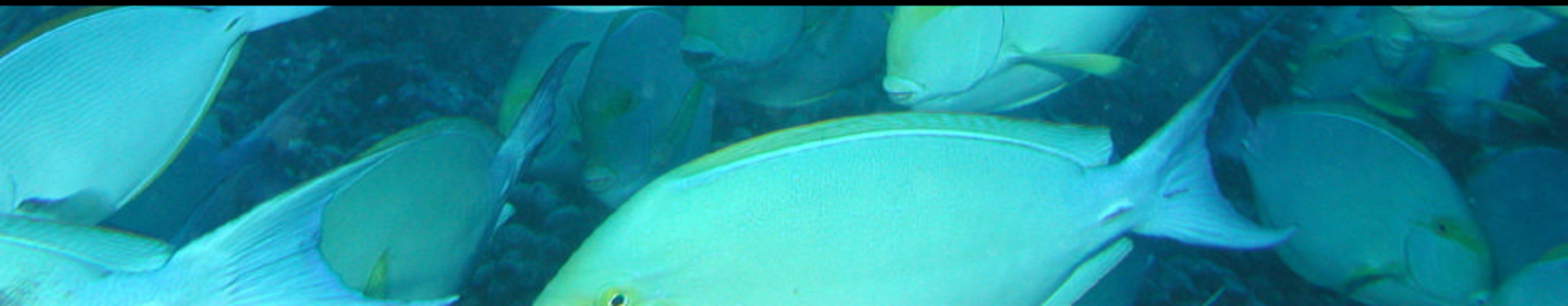
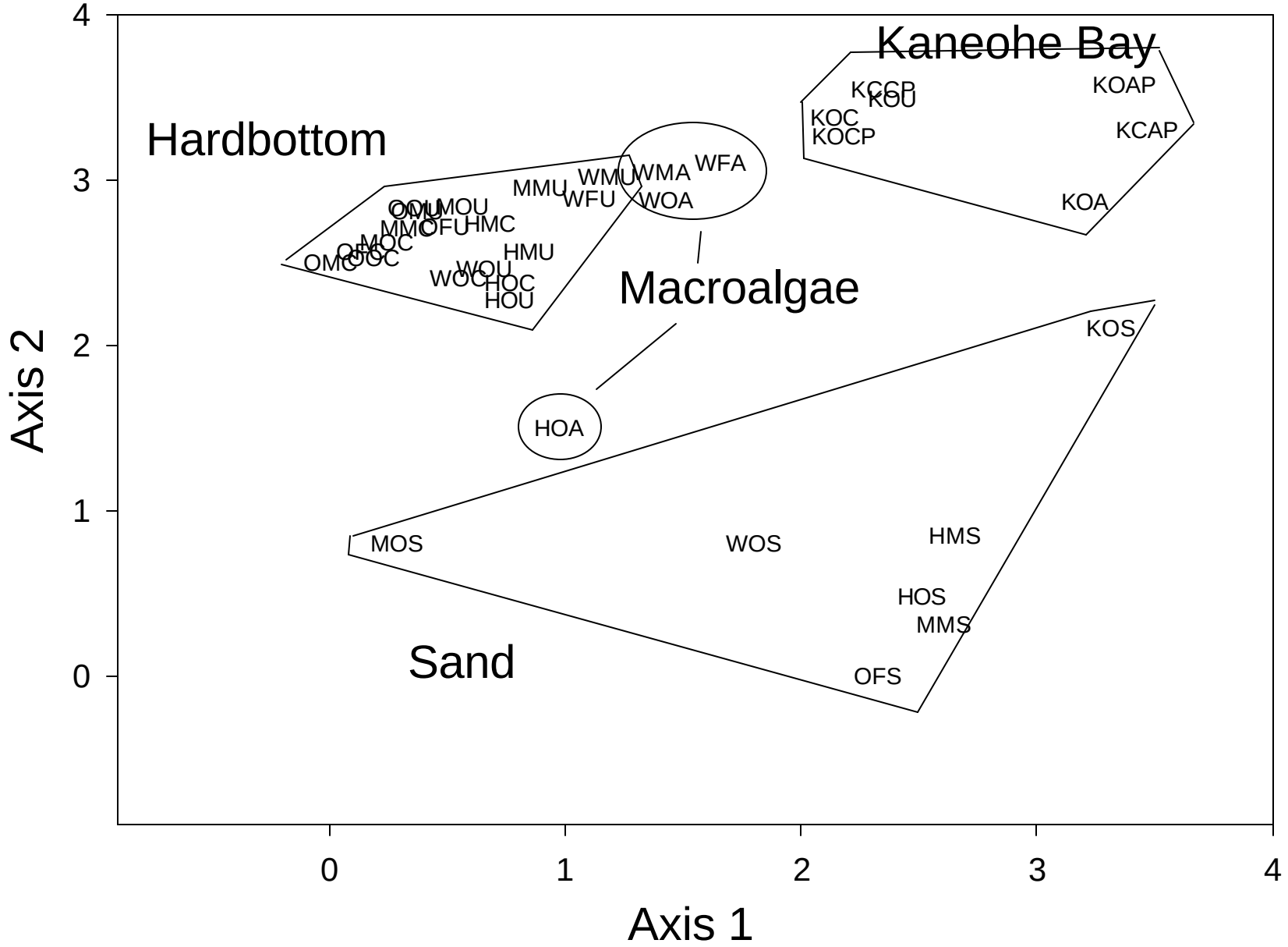
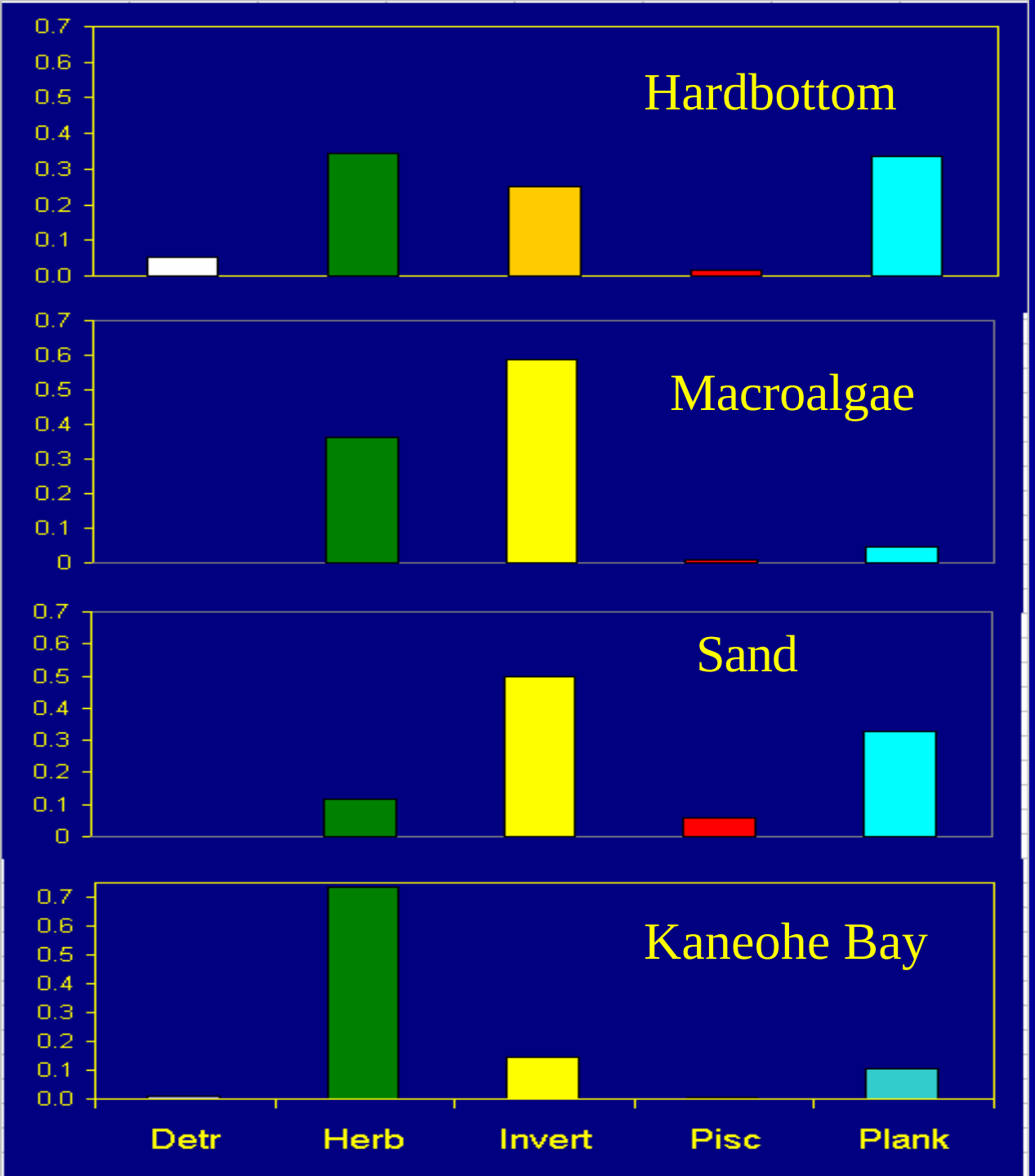
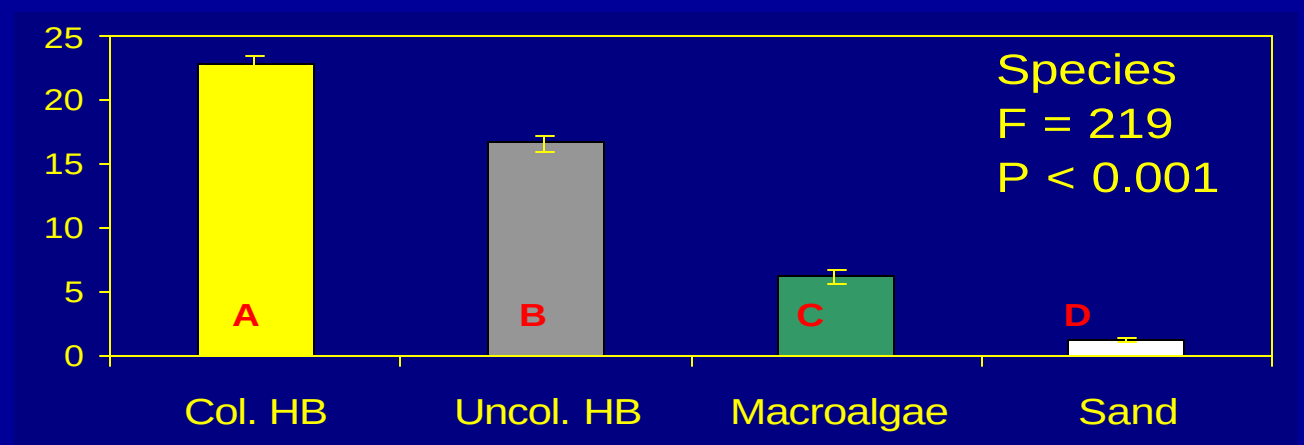


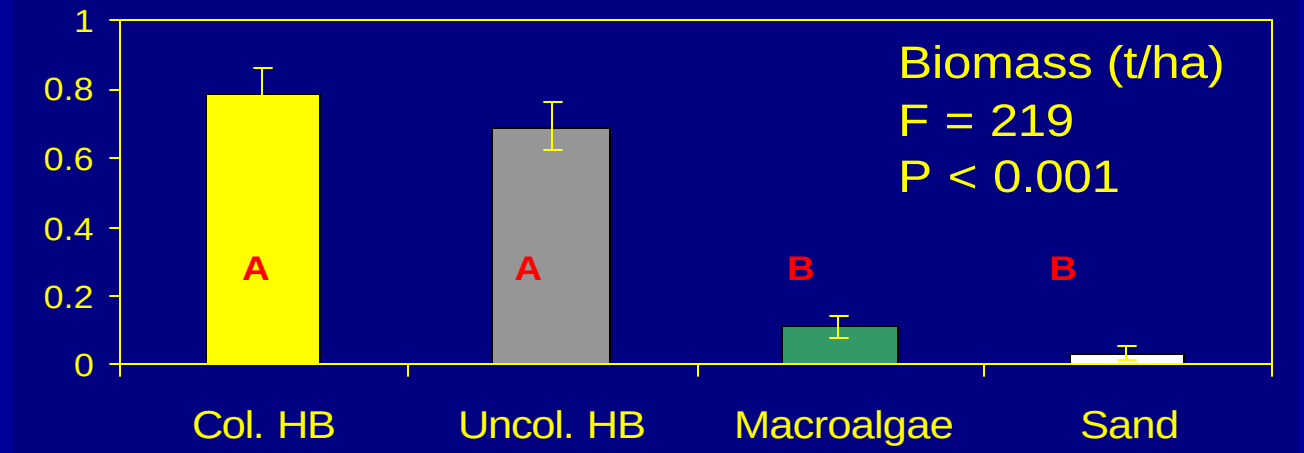
Fish Habitat Sampling Locations in Ordination Space based on Number of Individuals (N = 36, n = 449)

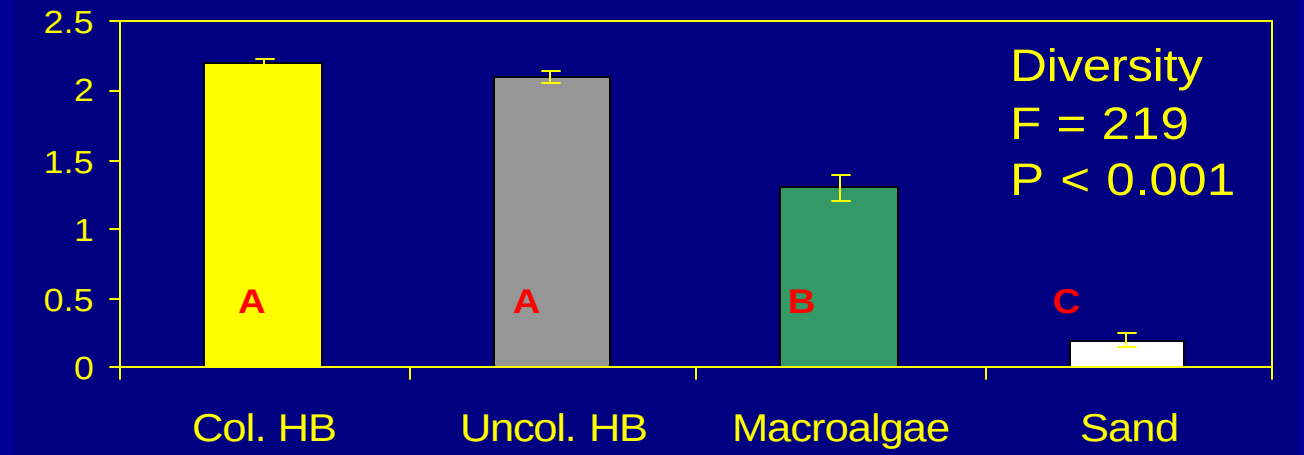




Trophic Comparisons among Major Habitat Types in Hawaii







Fish Assemblage Characteristics among Major Habitat Types n = 345

Waikiki Marine Reserve

Consolidated Reef
Spur and Groove
Sand
Waikiki Reserve Boundary

Kapahulu Groyne
Natatorium
Diamond Head
Lighthouse
MLCD
FMA

1500
1400
1200
1000
800
600
400
200

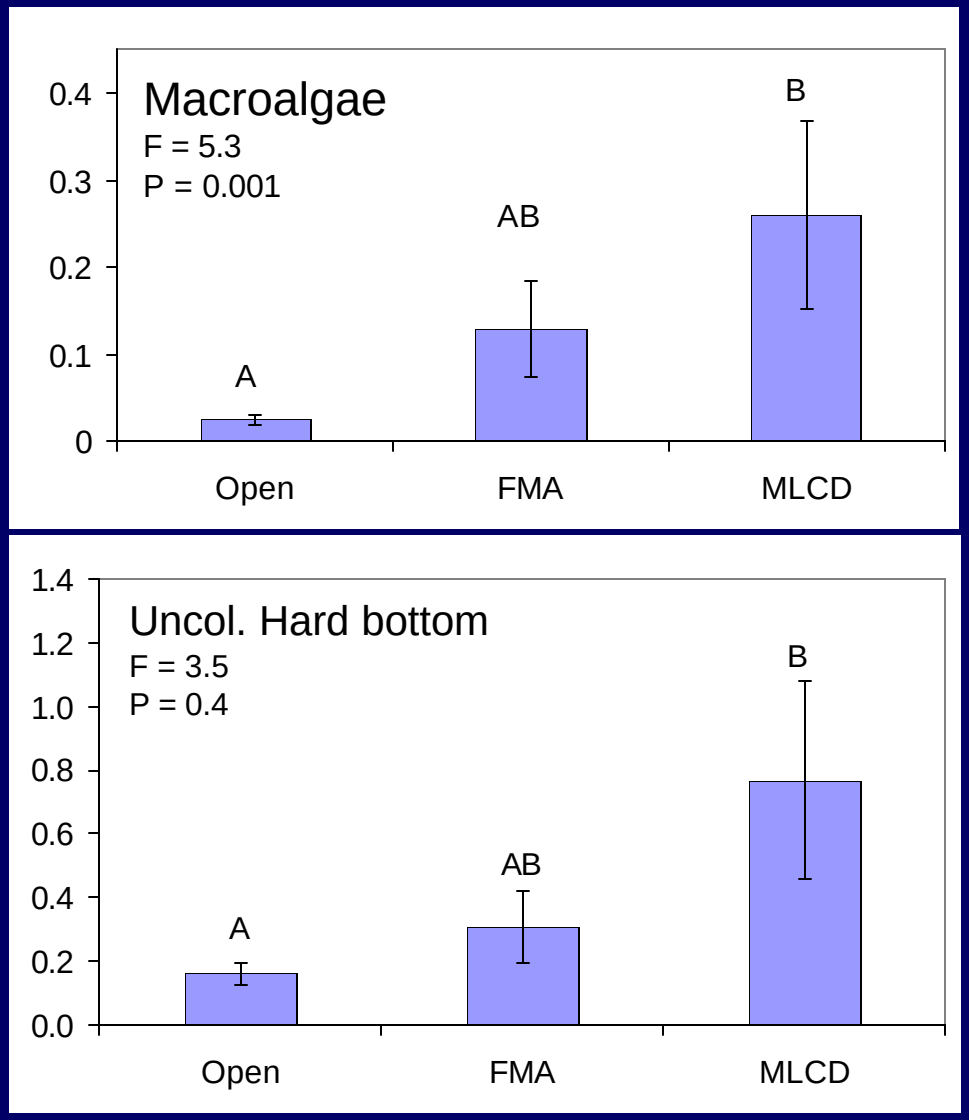
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2500

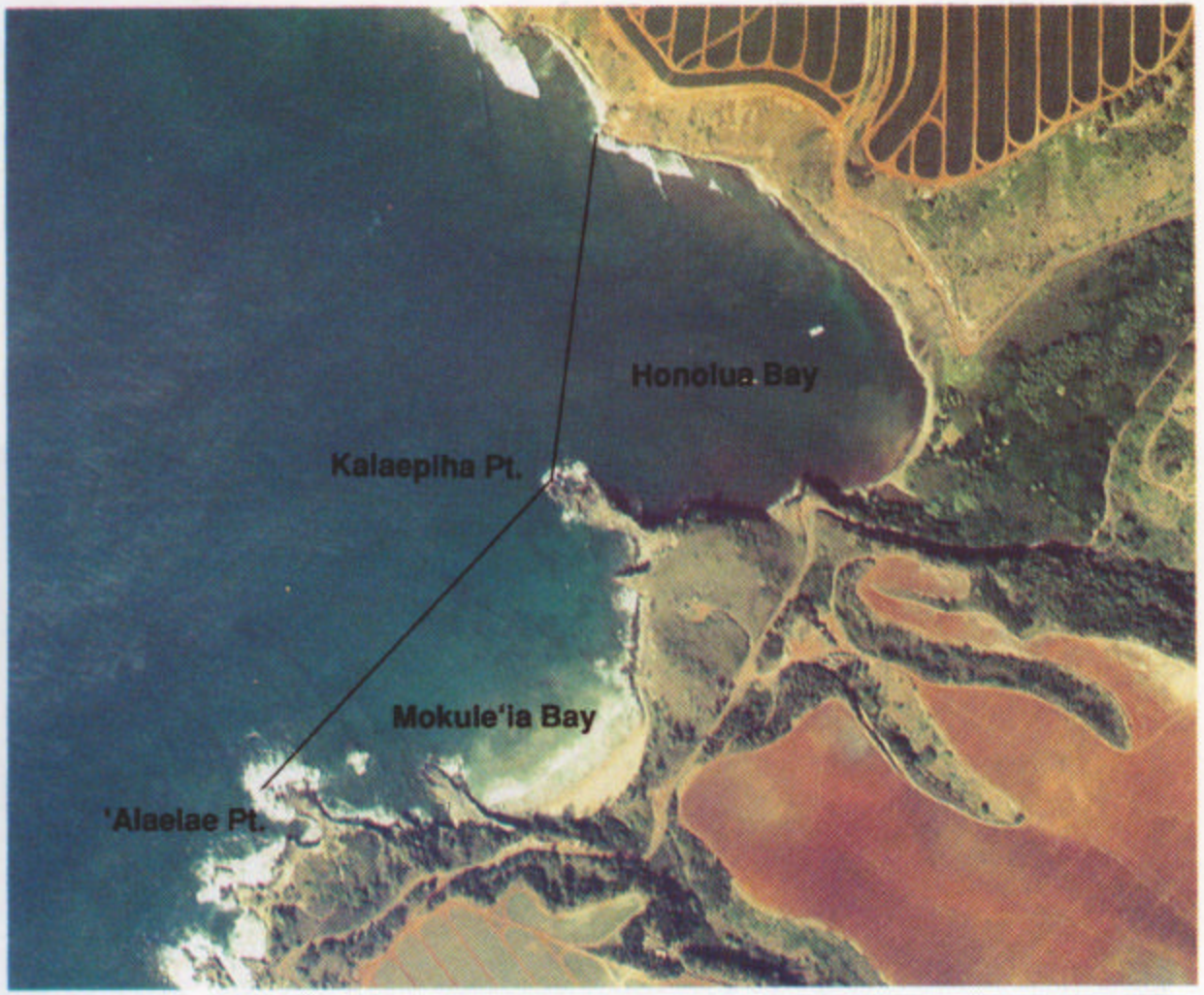
GRID SQUARE UNITS = METRES

Graphic by Carl Meyer

Photo:Richard Sullivan

Fish biomass in Waikiki study area under various management regimes



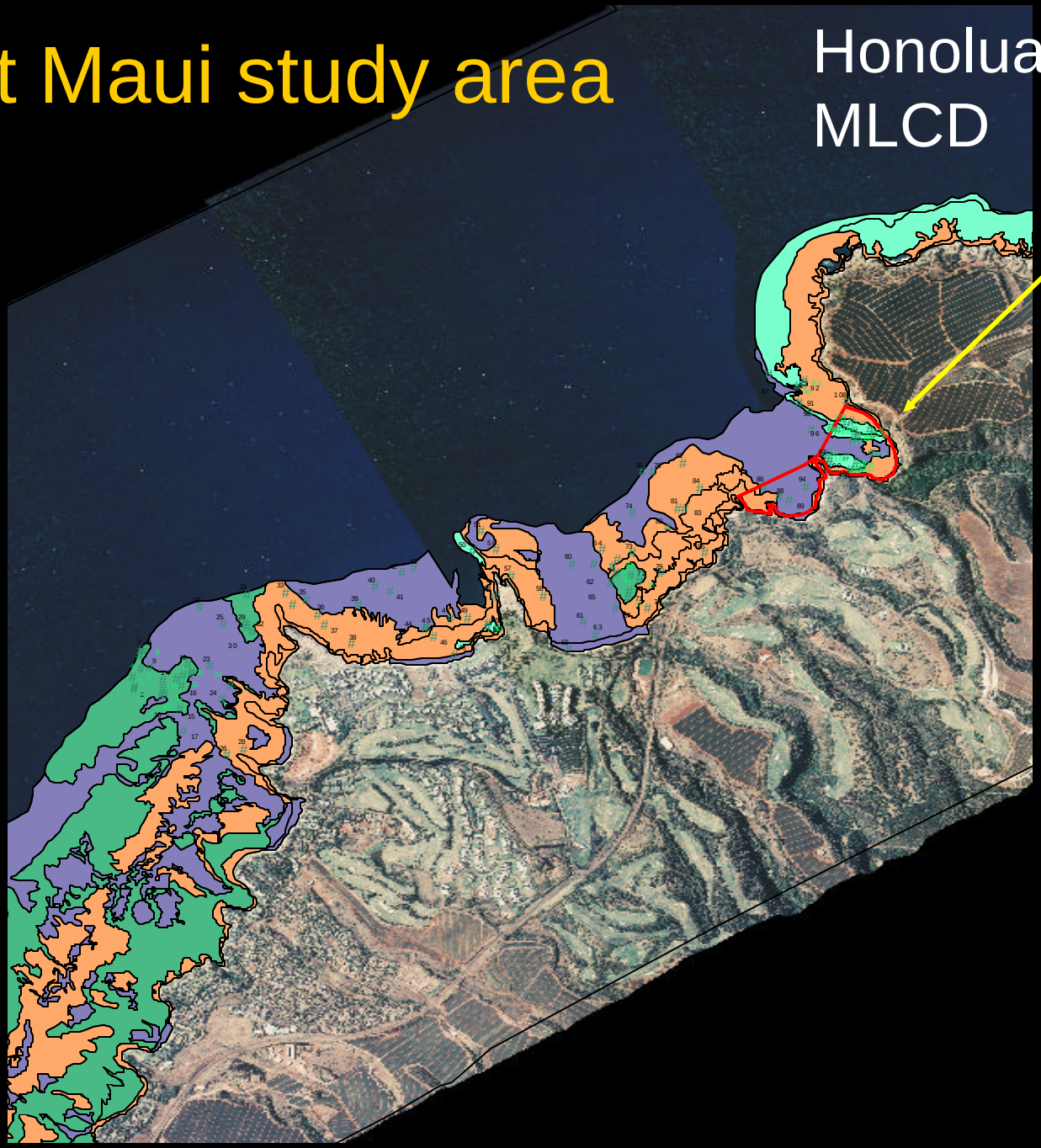


HONOLUA - MOKULE'IA BAY

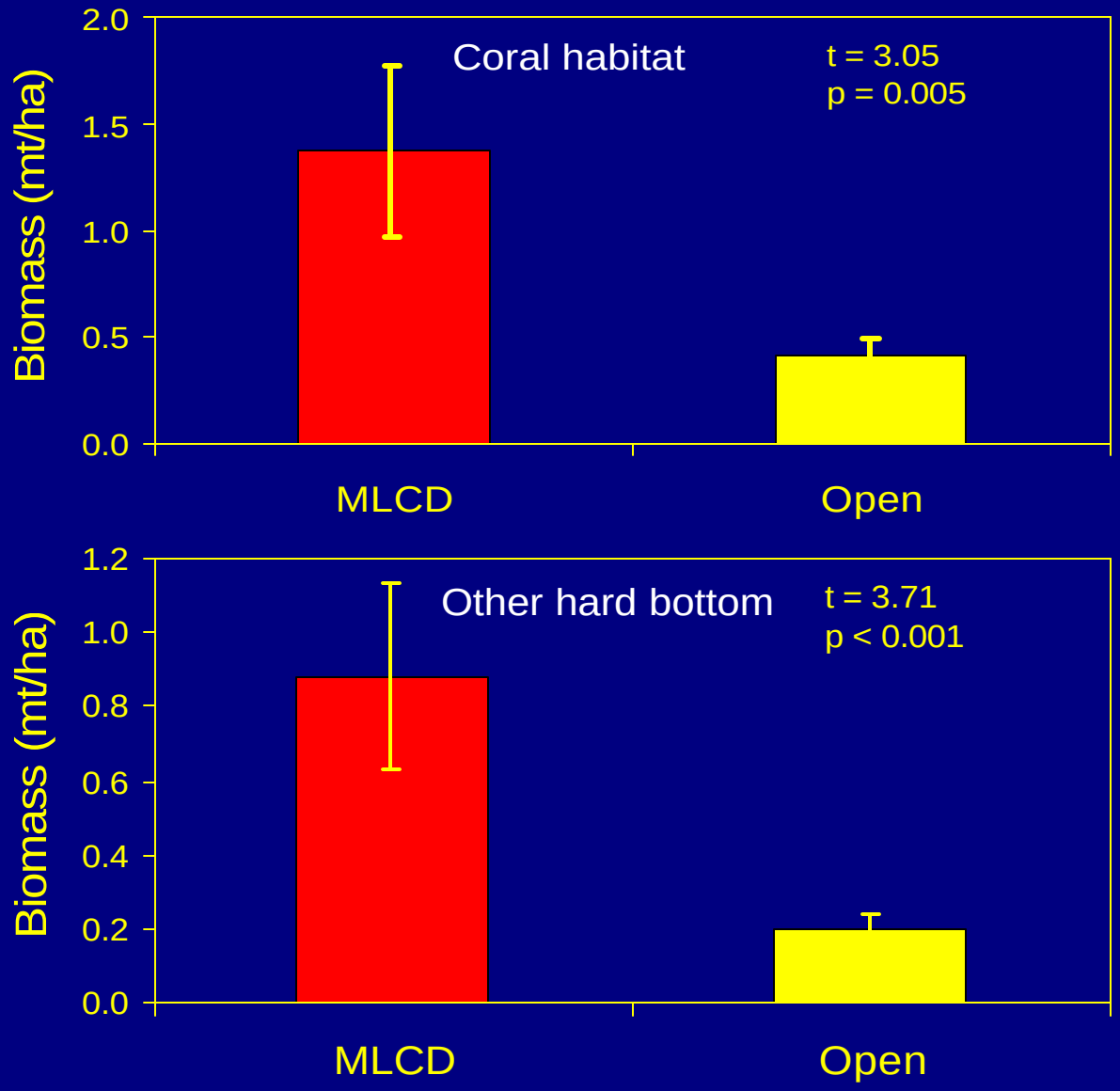
45 acres

Established 1978

West Maui study area

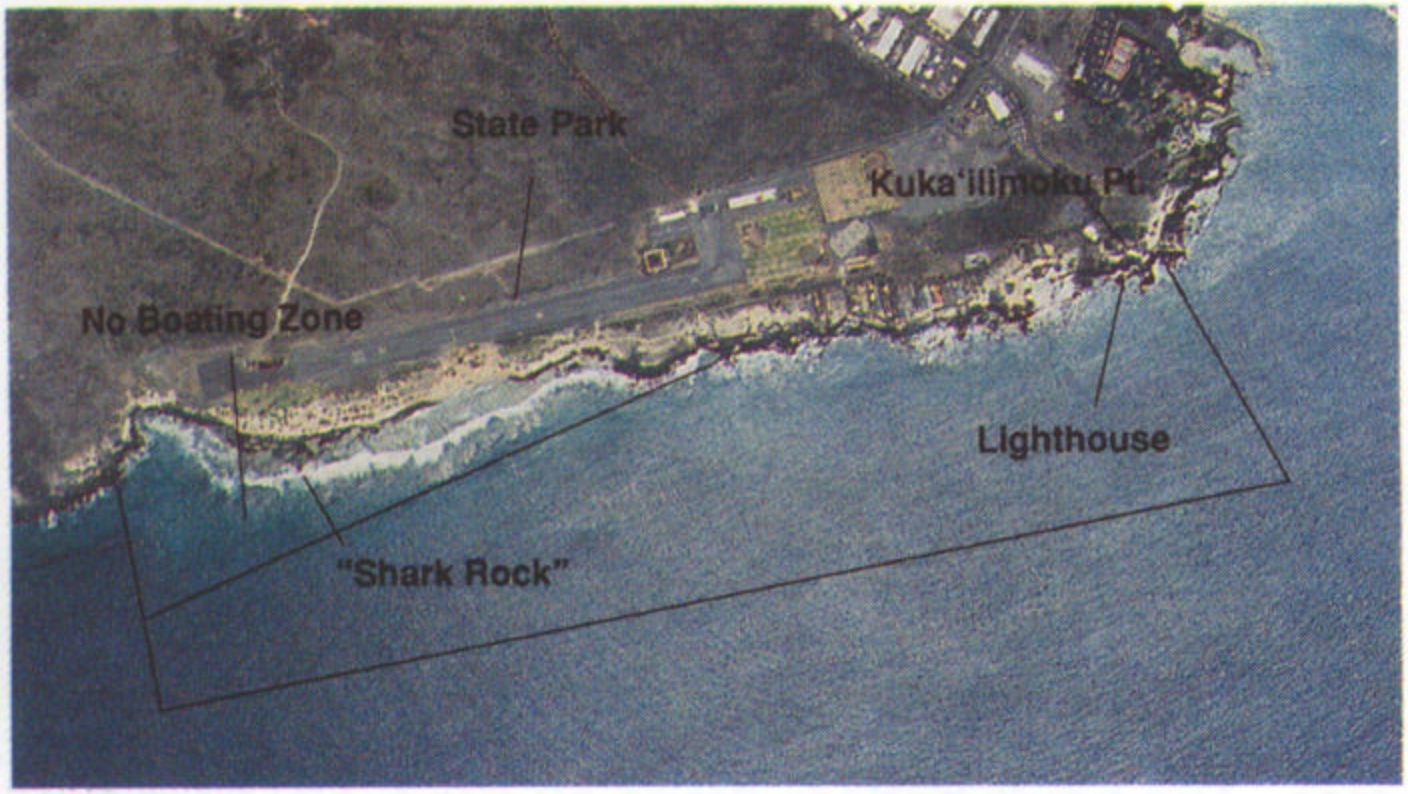


Comparison of fish biomass between Honolua-Mokule'ia MLCD and areas open to fishing

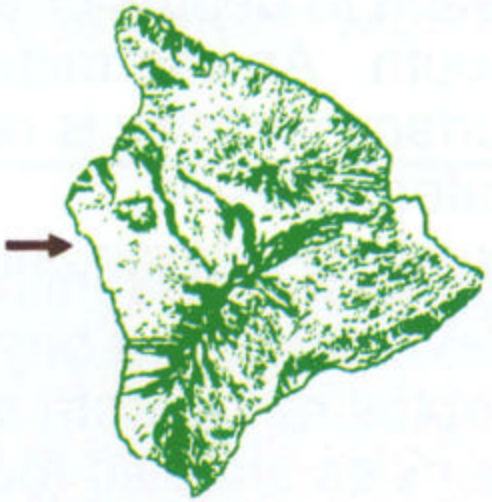


West Maui study area

Honolua/Mokulei MLCD

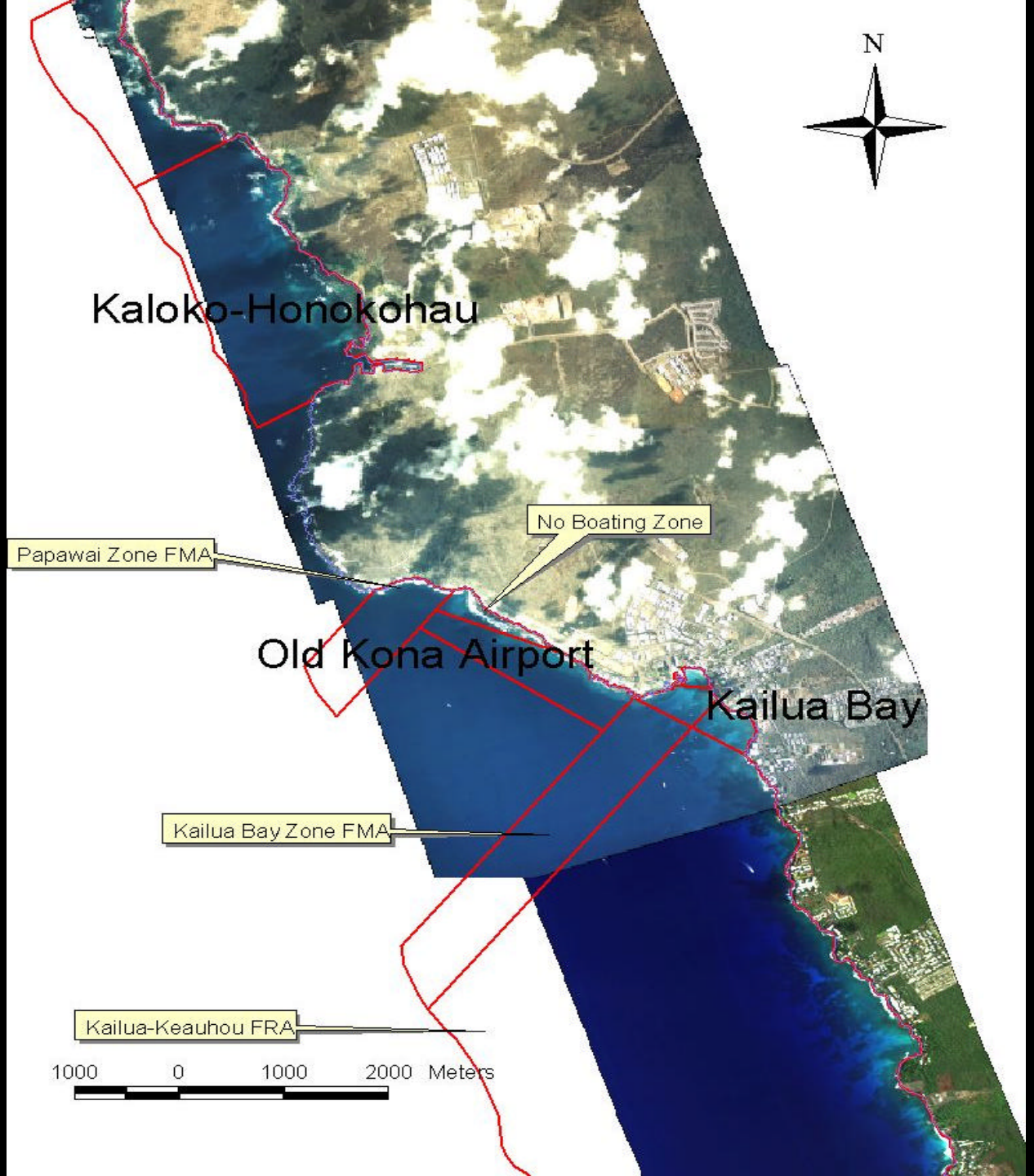


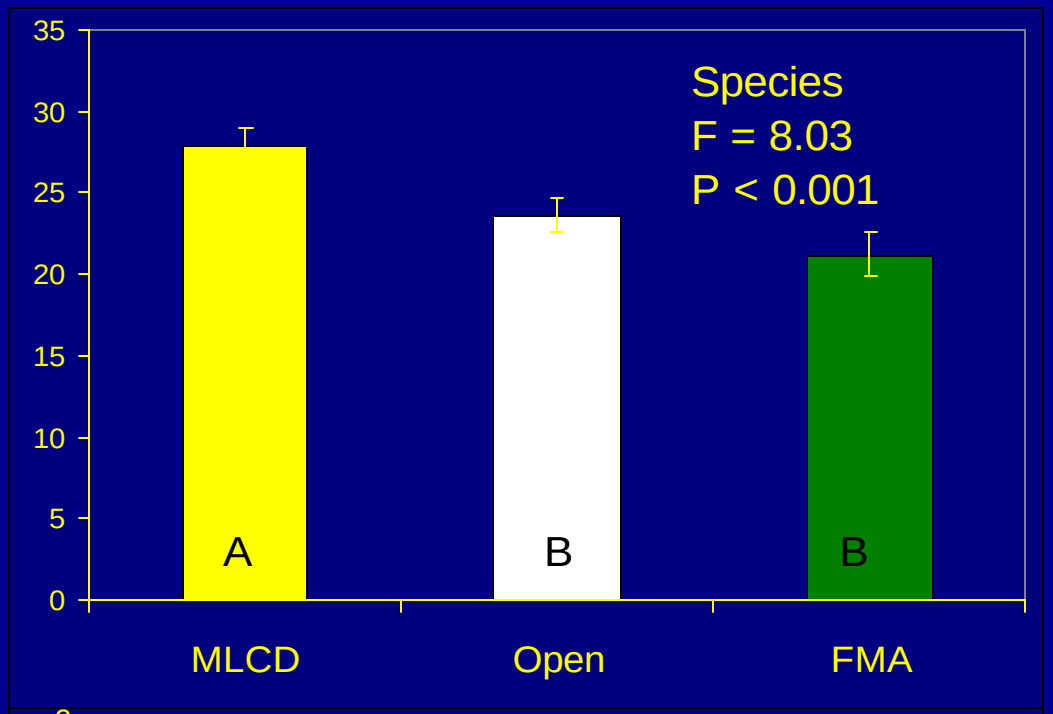
OLD KONA AIRPORT

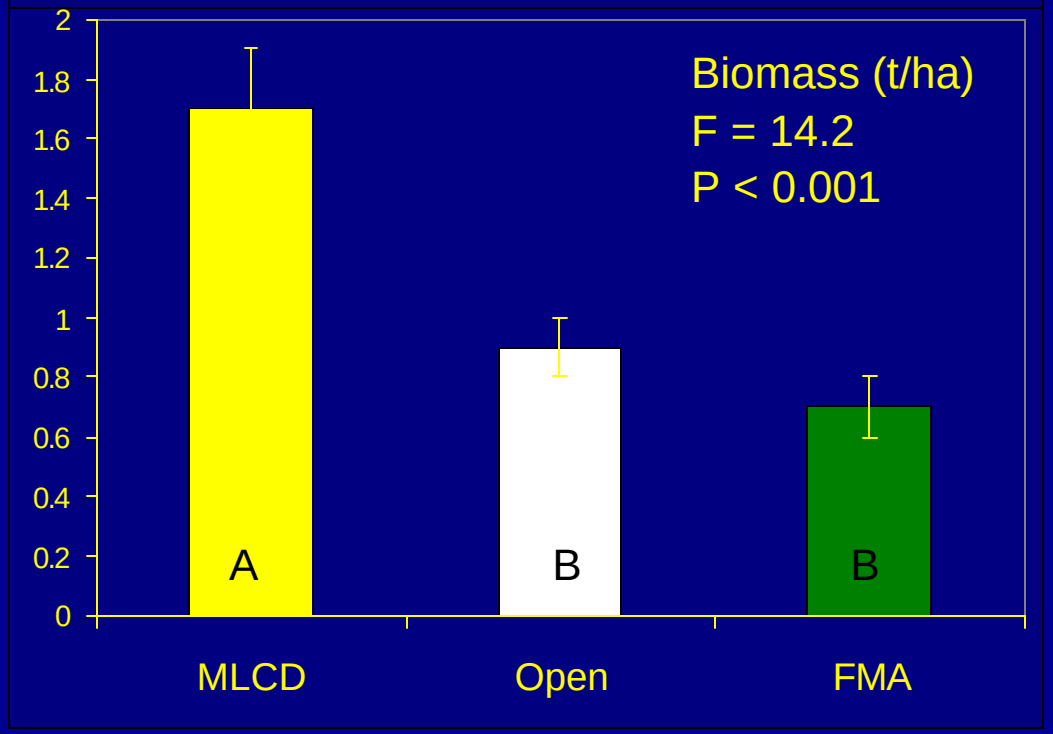


217 acres

Established 1992

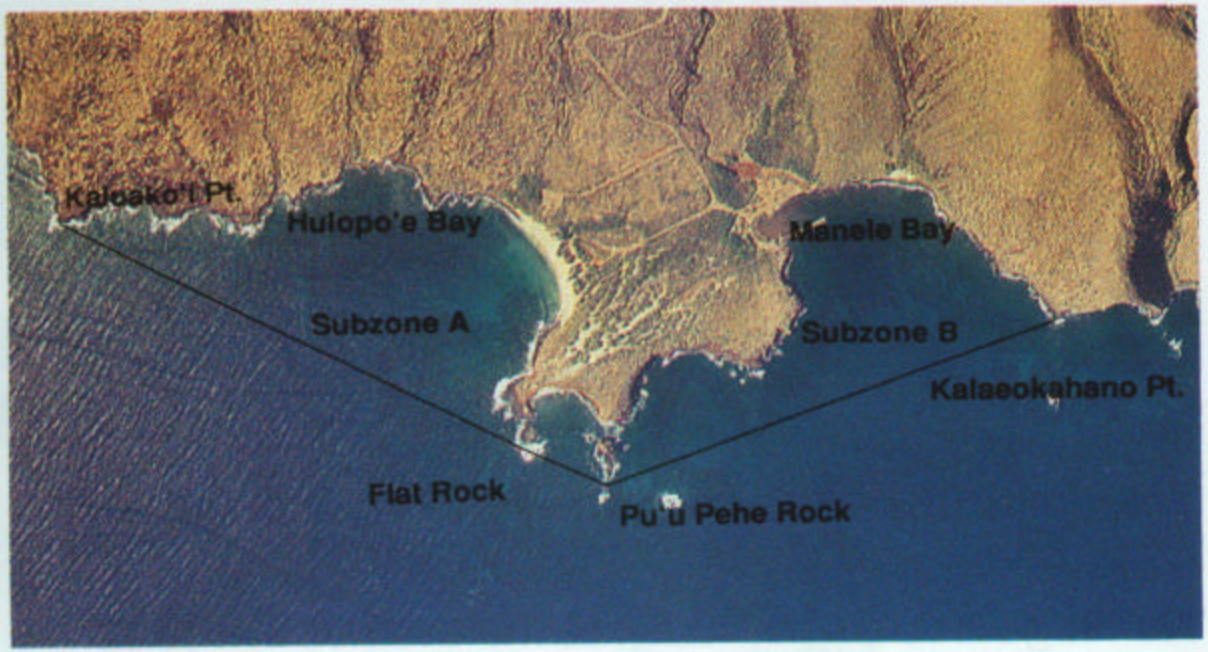

N
Kaloko-Honokohau
No Boating Zone
Papawai Zone FMA
Old Kona Airport
Kailua Bay
Kailua Bay Zone FMA
Kailua-Keauhou FRA
1000 0 1000 2000 Meters





Comparison of Fish Assemblage Characteristics In Hardbottom Habitats among various Management Regimes in and around Old Kona Airport MLCD

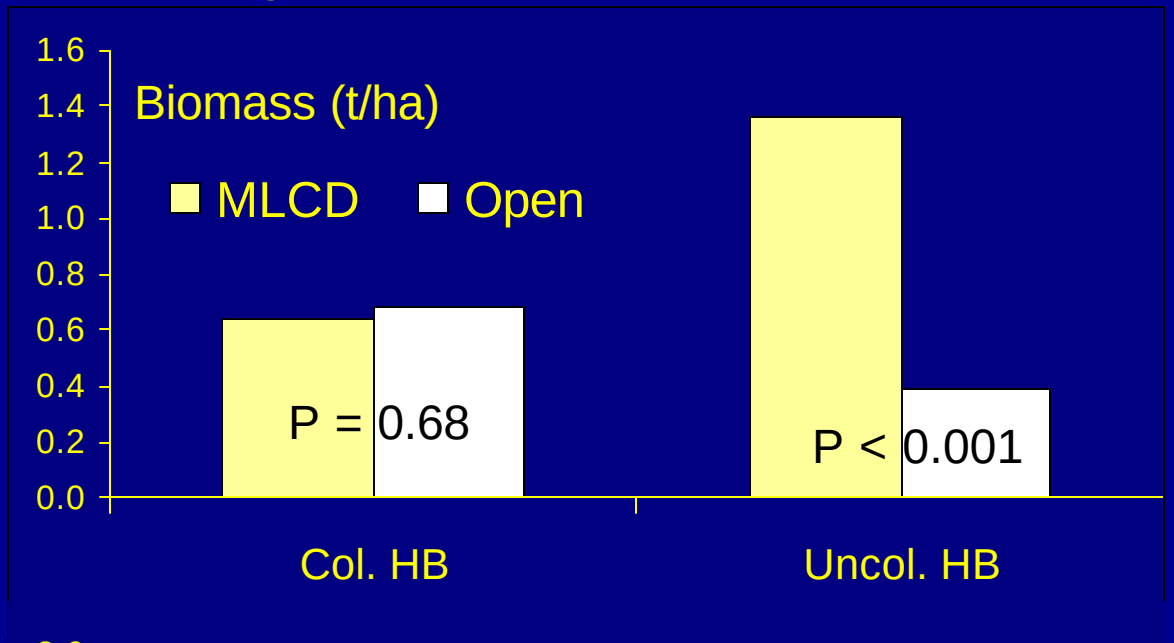
LANA'I

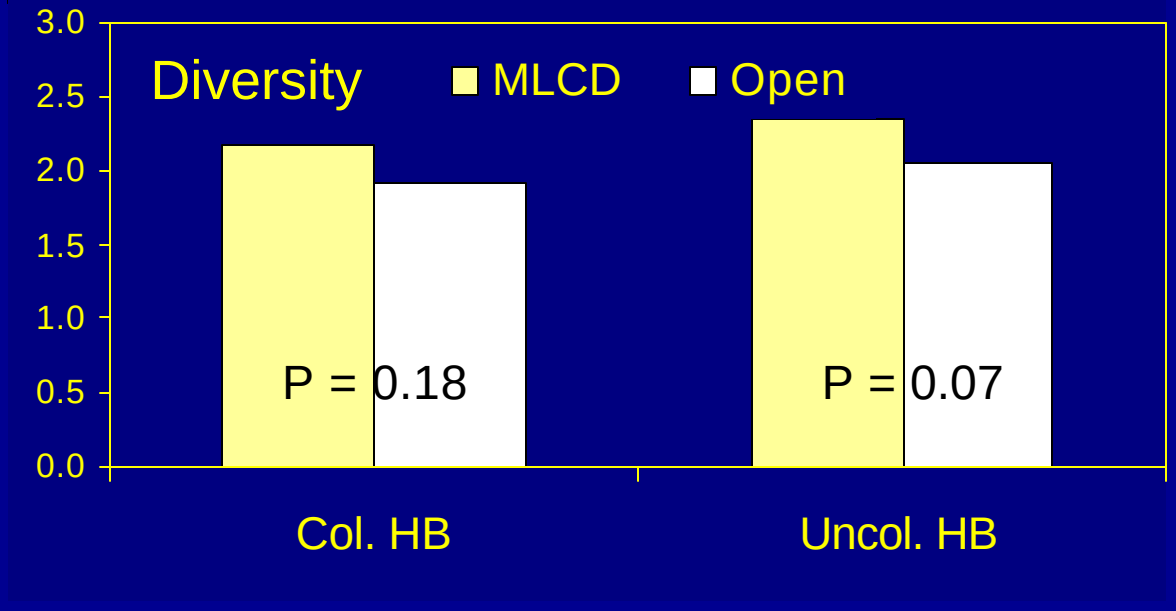


MANELE - HULOPO'E

309 acres Established 1976

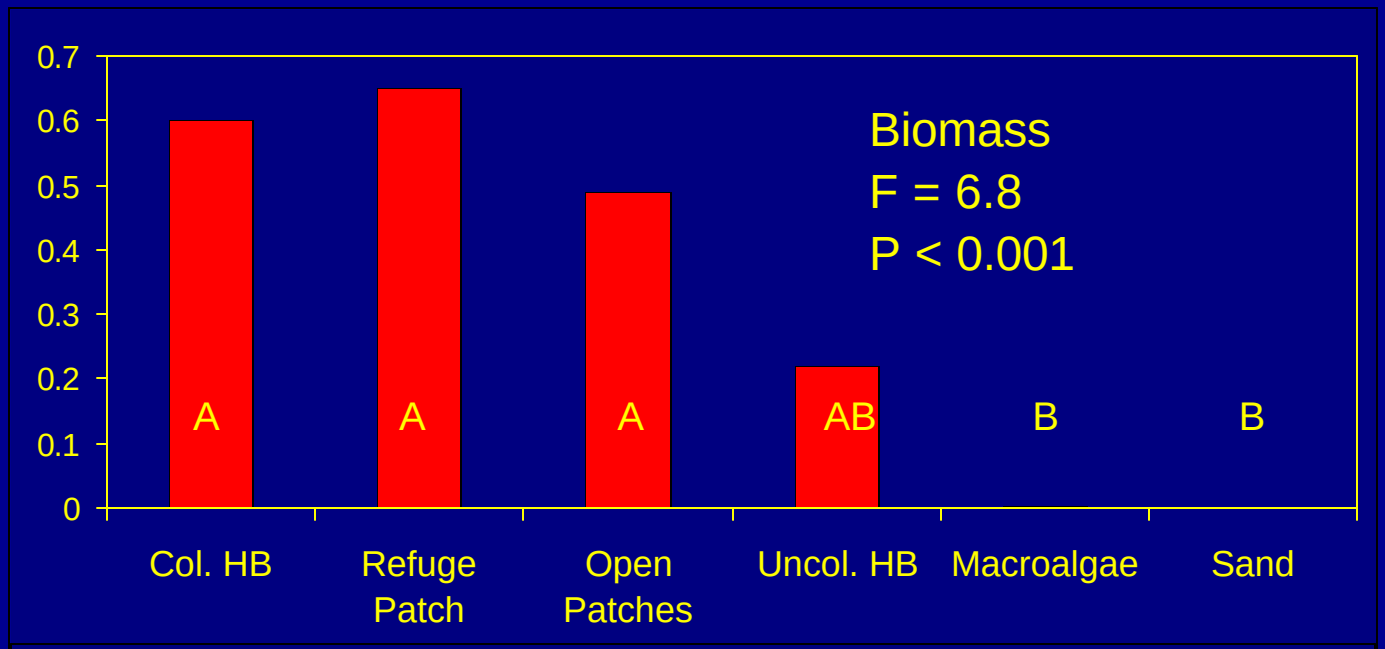
Fish Biomass and Diversity in Manele Bay MLCD and adjacent Habitats on Lanai

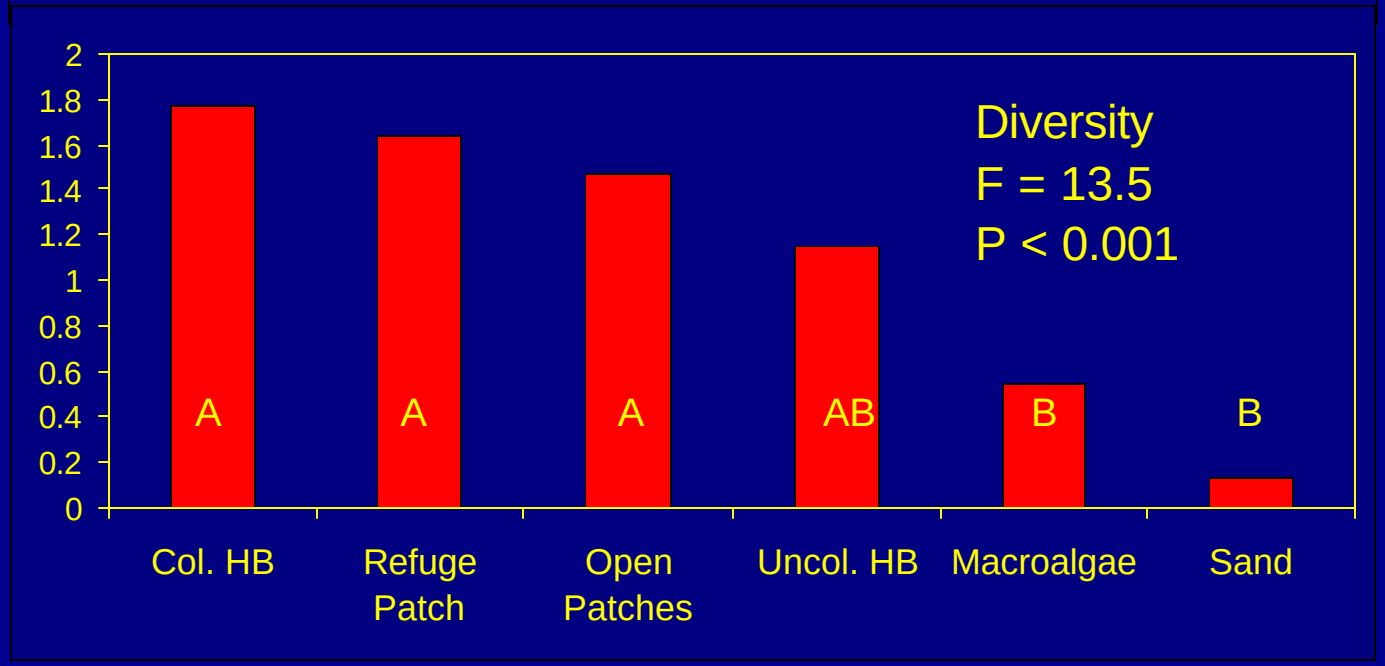




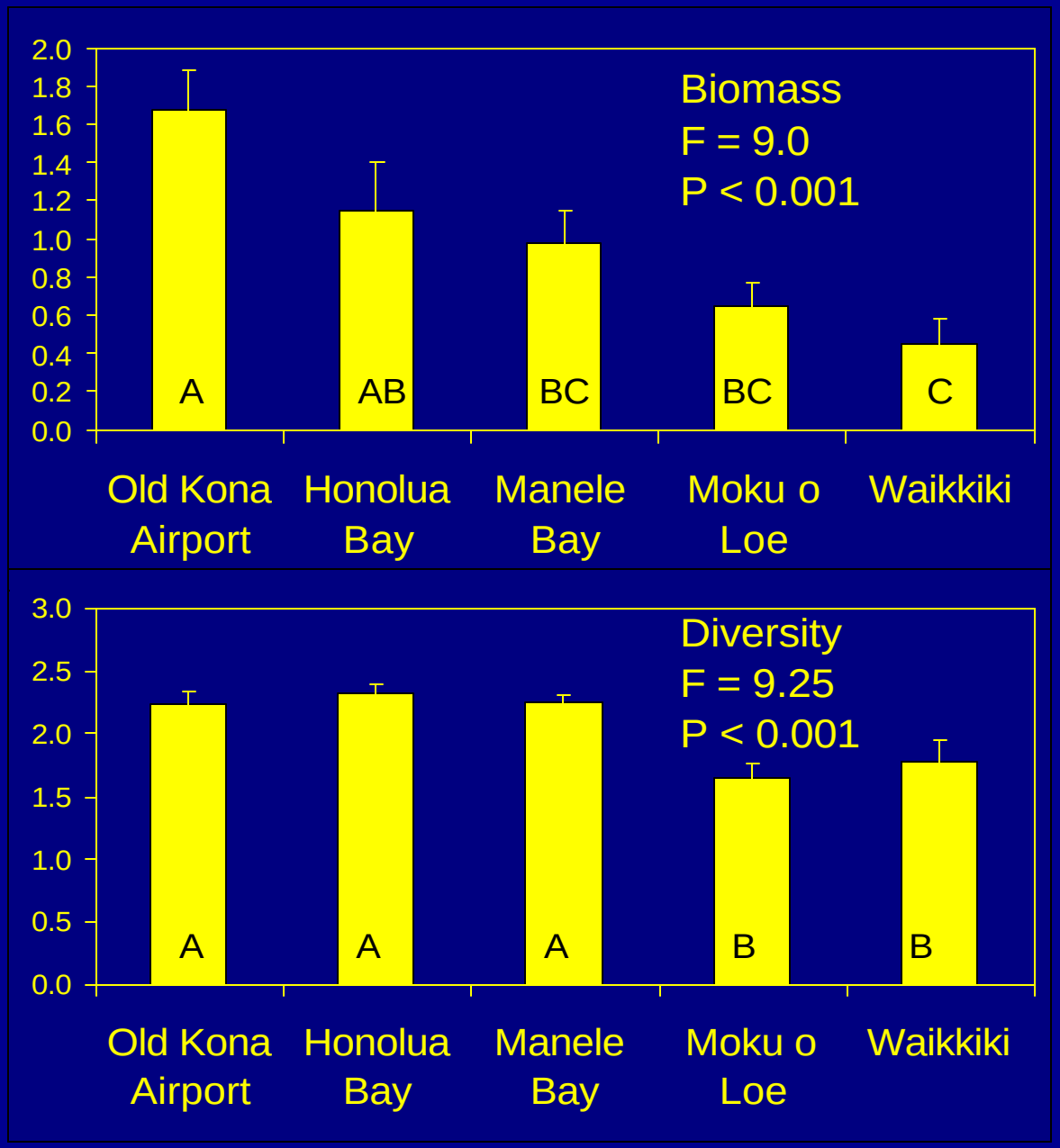
NO FISHING
NO TAKING OF MARINE LIFE
Hawai'i Marine Laboratory Refuge
BOUNDARIES:
The Hawai'i Marine Laboratory Refuge consists of the reefs and waters surrounding Moku-o-loe (Coconut Island) from the high water mark on the island seaward to 25 feet beyond the outer edges of the reefs.
PROHIBITED:
Unlawful to take any aquatic life within the refuge.
EXCEPTIONS:
Researchers and other agents of the University of Hawai'i may catch or take aquatic life for scientific purposes.
PENALTIES:
Maximum $500 fine and/or 30 days in jail.
To report violations, call 587-0077
Marine refuge boundary
State of Hawai'i
Department of Land and Natural Resources
Hawai'i Revised Statutes § 188-36
"Sustaining Hawai'i's Natural Resources for the Future"

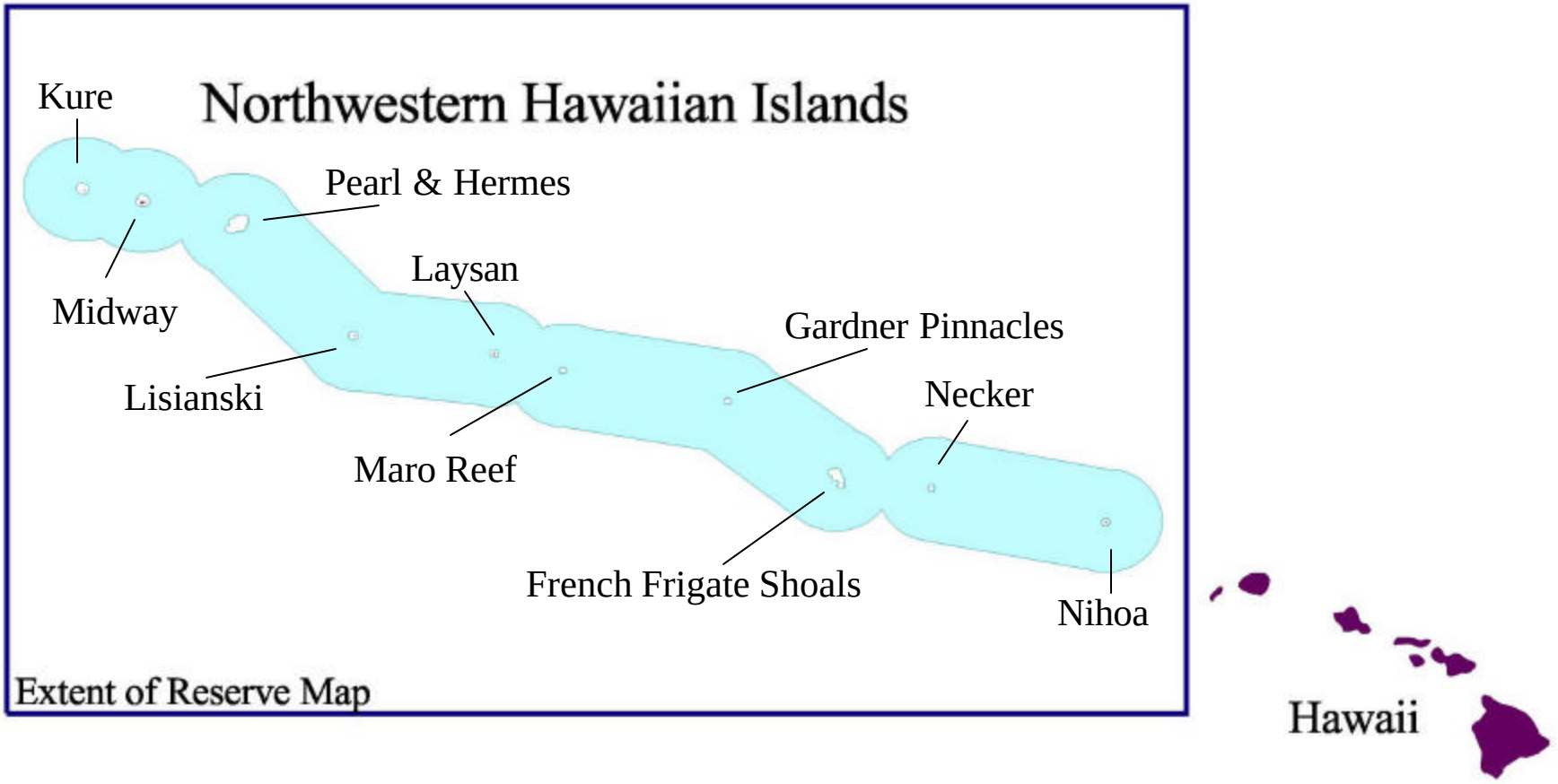
Biomass and Diversity among Habitat Types in Kaneohe Bay, Oahu

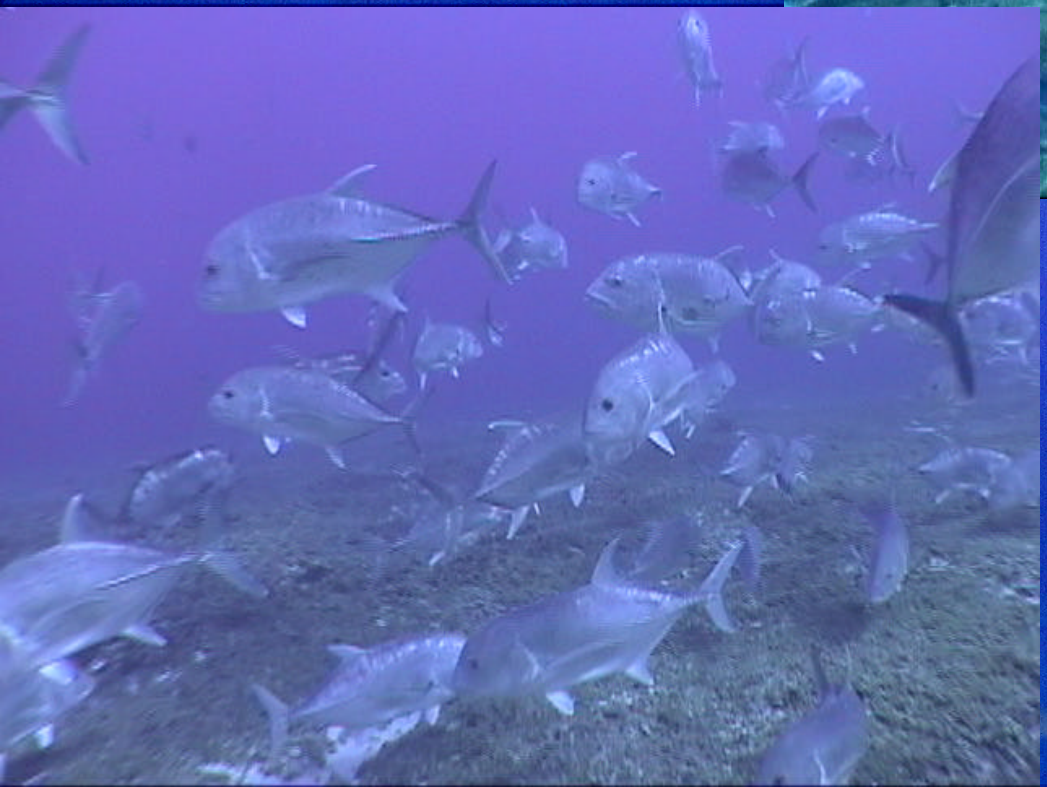
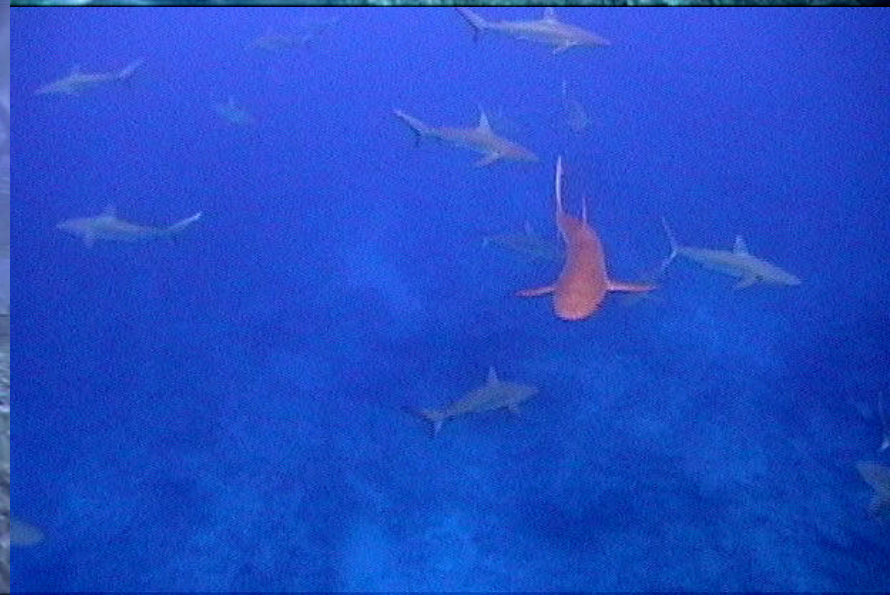




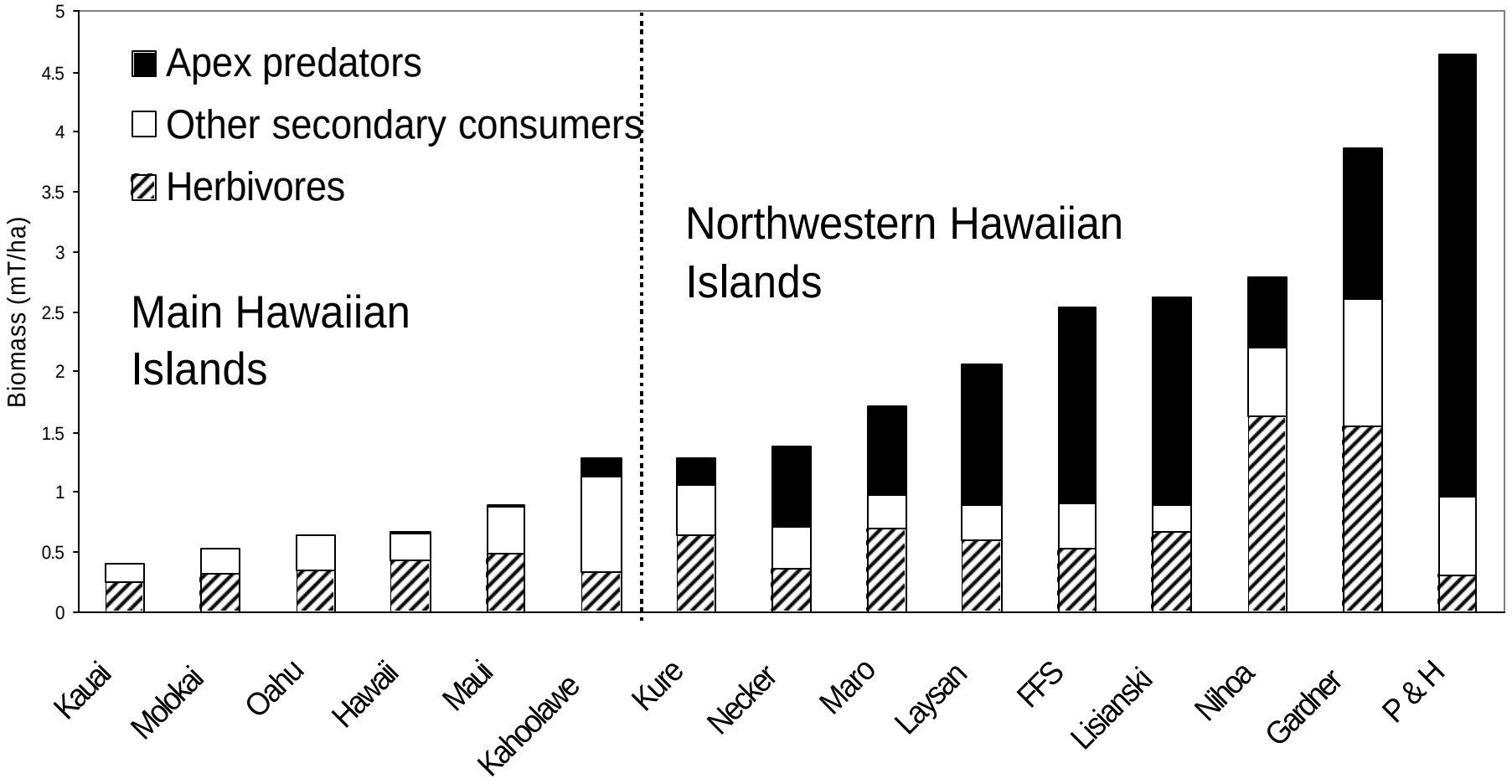
Biomass and Diversity among Protected Areas on Hardbottom Habitats




Northwestern Hawaiian Islands
Kure
Pearl & Hermes
Midway
Laysan
Gardner Pinnacles
Lisianski
Necker
Maro Reef
French Frigate Shoals
Nihoa
Extent of Reserve Map
Hawaii
N
200
0
200
400
Statute Miles

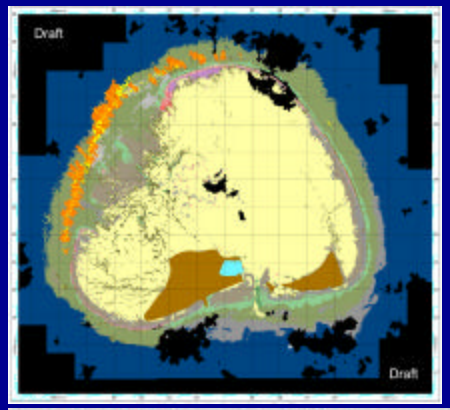
Mean fish biomass among islands in the Hawaiian archipelago

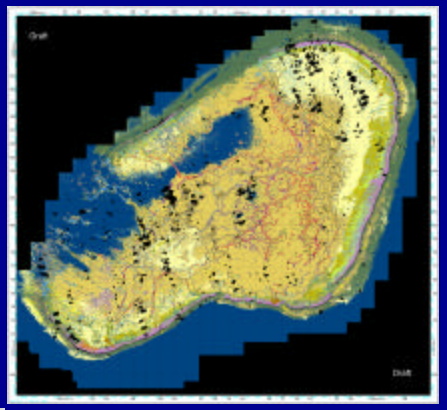


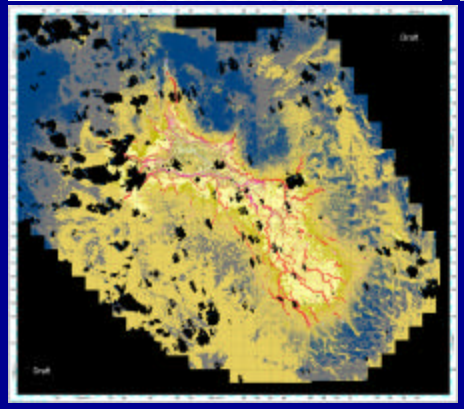
NWHI Coral Reef Mapping

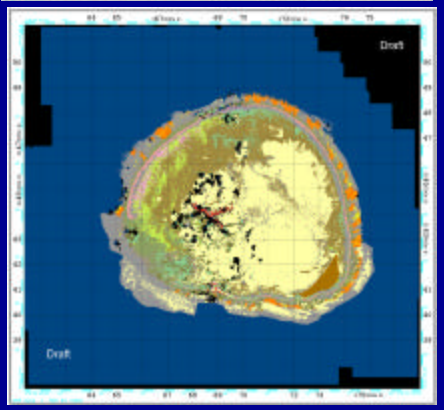
Area Mapped (km^2)

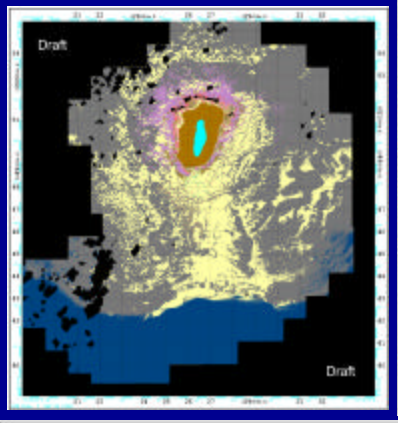
Kure Atoll - 70	Layson Is. - 128
Midway Is. - 96	French Frigate Shoals - 411
Pearl & Hermes Atoll - 389	Maro Reef - 518
Lisianski Is. - 439	Total - 2,050

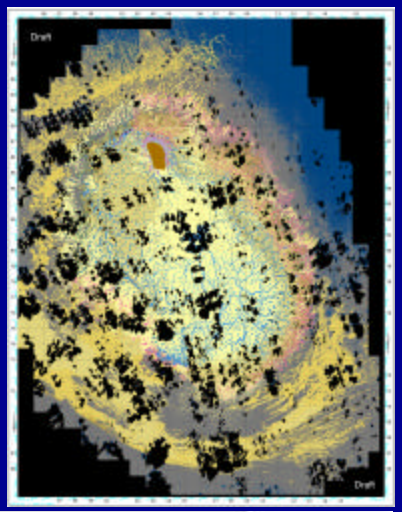


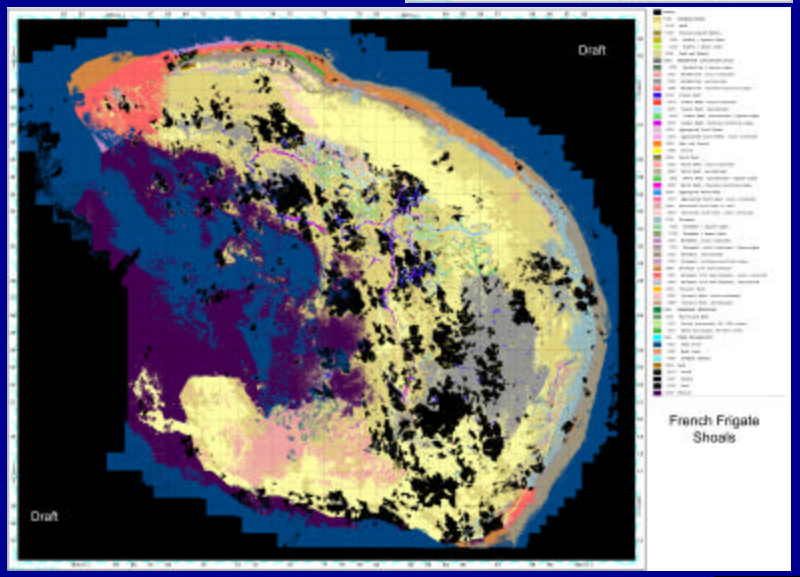


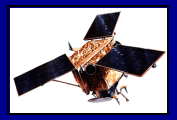










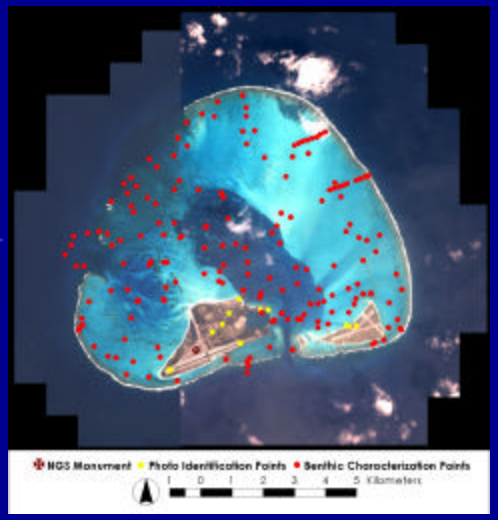


NOS Coral Reef Ecosystem Mapping Program

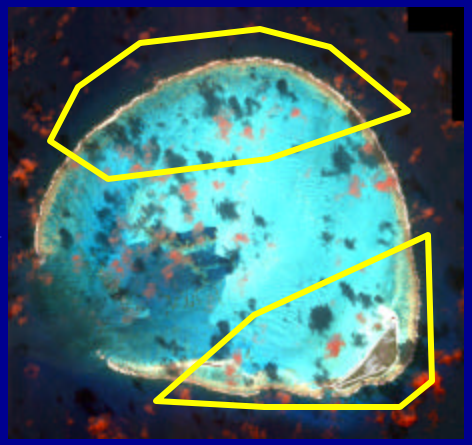
Integrated Mapping and Monitoring Activities

Completed coral reef ecosystem map

Monitoring program established using map

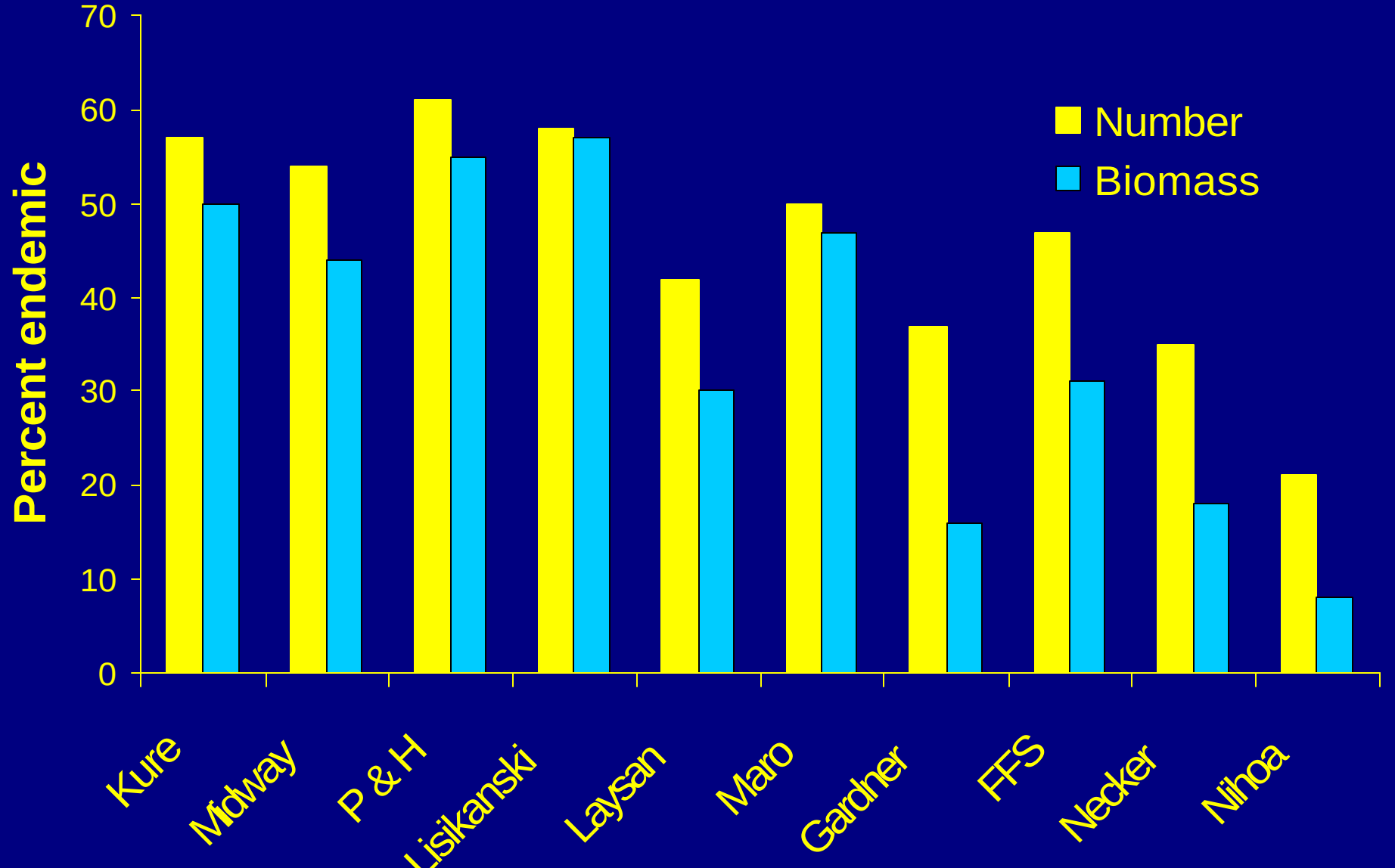


Assessment to answer management questions

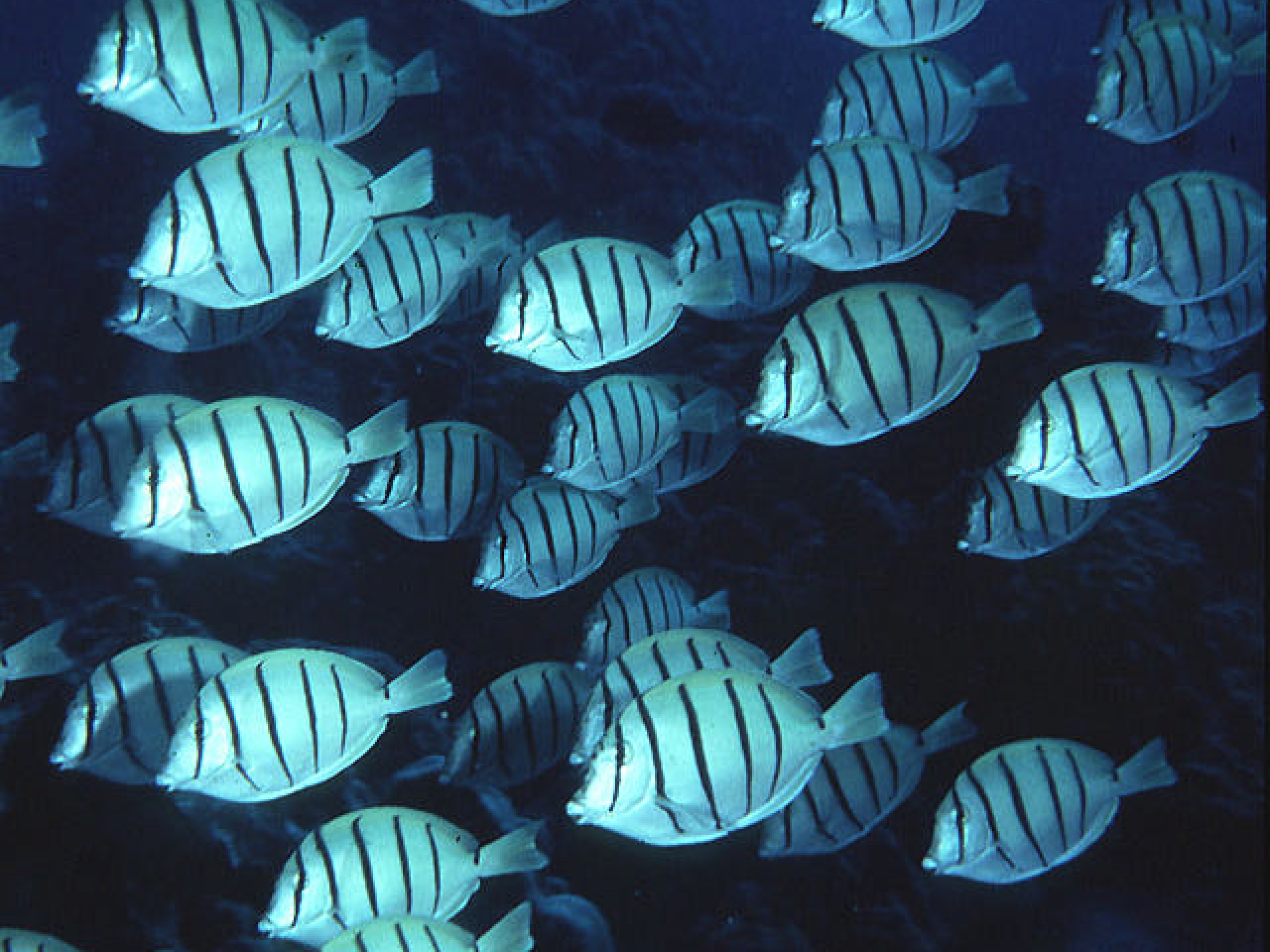


Endemic Hawaiian Fishes 24%

Percent Endemism in NWHI Fishes



DeMartini and Friedlander, in prep

Fish habitat utilization

- Identify major habitat types
- Stratify fish/benthic sampling by habitat
- Define fish habitat utilization patterns
- Identify essential fish habitat
- Examine efficacy of existing MPAs
- Develop ecological criteria for future MPAs