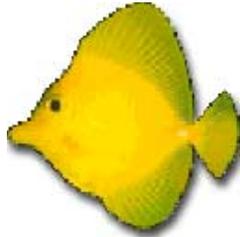


## OVERVIEW AND GOALS

In response to declines in reef fishes the Hawai'i state legislature created the **West Hawai'i Regional Fishery Management Area** in 1998 to improve management of fishery resources (Act 306). One of the requirements of the Act mandated that the State Division of Aquatic Resources declare a minimum of 30% of the west Hawai'i coastline as Fish Replenishment Areas (FRAs), reserves where aquarium fish collecting is prohibited.



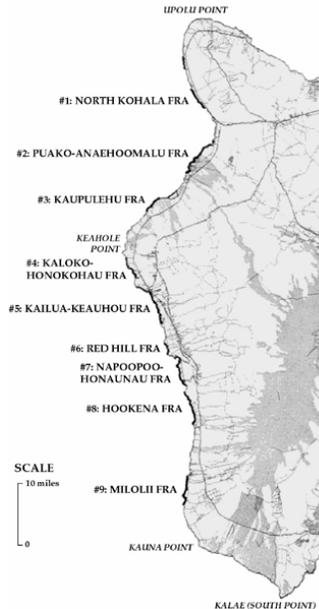
In 1999 the **West Hawai'i Fisheries Council**, a community-based group with members from distinct geographic areas, commonly referred to in Hawai'i as *ahupua'a*, proposed nine FRAs along the west Hawai'i coastline that prohibit aquarium fish collecting along 35% of the coast when combined with existing protected areas. This fishery management plan has been approved by Governor Cayetano and the FRAs officially became closed to aquarium collecting on Jan. 1, 2000.

The principle goals of the research program are to:

1. Estimate impacts of aquarium fish collecting in west Hawai'i.
2. Evaluate effectiveness of the FRA plan to increase aquarium fishes.
3. Estimate critical habitat characteristics for adult and juvenile aquarium fishes.
4. Document recruitment patterns of aquarium fishes.

## RESEARCH PROGRAM

A total of 23 study sites were established in 1998 along the west Hawai'i coastline in and adjacent to the proposed FRAs. Our study design compares changes in fish populations in the FRAs relative to natural variation in both normal (open collected areas), and protected (Fishery Management Areas and Marine Life Conservation Districts) areas.



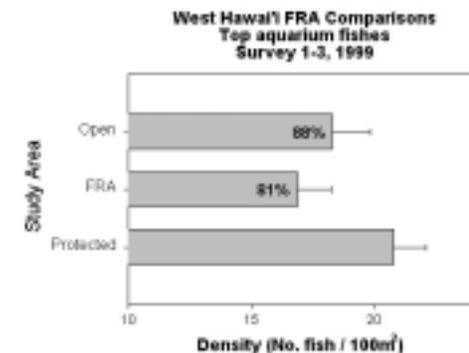
We began surveys in March 1999 and are conducted them on a bimonthly basis. During each survey we count the number of all fishes in four 100m<sup>2</sup> areas at each of the 23 sites. Since the FRAs became closed to aquarium collecting on Jan. 1 2000, surveys we conducted in 1999 will be used as pre-closure baseline surveys for future population comparisons.

## BASELINE

Surveys have documented the distribution and abundance of aquarium fishes at all study sites. Based on initial studies the number of sites and average abundance of the ten most collected aquarium fishes on west Hawai'i reefs is:

Species	# sites (of 23)	Abundance (# / 100 m <sup>2</sup> )
Goldring surgeonfish	23	25.2
Yellow tang	23	14.4
Multi-band butterflyfish	23	5.2
Potter's angelfish	23	1.6
Ornate butterflyfish	23	0.8
Forcepsfish	21	0.5
Four-spot butterflyfish	12	0.4
Achilles tang	17	0.4
Moorish Idol	16	0.3
Longnose butterflyfish	17	0.3

Analysis of baseline data indicate that targeted aquarium fishes are less abundant in FRA and impact areas relative to adjacent protected areas.

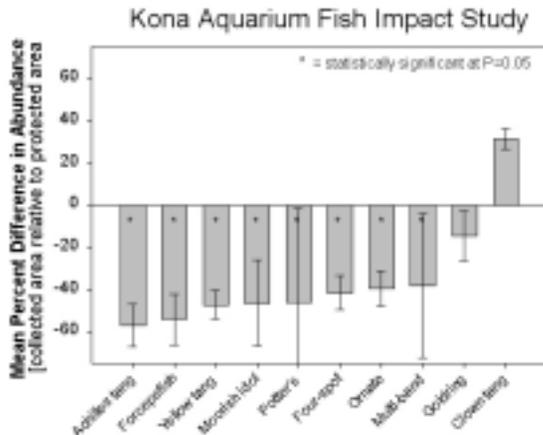


## AQUARIUM COLLECTING IN HAWAI'I

In 1995 a total of 422,823 fishes with a value of \$844,843 were collected from Hawaiian reefs. Fishes from west Hawai'i accounted for 59% of this total (Division of Aquatic Resource, 1997). Based on reports from aquarium collectors in west Hawai'i the following fishes were harvested in 1998:

Species	# collected
Yellow tang	177,994
Goldring surgeonfish	15,389
Achilles tang	11,210
Forcepsfish	4,643
Multi-band butterflyfish	3,792
Moorish Idol	3,037
Four-spot butterflyfish	2,886
Potter's angelfish	1,614
Ornate butterflyfish	984

In 1997-98 a University of Hawai'i Hilo–Division of Aquatic Resources study estimated the impact of aquarium collectors in Kona. They found significant declines in 8 of the 10 fish species targeted by collectors.



## CONTACT INFORMATION

### PRINCIPLE INVESTIGATORS

Dr. Brian Tissot  
**Washington State University Vancouver**  
 Overall project coordination, data analysis and report writing. 360-546-9611

Dr. William Walsh  
**Hawai'i Division of Aquatic Resources**  
 West Hawai'i field logistics and resource management issues. 808-328-8041

Dr. Leon Hallacher  
**University of Hawai'i Hilo**  
 East Hawai'i field logistics and UH-Hilo diver coordination. 808-974-7364

### COLLABORATORS

Dr. Robert Nishimoto  
 Peter Hendricks  
 Brent Carmen  
**Hawai'i Division of Aquatic Resources**

Sara Peck  
**UH Sea Grant Extension Service**

John Coney  
**University of Hawai'i Hilo**

### RESEARCH ASSISTANTS

Anne Creason, Jonathan Hultquist  
**Washington State University Vancouver**  
 Mark Albins, Paul Clark, Steve Cotton, Jeff Eble, Karen Geisler, Jackie Holbrook, Daniel Okumura, Kara Osada, Kim Page, Todd Wass, Lisa Wedding, Darla White, Rachael Younger, Brian Zgliczynski  
**University of Hawai'i Hilo**

### PROJECT WEBSITE

[HTTP://CORALREEFNETWORK.COM/KONA/](http://CORALREEFNETWORK.COM/KONA/)

Updated: Feb. 16, 2001

## WEST HAWAI'I AQUARIUM PROJECT (WHAP): FISHERY MANAGEMENT OF MARINE PROTECTED AREAS



FUNDED BY THE  
 HAWAI'I CORAL REEF INITIATIVE  
 RESEARCH PROGRAM