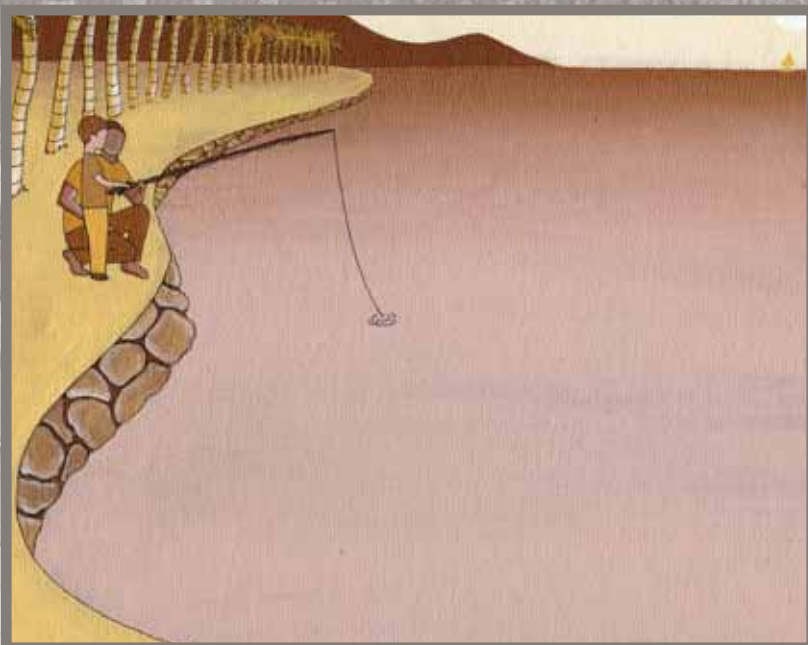


Fishing, Ocean Recreation, and Threats to Hawaii's Coral Reefs:

Results from a December 2004 Household Survey Michael P. Hamnett, Ming Liu and David B. Johnson



In 2004, 66% of Hawaii's households went ocean swimming an average of two times per month.



Of the households that went recreational fishing in 2004, 26% used pole and line. Recreational fishermen go an average of 32 times per year (or 2-3 times per month).

Considerable research has been done on the threats to Hawaii's coral reef ecosystems. Much of this research has focused on specific problems, like invasive species, the impact of land-based sources of pollution, and the impact of walking on reefs. However, no comprehensive assessment has been done on the number of residents who use Hawaii's coral reef ecosystems for ocean recreation and fishing; how often people engage in such activities; what they think the threats are to the resources they use; and what they think might be done to mitigate those threats.

In 2004, the Hawaii Coral Reef Initiative issued a request for proposals to conduct such a study. The program's management committee selected Q-Mark Research and Polling. A team from Q-Mark organized a series of focus groups and conducted a stratified random sample survey of 1600 households statewide during 2004 and 2005. The survey included 600 respondents from Oahu, 300 each from the neighbor island counties, and an additional 100 Hawaiian households from across the state. They conducted the telephone survey in December 2004. Preliminary results were published in a report available on the program website (www.hcri.hawaii.edu).

TABLE 1
HOW HAWAII RESIDENTS USE THE NEARSHORE AND HOW OFTEN

ACTIVITY	HOUSEHOLDS	AVERAGE PER YEAR
Ocean Swimming	66%	28
Recreation Fishing	31%	10
Surfing	29%	18
Snorkeling	32%	6
Subsistence Fishing	10%	5

Looking at Table 1, the survey found that 66% of households had one or more members involved in ocean swimming, with an average of 28 swimming trips annually. About 32% had one or more members involved in snorkeling, but the average number of snorkeling trips was only 6 times for the year. Twenty-nine percent of households had one or more members that surfed, averaging 18 times during the year.

Thirty-one percent of households went recreational fishing. Twenty-six percent of those used a pole and line. That amounts to over 109,055 households statewide. Moreover, households responding to the survey reported an average of five pole and line fishing trips during the year. Twelve percent of households had one or more recreational members who spearfished; 5% had one or more members who netted.

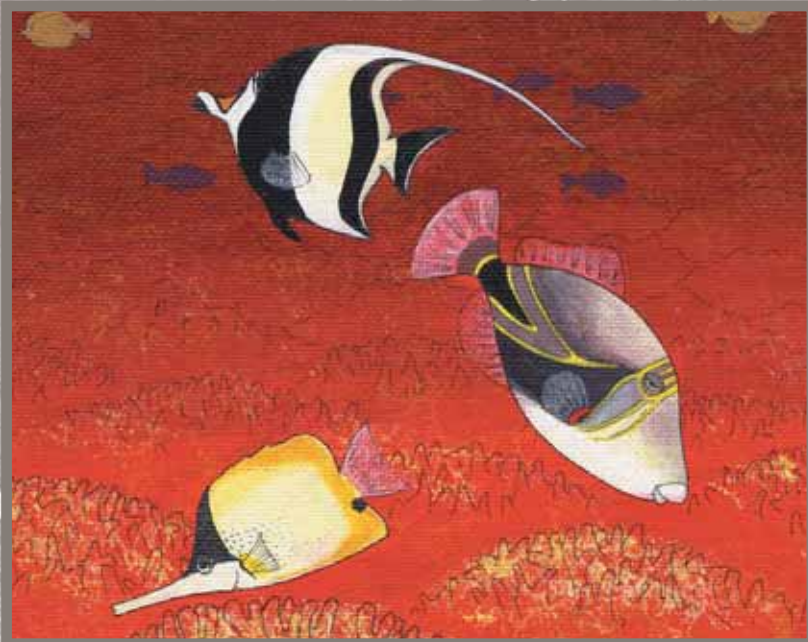
TABLE 2
FREQUENCY OF FISHING BY TYPE

	Recreational Fishing		Subsistence Fishing	
	ANNUAL AVERAGE	HOUSEHOLDS	ANNUAL AVERAGE	HOUSEHOLDS
HEAVY USER	≥32	8%	≥59	2%
LIGHT USER	<32	23%	<59	7%

Subsistence fishing was less frequently reported for 2004, with a total of 10% of Hawaii's households. Seven percent of households reported one or more household members pole and line fished for subsistence. That equates to over 29,000 households. Five percent reported spearfishing and 3% reported netting.

Among the respondents who identified themselves as ethnically Hawaiian, the percentage of households involved in ocean and coastal activities were ten to twenty percentage points higher than other households. They also reported a significantly higher frequency of household members that participated in the activities listed in Table 1.

About 11% of households reported one or more members fished 45 times or more during the year. Looking at subsistence and recreational fishing separately, about 8% of households with recreational fishermen reported fishing 32 times or more during the year (Table 2). Subsistence fishermen, while fewer in number, had a higher average number of at 59. This totals over 3100 subsistence-fishing trips in 2004 for the households surveyed. Extrapolating to the state's population as a whole, subsistence fishermen went on over 103,000 fishing trips that year.



Pollution from land is clearly considered the most serious threat to Hawaii's coral reefs. The largest number of respondents identified it as a threat and gave it the highest mean score.



Over 96% of fishermen's households think overfishing is a threat to coral reef ecosystems. 66-70% of fishing households consider it a serious threat.

The survey also asked people what they thought the major threats were to coral reef ecosystems, asking respondents to rank each threat on a scale of zero (no threat) to ten (serious threat). Table 3 shows the average assigned by those responding, the percentage ranking a threat above the average score for that threat, and the percentage of respondents ranking a threat as a ten. Pollution from land and coastal development were clearly considered the most serious threats to coral reef ecosystems with the highest average scores. It was given a higher than average score by the largest number of respondents and was ranked as most serious (10) by a significantly higher percentage of respondents than any other threat. Coastal development ranked third in terms of the percentage of respondents that ranked it above the mean and fourth in terms of the percentage of respondents that scored it most serious. Overfishing was the second-most frequently selected threat, with respondents giving it an average of 7.9 points out of ten. Forty percent of respondents gave overfishing a score of ten.

TABLE 3
HOW RESPONDENTS RANKED VARIOUS THREATS

THREAT	AVERAGE SCORE (0-10)	% WITH ABOVE AVERAGE SCORES	% THINKING THREAT A "10"
Pollution from Land	8.9	72%	62%
Overfishing	7.9	66%	40%
Coastal Development	7.9	65%	39%
Disease	7.8	62%	39%
Alien Marine Species	7.6	63%	41%
Near Shore Recreation	5.9	52%	14%

A larger percentage of respondents from ethnically Hawaiian households gave above average scores to invasive species, disease and coastal development. Overfishing was rated as a serious threat by about the same percentage of Hawaiian and non-Hawaiian households.

Over ninety-six percent of respondents from households that reported fishing in 2004 said overfishing was a threat to coral reef ecosystems (Table 4). In terms of the seriousness, fishing households ranked the threat higher than households that did not report fishing. Those that reported heavy fishing had a higher percentage ranking for overfishing than those who reported fewer trips.

Among recreational fishermen there was no difference between light or heavy users. Among household reporting subsistence fishing in 2004, 77% said overfishing was a serious threat.

TABLE 4
OPINION OF FISHING HOUSEHOLDS ABOUT OVERFISHING

	THINKS OVERFISHING IS A THREAT	THINKS OVERFISHING IS A SERIOUS THREAT
LIGHT FISHING HOUSEHOLD	96%	66%
HEAVY FISHING HOUSEHOLD	97%	74%

Households with heavy subsistence fishing ranked coastal pollution as a more serious threat than overfishing, whereas households reporting fewer subsistence fishing trips ranked overfishing as more serious than pollution from land. Rankings among recreational fishing households ranked pollution from land only slightly more serious than overfishing (Table 5).

Over half of those surveyed favored setting aside new areas in which fishing is not permitted as a way to address threats to the health of coral reef ecosystems (Table 6). Only 16% of respondents favored restricting all human access to some nearshore areas, whereas about 36% favored allowing some recreation, but no fishing. Twelve percent favored setting aside areas and allowing limited fishing and 35% favored fewer restrictions on use than exist now. The highest percentage of respondents favoring restricting access to all human use for some areas was among households reporting 58 or more fishing trips in 2004. A larger percentage of that group also favored less restrictions than there are now.

It is clear from the results of the survey conducted by Q-Mark for the Hawaii Coral Reef Initiative that a large percentage of households had members involved in activities in Hawaii's ocean and coastal waters in 2004. The highest percentage were involved in non-consumptive activities like swimming and surfing. But, a surprisingly large number of households reported fishing and gathering.



Heavy subsistence fishing households ranked land-based pollution as a more serious threat than overfishing. For households reporting fewer subsistence fishing trips, overfishing is considered more serious. Recreational fishing households ranked pollution only slightly more serious than overfishing.



The survey demonstrates that Hawaii's residents recognize the threats to our coral reefs. Over half those surveyed would like to set aside new, non-fishing areas. The highest percentage of respondents favoring restricting access are heavy recreational fishing households.



It is also clear that people in Hawaii recognize there are multiple threats to the health of coral reef ecosystems and most threats are considered very serious. None of the mean scores (on the 0 to 10 point scale) was below a 5.9. Most of the threats were reported as most serious by more than 39% of households.

Pollution from land was seen as the most serious threat by survey respondents in December 2004. It seems likely that pollution from land would be seen even more serious today, given the 2006 sewage spill in Waikiki and new reports about the risk of future spills.

Overfishing was seen as a major threat to coral reef ecosystems in Hawaii by almost everyone who participated in the 2004 random sample household survey. Over 60% of households with fishermen said overfishing as a serious threat.

TABLE 5
OPINION OF FISHING HOUSEHOLDS ABOUT LAND-BASED POLLUTION

	SEE POLLUTION AS A SERIOUS THREAT
Recreation and Fishing Households	
LIGHT USER	72%
HEAVY USER	79%
Subsistence Fishing Households	
LIGHT USER	62%
HEAVY USER	83%

Restricting access to nearshore areas to address the overfishing problem has been very controversial in Hawaii for many years. But, some limitations on fishing are clearly favored by the majority of Hawaii residents. Having some new areas closed entirely to human use is an option that some people favor. Many more people favored allowing limited fishing. Deciding what limits would be acceptable is clearly the next step and involving the fishing community in that decision is probably the only way it would be politically acceptable.

If new areas are to be closed to fishing and other ocean recreation activities, decisions on what areas are to be closed need to be made. And, it is likely that a smaller percentage of people will favor restricting fishing and other activities in their favorite places than those

responding to a general question about closures and a resource management strategy. But, it appears from the survey results that getting fishermen and other ocean users involved a process to decide what additional restrictions should be imposed is clearly the way forward.

The survey showed that people recognize the threats and the majority of Hawaii's people favor further restrictions on ocean use to reduce threats to coral reef ecosystems.

TABLE 6
FISHING AND NON-FISHING HOUSEHOLDS'
RESOURCE MANAGEMENT PREFERENCES

	NON-FISHERMEN	LIGHT FISHERMEN	HEAVY FISHERMEN
RESTRICT ALL HUMAN USE	16%	15%	19%
SOME USE (NO-FISHING)	39%	37%	10%
LIMITED FISHING	11%	12%	29%
PREFER LESS RESTRICTION	35%	36%	41%

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