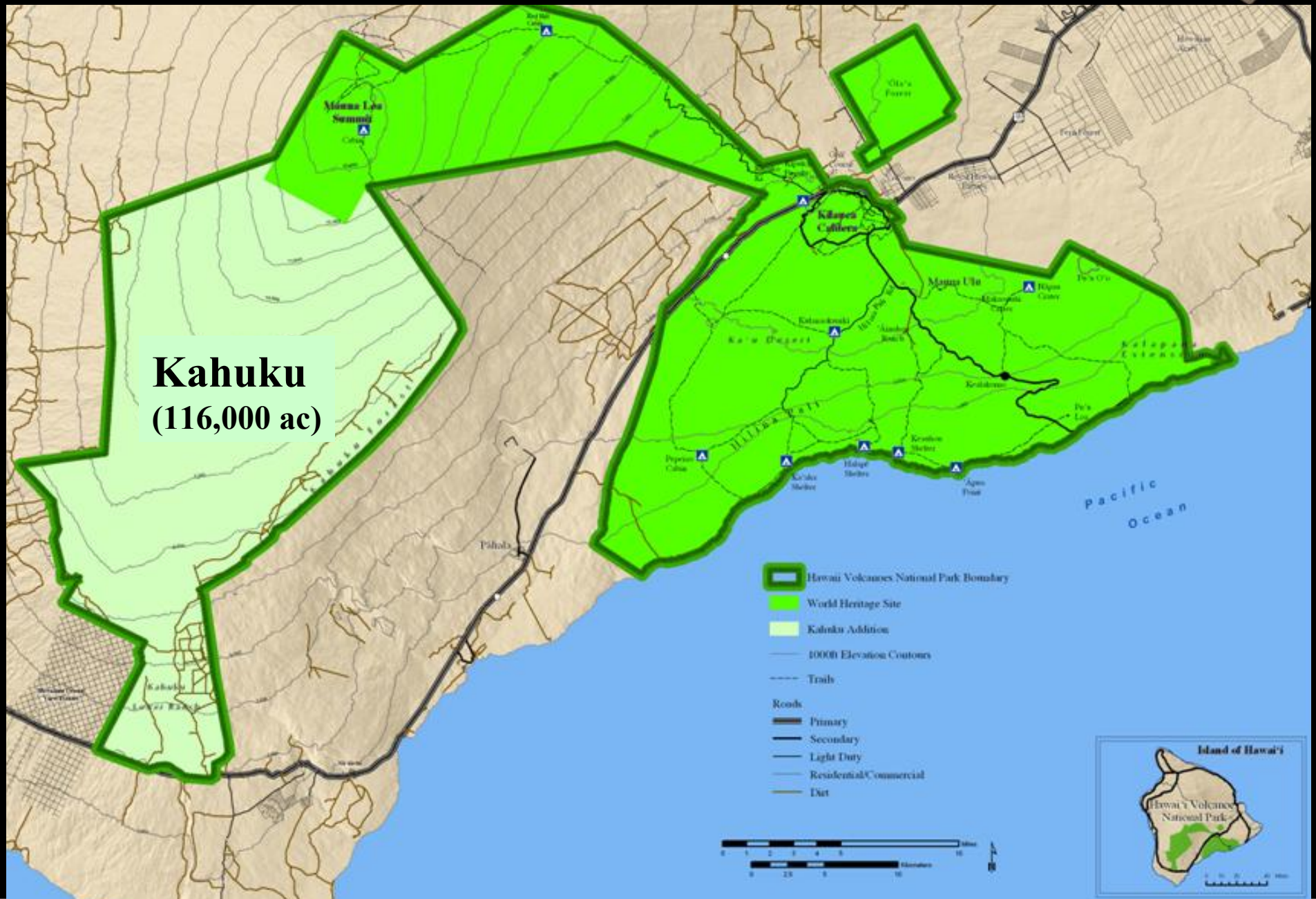
Special Ecological Areas …

20 years of Alien Plant Management at Hawai‘i Volcanoes

Rhonda Loh and Tim Tunison

Hawaii Volcanoes National Park



Park Ecosystems…Coastal Strand

Lama Forest

Dry ʻŌhiʻa Scrubland

Park's Ecosystems…Pioneer communities

…Rain Forest

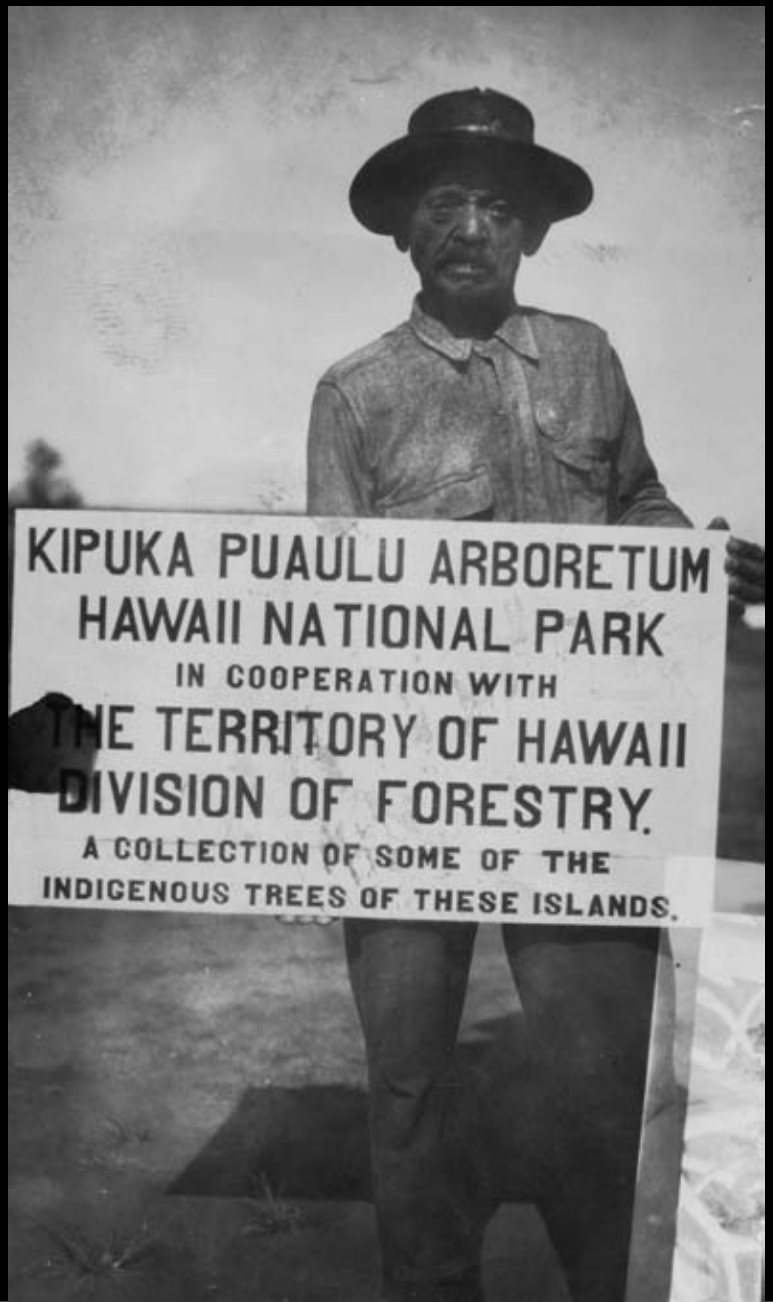
…Montane Shrubland

Rare species,,,

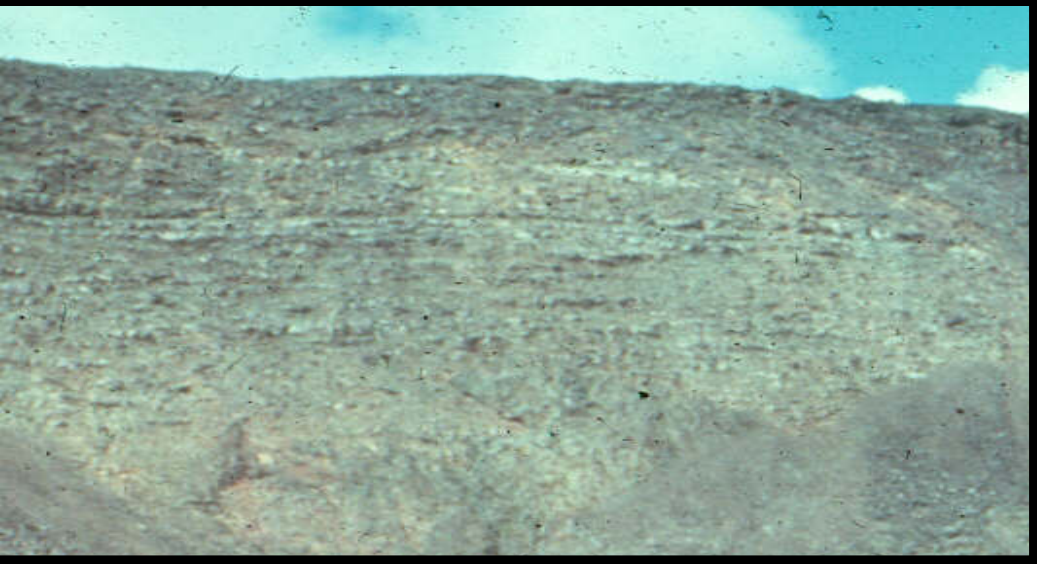
The park provides habitat for over 50 federally listed threatened, endangered and candidate endangered species

Mauna Loa Silversword

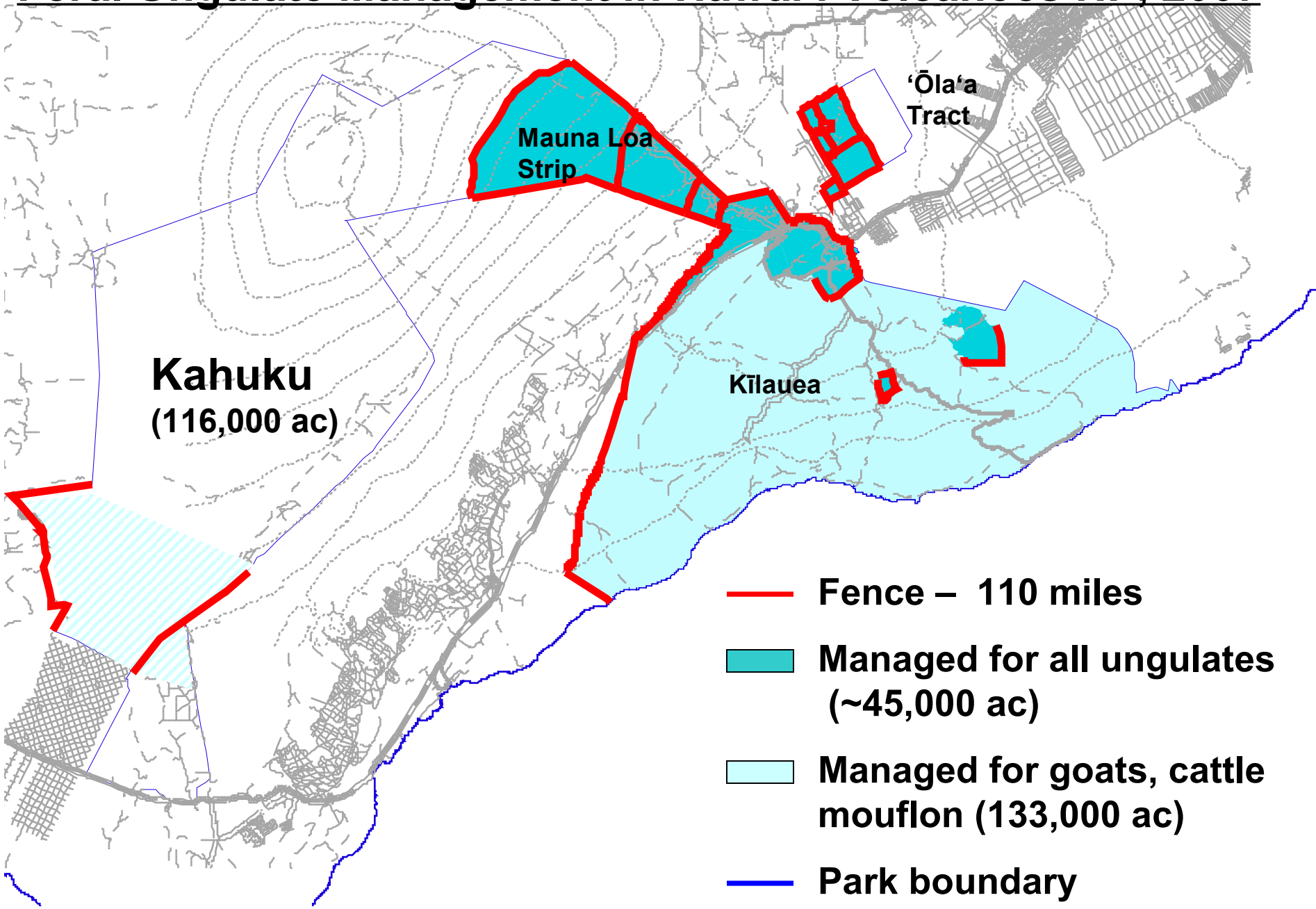
History of Natural Resources Management…



Feral Ungulates in the Park



Feral Ungulate Management in Hawai‘i Volcanoes NP, 2007



Koa Forest Recovery on Mauna Loa Strip, 2003

Vegetation recovery following fencing and animal removal in rain forest (Katahira 1980)

1975

1978

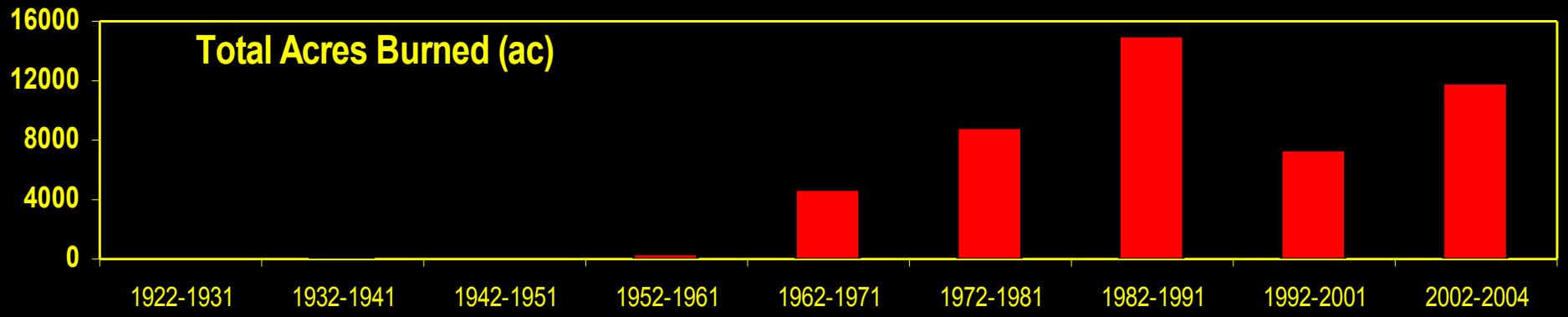
Alien Plants at HAVO

Kahili ginger replaces native understory and prevents native trees from establishing

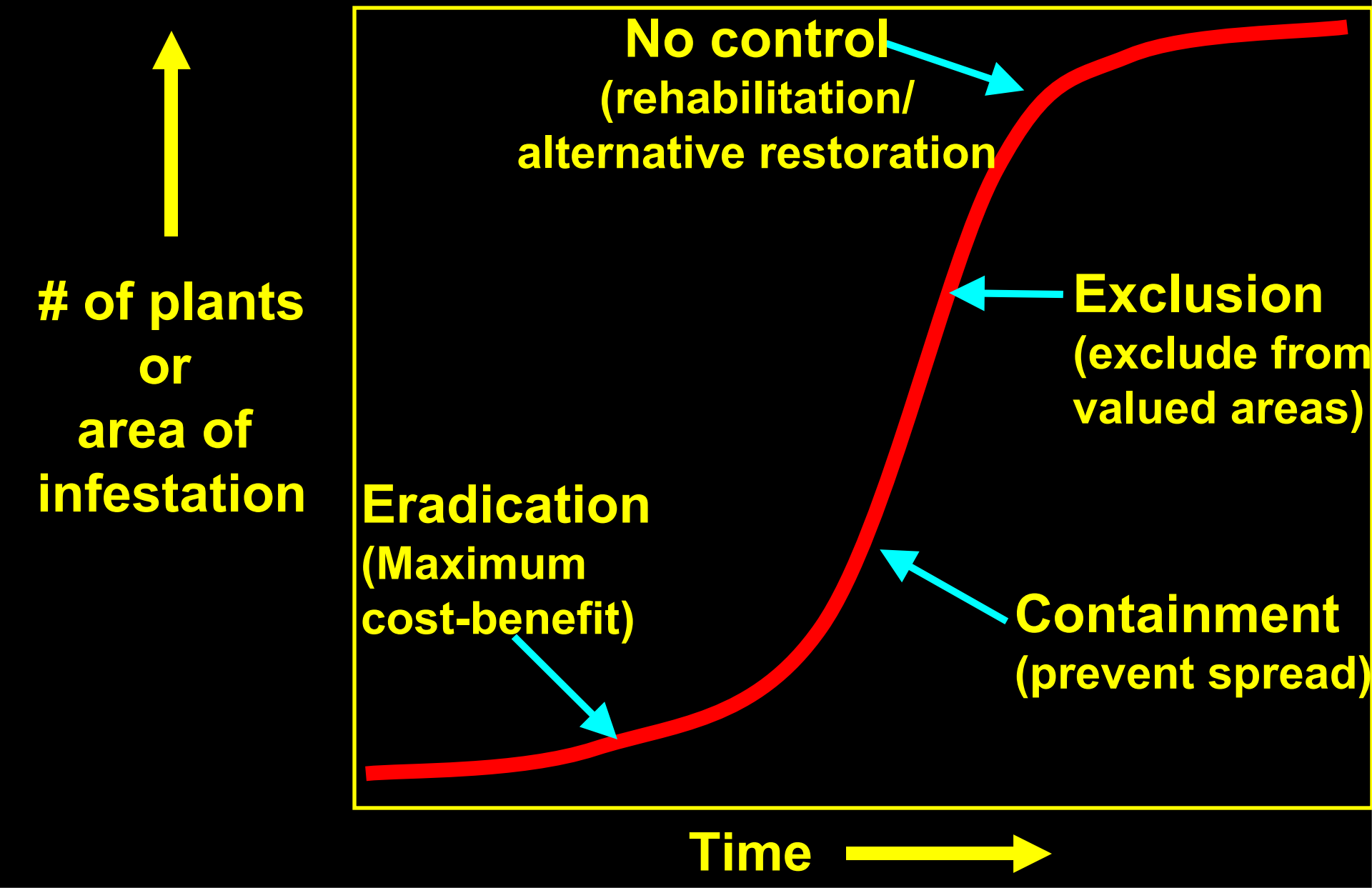
Strawberry Guava (*Psidium cattleianum*) along Highway 11, Hawai‘i Island

Faya tree increases Nitrogen inputs on young volcanic soils

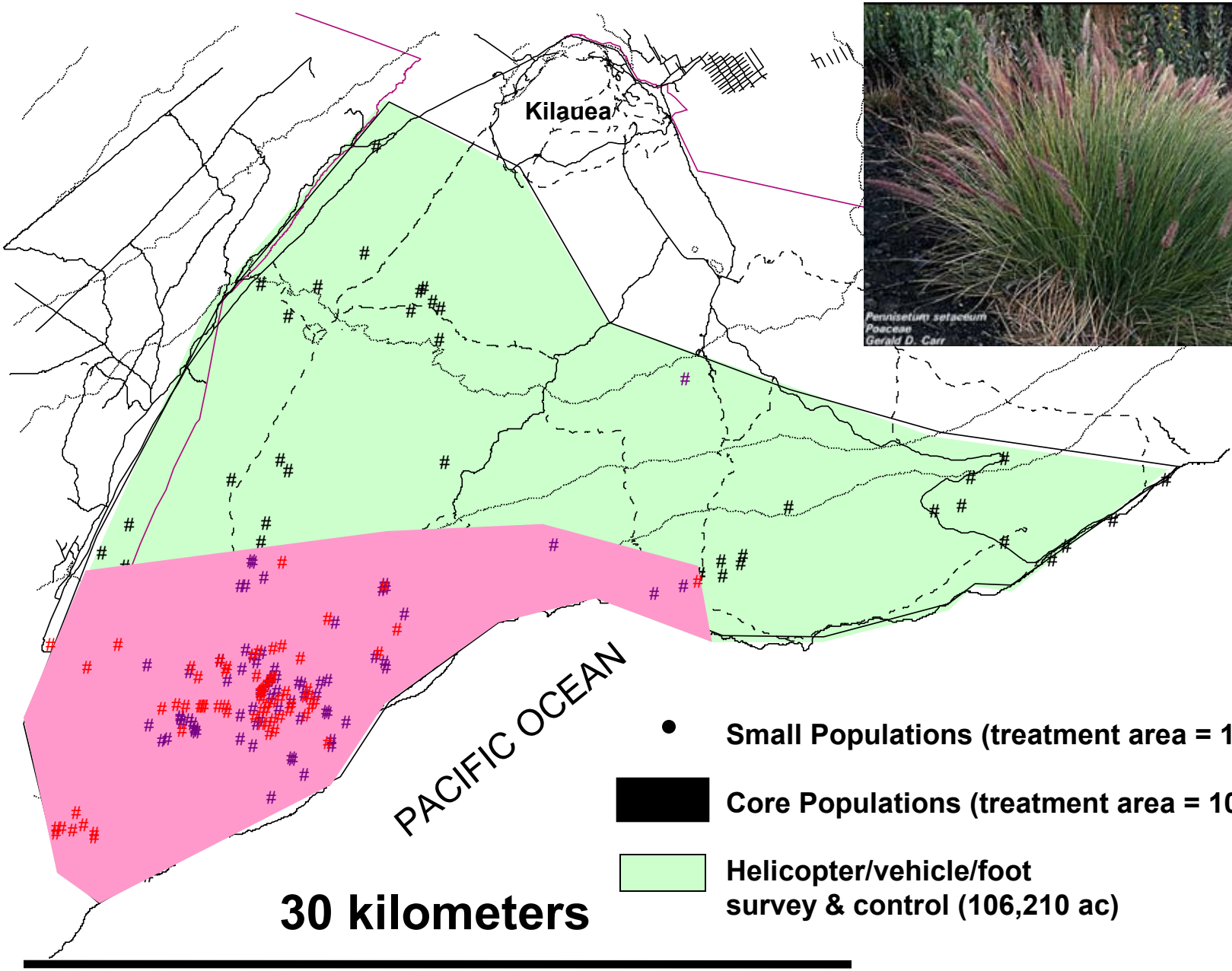
Alien Grasses increase fire size and frequency



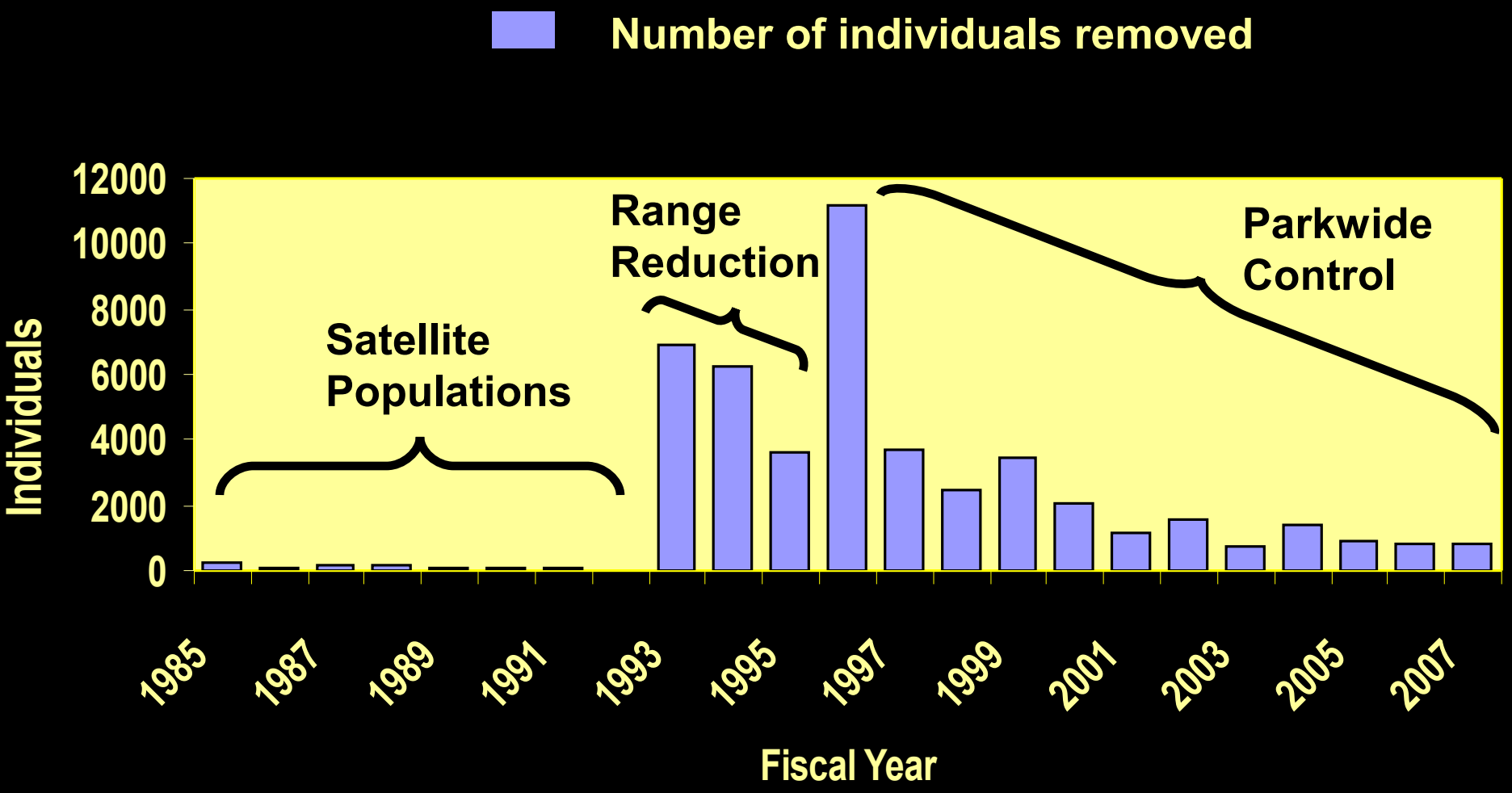
Alien Plant Management Strategies (NPS 1986)



Fountain Grass Distribution at Hawai‘i Volcanoes



Fountain Grass Control in Hawai'i Volcanoes National Park



SPECIAL ECOLOGICAL AREA'S (SEA)

REMOVE DISRUPTIVE WEEDS FROM HIGH PRIORITY AREAS

- Representativeness and/or rarity of vegetation

- Manageability/Vegetation Intactness

- Plant species diversity/richness/presence of rare species

- Research and interpretive values

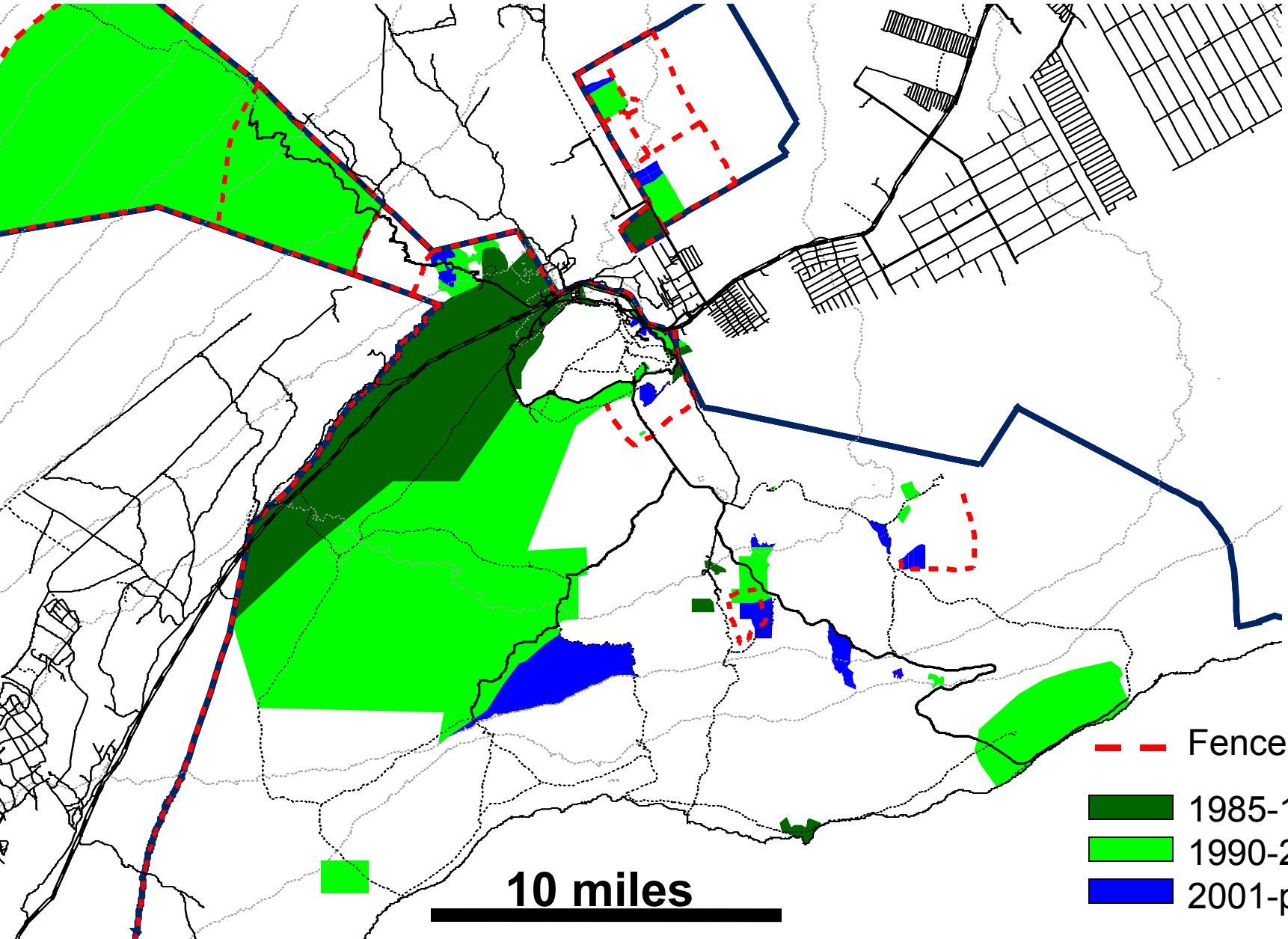
- Incremental approach. Can be expanded & new ones added as resources become available

Systematic ground and/or aerial sweeps

Treatment of all target species within the area (11 spp in 1984)

Revisit sites at 1-4 year intervals

Special Ecological Areas 1985-2007



How effective is removing target weeds from SEA's?

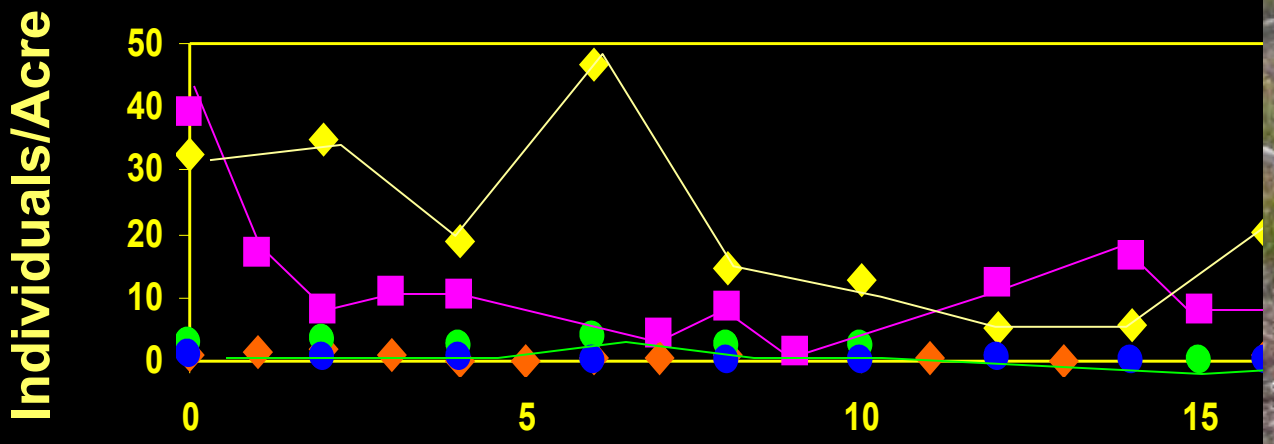
What is the cost of managing weeds over time ?

Seasonal Dry ʻŌhiʻa Woodlands SEA's

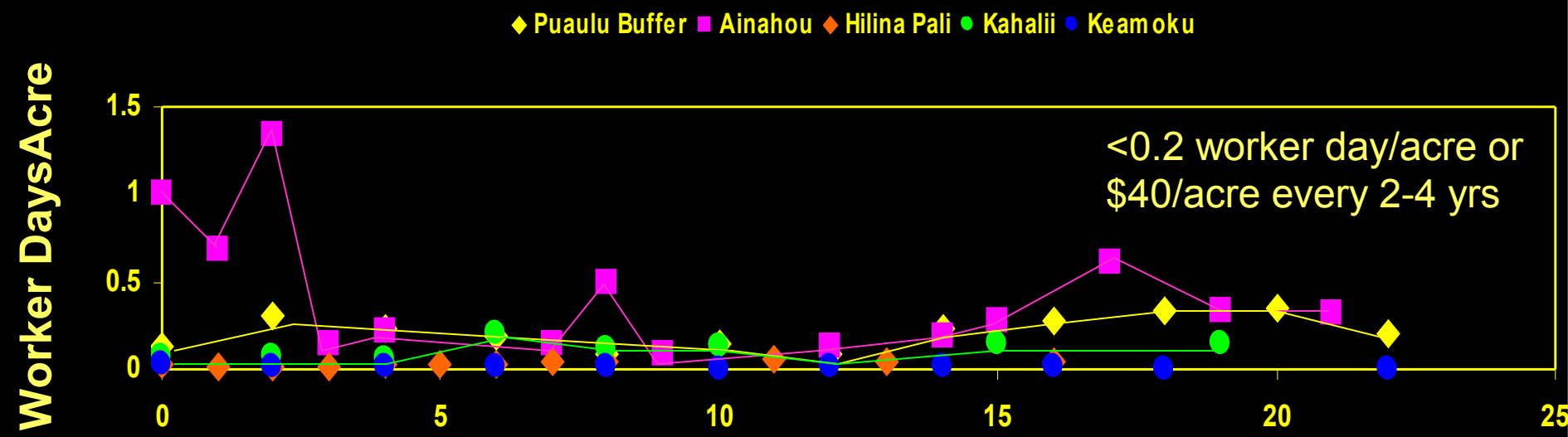
(18,058* ac)

*includes 10,488 ac helicopter swept

Treated Individuals/Acre

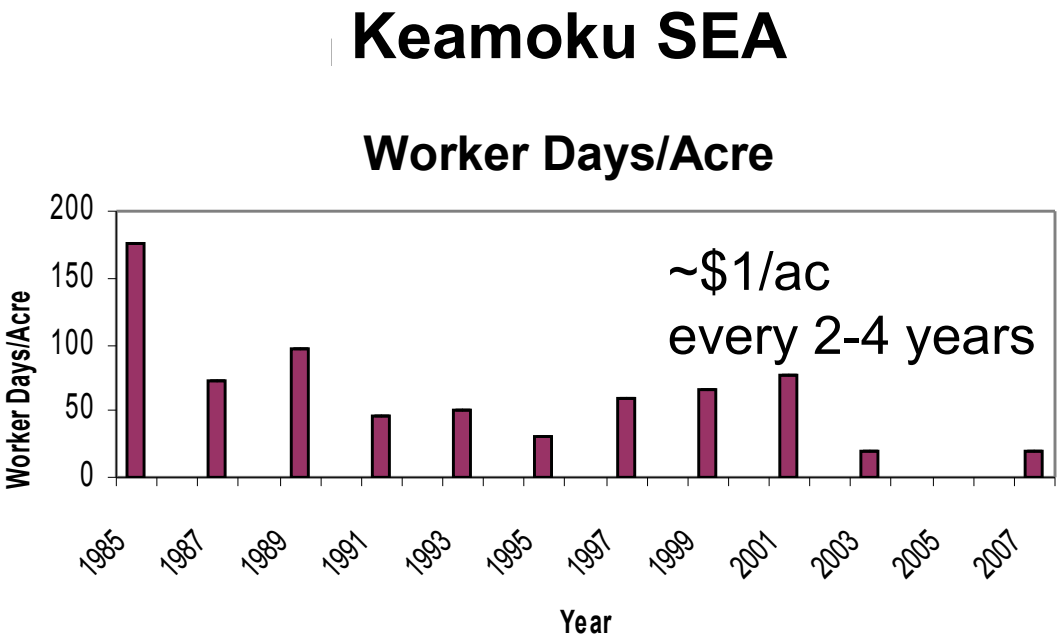


Worker Days/Acre

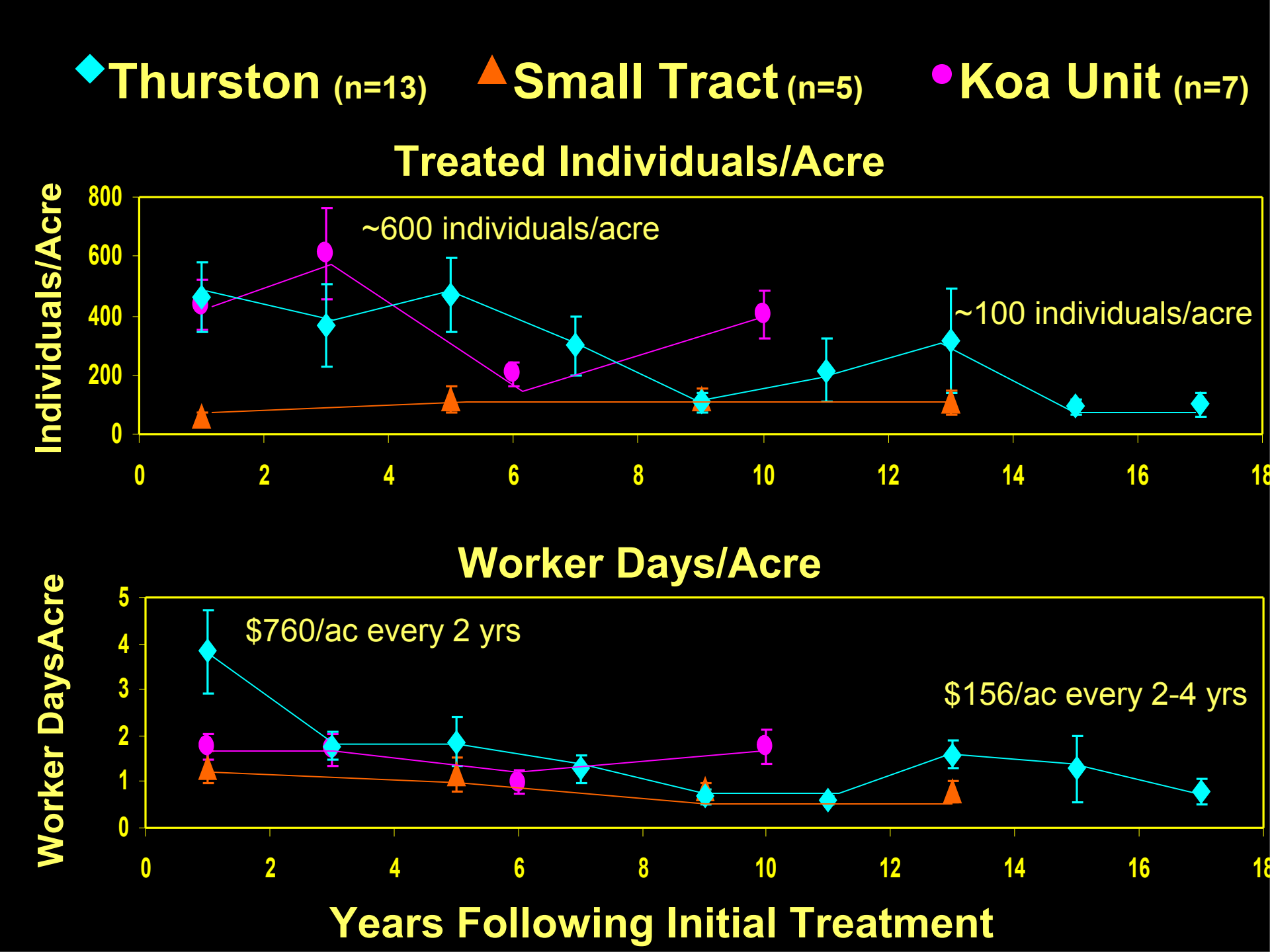


Years Following Initial Treatment

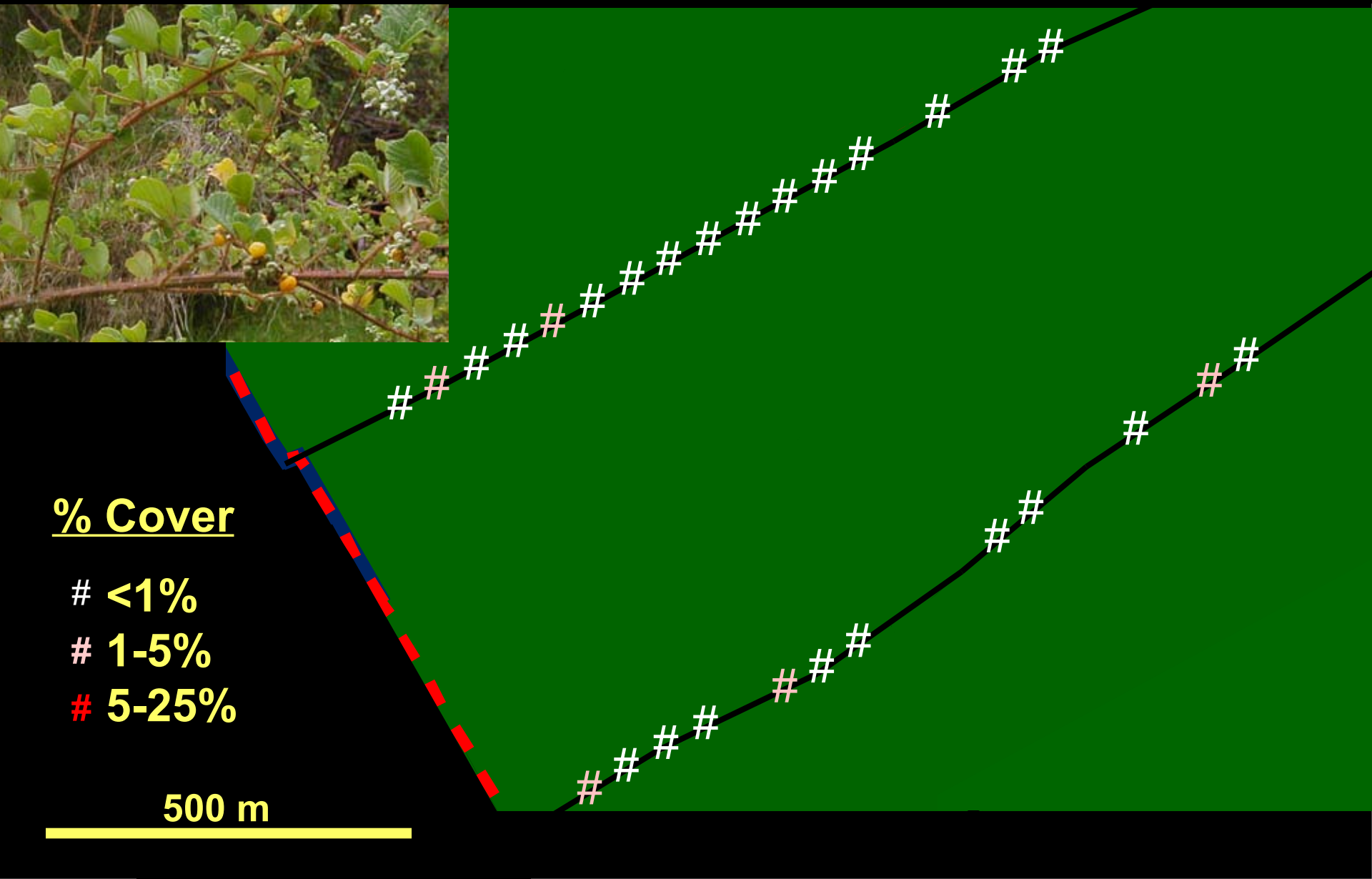
Increased use of Helicopter search and aerial treatment reduces workloads



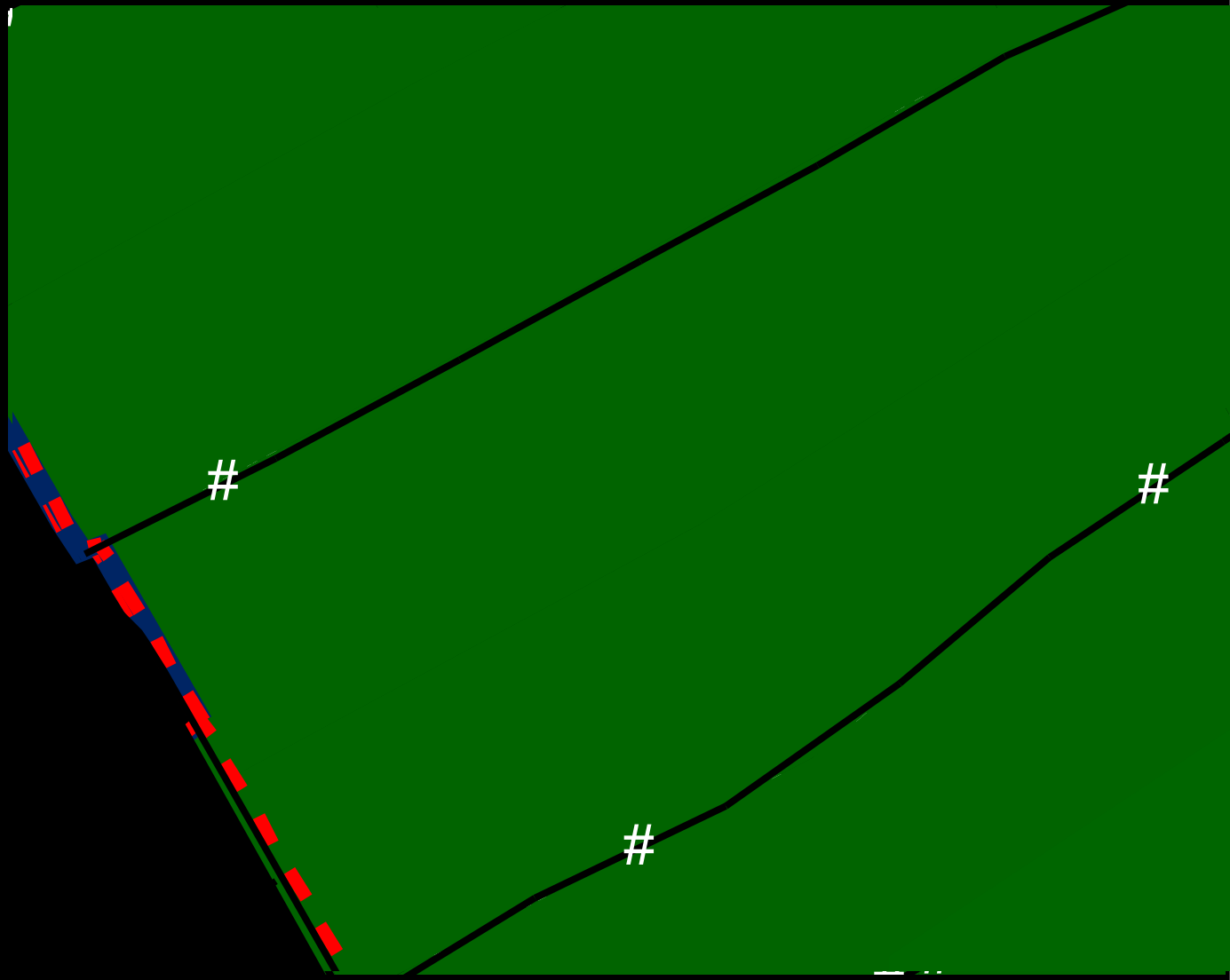
Rain Forest Units 2,491 ac


Thurston (n=13)
Small Tract (n=5)
Koa Unit (n=7)
Treated Individuals/Acre
Individuals/Acre
800
600
400
200
0
~600 individuals/acre
~100 individuals/acre
0
2
4
6
8
10
12
14
16
18
Worker Days/Acre
Worker DaysAcre
5
4
3
2
1
0
$760/ac every 2 yrs
$156/ac every 2-4 yrs
0
2
4
6
8
10
12
14
16
18
Years Following Initial Treatment

Distribution of Himalayan raspberry in `Ola`a Rainforest SEA



Distribution of Kahili Ginger



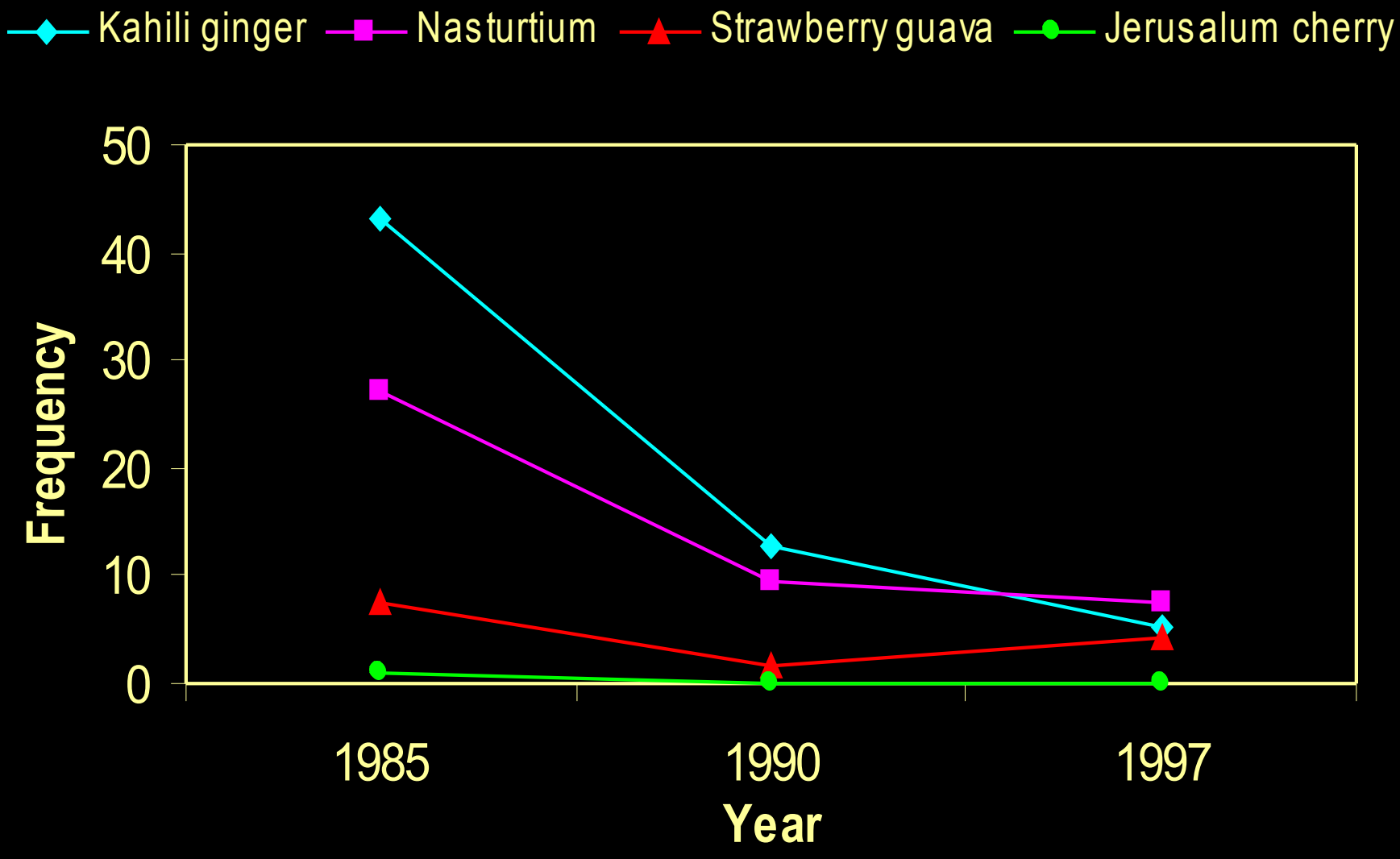
% Cover

<1%
1-5%
5-25%

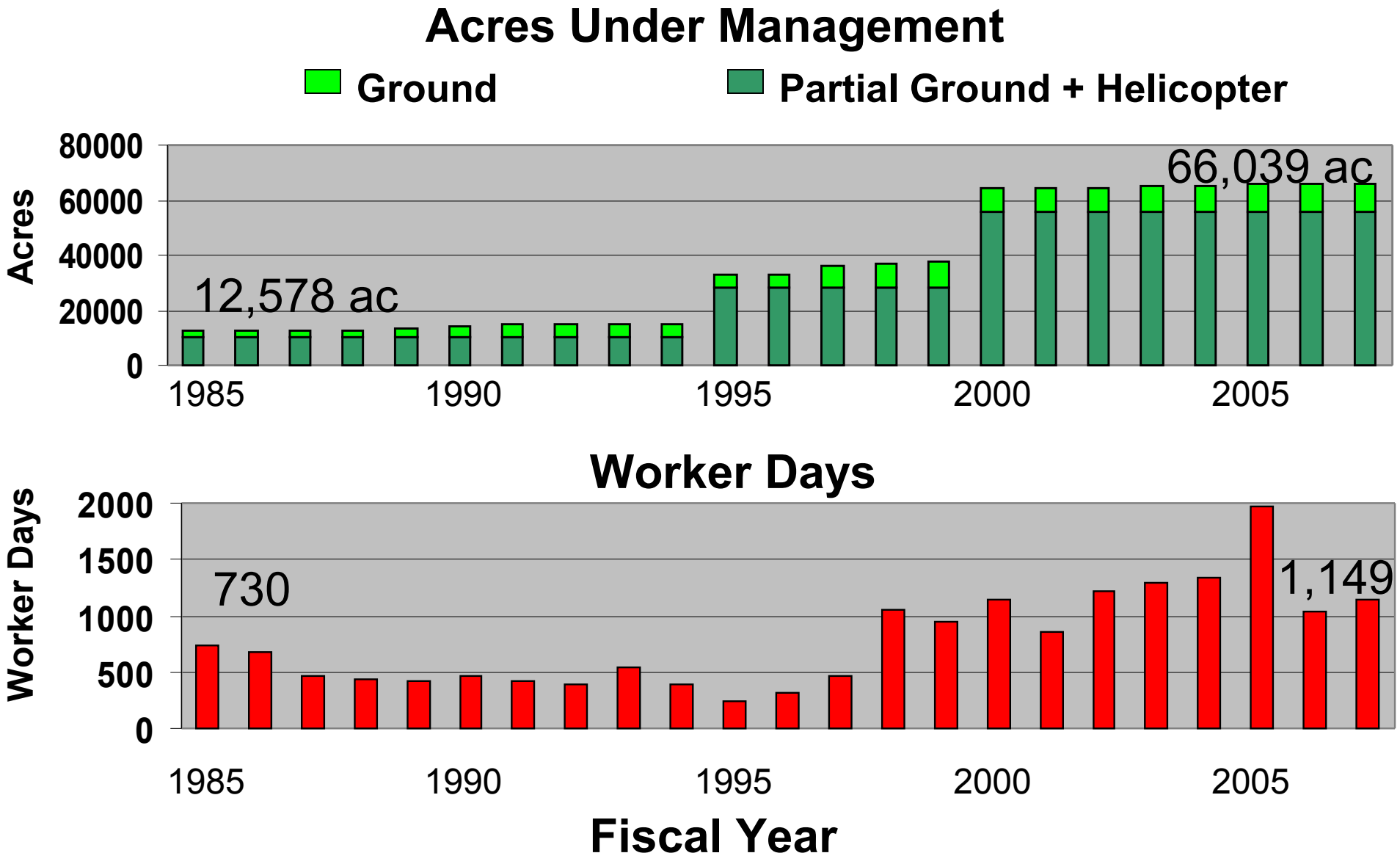
500 m

Mesic Forest Units - 458 ac

Number of weeds along transects in Kipuka Puaulu SEA



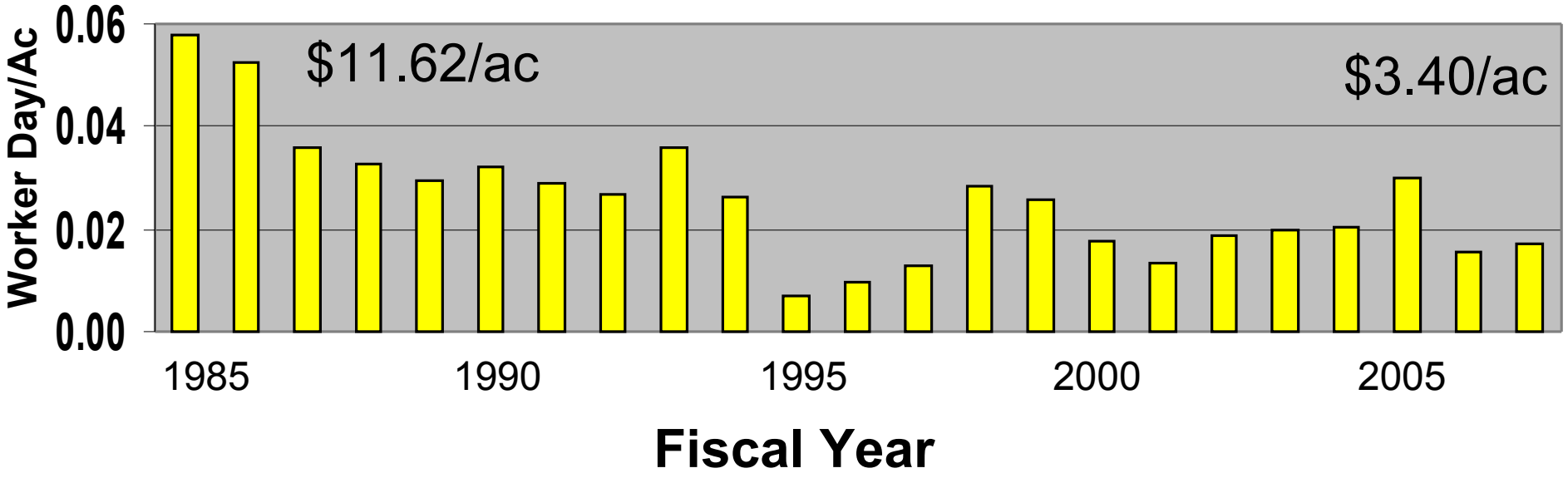
Special Ecological Areas 1985-2007



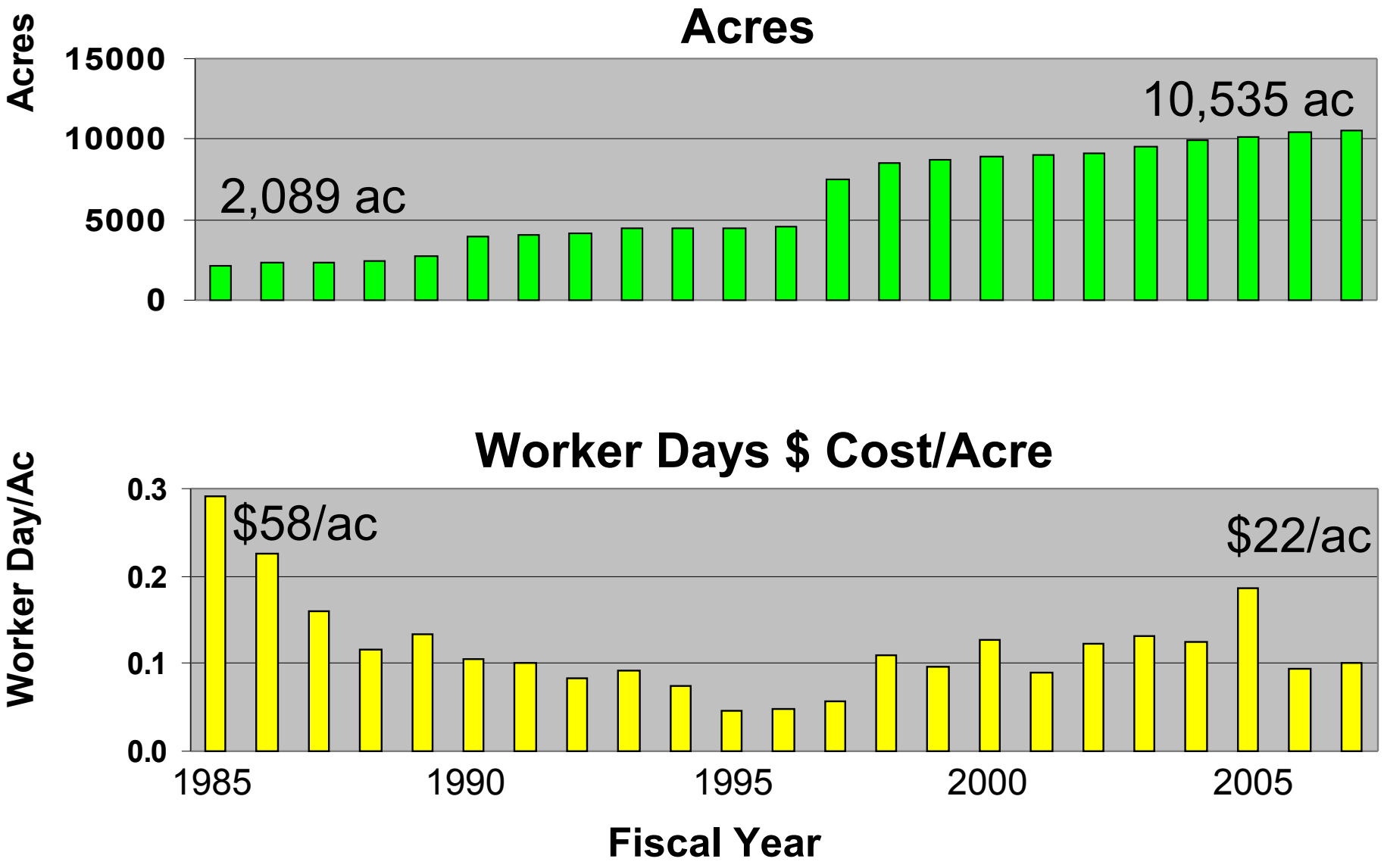
Special Ecological Areas 1985-2007

Ground + Helicopter Sweeps

Worker Day $ Cost/Acre



Ground Swept SEAS 1985-2007



Conclusions:

1) Populations of alien plant species can be reduced and maintained at very low levels after several cycles of control work

2) Subsequent recruitment of alien plants from the soil seed bank and seed rain from nearby areas

3) Continued follow-up treatments are required in all areas and may be needed indefinitely

4) Workloads drop significantly after initial control efforts

Future Directions

Addition and Expansion of new SEAs

Optimize treatment intervals

Improve technologies – imagery and analysis, control methods, biocontrol

Increase community participation

Reduce seed rain/recruitment- expand units and establish buffer areas

Reclaim/restore adjacent degraded areas

Partnerships with adjacent landowners

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