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PART 1: INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

WCPFC-SC18-AR/CCM-27(Rev.02)

UNITED STATES OF AMERICA

2022 Annual Report to the Western and Central Pacific Fisheries Commission

United States of America

PART I. INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS [1]

(Through 2021)

National Oceanic and Atmospheric Administration National Marine Fisheries Service

Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission by 30 April 2022	**YES**
If no, please indicate the reason(s) and intended actions:	

Summary

Large-scale fisheries of the United States and its Participating Territories for highly migratory species (HMS) in the Pacific Ocean include purse seine fisheries for skipjack tuna (*Katsuwonus pelamis*) and yellowfin tuna (*Thunnus albacares*); longline fisheries for bigeye tuna (*Thunnus obesus*), swordfish (*Xiphias gladius*), albacore (*Thunnus alalunga*), and associated pelagic fish species; and a troll fishery for albacore. Small-scale fisheries include troll fisheries for a wide variety of tropical tunas and associated pelagic species, handline fisheries for yellowfin and bigeye tuna, a pole-and-line fishery for skipjack tuna, and miscellaneous-gear fisheries.

Associated pelagic species include other tunas and billfishes, mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), moonfish (*Lampris* spp.), escolar (*Lepidocybium flavobrunneum*), and pomfrets (Bramidae). The large-scale fisheries operate on the high seas, within the U.S. exclusive economic zone (EEZ), and within the EEZs of other nations. The small-scale fisheries operate in nearshore waters off Hawaii and the U.S. Territories of American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands (CNMI).

Overall trends in total retained catch by the United States and U.S.-associated Participating Territory fisheries in the Western and Central Pacific Fisheries Commission (WCPFC) Statistical Area in 2021 are dominated by the catch of the purse seine fishery. Preliminary 2021 purse seine catch estimates total 39,507 t of skipjack, 4,820 t of yellowfin, and 6,145 t of bigeye tuna. The estimate of total U.S. purse-seine catch in 2020 has been revised to 137,406 t.

[1] PIFSC Data Report DR-22-xx.
Issued xx July 2022.

Longline retained catch increased by 877 t in 2021 as the fishery was less affected by a continuing global Coronavirus pandemic that started in 2020. Total longline catch in the Pacific Ocean (PO) in 2021 was 11,411 t compared to 10,534 t in 2020. Longline retained catch by American Samoa in the South Pacific Ocean (SPO) increased from 905 t in 2020 to 1,050 t in 2021. The 2020 catch was the lowest level recorded during the 2017–2021 time period. Bigeye tuna longline catch by the United States and its Territories remained stable at 5,677 t in 2021 compared to a revised estimate of 6,062 t in 2020. Albacore longline catch by the United States and its Territories increased from 596 t in 2020 to 820 t in 2021. Excluding catch attributed to the U.S. Participating Territories (i.e., American Samoa, Commonwealth of the Northern Mariana Islands, and Guam), longline catch of bigeye tuna by U.S. longline vessels is estimated to be 3,750 t in 2021which is above the limit of 3,554 t for 2021. The annual bigeye catch limits were established in U.S. fishery regulations (50 *CFR* Part 300) pursuant to the provisions of WCPFC Conservation and Management Measure (CMM) 2008-01 for bigeye and yellowfin tuna during 2009 through 2011, CMM 2011-01 in 2012, CMM 2012-01 in 2013, CMM 2013-01 in 2014, CMM 2014-01 in 2015, CMM 2015-01 in 2016, CMM 2016-01 in 2017, CMM 2017-01 in 2018 CMM 2018-01 in 2019, CMM 2019-01 in 2020, and CMM 2020-01 in 2021.

The longline catch of swordfish by the United States and its Territories increased to 573 t in 2021. Small-scale (tropical) troll and handline vessels operating in nearshore waters represented the largest number of U.S.-flagged vessels but contributed only a small fraction of the catch. The longline fleet was the next largest fleet, numbering 149 vessels in 2021, while the purse seine fleet continued a decreasing trend with 19 vessels in 2021 compared to 23 vessels in 2020, 31 vessels in 2019, and 34 vessels in 2018.

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries Service) conducted a wide range of research on Pacific tuna and associated species at its Southwest and Pacific Islands Fisheries Science Centers and in collaboration with scientists from other organizations. NOAA Fisheries conducts fishery monitoring and research, including biological and oceanographic research, fish stock assessment research, and socio-cultural studies on fisheries for tunas and billfishes. The monitoring and research also addresses animals caught as bycatch in those fisheries. In 2021, socio-economic studies investigated impacts of bigeye tuna catch rates in the Hawaii-based longline fishery and social vulnerability indicators of fishing communities in the Pacific region. Stock assessment research was conducted almost entirely in collaboration with members of the WCPFC, the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC), and the Inter-American Tropical Tuna Commission (IATTC) and included research on skipjack tuna, striped marlin, and blue marlin.

NOAA Fisheries biological and oceanographic research on tunas, billfishes, and sharks included environmental predictors of tuna recruitment, taking an ecosystem approach through a ground up view of pelagic fisheries from smaller pelagic fish species, the effects of biological, economic, and management factors on pelagic stocks, and ecosystem modelling. Bycatch mitigation studies focused on the longline fishery and included research on sea turtles, pelagic sharks, and cetaceans.

Tabular Annual Fisheries Information

This report presents estimates of annual catches of tuna, billfish, and other highly migratory species (HMS), and vessel participation during 2017–2021 for fisheries of the United States and its Participating Territories operating in the western and central Pacific Ocean (WCPO). All statistics for 2021 are provisional. Statistics for 2020 have been updated from those reported provisionally in the submission of 2019–2020 U.S. fishery statistics for the WCPO (NOAA, NMFS 2021). Statistics for 2017–2019 have also been updated using an automated reporting process that contains minor rounding differences from previous reports. For the purposes of this report, the WCPO is defined as the Western and Central Pacific Fisheries Commission (WCPFC) Statistical Area. For the most part, U.S. estimates of catch by weight are estimates of retained catches due to lack of data on weights of discarded fish.

The purse seine fishery remains the largest U.S. fishery in terms of total catch. It accounts for about 78% of the total catch of HMS by the United States and its Participating Territories in the WCPO. The longline, tropical troll, handline and albacore troll fisheries account for 18%, 1%, 2.2%, and 0.7% of the total catch, respectively.

Fisheries of the United States and its Participating Territories for tunas, billfishes and other HMS produced an estimated catch of 64,370 t in 2021 (Table 1a), decreasing from 151,380 t in 2020 (Table 1b) as a result of a decline in purse seine catch. The catch consisted primarily of skipjack tuna (62%), bigeye tuna (19%), yellowfin tuna (12%), and albacore (2%). Catches of skipjack, bigeye, and yellowfin tuna decreased in 2021 due to lower purse seine catches.

Further discussion of the tabular fisheries information is provided in the following section on flag state reporting.

Table 1a. Estimated weight (in metric tons) of catch by vessels of the United States and its Participating Territories (American Samoa, Guam, and Commonwealth of the Northern Mariana Islands) by species and fishing gear in the WCPFC Statistical Area, for 2021 (preliminary). Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). Purse seine species composition estimates have not been adjusted for 2021.

Species and FAO Code	Purse Seine	Longline	Albacore Troll	Tropical Troll	Handline	Total
Albacore (ALB), North Pacific	0	135	-	1	5	140
Albacore (ALB), South Pacific	0	685	654	0	-	1340
Bigeye tuna (BET)	6145	5677	-	12	121	11956
Pacific bluefin tuna (PBF)	0	1	-	0	-	1
Skipjack tuna (SKJ)	39507	183	-	514	5	40209
Yellowfin tuna (YFT)	4820	2549	-	386	276	8031
Other tuna (TUN KAW FRI)	0	0	-	3	1	4
TOTAL TUNAS	50472	9231	654	916	408	61681
Black marlin (BLM)	1	0	-	1	-	2
Blue marlin (BUM)	2	393	-	127	3	525
Sailfish (SFA)	0	11	-	1	-	12
Spearfish (SSP)	0	121	-	5	-	126
Striped marlin (MLS), North Pacific	0	229	-	8	-	237
Striped marlin (MLS), South Pacific	0	3	-	-	-	3
Other marlins (BIL)	0	1	-	0	-	1
Swordfish (SWO), North Pacific	0	573	-	0	1	574
Swordfish (SWO), South Pacific	0	2	-	-	-	2
TOTAL BILLFISHES	3	1333	-	143	4	1484
Blue shark (BSH)	0	0	-	0	-	0
Mako shark (MAK)	0	1	-	0	-	1
Thresher sharks (THR)	0	1	-	0	-	1
Other sharks (SKH OCS FAL SPN TIG CCL)	0	0	-	0	-	0
TOTAL SHARKS	0	2	-	0	-	2
Mahimahi (DOL)	2	128	-	193	7	330
Moonfish (LAP)	0	135	-	0	-	135
Oilfish (GEP)	0	58	-	1	0	59
Pomfrets (BRZ)	0	150	-	1	2	153
Wahoo (WAH)	2	371	-	133	4	511
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	1	3	-	11	0	15
TOTAL OTHER	5	846	-	340	13	1204
TOTAL	50479	11411	654	1399	426	64370

Table 1b. Estimated weight (in metric tons) of catch by vessels of the United States and its Participating Territories (American Samoa, Guam, and Commonwealth of the Northern Mariana Islands) by species and fishing gear in the WCPFC Statistical Area, for 2020 (preliminary). Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). Purse seine species composition estimates have not been adjusted for 2020.

Species and FAO Code	Purse Seine	Longline	Albacore Troll	Tropical Troll	Handline	Total
Albacore (ALB), North Pacific	0	56	18	0	3	78
Albacore (ALB), South Pacific	0	540	1908	0	-	2448
Bigeye tuna (BET)	9487	6062	-	19	145	15712
Pacific bluefin tuna (PBF)	0	1	-	0	-	1
Skipjack tuna (SKJ)	116886	203	-	347	5	117441
Yellowfin tuna (YFT)	11015	1580	-	331	243	13169
Other tuna (TUN KAW FRI)	0	0	-	1	1	2
TOTAL TUNAS	137388	8441	1926	698	397	148850
Black marlin (BLM)	1	0	-	1	-	3
Blue marlin (BUM)	9	513	-	111	3	635
Sailfish (SFA)	0	6	-	1	-	7
Spearfish (SSP)	0	105	-	3	-	108
Striped marlin (MLS), North Pacific	0	287	-	10	-	297
Striped marlin (MLS), South Pacific	1	2	-	-	-	2
Other marlins (BIL)	0	1	-	0	-	1
Swordfish (SWO), North Pacific	0	306	-	0	2	307
Swordfish (SWO), South Pacific	0	3	-	-	-	3
TOTAL BILLFISHES	11	1223	-	125	5	1364
Blue shark (BSH)	0	0	-	0	-	0
Mako shark (MAK)	0	2	-	0	-	2
Thresher sharks (THR)	0	1	-	0	-	1
Other sharks (SKH OCS FAL SPN TIG CCL)	0	0	-	0	-	0
TOTAL SHARKS	0	3	-	0	-	3
Mahimahi (DOL)	3	92	-	195	6	296
Moonfish (LAP)	0	238	-	0	-	238
Oilfish (GEP)	0	63	-	1	-	65
Pomfrets (BRZ)	0	181	-	0	1	182
Wahoo (WAH)	2	292	-	69	3	367
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	1	2	-	12	0	15
TOTAL OTHER	7	867	-	278	11	1162
TOTAL	137406	10534	1926	1101	413	151380

Table 1c. Estimated weight (in metric tons) of catch by vessels of the United States and its Participating Territories (American Samoa, Guam, and Commonwealth of the Northern Mariana Islands) by species and fishing gear in the WCPFC Statistical Area, for 2019 (preliminary). Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). Purse seine species composition estimates have not been adjusted for 2019.

Species and FAO Code	Purse Seine	Longline	Albacore Troll	Tropical Troll	Handline	Total
Albacore (ALB), North Pacific	0	101	1	1	10	112
Albacore (ALB), South Pacific	0	1050	872	0	-	1923
Bigeye tuna (BET)	3014	6005	-	35	226	9280
Pacific bluefin tuna (PBF)	0	2	-	0	-	2
Skipjack tuna (SKJ)	144839	295	-	482	10	145627
Yellowfin tuna (YFT)	18102	1965	-	456	249	20771
Other tuna (TUN KAW FRI)	0	0	-	3	1	4
TOTAL TUNAS	165955	9417	873	978	496	177719
Black marlin (BLM)	3	0	-	2	-	6
Blue marlin (BUM)	3	860	-	176	5	1045
Sailfish (SFA)	0	16	-	1	-	17
Spearfish (SSP)	0	173	-	7	-	179
Striped marlin (MLS), North Pacific	0	458	-	13	-	472
Striped marlin (MLS), South Pacific	0	2	-	-	-	2
Other marlins (BIL)	0	0	-	0	-	0
Swordfish (SWO), North Pacific	0	555	-	0	3	558
Swordfish (SWO), South Pacific	0	4	-	-	-	4
TOTAL BILLFISHES	7	2068	-	200	8	2282
Blue shark (BSH)	0	0	-	0	-	0
Mako shark (MAK)	0	35	-	0	-	35
Thresher sharks (THR)	0	5	-	0	-	5
Other sharks (SKH OCS FAL SPN TIG CCL)	0	0	-	0	-	0
TOTAL SHARKS	0	40	-	0	-	40
Mahimahi (DOL)	3	145	-	344	8	500
Moonfish (LAP)	0	428	-	0	-	428
Oilfish (GEP)	0	103	-	0	-	103
Pomfrets (BRZ)	0	275	-	0	8	283
Wahoo (WAH)	5	479	-	158	7	649
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	1	2	-	9	0	13
TOTAL OTHER	9	1433	-	511	24	1977
TOTAL	165971	12957	873	1689	528	182018

Table 1d. Estimated weight (in metric tons) of catch by vessels of the United States and its Participating Territories (American Samoa, Guam, and Commonwealth of the Northern Mariana Islands) by species and fishing gear in the WCPFC Statistical Area, for 2018 (preliminary). Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). Purse seine species composition estimates have not been adjusted for 2018.

Species and FAO Code	Purse Seine	Longline	Albacore Troll	Tropical Troll	Handline	Total
Albacore (ALB), North Pacific	0	70	12	1	20	103
Albacore (ALB), South Pacific	0	1542	429	0	-	1971
Bigeye tuna (BET)	6958	5236	-	27	117	12338
Pacific bluefin tuna (PBF)	0	1	-	0	-	1
Skipjack tuna (SKJ)	167235	196	-	535	5	167971
Yellowfin tuna (YFT)	20565	2339	-	598	340	23843
Other tuna (TUN KAW FRI)	0	0	-	5	1	6
TOTAL TUNAS	194759	9384	441	1166	484	206234
Black marlin (BLM)	3	0	-	2	0	5
Blue marlin (BUM)	5	598	-	167	3	773
Sailfish (SFA)	0	11	-	4	-	14
Spearfish (SSP)	0	187	-	10	0	197
Striped marlin (MLS), North Pacific	0	375	-	12	-	387
Striped marlin (MLS), South Pacific	0	1	-	-	-	2
Other marlins (BIL)	0	1	-	0	-	1
Swordfish (SWO), North Pacific	0	631	-	1	3	634
Swordfish (SWO), South Pacific	0	6	-	-	-	6
TOTAL BILLFISHES	8	1811	-	195	6	2020
Blue shark (BSH)	0	3	-	0	-	3
Mako shark (MAK)	0	42	-	0	-	42
Thresher sharks (THR)	0	2	-	0	-	2
Other sharks (SKH OCS FAL SPN TIG CCL)	0	0	-	1	-	1
TOTAL SHARKS	0	47	-	1	-	48
Mahimahi (DOL)	2	174	-	323	9	508
Moonfish (LAP)	0	449	-	0	-	449
Oilfish (GEP)	0	112	-	0	-	112
Pomfrets (BRZ)	0	298	-	0	7	305
Wahoo (WAH)	5	329	-	184	6	524
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	5	5	-	8	0	18
TOTAL OTHER	12	1367	-	515	23	1917
TOTAL	194779	12610	441	1876	513	210219

Table 1e. Estimated weight (in metric tons) of catch by vessels of the United States and its Participating Territories (American Samoa, Guam, and Commonwealth of the Northern Mariana Islands) by species and fishing gear in the WCPFC Statistical Area, for 2017 (updated). Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). Purse seine species composition estimates have not been adjusted for 2017.

Species and FAO Code	Purse Seine	Longline	Albacore Troll	Tropical Troll	Handline	Total
Albacore (ALB), North Pacific	0	90	335	0	35	461
Albacore (ALB), South Pacific	0	1495	465	0	-	1960
Bigeye tuna (BET)	3267	5356	-	41	106	8769
Pacific bluefin tuna (PBF)	0	2	-	0	-	2
Skipjack tuna (SKJ)	140081	262	-	392	6	140741
Yellowfin tuna (YFT)	23197	2621	-	477	406	26700
Other tuna (TUN KAW FRI)	0	0	-	16	2	18
TOTAL TUNAS	166545	9827	800	926	555	178653
Black marlin (BLM)	2	1	-	2	-	5
Blue marlin (BUM)	4	612	-	156	3	775
Sailfish (SFA)	0	12	-	2	0	14
Spearfish (SSP)	0	234	-	9	0	243
Striped marlin (MLS), North Pacific	0	330	-	6	-	336
Striped marlin (MLS), South Pacific	0	2	-	-	-	2
Other marlins (BIL)	0	1	-	0	-	1
Swordfish (SWO), North Pacific	0	967	-	0	6	974
Swordfish (SWO), South Pacific	0	6	-	-	-	6
TOTAL BILLFISHES	6	2165	-	175	9	2356
Blue shark (BSH)	0	1	-	0	-	1
Mako shark (MAK)	0	35	-	0	0	36
Thresher sharks (THR)	0	5	-	0	0	5
Other sharks (SKH OCS FAL SPN TIG CCL)	0	0	-	0	0	0
TOTAL SHARKS	0	41	-	0	1	43
Mahimahi (DOL)	1	180	-	230	9	420
Moonfish (LAP)	0	322	-	0	-	322
Oilfish (GEP)	0	116	-	0	0	116
Pomfrets (BRZ)	0	300	-	0	12	313
Wahoo (WAH)	5	304	-	111	4	424
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	4	3	-	9	1	17
TOTAL OTHER	10	1226	-	350	27	1612
TOTAL	166561	13259	800	1452	592	182664

Table 1f. Longline retained catch in metric tons (t) by species and species group, for U.S. and American Samoa vessels operating in the WCPFC Statistical Area in 2017–2021. Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). Catch in North Pacific Ocean = NPO and South Pacific Ocean = SPO. No Guam catch (2017-2021).

	U.S. (NPO)					CNMI (NPO)					American Samoa (NPO)					American Samoa (SPO)					Total				
Species	**2021**	**2020**	**2019**	**2018**	**2017**	**2021**	**2020**	**2019**	**2018**	**2017**	**2021**	**2020**	**2019**	**2018**	**2017**	**2021**	**2020**	**2019**	**2018**	**2017**	**2021**	**2020**	**2019**	**2018**	**2017**
Vessels	137	135	138	136	136	131	119	128	121	119	24	122	127	113	118	11	11	18	14	15	149	146	156	151	150
Albacore, NPO	104	48	88	59	74						30	8	12	11	17						135	56	101	70	90
Albacore, SPO											0	0	0	0	0	685	540	1050	1542	1495	685	540	1050	1542	1495
Bigeye tuna	3750	3550	3460	3393	2948	1500	926	999	993	999	404	1563	1514	798	1346	24	23	31	53	63	5677	6062	6005	5236	5356
Pacific bluefin tuna	1	0	1	0	1						0	0	0	0	0	0	0	0	1	2	1	1	2	1	2
Skipjack tuna	128	125	198	105	155						15	16	28	15	36	40	62	69	76	71	183	203	295	196	262
Yellowfin tuna	2029	1197	1556	1868	1751						275	160	220	209	311	246	223	189	261	559	2549	1580	1965	2339	2621
Other tuna	0	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL TUNAS	6012	4920	5304	5425	4928	1500	926	999	993	999	724	1747	1774	1034	1709	994	848	1339	1934	2190	9231	8441	9417	9384	9827
Black marlin	0	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Blue marlin	332	440	747	529	485						31	44	83	38	87	30	28	29	32	40	393	513	860	598	612
Sailfish	9	5	12	9	9						1	1	2	1	2	1	1	2	1	1	11	6	16	11	12
Spearfish	110	94	154	171	205						10	11	16	15	27	1	0	2	1	2	121	105	173	187	234
Striped Marlin, NPO	199	240	397	332	280						30	47	62	44	50	0	0	0	0	0	229	287	458	375	330
Striped Marlin, SPO	0	0	0	0	0						0	0	0	0	0	3	2	2	1	2	3	2	2	1	2
Other marlins	1	1	0	1	1						0	0	0	0	0	0	0	0	0	0	1	1	0	1	1
Swordfish, NPO	534	266	510	590	918						39	40	44	41	49	0	0	0	0	0	573	306	555	631	967
Swordfish, SPO	0	0	0	0	0						0	0	0	0	0	2	3	4	6	6	2	3	4	6	6
TOTAL BILLFISH	1185	1046	1821	1631	1899						112	143	208	138	215	37	33	39	41	51	1333	1223	2068	1811	2165
Blue shark																0	0	0	3	1	0	0	0	3	1
Mako shark	1	2	32	36	30						0	0	3	5	5	0	0	0	0	0	1	2	35	42	35
Thresher	1	1	4	2	2						1	0	1	0	0	0	0	1	1	2	1	1	5	2	5
Sharks nei																									
Oceanic whitetip shark																									
Silky shark																									
Hammerhead shark																									
Tiger shark																									
Blacktip shark																									
TOTAL SHARKS	1	3	36	38	32						1	0	3	5	6	0	0	1	4	3	2	3	40	47	41
Mahimahi	110	76	123	155	143						18	11	20	14	23	1	5	2	5	14	128	92	145	174	180
Moonfish	109	198	368	390	257						26	40	59	58	63	1	1	1	1	1	135	238	428	449	322
Oilfish	52	55	89	98	94						6	8	15	14	22	0	0	0	0	0	58	63	103	112	116
Pomfret	133	157	246	265	260						18	23	29	32	40	0	0	0	0	0	150	181	275	298	300
Wahoo	314	239	401	264	217						41	35	60	34	37	16	18	18	31	50	371	292	479	329	304
Other fish	2	1	1	4	2						0	0	1	0	0	1	0	0	0	1	3	2	2	5	3
TOTAL OTHER	718	726	1228	1178	975						109	118	184	153	184	19	24	21	37	67	846	867	1433	1367	1226
TOTAL	7917	6695	8388	8272	7834	1500	926	999	993	999	945	2009	2169	1329	2115	1050	905	1400	2016	2311	11411	10534	12957	12610	13259

Table 1g. Estimated catch of tropical troll fishery in metric tons (t) for Hawaii, Guam, CNMI, and American Samoa vessels by species and species group, for U.S. vessels operating in the WCPFC Statistical Area in 2017–2021. Totals may not match sums of values due to rounding to the nearest metric ton (< 0.5 t = 0). NPO = North Pacific Ocean and SPO = South Pacific Ocean.

	Hawaii					Guam					CNMI					American Samoa					Total Tropical Troll				
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017
Vessels	1179	1124	1293	1386	1417	546	459	465	398	408	82	73	51	56	48	5	8	5	7	8	1812	1664	1814	1847	1881
Albacore, NPO	1	0	1	1	1																1	0	1	1	1
Albacore, SPO						0	0	0	0	0						0	0	0	0	0	0	0	0	0	0
Bigeye tuna	12	18	35	27	40	0	0	0	0	0						0	0	0	0	1	12	19	35	27	41
Pacific bluefin tuna																									
Skipjack tuna	68	78	105	84	97	302	158	215	277	185	136	108	157	170	107	8	3	6	4	3	514	347	482	535	392
Yellowfin tuna	330	293	410	564	435	42	25	29	24	27	12	11	17	5	8	2	2	1	5	6	386	331	456	598	477
Other tunas	1	1	3	3	3	0	0	0	0	0	1	0	0	1	13	0	0	0	0	0	3	1	3	5	16
TOTAL TUNAS	412	392	554	680	576	344	183	244	301	213	149	119	173	177	127	10	5	7	9	10	916	698	978	1166	926
Black marlin	1	1	2	2	2	0	0	0	0	0						0	0	0	0	0	1	1	2	2	2
Blue marlin	112	88	152	154	140	14	23	23	11	14	1	0	2	1	1	0	0	0	1	0	127	111	176	167	156
Sailfish	1	1	1	2	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	2
Spearfish	5	3	7	10	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	7	10	9
Striped marlin, NPO	8	10	13	12	6																8	10	13	12	6
Striped marlin, SPO																0	0	0	0	0					
Other billfish																0	0	0	0	0	0	0	0	0	0
Swordfish, NPO	0		0	1	0	0	0	0	0	0						0	0	0	0	0	0	0	0	1	0
Swordfish, SPO																									
TOTAL BILLFISHES	128	102	175	179	159	14	23	23	13	14	1	0	2	1	1	0	0	0	1	0	143	125	200	195	175
Blue shark																					0	0	0	0	0
Mako shark				0	0																0	0	0	0	0
Thresher sharks																					0	0	0	0	0
Other sharks		0	0	1																	0	0	0	1	0
TOTAL SHARKS		0	0	1	0																0	0	0	1	0
Mahimahi	165	138	249	253	191	14	42	62	40	18	14	14	33	30	20	0	0	0	0	1	193	195	344	323	230
Moonfish																0	0	0	0	0	0	0	0	0	0
Oilfish						1	1	0	0	0						0	0	0	0	0	1	1	0	0	0
Pomfrets			0		0	1	0	0	0	0						0	0	0	0	0	1	0	0	0	0
Wahoo	121	47	146	137	85	10	21	11	44	21	3	1	1	3	4	0	0	0	1	0	133	69	158	184	111
Other pelagics	0	0	0	0	1	5	8	5	6	6	6	4	3	1	1	0	0	0	0	1	11	12	9	8	9
TOTAL OTHER	287	186	396	390	277	30	72	78	90	46	22	19	37	33	26	1	1	1	1	2	340	278	511	515	350
GEAR TOTAL	827	679	1124	1250	1012	388	278	345	404	273	172	138	212	211	155	11	5	9	11	12	1399	1101	1689	1876	1452

Table 1h. Estimated catch of swordfish, and number of U.S. vessels fishing for swordfish, south of 20° S in the WCPFC Statistical Area in 2017–2021, to fulfill the reporting requirements of WCPFC CMM 2009-03.

	U.S.-flagged Vessels South of 20° S	
Year	Catch (t) by all	Number of vessels fishing for swordfish
2021	0	0
2020	0	0
2019	0	0
2018	0	0
2017	0	1

Note: The catch is only reported for years when 3 or more vessels fished in the area, although the number of vessels fishing for swordfish may be less than the number that fished. The United States does not have any longline vessels operating under charter or lease as part of its domestic fishery south of 20° S nor does it have any other vessels fishing within its waters south of 20° S.

Table 2a. Estimated number of United States and Participating Territories vessels operating in the WCPFC Statistical Area, by gear type, from 2017 to 2021. Data for 2021 are preliminary.

	2021	2020	2019	2018	2017
Purse seine	19	23	31	34	34
Longline (N Pac-based) [1]	137	135	138	136	136
Longline (American Samoa-based)	24	122	127	113	118
Total U.S. Longline [2]	149	146	156	151	150
Albacore troll (N Pac) [3]	-	3	3	4	14
Albacore troll (S Pac) [3]	21	18	9	11	13
Tropical troll	1812	1664	1814	1847	1881
Handline	388	394	443	429	494
Tropical Troll and Handline (combined)[4]	1913	1792	1933	1962	2018
TOTAL	2104	1979	2129	2158	2215

[1] Includes Hawaii- and California-based vessels that fished west of 150 W.
[2] Some longline vessels fished in both Hawaii and American Samoa and are counted only once in the Total U.S. Longline.
[3] Some vessels fished on both sides of the equator, and are counted only once in the TOTAL.
[4] Some vessels used both tropical troll and handline gear, but are counted only once in the combined total.

Table 2b. Estimated number of United States and Participating Territories vessels operating in the WCPFC Statistical Area, by gear type, from 2017 to 2021. Data for 2021 are preliminary.

Gear and year	0-50	51-200	201-500	501-1000	1001-1500	1500+
2017 Purse Seine					14	20
2018 Purse Seine					15	19
2019 Purse Seine					14	17
2020 Purse Seine					8	15
2021 Purse Seine					6	13
2017 Longline	8	142				
2018 Longline	7	144				
2019 Longline	10	146				
2020 Longline	6	140				
2021 Longline	6	143				
	0-50	**51-150**	**150+**			
2017 Pole and Line	1	1				
2018 Pole and Line	1	1				
2019 Pole and Line	1	1				
2020 Pole and Line	1	1				
2021 Pole and Line	1	1				
2017 Albacore Troll		9	8			
2018 Albacore Troll		8	5			
2019 Albacore Troll	2	7	3			
2020 Albacore Troll		9	9			
2021 Albacore Troll		13	9			

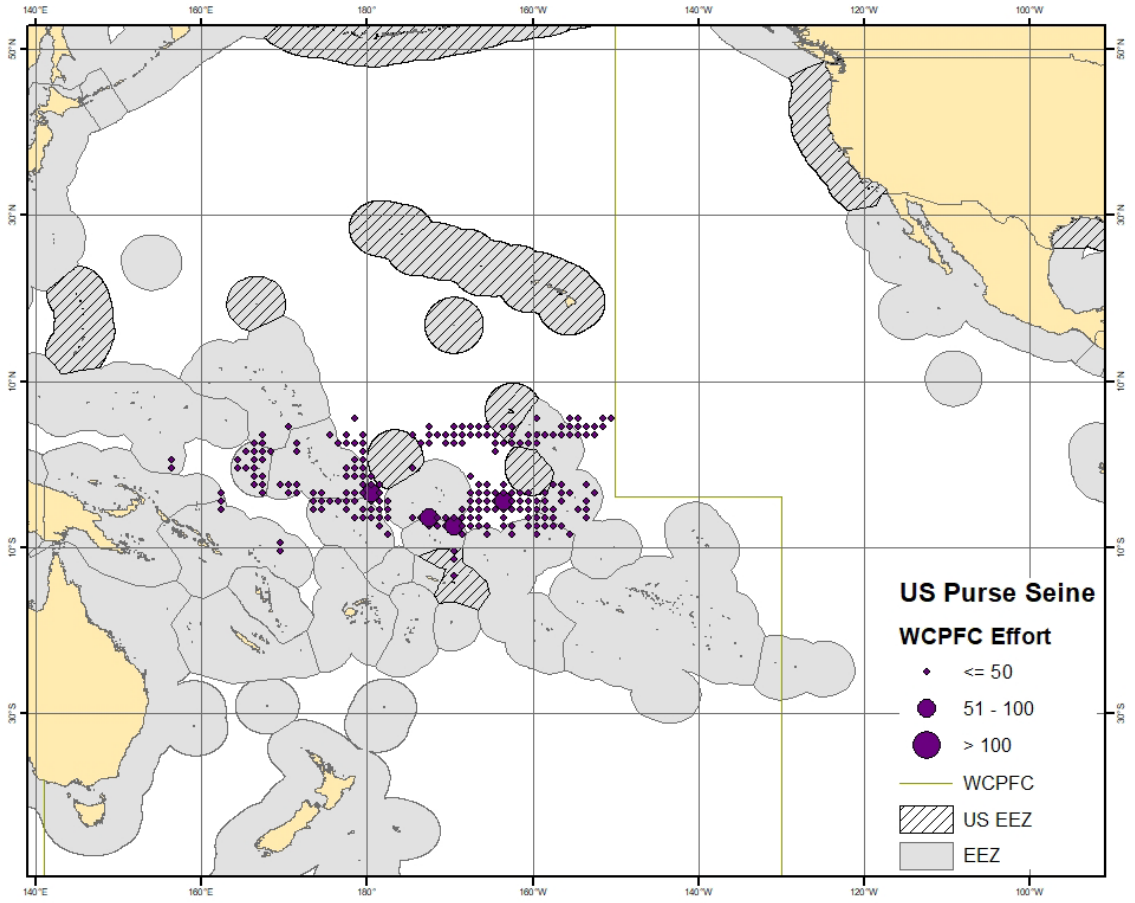

Figure 1. Spatial distribution of fishing effort (fishing sets) reported in logbooks by U.S.-flagged purse seine vessels the Pacific Ocean in 2021 (preliminary data). Effort in some areas is not shown to preserve data confidentiality.

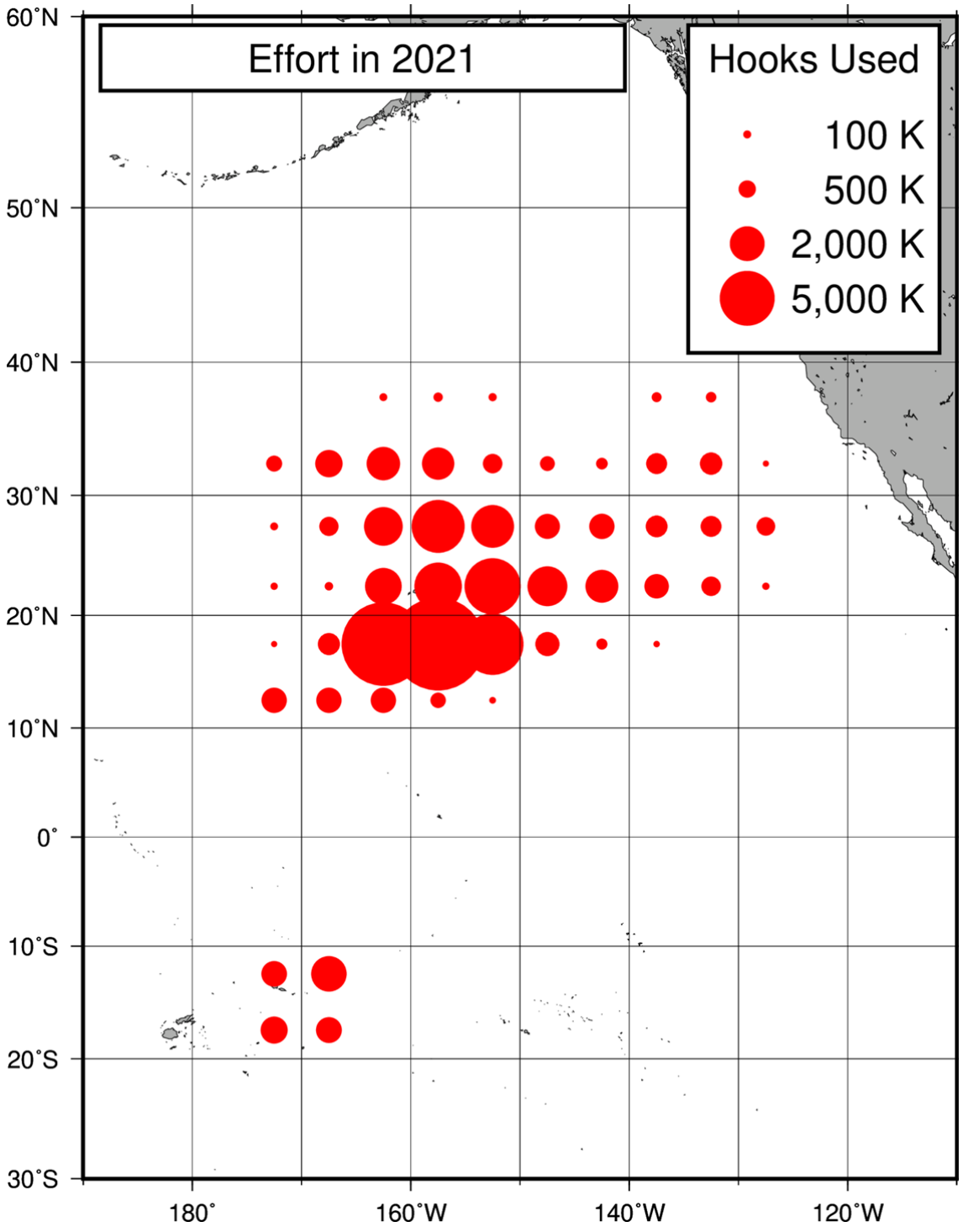

Figure 2a. Spatial distribution of fishing effort (K=1,000 hooks) reported by U.S.-flagged longline vessels in 2021 proportional to effort (preliminary data). Effort in some areas is not shown to preserve data confidentiality.

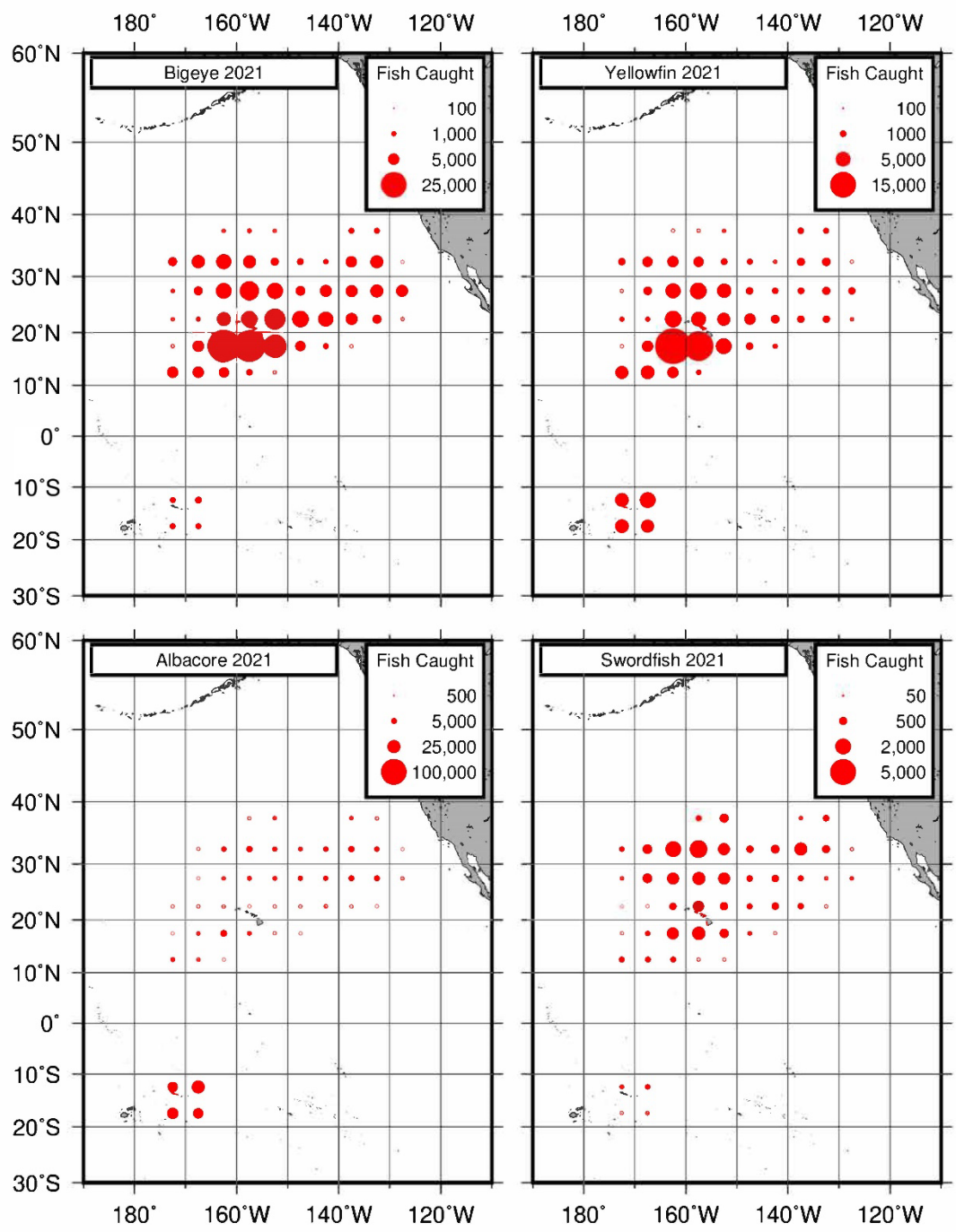

Figure 2b. Spatial distribution of catch by U.S.-flagged longline vessels, in numbers of fish (includes retained and released catch), in 2021 (preliminary data). Catches in some areas are not shown to preserve data confidentiality.

Background

[n/a]

Flag State Reporting of National Fisheries

U.S. Purse seine Fishery

The U.S. purse seine catch of tunas in the WCPO was 50,479 t in 2021, decreasing from 137,406 t in 2020. Total catch was primarily composed of skipjack tuna, with smaller catches of yellowfin and bigeye tuna. The total catches of tunas have fluctuated over the past 5 years (Tables 1a-1e) and 2021 saw the lowest catch of skipjack tuna on record. The number of vessels in 2021 was 19 vessels, continuing a decreasing trend over the past five years (Table 2a). The fishery continued to operate further eastward, and not as far northward as in prior years, mainly in areas between 5° N and 15° S latitude and 155° E and 135°W longitude (Figure 1).

U.S. Longline Fisheries

The longline fisheries of the United States and the Territory of American Samoa in the WCPO include vessels based in Hawaii, California, and American Samoa. The total number of longline vessels active in the WCPO has remained relatively consistent over the past five years with 149 participating vessels in 2021 compared to 146 vessels in 2020 (Table 2a). The U.S. longline fishery in the NPO consistently had the highest number of vessels in operation with 137 vessels in 2021. Participation in the American Samoa-permitted fleet operating in the South Pacific declined to 11vessels in 2020 and remained at 11 vessels in 2021. A few vessels occasionally operated in both the Hawaii-permitted and American Samoa-permitted longline fisheries during 2017–2021. Longline catches made outside of the U.S. EEZ in NPO by vessels operating with both American Samoa and Hawaii longline permits and landing their fish in Hawaii belong to the longline fishery of American Samoa and not to the U.S. longline fishery in the NPO in accordance with federal fisheries regulations (50 *CFR* 300.224).

These American Samoa longline landings in the NPO (labeled as American Samoa in the NPO in Table 1f) are shown separately from U.S. longline catches in the NPO. The table entries for American Samoa (Table 1f) include its catches in the South Pacific landed in American Samoa. The overall American Samoa fishery total is the sum of its catches in the South Pacific and in the NPO attributed to American Samoa. Pursuant to the Consolidated and Further Continuing Appropriations Act (CFCAA) of 2011 (Pub. L. 112-55, 125 Stat. 552 et seq.) and NMFS regulations under 50 *CFR* 300.224, if the U.S. vessel landing the fish was included in a valid arrangement under Sec. 113(a) of the CFCAA or Amendment 7 of the Pelagics Fishery Ecosystem Plan, its catch during those periods was attributed to the fishery of American Samoa in the NPO from 2011 to 2012 and 2017 to 2021, to CNMI during 2013 through 2021, and to Guam in 2015 and 2016. Under the Amendment 7 arrangements (2014 through 2021 only bigeye tuna was attributed to the participating territory and all other incidental catch was attributed to the Hawaii-based fishery).

The U.S. longline fishery in the NPO operated mainly from the equator to 40° N latitude and from 120° W to 175° W in 2021 (Figure 2a). The American Samoa-based longline fishery operated mostly from 10° S to 20° S latitude and 165° W to 175° W longitude in 2021 (Figure 2a). The U.S. longline fishery in the NPO fishery targeted bigeye tuna and swordfish, with significant landings of associated pelagic species, whereas the American Samoa longline fishery in the SPO targeted albacore, but also produced a noteworthy amount of yellowfin tuna. Pacific bluefin tuna catches are sometimes reported on longline log sheets for the American Samoa fishery, however the species may be misidentified (Tables 1a-1f). The dominant components of the longline catch by the United States and its Territories in 2021 were bigeye tuna, albacore, yellowfin tuna, and swordfish (Table 1a, Figure 2b). The total catch of all species during the past 5 years ranged from a high of 13,259 t in 2017 to a low of 10,483 t in 2020 with an increase to 11,411 t in 2021 (Tables 1a-1e).

Most of the U.S. longline fishery in the NPO involved deep set longline effort directed towards tunas. Despite an ongoing global Covid-19 pandemic, high ex-vessel tuna prices along with relatively lower operating expenses in this sector of the U.S. longline fishery in the NPO motivated longline fishers to continue targeting bigeye tuna.

U.S. longline landings of swordfish in the NPO (including Territories) varied substantially and fell from a high of 967 t in 2017 to a low of 306 t in 2020 and a rise to 573 t in 2021. The shallow set U.S. longline fishery for swordfish accounts for the majority of the swordfish catch and has operated under the allowable number of sea turtle interaction limits in 13 out of 18 years since its reopening in 2004.

U.S. Albacore Troll Fisheries

In recent years, participation in the U.S. troll fisheries for albacore in the WCPO has fluctuated greatly. Twenty-one vessels participated in the South Pacific albacore troll fishery in 2021 compared to 9 vessels in 2019 (Table 2). The South Pacific albacore troll fishery operates mostly between 30° S and 45° S latitude and 145° W and 175° W longitude. The catch in this fishery is composed almost exclusively of albacore. The albacore troll catches in the WCPO by both the U.S. North Pacific and South Pacific albacore troll fisheries decreased from 1,926 t in 2020 to 654 t in 2021 (Tables 1a-1e).

Other Fisheries of the United States and Participating Territories

Other fisheries of the United States and Participating Territories include the small-scale tropical troll, handline, and pole-and-line fleets, as well as miscellaneous recreational and subsistence fisheries. In American Samoa, Guam, and CNMI these fisheries are monitored by creel surveys, and the data are included in the tropical troll statistics, as this fishing method is the one most commonly used in the recreational and subsistence fisheries in these areas. Most of the vessels comprising the United States and Participating Territories tropical troll fishery, and all of the U.S. handline and pole-and-line vessels are located in Hawaii. The total catch by these fisheries was 1,513 t in 2021. The catch was composed primarily of yellowfin tuna, skipjack tuna, bigeye tuna, and mahimahi.

Coastal State Reporting

[n/a]

Socioeconomic Factors and Trends in the Fisheries

Socio-economic Surveys and Analyses

NMFS staff and colleagues have conducted surveys and analyses to better understand the socioeconomic considerations of U.S. fisheries in the WCPO.

Relevant Publications

Chan HL, Pan M. 2021. Fishing trip cost modeling using generalized linear model and machine learning methods - A case study with longline fisheries in the Pacific and an application in Regulatory Impact Analysis. PLoS ONE. 16(9):e0257027

Hospital J, Leong K. 2021. Community Participation in Hawai'i Commercial Fisheries. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-89, 213 p

Iwane M, Leong KM, Kleiber D. 2021. Non-commercial Fishing in Policy, Practice, and Culture: Insights from the Papahanaumokuakea Marine National Monument. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-114, 43 p

Leong KM, Oleson KLL, Suan A. 2021. Automated content analysis of the Hawaii small boat fishery survey reveals nuanced, evolving conflicts. Ecology and Society 26(4): 9 p

Pan M. 2021. Maximum Economic Yield and Non-Linear Catchability. North American Journal of Fisheries Management. 41(5) 1229-1245 https://doi.org/10.1002/nafm.10661

Disposition of Catch

The purse seine catch is stored onboard as a frozen whole product. Most of the catch has historically been off-loaded to canneries in Pago Pago, American Samoa; however, some vessels transship their catches in the ports of other Pacific Island countries to canneries in Southeast Asia or off-load their catches in Latin America and South America. Cannery products from American Samoa are typically destined for U.S. canned tuna markets. Catches of non-tuna species are consumed onboard the vessel or discarded at sea.

U.S. longline vessels in the NPO store their catch on ice and deliver their product to the market as a fresh product. Large tunas, marlins, and mahimahi are gilled and gutted before storage on the vessel, swordfish are headed and gutted, and the rest of the catch is kept whole. These products are primarily sold fresh locally in Hawaii to restaurants and retail markets, or air freighted to U.S. mainland destinations with a very small proportion of high quality bigeye tuna exported to Japan. The American Samoa-based longline albacore catch is gilled and gutted and delivered as a frozen product to the cannery in Pago Pago, American Samoa. Other associated catch is either marketed fresh (for vessels making day trips) or

frozen (for vessels making extended trips).

The catch in the albacore troll fishery in the South Pacific is frozen whole. Most vessels offload their catches in New Zealand or Canada. The other fisheries store their catch in ice. Large tunas are gilled and gutted while other species are kept whole. The small-scale tropical troll fisheries chill their products with ice and sell it fresh, mainly to local markets.

Onshore Developments

[n/a]

Future Prospects of the Fisheries

As a result of the global Covid-19 related pandemic in 2020 and 2021 resulting in a lower demand for fresh tuna in Hawaii and the U.S. mainland, the future prospect for the U.S. longline fishery in the NPO is uncertain. This sector of the longline fishery is already constrained by catch limits for bigeye tuna in the WCPO & EPO. The U.S. longline fishery bigeye tuna limit in the WCPO was 3,554 t in 2015 and 2016 decreased to 3,138 t in 2017 and increased back to 3,554 t from 2018 to 2021. In 2021 the longline fishery exceeded the 3,554 t limit. In 2018 to 2021, the bigeye tuna catch limit in the eastern Pacific Ocean (EPO) established pursuant to decisions of the Inter-American Tropical Tuna Commission (IATTC) was increased from 500 t to 750 t for vessels >24 m in length. About 30 Hawaii-permitted and California longline vessels >24 m were active in the EPO in 2021. Bigeye tuna catch in the EPO by longline vessels >24 m was 381 t in 2021, down from 508 t in 2019, and well below the 750 t catch limit.

The effort by the shallow set sector targeting swordfish declined during 2013–2021 despite the removal of the effort restriction in 2006 and revised sea turtle interaction limits in 2012 (26 leatherback and 34 loggerhead sea turtles). The shallow set longline fishery was closed early in 2018, 2019, and again in 2020, as a result of reaching a turtle take limit that a Court Order reset to the pre-2012 take limits to pre-2012 (16 leatherback and 17 loggerhead sea turtles). The bigeye tuna catch limits do not affect the shallow set longline fishery as adversely as the deep set sector since this species represents only a small proportion of its catch. The shallow set longline fishery for swordfish is also highly seasonal and coincides with a seasonal abundance in sea turtles in the same areas that the swordfish fishery targets, but not in an area that the deep set sector usually targets.

Fuel costs increased slightly throughout 2019, but decreased in response to the Covid-19 pandemic in 2020 with increases starting again in early 2021, whilst prices for supplies and goods remained constant or increased slightly. The future price of fuel is also highly uncertain for 2022 and this uncertainty may hinder the economic performance of both sectors of the longline fishery. Other issues facing both sectors of the U.S. longline fishery in the NPO are exceeding false killer whale (*Pseudorca crassidens*) interaction limits in the main Hawaiian Islands EEZ and the 2016 expansion of the NWHI Monument out to the 200-mile EEZ. The U.S. longline fishery in the NPO is expected to continue targeting bigeye tuna and swordfish as well as catch of other associated pelagic species and deliver them fresh to service both local and

mainland markets.

Catches by the American Samoa longline fishery in the South Pacific decreased from years 2017 to 2020 and were at a 5-year low in 2020, but saw a slight increase in 2021 (Table1f). Despite declining catches, the American Samoa longline fishery in the South Pacific is expected to continue targeting albacore and delivering their catch frozen to the cannery in Pago Pago, American Samoa.

The prospect of participation and catch from the U.S. small-scale troll and handline fisheries is expected to be fairly stable although these fisheries are challenged by an uncertain economy and the uncertainty of fish prices. The main Hawaiian Island troll and handline fisheries are expected to continue to make single-day trips targeting tunas, billfish, and other pelagic fish, and deliver their catch fresh to local markets.

Status of Fisheries Data Collection Systems

Logsheet Data Collection and Verification

Various sources of data are used to monitor U.S. pelagic fisheries. The statistical data systems that collect and process fisheries data consist of logbooks and fish catch reports submitted by fishers, at- sea observers, and port samplers; market sales reports from fish dealers; and creel surveys. The coverage rates of the various data systems vary considerably.

The primary monitoring system for the major U.S. fisheries (purse seine, longline, and albacore troll) in the WCPO consists of the collection of federally mandated logbooks that provide catches (in numbers of fish or weight), fishing effort, fishing location, and some details on fishing gear and operations. U.S. purse seine logbook and landings data are submitted as a requirement of the South Pacific Tuna Treaty (100% coverage) since 1988. The Hawaii, California, and American Samoa-based longline fisheries are monitored using the NOAA Fisheries Western Pacific Daily Longline Fishing Logs for effort and resulting catch. Electronic reporting of daily fishing logbooks began testing and implementation in 2019 and was mandated for use in the entire Hawaii longline fleet in 2021. The use of electronic reporting throughout the fleet is expected to assist in better real-time estimates of bigeye tuna catch. The coverage of logbook data is assumed to be complete (100%); for the American Samoa fishery, there may be under-reporting of a very small percentage of trips which can be estimated via a creel survey that monitors catch by small longline vessels. Beginning in 1995, all U.S. vessels fishing on the high seas have been required to submit logbooks to NOAA Fisheries.

In Hawaii, fish sales records from the Hawaii Division of Aquatic Resources (DAR) Commercial Marine Dealer Report database are an important supplementary source of information, covering virtually 100% of the Hawaii-based longline landings. The Western Pacific Fisheries Information Network (WPacFIN) has improved its procedures for integrating Hawaii fisheries catch data (numbers of fish caught, from logbooks) and information on fishing trips from fishermen's reports with fish weight and sales data from the dealers' purchase reports. As a result, data on the weight and value of most catches on a trip

level can be linked. This integration of data provides average fish weight data by gear type, time period, and species that are used to estimate total catch weights for the Hawaii fisheries in this report. Other enhancements to this integration are under development, such as linking the weight of longline-caught fish from the Hawaii Marine Dealer Report records with the Hawaii-based longline logbook data to approximate the weight of catch by geographic location. In addition, species misidentifications on a trip level have been corrected by cross-referencing the longline logbook data, the Hawaii Marine Dealer Report data, and data collected by NOAA Fisheries observers deployed on Hawaii-based longline vessels (see below). Information on these corrections has been published, but is not yet operationally applied to routine data reporting (i.e., the data reported here).

Small-scale fisheries in Hawaii, i.e., tropical troll, handline, and pole-and-line, are monitored using the Hawaii DAR Commercial Fishermen's Catch Report data and Commercial Marine Dealer Report data. The tropical troll fisheries in American Samoa, Guam, and CNMI are monitored with a combination of Territory and Commonwealth creel survey and market monitoring programs, as part of WPacFIN.

Observer Programs

U.S. purse seine vessels operating in the WCPO under the Treaty on Fisheries between the Governments of Certain Pacific Island States and the United States of America (The South Pacific Tuna Treaty) pay for, and are monitored by, observers deployed by the Pacific Islands Forum Fisheries Agency (FFA). Monitoring includes both the collection of scientific data as well as information on operator compliance with various Treaty- related and Pacific Island country (PIC)-mandated requirements. These data are not described here. NOAA Fisheries has a field station in Pago Pago, American Samoa, that facilitates the placement of FFA-deployed observers on U.S. purse seine vessels.

Starting on January 1, 2010, the observer coverage rate in the U.S. purse seine fishery in the Convention Area has been 100%. Data collected under this arrangement by FFA-deployed observers are currently provided directly to the WCPFC. In 2020, the WCPFC suspended purse seine observer coverage requirements in response to the COVID-19 pandemic, and this suspension has been in effect for U.S. purse seine vessels since April 2020.

Under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region established under the Magnuson-Stevens Fishery Conservation and Management Act, observers are required to be placed aboard Hawaii-based pelagic longline vessels targeting swordfish (shallow set, 100% coverage) and tunas (deep set, 20% coverage) and American Samoa-based longline vessels targeting tuna (deep set, 20% coverage). In 2020, observer coverage minimum requirements were temporarily waived in response to a global pandemic (Covid-19) and observer coverage rates were below 20% from March-December of 2020.

The main focus of the longline observer program is to collect scientific data on interactions with protected species. The observer program also collects relevant information on fishing operations, fish catch, and on the biology of target and non-target species. Fish catch data

collection now includes measurement of a systematic subsample of 33% of all fish brought on deck, including bycatch species. Prior to 2006, observers attempted to measure 100% of tunas, billfishes and sharks brought on deck, but not other species. Researchers use observer-collected protected species data to estimate the total number of interactions with those species.

For the U.S. longline fishery in the NPO, there were observers on 345 trips out of a total of 1,671 trips, resulting in a coverage rate of 20.6%. These coverage statistics are from 2021 reports of the NOAA Pacific Islands Regional Observer Program (PIROP) and are based on longline trips that departed with observers in calendar year 2021.

Per reporting requirements agreed to at WCPFC 11, Table 3 contains estimates on observer coverage in U.S. longline fisheries for 2021 in the WCPFC Area exclusive of the U.S. EEZ.

Table 3. Observer coverage in 2021 of the U.S. longline fisheries in the WCPFC Area exclusive of the U.S. EEZ.

Fishery	Number of Hooks			Days Fished			Number of Trips		
	Total Estimated	Observed	%	Total Estimated	Observed	%	Total Estimated	Observed	%
Hawaii and California-based	32,338,798	6,953,827	22	11,339	2,745	24	1,206	275	23
American Samoa	0	0	0	0	0	0	0	0	0

Fishery Interactions with Protected Species

Information on estimated fishery interactions with non-fish species by the Hawaii-based longline fishery during 2017–2021 is provided in Tables 4a-4c. For the American Samoa-based component of the U.S. longline fishery, scientists have not yet provided rigorous estimates of the total interactions with protected species.

CMM 2011-01 requires CCMs to report instances in which cetaceans have been encircled by purse seine nets of their flagged vessels. In 2021, no instances of interactions with individual marine mammals were reported.

CMM 2011-04 requires CCMs to estimate the number of releases of oceanic whitetip sharks (*Carcharhinus longimanus*) including their status upon release. For the U.S. purse seine fishery observer data indicates that there were 171 oceanic whitetip sharks released in 2021 (135 alive and 36 dead). In the longline fishery updated 2021 data are still pending, but previous years' data indicates that of the 1,030 oceanic whitetip sharks reported released an estimated 1,010 fish were released alive and 20 fish were released dead.

CMM 2012-04 requires CCMs to report instances in which whale sharks (*Rhincodon typus*) have been encircled by purse seine nets of their flagged vessels. In 2021, no purse seine vessels reported interactions with individual whale sharks.

CMM 2013-08 requires CCMs to estimate the number of releases of silky sharks

(*Carcharhinus falciformis*) including their status upon release. For the U.S. purse seine fishery, information available indicate that there were 5,185 silky sharks released in 2020 (1,010 alive and 4,148 dead). In the longline fishery updated 2021 data are still pending, but previous years' data indicate that of the 763 silky sharks released in 2021, an estimated 610 were released alive and 153 were released dead.

Table 4a. Estimated total numbers of fishery interactions (not necessarily resulting in mortalities or serious injury) with non-fish species by shallow set and deep set (combined) longline fishing in the Hawaii-based fishery during 2017–2021[2].

Species	2021	2020	2019	2018	2017
Marine Mammals					
Striped dolphin (*Stenella coeruleoalba*)				1	1
Common dolphin (*Delphinus delphis, D. capensis)*					
Bottlenose dolphin (*Tursiops truncatus*)	3	10		4	7
Risso's dolphin (*Grampus griseus*)		16	7	2	7
Blainville's beaked whale (*Mesoplodon blainvillei*)					
Bryde's whale (*Balaenoptera edeni*)					
False killer whale (*Pseudorca crassidens*)	15	23	75	49	45
Ginkgo-toothed beaked whale (*Mesoplodon*					
Shortfinned pilot whale (*Globicephala*	1				
Rough-toothed dolphin (*Steno bradenensis*)	2	29	4		
Northern elephant seal (*Mirounga angustirostris*)					
Humpback whale (*Megaptera novangliae*)					
Pygmy sperm whale (*Kogia Breviceps*)					
Fin whale (*Balaenoptera physalus)*					
Guadalupe fur seal (*Arctocephalus townsendi*)		7			3
Unspecified false killer or shortfinned pilot whale			6	4	
Unidentified Cetacean (*Cetacea*)	4	23	10	15	18
Unidentified Pinniped *(Pinnipedia*)					
Unspecified member of beaked whales (*Ziphiidae*)	1	6	7		6
Unspecified eared seal (*Otariidae*)		2	1		
Unidentified Kogia Whale		4			
Unidentified earless seal			1		
Total Marine Mammals	**26**	**120**	**111**	**75**	**87**

Sea Turtles	**2021**	**2020**	**2019**	**2018**	**2017**
Loggerhead turtle (*Caretta caretta*)	21	34	20	42	28
Leatherback turtle (*Dermochelys coriacea*)	11	32	14	28	4
Olive Ridley turtle (*Lepidochelys olivacea*)	48	79	140	97	123
Green turtle (*Chelonia mydas*)	18	13	12	18	20
Unidentified hardshell turtle (Cheloniidae)	1	0			5
Total Sea Turtles	**99**	**158**	**186**	**185**	**175**

[2] The estimates are made by raising the number of observed interactions by a factor determined according to the design of the observer sampling program. The counts for the 2021 marine mammals are the total observed. The species listed are those that have been observed. Sources: Pacific Islands Regional Office observer program reports (http://www.fpir.noaa.gov/OBS/obs_qrtrly_annual_rprts.html) and Pacific Islands Fisheries Science Center Internal Reports. Hawaii-based longline logbook reported data on fish discards are available at http://www.pifsc.noaa.gov./fmsd/reports.php

Table 4b. Effort and observed seabird captures 2017-2021 for Hawaii-based longline fishery for north of 23° N and 23° N – 30° S areas combined. Rate is observed captures per 1,000 hooks.

	Fishing Effort				Observed Seabird Captures	
Year	Number of Vessels	Number of Hooks	Observed Hooks	% Hooks Observed	Number	Rate
2017	142	54,630,336	11,199,621	20.50	192	0.02
2018	142	54,482,420	11,114,413	20.40	249	0.02
2019	146	63,349,796	13,322,564	21.03	226	0.02
2020	143	58,763,329	9,326,492	15.87	188	0.02
2021	143	64,985,095	12,427,023	19.12	184	0.01

Table 4c. Total number of observed seabird captures by species in Hawaii-based longline fishery 2017-2021 for north of 23° N and 23° N – 30° S areas combined. Observed capture numbers for 2021 by area are preliminary.

	2021	2021	2020	2020	2019	2019	2018	2018	2017	2017
Species	**>23° N**	**23° N – 30° S**	**>23° N**	**23° N – 30° S**	**>23° N**	**23° N – 30° S**	**>23° N**	**23° N – 30° S**	**>23° N**	**23° N – 30° S**
Blackfooted albatross (*Phoebastria nigripes*)	109	23	70	31	137	28	192	10	137	148
Laysan albatross (*Phoebastria diomedia*)	46	2	77	8	57	3	35	0	44	44
Unidentified albatross (*Diomedeidae*)										
Red-footed booby (*Sula sula*)							1			
Brown booby (*Sula leucogaster*)				1		1		1		
Sooty shearwater (*Ardenna grisea*)	1			1						
Unidentified shearwater (*Procellariidae*)	3						10			
	159	**25**	**147**	**41**	**194**	**32**	**238**	**11**	**181**	**182**

Table 4d. Mitigation types mandated for use in Hawaii based longline fishery are regulated by type of set, location of set, and method employed to set (side setting or stern setting). NS = night setting, WB = weighted branch lines, SS = side setting, BC = bird curtain, BDB = blue dyed bait, DSLS = deep setting line shooter, MOD = management of offal discharge.

Fishery type/location	Combination of Mitigation Measures mandated	Proportion of observed effort using mitigation measures 2012-2021
When setting from stern:		
Shallow set (anywhere)	**BDB + WB + MOD + NS**	100%
Deep set (North of 23° N)	**BDB + WB + MOD + DSLS**	100%
When setting from side:		
Shallow set (anywhere)	**SS + DSLS + BC + WB + NS**	100%
Deep set (North of 23° N)	**SS + DSLS + BC + WB**	100%

Port Sampling

N/A

Unloading / Transshipment

Information on the quantities transshipped and the number of transshipments by the U.S. longline and purse-seine fisheries in 2021 is provided in Table 5.

For the U.S. purse-seine fishery in the WCPFC Statistical Area, approximately 5% of the total landings of yellowfin, skipjack, and bigeye were transshipped to foreign ports for processing in 2021. There were an estimated 7 transshipments of purse-seine-caught fish in port in 2021.

There was no available information on transshipments for the longline fishery, albacore troll fishery, or any other HMS gear type in 2021.

Table 5. Information on quantities transshipped and numbers of transshipments of HMS species by U.S. purse seine fisheries in 2021 to satisfy reporting requirements of CMM 2009-06.

Gear Type		Purse Seine	
	2021	Quantities Transshipped	Number of Transshipments
Offloaded	Transshipped in port	2,447	7
	Transshipped at sea in areas of national jurisdiction	0	0
	Transshipped beyond areas of national jurisdiction	0	0
Received	Transshipped in Port	0	0
	Transshipped at sea in areas of national jurisdiction	0	0
	Transshipped beyond areas of national jurisdiction	0	0
Transshipped inside the Convention Area		2,477	7
Transshipped outside the Convention Area		0	0
Caught inside the Convention Area		2,477	7
Caught outside the Convention Area		0	0
Species	BET	74	
	SKJ	2,150	
	YFT	223	
Product Form	Fresh	0	
	Frozen	2,447	

Scientific Survey Data

Relevant Publications

Becker EA, Forney KA, Oleson EM, Bradford AL, Moore JE, Barlow J. 2021 Habitat-based density estimates for cetaceans within the waters of the U.S. Exclusive Economic Zone around the Hawaiian Archipelago. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-116, 38 p

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Gilmour ME, Adams J, Block BA, Caselle JE, Friedlander AM, Game ET, Hazen EL, Holmes ND, Lafferty KD, Maxwell SM, McCauley DJ, Oleson EM, Pollock K, Shaffer SA, Wolff NH, Wegmann A. 2022 Evaluation of MPA designs that protect highly mobile megafauna now and under climate change scenarios. Global Ecology and Conservation. Volume 35: e02070

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Research Activities

Highlights:

Emergent research and priorities for shark and ray conservation

Over the past 4 decades there has been a growing concern for the conservation status of elasmobranchs (sharks and rays). In 2002, the first elasmobranch species were added to Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Less than 20 years later, there were 39 species on Appendix II and 5 on Appendix I. Despite growing concern, effective conservation and management remain challenged by a lack of data on population status for many species, human−wildlife interactions, threats to population viability, and the efficacy of conservation approaches. This large study surveyed 100 of the most frequently published and cited experts on elasmobranchs and, based on ranked responses, prioritized 20 research questions on elasmobranch conservation. To address these questions, the authors then convened a group of 47 experts from 35 institutions and 12 countries. The 20 questions were organized into the following broad categories: (1) status and threats, (2) population and ecology, and (3) conservation and management. For each section, we sought to synthesize existing knowledge, describe consensus or diverging views, identify gaps, and suggest promising future directions and research priorities. The resulting synthesis aggregates an array of perspectives on emergent research and priority directions for elasmobranch conservation (Hutchinson and Cortes, 2022).

Net illumination reduces fisheries bycatch, maintains catch value, and increases operational efficiency

In this study NOAA researchers used controlled experiments along Mexico's Baja California peninsula to show that illuminating gillnets with green LED lights-an emerging technology originally developed to mitigate sea turtle bycatch-significantly reduced mean rates of total discarded bycatch biomass by 63%, which included significant decreases in elasmobranch (95%), Humboldt squid (81%), and unwanted finfish (48%). Moreover, illuminated nets significantly reduced the mean time required to retrieve and disentangle nets by 57%. In contrast, there were no significant differences in target fish catch or value. These findings advance our understanding of how artificial illumination affects operational efficiency and changes in catch rates in coastal gillnet fisheries, while illustrating the value of assessing broad-scale ecological and socioeconomic effects of species-specific conservation strategies (Senko et al., 2022).

Patterns of depredation in the Hawai‘i deep-set longline fishery informed by fishery and false killer whale behavior

False killer whales (Pseudorca crassidens) depredate bait and catch in the Hawai‘i-based deep-set longline fishery, and as a result, this species is hooked or entangled more than any other cetacean in this fishery. This NOAA study analyzed data collected by fisheries observers and from satellite-linked transmitters deployed on false killer whales to identify patterns of odontocete depredation that could help fishermen avoid overlap with whales. Odontocete depredation was observed on ˜6% of deep-set hauls across the fleet from 2004 to 2018. Model outcomes from binomial GAMMs suggested coarse patterns, for example, higher rates of depredation in winter, at lower latitudes, and with higher fishing effort. However, explanatory power was low, and no covariates were identified that could be used in a predictive context. The best indicator of depredation was the occurrence of depredation on a previous set of the same vessel. Researchers identified spatiotemporal scales of this repeat depredation to provide guidance to fishermen on how far to move or how long to wait to reduce the probability of repeated interactions. The risk of depredation decreased with both space and time from a previous occurrence, with the greatest benefits achieved by moving ˜400 km or waiting ˜9 d, which reduced the occurrence of depredation from 18% to 9% (a 50% reduction). Fishermen moved a median 46 km and waited 4.7 h following an observed depredation interaction, which analysis suggests is unlikely to lead to large reductions in risk. Satellite-tagged pelagic false killer whales moved up to 75 km in 4 h and 335 km in 24 h, suggesting that they can likely keep pace with longline vessels for at least four hours and likely longer. The authors recommend fishermen avoid areas of known depredation or bycatch by moving as far and as quickly as practical, especially within a day or two of the depredation or bycatch event. They also encourage captains to communicate depredation and bycatch occurrence to enable other vessels to similarly avoid high-risk areas (Fader et al., 2021)

Quantifying the accuracy of shark bycatch estimations in tuna purse seine fisheries

Estimating bycatch is essential for monitoring the ecological impacts of a fishery in order to set management and mitigation priorities. Purse seine vessels targeting tropical tunas incidentally catch pelagic sharks (mainly silky and oceanic whitetip sharks), which are brought onboard and can be observed on the upper and lower decks. Currently, single onboard observers can only be

efficiently stationed on one of the two decks, and thus often rely on information provided by the crew to complement their bycatch estimations. In this study, NOAA used dedicated scientists strategically positioned during fishing sets in order to establish a reference count of captured sharks during conventional commercial fishing trips. They then assessed the accuracy of the counts made by observers onboard during the same fishing trips in the Pacific Ocean (where observers estimate catch of target species and bycatch estimation is a lower priority) and the Atlantic Ocean (where observers' focus is on bycatch) and Electronic Monitoring System (EMS) in the Indian Ocean. A total of 74 fishing sets conducted during four purse seine fishing trips revealed that shark counts were underestimated for 50–100 percent of the sets, with the mean shark count underestimation, at the fishing trip level, ranging from 9 to 40 percent (onboard observers) and 65 percent for EMS. Given the importance of monitoring populations of vulnerable species, the authors strongly encourage specific studies during which the complementary counts of two onboard observers are used simultaneously to assess the accuracy of various EMS configurations, bearing in mind that single onboard observers appear to underestimate the number of captured sharks (Forget et al., 2021).

Relevant Publications

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