APPENDIX G — ATTACHMENT 2

Commercial and Recreational Fisheries Assessment

Commercial and Recreational Fisheries Assessment

Status of Impacts to Fisheries

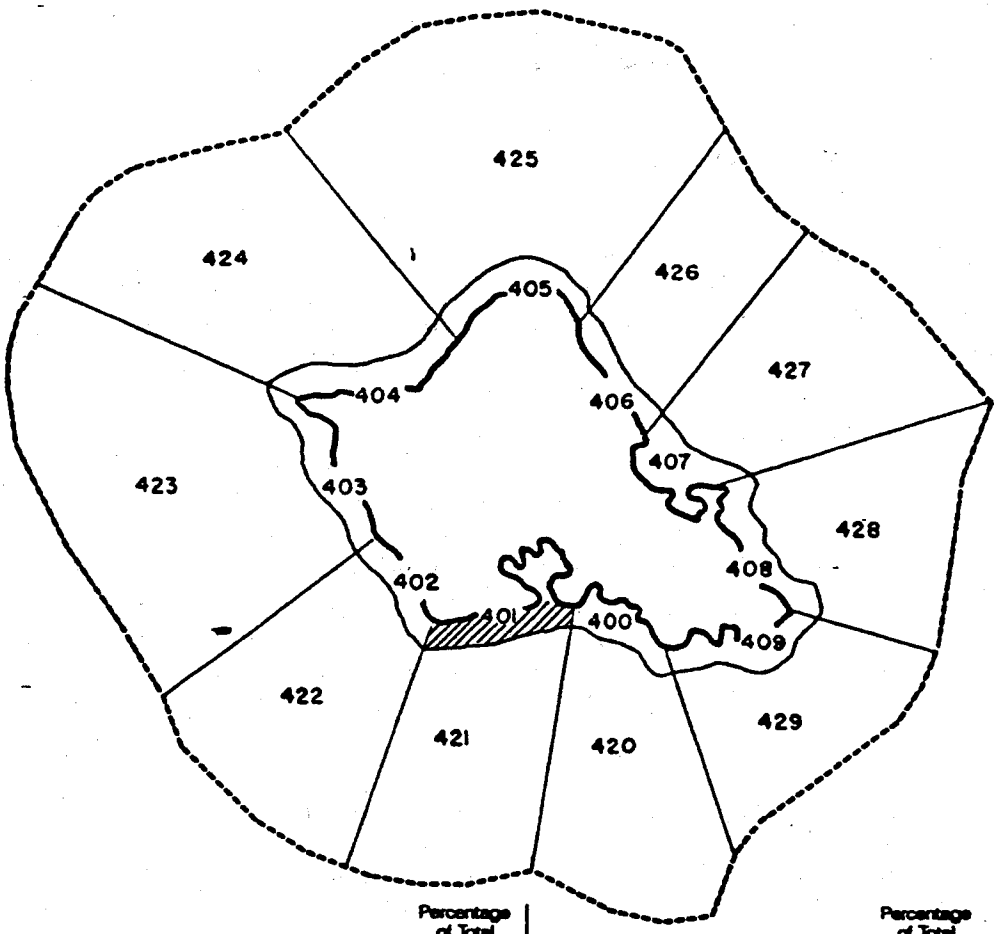
There are two basic fisheries, the nearshore coral reef fisheries, and the pelagic or offshore fisheries. The offshore fishery is dependent upon use of long lines, ranges far offshore (up to 1,500 miles) and is focused on the valuable pelagic species such as tuna. The nearshore fishery (excluding the Northwest Hawaiian Islands lobster fishery) was worth just 4 percent of the pelagic catch (Dollar, 1993). Catch records are maintained by the state for all licensed commercial fishermen who must report their catches monthly.

Marine recreational fishermen are not licensed, and catch records are not available. The commercial catch recorded near the Honouliuli outfall is recorded as being within one of a series of statistical areas referred to as fishing blocks by the State of Hawaii. The locations and designations of these blocks are shown on Figure G-2-1. Fishing blocks 400 to 409 encompass the nearshore regions around Oahu (Figure G-2-1), while the offshore areas are designated for blocks 420 to 429. The Honouliuli outfall discharge is in the block designated 401. Block 401 extends from just beyond the reef, about 2 nautical miles from shore, while the outer boundary of the offshore areas extends a distance of about 20 nautical miles.

The shoreline area is the region where impacts would be expected to occur. Fishing block 401 extends from the Honolulu Airport to Barbers Point and was estimated to be used by an estimated 9.6 percent of the inshore fisherman. The offshore block, 421, was used by an estimated 8.4 percent of fisherman (Hawaii Department of Land and Natural Resources, 1979).

Catch records for block 401 and the two blocks on either side (400 and 402) have been compiled for comparative purposes and are shown in Tables G-2-1, G-2-2, and G-2-3. The data for block 401 is shown in Table G-2-2.

Evaluations and comparisons of the data are done as part of the Annual Assessment prepared by the city. To date, no significant findings regarding the potential effects of the Honouliuli discharge have been noted. One interesting analysis was done by Dr. Richard Brock for the 1993 evidentiary hearing on the Honouliuli NPDES permit (Brock, 1993). This analysis included data for the period prior to the construction of the Honouliuli outfall (1970-1971), data for the period when the outfall became operational (1981-1982), and data representing more recent conditions (1990-1991). Dr. Brock's analysis of commercial fisheries for the periods 1971-1972, 1981-1982 and 1991-1992 included statistics for block 401 and compared these with statewide catch records. His analysis included a comparison of the dollar value of the catch and the number of licensed fisherman statewide for the three time frames. His analysis was done to put the historical trends in perspective and to address the question of whether the fishery changed after the outfall was constructed and made operational. His analysis is summarized in Table G-2-4. He noted from this analysis that:



Area Code	Inshore Areas	Percentage of Total Inshore Fishermen
403	Maili Point to Kaena Point	14.6
400	Diamond Head to Honolulu Airport	13.3
407	Kaawa Point to Mokapu Pen.	12.3
409	Makapuu Point to Diamond Head	10.6
408	Mokapu Pen. to Makapuu Point	9.7
401	Honolulu Airport to Barbers Point	9.6
404	Kaena Point to Puamalu	8.6
405	Puamalu to Laie	8.0
406	Laie to Kaawa	7.9
402	Barbers Point to Maili Point	5.4
		100.0

Area Code	Offshore Areas	Percentage of Total Offshore Fisherman
420	Diamond Head to Honolulu Airport	22.0
423	Maili Point to Kaena Point	18.8
427	Kaawa to Mokapu Pen.	18.2
429	Makapuu Point to Diamond Head	8.7
421	Honolulu Airport to Barbers Point	8.4
426	Laie to Kaawa	7.0
428	Makapu Pen. to Makapuu Point	6.3
424	Kaena Point to Puamalu	4.9
425	Puamalu to Laie	3.4
422	Barbers Point to Maili Point	2.3
		100.0

SECTOR APPLICABLE TO HONOULIULI DISCHARGE AREA

Source: Hawaii Department of Land and Natural Resources, Division of Fish and Game, "Hawaii Coastal Zone Fisheries Management Study," December 1979.

APPENDIX E FIG

Harding Lawson Associates
Engineering and Environmental Services

Order of Saltwater Fishing Area "Preferences" City and County of Honolulu
Honouliuli Wastewater Treatment Plant
Ewa Beach, Oahu, Hawaii

G.2-1

DRAWN	JOB NUMBER	APPROVED	DATE
jcl	31038.201	DR	9/95

1) The catches made in this square are trivial relative to those statewide accounting for about 0.3 to 0.8 percent of the totals for the state.

2) The annual catch of $0.7g/m^2$ was very low in terms of productivity, similar in 1971 and 1991, and that this area was not significant state fishing waters.

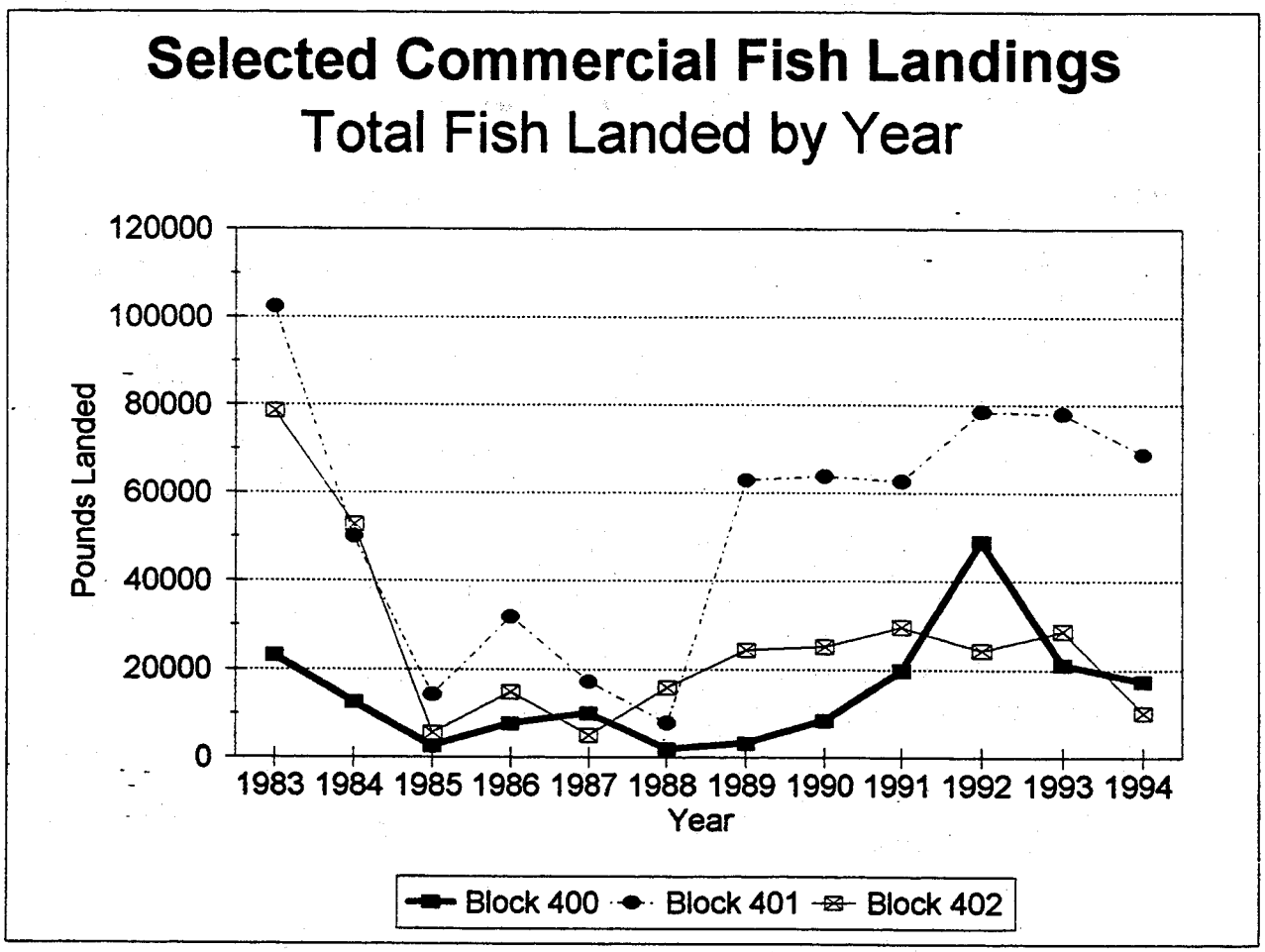
3) Changes noted in the fishery are not significant, and the variation is probably related to the effort expended and reported rather than from changes in abundance in species.

4) There are no significant shellfish resources harvested in the area because they are not present.

Brock (1993) concluded that: "The commercial fisheries data suggest that the coral reef fisheries in the vicinity of the Honouliuli discharge have not been significantly different from the time preceding outfall construction, and have not significantly changed since that outfall became operational."

The inshore fishes grouping shown in Table G-2-4 includes reef fishes as well as coastal pelagic species such as akule, *Selar crumenopthalmus* and the opelu, *Decapterus macarellus*, which represent some of the most desirable species and are those for which bioaccumulation analyses are done.

Analysis of the information presented in Tables G-2-1 through G-2-3 is summarized and shown graphically on Figure G-2-2. As shown, block 401 commercial catch records show that a very stable and sustained fishery exists at between 60,000 and 80,000 pounds per year since 1989. From such data there is no evidence of any adverse impact from the Honouliuli outfall. Most of the catch is accounted for by akule as shown on Figure G-2-3. Again the fishery has been thriving since 1988. Catch records for ta'ape are presented in Figure G-2-4. These records show no decline in the fishery over the study period. The other species are of interest because they are caught for bioaccumulation analyses. This species accounts for between approximately 200 to 4,600 pounds per year and does not represent a significant portion of the commercial catch.

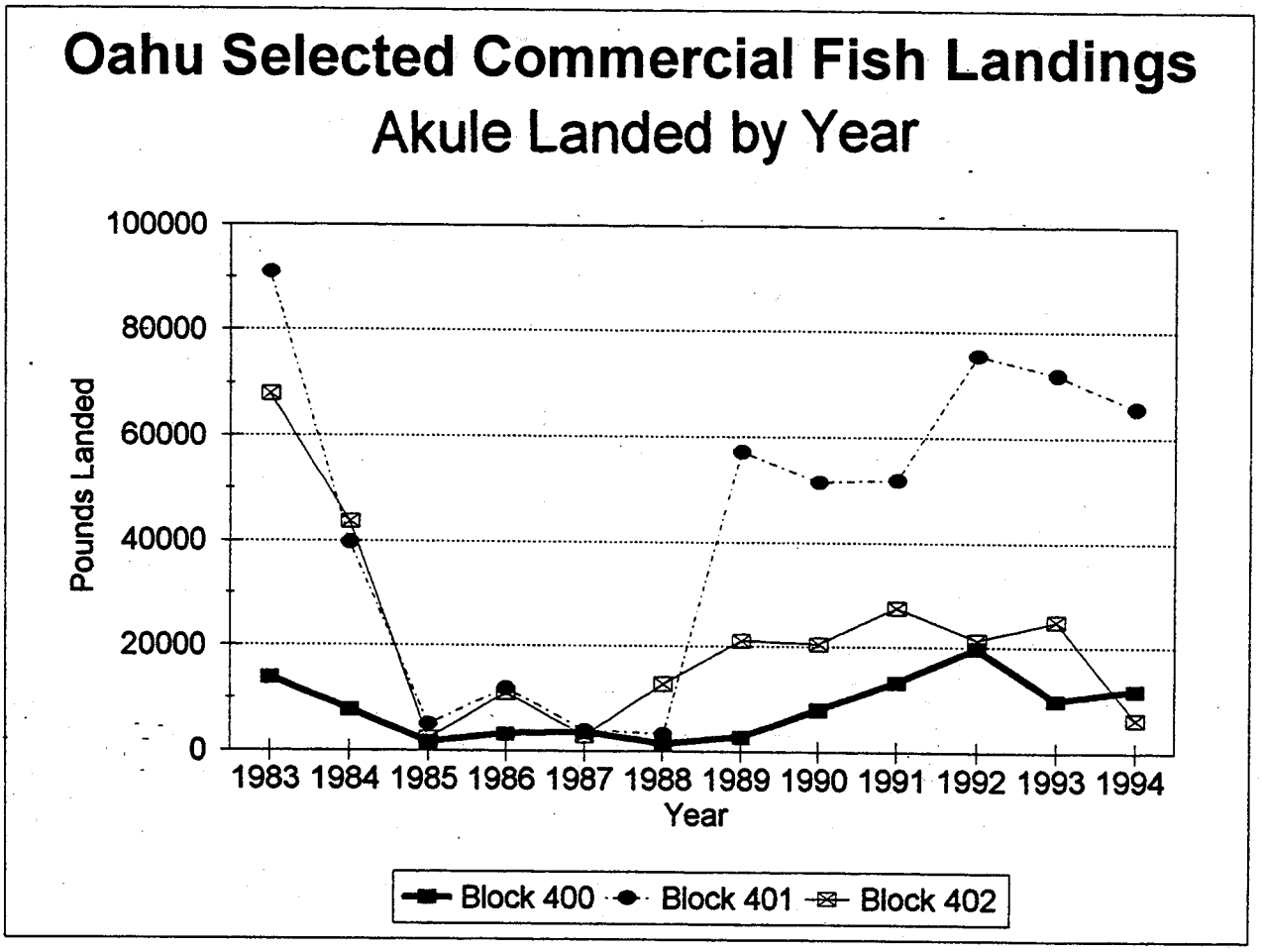


Harding Lawson Associates
Engineering and Environmental Services

Selected Commercial Fish Landings
Honouliuli Wastewater Treatment Plant
Ewa Beach, Oahu, Hawaii

APPENDIX G FIGURE
G.2-2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
jcl	31038.201	DR	9/95	

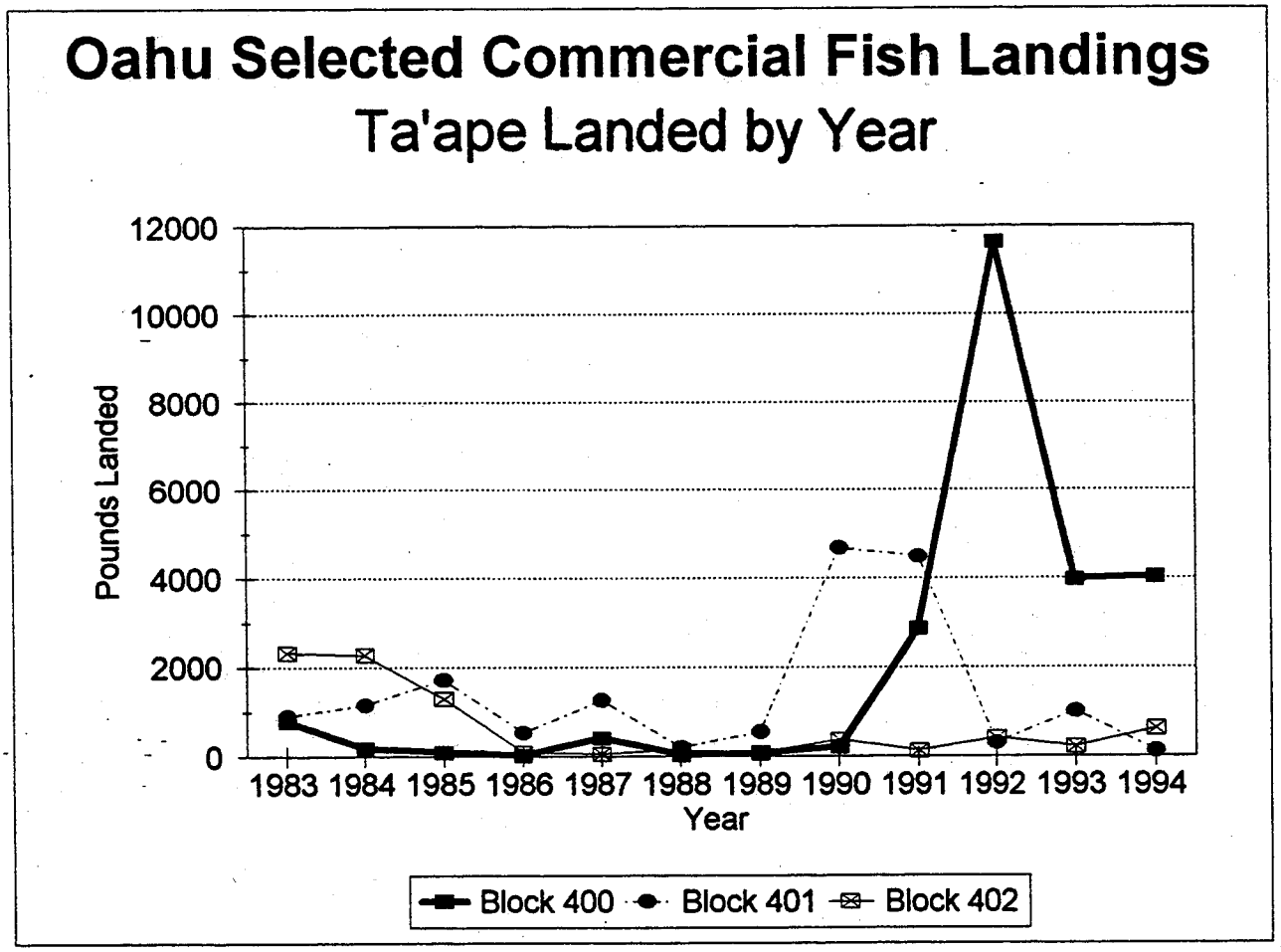


Harding Lawson Associates
Engineering and Environmental Services

Oahu Selected Commercial Fish Landings
Honouliuli Wastewater Treatment Plant
Ewa Beach, Oahu, Hawaii

APPENDIX G FIGURE
G.2-3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
jcl	31038.201	DR	9/95	



APPENDIX G FIG

Harding Lawson Associates
Engineering and Environmental Services

Oahu Selected Commercial Fish Landings
Honouliuli Wastewater Treatment Plant
Ewa Beach, Oahu, Hawaii

G.2-4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
jcl	31038.201	DR	9/95	

Table G-2-1. Commercial Fish Catch Statistics From Area 400

(Pounds Landed Per Year by Species)

Year	Ulua	Onaga	Weke Ula	Aawa	Akule	Aweoweo	Kala	Oio	Opelu	Palani	Weke	Taape	Total
	Fish Name												
1983	1,041	43	6	19	13,839	11	107	1,910	1,631	1,559	2,152	787	23,105
1984	246	560	16	22	7,679	14	198	309	350	1456	1,451	172	12,473
1985	32	0	0	0	1,489	1	4	0	2	20	916	84	2,548
1986	87	0	1,074	0	3,058	44	14	126	1,697	1,138	3350	14	7,602
1987	974	0	2,102	5	3,463	4	0	433	2,274	278	3	405	9,941
1988	13	0	0	0	1,310	16	111	5	157	100	49	22	1,783
1989	55	0	22	18	2,652	0	0	0	3	164	242	55	3,211
1990	172	32	18	5	7,847	38	9	16	1	8	16	204	8,366
1991	24	9	82	21	13,117	36	210	0	6	1,947	1,400	2,857	19,709
1992	1,462	45	28	295	19,731	149	2,158	0	169	3,342	9,729	11,638	48,745
1993	114	0	21	162	9,758	59	537	12	523	2,346	3,626	3,960	21,118
1994	5	0	19	19	11,643	81	111	17	115	393	843	4,023	17,269

Table G-2-2. Commercial Fish Catch Statistics From Area 401

(Pounds Landed Per Year by Species)

Year	Ulua	Onaga	Weke Ula	Aawa	Akule	Aweoweo	Kala	Oio	Opelu	Palani	Weke	Taape	Total
	Fish Name												
1983	4,227	0	505	28	91,067	9	3,295	3	1,899	233	193	915	102,374
1984	1,422	16	193	0	39,763	1	785	1,397	768	159	4,337	1,151	49,992
1985	867	10	45	7	5,019	0	160	202	75	2,973	3,290	1,714	14,362
1986	1,022	0	2,322	28	11,832	105	498	1,290	6,564	4,979	2,616	530	31,786
1987	1,155	0	1,384	15	4,012	101	231	197	676	4,446	3,728	1,260	17,205
1988	1,651	5	46	10	3,219	98	102	103	283	470	1,698	197	7,882
1989	695	52	30	23	57,161	6	100	177	792	1,847	1,396	556	62,835
1990	1,078	26	260	27	51,419	23	708	108	648	2,533	2,297	4,685	63,812
1991	1,896	12	106	28	51,873	51	694	608	909	1,221	732	4,489	62,619
1992	535	27	27	0	75,607	88	26	264	1,331	262	130	298	78,595
1993	557	37	113	0	71,928	81	1,374	154	1,674	559	522	1,004	78,003
1994	92	11	721	20	65,677	34	78	363	947	643	129	117	68,798

Table G-2-3. Commercial Fish Catch Statistics From Area 402

(Pounds Landed Per Year by Species)

Year	Fish Name												Total
	Ulua	Onaga	Weke Ula	Aawa	Akule	Aweoweo	Kala	Oio	Opelu	Palani	Weke	Taape	
1983	816	5	553	5	67,897	12	443	2,999	2,024	154	1,419	2,337	78,664
1984	470	0	282	2	43,761	105	92	2,858	1,126	365	1,416	2,277	52,754
1985	703	0	398	20	2,304	46	103	32	168	108	480	1,304	5,666
1986	171	0	7	5	10,970	29	91	1,556	1,389	45	524	88	14,875
1987	262	0	95	1	2,796	13	0	25	1,757	6	0	48	5,003
1988	555	0	0	22	12,846	8	60	18	2,191	12	0	141	15,853
1989	80	12	13	7	21,146	0	31	16	3,049	29	0	82	24,465
1990	178	22	84	0	20,535	12	0	15	3,954	0	6	373	25,179
1991	10	11	8	2	27,432	0	0	8	1,947	0	17	127	29,552
1992	144	0	36	0	21,349	115	70	18	2,151	5	60	412	24,361
1993	47	2	11	0	24,935	53	0	0	3,490	0	0	215	28,753
1994	25	0	20	0	6,301	366	4	6	2,901	5	7	628	10,263

Table G-2-4. Reported Commercial Catches and Values from Statistical Square 401 Fronting Ewa Beach, Oahu, for Six Calendar Years

Group	YEAR					
	1971	1972	1981	1982	1991	1992
Inshore fishes, kg	41,860	57,473	11,945	16,603	28,168	36,764
Invertebrates, kg	1,913	1,345	1,114	926	972	1,264
Seaweeds, kg	0	0	1,107	525	1,252	2,672
Total catch, Area 401	43,773	58,818	14,166	18,054	30,393	40,700
% of total state reported catch	0.6	0.8	0.3	0.4	0.3	0.4
Value of catch ($ x 1,000)	62	76	45	58	113	152
No Licensed Fishermen	1,373	1,544	2,577	2,525	4,044	3,800

Source: Brock, 1993.