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004-89H

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Manuscript Report File MRF-004-89H

KAHULUI SMALL FISHING BOAT FACILITY

Alternative Net Benefit Estimates

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August 1989

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KAHULUI SMALL FISHING BOAT FACILITY
Alternative Net Benefit Estimates

March 1, 1988

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Introduction

This report presents estimates of the potential benefits from an improved small fishing boat facility in Kahului Harbor, Maui. It revises estimates originally presented in "Kahului small boat harbor -- benefit analysis -- 4th draft" (April 1987). The revisions are based on new information obtained through a collaborative special survey of boat owners on Maui fielded by the Corps in August and September 1987.

Historical information was presented in the 4th draft report but that data had a number of significant limitations which were revealed during the public review of the report's results. Therefore the contemporary situation is analyzed primarily from numbers obtained in the special survey. As a result, this report stands alone in providing information on the benefit estimation procedures.

The largest apparent constraints on the project are:

a. the resource dependent effect on catch rates **WITH** the project; and,

b. the cost of fishing per trip.

These effects reduce the catch rates at Kahului as fishing increases and reduce the net benefits of each day fishing. The first constraint is judged to be the most important; without the resource dependent effect, benefits would be substantially

higher as indicated later in this report.

Survey Frame

The survey was conducted because information presented at a public workshop in Kahului made clear that the existing information on commercial fishing practices in that area was inadequate to make an accurate estimate of potential benefits from a proposed Corps of Engineers launching ramp and temporary moorage project in Kahului harbor.

The survey was prepared (Appendix A) and mailed first to those people who had attended the public workshop or who had earlier expressed interest in the project. The survey was also made available to two State of Hawaii officials on Maui and to leaders of two major fishing clubs for wider distribution. Finally, a month later, a second mailing of the survey was made to all persons living on Maui who had a commercial fishing boat registered with the State of Hawaii's Harbors Division who had not been included in the earlier distribution. The survey contained 61 numerical questions and a number of fill-in-the-blank opinion questions.

Altogether, 385 surveys were mailed out and another 80 were made available through the State of Hawaii and fishing club representatives.

There were 110 surveys returned to the Corps of Engineers by November 13, 1987: 67 from the first set of mailings and 43 from the commercial fishing boat owners. This was not an excellent response rate, but the information obtained from the surveys was very thorough.

Statistical Population

There were 87 surveys with sufficient information on which to make statistical analyses. The remaining surveys represented people who no longer owned a boat, or who didn't want to give information on their fishing practices. Although these surveys were not included in the statistical analysis, opinions expressed on these survey forms have been saved.

Survey Results

It proved not to be necessary to "extrapolate" this sample of Maui commercial fishers because the respondents appear to represent almost all those fishing boat operators who currently or expect to fish off Kahului. Furthermore, the resource constraint coincidentally restricts the optimal benefits to the expected number of trips indicated in the analysis of this sample alone.

Of the 87 respondents, 16 could be considered "full-time" commercial fishers, people who landed at least 10,000 pounds in 1986. The remainder are part-timers who nonetheless sell part of their catch.

Sample results are shown in Table 1 **only** for those respondents who indicated they fished from Kahului during 1986 (61). Table 2 also includes those who **would** fish from Kahului WITH the project (72). The results are adjusted to reflect **only** commercial and subsistence fishing trips (Survey questions Q3 & Q4).

Table 1: **WITHOUT** Project Baseline (Survey results), Kahului vessels (1)

	All vessels	"Full-time"	"Part-time"
Vessels	61	15	46
Total Trips (per vessel) --Maui-wide	2862 (46.9	1019 67.9	1843 40.0)
Kahului Trips (per vessel)	1302 (21.3	326 21.7	976 21.2)
Total Catch --Maui-wide	425,594	267,226	158,367
Kahului Catch	186,595	88,811	97,784
Catch per Trip --Maui-wide	149	262	86
Kahului Catch per Trip	143	272	100

(1) Respondents indicating they **currently** fish from Kahului.

Table 2: Current fishing practices, All vessels (1)

	All vessels	"Full-time"	"Part-time"
Vessels	72	15	57
Total Trips (per vessel) --Maui-wide	3068 (42.6	1019 67.9	2049 35.9)
Total Catch --Maui-wide	446,507	267,226	179,281
Catch per Trip --Maui-wide	146	262	87

(1) Respondents indicating they currently fish from Kahului or **would** fish from Kahului, WITH the project.

Full-time Equivalent Estimation

The responses could be analyzed either as averages or as "full-time equivalent" fishing vessel operators. Although the latter is more difficult to perform, it coincides most closely with the Corps procedures for this type of benefit estimation, which emphasize commercial benefits. Using the information from Table 1, the current "full-time equivalent" usage of Kahului harbor is estimated based on the Kahului catch of "full-time" boats (Table 3). The gross (unadjusted) numbers of commercial fishing vessels and trips remain as indicated in Tables 1 and 2. Per vessel values are based on "full-time" boats. A similar "full-time" adjustment is made for Maui-wide fishing vessel activity (Table 4), using **only** those vessels that fished from Kahului in 1986.

Table 3: Kahului full-time equivalent adjustment, WITHOUT project (1)

Catch: C(F,K) = 88,811 C(P,K) = 97,784
C(K) = 186,595

Adjustment factor: C(P,K)/C(F,K) = 1.10

Trips: T(F,K) = 326 T(P,K)* = 326 X 1.10 = 359

T(K)* = 685 @ 272 LBS/TRIP

Vessels: V(F,K) = 15 V(P,K)* = 15 * 1.10 = 16.5
V(K)* = 31.5

T(K)/V(K) = 21.7

C represents catch in pounds.
T represents trips; V represents vessels.
Subscripts are indicated by ().
F represents full-time operators; P, part-time.
K represents Kahului-trips only
* represents adjusted figures to reflect full-time equivalents

(1) Respondents indicating they **currently** fish from Kahului.

Table 4: Maui-wide full-time equivalent adjustment, WITHOUT project (1)

C(F,M) = 267,226 C(P,M) = 158,367
C(M) = 425,594

Adjustment factor: C(P,M)/C(F,M) = 0.59

T(F,M) = 1019 T(P,M)* = 1019 X 0.59 = 601

T(M)* = 1620 @ 262 LBS/TRIP

T/V = 51.4 V* = 31.5

C represents catch in pounds.
T represents trips; V represents vessels.
Subscripts are indicated by ().
F represents full-time operators; P, part-time.
M represents Maui-wide trips.
K represents Kahului-trips only
* represents adjusted figures to reflect full-time equivalents

(1) Includes only those vessels **currently** fishing from Kahului.

WITHOUT Project Economic Condition

These results were entered into a vessel operations simulator which combines catch, revenue and vessel cost information to calculate net revenue. Aggregate cost data shows that these vessels have fixed costs of $3979 per year plus a capital cost of $3062 on an investment of $31,233. The vessels operate at a cost of $141 per trip, excluding a 29.5% crew share. The average price of fish landed by the respondents was $2.14 in 1986. With an average catch per trip of 262 pounds, revenue per trip was $561, and crew share was $124 per trip. Average estimated gross revenue per vessel was $28,819 per year WITHOUT the project.

The results from the vessel operations simulator are shown in Spreadsheet #1.

These data show the average full-time "equivalent" commercial fishing vessel which operates 22 trips per year out of Kahului harbor and 29 trips per year from other Maui sites makes $8,181 in net revenue and $6,370 in crew income.

WITH Project Economic Condition

The next step in the benefit estimation procedure is to calculate the operating characteristics **WITH** the project. Table 5 presents the survey results for expected activity levels for vessels which actually fished from Kahului in 1986 (to form a consistent basis for comparison to the WITHOUT project situation). These values are translated into "full-time equivalent" values in Table 6 and 7 for Kahului trips and Maui-wide trips.

Table 5: **WITH** Project Operating Estimates (1)
(Survey results)

	All vessels	"Full-time"	"Part-time"
	61	15	51
Total Trips (per vessel) --Maui-wide	3,918 (64.2	1,295 86.3	2,623 51.4)
Kahului Trips (per vessel)	2,740 (44.9	889 59.3	1,851 36.3)
Total Catch --Maui-wide	848,718	404,521	444,197
Kahului Catch	631,214	274,132	357,082
Catch per Trip --Maui-wide	217	312	169
Kahului Catch per Trip	230	308	193

(1) Calculating **only** for vessels fishing from Kahului in 1986.

Table 6: Kahului **WITH project** full-time equivalent adjustment

--**Expected** Values WITH Project--

Catch: C(F,K) = 274,132 C(P,K) = 357,082
C(K) = 631,214

Adjustment factor: C(P,K)/C(F,K) = 1.30

Trips: T(F,K) = 889 T(P,K)* = 889 X 1.30 = 1158

T(K)* = 2045 @ 308 LBS/TRIP

Vessels: V(F,K) = 15 V(P,K) = 51
V(P,K)* = 15 X 1.30 = 19.5
V(K)* = 34.5 [full-time equivalents]

Trips per vessel: T(K)/V(K)* = 61

C represents catch in pounds.
T represents trips; V represents vessels.
Subscripts are indicated by ().
F represents full-time operators; P, part-time.
K represents Kahului-trips only
* represents adjusted figures to reflect full-time equivalents

Table 7: Maui-wide **WITH project** full-time equivalent adjustment

--**Expected** Values WITH Project--

Catch: C(F,M) = 404,521 C(P,M) = 444,197
C(M) = 848,718

Adjustment factor: C(P,M)/C(F,M) = 1.10

Trips: T(F,M) = 1,295 T(P,M)* = 1,295 X 1.10 = 1,425

T(M)* = 2,720 @ 312 LBS/TRIP

Vessels: V(M)* = 34.5 [full-time equivalents]

Trips per vessel: T(M)/V(M) = 79

C represents catch in pounds.
T represents trips; V represents vessels.
Subscripts are indicated by ().
F represents full-time operators; P, part-time.
M represents Maui-wide trips.
K represents Kahului-trips only
* represents adjusted figures to reflect full-time equivalents

Potential Resource Effect

However, although the respondents **anticipated** catching fish off Kahului at a rate of 308 pounds **WITH** the project (Table 6), the projected increase in Kahului fishing trips would lead to increased biological pressure on these fishery resources. In some cases, the overall population structure might be depressed (such as with bottom fish) while with others only their immediate density would be decreased (such as with tuna).

There is very little information available concerning the "carrying capacity" of fisheries off the north coast of Maui. Because of apparent under-reporting on official State of Hawaii Division of Aquatic Resources (HDAR) commercial fishing catch reports, and because there have been no contemporary resource surveys of the area, there is insufficient information for a precise and detailed resource assessment. Therefore we took two approaches to providing a provisional answer to the question: application of Ralston's (1987) bottom fish productivity estimates and comparison of the existing fisheries information from the north coast of Maui with similar fisheries, in particular the north coasts of Oahu

and Molokai (neighboring islands).

The north coasts of the main Hawaiian islands are subject to strong winds and oceanographic conditions, and like most coasts in the main Hawaiian islands, the surface topography of the bottom drops off rapidly. This means that for bottom-associated fish, such as the snappers and groupers, the habitat range is narrow. Similarly, for small boat fishing methods which utilize topographical drop-offs, such as the handline tuna fisheries, there is a limited accessible range. From a fishing operations perspective, the north coasts are not nearly as easy to fish as the south and western coasts, which also have considerable bank areas associated with them. Given a choice, commercial small boat fishers have chosen the more protected grounds.

However, such protected grounds are now near their sustainable yields, and with the high demand for fresh bottom fish and tunas, commercial fishers have begun to explore the north coasts with greater intensity. An example of this can be seen in Figure 1 which shows the near doubling of handline fishing effort **and** catch rates off the north coast of Molokai in 1983 and 1984.

Ralston (1987) estimates bottom fish (snappers, groupers and jacks) annual productivity in the main Hawaiian islands at 286 Kg per linear nautical mile of 100 fathom (600 ft.) isobath. The north Maui 100 fathom isobath is approximately 225 nmi. so sustainable production is approximately 140,000 pounds of bottom fish annually. Ralston indicates (pers. comm.) there is no reason to expect the north coast of Maui to be less productive than other areas in the main Hawaiian islands, although absolute catch rates (catchability) may be lower due to fishing conditions.

The small boat commercial fishery on the north coast of Maui does not concentrate on bottom fish, although it will harvest these species to the extent possible. Bottom fish comprised only 20% of Kahului landings in 1983 (HDAR data). Therefore the bottom fish resource constraint is not an immediate bound on development of the fishery. The primary target species are the pelagic resources.

For the pelagic resources (tunas, mahimahi, and wahoo (ono)), the Maui fishery would have an infinitesimal effect on the Pacific-wide stocks of these species. However, there might be an immediate density effect on the stocks of fish available to north Maui fishers, i.e. the more fishing that takes place on the north coast of Maui, the less dense will be the supply of pelagic fish at any point in time, and therefore catch rates may be reduced if fishing increases substantially. Figure 2 summarizes recent fishing activity on the north coasts using HDAR data and Figure 3 shows the resource density problem for the small-boat trolling fleet operations off the

north coasts of Maui, Molokai, and Oahu. Over a 5 year period, as the number of fishing trips increased, the catch per trip declined substantially. This is **not** an indication of biological resource stress, which might be true of a bottom-associated species, but of competition amongst fishers for a limited, but constantly renewing, pool of available pelagic fish. The handline fishery shows no such resource pressure (Figure 4), although the decline in catch rates on Oahu (the population center) is suggestive.

Therefore, a resource density equation was calculated from HDAR records for fishing off the north shores of Oahu, Molokai, and Maui. The equation depicts the relationship between fishing trips and catch rates over a 5-year period (Figure 3). It shows that for each 100 additional trips, the catch rate declines by 7.3 pounds per trip. We adjusted the HDAR data used in constructing the equation to account for under-reporting and the fishing power of full-time equivalent vessels. The equation is then used to estimate the resource effect on an expansion of fishing activity caused by the harbor improvement. The adjusted resource density equation is shown in Table 8.

Table 8: Resource density equation
North shores of Maui, Oahu and Molokai
(adjusted for "full-time equivalent" trips)

$$CPT(K)^* = 323.5 - [\ 0.073 \times T(K)^*\ ]$$

Linear regression results:

$R^2 = .8105$
N = 5
B = - 0.072601
t = 3.50

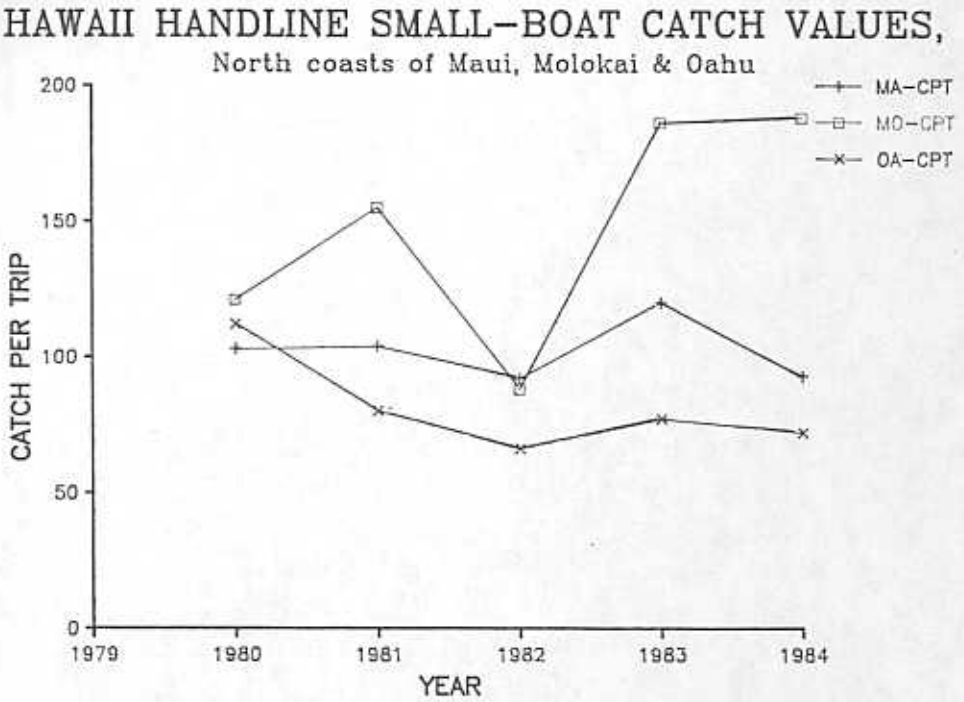
CPT represents catch per trip in pounds;
T represents the number of trips per year.
Subscripts are indicated by ().
K represents Kahului-trips only
* represents adjusted figures to reflect full-time equivalents

Data adjusted from Hawaii Division of Aquatic Resource commercial catch reports, 1980-84.

Simulation results:

Trips	Catch per trip	Catch
0	323.5	0
100	316.2	31,624
500	287.2	143,600
685	273.8	187,344
1000	250.9	250,900
2000	178.3	356,596
2045	175.0	357,938
2500	142.0	354,994

The resource density equation represents a compromise between alternative specifications of the biological and operational conditions of the fishery. It is not a true Schaefer production model because it is not species-dependent and its time period is sufficiently brief to raise questions of statistical reliability. It may exaggerate the resource density effect for pelagic species while underestimating the long-term resource effect on bottom fish species. Since the purpose of the resource density equation is to bound our estimates of potential fisheries expansion, which is does quite effectively, we are confident that the true resource effect will not be the effective constraint to fisheries development off the north coast of Maui given the level of fishing anticipated by this analysis. In terms of the bottom fish resource constraint, at the optimized level of fishing effort, 20% of the anticipated catch (358,000 pounds, Table 8) would yield 71,600 pounds of bottom fish, just one half of the estimated constraint.



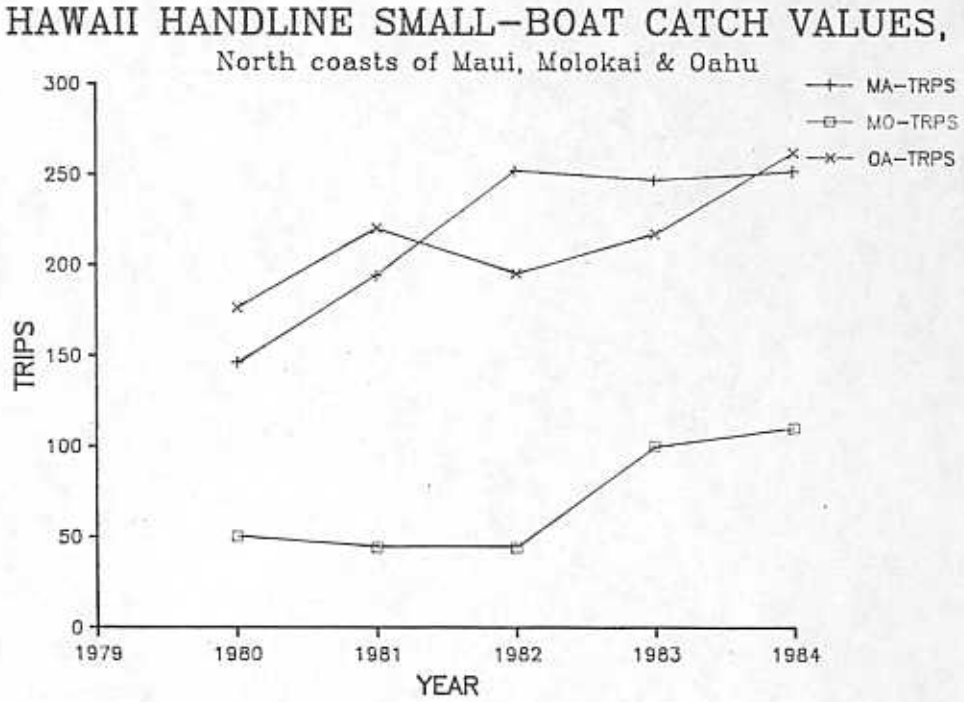
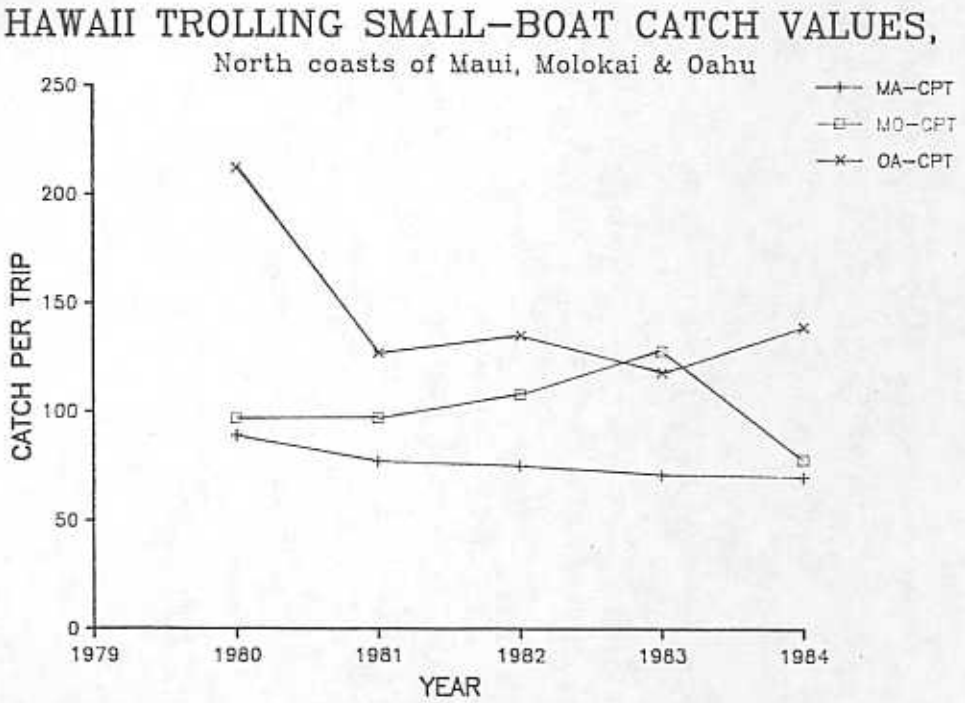


Figure 1: North coast handline fisheries
Hawaii Division of Aquatic Resources data
(Unadjusted for reporting problems or full-time equivalent levels)



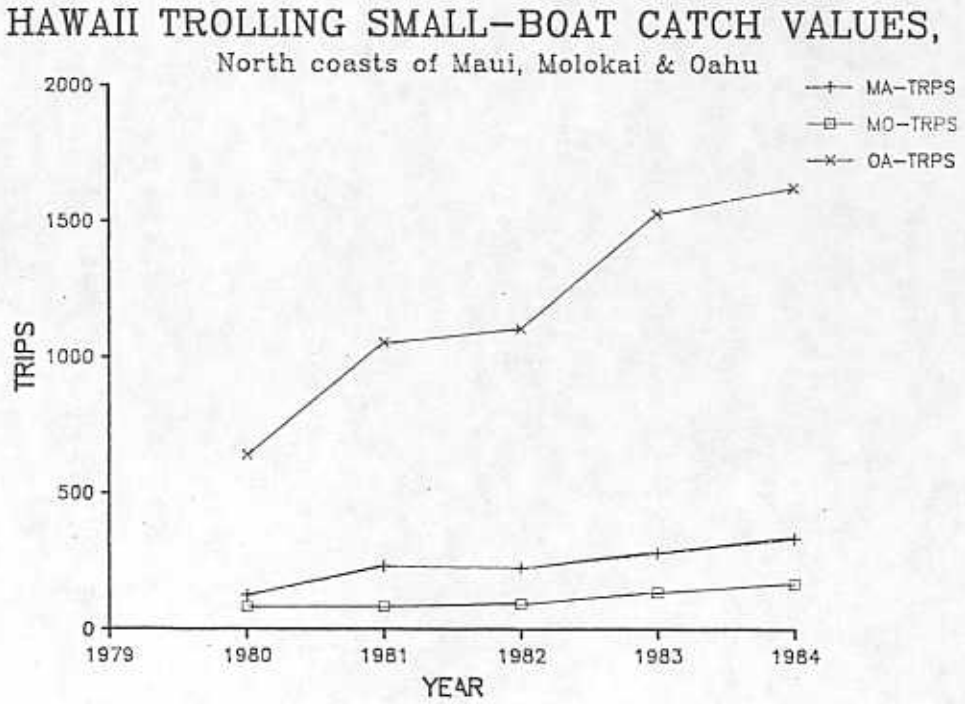
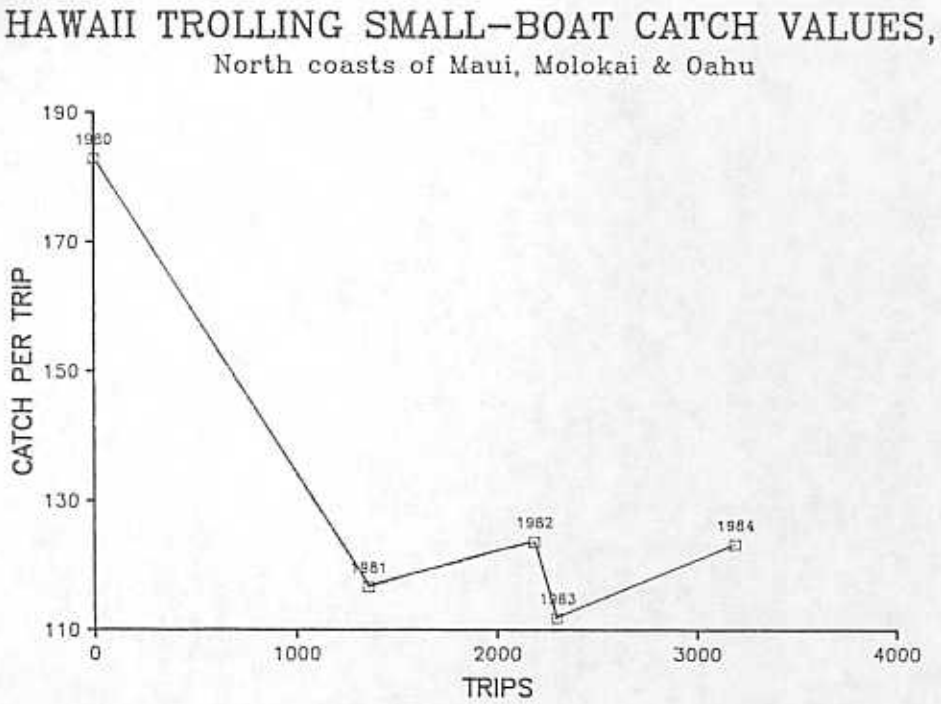


Figure 2: North coast troll fisheries
Hawaii Division of Aquatic Resources data
(Unadjusted for reporting problems or full-time equivalent levels)



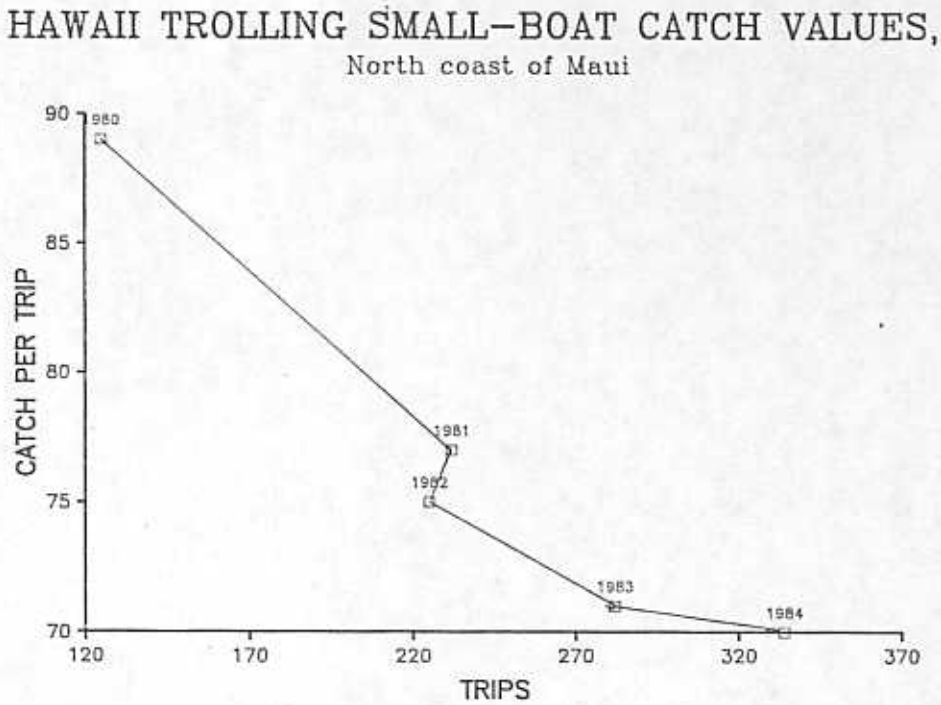
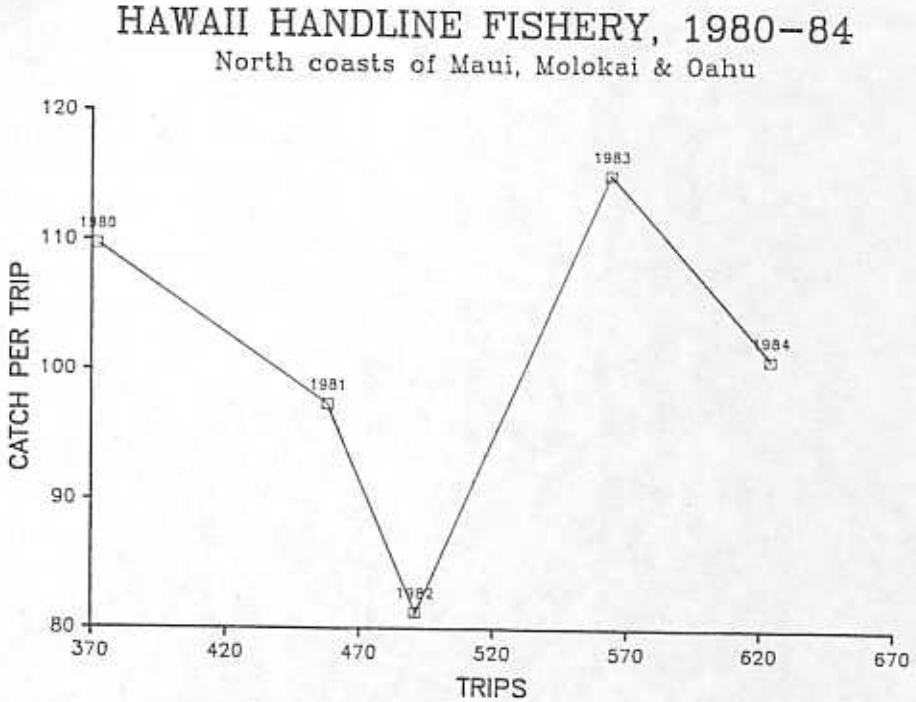


Figure 3: North coast troll fishery catch rate tendencies
Hawaii Division of Aquatic Resources data
(Unadjusted for reporting problems or full-time equivalent levels)



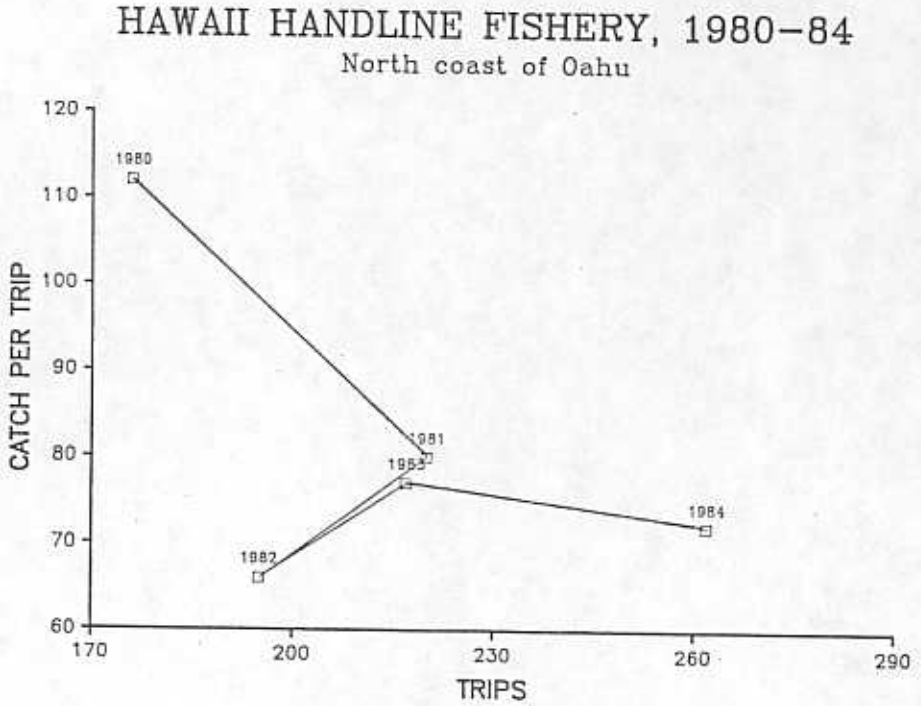


Figure 4: North coast handline fishery catch rate tendencies
Hawaii Division of Aquatic Resources data
(Unadjusted for reporting problems or full-time equivalent levels)

The estimated increase in Kahului trips is from 685 trips WITHOUT the project (Table 3) to 2045 trips WITH the project (Table 6). The effect of this increased fishing pressure is estimated to reduce catch rates by 28% off Kahului, from 272 pounds per trip (Table 3) to 197 pounds per trip (Table 9). Accounting for the difference in catch rates elsewhere in Maui, the adjusted Maui-wide catch rate is estimated at 200 pounds per trip, WITH the project. The details of this estimation are shown in the following table.

Table 9: Resource dependent effect

WITHOUT Project Condition

CPT(K) = 323.5 - [0.073 X T(K)] = 272 pounds/trip

where T(K) = 685 Trips (full-time equivalent) [Table 3]

Equation may not balance perfectly due to sequential rounding.

WITH Project Condition: Kahului trips

CPT(K)* = 323.5 - [0.073 X T(K)] = 174 pounds/trip

where T(K)* = 2045 Trips (full-time equivalent) [Table 6]

Equation may not balance perfectly due to sequential rounding.

Catch rate adjustment for expected values at Kahului

CPT(K)** = CPT(K)* X (308/272) =
= 174 X 1.13 = 197 pounds/trip

correcting for changes in fishing conditions, species composition, etc. [Kahului WITH/WITHOUT]

WITH project Maui-wide catch rate:

CPT(M)* = CPT(K)** X (312/308) = 200 pounds/trip

where (312/308) represents the relative catch rates between **expected** Maui-wide landings and Kahului landings WITH the project.

CPT represents catch per trip in pounds;
T represents the number of trips per year.
Subscripts are indicated by ().
M represents Maui-wide trips
K represents Kahului-trips only
* represents adjusted figures to reflect full-time equivalents

The economic effect of the **resource dependent catch rates** is shown in Spreadsheet #2 where catch per trip Maui-wide is decreased to 200 pounds per trip (Table 9) and the number of trips increased to 79 trips (Table 7). Net revenue per vessel is $8,925, barely an improvement over the original situation.

To show the impact of the resource estimate, a spreadsheet is included which reduces the resource impact in **half** (Spreadsheet #3). The net revenue in this situation is substantially higher ($15,583), obviously, as is the situation with **no resource effect**, as shown in Spreadsheet #4 ($22,240).

Since the resource effect is so significant, we computed the optimized mix of Kahului and non-Kahului trips by reducing the planned trips **from Kahului** WITH the project (but keeping the total number of Maui-wide trips per vessel the same, i.e. 79), using the full resource effect. This effectively increased the Kahului catch rate to 249 and the overall catch rate to 252 pounds per trip. The **optimized activity level** results are shown in Spreadsheet #5: net revenue is $16,276 which is a net revenue WITH the project of $15,107.

Total Project Benefits

Net benefit WITH the project is calculated by comparing the WITH project level of total income (net revenue plus labor income) with the WITHOUT level of total income. Labor income is included as a net benefit because the increase in trips is marginal, i.e. crew time can be obtained without cost to alternative sources of income. The alternative net benefit estimates per vessel are shown in Table 10.

Table 10: Alternative estimated net benefits WITH project
(Values per vessel using the Kahului facility

	Net Revenue + Labor Income	Total Income	Net Benefit*
WITHOUT Project (Spreadsheet #1)	$8,181 +6,370	$14,551	N/A
WITH Project			
Full constraint (Spreadsheet #2)	8,925 +6,681	15,606	$1,055
Half constraint (Spreadsheet #3)	15,583 +9,467	25,050	10,499
No constraint (Spreadsheet #4)	22,240 +12,252	34,492	19,941
Optimized (Spreadsheet #5)	15,107 +9,268	24,375	9,824

* Net Benefit = Total Income (WITH) - Total Income (WITHOUT)

Total project benefits can be calculated from any of the alternative net benefit estimates, depending on ones assessment of the uncertainties in the resource effect. Net benefits per vessel are multiplied by the number of vessels expected to participate in the project (on a full-time equivalent basis). The optimized net revenue figures (Spreadsheet #5) project an **increase** in **total income** WITH the project of $338,928 per year for a "full-time equivalent" fleet of 34.5 vessels (Table 11). The increase in **net revenue** (i.e. **without** labor income) WITH the project in the optimized situation is $238,947.

Table 11: Total net benefits WITH project, fleet-wide

	Net Revenue basis	Total Income basis
	Net Benefit *	Net Benefit **
Full constraint (Spreadsheet #2)	$25,668	$36,398
Half constraint (Spreadsheet #3)	255,369	362,216
No constraint (Spreadsheet #4)	485,036	687,965
Optimized (Spreadsheet #5)	238,947	338,928

* Net Benefit = [Net Revenue (WITH) - Net Revenue (WITHOUT)] X 34.5 "full-time equivalent" vessels

** Net Benefit = [Total Income (WITH) - Tome Income (WITHOUT)] X 34.5 "full-time equivalent" vessels

The estimated gross number of full-time and part-time commercial fishing vessels which would operate from Kahului WITH the project is 72, an increase of 12 from the WITHOUT project situation. The gross number of expected trips from Kahului would be 2,740 trips, an increase of 110%.

Conclusion

It is an unfortunate fact that the biology of Hawaii's marine resources seems to limit their exploitation by small fishing vessels, despite the apparent breadth of our oceanic surroundings. However, the experience of the tremendous growth in the ika shibi and palu ahi fisheries on the Big Island of Hawaii indicates that estimates of resource dependency based on underutilized fishing grounds may prove to be overly conservative.

The optimized activity benefits ($339,000) appear to be a realistic estimate based on the available information. The tremendous avidity with which the Maui fishing community turned out to support improved facilities at Kahului can be used as "key respondent" evidence on anticipated fishery conditions. Even the unconstrained project benefits ($687,964) may not be excessive, while the fully-constrained ($36,398) benefit levels are almost certainly conservative. In a situation where the statistical data base is small and weak, it is prudent to weigh heavily the commentary of those who are experienced in the fishery. The optimized activity benefits lie appropriately in the middle.

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Reference

Ralston, Stephen and Kurt E. Kawamoto.
1987. An assessment and description of the status of bottom fish stocks in Hawaii. Southwest Fisheries Center Administrative Report H-87-7, 55p.

Acknowledgment

A.C. Todoki and J.J. Czyz performed most of the computer summaries of the HDAR data contained in this report.

Kahurep2

Spreadsheet #1: WITHOUT Project Condition

Combined estimate of operating characteristics
1987

Income Statement	Full-time operation Survey Data	
Revenue		$28,819
Fixed Costs		$7,041
Capital Cost & Recovery	$3,062	
Annual Repair	$2,755	
Vessel Insurance	$507	
Other	$717	
Operating Costs		$13,597
Fuel & Oil	$2,806	
Ice	$766	
Bait	$1,326	
Handling	$252	
Supplies	$714	
Gear	$1,054	
Other	$308	
Crew Share	$6,370	
Total Cost		$20,638
Net Revenue		$8,181

Operating Parameters

Investment	$31,233	
Trips	51	
Catch per trip	262	13,467
Crew share	29.50%	
Crew	1	
Product Price per pound	$2.14	$28,819

Decimals suppressed in some displays.

File Name MAUIc12 2/11/1988

Spreadsheet #2: WITH Project Condition, Full resource constraint

Combined estimate of operating characteristics
1987

Income Statement	Full-time operation	
Revenue		$33,726
Fixed Costs		$7,041
Capital Cost & Recovery	$3,062	
Annual Repair	$2,755	
Vessel Insurance	$507	
Other	$717	
Operating Costs		$17,760
Fuel & Oil	$4,302	
Ice	$1,174	
Bait	$2,033	
Handling	$386	
Supplies	$1,095	
Gear	$1,615	
Other	$473	
Crew Share	$6,681	
Total Cost		$24,801
Net Revenue		$8,925

Operating Parameters

Investment	$31,233	
Trips	79	
Catch per trip	200	15,760
Crew share	29.50%	
Crew	1	
Product Price per pound	$2.14	$33,726

Spreadsheet #3: WITH Project Condition, Half resource constraint

Combined estimate of operating characteristics
1987

Income Statement	Full-time operation Survey Data	
Revenue		$43,170
Fixed Costs		$7,041
Capital Cost & Recovery	$3,062	
Annual Repair	$2,755	
Vessel Insurance	$507	
Other	$717	
Operating Costs		$20,546
Fuel & Oil	$4,302	
Ice	$1,174	
Bait	$2,033	
Handling	$386	
Supplies	$1,095	
Gear	$1,615	
Other	$473	
Crew Share	$9,467	
Total Cost		$27,587
Net Revenue		$15,583

Operating Parameters

Investment	$31,233	
Trips	79	
Catch per trip	256	20,173
Crew share	29.50%	
Crew	1	
Product Price per pound	$2.14	$43,170

Spreadsheet #4: WITH Project Condition, No resource constraint

Combined estimate of operating characteristics
1987

Income Statement	Full-time operation Survey Data	
Revenue		$52,613
Fixed Costs		$7,041
Capital Cost & Recovery	$3,062	
Annual Repair	$2,755	
Vessel Insurance	$507	
Other	$717	
Operating Costs		$23,332
Fuel & Oil	$4,302	
Ice	$1,174	
Bait	$2,033	
Handling	$386	
Supplies	$1,095	
Gear	$1,615	
Other	$473	
Crew Share	$12,252	
Total Cost		$30,373
Net Revenue		$22,240
Operating Parameters		
Investment	$31,233	
Trips	79	
Catch per trip	312	24,586
Crew share	29.50%	
Crew	1	
Product Price per pound	$2.14	$52,613

Spreadsheet #5: WITH Project Condition, Optimized scenario

Combined estimate of operating characteristics
1987

Income Statement	Full-time operation Survey Data	
Revenue		$42,495
Fixed Costs		$7,041
Capital Cost & Recovery	$3,062	
Annual Repair	$2,755	
Vessel Insurance	$507	
Other	$717	
Operating Costs		$20,347
Fuel & Oil	$4,302	
Ice	$1,174	
Bait	$2,033	
Handling	$386	
Supplies	$1,095	
Gear	$1,615	
Other	$473	
Crew Share	$9,268	
Total Cost		$27,388
Net Revenue		$15,107

Operating Parameters

Investment	$31,233	
Trips	79	
Catch per trip	252	19,858
Crew share	29.50%	
Crew	1	
Product Price per pound	$2.14	$42,495

Appendix A

Kahului Special Survey

US Army Corps
of Engineers
Honolulu District

KAHULUI MAUI COMMERCIAL FISHING

SPECIAL SURVEY

AUGUST 1987

This survey is designed to get up-to-date and accurate information on commercial fishing practices from those of you who use or might use Kahului harbor.

Your answers to this survey are important to us. Your answers will be kept confidential and we will let you know the overall results.

If you do not have a fishing boat, please answer the first question of the survey and return the survey to us anyway.

Thank you!

.....

Planning Branch
Pacific Ocean Division
Corps of Engineers
Fort Shafter, HI 96858

WHEN YOU HAVE COMPLETED THE SURVEY,
PLEASE RETURN IT IN THE ENCLOSED ENVELOPE
AS SOON AS POSSIBLE.

[No later than September 4th!]

CONFIDENTIAL .....CONFIDENTIAL

KAHULUI SPECIAL SURVEY

Please fill in the blanks as appropriate.

If you need to explain any answers, please write along the side or enclose a separate sheet.

About your Boat

Q1 Do you have a fishing boat on Maui? [check 1]

_____ Yes _____ No

If No, thank you for your interest. Please return the survey to us anyway. Thanks!

Q2 Is your boat moored or trailered? [Check 1]

Moored _____ Trailered _____

Fishing Trips

During 1986, how many of the following types of fishing trips did you take on Maui?

		1986
Q3	Commercial fishing trips (primarily to sell catch)	_____ trips
Q4	Fishing for food (family or friends)	_____ trips
Q5	Recreational fishing (primarily for sport)	_____ trips
Q6	Other (Please describe) _____	_____ trips

Q7 How many fishing trips have you taken so far in 1987?

_____ trips so far in 1987

More about Your Fishing Trips

How many of your fishing trips in 1986 were from ...

		1986
Q8	... Kahului	_____ trips
Q9	... Hana	_____ trips
Q10	... other north shore Maui sites	_____ trips
Q11	... Maalaea or Lahaina	_____ trips
Q12	... other Maui areas	_____ trips

Catch

What was your **average** catch per trip in 1986?

Q13	... off Kahului	_____ pounds / trip
Q14	... off other areas	_____ pounds / trip

Trip Time

How many hours do you spend **actually** fishing on an **average** trip?

[as compared to driving to the harbor, launch time, and at-sea transit time]

Q15 _____ **fishing** hours/ trip

KAHULUI SPECIAL SURVEY

Annual Costs

Now we need to know some details about your fishing costs, and then about your revenue. Your answers will be confidential.

Q16 Annual repairs & haulout $ _____ / year
(Choose an average if your expenses go over several years.)

Q17 Boat insurance $ _____ / year

Q18 Replacement parts/gear $ _____ / year

Other (please describe)

Q19 _____ $ _____ / year

Q20 _____ $ _____ / year

Q21 How much is your boat worth today?
(including gear & equipment) $_____

Damage

Q22 Have you ever damaged your boat launching or mooring in Kahului harbor? [Check 1]

Yes ____ No ____

If Yes,

please list the two most **recent** times:

Q23 Date _____ Damage $ _____
(approximately)

Q24 Date _____ Damage $ _____
(approximately)

If there was a previous time when your boat sustained **more** damage at Kahului harbor, please list it.

Q25 Date _____ Damage $ _____

KAHULUI SPECIAL SURVEY

Trip Costs

The following questions are about your costs and revenues per trip. If you take different types of trips, please think of an "average" trip when answering.

How much does it cost per trip to operate your boat?

Q26&27	Fuel	$_____	for _____ gallons
Q28&29	Oil	$_____	for _____ quarts
Q30&31	Ice	$_____	for _____ pounds
Q32&33	Bait	$_____	for _____ pounds
Q34	Handling (Cost to sell your catch, such as auction fees or transportation)	$_____	
Q35	Gear (Gear which might be used up on a single trip, such as lures, leader, and gloves.)	$_____	
Q36	Supplies	$_____	
	Other (Please describe)		
Q37	_____	$_____	
Q38	_____	$_____	

Q39 If you pay a crew share, how much do you pay per trip?

$ _____ / trip or _____ % of revenue

Q40 Do you give yourself part of the crew share, or just keep what is left-over? [Check 1]

Pay myself part of the crew share _____

Only keep what is left _____

Trip Revenues

Q41 How much of your catch do you sell? _____ %

Q42 How much does your average catch sell for?

$ _____ / trip

Fishing experience and fishing problems

Q*1 What is the main problem with fishing off Kahului? [Please describe]

_____

Q*2 If it were easier to use Kahului harbor as a commercial fishing base, what would the main benefit be to you? [Please describe]

_____
(catch rates, species, less travel time, etc.)

Future Plans

Finally, this part of the survey is designed to get your opinions on future commercial fishing use of Kahului harbor.

The Corps of Engineers is considering an improved two-lane launching ramp in Kahului harbor (probably near the existing ramp) with 24 temporary mooring spaces and a deeper channel.

If the project is built,

how many fishing trips per year would you take from ...

Q43 ... Kahului harbor _____ trips/year

Q44 ... Other harbors or launch sites _____ trips/year

More about the Future

If the project were built,

Q45 what do you think your average **catch rate** would be from trips launched/moored at **Kahului**?

_____ pounds / trip for **Kahului** trips

How many pounds of each species group did you catch in 1986 from the **Kahului area** and how many do you think you would catch if the new facility were built?

(Pounds Caught)
(All Year)
(Kahului area only)

		In 1986	With A New Kahului Facility
Q46&47	Tunas	_____	_____
Q48&49	Billfish	_____	_____
Q50&51	Mahimahi & Ono	_____	_____
Q52&53	Bottomfish	_____	_____
Q54&55	Reef Fish	_____	_____
Q56&57	Akule & Opelu	_____	_____
Q58&59	Other	_____	_____

Q60 If the project were only an improved two-lane launch ramp and did **not** have temporary moorings,

would you take **less** trips from Kahlului harbor?

Yes _____ No ____

Q61 How many trips would you take from **Kahului** harbor in this case?

_____ trips / year from Kahului

Q*3 Can you see any major difficulties with the Corps of Engineers' proposal for improvements in Kahului harbor?

Please tell us.

As you know, we've tried to get as much public input into this project plan as possible, but we're not perfect. So, to complete the survey,

Q*4 how satisfied are you now with your chance for giving us your opinion on this project? [Check 1]

Very satisfied ____

Satisfied ____

Not satisfied ____

Not sure ____

**5 What could we do better next time?

Please tell us.

Thank you. Everyone who participates in this survey will get a copy of the overall results.

-0-

PLEASE RETURN THIS SURVEY TO US
IN THE ENCLOSED ENVELOPE
AS SOON AS POSSIBLE.