1 FISHERY PERFORMANCE

1.1 DEEP-7 BMUS

1.1.1 Fishery Descriptions

The State of Hawaii Department of Land and Natural Resources (DLNR), Division of Aquatic Resources (DAR) manages the deep-sea bottomfish fishery in the Main Hawaiian Islands (MHI) under a joint management arrangement with the National Marine Fisheries Service (NMFS), Pacific Islands Regional Office (PIRO), and the Western Pacific Regional Fishery Management Council (WPRFMC; the Council). The Deep-7 bottomfish management unit species (BMUS) group is comprised of seven deep water bottomfish: ʻōpakapaka (*Pristipomoides filamentosus*; pink snapper), onaga (*Etelis coruscans*; longtail snapper), ehu (*Etelis carbunculus*; ruby snapper), hapuʻupuʻu (*Epinephelus quernus*; Hawaiian grouper), kalekale (*Pristipomoides sieboldii*; Von Siebold's snapper), gindai (*Pristipomoides zonatus*; oblique-banded snapper), and lehi (*Aphareus rutilans*; silverjaw snapper).

The Deep-7 fishery is driven in large part by the traditional consumption of a whole red fish during the holiday season. Though Asian in origin, this practice is commonplace in local households of all ethnicities and seen by many as an essential element of gatherings during the season. Local families will commonly consume red fish on both New Year and Christmas. As a result, market price and demand both increase markedly during the holiday season.

Management of the Deep-7 fishery is performed jointly by DAR, NMFS, and the Council. DAR collects the fishery information, NMFS analyzes this information, and the Council, working with DAR, proposes the management scheme. Lastly, NMFS implements the scheme into federal regulations before DAR adopts state regulations. These three agencies coordinate management to simplify regulations for the fishing public, prevent overfishing, and manage the fishery for long-term sustainability. This shared management responsibility is necessary as the bottomfish complex of species occurs in both State and Federal waters. The information in this report is largely based on DAR-collected data.

1.1.2 Dashboard Statistics

The collection of commercial MHI Deep-7 bottomfish fishing reports comes from two sources: paper reports received by mail, fax, or PDF copy via e-mail, and reports filed online through the Online Fishing Report system (OFR). Since the federal management of the Deep-7 bottomfish fishery began in 2007, bottomfish landings have been collected on three types of fishing reports. Initially, bottomfishers were required to use the Monthly Fishing Report and deep-sea handline Fishing Trip Report to report their Deep-7 landings within 10 days of the end of the month. These reports were replaced by the MHI Deep-7 Bottomfish Fishing Trip Report in September 2011, after which bottomfish fishers were required to submit the trip report within five days of the trip end date. DAR implemented the OFR online website in February 2010.

Paper fishing reports received via mail are initially processed by an office assistant that date stamps the report, scans the report image, and enters the report header as index information into an archival database application to store them as database files. The report header index information is downloaded in a batch text file via file transfer protocol (FTP) at 12:00 AM for transmission to the web portal vendor that maintains the Commercial Marine Licensing System

(CMLS). This information updates the fisher's license report log in the CMLS to credit submission of the fishing report. The web portal vendor also exports a batch text file extract of the updated license profile and report log data file via FTP daily at 2:00 AM for transmission to DAR. An office assistant checks reports for missing information, sorts by fishery form type (e.g. Deep-7 or Monthly Fishing Report) and distributes it to the appropriate database assistant by the next business day. Database assistants and the data monitoring associate enter the deep-sea handline Fishing Trip Report into the Fishing Report System (FRS) database and enter the other report types through the OFR within two business days.

The data records from fishing reports submitted online by fishers are automatically extracted and exported as daily batch text files from the OFR and uploaded by DAR and imported into the FRS database on the following business day.

The FRS processes the data, and a general error report is run daily by the data supervisor. A database assistant will contact the fisher when clarification of the data is needed. Duplicate data checks are run weekly before being researched by a database assistant. Discrepancies between dealer and catch data are checked monthly by a fisheries database assistant, who will call the fisher or dealer to clarify any discrepancies. The data supervisor then transfers both the fisheries and the dealer data to the Western Pacific Fisheries Information Network (WPacFIN) daily where data trends are created and reported weekly to Deep-7 BMUS fishery managers and stake holders.

1.1.2.1 Historical Summary

In 2020, all Deep-7 BMUS annual fishing parameters including number of licenses, number of trips, number caught, and pounds caught were below corresponding 10- and 20-year averages.

Note* in DAR fishing report data, "caught" refers to all fish kept, whether for the purpose of commercial sale or personal consumption. It does not include releases or losses to depredation.

Table 1. Annual fishing parameters for the 2020 fishing year in the MHI Deep-7 bottomfish fishery compared with short-term (10-year) and long-term (20-year) averages

Fishery	Parameter	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
Deep-7 BMUS	No. Licenses	334	↓ 15.4%	↓ 15.0%
	Trips	1,841	↓ 30.2%	↓ 32.4%
	No. Caught	45,860	↓ 33.2%	↓ 27.5%
	Lbs. Caught	161,437	↓ 33.8%	↓ 31.0%

1.1.2.2 Species Summary

For the deep-sea handline gear type, number of licenses, number of trips, and pounds caught in 2020 were all below 10- and 20-year averages. Gear type CPUE was below the 10-year average, but above the 20-year average. Lehi was the only BMUS species caught with deep-sea handline gear in which 2020 catch was higher than the 10-year average. Ehu, kalekale, and gindai catch in 2020 was higher than their 20-year averages.

For non- deep-sea handline gears, number of licenses, pounds caught, and CPUE in 2020 were below their 10- and 20-year averages. non-deep-sea handline trips in 2020 were above both 10- and 20-year averages. In terms of species catch, Lehi catch was above both 10- and 20-year averages. All, other species were either below average, or their data could not be included to uphold fisher confidentiality.

Table 2. Annual fishing parameters by gear and species for the 2020 fishing year in the MHI Deep-7 bottomfish fishery compared with short-term (10-year) and long-term (20-year) averages

Method	Species/ Fishery Indicator	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
Deep-Sea Handline	ʻŌpakapaka	63,601 lbs.	↓ 46.2%	↓ 42.8%
	Onaga	41,208 lbs.	↓ 33.7%	↓ 37.0%
	Ehu	24,954 lbs.	↓ 8.5%	↑ 4.9%
	Hapuʻupuʻu	5,592 lbs.	↓ 36.6%	↓ 36.4%
	Kalekale	11,041 lbs.	↓ 13.2%	↑ 2.6%
	Gindai	5,123 lbs.	↑ 60.2%	↑ 81.5%
	Lehi	7,338 lbs.	↓ 13.3%	↓ 13.3%
	No. Lic.	320	↓ 15.3%	↓ 14.0%
	No. Trips	1,696	↓ 32.9%	↓ 35.2%
	Lbs. Caught	158,856 lbs.	↓34.0%	↓ 31.3%
	CPUE	93.7 lbs./trip	↓ 3.1%	↑ 4.73%
Non-Deep-Sea Handline Methods	ʻŌpakapaka	1,015 lbs.	↓ 30.0%	↓ 24.1%
	Onaga	103	-	↓ 21.4%
	Ehu	21	↓ 80.2%	↓ 87.5%
	Hapuʻupuʻu	n.d.	-	-
	Kalekale	25 lbs.	↓ 64.3%	↓ 75.7%
	Gindai	NULL	-	-
	Lehi	1,365 lbs.	↑ 34.0%	↑ 54.8%
	No. Lic.	26	↓ 21.2%	↓ 31.6%
	No. Trips	146	↑ 28.1%	↑ 33.9%
	Lbs. Caught	2,581 lbs.	↓ 8.7%	↓ 7.8%
	CPUE	17.7 lbs./trip	↓ 29.0%	↓ 29.3%

NULL = no available data; n.d. = non-disclosure due to data confidentiality.

1.1.3 Time Series Statistics

1.1.3.1 Commercial Fishing Parameters

The time series format for the Deep-7 bottomfish fishery begins with an arrangement by the state fiscal year period (July – June) until June 1993. Prior to July 1993, the state issued and renewed the Commercial Marine License (CML) on a fiscal year basis and all licenses expired on June 30, regardless of when it was issued. During that period, each fisher received a different CML number, reducing duplicate licensee counts through June 1993. The State issued and renewed

permanent CML numbers effective July 1993. The federal Deep-7 bottomfish fishing year, defined as September through August of the following year, was established in 2007. In order to evaluate Deep-7 bottomfish fishing trends, the time series format was re-arranged to extend from September to August beginning in September 1993. This arrangement provides a 22-year time series trend for the Deep-7 bottomfish fishery. There is a two-month segment spanning from July 1993 through August 1993 that is defined as a separate period.

Early in the time series, the Deep-7 fishery was dominated by a relatively low number of highliners that consistently produced large landings. Prior to the ubiquity of small relatively affordable watercraft and modern electronics, the fishery required both a high degree of seamanship and a large, well-equipped vessel at that time rarely owned by part-time or non-commercial fishers. In 1965, only 84 licensed fishers participated in this fishery. As the availability of modernized fishing boats increased in the 1970's and 1980's, so too did the number of fishers. In 1986, fishery participation peaked at 610 registered CML holders. With the expansion of the small vessel fleet, effort and landings increased accordingly and in 1987 peaked at 596,255 pounds. In June 1993, concerns regarding the sustainability of the fishery prompted the State to establish bottomfish regulations including: bottomfish restricted fishing areas (BRFAs), vessel registration identification, and non-commercial bag limits. Since the implementation of federal Deep-7 bottomfish management, landings have been limited by an annual catch limit (ACL). In July 2019, four BRFAs including BRFA C (Makahū‘ena, Kaua‘i), BRFA F (Penguin Banks), BRFA J (Mokumana-Umalei Pt, Maui), and BRFA L (Leleiwi Pt, Hawai‘i Island) were re-opened to bottomfish fishing.

Following the peak and subsequent decline in catch in the late 1980's, the Deep-7 fishery had another brief increase in catch peaking in 2014. There are multiple likely causes of this recent increase in catch including the closure of the Northwest Hawaiian Islands (NWHI) in 2009, which resulted both in certain fishers moving effort into the MHI, and increased market demand to fill the void. Economic downturn and high unemployment rate associated with the recession during that period may have also led some to enter the fishery or increase effort to offset economic losses. In 2020, BMUS catch was well-below 10- and 20-year averages. COVID-19 did not affect the period of peak Holiday demand as lockdown restrictions did not occur until March of 2020. The near complete shutdown of the hotel and restaurant industries did however decrease demand drastically following initial lockdown. Additionally, ongoing reports of high shark depredation, challenging environmental conditions, and atypical fish behavior likely also contributed to the lowered catch.

Table 3. Time series of commercial fishing reports for Deep-7 BMUS reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	84	1,149	428	14,611	211,326
1966	92	1,059	414	11,040	181,868
1967	110	1,469	550	16,005	231,315
1968	121	1,194	524	12,945	195,039
1969	132	1,216	532	11,415	177,495
1970	139	1,150	528	8,482	158,195
1971	167	1,254	606	10,203	135,156

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1972	218	1,929	831	19,833	228,375
1973	210	1,574	732	16,747	169,273
1974	264	2,163	938	23,976	225,767
1975	247	2,096	904	24,165	222,114
1976	308	2,321	1,011	26,364	258,852
1977	338	2,722	1,173	26,880	274,308
1978	434	2,657	1,539	41,381	307,628
1979	447	2,256	1,517	32,312	273,841
1980	461	2,861	1,435	35,098	244,075
1981	486	3,770	1,637	45,086	308,306
1982	450	3,909	1,630	46,873	329,436
1983	538	4,880	1,892	61,889	409,453
1984	555	4,483	1,806	55,952	345,326
1985	556	5,812	2,065	93,799	507,639
1986	610	5,823	2,285	101,469	524,726
1987	586	5,591	2,194	133,023	596,255
1988	553	6,058	2,135	138,109	575,345
1989	569	6,327	2,252	122,033	575,616
1990	531	5,258	1,948	90,745	459,215
1991	499	4,216	1,770	67,666	331,144
1992	488	4,511	1,845	84,427	362,517
1993.1	450	3,538	1,492	62,434	260,350
1993.2	120	373	167	7,280	28,519
1994	522	3,893	1,705	85,112	317,989
1995	526	3,919	1,711	77,776	319,940
1996	518	3,980	1,745	81,391	287,138
1997	500	4,181	1,760	81,594	297,678
1998	522	4,118	1,735	83,482	288,315
1999	433	3,012	1,431	56,755	214,180
2000	498	3,935	1,700	83,429	308,128
2001	458	3,570	1,550	70,812	262,874
2002	393	2,920	1,355	56,438	217,231
2003	364	2,959	1,255	63,311	248,463
2004	333	2,669	1,145	57,588	209,475
2005	352	2,705	1,200	61,406	241,173
2006	352	2,287	1,053	46,154	193,191
2007	357	2,553	1,148	50,008	204,862
2008	351	2,354	1,027	49,397	196,347
2009	478	3,283	1,479	67,065	259,356
2010	461	2,804	1,229	56,942	209,277

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2011	474	3,490	1,432	74,886	274,571
2012	480	3,108	1,529	68,024	227,971
2013	459	2,990	1,501	68,441	239,010
2014	423	3,182	1,496	90,296	311,209
2015	411	2,890	1,415	90,790	307,014
2016	372	2,348	1,194	74,536	260,732
2017	340	2,351	1,162	66,483	237,879
2018	341	2,169	1,102	59,332	236,119
2019	318	2,021	1,043	47,837	180,859
2020	334	1,841	1,000	45,860	161,437
10-year avg.	**395**	**2,639**	**1,287**	**68,649**	**243,680**
20-year avg.	**393**	**2,725**	**1,266**	**63,280**	**233,953**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.1.4 Preferred Targets by Gear Type

1.1.4.1 Deep-Sea Handline

Typically, almost all (~99%) of Deep-7 BMUS are caught using deep-sea handline gear. ʻŌpakapaka is the most caught species, and typically makes up approximately 50% of all catch. Onaga, though a more valuable fish at market, is more difficult to catch than ʻōpakapaka and usually makes up approximately 25% of the catch. Ehu, like onaga prized during the holiday season for their bright red color, is the third most caught species at approximately 10% of catch. Kalekale, gindai, hapuʻupuʻu, and lehi each typically make up less than 6% of the total Deep-7 catch.

Deep-7 species composition in 2020 varied slightly from the average with a relatively low (40%) contribution from ʻōpakapaka. This is likely in part due to the challenges reported by fishers in 2020, which included difficulty in locating normal ʻōpakapaka aggregations and poor bite. Conversely, the lesser caught ehu, kalekale, gindai, and lehi all increased in the proportion of catch in 2020. Most notably, gindai catch which is typically less than 1% of the total catch, rose to 3.2% in 2020.

Table 4a. DAR MHI annual Deep-7 catch summary by species and top gear, deep-sea handline, reported by Fiscal Year from 1965-1993 and by Fishing Year from 1994-2020

Year	ʻŌpakapaka		Onaga		Ehu		Hapuʻupuʻu	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1965	66	102,901	31	59,521	48	20,093	48	10,965
1966	76	70,651	34	63,965	47	17,607	49	11,863
1967	96	120,888	43	68,442	62	18,350	60	10,624
1968	97	84,164	62	69,504	68	19,871	58	11,304
1969	115	85,663	48	53,839	68	16,088	60	10,881
1970	114	69,538	44	43,540	62	15,870	64	19,842

Year	ʻŌpakapaka		Onaga		Ehu		Hapuʻupuʻu	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1971	130	59,002	53	39,213	78	15,255	81	14,471
1972	184	117,426	71	58,673	105	21,282	112	16,659
1973	175	93,197	68	35,584	94	14,524	117	14,828
1974	220	134,838	86	43,607	113	21,113	117	14,444
1975	199	114,571	94	45,016	115	21,705	108	23,078
1976	224	101,718	118	78,684	152	28,069	140	21,236
1977	255	98,398	100	82,049	144	32,530	130	26,769
1978	345	149,538	135	66,124	191	34,385	197	27,366
1979	306	140,303	133	51,601	190	20,859	184	28,053
1980	344	147,341	161	29,889	183	15,828	182	16,984
1981	386	193,944	153	42,659	207	20,754	188	16,056
1982	369	173,764	176	65,235	232	24,088	189	20,854
1983	421	226,614	240	71,687	277	27,482	209	31,849
1984	396	153,925	240	84,615	282	35,430	208	29,010
1985	442	202,822	297	172,774	310	43,928	253	33,098
1986	481	180,087	346	195,675	371	60,969	245	27,238
1987	459	263,468	291	175,365	323	45,963	180	32,699
1988	448	301,053	275	159,975	299	43,234	197	11,094
1989	440	309,112	305	147,724	322	42,916	187	15,442
1990	419	210,224	307	143,003	312	37,720	176	14,203
1991	384	136,764	276	104,294	300	31,943	168	16,528
1992	374	173,118	253	91,813	310	31,907	167	15,136
1993.1	346	138,613	194	52,634	256	23,926	167	13,180
1993.2	85	14,511	51	5,707	60	3,059	34	1,971
1994	393	176,151	243	71,564	290	22,903	191	10,766
1995	426	178,302	236	66,199	288	26,109	228	14,932
1996	415	147,093	244	67,985	276	28,892	220	10,110
1997	377	157,591	216	59,587	263	26,598	213	13,740
1998	386	145,776	250	68,926	299	25,154	215	11,933
1999	326	101,875	199	60,611	233	19,548	179	9,737
2000	386	166,747	251	70,984	282	26,804	209	13,084
2001	339	126,788	253	63,089	272	25,603	202	15,531
2002	291	105,788	200	60,699	223	17,029	167	8,844
2003	254	127,628	188	70,487	212	15,740	142	9,483
2004	233	88,099	186	76,519	193	20,571	130	8,255
2005	249	102,303	202	87,832	208	21,890	131	10,121
2006	245	76,968	203	75,063	206	17,980	123	7,442
2007	271	82,489	201	80,747	224	17,713	117	5,967

Year	ʻŌpakapaka		Onaga		Ehu		Hapuʻupuʻu	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
2008	268	94,099	197	55,825	207	17,850	130	6,209
2009	362	133,475	245	59,827	296	24,674	168	7,808
2010	325	101,986	251	57,011	297	24,061	165	7,960
2011	369	147,813	258	67,652	306	24,191	176	7,973
2012	345	109,344	261	56,084	323	27,261	157	10,384
2013	327	98,600	246	68,314	308	31,332	156	10,342
2014	324	162,369	234	75,213	276	30,408	161	10,667
2015	309	151,223	228	78,006	271	33,080	138	9,934
2016	285	133,770	203	62,411	234	30,844	122	9,718
2017	266	133,898	173	46,100	223	24,226	127	7,714
2018	258	114,413	183	66,252	220	21,483	129	9,593
2019	210	67,226	158	60,266	218	24,918	107	6,328
2020	235	63,601	158	41,208	219	24,954	104	5,592
10-yr avg.	**293**	**118,226**	**210**	**62,151**	**260**	**27,270**	**138**	**8,825**
20-yr avg.	**288**	**111,094**	**211**	**65,430**	**247**	**23,790**	**143**	**8,793**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 4b. DAR MHI annual Deep-7 catch summary by species and top gear, deep-sea handline, reported by Fiscal Year from 1965-1993 and by Fishing Year from 1994-2020

Year	Kalekale		Gindai		Lehi	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1965	25	14,538	19	923	21	1,256
1966	32	13,536	20	829	20	1,953
1967	34	9,584	22	769	32	2,357
1968	31	6,870	28	754	34	2,215
1969	32	4,131	23	462	41	5,924
1970	33	5,079	34	1,437	29	2,547
1971	38	4,316	36	870	34	1,789
1972	65	8,059	50	1,237	58	4,408
1973	66	5,093	47	1,260	57	4,490
1974	64	4,860	49	1,467	67	4,852
1975	79	5,885	59	1,365	78	8,043
1976	100	7,562	59	1,076	84	9,846
1977	96	7,590	66	1,143	81	6,644
1978	150	8,823	103	2,308	116	8,623
1979	126	6,602	89	2,505	114	10,076

Year	Kalekale		Gindai		Lehi	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1980	142	6,294	87	2,089	123	16,836
1981	152	7,377	108	1,654	143	19,282
1982	158	7,735	102	1,473	139	29,500
1983	192	14,080	138	2,321	193	27,766
1984	191	12,427	160	2,798	158	15,892
1985	237	22,171	181	4,598	201	25,484
1986	283	25,059	195	3,756	185	26,548
1987	263	28,154	144	3,328	214	37,503
1988	228	18,130	121	2,075	186	37,970
1989	219	11,053	132	1,830	230	45,170
1990	248	15,482	178	2,785	207	34,944
1991	245	18,874	189	3,644	166	18,970
1992	252	28,002	190	5,120	158	17,254
1993.1	245	16,954	153	3,765	154	11,177
1993.2	48	1,908	28	652	19	658
1994	236	20,252	176	4,062	129	11,987
1995	239	17,284	187	3,721	171	13,087
1996	266	19,561	156	3,159	134	9,523
1997	224	22,634	141	2,837	142	11,866
1998	239	23,084	176	3,260	150	8,701
1999	174	11,113	130	2,182	109	7,687
2000	217	15,973	170	3,215	149	10,654
2001	187	15,371	155	3,740	142	12,251
2002	155	11,036	134	2,308	114	10,896
2003	151	12,523	108	2,131	97	8,296
2004	127	7,584	96	2,085	73	3,779
2005	133	7,846	98	2,028	85	6,800
2006	139	5,262	97	1,516	74	5,643
2007	146	5,646	106	2,010	80	6,851
2008	126	5,320	119	2,424	106	9,748
2009	209	9,382	169	3,557	153	15,159
2010	211	7,926	157	2,677	104	5,270
2011	213	9,804	178	2,947	115	11,058
2012	221	12,185	177	3,853	104	7,109
2013	226	12,026	184	3,423	113	11,503
2014	228	18,861	159	3,715	105	7,239
2015	222	17,623	135	2,882	130	11,338
2016	177	12,832	125	1,843	97	7,591

Year	Kalekale		Gindai		Lehi	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
2017	169	10,782	121	2,130	111	8,332
2018	174	11,882	118	2,611	102	7,329
2019	169	10,184	129	3,452	79	5,799
2020	194	11,041	155	5,123	81	7,338
10-yr avg.	**199**	**12,722**	**148**	**3,198**	**104**	**8,464**
20-yr avg.	**179**	**10,756**	**136**	**2,823**	**103**	**8,466**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.1.4.2 Non-Deep-Sea Handline Gear Types

The following section denotes Deep-7 species that are harvested using gear types other than the deep-sea handline, including both inshore handline and palu ahi. These gear types do occasionally harvest Deep-7 BMUS though they are typically not their primary targets. The inshore handline gear is intended to be a lighter tackle than the deep-sea handline. Though it is possible to catch Deep-7 with inshore handline gear, it is likely that some of the landings were made with the heavier tackle gear but were reported incorrectly as inshore handline. Palu ahi is a tuna handline gear primarily used during the day with a drop stone or weight and chum. The target species are ahi, which include yellowfin and bigeye tuna. Deep-7 BMUS are common bycatch for Hawai‘i Island fishers that regularly use the palu ahi method. Some of the landings may have been taken by bottomfishers who used deep-sea handline tackle but reported it as palu ahi because of the gear definition, which also involves weights and chum on a handline. In the event that DAR personnel suspect that incorrect gear types may have been recorded, fishers are contacted for verification. The fishing reports are not amended if the fisher does not respond.

The two Deep-7 species most caught with non-deep-sea handline gears are ‘ōpakapaka and Lehi, both of which are known to be found in relatively shallower waters. ‘Ōpakapaka are also the most targeted of the Deep-7 species. It is likely that some of the ‘ōpakapaka caught with non-deep-sea handline gears are actually being targeted either with non-deep-sea handline gears or incorrectly reported deep-sea handline gear. non-deep-sea handline gears in the past 20 years make up approximately 1% of all Deep-7 catch. Though we see some increase in the catch of Deep-7 using these gears, it does not appear that another dominant method is gaining in popularity.

Table 5a. DAR MHI annual Deep-7 catch summary by species for non-deep sea handline methods reported by Fiscal Year from 1965-1993 and by Fishing Year from 1994-2020

Year	‘Ōpakapaka		Onaga		Ehu		Hapu‘upu‘u	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1965	18	662	n.d.	n.d.	11	222	3	37
1966	7	756	n.d.	n.d.	7	537	NULL	NULL
1967	3	263	NULL	NULL	NULL	NULL	n.d.	n.d.

Year	ʻŌpakapaka		Onaga		Ehu		Hapuʻupuʻu	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1968	n.d.	n.d.	NULL	NULL	n.d.	n.d.	n.d.	n.d.
1969	4	281	n.d.	n.d.	4	80	n.d.	n.d.
1970	3	152	NULL	NULL	NULL	NULL	n.d.	n.d.
1971	7	108	6	57	5	26	n.d.	n.d.
1972	5	428	n.d.	n.d.	3	26	5	72
1973	7	159	n.d.	n.d.	3	37	4	17
1974	8	375	NULL	NULL	n.d.	n.d.	6	181
1975	23	1,613	3	38	6	214	10	123
1976	41	3,771	18	1,550	40	3,210	38	1,163
1977	77	7,927	21	2,704	41	3,218	36	3,345
1978	68	5,104	14	381	42	1,319	29	1,241
1979	106	5,708	21	1,426	63	1,632	61	1,503
1980	54	3,715	32	1,455	36	1,170	28	726
1981	47	3,423	14	210	28	397	27	907
1982	29	3,964	13	710	26	348	18	826
1983	61	3,233	22	1,105	36	506	30	845
1984	65	5,382	44	1,984	36	730	36	721
1985	10	850	7	1,097	8	102	12	121
1986	38	1,770	15	851	25	930	20	325
1987	34	3,947	8	304	11	3,238	15	673
1988	14	818	6	241	6	158	11	193
1989	28	1,044	16	675	11	167	9	170
1990	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	6	454
1991	NULL	NULL	NULL	NULL	NULL	NULL	11	127
1992	n.d.	n.d.	NULL	NULL	NULL	NULL	6	118
1993.1	n.d.	n.d.	NULL	NULL	NULL	NULL	6	88
1993.2	n.d.	n.d.	NULL	NULL	NULL	NULL	n.d.	n.d.
1994	n.d.	n.d.	NULL	NULL	NULL	NULL	8	126
1995	3	45	NULL	NULL	NULL	NULL	8	144
1996	7	262	NULL	NULL	n.d.	n.d.	10	129
1997	12	360	3	20	5	576	7	785
1998	12	799	n.d.	n.d.	3	37	7	68
1999	10	164	NULL	NULL	n.d.	n.d.	n.d.	n.d.
2000	10	148	NULL	NULL	n.d.	n.d.	3	19
2001	10	110	3	37	5	104	4	53
2002	7	200	n.d.	n.d.	3	71	3	62
2003	27	1,025	4	136	8	220	7	100
2004	30	1,283	6	100	11	129	8	188

Year	ʻŌpakapaka		Onaga		Ehu		Hapuʻupuʻu	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
2005	22	938	3	200	8	255	5	132
2006	21	1,787	4	344	6	121	4	93
2007	23	1,459	5	169	6	447	3	468
2008	20	2,118	3	62	4	412	4	370
2009	29	2,581	8	260	13	270	7	209
2010	35	757	5	201	20	271	10	203
2011	28	1,634	4	125	14	318	8	260
2012	23	540	NULL	NULL	3	59	n.d.	n.d.
2013	26	1,417	n.d.	n.d.	3	141	3	63
2014	25	1,262	3	35	5	30	n.d.	n.d.
2015	22	1,647	3	62	5	183	n.d.	n.d.
2016	16	954	n.d.	n.d.	5	19	n.d.	n.d.
2017	23	3,288	NULL	NULL	4	126	7	182
2018	14	1,471	n.d.	n.d.	7	111	n.d.	n.d.
2019	24	1,259	NULL	NULL	n.d.	n.d.	4	139
2020	17	1,015	4	103	3	21	n.d.	n.d.
10-yr avg.	**22**	**1,449**	**n.d.**	**n.d.**	**5**	**106**	**3**	**87**
20-yr avg.	**22**	**1,337**	**3**	**131**	**7**	**168**	**4**	**137**

NULL = no available data; n.d. = non-disclosure due to data confidentiality.
1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 5b. DAR MHI annual Deep-7 catch summary by species and non-deep-sea handline methods, reported by Fiscal Year from 1965-1993 and by Fishing Year from 1994-2020

Year	Kalekale		Gindai		Lehi	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1965	8	115	n.d.	n.d.	n.d.	n.d.
1966	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
1967	n.d.	n.d.	NULL	NULL	3	19
1968	n.d.	n.d.	NULL	NULL	NULL	NULL
1969	3	26	4	8	NULL	NULL
1970	n.d.	n.d.	NULL	NULL	4	129
1971	4	21	n.d.	n.d.	n.d.	n.d.
1972	5	13	4	8	3	22
1973	7	13	n.d.	n.d.	3	32
1974	n.d.	n.d.	NULL	NULL	n.d.	n.d.
1975	7	76	4	38	10	349

Year	Kalekale		Gindai		Lehi	
	No. License	Lbs. Caught	No. License	Lbs. Caught	No. License	Lbs. Caught
1976	14	345	21	133	13	489
1977	21	1,008	16	382	18	601
1978	36	1,003	34	245	43	1,168
1979	71	1,152	33	378	58	2,043
1980	25	753	27	305	33	690
1981	22	801	22	200	27	642
1982	21	315	21	142	25	482
1983	35	922	34	332	29	711
1984	25	994	35	767	36	651
1985	12	522	n.d.	n.d.	4	68
1986	27	356	3	4	18	1,158
1987	13	402	3	18	16	1,193
1988	8	129	3	6	15	269
1989	8	181	n.d.	n.d.	9	129
1990	n.d.	n.d.	NULL	NULL	NULL	NULL
1991	NULL	NULL	NULL	NULL	NULL	NULL
1992	n.d.	n.d.	NULL	NULL	NULL	NULL
1993.1	n.d.	n.d.	NULL	NULL	NULL	NULL
1993.2	NULL	NULL	NULL	NULL	NULL	NULL
1994	3	22	NULL	NULL	n.d.	n.d.
1995	n.d.	n.d.	NULL	NULL	6	92
1996	5	32	3	62	13	253
1997	7	650	5	91	22	345
1998	5	205	NULL	NULL	15	351
1999	5	224	n.d.	n.d.	27	843
2000	7	129	n.d.	n.d.	16	357
2001	6	86	3	79	4	34
2002	5	113	n.d.	n.d.	6	159
2003	6	110	4	40	18	545
2004	7	51	3	66	20	765
2005	10	114	6	71	23	644
2006	9	86	n.d.	n.d.	23	874
2007	6	121	5	120	18	657
2008	10	212	3	404	20	1,295
2009	12	316	6	90	32	1,748
2010	15	160	12	64	24	731
2011	11	185	10	153	15	459
2012	7	67	n.d.	n.d.	19	1,050

Year	Kalekale		Gindai		Lehi	
	No. License	**Lbs. Caught**	**No. License**	**Lbs. Caught**	**No. License**	**Lbs. Caught**
2013	n.d.	n.d.	n.d.	n.d.	22	1,532
2014	5	53	n.d.	n.d.	27	1,328
2015	7	35	3	18	20	948
2016	n.d.	n.d.	n.d.	n.d.	12	597
2017	9	221	n.d.	n.d.	20	842
2018	5	22	n.d.	n.d.	16	919
2019	6	54	n.d.	n.d.	25	1,154
2020	3	25	NULL	NULL	15	1,365
10-year avg.	**6**	**70**	**3**	**29**	**19**	**1,019**
20- year avg.	**7**	**103**	**4**	**65**	**19**	**882**

NULL = no available data; n.d. = non-disclosure due to data confidentiality.
1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.1.5 Catch Parameters by Gear Type

Deep-sea handline CPUE has decreased markedly since the expansion of the small boat fleet in the 1970's and 1980's. During that period, number of fishers and trips using deep-sea handline gear increased rapidly as new technology and availability of reliable fishing vessels increased. Despite the boom in participation and effort, new entrants into the fishery were not as savvy as the established full-time highliners and caught far fewer fish per trip. Following the expansion of the small boat fleet, deep-sea handline CPUE has remained relatively stable with a slight increase between 1998 and 2020.

Non-deep-sea handline catch parameters have stayed relatively consistent throughout the time series compared to those of deep-sea handline gear. Licenses, trips, and pounds caught showed the most notable increases coinciding with the expansion of the small boat fleet in the 1970's and 1980's. Presumably, this was due to the rapid increase in fishers using other methods like tuna handline that often catch Deep-7 incidentally. CPUE for non-deep-sea handline gears has fluctuated over the time series while staying consistently below that of deep-sea handline.

Table 6. DAR MHI annual Deep-7 CPUE by dominant fishing methods reported by Fiscal Year from 1965-1993 and by Fishing Year from 1994-2020

Year	Deep-Sea Handline				Non-Deep-Sea Handline Gears			
	No. Lic.	**No. trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. trips**	**Lbs. Caught**	**CPUE**
1965	73	1,067	210,197	197.0	27	89	1,129	12.7
1966	86	1,016	180,404	177.6	15	46	1,464	31.8
1967	107	1,449	231,014	159.4	7	21	301	14.3
1968	118	1,165	194,682	167.1	5	29	357	12.3
1969	128	1,175	176,988	150.6	12	46	507	11.0

Year	Deep-Sea Handline				Non-Deep-Sea Handline Gears			
	No. Lic.	No. trips	Lbs. Caught	CPUE	No. Lic.	No. trips	Lbs. Caught	CPUE
1970	135	1,118	157,853	141.2	9	35	342	9.8
1971	163	1,219	134,916	110.7	18	36	240	6.7
1972	214	1,896	227,744	120.1	18	39	631	16.2
1973	201	1,537	168,976	109.9	22	38	297	7.8
1974	258	2,126	225,181	105.9	14	37	586	15.8
1975	238	2,040	219,663	107.7	39	62	2,451	39.5
1976	272	2,062	248,191	120.4	92	269	10,661	39.6
1977	290	2,263	255,123	112.7	105	461	19,185	41.6
1978	392	2,365	297,167	125.7	145	351	10,461	29.8
1979	379	1,901	259,999	136.8	187	380	13,842	36.4
1980	412	2,594	235,261	90.7	123	304	8,814	29.0
1981	456	3,459	301,726	87.2	105	342	6,580	19.2
1982	428	3,680	322,649	87.7	97	276	6,787	24.6
1983	500	4,574	401,799	87.8	142	363	7,654	21.1
1984	505	4,176	334,097	80.0	161	383	11,229	29.3
1985	538	5,682	504,875	88.9	44	138	2,764	20.0
1986	587	5,638	519,332	92.1	99	203	5,394	26.6
1987	567	5,431	586,480	108.0	65	164	9,775	59.6
1988	537	5,980	573,531	95.9	50	85	1,814	21.3
1989	541	6,229	573,247	92.0	68	107	2,369	22.1
1990	526	5,239	458,361	87.5	8	19	854	45.0
1991	492	4,198	331,017	78.9	11	21	127	6.1
1992	483	4,488	362,350	80.7	7	23	167	7.3
1993.1	445	3,525	260,249	73.8	8	13	101	7.8
1993.2	119	371	28,466	76.7	n.d.	n.d.	n.d.	n.d.
1994	515	3,871	317,685	82.1	13	25	304	12.2
1995	517	3,895	319,634	82.1	17	24	306	12.8
1996	504	3,930	286,321	72.9	34	55	816	14.8
1997	481	4,111	294,852	71.7	44	83	2,826	34.1
1998	506	4,049	286,833	70.8	35	79	1,482	18.8
1999	416	2,919	212,752	72.9	36	101	1,428	14.1
2000	492	3,886	307,460	79.1	28	50	668	13.4
2001	446	3,529	262,372	74.4	25	45	503	11.2
2002	384	2,885	216,599	75.1	22	38	632	16.6
2003	344	2,855	246,288	86.3	45	107	2,174	20.3
2004	303	2,550	206,893	81.1	48	122	2,582	21.2
2005	319	2,595	238,820	92.0	51	111	2,353	21.2
2006	323	2,176	189,873	87.3	43	111	3,318	29.9

Year	Deep-Sea Handline				Non-Deep-Sea Handline Gears			
	No. Lic.	**No. trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. trips**	**Lbs. Caught**	**CPUE**
2007	335	2,438	201,422	82.6	40	118	3,440	29.2
2008	329	2,250	191,475	85.1	34	104	4,872	46.8
2009	450	3,133	253,883	81.0	61	153	5,474	35.8
2010	422	2,679	206,891	77.2	67	128	2,386	18.6
2011	450	3,387	271,438	80.1	47	104	3,133	30.1
2012	465	3,007	226,219	75.2	32	102	1,752	17.2
2013	439	2,858	235,538	82.4	38	133	3,472	26.1
2014	404	3,069	308,472	100.5	36	114	2,737	24.0
2015	392	2,782	304,085	109.3	33	109	2,929	26.9
2016	360	2,266	259,009	114.3	23	82	1,723	21.0
2017	325	2,226	233,181	104.8	34	126	4,698	37.3
2018	328	2,075	233,562	112.6	25	94	2,557	27.2
2019	299	1,898	178,173	93.9	38	125	2,686	21.5
2020	320	1,696	158,856	93.7	26	146	2,581	17.7
10-year avg.	**378**	**2,526**	**240,853**	**96.7**	**33**	**114**	**2,827**	**24.9**
20- year avg.	**372**	**2,618**	**231,152**	**89.4**	**38**	**109**	**2,800**	**25.0**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.1.6 Bycatch Summary

Bycatch for BMUS is generally low due to no restrictions on size (statewide) or daily bag limit (commercial catch). The increase in percent bycatch beginning in 2007 and peaking in 2013 is due primarily to tagging efforts by the Pacific Islands Fisheries Science Center (PIFSC) and Pacific Islands Fisheries Group (PIFG) during that time. Tagging was performed by local fishers with CMLs, so all catch including Deep-7 caught and released for research purposes was included in their reports. In 2020, percent bycatch for the Deep-7 fishery is below 10- and 20-year averages due primarily to a decrease in the amount of tagging activity reported by CML holders.

Table 7. Time series of commercial fishing bycatch for Deep-7 BMUS reported by Fishing Year from 2002-2020

Year	No. Lic.	No. Trips	No. Reports	No. Caught	No. Released	Percent Bycatch
2002	393	2,920	1,355	56,438	3	0.0
2003	364	2,959	1,255	63,311	217	0.3
2004	333	2,669	1,145	57,588	117	0.2
2005	352	2,705	1,200	61,406	156	0.3
2006	352	2,287	1,053	46,154	55	0.1
2007	357	2,553	1,148	50,008	535	1.1
2008	351	2,354	1,027	49,397	542	1.1
2009	478	3,283	1,479	67,065	507	0.8
2010	461	2,802	1,229	56,942	1,102	1.9
2011	474	3,456	1,432	74,886	2,098	2.7
2012	480	3,108	1,529	68,024	1,420	2.0
2013	459	2,990	1,501	68,441	2,010	2.9
2014	423	3,182	1,496	90,296	1,474	1.6
2015	411	2,890	1,415	90,790	1,378	1.5
2016	372	2,348	1,194	74,536	733	1.0
2017	340	2,351	1,162	66,483	411	0.6
2018	341	2,169	1,102	59,332	440	0.7
2019	318	2,021	1,043	47,837	630	1.3
2020	334	1,841	1,000	45,860	206	0.4
10-year avg.	**395**	**2,636**	**1,287**	**68,649**	**1,080**	**1.5**
20-year avg.	**389**	**2,678**	**1,251**	**62,884**	**739**	**1.1**

1.2 *APRION VIRESCENS* (UKU; FORMERLY NON-DEEP-7 BMUS)

1.2.1 Fishery Descriptions

The uku (*Aprion virescens*) or green jobfish is a valued foodfish in Hawaii and prized by both commercial and non-commercial fishers. Once a member of the non-Deep-7 BMUS complex, uku were previously grouped with the white/giant ulua (*Caranx ignobilis*), gunkan/black ulua (*Caranx lugubris*), butaguchi/pig-lip ulua (*Pseudocaranx dentex*), and yellowtail kalekale (*Pristipomoides auricilla*) before being removed during the recent ecosystem component species (ECS) amendment to the Hawaii FEP in 2019 (84 FR 2767).

As a foodfish, uku are regarded similarly as ʻōpakapaka, onaga, and other Deep-7 for their firm and flavorful white meat. Unlike Deep-7, uku are not typically used to fill the seasonal demand for whole fish during the holiday season due to a preference for red color. Outside of the holiday demand, uku are commonly consumed by the hotel and restaurant industries that take advantage of the low-price alternative to Deep-7 BMUS. Uku can be found across a wide range of depths and are commonly caught with a diverse array of fishing gears. Uku are typically targeted most heavily in May and June of each year, though some fishers catch them year-round in relatively high numbers.

1.2.2 Dashboard Statistics

The collection of commercial uku fishing reports comes from two sources: paper reports received by mail, fax, or PDF copy via e-mail; and reports filed online through the OFR. Uku are reported by commercial fishers on the Monthly Fishing Report, the Net, Trap, Dive Activity Report, or the MHI Deep-7 Bottomfish Fishing Trip Report.

Similar to the Deep-7 fishery, the time series format for the uku fishery begins with an arrangement by the state fiscal year period (July – June) until June 1993 before being reported by fishing year. Refer to data processing procedures documented in the Deep-7 BMUS section for paper fishing reports and fishing reports filed online. Database assistants and data monitoring associate will enter the paper Monthly Fishing Report information within four weeks, and the Net, Trap, Dive Activity Report and the MHI Deep-7 Bottomfish Fishing Trip Report within two business days.

1.2.2.1 Historical Summary

Number of licenses, number of trips, pieces caught, and pounds caught in 2020 were all below their corresponding 10- and 20-year averages.

Table 8. Annual fishing parameters for 2020 in the MHI uku fishery compared with short-term (10-year) and long-term (20-year) averages

Fishery	Parameter	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
Uku	No. License	285	↓ 29.0%	↓ 24.3%
	Trips	1,290	↓ 36.2%	↓ 29.6%
	No. Caught	11,078	↓ 52.5%	↓ 47.7%

	Lbs. Caught	89,836	↓ 52.6%	↓ 45.2%

1.2.2.2 Gear Summary

Excluding number of CMLs using the Troll with Bait gear type, all other parameters were below their 10- and 20-year average values in 2020.

Table 9. Annual fishing parameters for 2020 in the MHI uku fishery compared with short-term (10-year) and long-term (20-year) averages

Method	Species/ Fishery Indicator	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
Deep-Sea Handline	No. Lic.	120	↓ 30.2%	↓ 30.2%
	No. Trips	400	↓ 44.3%	↓ 44.4%
	Lbs. Caught	26,361 lbs.	↓ 57.3%	↓ 53.6%
	CPUE	65.9 lbs./trip	↓ 23.3%	↓ 15.1%
Inshore Handline	No. Lic.	32	↓ 47.5%	↓ 55.6%
	No. Trips	218	↓ 30.6%	↓ 27.3%
	Lbs. Caught	7,927 lbs.	↓ 47.8%	↓ 38.7%
	CPUE	36.4 lbs./trip	↓ 25.1%	↓ 14.7%
Troll with Bait	No. Lic.	29	↓ 19.4%	↑ 7.41%
	No. Trips	108	↓ 32.5%	↓ 12.9%
	Lbs. Caught	4,132 lbs.	↓ 45.5%	↓ 38.8%
	CPUE	38.3 lbs./trip	↓ 18.8%	↓ 30.9%
All Other Gears	No. Lic.	107	↓ 29.6%	↓ 11.6%
	No. Trips	298	↓ 30.2%	↓ 6.6%
	Lbs. Caught	9,492 lbs.	↓42.5%	↓ 16.3%
	CPUE	31.9 lbs./trip	↓ 17.9%	↓ 5.52%

1.2.3 Time Series Statistics

1.2.3.1 Commercial Fishing Parameters

Uku catch spiked drastically in 1989. Though effort and participation also increased during the same time, local fishers have reported that the increase in catch was due to a sudden appearance of abundant adult uku into Hawaiian waters. Following the 1989 peak, catch quickly decreased to a low in 1996. Between 2003 and 2017, uku catch increased steadily likely due to multiple factors. Prior to 2010, a large proportion (occasionally the majority) of all uku landed annually in the state were caught in the NWHI. Following the NWHI closure 2009, some fishers moved effort down into the MHI. MHI fishers also likely took advantage of the high market demand left by the void in catch. After multiple initial closures of the fishery due to exceedance of the ACL, some Deep-7 bottomfishers switched to targeting uku as an alternative further developing the fishery. Increasing market demand, especially to supply the hotel and restaurants has also been suggested as a cause of the recent increase in catch. Between 2003 and 2018 average price per pound (adjusted for inflation) offered by registered showed persistent increase. Lastly, economic downturn and increased joblessness caused by the recession starting in 2007 may have influenced new entrants into the fishery and/or more effort by existing fishers in attempts to

offset economic losses. Between 2018 and 2020 however, uku catch broke from the upward trend. In 2020, number of licenses, trips, number of reports, number caught, and pounds caught were all below 10- and 20-year averages. Difficult fishing conditions, high incidence of depredation by sharks, and in 2020 the near-compete losses of the hotel and restaurant industries due to COVID-19 restrictions are thought to the primary contributing factors to the recent decline in catch.

Table 10. Time series of commercial fishing reports for uku by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	83	627	312	1,732	68,231
1966	84	571	278	1,297	46,816
1967	108	733	366	1,911	64,215
1968	110	571	318	1,224	52,362
1969	116	716	377	1,554	54,139
1970	125	731	394	1,576	49,794
1971	137	608	356	1,712	48,418
1972	161	761	441	1,369	54,139
1973	169	767	472	1,897	46,578
1974	235	1,040	632	3,769	72,955
1975	213	1,041	580	2,709	75,490
1976	213	934	518	2,388	69,009
1977	245	1,093	612	2,643	47,094
1978	376	1,569	1,038	4,460	94,798
1979	381	1,346	1,037	4,832	82,747
1980	362	1,488	902	5,150	63,714
1981	392	2,117	1,107	7,950	95,027
1982	384	1,994	1,107	7,664	92,871
1983	410	2,653	1,321	10,853	121,498
1984	423	2,389	1,202	12,471	141,601
1985	387	1,878	1,017	8,867	96,014
1986	307	1,346	741	4,767	67,695
1987	326	1,353	776	7,275	87,805
1988	423	2,454	1,157	14,100	185,689
1989	477	3,032	1,523	27,108	314,285
1990	454	2,205	1,267	11,720	139,387
1991	403	1,824	1,081	9,596	117,084
1992	384	1,702	1,003	8,640	93,561
1993.1	336	1,327	798	6,080	65,925
1993.2	230	696	420	2,816	34,463
1994	355	1,457	867	5,960	73,286
1995	339	1,304	789	6,131	60,128

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1996	360	1,320	887	6,234	53,346
1997	420	1,705	1,006	8,099	68,003
1998	366	1,455	890	6,992	61,147
1999	379	1,493	908	11,129	90,992
2000	383	1,546	923	10,820	83,341
2001	303	1,197	768	6,749	59,095
2002	276	1,040	671	6,788	59,347
2003	282	1,028	670	5,446	46,440
2004	319	1,291	772	8,751	76,338
2005	302	1,170	741	7,891	65,242
2006	259	1,186	673	6,852	61,152
2007	280	1,265	717	8,390	69,105
2008	318	1,486	812	11,298	92,576
2009	371	1,479	906	10,091	88,196
2010	407	1,924	1,075	13,660	121,046
2011	383	1,700	986	13,048	109,432
2012	407	1,754	1,075	13,600	116,395
2013	395	1,814	1,054	14,052	121,476
2014	379	1,679	1,004	11,687	97,003
2015	417	1,846	1,085	12,882	101,897
2016	378	1,915	1,051	15,133	118,622
2017	363	1,775	1,018	17,503	132,710
2018	286	1,235	746	10,145	75,250
2019	286	1,295	793	11,106	90,016
2020	252	1,024	622	5,937	47,912
10-year avg.	**355**	**1,604**	**943**	**12,509**	**101,071**
20-year avg.	**333**	**1,455**	**862**	**10,550**	**87,463**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.2.4 Catch Parameters by Gear

The dominant gear type used to target uku is the deep-sea handline. However, since 1965 proportional catch using deep-sea handline gear has decreased as other gears become more commonly reported. This may be indicative of a shift away from uku being caught primarily as incidental catch by the Deep-7 fishery, which uses almost entirely the deep-sea handline gear type, to a species being targeted intentionally. Fishers moving to target uku specifically have in some cases modified their gears and techniques, and as a result some have chosen to report as different methods. While some fishers have chosen to redefine their gear as inshore handline to reflect lighter gear weight, others have chosen to move away from the handline designation entirely and report instead with other gears, most notably casting (included in the below table as Other).

Despite changes in how fishers define their gear, CPUE for all major gear types has been increasing since the late 1970's and early 1980's. This again may be an indication of uku shifting from a largely incidentally caught species, to one that is commonly targeted specifically with specialized gears and techniques. CPUE in recent years, including 2020, has been low for all predominant gears, again likely due to adverse fishing condition, depredation, and COVID-19 restrictions.

Table 11. Time series of uku CPUE (lbs./trip) reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	Deep-Sea Handline				Inshore Handline				Troll with Bait				All Other Gear Types			
	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE
1965	74	560	66,926	119.5	10	17	822	48.4	NULL	NULL	NULL	NULL	7	51	483	9.5
1966	78	514	46,358	90.2	4	4	50	12.5	NULL	NULL	NULL	NULL	6	53	408	7.7
1967	101	683	63,303	92.7	4	5	554	110.8	NULL	NULL	NULL	NULL	9	46	358	7.8
1968	104	510	51,715	101.4	8	13	345	26.5	NULL	NULL	NULL	NULL	8	48	302	6.3
1969	107	615	52,824	85.9	3	3	24	8.0	NULL	NULL	NULL	NULL	11	98	1,291	13.2
1970	115	633	48,645	76.9	3	4	20	5.0	NULL	NULL	NULL	NULL	10	94	1,129	12.0
1971	133	548	48,038	87.7	3	4	25	6.3	NULL	NULL	NULL	NULL	5	56	355	6.3
1972	154	663	53,336	80.5	3	3	12	4.0	NULL	NULL	NULL	NULL	12	95	791	8.3
1973	161	675	45,817	67.9	8	9	47	5.2	NULL	NULL	NULL	NULL	12	83	714	8.6
1974	216	969	72,132	74.4	7	10	158	15.8	NULL	NULL	NULL	NULL	21	61	665	10.9

Year	Deep-Sea Handline				Inshore Handline				Troll with Bait				All Other Gear Types			
	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE
1975	191	947	74,325	78.5	16	23	331	14.4	NULL	NULL	NULL	NULL	24	71	834	11.8
1976	166	732	63,048	86.1	42	97	2,453	25.3	NULL	NULL	NULL	NULL	33	106	3,508	33.1
1977	187	716	36,177	50.5	60	211	7,792	36.9	NULL	NULL	NULL	NULL	49	166	3,125	18.8
1978	303	1,097	75,501	68.8	134	298	14,348	48.2	NULL	NULL	NULL	NULL	49	181	4,949	27.3
1979	248	857	67,218	78.4	211	431	12,673	29.4	NULL	NULL	NULL	NULL	26	70	2,856	40.8
1980	290	1,196	57,753	48.3	71	113	1,836	16.3	NULL	NULL	NULL	NULL	78	181	4,125	22.8
1981	338	1,763	90,177	51.2	67	110	1,198	10.9	NULL	NULL	NULL	NULL	59	247	3,652	14.8
1982	354	1,752	88,334	50.4	43	64	582	9.1	NULL	NULL	NULL	NULL	40	180	3,955	22.0
1983	368	2,451	115,347	47.1	46	67	581	8.7	NULL	NULL	NULL	NULL	56	141	5,570	39.5
1984	381	2,152	134,986	62.7	53	76	1,169	15.4	NULL	NULL	NULL	NULL	69	166	5,446	32.8
1985	361	1,785	94,464	52.9	4	4	207	51.8	NULL	NULL	NULL	NULL	33	89	1,343	15.1
1986	270	1,220	63,788	52.3	22	52	2,323	44.7	NULL	NULL	NULL	NULL	47	75	1,584	21.1
1987	247	988	61,460	62.2	91	245	11,695	47.7	NULL	NULL	NULL	NULL	53	120	14,650	122.1
1988	350	2,091	167,959	80.3	91	186	10,401	55.9	NULL	NULL	NULL	NULL	59	177	7,329	41.4
1989	424	2,667	298,435	111.9	75	162	4,532	28.0	NULL	NULL	NULL	NULL	77	209	11,318	54.2
1990	375	1,799	122,703	68.2	78	218	2,653	12.2	NULL	NULL	NULL	NULL	91	189	14,031	74.2
1991	322	1,427	103,311	72.4	106	236	4,719	20.0	NULL	NULL	NULL	NULL	75	165	9,054	54.9
1992	281	1,119	68,813	61.5	127	441	18,850	42.7	NULL	NULL	NULL	NULL	73	144	5,898	41.0
1993.1	222	808	54,507	67.5	114	354	8,286	23.4	NULL	NULL	NULL	NULL	60	166	3,132	18.9
1993.2	172	508	30,667	60.4	45	90	1,740	19.3	NULL	NULL	NULL	NULL	40	99	2,056	20.8
1994	259	1,026	59,416	57.9	93	275	11,415	41.5	NULL	NULL	NULL	NULL	74	158	2,455	15.5
1995	249	931	52,322	56.2	76	222	4,836	21.8	NULL	NULL	NULL	NULL	78	152	2,970	19.5
1996	223	743	41,024	55.2	140	400	8,612	21.5	NULL	NULL	NULL	NULL	87	179	3,710	20.7
1997	231	912	47,676	52.3	189	634	17,575	27.7	NULL	NULL	NULL	NULL	87	161	2,752	17.1
1998	224	771	44,129	57.2	146	550	14,049	25.5	NULL	NULL	NULL	NULL	69	134	2,970	22.2
1999	236	836	76,039	91.0	153	508	11,700	23.0	NULL	NULL	NULL	NULL	61	150	3,253	21.7

Year	Deep-Sea Handline				Inshore Handline				Troll with Bait				All Other Gear Types			
	No. Lic.	**No. Trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. Trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. Trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. Trips**	**Lbs. Caught**	**CPUE**
2000	246	914	67,280	73.6	143	485	12,948	26.7	NULL	NULL	NULL	NULL	71	148	3,113	21.0
2001	185	700	38,547	55.1	115	356	15,369	43.2	NULL	NULL	NULL	NULL	62	143	5,179	36.2
2002	176	618	44,885	72.6	81	279	9,765	35.0	9	17	404	23.7	69	127	4,294	33.8
2003	141	576	31,930	55.4	78	209	6,454	30.9	17	67	4,674	69.8	86	177	3,382	19.1
2004	155	721	56,942	79.0	94	307	7,871	25.6	23	93	7,395	79.5	86	170	4,130	24.3
2005	164	655	46,370	70.8	71	217	5,378	24.8	18	90	6,768	75.2	89	209	6,726	32.2
2006	147	665	39,997	60.2	51	230	9,554	41.5	12	76	6,171	81.2	80	216	5,430	25.1
2007	153	684	45,566	66.6	66	276	11,488	41.6	12	112	7,500	67.0	78	193	4,552	23.6
2008	177	826	63,152	76.5	84	319	12,983	40.7	17	123	10,962	89.1	95	220	5,480	24.9
2009	205	845	66,618	78.8	90	291	10,677	36.7	16	61	2,789	45.7	118	284	8,112	28.6
2010	221	1,068	83,633	78.3	100	367	17,152	46.7	31	118	5,890	49.9	135	373	14,370	38.5
2011	206	868	76,826	88.5	96	401	18,232	45.5	28	114	4,076	35.8	140	319	10,298	32.3
2012	206	767	75,310	98.2	90	409	19,789	48.4	32	146	5,778	39.6	144	435	15,518	35.7
2013	184	799	76,271	95.5	80	332	18,964	57.1	44	218	7,945	36.4	169	470	18,297	38.9
2014	163	715	56,801	79.4	67	276	12,156	44.0	45	196	8,259	42.1	167	492	19,788	40.2
2015	178	779	65,083	83.6	64	346	12,591	36.4	49	172	6,344	36.9	200	550	17,879	32.5
2016	181	823	73,387	89.2	59	308	11,518	37.4	33	222	12,721	57.3	173	565	20,997	37.2
2017	201	900	85,542	95.1	45	318	16,954	53.3	35	151	13,717	90.8	153	409	16,496	40.3
2018	138	469	34,014	72.5	34	273	17,363	63.6	27	132	7,404	56.1	140	363	16,469	45.4
2019	145	529	48,327	91.4	38	259	16,460	63.6	41	142	5,390	38.0	131	370	19,840	53.6
2020	120	400	26,361	65.9	32	218	7,927	36.4	29	108	4,132	38.3	107	298	9,492	31.9
10-yr avg.	**172**	**705**	**61,792**	**85.9**	**61**	**314**	**15,195**	**48.6**	**36**	**160**	**7,577**	**47.1**	**152**	**427**	**16,507**	**38.8**
20-yr avg.	**172**	**720**	**56,778**	**77.6**	**72**	**300**	**12,932**	**42.6**	**27**	**124**	**6,754**	**55.4**	**121**	**319**	**11,336**	**33.7**

NULL = no available data; n.d. = non-disclosure due to data confidentiality.
1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.2.5 Bycatch Summary

Uku bycatch is relatively low since the only regulation limiting commercial catch is a one-pound minimum size. Uku less than one pound can be retained for personal consumption. Percent bycatch since 2002 has seen steady increase through 2020. One possible explanation for this is the increase in the use of inshore handline gear. In the past ten years, inshore handline gear made about 16% of the total uku catch. In terms of releases though, inshore handline gear produced a disproportionately high average of about 51% of all uku releases over the same period. Potentially due to the lighter gear being used in inshore waters where small or undersized uku are more prevalent, the increase in percent bycatch may be linked to the increase in inshore handline use. Peak uku bycatch in 2020 is likely also the result of COVID-19 restrictions limiting market demand. Individual fishers have noted that during the heaviest periods of lockdown, local dealers were limiting drastically the amount of uku they were willing to purchase per day.

Table 12. Time series of commercial fishing bycatch for uku reported by Fishing Year from 2002-2020

Year	No. Lic.	No. Trips	No. Reports	No. Caught	No. Released	Percent Bycatch
2002	276	1,040	671	6,788	12	0.2
2003	282	1,028	670	5,446	2	0.0
2004	319	1,291	772	8,751	44	0.5
2005	302	1,170	741	7,891	12	0.2
2006	259	1,186	673	6,852	27	0.4
2007	280	1,265	717	8,390	13	0.2
2008	318	1,486	812	11,298	27	0.2
2009	371	1,479	906	10,091	52	0.5
2010	407	1,924	1,075	13,660	81	0.6
2011	383	1,695	986	13,048	148	1.1
2012	407	1,753	1,075	13,600	132	1.0
2013	395	1,811	1,054	14,052	134	0.9
2014	379	1,678	1,004	11,687	169	1.4
2015	417	1,844	1,085	12,882	208	1.6
2016	378	1,909	1,051	15,133	154	1.0
2017	363	1,770	1,018	17,503	100	0.6
2018	286	1,222	746	10,145	119	1.2
2019	286	1,283	793	11,106	171	1.5
2020	252	1,019	622	5,937	144	2.4
10-year avg.	**355**	**1,598**	**943**	**12,509**	**148**	**1.3**
20-year avg.	**335**	**1,466**	**867**	**10,751**	**92**	**0.8**

1.3 CORAL REEF ECOSYSTEM COMPONENTS

1.3.1 Fishery Descriptions

In 2018, the Council drafted an Amendment 5 to the Hawaii Archipelago FEP that reclassified a large number MUS as Ecosystem Component Species (ECS; WPRFMC, 2018). The final rule was posted in the Federal Register in early 2019 (84 FR 2767). This amendment reduces the number of MUS from 173 species/families to 20 in the Hawaii FEP. All former coral reef ecosystem management unit species (CREMUS) were reclassified as ECS that do not require ACL specifications or accountability measures but are still to be monitored regularly to prioritize conservation and management efforts and to improve efficiency of fishery management in the region. All existing management measures, including reporting and record keeping, prohibitions, and experimental fishing regulations apply to the associated ECS.

Representing continued effort to monitor ECS, a one-year reflection of the top ten harvested ECS (by weight) is included. Additionally, DAR selected ten species reclassified as ECS that are still of priority to the State for regular monitoring. These prioritized ECS species are ‘opihi (*Cellana* spp.; limpet), ula (*Panulirus* spp.; spiny lobster), kūmū (*Parupeneus porphyreus*; whitesaddle goatfish), omilu (*Caranx melampygus;* bluefin trevally), uhu (family Scaridae; parrotfish), he’e (*Octopus cyanea*; day tako), kala (*Naso* spp.; horned unicornfish), nenue (*Kyphosus* spp.; chubs), manini (*Acanthurus triostegus*; convict tang), and ta‘ape (*Lutjanus kasmira*; bluestripe snapper). Time series of commercial fishing reports for these species are included in the report. These ten species are important not only commercially but recreationally and culturally as well. There is no current data gathering system for recreational or subsistence catch of these ten species other than the Hawaii Marine Recreational Fishers Survey (HMRFS). HMRFS conducts creel surveys around the state to collect catch data from recreational and subsistence fishers. This data, along with the commercial data, can be used to determine the overall catch for these ten species. DAR can also use fisheries independent data (e.g., in-water surveys) to obtain density and abundance estimates for these ten species.

1.3.2 Dashboard Statistics

The collection of commercial ECS finfish and invertebrate fishing reports comes from two sources: paper reports received by mail, fax, or PDF copy via e-mail, and reports filed online through the OFR. The ECS are reported by commercial fishers in the Monthly Fishing Report, the Net, Trap, Dive Activity Report, or the MHI Deep-7 Bottomfish Fishing Trip Report.

Similar to the Deep-7 bottomfish, the time series format for the ECS fishery begins with an arrangement by the state fiscal year period (July – June) until June 1993 before being reported by fishing year. Refer to data processing procedures documented in the Deep-7 BMUS section for paper fishing reports and fishing reports filed online (see Section 1.1.2). Database assistants and the data monitoring associate will enter the paper Monthly Fishing Report information within four weeks, and the Net, Trap, Dive Activity Report and the MHI Deep-7 Bottomfish Fishing Trip Report within two business days.

In terms of catch parameters (pieces and pounds), the reliability of each can vary depending on the size, quantity, and collection techniques associated each species. Pieces caught is generally seen as less accurate of a measure of catch in that some fishers have a practice of providing only a rough estimate of number or occasionally omit this information altogether. This is especially

common in species that are small in size and/or caught in large quantities. Whereas counting small and/or numerous catch is time consuming, weighing is simple and ensures that dealer records (which rely on weight as a primary measure of purchase) will be similar to what is reported on fishing reports. In most cases, DAR recommends using weight over pieces as a measure of catch.

1.3.2.1 2019 Most Harvested ECS

As usual, akule dominated 2020 ECS fisheries. Akule are consistently the top species harvested in the MHI due to their ability to be caught in large quantities with net gear types, and persistent high demand from local markets. Between years, the top-10 ECS ranking commonly changes in composition as fishing activity including the activity of specific highliners changes. This is exemplified by the recent appearance of kahala in the top-10 ECS in the past five years. Kahala catch, which primarily occurs incidentally using deepsea handline gear, has been relatively consistent over the past ten years in comparison to many inshore net-based fisheries, which have seen decline during the same period. In this case, kahala has moved into the top-10 because of a shift away from other inshore fisheries, not an increase in catch.

Table 13. Top ten landed species (lbs.) in Hawaii ECS fisheries in 2020

Species	No. Licenses	No. Trips	Catch (lbs.)
Selar crumenophthalmus (akule)	210	1,558	267,551
Decapterus macarellus (ʻopelu)	115	1,082	70,774
Myripristis spp. (menpachi)	163	862	60,518
Parrotfish species (uhu)	50	514	38,100
Lutjanus kasmira (taʻape)	178	756	37,787
Acanthurus dussumieri (palani)	47	384	26,442
Mulloidichthys vanicolensis (red weke)	50	191	20,615
Cellana spp. (ʻopihi)	11	205	16,558
Seriola dumerili (kahala)	146	495	14,624
Acanthurus triostegus (manini)	34	304	12,103

1.3.2.2 Prioritized Species Summary

Taʻape was the only species in 2020 to show improved catch (pieces and pounds) in comparison to 10-and 20-year averages. ʻOpihi and manini showed increased pieces reported but decreases in pounds. For these species, we suspect that catch declined given that weight is seen as a more reliable measure of catch for these small species. Number of licenses and number of trips in 2020 was below corresponding 10- and 20-year averages for all ten species.

Table 14. Annual fishing parameters for 2020 for prioritized MHI ECS designated by DAR compared with short-term (10-year) and long-term (20-year) averages

Species	Fishery Indicator	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
ʻopihi	No. Lic.	11	↓ 45.0%	↓ 47.6%
	No. Trips	205	↓ 16.7%	↓ 19.9%
	No. Caught	108,529	↑ 153.0%	↑ 331.0%

	Lbs. Caught	16,558 lbs.	↓ 4.77%	↓ 14.7%
Lobster	No. Lic.	10	↓ 37.5%	↓ 50.0%
	No. Trips	135	↓ 29.0%	↓ 38.1%
	No. Caught	1,993	↓ 42.6%	↓ 49.6%
	Lbs. Caught	3,713 lbs.	↓ 47.6%	↓ 54.3%
Kūmū	No. Lic.	35	↓ 50.7%	↓ 55.1%
	No. Trips	123	↓ 64.8%	↓ 68.7%
	No. Caught	624	↓ 75.1%	↓ 70.3%
	Lbs. Caught	864 lbs.	↓ 77.2%	↓ 76.9%
Omilu	No. Lic.	115	↓ 4.2%	↓ 2.54%
	No. Trips	311	↓ 16.8%	↓ 13.9%
	No. Caught	772	↓ 31.5%	↓ 29.8%
	Lbs. Caught	4,749 lbs.	↓ 26.4%	↓ 26.6%
Uhu	No. Lic.	50	↓ 35.9%	↓ 42.5%
	No. Trips	514	↓ 39.4%	↓ 41.7%
	No. Caught	8,314	↓ 30.7%	↓ 21.3%
	Lbs. Caught	38,100 lbs.	↓ 28.3%	↓ 17.6%
He'e (Day tako)	No. Lic.	41	↓ 40.6%	↓ 43.1%
	No. Trips	206	↓ 70.8%	↓ 72.6%
	No. Caught	1,521	↓ 81.6%	↓ 80.3%
	Lbs. Caught	4,360 lbs.	↓ 81.9%	↓ 80.7%
Kala	No. Lic.	31	↓ 36.7%	↓ 45.6%
	No. Trips	172	↓ 53.8%	↓ 53.4%
	No. Caught	3,109	↓ 40.0%	↓ 36.9%
	Lbs. Caught	11,150 lbs.	↓ 49.2%	↓ 49.8%
Nenue	No. Lic.	32	↓ 48.4%	↓ 52.2%
	No. Trips	199	↓ 41.5%	↓ 41.0%
	No. Caught	3,626	↓ 28.0%	↓ 42.4%
	Lbs. Caught	9,147 lbs.	↓ 44.6%	↓ 52.6%
Manini	No. Lic.	34	↓ 39.3%	↓ 46.0%
	No. Trips	304	↓ 43.3%	↓ 47.8%
	No. Caught	25,273	↑ 5.2%	↑ 5.4%
	Lbs. Caught	12,103 lbs.	↓ 1.16%	↓ 5.10%
Ta'ape	No. Lic.	178	↓ 23.9%	↓ 21.9%
	No. Trips	756	↓ 33.0%	↓ 35.9%
	No. Caught	72,703	↑ 58.0%	↑ 72.6%
	Lbs. Caught	37,787 lbs.	↑ 14.1%	↑ 3.7%

1.3.3 Prioritized Species Statistics

A common catch trend among inshore species in the past 20 years is a peak occurring between 2010 and 2015. This trend can be seen in a diverse array of fisheries including those using handpick, net, hook and line, and spearfishing gear types. We suspect that this in part is due to the economic downturn that occurred concurrently. In times of economic downturn and high unemployment, we commonly see an increase in the number of individuals participating in these fisheries some turn to commercial fishing to supplement their incomes or replace lost jobs. For

many of these species, catch tracks similarly with statewide rates of unemployment. Unlike offshore boat-based fisheries, the targeting of inshore species requires minimal initial investment and therefore the greatest ease of entry. Accordingly, it is likely that the decreasing employment rates post-2011 influenced the decreased catch in many of these fisheries.

We suspect that many ECS fisheries were largely spared from the effects of COVID-19 restrictions since nearly all are purchased by locals for home consumption. Some ECS fisheries like ʻopihi, kūmū, kala, manini, and taʻape saw increases in catch between 2019 and 2020. We again suspect that job loss and economic insecurity may have driven some of this increase though its total impact is unknown.

Of the prioritized ECS, the uhu or parrotfish fishery is of particular interest to DAR. Catch of uhu has shown relatively persistent increase since 1965. The noticeable increase in uhu catch is mainly the result of increases in spearfishing. Whereas other gears including nets and fish traps once made up a significant proportion of methods used to target uhu, the fishery has been increasingly dominated by spearfishing. In 2020, approximately 96% of all uhu are caught via spearing. Spearfishing as a gear type has changed as well, as fishers more commonly employ the use of SCUBA and rebreathers to target deeper areas. Uhu are a prized foodfish in Hawaii, important to non-commercial fisheries, and play a key role in reef ecosystems.

Unlike uhu, it is decreasing he'e catch that warrants attention. He'e catch in recent years has dropped precipitously from a recent high of 39,206 lbs. in 2013, to just 4,360 lbs. in 2020. The he'e fishery is unique in that a large proportion of catch is sold to fishing stores for bait. Because of this, low catch in 2020 is especially surprising give the increase in recreational fishing during COVID-19 restrictions. A large proportion of this decrease in catch can be attributed to losses of known highliners during the period. The fishery in general though has also decreased in effort and participation. CPUE, though affected by the lack of prominent highliners, has not decreased to the extent that catch has.

Table 15. Time series of commercial fishing reports for all ʻopihi (*Cellana spp.*; limpet) species reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	14	239	66	-	16,651
1966	13	171	61	-	13,989
1967	40	779	176	-	36,000
1968	26	450	112	-	23,185
1969	36	413	127	-	23,818
1970	41	392	133	1,810	20,446
1971	46	368	148	1,929	17,229
1972	44	268	117	5	16,739
1973	46	257	121	600	17,169
1974	51	351	147	66,163	19,558
1975	46	333	140	115	14,396
1976	52	327	151	13,560	19,052
1977	60	306	157	750	13,969

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1978	54	231	155	15,622	15,119
1979	51	182	158	-	14,146
1980	49	230	119	28	10,617
1981	36	218	87	30	7,889
1982	36	190	82	1	7,725
1983	37	190	78	-	6,675
1984	40	181	95	61	8,548
1985	36	285	95	151	13,512
1986	64	289	141	1,066	12,426
1987	91	563	222	200	17,949
1988	71	334	145	618	12,277
1989	68	319	143	40	11,685
1990	56	179	110	-	7,848
1991	58	212	114	-	7,680
1992	55	315	130	-	9,271
1993.1	39	194	87	-	5,672
1993.2	26	138	55	-	4,628
1994	42	435	137	-	11,444
1995	56	461	151	-	13,098
1996	41	371	115	-	12,079
1997	51	299	125	1,106	10,979
1998	50	289	128	110	13,936
1999	43	406	112	-	10,774
2000	31	415	103	-	9,950
2001	24	356	96	710	12,938
2002	32	427	105	11,300	13,373
2003	23	341	106	9,980	11,714
2004	15	193	57	2,234	8,087
2005	12	181	42	372	7,380
2006	19	143	51	7,919	10,264
2007	20	182	63	5,508	6,911
2008	27	202	67	3,692	10,530
2009	25	294	81	16,716	22,773
2010	34	340	97	16,570	26,747
2011	25	261	78	41,370	16,053
2012	28	289	96	8,750	18,377
2013	18	362	86	6,893	25,816
2014	27	333	91	10,419	22,417
2015	17	248	82	14,126	14,211
2016	16	156	77	39,166	9,125

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2017	16	198	80	72,820	11,131
2018	17	229	93	76,541	13,336
2019	20	182	91	50,631	11,018
2020	11	205	67	108,529	16,558
10-year avg.	**20**	**246**	**84**	**42,925**	**15,804**
20-year avg.	**21**	**256**	**80**	**25,212**	**14,438**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 16. Time series of commercial fishing reports for all lobster species from reported by Calendar Year from 2002-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2002	16	58	25	968	1,982
2003	38	205	90	3,645	7,404
2004	24	278	75	4,382	8,451
2005	27	321	73	5,844	11,633
2006	18	247	62	3,770	7,669
2007	18	224	64	4,028	8,246
2008	19	261	60	5,242	11,510
2009	28	353	80	6,832	14,512
2010	28	300	77	5,727	12,094
2011	26	257	73	5,190	10,646
2012	25	257	72	4,841	9,808
2013	14	250	57	5,091	10,949
2014	19	228	54	4,887	10,526
2015	14	141	41	2,941	5,922
2016	14	160	43	2,249	4,521
2017	15	185	49	2,817	5,578
2018	8	157	36	2,585	5,015
2019	10	128	32	2,120	4,213
2020	10	135	29	1,993	3,713
10-year avg.	**16**	**190**	**49**	**3,471**	**7,089**
20-year avg.	**20**	**218**	**57**	**3,955**	**8,126**

Table 17. Time series of commercial fishing reports for kūmū (*Parupeneus porphyus*; white saddle goatfish) reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	62	700	234	1,874	12,060
1966	51	546	201	2,900	8,515
1967	62	575	216	3,826	9,599
1968	51	482	179	3,570	8,599

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1969	72	649	240	3,215	8,616
1970	78	635	248	2,883	8,408
1971	96	598	270	1,649	7,205
1972	98	583	274	2,674	6,394
1973	99	617	296	2,731	8,813
1974	109	629	290	3,521	7,894
1975	88	630	255	2,585	7,033
1976	104	639	285	3,037	7,367
1977	117	887	380	2,629	10,373
1978	168	897	519	3,731	15,435
1979	163	620	488	3,133	15,429
1980	149	810	439	2,544	13,978
1981	143	1,192	465	4,891	15,235
1982	119	980	411	3,024	10,164
1983	119	771	361	2,145	8,728
1984	143	814	386	2,074	7,150
1985	134	941	396	2,015	10,866
1986	117	719	331	1,194	6,760
1987	129	782	368	2,290	7,919
1988	121	739	316	2,164	8,288
1989	137	763	373	1,788	7,959
1990	122	616	327	1,564	5,903
1991	149	650	374	1,193	5,335
1992	118	799	343	1,746	6,943
1993.1	117	760	334	935	6,628
1993.2	79	335	159	595	2,811
1994	132	575	336	1,151	4,037
1995	151	784	391	1,174	6,246
1996	139	665	386	839	5,284
1997	131	637	367	1,127	5,118
1998	127	642	347	2,103	5,357
1999	108	560	319	1,436	4,117
2000	110	535	305	1,646	5,133
2001	104	532	276	1,648	4,539
2002	98	558	283	1,266	3,917
2003	91	364	223	1,218	2,585
2004	82	380	231	1,255	2,233
2005	71	295	181	958	2,585
2006	56	228	148	673	1,471
2007	61	315	174	971	1,759

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2008	71	297	192	918	2,335
2009	111	555	305	2,612	5,483
2010	101	841	359	5,503	9,832
2011	96	665	305	6,144	9,564
2012	106	679	333	6,216	8,451
2013	102	571	287	4,499	7,179
2014	91	438	236	2,945	4,418
2015	70	276	177	1,668	2,708
2016	59	291	160	1,114	2,069
2017	61	205	133	951	1,371
2018	45	144	105	538	751
2019	43	99	75	357	553
2020	35	123	93	624	864
10-year avg.	**71**	**349**	**190**	**2,506**	**3,793**
20-year avg.	**78**	**393**	**214**	**2,104**	**3,733**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 18. Time series of commercial fishing reports for omilu (*Caranx melampygus*; bluefin trevally) reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	26	155	75	383	3,633
1966	25	138	61	125	2,114
1967	25	109	60	463	1,851
1968	23	129	55	763	4,397
1969	32	259	81	202	6,876
1970	26	236	71	273	4,545
1971	20	161	60	410	2,912
1972	19	83	50	159	815
1973	19	76	46	35	907
1974	19	122	55	110	1,841
1975	22	118	55	62	1,263
1976	21	61	43	103	1,607
1977	28	87	59	143	1,251
1978	45	130	88	132	2,169
1979	31	57	54	65	1,243
1980	33	87	67	111	1,417
1981	57	179	123	269	2,949
1982	66	173	126	464	2,820
1983	84	247	157	717	5,135
1984	108	316	195	1,879	16,501
1985	117	333	212	850	7,341

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1986	115	368	205	1,317	8,145
1987	150	560	337	1,808	12,190
1988	169	567	357	2,084	14,638
1989	160	591	369	2,235	13,604
1990	151	507	341	2,093	14,772
1991	159	405	289	1,414	9,786
1992	59	135	108	343	4,530
1993.1	58	120	94	224	1,960
1993.2	39	64	54	114	1,319
1994	64	123	93	302	2,717
1995	70	122	104	159	1,836
1996	58	145	111	301	3,141
1997	64	128	109	277	2,422
1998	56	103	88	168	1,572
1999	47	93	71	194	1,251
2000	61	137	108	282	2,418
2001	70	154	117	354	2,504
2002	89	180	140	429	3,085
2003	102	342	231	1,321	7,590
2004	124	360	243	1,213	7,216
2005	113	338	231	1,506	9,271
2006	107	302	228	679	3,650
2007	112	394	260	953	7,402
2008	150	444	319	1,126	7,383
2009	150	456	328	1,472	7,697
2010	143	505	342	1,660	9,082
2011	146	442	302	1,074	6,857
2012	135	508	328	1,273	8,282
2013	123	400	274	965	6,470
2014	130	378	267	1,262	7,627
2015	113	356	253	1,563	6,243
2016	113	363	257	992	5,961
2017	127	396	276	1,472	8,274
2018	100	294	200	1,172	5,262
2019	96	289	203	725	4,784
2020	115	311	218	772	4,749
10-year avg.	**120**	**374**	**258**	**1,127**	**6,451**
20-year avg.	**118**	**361**	**251**	**1,099**	**6,469**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 19. Time series of commercial fishing reports for uhu (*Scaridae;* parrotfish) reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	33	273	105	301	6,653
1966	20	235	94	336	6,460
1967	29	248	112	678	8,428
1968	31	199	104	531	4,572
1969	44	372	153	733	7,710
1970	43	347	163	1,320	9,012
1971	57	348	184	640	7,044
1972	45	255	126	400	3,284
1973	45	253	141	500	4,405
1974	60	263	151	541	5,215
1975	39	243	123	295	3,624
1976	59	272	159	406	9,633
1977	76	393	228	427	6,418
1978	124	598	369	955	19,775
1979	125	437	364	1,004	19,718
1980	119	586	333	1,425	22,509
1981	116	740	344	1,519	21,487
1982	96	633	316	1,099	16,782
1983	107	568	293	3,103	25,782
1984	117	620	315	3,423	27,694
1985	110	763	337	1,428	27,697
1986	124	823	359	1,991	35,171
1987	134	853	388	3,289	41,016
1988	122	865	356	3,104	44,689
1989	114	759	313	2,044	31,511
1990	75	586	250	2,284	25,999
1991	117	734	358	2,676	26,708
1992	103	964	364	5,388	36,697
1993.1	103	908	336	3,034	26,499
1993.2	79	518	206	2,290	19,382
1994	124	967	413	4,767	39,803
1995	139	1,165	479	2,817	42,036
1996	143	1,047	494	2,579	36,189
1997	131	995	451	2,731	35,968
1998	132	995	446	3,635	35,805
1999	120	952	442	4,511	35,060
2000	116	785	375	3,141	28,510
2001	113	800	386	3,819	21,786

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2002	111	885	391	4,324	31,324
2003	92	822	315	8,377	35,483
2004	84	854	340	7,762	33,279
2005	88	737	296	7,967	32,583
2006	80	637	272	7,684	31,698
2007	84	867	353	11,090	40,398
2008	90	954	371	11,445	44,937
2009	118	1,161	459	11,556	50,884
2010	108	1,441	450	17,483	71,028
2011	96	1,190	409	17,687	72,347
2012	117	1,399	462	20,301	84,442
2013	96	1,197	399	17,689	76,813
2014	89	934	348	14,190	69,929
2015	75	642	274	7,461	33,661
2016	66	585	254	6,411	26,204
2017	70	668	276	7,939	32,572
2018	57	747	248	10,488	51,621
2019	62	605	209	9,834	45,606
2020	50	514	186	8,341	38,100
10-year avg.	**78**	**848**	**307**	**12,034**	**53,130**
20-year avg.	**87**	**882**	**335**	**10,592**	**46,235**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 20. Time series of commercial fishing reports for he'e (*Octopus cyanea*; day tako) reported by Calendar Year from 2002-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2002	9	28	12	147	341
2003	77	666	221	6,128	17,592
2004	62	749	228	5,966	19,228
2005	80	824	262	6,250	19,614
2006	75	959	277	7,134	19,284
2007	77	817	293	6,286	17,318
2008	92	962	333	10,425	29,998
2009	96	1,056	358	10,581	30,908
2010	115	1,176	392	11,216	34,089
2011	95	996	351	10,735	30,142
2012	92	1,191	405	11,969	34,602
2013	88	1,155	413	13,436	39,206
2014	86	866	311	10,422	33,637
2015	68	737	243	10,607	32,713
2016	56	588	184	8,158	22,938

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2017	60	523	205	7,265	19,895
2018	57	431	198	4,512	12,642
2019	49	367	167	4,070	11,082
2020	41	206	122	1,521	4,360
10-year avg.	**69**	**706**	**260**	**8,270**	**24,122**
20-year avg.	**72**	**752**	**262**	**7,728**	**22,610**

Table 21. Time series of commercial fishing reports for kala (*Naso spp.*; bluespine unicornfish, short-nosed unicornfish, whitemargin unicornfish) reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	27	251	93	823	30,278
1966	20	220	60	174	26,115
1967	27	168	68	398	35,453
1968	24	160	57	423	23,886
1969	31	182	83	560	32,020
1970	40	226	108	1,114	23,954
1971	45	223	118	1,036	19,925
1972	52	189	106	703	16,421
1973	43	151	99	1,084	17,508
1974	57	166	122	1,034	20,793
1975	72	248	159	905	17,997
1976	73	233	167	1,236	13,697
1977	94	369	244	1,374	18,960
1978	103	279	226	1,143	21,775
1979	95	240	222	805	14,430
1980	90	223	174	807	10,397
1981	80	334	166	1,697	11,990
1982	86	345	179	1,515	13,525
1983	89	335	195	822	14,791
1984	92	257	171	492	11,560
1985	98	348	215	1,004	8,890
1986	98	226	159	926	14,647
1987	86	260	177	1,217	14,644
1988	95	298	184	2,348	13,050
1989	102	345	216	864	8,912
1990	49	218	118	527	3,191
1991	91	359	194	809	8,736
1992	74	295	172	477	6,892
1993.1	73	347	183	724	7,805

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1993.2	50	174	90	325	4,445
1994	84	419	229	1,332	12,945
1995	87	478	250	780	17,679
1996	102	496	270	859	15,105
1997	91	500	268	940	12,929
1998	97	497	276	1,413	15,244
1999	90	477	266	1,384	16,439
2000	74	455	223	1,912	18,115
2001	84	426	238	1,832	24,427
2002	77	516	253	2,993	20,243
2003	67	449	187	4,169	21,218
2004	59	419	177	5,074	21,855
2005	51	330	140	5,447	22,502
2006	48	329	141	5,392	21,693
2007	52	310	163	3,712	13,629
2008	55	372	169	5,022	20,227
2009	85	437	245	4,941	24,919
2010	66	578	253	8,182	33,955
2011	68	514	216	7,303	29,724
2012	69	688	247	8,559	42,464
2013	66	534	241	6,946	32,580
2014	61	480	198	6,624	30,216
2015	48	363	174	4,717	21,917
2016	41	305	140	4,056	12,665
2017	42	301	152	5,433	19,620
2018	33	208	117	2,731	10,078
2019	32	154	100	2,323	8,843
2020	31	172	108	3,109	11,150
10-year avg.	**49**	**372**	**169**	**5,180**	**21,926**
20-year avg.	**57**	**394**	**183**	**4,928**	**22,196**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 22. Time series of commercial fishing reports for nenue (*Kyphosus spp.*; chubs) from reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	20	113	70	382	6,209
1966	18	97	61	299	6,908
1967	33	132	83	472	11,908
1968	24	70	49	266	2,428
1969	41	111	82	777	8,611
1970	48	120	89	558	3,088

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1971	57	163	118	84	4,187
1972	53	146	105	322	4,621
1973	61	131	106	332	4,746
1974	58	175	122	658	10,553
1975	83	208	146	1,110	16,750
1976	78	227	151	971	10,433
1977	104	288	215	1,692	9,426
1978	119	292	239	1,499	10,535
1979	107	247	223	1,294	8,780
1980	84	258	177	810	13,104
1981	92	342	199	963	10,788
1982	80	428	238	2,980	19,782
1983	96	301	207	1,504	8,181
1984	116	360	241	2,223	11,282
1985	116	423	274	1,619	8,957
1986	124	412	270	2,188	10,980
1987	122	583	307	2,689	17,672
1988	109	542	278	2,483	18,445
1989	94	433	231	2,024	8,430
1990	70	310	173	1,409	6,046
1991	100	413	224	2,349	11,122
1992	80	408	221	812	15,459
1993.1	94	402	222	1,186	7,378
1993.2	57	202	107	734	3,531
1994	98	445	241	1,505	10,753
1995	100	423	259	1,293	10,872
1996	106	525	270	2,206	11,952
1997	102	484	262	2,310	7,515
1998	97	451	243	2,824	15,503
1999	92	474	260	3,492	16,042
2000	83	400	208	1,844	9,704
2001	73	358	209	1,740	11,750
2002	84	376	223	2,018	22,627
2003	64	262	159	5,084	19,476
2004	68	312	194	5,809	19,310
2005	54	252	150	8,867	19,623
2006	59	245	150	12,651	35,621
2007	64	286	173	10,902	26,758
2008	77	334	201	8,287	21,621
2009	104	469	279	5,735	14,583

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2010	79	450	240	14,399	31,690
2011	82	506	220	9,901	27,755
2012	91	571	239	7,442	31,238
2013	78	425	225	5,685	27,473
2014	84	418	221	4,664	16,638
2015	56	279	157	3,697	17,443
2016	55	258	153	3,290	10,465
2017	57	256	147	2,677	6,901
2018	44	267	129	5,135	9,677
2019	37	216	105	4,274	10,199
2020	32	199	105	3,626	9,247
10-year avg.	**62**	**340**	**170**	**5,039**	**16,704**
20-year avg.	**67**	**337**	**184**	**6,294**	**19,505**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 23. Time series of commercial fishing reports for manini (*Acanthurus triostegus*; convict tang) reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	40	440	179	9,811	9,244
1966	34	316	158	11,170	7,391
1967	50	293	172	11,480	8,767
1968	41	279	171	11,559	7,046
1969	53	391	188	19,598	12,401
1970	52	372	178	15,977	9,990
1971	79	387	209	11,860	8,527
1972	63	326	182	8,337	7,360
1973	76	424	224	11,859	9,234
1974	89	511	266	11,836	8,682
1975	86	512	246	9,382	9,463
1976	82	483	255	8,714	8,337
1977	103	575	326	6,586	10,236
1978	112	463	352	6,014	9,653
1979	103	437	338	9,687	14,440
1980	86	381	239	4,832	7,121
1981	90	404	251	6,369	15,907
1982	77	463	222	6,405	9,152
1983	86	452	253	2,294	11,091
1984	98	471	266	2,320	9,505
1985	97	533	275	1,737	9,472
1986	98	549	274	4,226	6,971

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1987	94	654	299	5,374	11,042
1988	94	670	319	7,739	9,037
1989	101	705	330	8,126	12,637
1990	68	542	224	6,364	6,977
1991	93	641	294	7,595	7,667
1992	85	649	255	5,788	9,575
1993.1	89	733	265	7,803	9,286
1993.2	66	305	139	5,258	8,193
1994	98	778	303	15,968	12,923
1995	106	777	309	11,216	14,961
1996	113	1,007	367	18,570	18,331
1997	98	896	341	16,397	15,032
1998	105	754	325	19,039	13,317
1999	107	704	310	16,454	14,612
2000	86	563	247	12,943	12,152
2001	78	543	233	10,555	11,919
2002	79	591	255	18,103	15,912
2003	61	560	213	38,573	20,008
2004	61	614	230	20,445	10,057
2005	63	481	220	27,947	12,312
2006	69	539	207	20,059	9,109
2007	66	715	258	26,578	11,398
2008	70	623	272	20,623	11,602
2009	79	718	300	25,386	12,793
2010	85	895	332	30,925	17,496
2011	76	872	296	33,450	17,746
2012	79	768	297	23,949	14,039
2013	66	744	280	28,089	15,896
2014	59	593	247	25,475	11,609
2015	65	406	205	14,261	9,152
2016	47	445	187	18,675	8,957
2017	47	406	181	23,423	10,441
2018	42	469	174	29,252	13,777
2019	40	355	149	18,498	8,725
2020	34	304	137	25,273	12,103
10-year avg.	**56**	**536**	**215**	**24,035**	**12,245**
20-year avg.	**63**	**582**	**234**	**23,977**	**12,753**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

Table 24. Time series of commercial fishing reports for taʻape (*Lutjanus kasmira*; bluestripe snapper) reported by Fiscal Year from 1970-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1970	5	26	11	-	534
1971	30	109	57	29	1,723
1972	48	198	100	332	2,591
1973	60	249	135	862	3,749
1974	77	322	178	1,304	7,829
1975	88	353	211	1,085	9,353
1976	142	527	320	8,326	28,405
1977	201	801	436	6,853	28,541
1978	289	1,089	741	14,524	50,933
1979	320	972	845	25,672	58,175
1980	331	1,153	762	17,912	56,056
1981	299	1,448	756	20,295	80,498
1982	298	1,451	782	20,871	71,101
1983	308	1,508	799	11,078	69,225
1984	335	1,485	798	13,861	43,747
1985	364	1,748	872	12,844	50,787
1986	410	1,944	1,012	16,189	52,328
1987	372	1,629	948	13,519	55,084
1988	417	1,908	1,037	16,970	50,894
1989	389	1,629	957	15,746	36,211
1990	400	1,635	954	17,099	43,888
1991	426	1,768	1,048	17,041	62,487
1992	343	1,865	949	19,302	74,105
1993.1	330	1,739	875	19,735	62,315
1993.2	249	991	507	11,260	30,092
1994	338	1,690	882	16,459	59,773
1995	365	1,783	951	14,943	71,781
1996	352	1,538	904	14,415	44,195
1997	365	1,983	979	23,281	85,497
1998	365	1,754	933	20,894	74,851
1999	297	1,821	841	31,734	70,073
2000	280	1,926	817	27,267	55,041
2001	240	1,593	666	17,328	47,550
2002	234	1,202	635	14,403	41,147
2003	211	1,068	541	28,194	42,130
2004	210	1,149	554	62,451	45,718
2005	176	1,033	487	45,580	39,479

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2006	171	1,003	461	28,317	29,438
2007	187	1,130	529	35,662	30,281
2008	247	1,220	619	43,786	40,000
2009	274	1,392	717	49,927	38,390
2010	270	1,518	767	56,918	43,538
2011	265	1,369	693	56,221	41,261
2012	297	1,394	800	37,849	33,003
2013	269	1,394	734	38,888	33,451
2014	261	1,233	658	35,159	30,271
2015	227	1,074	582	31,077	25,823
2016	221	1,107	590	39,258	33,902
2017	241	1,247	669	60,647	37,200
2018	199	871	499	43,388	28,835
2019	178	831	465	44,856	29,583
2020	178	756	433	72,703	37,787
10-year avg.	**234**	**1,128**	**612**	**46,005**	**33,112**
20-year avg.	**228**	**1,179**	**605**	**42,131**	**36,439**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.3.4 Bycatch Summary

Bycatch in 2020 was below both the 10- and 20-year average values. Bycatch for non-MUS has been decreasing overall since a peak in 2007. This trend in non-MUS bycatch can be attributed almost entirely to the akule and ‘opelu fisheries, which since 2002 typically make up approximately 69% of all non-MUS caught each year. High reported releases by akule and ‘opelu fishers using net gear types, in particular pelagic purse seine, seine, and gill nets, have a disproportionately large influence on the total released of non-MUS. Because akule and ‘opelu are caught in large numbers with these gears, a single release event can result in up to 90,000 pieces reported as released. While annual released of akule and ‘opelu have ranged between 0.04% to 20.3%, total bycatch rates of other non-MUS are more stable, ranging between 2.1% and 9.0%.

Table 25. Time series of commercial fishing bycatch for all ECS reported by Fishing Year from 2002-2020

Year	No. Lic.	No. Trips	No. Reports	No. Caught	No. Released	Percent Bycatch
2002	997	12,060	3,897	794,750	44,156	5.3
2003	888	11,718	3,608	1,352,457	100,021	6.9
2004	875	11,865	3,539	1,249,356	57,736	4.4
2005	862	10,081	3,155	1,068,289	167,912	13.6
2006	761	9,446	2,891	1,193,618	133,748	10.1
2007	824	10,792	3,262	2,217,897	369,774	14.3
2008	963	11,463	3,662	1,877,246	237,940	11.2
2009	1,116	13,789	4,377	1,788,814	230,382	11.4
2010	1,102	14,387	4,538	1,702,132	135,766	7.4
2011	1,027	12,629	4,083	1,735,860	99,615	5.4
2012	1,032	12,591	4,219	1,511,833	17,225	1.1
2013	980	12,225	4,077	1,503,004	43,129	2.8
2014	951	10,901	3,848	1,559,658	32,191	2.0
2015	915	10,127	3,641	1,433,792	21,683	1.5
2016	792	8,879	3,209	1,502,188	97,984	6.1
2017	801	8,717	3,259	1,417,472	21,228	1.5
2018	720	7,519	2,830	1,303,904	28,208	2.1
2019	678	7,057	2,737	1,197,643	22,769	1.9
2020	650	6,180	2,482	1,228,677	24,942	2.0
10-year avg.	**855**	**9,683**	**3,439**	**1,439,403**	**40,897**	**2.6**
20-year avg.	**891**	**10,654**	**3,543**	**1,454,663**	**99,285**	**5.8**

1.4 CRUSTACEAN

1.4.1 Fishery Descriptions

This species group of crustacean management unit species (CMUS) is comprised of the *Heterocarpus* deep water shrimps (*H. laevigatus* and *H. ensifer*) and Kona crab (*Ranina ranina*). The main gear types used are shrimp traps and Kona crab nets.

1.4.2 Dashboard Statistics

The collection of commercial crustacean fishing reports comes from two sources: paper reports received by mail, fax, or PDF copy via e-mail; and reports filed online through the OFR. The crustacean landings are reported by commercial fishers on the Monthly Fishing Report, the Net, Trap, Dive Activity Report, or the MHI Deep-7 Bottomfish Fishing Trip Report.

Similar to the Deep-7 Bottomfish, the time series format for the crustacean fishery begins with an arrangement by the state fiscal year period (July – June) until June 1993 before being reported by fishing year. Refer to data processing procedures documented in the Deep-7 BMUS section (Section 1.1.2) for more information on paper fishing reports and fishing reports filed online. Database assistants and data monitoring associates will enter the paper Monthly Fishing Report information within four weeks, and the Net, Trap, Dive Activity Report and the MHI Deep-7 Bottomfish Fishing Trip Report within two business days.

1.4.2.1 Historical Summary

CMUS Catch, number of licenses, and number of trips in 2020 were all below 10- and 20-year averages.

Table 26. Annual fishing parameters for 2020 in the MHI crustacean fishery compared with short-term (10-year) and long-term (20-year) averages

Fishery	Parameters	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
Crustacean	No. License	14	↓ 54.8%	↓ 65.0%
	Trips	168	↓ 32.0%	↓ 32.5%
	No. Caught	4,810	↓ 94.7%	↓ 90.9%
	Lbs. Caught	13,256 lbs.	↓ 40.1%	↓ 49.4%

1.4.2.2 Species Summary

Shrimp trap and all other gear parameters could not be reported due to fewer than three distinct CML holders reporting CMUS catch using them. Number of licenses and trips using the Kona crab net gear type in 2020 were below both 10- and 20-year averages. Pounds caught using Kona crab nets was also below 10-and 20-year averages, but to a lesser degree than the 2020 decrease in trips. As a result, CPUE for the Kona crab net gear type in 2020 increased in comparison to 10- and 20-year averages.

Table 27. Annual fishing parameters for 2020 in the MHI crustacean fishery compared with short-term (10-year) and long-term (20-year) averages

Methods	Fishery Indicator	2020 Value	2020 Comparative Trends	
			Short-Term Avg. (10-year)	Long-Term Avg. (20-year)
Shrimp trap	*H. laevigatus*	n.d.	-	-
	H. ensifer	n.d.	-	-
	No. Lic.	n.d.	-	-
	No. Trips	n.d.	-	-
	Lbs. Caught	n.d.	-	-
	CPUE	n.d.	-	-
Kona crab Net	Kona crab	4,201 lbs.	↓ 11.1%	↓ 44.5%
	No. Lic.	12	↓ 53.9%	↓ 65.7%
	No. Trips	42	↓ 43.2%	↓ 65.9%
	Lbs. Caught	4,201 lbs.	↓ 11.1%	↓ 44.5%
	CPUE	100.01 lbs./trip	↑ 62.9%	↑ 64.0%
All Other Gears	No. Lic.	n.d.	-	-
	No. Trips	n.d.	-	-
	Lbs. Caught	n.d.	-	-
	CPUE	n.d.	-	-

n.d. = non-disclosure due to data confidentiality.

1.4.3 Time Series Statistics

CMUS catch (weight) has been highly variable since 1965, and currently in a state of decline. Catch in terms of pieces is likely unreliable for CMUS due to limited deepwater shrimp count data. CMUS fishery licenses and reports both peaked in 1998 and have been declining steadily since. Like catch, effort has been variable over the time series with multiple distinct peaks in annual number of trips occurring since 1965. It's important to note that the two fisheries included in CMUS (deepwater shrimp trap fishery and Kona crab net fishery) are very different in both their operation and catch trends. Because of those differences (further detailed in sections 1.4.4.1 and 1.4.4.2), care must be taken when using combined CMUS data to make inferences about the state of the individual contributing fisheries.

1.4.3.1 Commercial Fishing Parameters

Table 28. Time series of commercial fishermen reports for the CMUS fishery reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1965	26	171	71	4,238	11,421
1966	22	179	67	3,604	10,033
1967	30	185	82	3,071	17,444
1968	25	167	71	1,764	26,419
1969	29	233	84	3,109	35,955

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
1970	30	197	78	2,544	35,042
1971	40	254	111	4,162	43,576
1972	41	260	102	3,042	69,331
1973	32	231	97	2,111	62,515
1974	49	211	112	7,562	40,552
1975	59	241	127	5,076	24,616
1976	59	234	136	8,568	26,577
1977	54	233	114	4,144	23,153
1978	61	243	159	5,224	31,675
1979	52	202	128	5,817	28,711
1980	42	108	67	1,920	10,390
1981	50	157	103	6,717	17,858
1982	52	178	108	2,386	8,701
1983	55	180	107	4,204	13,130
1984	76	386	157	6,303	214,792
1985	80	460	190	6,052	82,741
1986	82	312	176	4,196	27,575
1987	76	239	133	3,831	23,876
1988	53	242	101	2,906	30,684
1989	37	148	63	916	60,726
1990	44	242	84	2,624	361,914
1991	47	187	87	1,620	89,383
1992	73	342	133	7,550	38,552
1993.1	70	398	149	4,580	61,525
1993.2	52	187	80	3,047	31,995
1994	74	340	165	3,114	105,179
1995	88	467	200	4,992	98,478
1996	92	401	180	5,291	62,662
1997	90	346	169	8,119	50,913
1998	102	438	207	7,966	213,067
1999	86	298	170	5,810	52,506
2000	65	199	113	4,075	14,970
2001	64	243	130	3,771	20,209
2002	66	248	134	6,593	17,032
2003	53	217	102	10,082	17,632
2004	51	204	90	7,441	13,469
2005	51	381	106	8,240	124,900
2006	38	203	77	5,941	49,666
2007	34	238	75	26,487	13,469
2008	38	302	88	56,257	21,571

Year	No. License	Trips	No. Reports	No. Caught	Lbs. Caught
2009	41	237	98	15,960	10,645
2010	48	243	96	15,377	13,481
2011	51	272	114	55,352	19,076
2012	40	272	97	115,257	20,106
2013	43	310	101	105,954	26,807
2014	34	398	94	372,676	50,808
2015	32	271	86	150,530	31,693
2016	22	161	53	30,034	17,961
2017	22	142	49	10,207	8,761
2018	25	194	56	33,956	14,551
2019	26	282	67	23,079	18,429
2020	14	168	39	4,810	13,256
10-year avg.	**31**	**247**	**76**	**90,186**	**22,145**
20-year avg.	**40**	**249**	**88**	**52,900**	**26,176**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.4.4 Preferred Targets by Gear Type

1.4.4.1 Shrimp Trap

The shrimp trap gear code was established in 1986. Prior to then, all trap activities were reported under miscellaneous traps. The principal species taken by shrimp traps are the deep water *Heterocarpus* shrimp. Of the two species commonly caught, *Heterocarpus laevigatus* is preferred over *Heterocarpus ensifer* due to their larger size and superior food quality. Deepwater shrimp catch has pulsed multiple times since the early 1980's, the result of a small number of large mainland-based vessels periodically entering the fishery primarily for the purpose of export to out of state markets. Fishing by these mainland-based vessels has not occurred since 2006, notably reducing catch.

Despite the potential for high catch, the deepwater shrimp trap fishery is characterized by low participation even in years when mainland-based vessels were active. Peak CMLs active in the fishery occurred in 2013 with ten fishers reporting catch. Since the peak, participation has declined to three or fewer fishers per year. Though seemingly low, this is typical for the fishery. Catch (weight) has also declined primarily because of the loss of notable mainland-based and to a lesser extent a few Hawaii-based highliners. Catch and participation for the shrimp trap gear type in 2020 could not be reported in this report to due to fewer than three licensed fishers reporting during the year.

Table 29. DAR MHI annual crustacean catch summary by species for shrimp traps reported by Fiscal Year from 1987-1993 and by Calendar Year from 1994-2020

Year	*Heterocarpus laevigatus*		*Heterocarpus ensifer*	
	No. License	Lbs. Caught	No. License	Lbs. Caught
1987	3	1,796	n.d.	n.d.

Year	*Heterocarpus laevigatus*		*Heterocarpus ensifer*	
	No. License	**Lbs. Caught**	**No. License**	**Lbs. Caught**
1988	n.d.	n.d.	3	1,568
1989	n.d.	n.d.	n.d.	n.d.
1990	5	341,780	n.d.	n.d.
1991	n.d.	n.d.	NULL	NULL
1992	n.d.	n.d.	NULL	NULL
1993.1	3	35,631	NULL	NULL
1993.2	3	15,627	n.d.	n.d.
1994	5	82,243	n.d.	n.d.
1995	4	66,493	n.d.	n.d.
1996	8	34,588	n.d.	n.d.
1997	6	21,697	n.d.	n.d.
1998	7	180,391	3	1,521
1999	5	33,585	n.d.	n.d.
2000	n.d.	n.d.	n.d.	n.d.
2001	4	9,225	n.d.	n.d.
2002	3	3,779	n.d.	n.d.
2003	3	5,166	n.d.	n.d.
2004	n.d.	n.d.	NULL	NULL
2005	5	109,660	n.d.	n.d.
2006	n.d.	n.d.	n.d.	n.d.
2007	n.d.	n.d.	n.d.	n.d.
2008	n.d.	n.d.	n.d.	n.d.
2009	n.d.	n.d.	n.d.	n.d.
2010	n.d.	n.d.	n.d.	n.d.
2011	4	6,103	n.d.	n.d.
2012	5	11,750	n.d.	n.d.
2013	10	18,977	4	406
2014	9	48,050	4	657
2015	6	28,766	n.d.	n.d.
2016	5	17,158	n.d.	n.d.
2017	3	5,964	n.d.	n.d.
2018	3	11,588	n.d.	n.d.
2019	3	12,630	n.d.	n.d.
2020	n.d.	n.d.	n.d.	n.d.
10-year avg.	**5**	**16,997**	**n.d.**	**n.d.**
20-year avg.	**4**	**17,652**	**n.d.**	**n.d.**

NULL = no available data; n.d. = non-disclosure due to data confidentiality

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.4.4.2 Kona Crab Net

Also referred to as loop nets, Kona crab nets are specifically designed to capture the Kona crab species. They are characterized by a single or double layer of thin taught cotton or nylon mesh over a metal hoop. Kona crab are caught in the net when their joints become entangled in the thin mesh.

A challenge to Kona crab fishing is the suite of regulations currently in place including size (4" minimum carapace), sex (no-take of females), seasonal (May-August closed season), and gear-type (no spearing) restrictions. Though previous stock assessment had indicated that the population may be at risk from fishing, the 2018 stock assessment has deemed the MHI population not overfished or experiencing overfishing. As a result, DAR is currently taking steps to allow the take of female Kona crab, which should provide fishers with improved opportunities for retention.

Fishing effort and landings have been in a state of overall decline since the late 1990's. The downward trend in catch is due in part to the progressively decreasing activity, and eventual loss of a prominent Kona crab highliner. The primary fishing areas used are changing as well. Whereas the fishery once primarily targeted larger, and more numerous Kona crab in federal waters, fishing in state waters has been increasingly dominant over time, and now makes up the majority of all effort. Kona crab catch in recent years continues to show improvement in comparison to the all-time low in 2016. It remains unclear what future interest in the fishery will be, though it seems likely that the removal of the no-take of females will result in some increased effort and new intrants into the fishery. However, without the emergence of dedicated highliners, the fishery may struggle to return to its previous levels of catch.

Table 30. DAR MHI annual crustacean catch summary for Kona crab net catching Kona crab reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	No. License	Lbs. Caught
1965	25	11,378
1966	21	10,029
1967	30	17,444
1968	25	26,419
1969	28	35,939
1970	29	35,033
1971	38	42,977
1972	40	69,328
1973	32	62,455
1974	49	39,121
1975	58	23,996
1976	50	23,195
1977	33	15,966
1978	60	28,582
1979	51	24,674
1980	39	8,162

Year	No. License	Lbs. Caught
1981	47	12,102
1982	48	8,291
1983	48	9,009
1984	58	12,944
1985	71	20,846
1986	80	27,200
1987	62	16,310
1988	47	12,475
1989	32	11,790
1990	32	16,118
1991	44	22,789
1992	71	34,291
1993.1	66	25,305
1993.2	50	15,464
1994	69	19,472
1995	84	27,741
1996	83	27,603
1997	82	27,931
1998	91	30,639
1999	81	18,698
2000	62	14,143
2001	59	10,763
2002	63	12,830
2003	49	11,841
2004	48	12,164
2005	46	9,937
2006	35	6,749
2007	31	9,773
2008	36	10,940
2009	41	9,097
2010	46	9,913
2011	46	10,876
2012	35	7,980
2013	33	7,330
2014	24	2,029
2015	26	2,902
2016	16	745
2017	19	2,753
2018	20	2,769
2019	24	5,688

Year	No. License	Lbs. Caught
2020	12	4,201
10-year avg.	**26**	**4,727**
20-year avg.	**35**	**7,564**

1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.4.5 Catch Parameters by Gear

Shrimp trap CPUE over time has, like catch, spiked periodically as a small number of mainland-based vessels returned to Hawaii to catch deepwater shrimp. In years in which those vessels were active, CPUE saw a marked increase due to the high number of gears the larger and more well-equipped mainland vessels could handle. The 1984 peak in CMUS CPUE using "All Other Gear Types" is due to the lack of a specific shrimp trap gear code offered at that time. Deepwater shrimp fishers prior to 1986 used the "Miscellaneous Trap" gear code in lieu of a dedicated shrimp trap code.

Kona crab net CPUE spiked in the early 1970s. High CPUE during that time is primarily attributed to a specific highliner. The majority of fishers during that period, including the dominant highliner fished primarily in federal waters, some of which were known to hold larger, more abundant crabs. Over time, highliner activity has decreased and the fishery had progressively moved to occurring predominantly in state waters. As a result, CPUE has declined. The introduction of regulations, especially the 2006 ban on the take of females also likely played a role in the persistently low CPUE in comparison to historic levels.

Table 31. Time series of crustacean CPUE (lbs./trip) in the MHI reported by Fiscal Year from 1965-1993 and by Calendar Year from 1994-2020

Year	Shrimp Trap				Kona Crab Net				All Other Gear Types			
	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE
1965	NULL	NULL	NULL	NULL	25	169	11,378	67.33	n.d.	n.d.	n.d.	n.d.
1966	NULL	NULL	NULL	NULL	21	178	10,029	56.34	n.d.	n.d.	n.d.	n.d.
1967	NULL	NULL	NULL	NULL	30	185	17,444	94.29	NULL	NULL	NULL	NULL
1968	NULL	NULL	NULL	NULL	25	167	26,419	158.2	NULL	NULL	NULL	NULL
1969	NULL	NULL	NULL	NULL	28	232	35,939	154.91	n.d.	n.d.	n.d.	n.d.
1970	NULL	NULL	NULL	NULL	29	195	35,033	179.66	n.d.	n.d.	n.d.	n.d.
1971	NULL	NULL	NULL	NULL	38	241	42,977	178.33	n.d.	n.d.	n.d.	n.d.
1972	NULL	NULL	NULL	NULL	40	259	69,328	267.68	n.d.	n.d.	n.d.	n.d.
1973	NULL	NULL	NULL	NULL	32	230	62,455	271.54	n.d.	n.d.	n.d.	n.d.
1974	NULL	NULL	NULL	NULL	49	199	39,121	196.59	3	12	1,431	119.25
1975	NULL	NULL	NULL	NULL	58	233	23,996	102.99	n.d.	n.d.	n.d.	n.d.
1976	NULL	NULL	NULL	NULL	50	203	23,195	114.26	20	31	3,382	109.1
1977	NULL	NULL	NULL	NULL	33	133	15,966	120.05	34	100	7,187	71.87
1978	NULL	NULL	NULL	NULL	60	227	28,582	125.91	n.d.	n.d.	n.d.	n.d.
1979	NULL	NULL	NULL	NULL	51	188	24,674	131.24	3	14	4,037	288.36

Year	Shrimp Trap				Kona Crab Net				All Other Gear Types			
	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE	No. Lic.	No. Trips	Lbs. Caught	CPUE
1980	NULL	NULL	NULL	NULL	39	100	8,162	81.62	6	8	2,228	278.5
1981	NULL	NULL	NULL	NULL	47	143	12,102	84.6	8	14	5,756	411.1
1982	NULL	NULL	NULL	NULL	48	163	8,291	50.9	8	15	410	27.3
1983	NULL	NULL	NULL	NULL	48	146	9,009	61.7	9	34	4,121	121.2
1984	NULL	NULL	NULL	NULL	58	179	12,944	72.3	29	207	201,848	975.1
1985	NULL	NULL	NULL	NULL	71	309	20,846	67.5	18	151	61,895	409.9
1986	NULL	NULL	NULL	NULL	80	302	27,200	90.1	9	10	375	37.5
1987	4	22	1,831	83.2	62	158	16,310	103.2	17	59	5,735	97.2
1988	3	44	12,934	294.0	47	179	12,475	69.7	6	19	5,275	277.6
1989	n.d.	n.d.	n.d.	n.d.	32	134	11,790	88.0	4	8	1,326	165.8
1990	5	87	343,102	3943.7	32	130	16,118	124.0	14	30	2,694	89.8
1991	n.d.	n.d.	n.d.	n.d.	44	161	22,789	141.6	6	11	852	77.5
1992	n.d.	n.d.	n.d.	n.d.	71	316	34,291	108.5	4	21	2,363	112.5
1993.1	3	86	35,631	414.3	66	309	25,305	81.9	n.d.	n.d.	n.d.	n.d.
1993.2	3	36	16,531	459.2	50	151	15,464	102.4	NULL	NULL	NULL	NULL
1994	5	86	85,657	996.0	69	253	19,472	77.0	n.d.	n.d.	n.d.	n.d.
1995	4	140	70,737	505.3	84	327	27,741	84.8	NULL	NULL	NULL	NULL
1996	8	114	34,973	306.8	83	283	27,603	97.5	3	4	86	21.5
1997	6	51	22,792	446.9	82	288	27,931	97.0	3	7	190	27.1
1998	7	129	181,912	1410.2	91	299	30,639	102.5	4	10	516	51.6
1999	5	75	33,644	448.6	81	221	18,698	84.6	n.d.	n.d.	n.d.	n.d.
2000	n.d.	n.d.	n.d.	n.d.	62	152	14,143	93.1	n.d.	n.d.	n.d.	n.d.
2001	4	81	9,313	115.0	59	158	10,763	68.1	3	4	133	33.3
2002	3	50	3,989	79.8	63	196	12,830	65.5	n.d.	n.d.	n.d.	n.d.
2003	3	56	5,420	96.8	49	158	11,841	74.9	3	3	370	123.3
2004	n.d.	n.d.	n.d.	n.d.	48	167	12,164	72.8	3	30	133	4.4
2005	5	178	114,789	644.9	46	161	9,937	61.7	n.d.	n.d.	n.d.	n.d.
2006	n.d.	n.d.	n.d.	n.d.	35	128	6,749	52.7	3	26	172	6.6
2007	n.d.	n.d.	n.d.	n.d.	31	188	9,773	52.0	4	13	142	10.9
2008	n.d.	n.d.	n.d.	n.d.	36	201	10,940	54.4	4	42	456	10.9
2009	n.d.	n.d.	n.d.	n.d.	41	191	9,097	47.6	3	38	325	8.6
2010	n.d.	n.d.	n.d.	n.d.	46	178	9,913	55.7	4	45	282	6.3
2011	4	69	8,098	117.4	46	172	10,876	63.2	5	39	103	2.7
2012	5	143	11,894	83.2	35	121	7,980	66.0	3	8	232	29.0
2013	10	205	19,383	94.6	33	83	7,330	88.3	n.d.	n.d.	n.d.	n.d.
2014	9	323	48,707	150.8	24	59	2,029	34.4	3	16	72	4.5
2015	6	200	28,775	143.9	26	62	2,902	46.8	n.d.	n.d.	n.d.	n.d.
2016	5	133	17,203	129.4	16	25	745	29.8	n.d.	n.d.	n.d.	n.d.

Year	Shrimp Trap				Kona Crab Net				All Other Gear Types			
	No. Lic.	**No. Trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. Trips**	**Lbs. Caught**	**CPUE**	**No. Lic.**	**No. Trips**	**Lbs. Caught**	**CPUE**
2017	3	80	5,984	74.8	19	53	2,753	52.0	n.d.	n.d.	n.d.	n.d.
2018	3	131	11,598	88.5	20	52	2,769	53.3	3	12	184	15.4
2019	3	196	12,692	64.8	24	71	5,688	80.1	n.d.	n.d.	n.d.	n.d.
2020	n.d.	n.d.	n.d.	n.d.	12	42	4,201	100.0	n.d.	n.d.	n.d.	n.d.
10-yr avg.	**5**	**159**	**17,333**	**105.2**	**26**	**74**	**4,727**	**61.4**	**n.d.**	**n.d.**	**n.d.**	**n.d.**
20-yr avg.	**4**	**108**	**18,450**	**144.9**	**35**	**123**	**7,564**	**61.0**	**3**	**20**	**163**	**21.3**

NULL = no available data; n.d. = non-disclosure due to data confidentiality
1993.1 = Fiscal Year 1993; 1993.2 = July-December of calendar year 1993.

1.4.6 Bycatch Summary

CMUS percent bycatch in 2020 at 83.5% was much higher than corresponding10- and 20-year averages, both of which were less than 25%. Releases specifically of Kona crab have been increasing in recent years, with a growing proportion being reported as released due to being undersized. While we have received reports of unusually small crab being caught in 2020, it is unclear if Kona crab encountered state-wide are smaller than average presently, or more fishers are opting to distinguish their reason for release instead of reporting as a general release. We also suspect that a growing number of fishers are correctly reporting releases, i.e., reporting releases at all. The chance of having to release Kona crab is high, given both size and sex restrictions that commonly result in less than 50% of crab being fit for legal retention. The decreasing number of trips in which Kona grab were caught, but none were released suggests fishers are beginning to more accurately self-report.

Another contributing factor to the increase in CMUS bycatch is the recent decline in the harvest of deepwater shrimp. Unlike Kona crab, deepwater shrimp have no size or sex restrictions resulting in little, to no releases and are caught in comparatively high numbers. As a result, as deepwater shrimp catch decreases (as it has since 2014), total CMUS catch drops accordingly while total CMUS releases are not affected.

Table 32. Time series of commercial fishing bycatch for CMUS reported by Fishing Year from 2002-2020

Year	No. Lic.	No. Trips	No. Reports	No. Caught	No. Released	Percent Bycatch
2002	66	248	134	6,593	195	2.9
2003	53	217	102	10,082	1,080	9.7
2004	51	204	90	7,441	1,620	17.9
2005	51	381	106	8,240	1,177	12.5
2006	38	203	77	5,941	3,688	38.3
2007	34	238	75	26,487	3,422	11.4
2008	38	302	88	56,257	1,376	2.4
2009	41	237	98	15,960	2,295	12.6
2010	48	219	96	15,377	6,511	29.7
2011	51	252	114	55,352	7,360	11.7
2012	40	258	97	115,257	3,816	3.2
2013	43	302	101	105,954	7,816	6.9
2014	34	398	94	372,676	5,610	1.5
2015	32	271	86	150,530	7,760	4.9
2016	22	161	53	30,034	5,122	14.6
2017	22	142	49	10,207	6,967	40.6
2018	25	194	56	33,956	12,141	26.3
2019	26	282	67	23,079	27,186	54.1
2020	14	168	39	4,810	24,297	83.5

10-year avg.	**31**	**243**	**76**	**90,186**	**10,808**	**24.7**
20-year avg.	**38**	**246**	**85**	**55,486**	**6,813**	**20.2**

1.5 PRECIOUS CORALS FISHERY

1.5.1 Fishery Descriptions

This species group is comprised of any coral of the genus *Corallium* (pink coral, also known as red coral, *Corallium secundum, C. regale, C. laauense*) in addition to gold coral (*Gerardia* spp., *Callogorgia gilberti*, *Narella* spp., *Calyptrophora* spp.), bamboo coral (*Lepidisis olapa*, *Acanella* spp.), and black coral (*Antipathes griggi*, *A. grandis*, *A. ulex*).

There are no active fisheries for precious coral in Federal waters around Hawaii, as most fishing for precious coral occurs in nearshore waters managed by the State of Hawaii. The precious coral fishery in Hawaii is limited to black coral harvests in the ʻAuʻau Channel, and fishing is not currently occurring for pink, bamboo, or gold corals. Only selective gear may be used to harvest corals, and the top gears utilized for harvesting this species group are submersible and SCUBA.

1.5.2 Dashboard Statistics

Future reports will include data as resources allow (see Section 1.5.3)

1.5.3 Other Statistics

Commercial fishery statistics for recent years are unavailable due to data confidentiality restrictions, as the number of active participants has been fewer than three since the 2011-2012 fishing year. Future reports will include data as resources and reporting confidentiality thresholds allow.