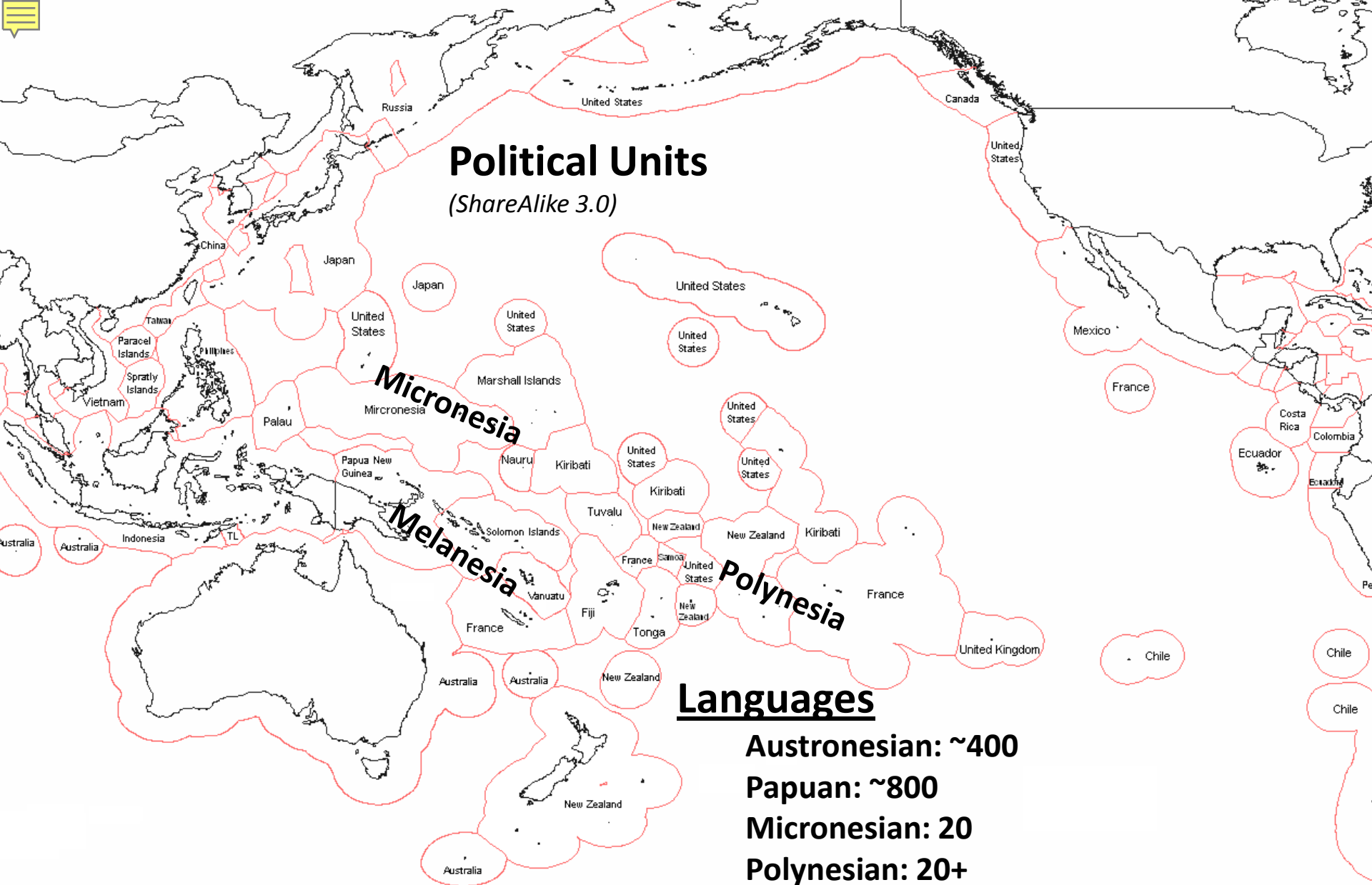
**Tropical islands are famous
as hotspots of diversity,
both biological
and cultural**



Biodiversity Hotspots: Which stand to lose most to invasion?

Endemic Density
 (# endemic plant spp. per km² of remaining habitat)
 (data from Myers et al. 2000 *Nature*)





Strong cultural traditions



Polynesian voyaging

Maisu and Hokule'a at Chuuk. Photo: Mike Taylor



Decision making in Palau



Juan Wilson



Hawaiian agriculture



Challenges for conserving island ecosystems:

Impacts of land use

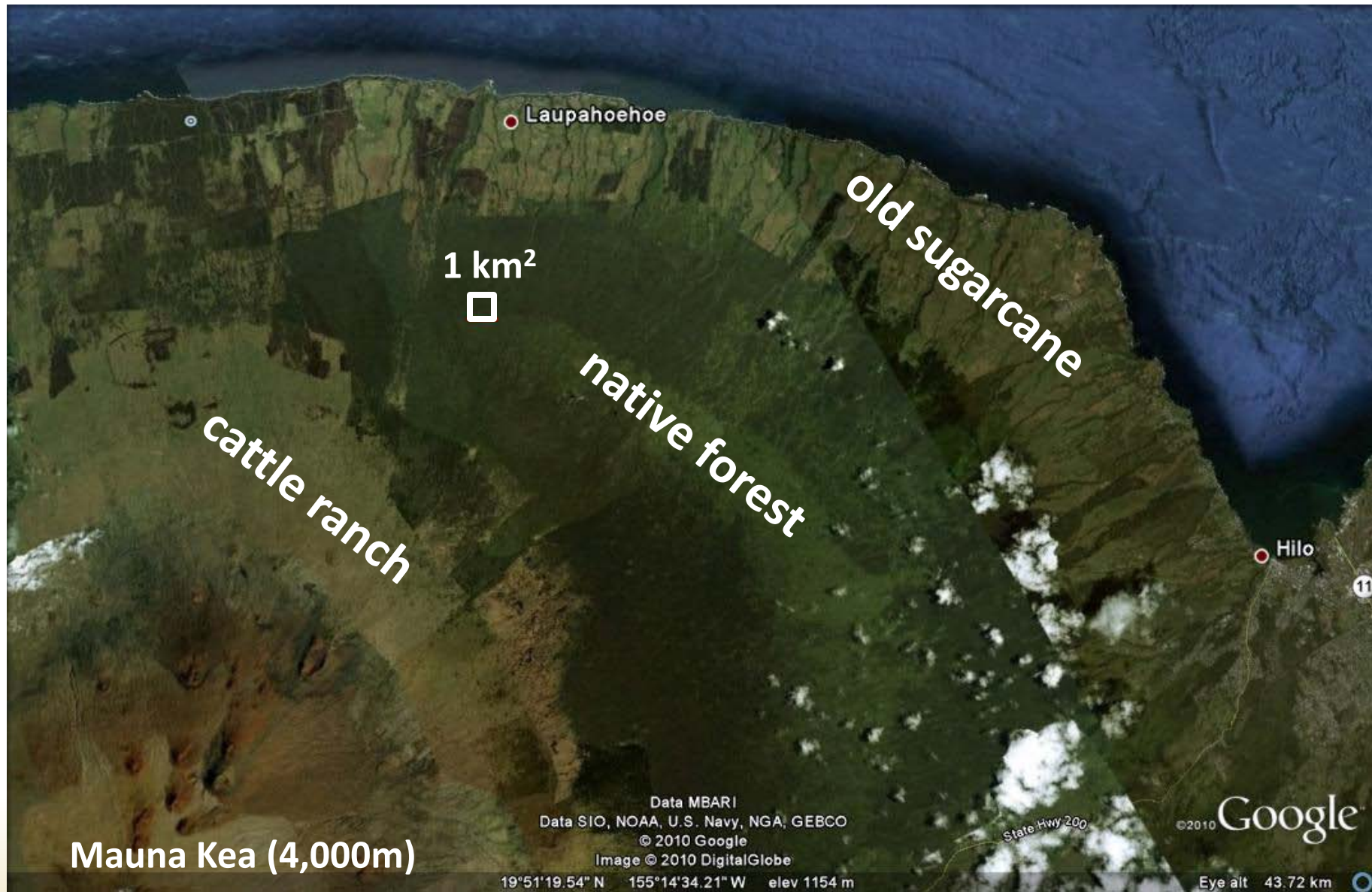


**Coastal areas have been converted for agriculture and homes;
Upland forests continue to be valued culturally
... and as a water resource**





Land conversion on Hawai'i Island



American Samoa

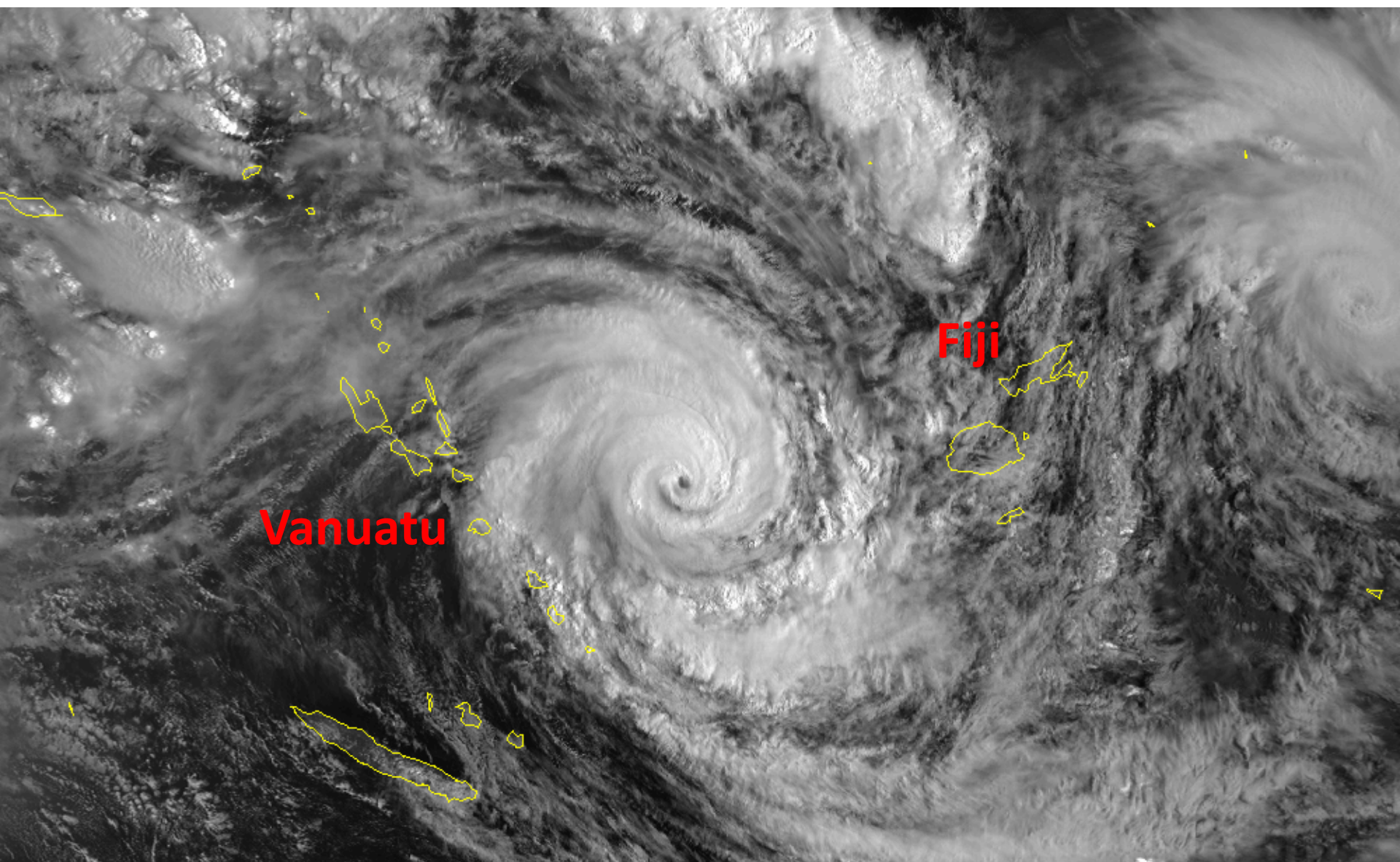


Samoan agroforestry



Native forests extend to the sea





Tropical Cyclone Ron, 1998 (NOAA)





**Miconia
in Tahiti
(J.-Y. Meyer)**

Aftermath of Cyclone Heta, American Samoa 2004



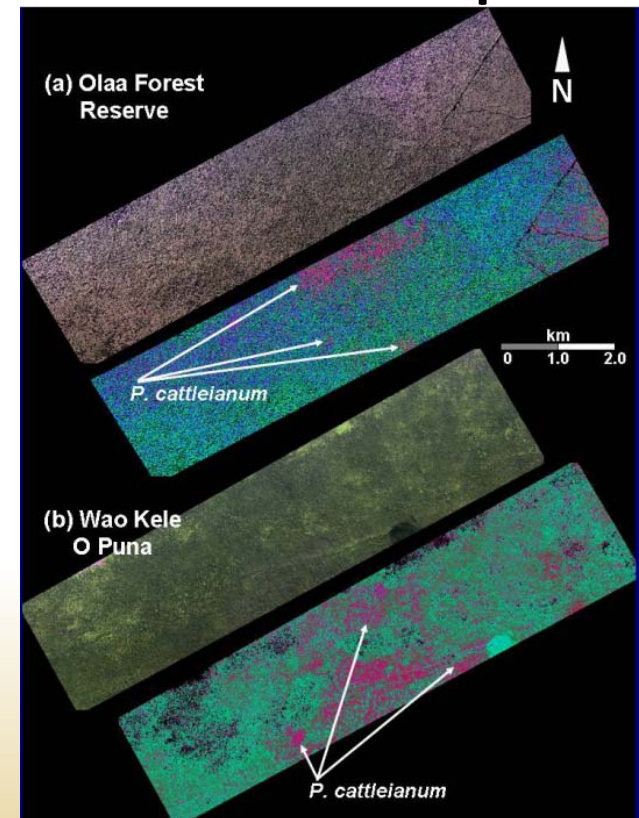
Challenges for conserving island ecosystems:

#1: Spread of Invasive species



Established invaders continue to spread

Existing biosecurity measures often are inadequate



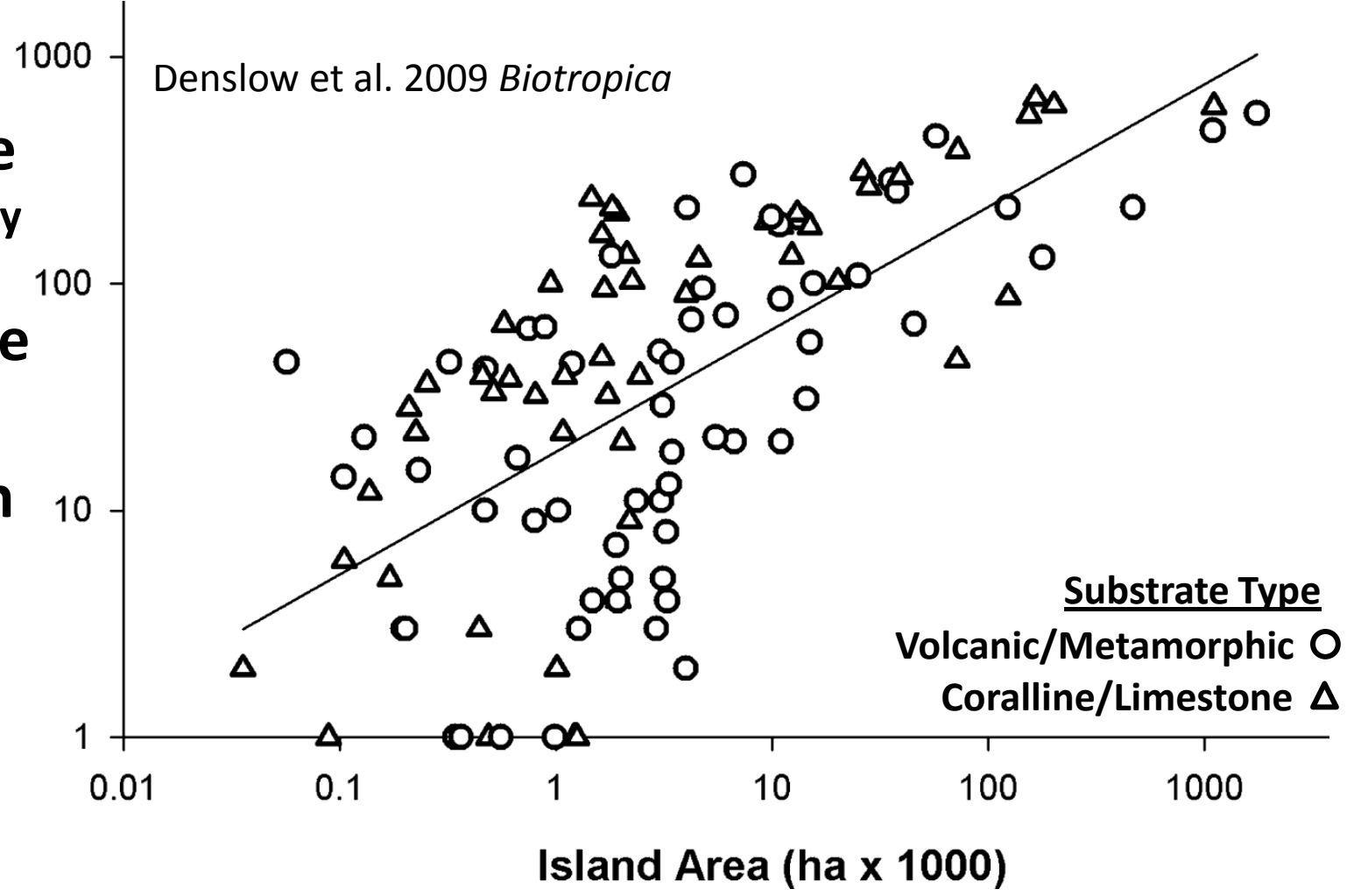
Carnegie Airborne Observatory





**# Invasive
(or potentially
invasive)
non-native
plant
species in
Pacific
islands**

Denslow et al. 2009 *Biotropica*



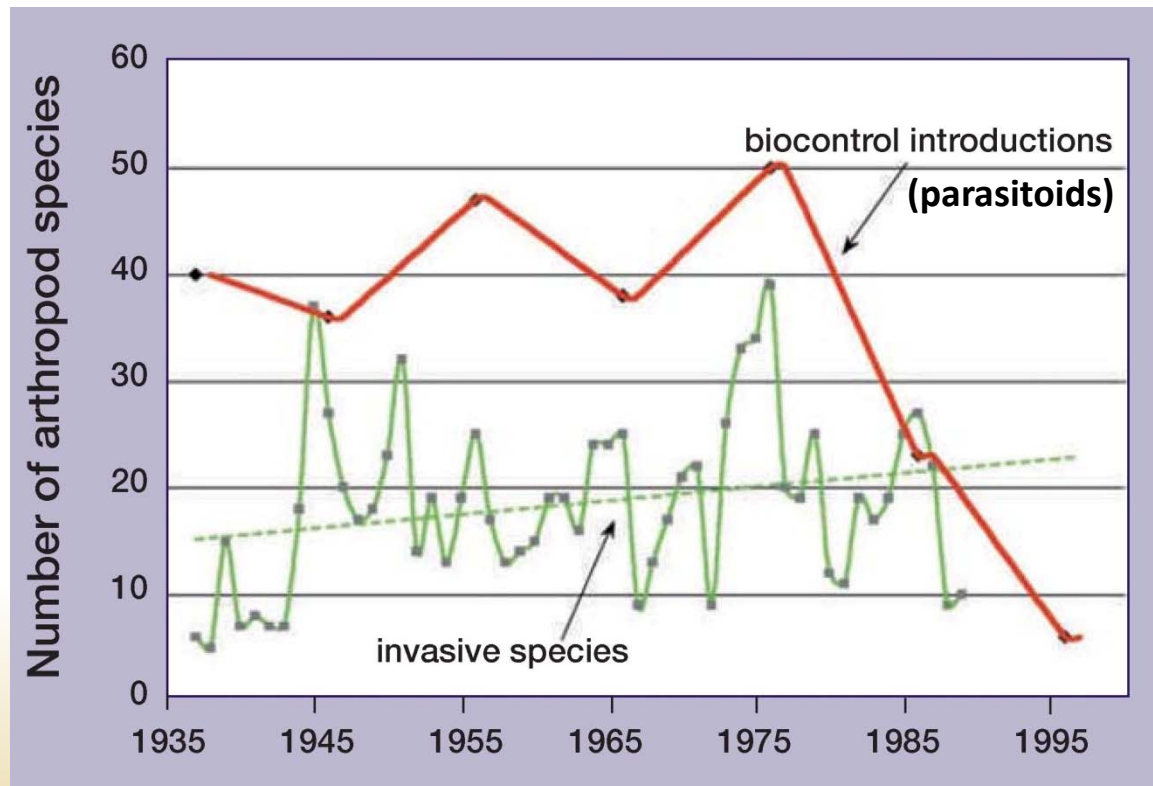
Larger islands (esp. high islands with richer native flora, more people and greater economic activity) tend to have more invasive alien plants



Challenges for conserving island ecosystems:

- Invasive species
- Impacts of land use
- Natural disturbance cycles, especially storms
- All of the above likely will worsen with climate change
- Capacity for biocontrol research is limited

Introductions for biocontrol in Hawaii have declined greatly, while arrivals of new invasive species increase (Messing & Wright 2006)



Challenges for conserving island ecosystems:

- Invasive species
- Impacts of land use
- Natural disturbance cycles, especially storms
- All of the above likely worsen with climate change
- Limited capacity for biocontrol research
- Negative attitudes toward new introductions of any kind



natural enemies
=
introduced for pest control

Biocontrol often is viewed as equally risky and unwelcome as alien pest introductions





Conserving island ecosystems with biocontrol: Opportunities

- Disharmonic flora and fauna can simplify nontarget issues

Potential biocontrols for Melastomataceae in Hawaii



Miconia



Tibouchina



Clidemia



Conserving island ecosystems with biocontrol: Opportunities

Islands are excellent model systems for ecological science

- compact, with steep gradients of rainfall and temperature
- readily identifiable patterns in soil chemistry

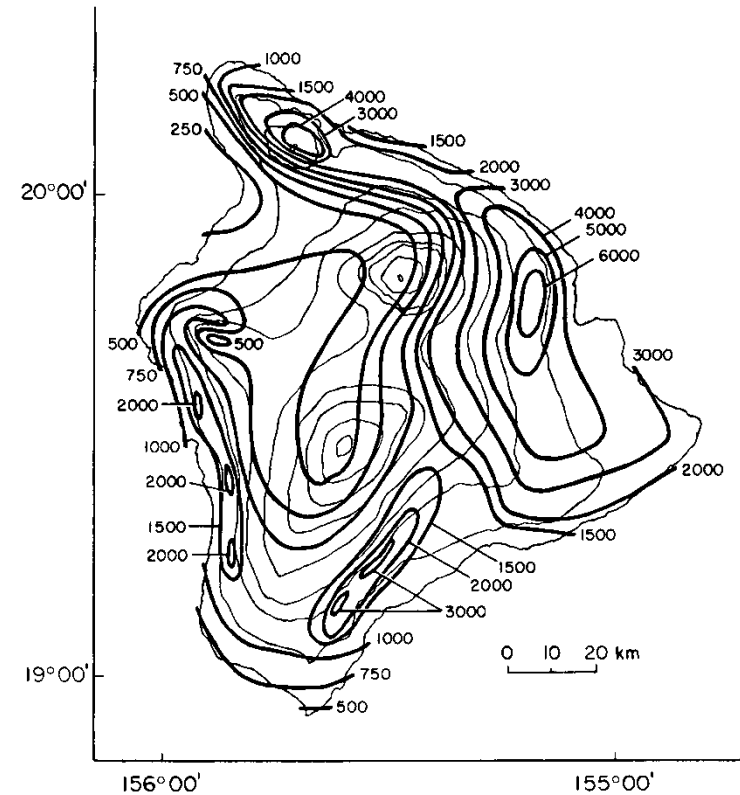
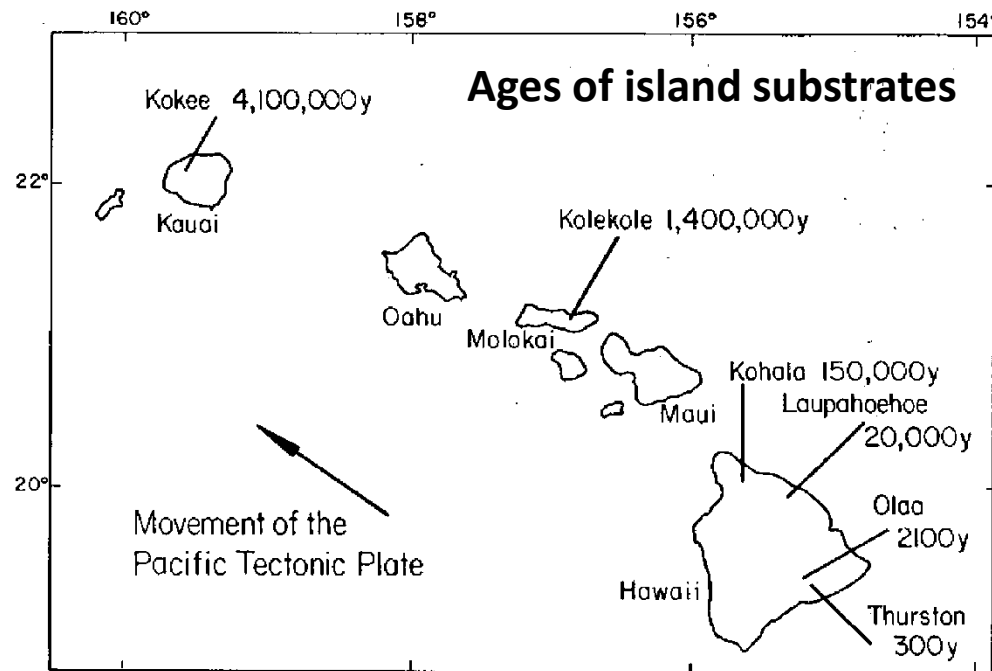


Figure 1 Distribution of mean annual precipitation on the Island of Hawai'i, from Giambelluca *et al.* (1986). The fine lines are elevation contours (500 m); coarse lines are precipitation isohyets (mm year⁻¹).

© 2002 Blackwell Science Ltd, *Journal of Biogeography*, 29, 573–582

Post-release monitoring plans for strawberry guava biocontrol

Plot-based demographic studies began in 2004



Can biocontrol reduce strawberry guava's impacts on native ecosystems?

or on Hawaiian agriculture (by reducing pest fruit flies)?

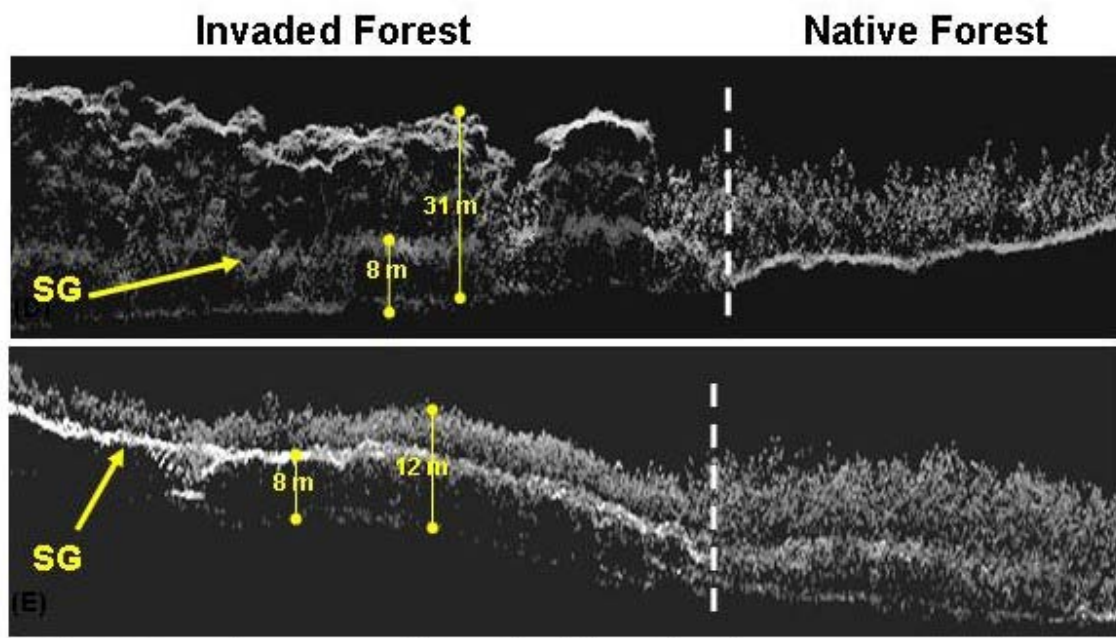
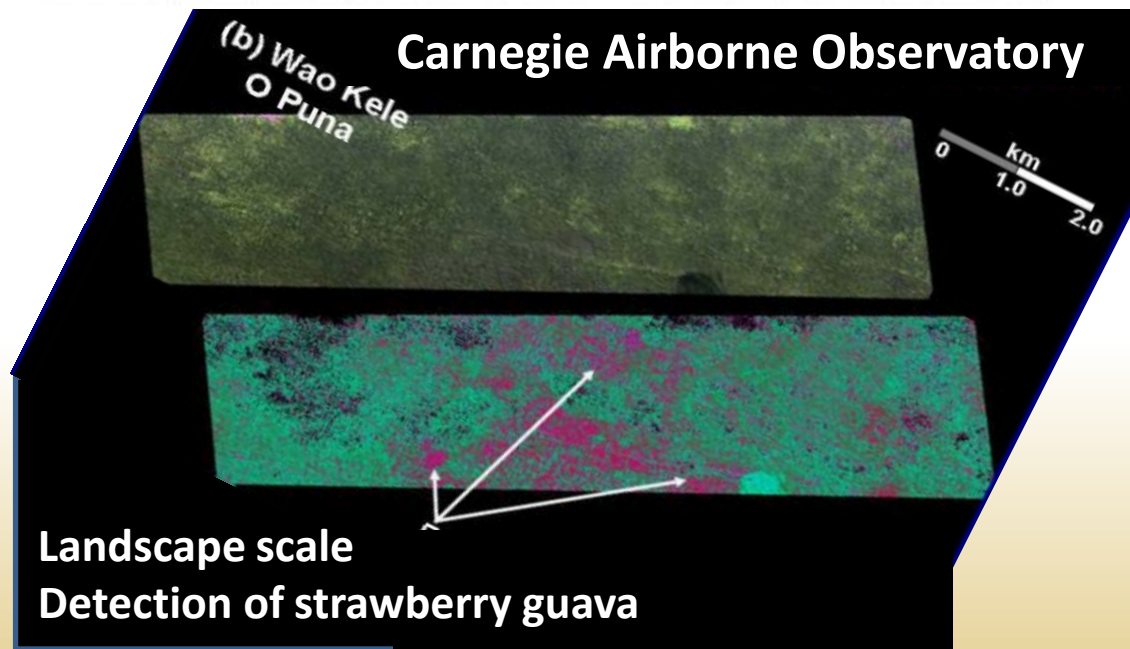


Fig. 5. Strawberry guava detected within and under overstory canopies



Conserving island ecosystems with biocontrol: Opportunities

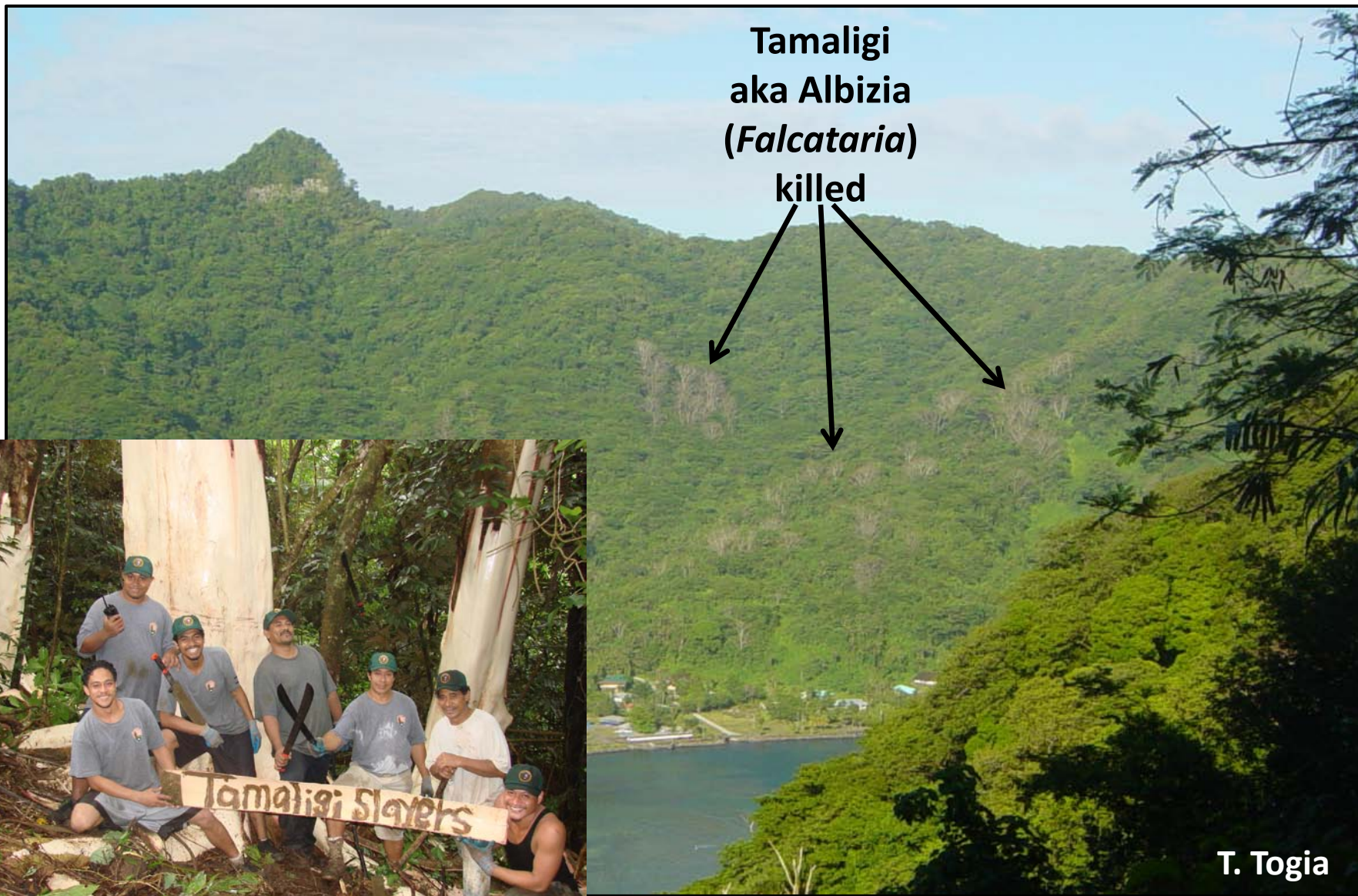
Islanders have strong sense of place and eagerness to participate in conservation



Invasive species management and forest restoration in American Samoa (photos: T. Togia)



American Samoa



Tamaligi
aka Albizia
(*Falcataria*)
killed

Three arrows point from the word "killed" to three distinct areas of dead, greyish trees in the forest landscape shown in the background image.

T. Togia



Restoring native species habitat in Hawai`i



Clearing strawberry guava requires intensive effort



(photos: J. Penniman & J. Beachy)





Conserving island ecosystems: Crucial targets

- Ecosystem transforming weeds (dozens of species)



- Ants



Mahalo!



HAWAI`I

XIII International Symposium on Biological Control of Weeds (ISBCW 2011)



Save the Dates! September 11 - 16, 2011

Waikoloa Beach Marriott Resort & Spa
Waikoloa, Hawai`i USA

Website - http://uhhconferencecenter.com/xiii_isbcw.html

SAMPLE TOPICS

- Managing Invasive Plants under Climate Change
- History and Prospects for Weed Biocontrol in Pacific Islands
- Social and Economic Assessments of Biocontrol
- Target and Agent Selection
- Post-release Evaluation and Management
- Ecological and Genetic Processes
- Pre-release Testing of Agents

