Catch, Effort and Yields for Coral Reef Fisheries in Kaneohe Bay, Oahu and Hanalei Bay, Kauai



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METHODS

- Data Collection Patterned After HSBFS 1990-91
- Main Hawaiian Islands Marine Resources Investigation (MHIMRI)
- Dual Approach

 Roving Creel Effort
 Access Point CPUE & Catch



Estimates of Fishing Effort

- Bays Subdivided--Discrete Units
- Inside v. Outside fishers
- Primary Vantage Points
- Info Recorded--Type of Activity
 - Location
 - Method
 - Number of Fishers, Gear
- Roving Counts
 - Conducted Simultaneously
- Sampled Sunrise to Dusk



CPUE & Catch •Heeia Kea Harbor, Hanalei Pier Access Point •Fishermen Approached Upon Return To Port Info Recorded--Area Fished -Total Time Fished By Method -Total Catch (Number & Weight) - By Method & Species -General Comments •Some Interviews Conducted During Roving Counts



Data Analysis--Effort

- Active vs Passive Methods
 - Active--Calculated In Angler Hours
 - Passive--Calculated In Effort Days
- Mean Angler Hours Per Day, or Mean Effort Days Per Method
- Expanded Effort By Method
 - Mean Daily Hours (Or Effort Days) * # Of WD or WE/H Days In Quarter
- Variance -- Standard Formula Variance Of Mean
- Relative Standard Error
 SE Divided By Estimate x 100

CATCH

- CPUE--Sum Of Total Catch Divided By Sum Of Total Effort For Each Method
 - Total Ratio Estimate
 - Variance, Standard Error, Relative Standard Error
- Expanded Catch By Method

 CPUE x Expanded Effort Hours Or Days
- Catch By Species
 Calculate % Species Composition By Method
- Multiply By Expanded Catch Estimate









Expanded annual fishing effort (gear-hours) for major active gears



Table 3. Catch per unit effort for active (kg/effort-hour) and passive gear (kg/effort-day) in Kaneohe and Hanalei bays.

	Kaneohe Bay			Hanalei Bay
			Average	
Method	1991	1992	91-92	92-93
Passive Gear				
Spear	0.83	1.02	0.93	0.87
Line fishing	0.31	0.23	0.27	0.17
Troll	0.35	0.25	0.30	0.64
Throw net				1.60
Crab nets		0.87	0.87	0.10
Invert collectors*		20.08	20.08	
Passive Gear				
Gill nets	15.80	19.08	17.44	9.00
Surround Nets	198.85	112.41	155.63	213.38
Traps	4.09		4.09	

Invert collectors* = number per hour

Comparison of catch by gear type for Kaneohe and Hanalei Bays



			Average	Percentage
Taxa	1991	1992	1991-92	of total
he'e (Octopus)	11750.4	15485.4	13617.9	52.10
Jacks (pâpio, ômilu, ulua, Carangidae)	2059.1	2580.0	2319.5	8.87
Crabs (mainly kuhonu, Portunus				
sanguinolentus)	2036.8	1425.0	1730.9	6.62
Goatfishes (Mullidae)	2252.7	1084.1	1668.4	6.38
mano or sharks (mainly scalloped				
hammerheads, Sphyrna lewini)	697.7	1498.2	1098.0	4.20
akule (Selar crumenopthalmus)	347.3	670.9	1009.1	3.86
'awa'awa (Elops hawaiiensis)	814.5	997.3	905.9	3.47
uhu (Scaridae)	713.6	1091.4	902.5	3.45
ta'ape (Lutjanis kasmira)	966.4	43.2	504.8	1.93
awa (Chanos chanos)	714.1	0.0	357.0	1.37

Annual harvest (kg) in Hanalei for both active and passive gears

Taxa	Annual Total	Percentage	Percentage of
	(Dec. '92	of	catch excluding
	to Nov. '93)	total catch	coastal pelagics
akule (Selar crumenophthalmus)	6231.00	49.28	-
opelu (Decapterus species)	2810.46	22.23	-
Jacks	703.68	5.56	19.53
papio (Caranx melampygus and other			
juvenile Carangids)	(345.54)	(2.73)	(9.59)
ulua aukea (<i>Caranx ignobilis</i>)	(188.52)	(1.49)	(5.23)
Goatfishes (Mullidae)	439.87	3.48	12.21
oama (Mulloidichthys spp.)	(236.39)	(1.87)	(6.56)
kumu (Parupeneus porphyreus)	(53.54)	(0.42)	(1.49)
kuhonu or white crab (Portunus	350.64		
sanguinolentus)		2.77	9.73
mano kihikihi or scalloped hammerhead	342.01		
(Sphyrna lewini)		2.70	9.49
nenue (Kyphosus species)	319.13	2.52	8.86
manini (Acanthurus triostegus)	293.54	2.32	8.15
'o 'io (Albula spp.)	259.88	2.06	7.21

Conclusions – active gear

- Pole and Line dominant gear type by effort

 low CPUE
 - 40 different species--jacks, goatfish, sharks, akule
- <u>Spear highest seasonal and annual active</u> <u>CPUE in K-Bay</u>
 - range 0.87 to 1.0 kg/gear-hr for both bays
 - nearly 90% of Kaneohe catch octopus (12-15 t/yr)
- Aquarium K-Bay
 - feather duster worms--90,000 per year



Conclusions – passive gear

- Nets including gill and surround
 - Responsible for ½ of total catch
 - high CPUE for both fisheries
 - high variance
 - Surround netting for akule/opelu produced highest annual harvest in Hanalei Bay followed by pole and line
 - Gillnet catch in Kbay consisted of goatfishes, chubs, jacks, bonefish, and mullet



Yield comparisons among select Pacific insular reefs

Location	Area of reef	Groups included in statistics	Yield (mt/km ² -
	(km ²)		year)
American Samoa	3.6	fish only	21.2
		fish and invertebrates	26.6
Philippines (Sumilon Island)	0.5	demersal fish only	20.2
	0.65	demersal and pelagic fish	18.3
Philippines (Apo Island)	1.56	demersal fish and octopus	5.8
·		demersal and pelagic fish	11.3
Ifaluk Atoll	6.0		5.1
Hanalei Bay, Kauai	4.6*	all	3.60*
		finfish and invertebrates excluding small coastal pelagics	0.91*
		finfish excluding small coastal pelgics	0.80*
Kaneohe Bay, Oahu	ı 56.7	all	1.16

* Includes soft sediment and reef habitats

COMPARISON OF DAR DATA WITH HANALEI EXPANDED CATCH



Annual harvest for major fishing methods in Kaneohe Bay, Oahu 1991-92



Length Frequency Distribution for omilu (Caranx melampygus) from Hanalei Bay, Kauai



<u>Summary</u>

- Nearly complete estimates of catch and effort
- Multispecies, multigear fisheries with low yield
- Octopus dominated active gear catch in Kaneohe
- Nets accounted for ½ of catch assorted species
- Surround net for Akule dominant fishery by weight at Hanalei
- Some prized species suffer from growth overfishing

