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PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

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UNITED STATES OF AMERICA

2010 Annual Report to the Western and Central Pacific Fisheries Commission

United States of America

PART I. INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS [1]
(For 2009)

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 2010	No
If no, please indicate the reason(s) and intended actions:	Submitted 10 June 2010

Summary

Large-scale fisheries of the U.S. 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 species; and a troll fishery for albacore. Small-scale fisheries include troll fisheries for a wide variety of tropical tunas and associated species, handline fisheries for yellowfin and bigeye tuna, and a pole-and-line fishery for skipjack tuna. Associated species include other tunas and billfishes, mahimahi (*Coryphaena hippurus*), and wahoo (*Acanthocybium solandri*). The large-scale fisheries operate on the high seas, and some also operate within the U.S. exclusive economic zone (EEZ), and within the EEZs of other nations. The tropical troll fisheries operate in nearshore waters around Hawaii and the U.S. Participating Territories of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam. The other small-scale fisheries (tropical handline, pole-and-line) operate in Hawaiian waters.

Overall trends in estimated annual catch by U.S. and Participating Territory fisheries in the Western and Central Pacific Fisheries Commission (WCPFC) statistical area in 2009 are dominated by the largest sector, the purse seine fishery. Preliminary 2009 purse seine estimates are known to be significant underestimates of actual catch due to data management delays. U.S. purse seine catch in 2008 have been revised upwards to 209,374 metric tons (t) from last year's preliminary estimate of about 158,000 t. Revised catch estimates include 159,740 t of skipjack tuna, 45,363 t of yellowfin tuna, and 4,220 t of bigeye tuna. Updated estimates for 2009 are expected to be greater than the updated 2008 estimates. Longline catch estimates in 2009 decreased from 2008 after peaking in 2007. Bigeye tuna and albacore catch by longliners declined from record highs of 5,599 t and 5,426 t, respectively, in 2007 to 4,029 t and 4,086 t,

[1] PIFSC Data Report DR-10-009
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respectively, in 2009. Excluding catch by the U.S. Participating Territories (i.e., American Samoa), longline catch of bigeye tuna declined to 3,709 t in 2009 from 4,649 t in 2008, and from the peak of 5,381 t in 2007. Swordfish longline catch of 1,209 t in 2009 remained virtually the same as in 2008, slightly less than the peak of 1,441 t in 2007. Small-scale (tropical) trollers and handliners operating in Pacific Island waters represented the largest number of U.S. flagged vessels but contributed a small fraction of the catch. The longline fleet was the next largest fleet, numbering 151 in 2009.

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries) 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 Service conducts fishery monitoring and socio-cultural research on tunas, billfishes, and animals caught as bycatch in those fisheries. In 2009, NOAA Fisheries Service continued to collect billfish distribution, catch and angler effort information for the International Billfish Angler Survey, summarized shark catch in the Hawaiian longline fishery, and began a study to understand the market impact of regulations on fisheries. Stock assessment research was conducted in collaboration with member scientists of the WCPFC and the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). The stock assessment work is not described in this report.

NOAA Fisheries conducted biological and oceanographic research on tunas, billfishes, and sharks that addressed fish movements, habitat preferences, post-release survival, feeding habits, abundance, maturity, and age and growth. Oceanographic influences on the American Samoa longline fishery for albacore were studied, as well as billfish migration and life history. Several studies on sharks focused on their survival after capture and release. Shark tagging studies continued, and provide an increasing body of migration data. Research on sea turtles and sharks focused bycatch mitigation. The change in seabird bycatch resulting from new regulations was also evaluated.

1.1 ANNUAL FISHERIES INFORMATION

This report presents estimates of annual catches[2] of tuna, billfish, and other highly migratory species (Table 1a-1g), and vessel participation during 2005-2009 (Table 2a-2b) for fisheries of the U.S. and its Participating Territories operating in the western and central Pacific Ocean (WCPO). All statistics for 2009 are preliminary. For the purposes of this report, the WCPO is defined as the Western and Central Pacific Fisheries Commission (WCPFC) Statistical Area. Information on fisheries is provided and pelagic research over the last year is described. The fisheries include large-scale purse seine, longline, and albacore troll fisheries operating on the high seas. The purse seine and longline fisheries also operate within the exclusive economic zone (EEZ) of the U.S., and within the EEZs of other nations. Small-scale tropical troll fisheries operate in nearshore waters around American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and Hawaii (Table 1g), while small-scale handline and pole-and-line fisheries operate only in the Hawaii EEZ.

The purse seine fishery remains the largest U.S. fishery in terms of total annual catch. Preliminary 2009 purse seine estimates are known to be significant underestimates due to data management delays. The updated data for 2008 in this report provides the most current accurate description of the overall fisheries, indicating that the purse seine fishery accounts for about 93%

of the total U.S. and U.S. Participating Territory catch[2] of HMS in the WCPO. The longline, albacore troll, tropical troll, handline, and pole-and-line fisheries account for about 6%, 0.1%, 0.8%, 0.2%, and 0.1% of the total catch, respectively. Catch by the purse seine, tropical troll, handline, and albacore troll fisheries increased while catch by the longline, and pole-and-line fisheries decreased in 2009 in comparison to 2008. U.S. and US Territory fisheries for tunas, billfishes and other pelagic species produced an estimated 226,058 t in 2008 (Table 1b), up from 108,416 t in 2007 (Table 1c). The most recent reliable (2008) data indicates that catch consisted primarily of skipjack tuna (71%), yellowfin tuna (21%), bigeye tuna (4%), and albacore (2%). Catch of all these species except albacore increased in 2008 as compared to 2007, and the greatest increase was for skipjack tuna (up to 160,699 t in 2008 from 76,014 t in 2007).

[2] For the most part, U.S. estimates of catch by weight are based on catch kept due to lack of data on the weight of discarded fish. With the exception of some small-scale fisheries, weight estimates do not include at-sea discards or subsistence or recreational catches. In the future, it may be possible for the longline weight estimates to include at-sea discards, as procedures are developed to estimate discarded fish sizes from observer data.

Table 1a. Estimated weight (in metric tons) of catch for the United States and U.S. Participating Territories by species and fishing gear in the WCPFC Statistical Area, for 2009 (preliminary). Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

Species and FAO code	**Purse seine**	**Longline**	**Albacore troll**	**Tropical troll**	**Handline**	**Pole & line**	**TOTAL**
Albacore (ALB), North Pacific	0	171		3	96	0	270
Albacore (ALB), South Pacific	0	3,915	237	0	0	0	3,915
Bigeye tuna (BET)	3,277	4,029		63	143	0	7,512
Pacific bluefin tuna (PBF)	0	2		0	0	0	2
Skipjack tuna (SKJ)	133,666	266		347	10	214	134,503
Yellowfin tuna (YFT)	11,571	820		469	314	17	13,191
Other tuna (TUN KAW FRI)	470	0		13	3	1	487
TOTAL TUNAS	148,984	9,203	237	895	566	232	159,880
Black marlin (BLM)	0	1		0	0	0	1
Blue marlin (BUM)	0	389		179	1	0	569
Sailfish (SFA)	0	12		0	0	0	12
Spearfish (SSP)	0	103		0	0	0	103
Striped marlin (MLS), North Pacific	0	240		11	0	0	251
Striped marlin (MLS), South Pacific	0	4		0	0	0	4
Other marlins (BIL)	0	0		9	0	0	9
Swordfish (SWO), North Pacific	0	1,290		0	5	0	1,295
Swordfish (SWO), South Pacific	0	12		0	0	0	12
TOTAL BILLFISHES	0	2,051	0	199	6	0	2,256
Blue shark (BSH)	0	9		0	0	0	9
Mako shark (MAK)	0	104		0	0	0	104
Thresher sharks (THR)	0	29		0	0	0	29
Other sharks (SKH OCS FAL SPN TIG CCL)	0	6		0	0	0	6
TOTAL SHARKS	0	148	0	0	0	0	148
Mahimahi (DOL)	0	276		390	18	1	685
Moonfish (LAP)	0	512		0	0	0	512
Oilfish (GEP)	0	203		0	0	0	203
Pomfrets (BRZ)	0	218		0	18	0	236
Wahoo (WAH)	0	257		258	5	0	520
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	0	8		13	0	0	21
TOTAL OTHER	0	1,474	0	661	41	1	2,177
TOTAL	148,984	12,875	237	1,755	613	233	164,460

Table 1b. Estimated weight in metric tons (t) of catch for the United States and the Participating Territories by species and fishing gear in the WCPFC Statistical Area, for 2008 (updated). Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

Species and FAO code	**Purse seine**	**Longline**	**Albacore troll**	**Tropical troll**	**Handline**	**Pole & line**	**TOTAL**
Albacore (ALB), North Pacific	0	298	1	1	28	0	328
Albacore (ALB), South Pacific	0	3,550	150	0	0	0	3,700
Bigeye tuna (BET)	4,220	4,781	0	74	148	0	9,223
Pacific bluefin tuna (PBF)	0	1	0	0	0	0	1
Skipjack tuna (SKJ)	159,740	282	0	375	9	293	160,699
Yellowfin tuna (YFT)	45,363	1,169	0	453	227	23	47,235
Other tuna (TUN KAW FRI)	51	0	0	7	1	4	63
TOTAL TUNAS	209,374	10,081	151	910	413	320	221,249
Black marlin (BLM)	0	0	0	0	0	0	0
Blue marlin (BUM)	0	367	0	180	1	0	549
Sailfish (SFA)	0	11	0	1	0	0	12
Spearfish (SSP)	0	211	0	0	0	0	211
Striped marlin (MLS), North Pacific	0	411	0	14	0	0	425
Striped marlin (MLS), South Pacific	0	1	0	0	0	0	1
Other marlins (BIL)	0	2	0	13	0	0	15
Swordfish (SWO), North Pacific	0	1,301	0	0	6	0	1,307
Swordfish (SWO), South Pacific	0	7	0	0	0	0	7
TOTAL BILLFISHES	0	2,310	0	208	7	0	2,526
Blue shark (BSH)	0	7	0	0	0	0	7
Mako shark (MAK)	0	109	0	0	0	0	109
Thresher sharks (THR)	0	39	0	0	0	0	39
Other sharks (SKH OCS FAL SPN TIG CCL)	0	4	0	0	0	0	4
TOTAL SHARKS	0	160	0	0	0	0	160
Mahimahi (DOL)	0	335	0	309	18	1	663
Moonfish (LAP)	0	415	0	0	0	0	415
Oilfish (GEP)	0	178	0	0	0	0	178
Pomfrets (BRZ)	0	224	0	1	16	0	241
Wahoo (WAH)	0	326	0	273	5	0	604
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	0	14	0	8	0	0	22
TOTAL OTHER	0	1,493	0	591	39	1	2,123
TOTAL	209,374	14,043	151	1,709	459	321	226,058

Table 1c. Estimated weight in metric tons (t) of catch for the United States and the Participating Territories by species and fishing gear in the WCPFC Statistical Area, for 2007. Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

Species and FAO code	**Purse seine**	**Longline**	**Albacore troll**	**Tropical troll**	**Handline**	**Pole & line**	**TOTAL**
Albacore (ALB), North Pacific	0	243	0	3	94	0	340
Albacore (ALB), South Pacific	0	5,183	272	0	0	0	5,455
Bigeye tuna (BET)	2,985	5,599	0	63	324	0	8,970
Pacific bluefin tuna (PBF)	0	2	0	0	0	0	2
Skipjack tuna (SKJ)	75,210	253	0	272	7	272	76,014
Yellowfin tuna (YFT)	10,541	1,473	0	505	254	23	12,796
Other tuna (TUN KAW FRI)	0	0	0	8	1	1	11
TOTAL TUNAS	88,736	12,753	272	851	680	296	103,589
Black marlin (BLM)	0	1	0	0	0	0	1
Blue marlin (BUM)	0	293	0	128	1	0	422
Sailfish (SFA)	0	11	0	0	0	0	11
Spearfish (SSP)	0	142	0	0	0	0	142
Striped marlin (MLS), North Pacific	0	267	0	13	0	0	280
Striped marlin (MLS), South Pacific	0	1	0	0	0	0	1
Other marlins (BIL)	0	1	0	12	0	0	14
Swordfish (SWO), North Pacific	0	1,428	0	1	5	0	1,434
Swordfish (SWO), South Pacific	0	13	0	0	0	0	13
TOTAL BILLFISHES	0	2,156	0	154	6	0	2,316
Blue shark (BSH)	0	7	0	0	0	0	7
Mako shark (MAK)	0	120	0	0	0	0	120
Thresher sharks (THR)	0	42	0	0	0	0	42
Other sharks (SKH OCS FAL SPN TIG CCL)	0	7	0	0	0	0	7
TOTAL SHARKS	0	176	0	0	0	0	176
Mahimahi (DOL)	0	390	0	433	12	0	835
Moonfish (LAP)	0	454	0	0	0	0	454
Oilfish (GEP)	0	180	0	0	0	0	180
Pomfrets (BRZ)	0	235	0	2	8	0	244
Wahoo (WAH)	0	366	0	228	3	0	598
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	0	10	0	14	0	0	24
TOTAL OTHER	0	1,635	0	677	23	0	2,335
TOTAL	88,736	16,720	272	1,682	710	296	108,416

Table 1d. Estimated weight in metric tons (t) of catch for the United States and the Participating Territories by species and fishing gear in the WCPFC Statistical Area, for 2006. Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

Species and FAO code	**Purse seine**	**Longline**	**Albacore troll**	**Tropical troll**	**Handline**	**Pole & line**	**TOTAL**
Albacore (ALB), North Pacific	0	256	2	1	94	0	353
Albacore (ALB), South Pacific	0	4,078	585	0	0	0	4,663
Bigeye tuna (BET)	4,364	4,562	0	56	247	0	9,229
Pacific bluefin tuna (PBF)	0	1	0	0	0	0	1
Skipjack tuna (SKJ)	55,633	283	0	296	247	294	56,753
Yellowfin tuna (YFT)	8,448	1,450	0	299	209	3	10,409
Other tuna (TUN KAW FRI)	0	4	0	11	1	3	19
TOTAL TUNAS	68,445	10,635	587	663	798	300	81,428
Black marlin (BLM)	0	1	0	0	0	0	1
Blue marlin (BUM)	0	433	0	158	2	0	593
Sailfish (SFA)	0	15	0	0	0	0	15
Spearfish (SSP)	0	162	0	0	0	0	162
Striped marlin (MLS), North Pacific	0	609	0	21	0	0	630
Striped marlin (MLS), South Pacific	0	4	0	0	0	0	4
Other marlins (BIL)	0	4	0	14	0	0	18
Swordfish (SWO), North Pacific	0	1,149	0	0	4	0	1,153
Swordfish (SWO), South Pacific	0	38	0	0	0	0	38
TOTAL BILLFISHES	0	2,415	0	193	6	0	2,614
Blue shark (BSH)	0	10	0	0	0	0	10
Mako shark (MAK)	0	95	0	0	0	0	95
Thresher sharks (THR)	0	33	0	0	0	0	33
Other sharks (SKH OCS FAL SPN TIG CCL)	0	12	0	0	0	0	12
TOTAL SHARKS	0	151	0	0	0	0	151
Mahimahi (DOL)	0	342	0	420	20	0	782
Moonfish (LAP)	0	482	0	0	0	0	482
Oilfish (GEP)	0	175	0	0	0	0	175
Pomfrets (BRZ)	0	251	0	0	5	0	256
Wahoo (WAH)	0	505	0	256	4	0	765
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	0	14	0	19	0	0	33
TOTAL OTHER	0	1,768	0	695	29	0	2,492
TOTAL	68,445	14,968	587	1,551	833	300	86,684

Table 1e. Estimated weight in metric tons (t) of catch for the United States and the Participating Territories by species and fishing gear in the WCPFC Statistical Area, for 2005. Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

Species and FAO code	Purse seine	Longline	Albacore troll	Tropical troll	Handline	Pole & line	TOTAL
Albacore (ALB), North Pacific	0	287	89	6	169	0	551
Albacore (ALB), South Pacific	0	2,936	487	0	0	0	3,423
Bigeye tuna (BET)	6,108	4,596	0	85	210	0	10,999
Pacific bluefin tuna (PBF)	0	0	0	0	0	0	0
Skipjack tuna (SKJ)	62,379	233	0	264	210	353	63,439
Yellowfin tuna (YFT)	17,685	1,224	0	361	321	68	19,659
Other tuna (TUN KAW FRI)	0	4	0	12	2	1	19
TOTAL TUNAS	86,172	9,279	576	728	912	422	98,089
							0
Black marlin (BLM)	0	1	0	0	0	0	1
Blue marlin (BUM)	0	350	0	185	2	0	537
Sailfish (SFA)	0	8	0	0	0	0	8
Spearfish (SSP)	0	203	0	0	0	0	203
Striped marlin (MLS), North Pacific	0	493	0	20	0	0	513
Striped marlin (MLS), South Pacific	0	3	0	0	0	0	3
Other marlins (BIL)	0	2	0	15	0	0	17
Swordfish (SWO), North Pacific	0	1,475	0	0	5	0	1,480
Swordfish (SWO), South Pacific	0	8	0	0	0	0	8
TOTAL BILLFISHES	0	2,542	0	220	7	0	2,769
							0
Blue shark (BSH)	0	25	0	0	0	0	25
Mako shark (MAK)	0	96	0	0	0	0	96
Thresher sharks (THR)	0	33	0	0	0	0	33
Other sharks (SKH OCS FAL SPN TIG CCL)	0	4	0	0	0	0	4
TOTAL SHARKS	0	157	0	0	0	0	157
							0
Mahimahi (DOL)	0	449	0	350	23	0	822
Moonfish (LAP)	0	412	0	0	0	0	412
Oilfish (GEP)	0	156	0	0	0	0	156
Pomfrets (BRZ)	0	270	0	0	4	0	274
Wahoo (WAH)	0	420	0	215	5	0	640
Other fish (PEL PLS MOP TRX GBA ALX GES RRU DOT)	0	14	0	22	0	0	36
TOTAL OTHER	0	1,721	0	587	32	0	2,340
TOTAL	86,172	13,700	576	1,535	951	422	103,356

Table 1f. Estimated longline catch in metric tons (t) by species and species group, for vessels in the U.S. and American Samoa fisheries in the WCPFC Statistical Area in 2005-2009. Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

U.S. in North Pacific Ocean (NPO)	American Samoa in NPO	American Samoa	Total

	2009	2008	2007	2006	2005	2009	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005
Vessels	127	129	129	127	125	9	26	28	29	28	36	151	155	156	154	156
Species																
Albacore, North Pacific	168	298	243	256	287	3	0	0				171	298	243	256	287
Albacore, South Pacific	0	0				0	3,915	3,550	5,183	4,078	2,936	3,915	3,550	5,183	4,078	2,936
Bigeye tuna	3,709	4,649	5,381	4,381	4,462	153	167	132	218	181	134	4,029	4,781	5,599	4,562	4,596
Pacific bluefin tuna	1	0	0	1	0	0	1	1	2	0	0	2	1	2	1	0
Skipjack tuna	116	117	91	93	90	5	146	165	162	190	142	266	282	253	283	233
Yellowfin tuna	431	836	833	937	698	15	374	333	640	513	526	820	1,169	1,473	1,450	1,224
Other tuna	0	0	0	0	0	0	0	0	0	3	3	0	0	0	4	4
TOTAL TUNA	4,424	5,900	6,549	5,668	5,538	176	4,603	4,180	6,205	4,967	3,741	9,203	10,081	12,753	10,635	9,279
Black marlin	0	0	1	0	1	0	0	0	0	0	0	1	0	1	1	1
Blue marlin	340	333	255	409	326	7	42	34	38	25	23	389	367	293	433	350
Sailfish	9	10	10	9	6	0	2	1	1	6	2	12	11	11	15	8
Spearfish	98	210	141	160	201	2	3	1	1	2	2	103	211	142	162	203
Striped marlin, North Pacific	235	411	267	609	493	5	0	0				240	411	267	609	493
Striped marlin, South Pacific	0	0				0	4	1	1	4	3	4	1	1	4	3
Other marlins	0	2	1	4	2	0	0	0	0	0	0	0	2	1	4	2
Swordfish, North Pacific	1,285	1,301	1,428	1,149	1,475	5	0	0				1,290	1,301	1,428	1,149	1,475
Swordfish, South Pacific	0	0				0	12	7	13	38	8	12	7	13	38	8
TOTAL BILLFISH	1,968	2,267	2,103	2,340	2,504	20	63	43	54	75	38	2,051	2,310	2,156	2,415	2,542

Table 1f. (Continued.)

	U.S. in North Pacific Ocean (NPO)					American Samoa in NPO	American Samoa					Total				
	2009	2008	2007	2006	2005	2009	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005
Blue shark	9	7	6	10	25	0	1	1	1	1	0	9	7	7	10	25
Mako shark	103	109	119	94	96	1	0	0	0	1	0	104	109	120	95	96
Thresher	29	39	42	33	33	0	0	0	0	0	0	29	39	42	33	33
Other sharks	6	4	7	12	3	0	0	0	1	0	0	6	4	7	12	4
TOTAL SHARKS	146	159	174	149	157	1	1	1	2	1	0	148	160	176	151	157
Mahimahi	253	323	376	316	421	7	17	12	14	26	28	276	335	390	342	449
Moonfish	487	412	451	477	407	22	3	2	3	4	5	512	415	454	482	412
Oilfish	193	178	180	173	155	7	3	0	0	1	0	203	178	180	175	156
Pomfret	207	224	234	250	269	10	1	0	0	0	1	218	224	235	251	270
Wahoo	118	194	169	231	201	4	134	133	197	274	219	257	326	366	505	420
Other fish	8	14	10	14	14	0	0	0	0	0	0	8	14	10	14	14
TOTAL OTHER	1,266	1,345	1,420	1,462	1,467	50	157	148	215	306	254	1,474	1,493	1,635	1,768	1,721
GEAR TOTAL	7,804	9,671	10,246	9,619	9,666	247	4,824	4,372	6,475	5,349	4,033	12,875	14,043	16,720	14,968	13,700

Table 1g. Estimated tropical troll catch in metric tons (t) for vessels in the Hawaii, Guam, CNMI, and American Samoa fisheries by species and species group, in the WCPFC Statistical Area in 2005-2009. Totals may not match sums of values due to rounding to the nearest metric ton (<0.5 t = 0).

	Hawaii					Guam					CNMI					American Samoa				
	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005
Vessels	1,667	1,541	1,447	1,394	1,402	368	385	370	386	358	44	52	52	69	77	10	16	19	8	9
Species																				

Albacore, North Pacific	3	1	3	1	6															
Albacore, South Pacific																				
Bigeye tuna	63	74	63	56	85															
Pacific bluefin tuna																				
Skipjack tuna	137	157	87	100	86	150	134	71	67	65	59	77	108	124	108	1	7	6	5	5
Yellowfin tuna	434	427	463	262	319	23	9	22	13	17	11	8	16	20	22	1	9	4	4	3
Other tunas	8	4	5	7	7	3	2	1	0	1	2	1	2	4	4					
TOTAL TUNAS	645	663	621	426	503	176	145	94	80	83	72	86	126	148	134	2	16	10	9	8
Black marlin																				
Blue marlin	164	175	119	144	178	15	4	9	13	6	0	1	0	1	1	0	0	0	0	0
Sailfish											0	1								
Spearfish																				
Striped marlin, N. Pacific	11	14	13	21	20															
Striped marlin, S. Pacific																				
Other billfish	9	13	10	13	15	0	0	2	1	0										
Swordfish, North Pacific	0	0	1	0	0															
Swordfish, South Pacific																				
TOTAL BILLFISHES	184	202	143	178	213	15	4	11	14	6	0	2	0	1	1	0	0	0	0	0

Table 1g. (Continued.)

	Hawaii					Guam					CNMI					American Samoa				
	2009	**2008**	**2007**	**2006**	**2005**	**2009**	**2008**	**2007**	**2006**	**2005**	**2009**	**2008**	**2007**	**2006**	**2005**	**2009**	**2008**	**2007**	**2006**	**2005**
Blue shark																				
Mako shark																				
Thresher sharks																				

Other sharks																				
TOTAL SHARKS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahimahi	314	252	304	337	265	67	51	117	74	74	9	6	12	8	11	0	0	0	1	0
Moonfish																				
Oilfish																				
Pomfrets						0	1				0	0	2							
Wahoo	197	227	206	207	186	59	45	20	48	28	2	1	1	1	1	0	0	0		
Other pelagics	2	2	1	1	2	10	3	12	14	12	1	3	1	4	8	0	0			
TOTAL OTHER	513	481	511	545	453	136	100	149	136	114	12	10	16	13	20	0	0	1	1	0
GEAR TOTAL	1,342	1346	1,275	1,149	1,169	327	249	254	230	203	84	98	142	162	155	2	16	11	10	8

Table 2a. Number of vessels of the United States and ParticipatingTerritories that reported catches in the WCPFC statistical area, by gear type, from 2005-2009. Data for 2009 are preliminary.

	2009	2008	2007	2006	2005
Purse seine	**38**	**38**	22	13	15
Longline (U.S.-based)[1]	**127**	**129**	129	127	125
Longline (American Samoa-based)	**35**	**28**	29	28	36
Total U.S. Longline[2]	**151**	**155**	156	154	156
Albacore troll (N Pac)	**0**	**2**[3]	2[3]	3[3]	5[3]
Albacore troll (S Pac)	**4**	**3**	6	8	8
Tropical troll	**2,089**	**1,994**	1,888	1,857	1,846
Handline	**550**	**475**	424	375	432
Tropical Troll and Handline (combined)[4]	**2,178**	**2,076**	1,888	1,924	1,917
Pole and line	**6**	**3**	3	4	3
TOTAL	**2377**	**2,275**	2,075	2,103	2,099

[1]Includes only Hawaii-based vessels in 2005-2009.
[2]Some longline vessels fish in both Hawaii and American Samoa and are counted only once in this total.
[3]These vessels fished on both sides of the equator and are counted only once in the bottom line TOTAL, except in 2008 when one vessel fished exclusively in the N. Pac., making a total count of 4 vessels in the whole.
[4]Some vessels fished both tropical troll and handline, and are counted only once in this total.

Table 2b. Number of vessels of the United States and Participating Territories that reported purse seine, longline, pole-and-line, and albacore troll catch in the WCPFC statistical area, by gross registered ton categories, 2005-2009. Data for 2009 are preliminary.

	Vessel size (gross registered tons)						
Gear and year	0-50	51-150	51-200	501-1000	1001-1500	1500+	Unknown
2007 Purse seine				3	13	6	0
2008 Purse seine				**3**	**20**	**14**	0
2009 Purse seine				**3**	**18**	**17**	0
2005 Longline	23		133				
2006 Longline	16		138				
2007 Longline	15		141				
2008 Longline	**13**		**142**				
2009 Longline	**12**		**139**				
2007 Pole and line		3					
2008 Pole and line	**1**	**2**					
2009 Pole and line	**3**	**3**					
2007 Albacore Troll			6				
2008 Albacore Troll			**4**				
2009 Albacore Troll			**4**				

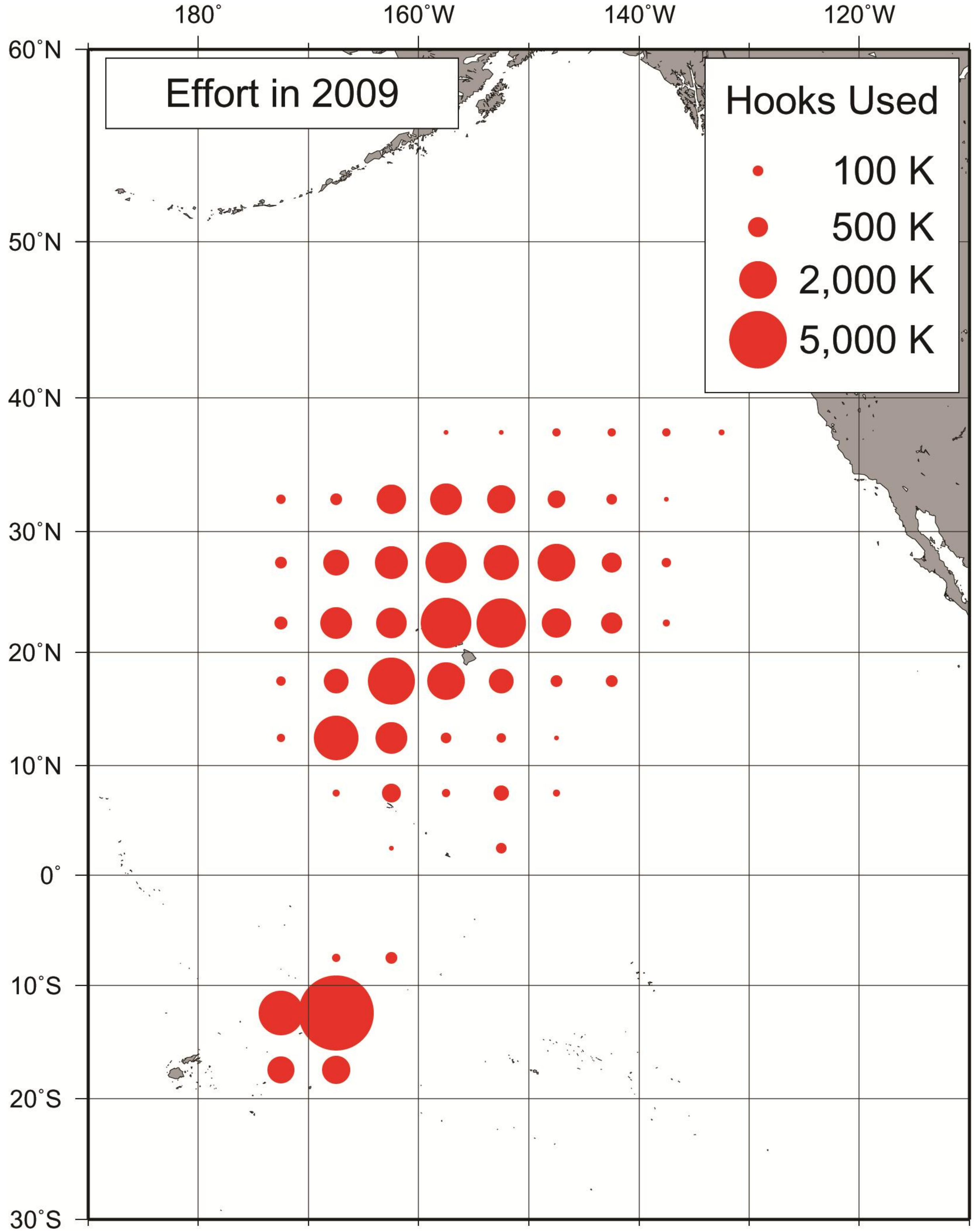

Figure 1a. Spatial distribution of fishing effort reported in logbooks by U.S. flagged longline vessels, in 1,000’s of hooks (K), in 2009 (preliminary data). Area of circles is proportional to effort. Effort in some areas is not shown in order to preserve data confidentiality.

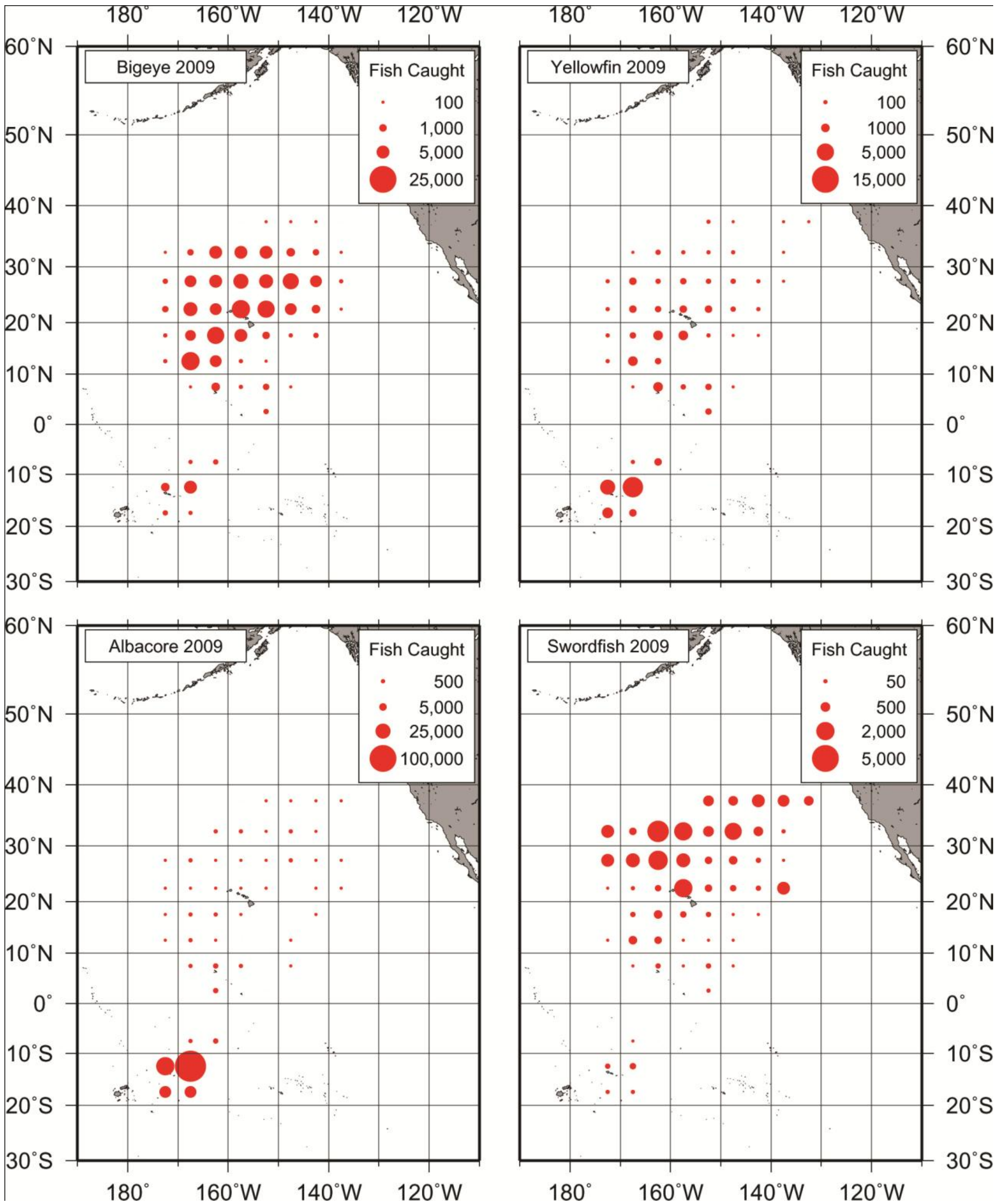

Figure 1b. Spatial distribution of catch in the WCPO reported in logbooks by U.S. flagged longline vessels, in numbers of fish (includes retained and released catch), in 2009 (preliminary data). Area of circles is proportional to catch. Catches in some areas are not shown in order to preserve data confidentiality.

Table 3. 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 2005-2009[3]. Estimates of total marine mammal interactions by the deep-set fishery in 2009 have not yet been completed; only the observed values are included here. Statistically rigorous estimates have not yet been developed for the American Samoa-based fishery given the low level of observer coverage in that fleet.

Species	2005	2006	2007	2008	2009
Marine mammals					
Striped dolphin (*Stenella coeruleoalba*)	0	6	0	1	0
Bottlenose dolphin (*Tursiops truncatus*)	0	2	3	0	1
Risso's dolphin (*Grampus griseus*)	4	7	6	6	3
Blainville's beaked whale (*Mesoplodon blainvillei*)	6	0	0	0	0
Bryde's whale (*Balaenoptera edeni*)	1	0	0	0	0
False killer whale (*Pseudorca crassidens*)	7	17	14	12	11
Humpback whale (*Megaptera novangliae*)	0	1	0	1	0
Shortfinned pilot whale (*Globicephala macrorhynchus*)	6	6	2	5	0
Spotted dolphin (*Stenella attenuata*)	0	0	0	3	0
Unspecified false killer whale or shortfinned pilot whale	1	14	0	10	0
Unidentified Cetacean (Cetacea)	1	2	4	3	2
Unspecified member of beaked whales (Ziphiidae)	0	7	0	0	0
Unspecified pygmy sperm whales (*Kogia*)	0	0	0	1	0
TOTAL MARINE MAMMALS	26	62	29	42	17
Sea turtles					
Loggerhead turtle (*Caretta caretta*)	10	17	22	0	3
Leatherback turtle (*Dermochelys coriacea*)	12	11	9	13	13
Olive Ridley turtle (*Lepidochelys olivacea*)	16	54	27	20	18
Green turtle (*Chelonia mydas*)	0	6	0	1	1
Unidentified hardshell turtle (Cheloniidae)	0	2	0	0	0
TOTAL SEA TURTLES	38	90	58	34	35

[3] 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 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 IR-07-006 and IR-08-007. Hawaii-based longline logbook reported data on fish discards are available at http://www.pifsc.noaa.gov./fmsd/reports.php

Table 3 (Continued.)

Species	2005	2006	2007	2008	2009
Albatrosses					
Blackfooted albatross (*Phoebastria nigripes*)	89	73	85	124	139
Laysan albatross (*Phoebastria diomedia*)	105	15	83	88	141
TOTAL ALBATROSSES	194	88	168	212	280
Other Seabirds					
Red-footed booby (*Sula sula*)	0	0	0	4	0
Brown booby (*Sula leucogaster*)	3	0	0	0	0
Unspecified bird	0	19	0	64	25
TOTAL OTHER SEABIRDS	3	19	0	68	25
Observer Information					
Total trips	1,483	1,357	1,451	1,409	1,325
Observed trips	466	332	347	380	355
Proportion of trips observed	31.40%	24.50%	23.90%	27.00%	26.80%
Observed sets	6,206	4,544	5,002	5,402	5,084
Observed hooks	10,689,477	8,285,411	8,912,119	10,126,078	9,644,989

1.1.1 Developments and trends

U.S. Purse Seine Fishery

The most accurate description of the recent U.S. purse seine catch is based on the updated 2008 data totaling 209,374 t composed primarily of skipjack tuna, with smaller catches of yellowfin and bigeye tuna. The updated 2008 total catch increased significantly from 2007 (Tables 1b-1c), and it is expected that 2009 catch will be higher than the 2008 catch. Yellowfin tuna catches in the fishery increased from 10,541 t in 2007 to 45,363 t in 2008 and skipjack tuna catches increased from 75,210 t in 2007 to 159,741 t in 2008. The number of licensed vessels increased to 38 in 2009 from 22 in 2007 (Table 2a). The fishery operated mainly in areas between 10° N and 10° S latitude and 130° E and 150°W longitude in 2008. Fishing effort is predominantly focused on floating objects, including logs and fish aggregating devices (FADs), rather than free-swimming schools.

U.S. Longline Fisheries

The longline fisheries of the U.S. and its Participating Territories in the WCPO include vessels based in Hawaii and American Samoa. The total number of longline vessels in the WCPO declined from 166 in 2004 to 156 vessels in 2005 and has remained about the same since then (Table 2a). The Hawaii-based U.S. fishery consistently had the highest number of vessels in operation, increasing from 125 in 2005 to 129 in 2007 and 2008 with 127 vessels in 2009. Participation in the American Samoa-based fleet declined from 36 vessels in 2005 to 26 in 2009. A few vessels occasionally operated in both the

Hawaii-based and American Samoa-based longline fisheries. In 2009 and in future, the catches made outside the EEZ around the Hawaiian Archipelago by vessels operating with American Samoa permits and landing those catches in Hawaii are considered to belong to the fisheries of the U.S. Participating Territory of American Samoa (American Samoa in the NPO, Table 1f) and not to the U.S. fishery (see http://www.fpir.noaa.gov/SFD/SFD_regs_6.html).

The U.S. Hawaii-based longline fishery operated mainly from the equator to 40^o N latitude and from 130^o W to 175^o W in 2009 (Figure 1a), representing some expansion to the east as compared with 2007 and 2008. There was slightly greater effort east and southwest in 2009 compared to the previous year. The American Samoa-based longline fishery operated mostly from 5^o S to 20^o S latitude and 160^o W to 175^o W longitude during 2006 - 2009 (Figure 1a). The Hawaii-based fishery targeted bigeye tuna and swordfish, with some catches of associated HMS species, whereas the American Samoa-based fishery targeted mainly albacore, with a small number of vessels exploring shallow-set fishing for swordfish in recent years. The dominant components of the U.S. longline catch in 2009 were bigeye tuna, albacore, swordfish, and yellowfin tuna (Figure 1b). The total catch of all species ranged from a low of 12,875 t in 2009, to a high of 16,720 t in 2007 (Tables 1a-1e).

Targeting of swordfish in the Hawaii-based longline fishery was prohibited from 2001 until early 2004. The swordfish fishery was reopened in April 2004 under a new set of regulations intended to reduce interactions with sea turtles. However, the California-based longline fishery was closed concomitantly with the reopening of the Hawaii fishery; this prompted many California-based longline vessels to relocate to Hawaii. In fact, most of these vessels had been home ported in Hawaii before the 2001 closure so their movement in 2004 was essentially a return to their prior base of operation. Most of the Hawaii-based longline fishery involved deep-set longline effort directed towards tunas. Swordfish catch decreased from 1,475 in 2005 to 1,285 t in 2009. In 2006, the Hawaii-based shallow-set longline fishery reached its allowable annual limit of loggerhead interactions (17) in March and accordingly was closed for the remainder of the year. This sector of the Hawaii-based longline fishery managed to stay under the allowable annual sea turtle limits and remained open all year in four out of the five complete calendar years since this sector was reopened.

U.S. Albacore Troll Fishery

In recent years, the U.S. troll fishery for albacore experienced significant decline in participation. The number of vessels participating in the WCPO portion of this fishery declined from 6 vessels in 2007 to 4 vessels in 2009 (Table 2). All of these vessels fished in the South Pacific. The albacore troll fishery operated mostly between 35° S and 45° S latitude and 115° W and 170° W longitude. The South Pacific albacore troll catches in the WCPO increased from 150 t in 2008 to 237 t in 2009 (Tables 1a-1b). In the WCPO, the North Pacific component of the catch has declined to zero due to reduced participation by U.S. vessels in high seas areas. The catch by this fishery is composed exclusively of albacore.

Other U.S. Fisheries

The data on other fisheries come mostly from vessels participating in small-scale tropical troll, handline, and pole-and-line fleets, but also include some data from miscellaneous recreational and subsistence fisheries monitored by creel surveys in American Samoa and Guam. These miscellaneous recreational and subsistence data are included in the tropical troll statistics, as this fishing method is the most common recreational and subsistence fishing technique in these areas. Most of the vessels comprising the tropical troll fishery, and all of the handline and pole-and-line vessels are located in Hawaii. The total catch by these fisheries over the last 5 years ranged from a low of 2,432 t in 2006 to a high of 2,694 t in 2005. The catch was composed primarily of yellowfin tuna, skipjack tuna, and mahimahi.

1.1.2 Disposition of the Landings

The purse seine catch is stored as a frozen whole product. Most of the catch has historically been off-loaded to the canneries in Pago Pago, American Samoa, however most vessels are now transshipping catches in Pacific Islands ports for canning and loining destinations in Southeast Asia and Latin America. The final product that is canned in American Samoa is typically destined for the domestic U.S. canned tuna markets. Frozen non-tuna catches may be processed locally (e.g., wahoo) or transshipped to foreign destinations (e.g., billfish and shark).

The North Pacific-based longline vessels store their catch on ice and deliver their product fresh. Large tunas, marlins, and other pelagic species 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 to restaurants and retail markets, or exported to the U.S. mainland; a small proportion of high quality bigeye tuna is exported to Japan. The American Samoa-based longline albacore catch is gilled and gutted and delivered as a frozen product to the canneries 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 albacore troll fishery in the South Pacific froze their catch whole and sold the fish to the canneries in Pago Pago, American Samoa, and Papeete, Tahiti. The other fisheries store their catch in ice. Large tunas and marlins are gilled and gutted while other species are kept whole. The small-scale fisheries chill their products with ice and sell it fresh, mainly to local markets.

1.1.4 Future prospects

Generally high fuel costs and increasing prices for supplies and goods will result in higher operating costs which will likely continue to constrain the economic performance of most U.S. pelagic fisheries. If the current scenario persists, the likely outcome would be lower participation and declining catches in most fisheries. This outcome has been predicted for several years but has not been evident, except perhaps in the albacore troll fishery in the WCPO. The U.S. longline fishery will be limited by the bigeye tuna limit established under the WCPFC through 2011. Recent increased investment and participation in the U.S. purse seine fishery stabilized in 2009 as fleet numbers moved toward the maximum number of licenses authorized under the South Pacific Tuna Treaty. The U.S. Government has indicated its commitment to the South Pacific Tuna Treaty and to maintaining a viable U.S. purse seine fleet in the WCPO. The

U.S. Government has engaged the Pacific Island nations in negotiations to extend the Treaty beyond 2013.

In 2009-2011 the U.S. longline fishery based in Hawaii is subject to a limit of 3,763 t of bigeye tuna. The U.S. longline fishery managed to stay within this limit with landings at 3,709 t in 2009. International management measures by the Inter-American Tropical Tuna Commission (IATTC) affected the portion of the Hawaii-based longline fleet that operated in the eastern Pacific Ocean (EPO) in 2006 when it was projected that the U.S. longline fishery would reach its annual bigeye tuna catch limit of 150 t established under the IATTC decision. The fishery operated throughout 2007 without reaching a revised limit of 500 t. There was no bigeye tuna limit in the EPO in 2008, but a limit of 500 t for vessels greater than 24 m has been instituted for 2009 through 2011. This limit was not reached in 2009.

In the future the Hawaii-based component of the longline fishery is likely to continue to target tunas primarily. However, recent actions by regional fishery management organizations to implement output-based catch limits on bigeye tuna will result in lower landings by this sector of the longline fishery. This along with recent changes allowing increased effort in the Hawaii-based shallow-set longline fishery for swordfish and increased limits on annual sea turtle interactions could result in increased effort in this segment of the fishery. The swordfish segment of the Hawaii-based longline fishery is highly seasonal and operates under strict regulations to limit interactions with sea turtles and seabirds. There are viable prospects to further reduce sea turtle bycatch rates, including voluntary efforts to avoid areas of sea turtle concentrations.

The closure of one of two canneries in American Samoa in 2009 is not expected to curtail the operation of the longline fishery there, nor will that fishery be limited under the WCPFC bigeye tuna conservation measure. The American Samoa-based component of the longline fishery is expected to continue targeting albacore and delivering its catch frozen to the remaining cannery.

The prospect for the U.S. small-scale fisheries is believed to be fairly stable although participation is sensitive to a slow economy and high fuel prices. Fuel prices have stabilized and eased from their 2008 high levels. These 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.

1.2 RESEARCH AND STATISTICS

1.2.1 Observer Programs, Port Sampling, and Scientific Survey Data

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 from the Pacific Island States deployed by the 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 regulations. These data are not described here. NOAA Fisheries Service has a field station in Pago Pago, American Samoa that facilitates the placement of FFA-deployed observers on U.S. purse seine vessels. The target coverage rate is 20%

coverage of all U.S. purse seine trips, which has been met every year in the last five years. Additionally, during 2009 and in accordance with CMM 2008-01, U.S. purse seine vessels that operated during the FAD closure had a 100% observer requirement. This requirement was fully met. These observers were deployed from the FFA observer program and all data collected from these trips are to be submitted to the Secretariat on behalf of the United States by FFA. The U.S. has also agreed with FFA to provide the additional 80% observer coverage rate required under CMM 2008-01 beginning Jan. 1 2010, or 100% coverage) and data from those trips are also to be directly submitted to the Secretariat from FFA.

All U.S. longline vessels are subject to observer placement as a condition of the fishing permits issued by NOAA Fisheries Service. The main focus of the longline observer program is to collect scientific data on interactions with protected species, primarily sea turtles. The observer program also collects relevant information on the 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, fish measurement by observers covered 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. In 2009, the observer coverage rate (on a trip basis) in the deep-set (tuna) component of the Hawaii-based longline fishery was 20.6%--for a total of 251 observer trips and 3,520 sets observed. In the shallow-set (swordfish) component of the Hawaii-based fishery, which has a regulatory requirement of 100% observer coverage, all 104 trips were observed, totaling 1,833 sets.

Overall, 251 out of 1,221 deep-set trips were observed, and all 104 shallow-set trips, resulting in a combined coverage rate of 26.8% in 2009 (Table 3). The results indicated a very similar number of interactions with sea turtles and a much lower number of interactions with seabirds and marine mammals in 2009 as compared with 2008.

For the American Samoa-based component of the U.S. longline fishery, 2009 was the third full calendar year observed. The coverage rate was 7.7%--for a total of 10 trips and 306 sets. Scientists have not yet provided rigorous estimates of the total interactions with protected species for this fishery. Detailed information on the U.S. Pacific Islands Regional Observer Program can be found at http://www.fpir.noaa.gov/OBS/obs_index.html.

Port Sampling

Less than 2% of the fish caught by U.S. purse seine, longline, and albacore troll fisheries are measured (fork length) by NOAA Fisheries Service personnel as vessels are unloading in American Samoa and by port samplers in ports where transshipping takes place. Species composition samples are also taken to more accurately determine the catch of yellowfin tuna and bigeye tuna from U.S. purse seine vessel landings. Fish caught by U.S. albacore troll vessels are also measured (fork length) by port samplers in American Samoa when vessels unload there.

International Billfish Angler Survey

NOAA Fisheries and the billfish angling community have worked together since 1963 to study various aspects of billfish biology and obtain an index of angler effort and success in the Pacific

Ocean. In 2008, billfish anglers reported catching 3,008 Pacific billfish during 4,217 fishing days. The mean CPUE for all billfish in the Pacific was 0.72, which is high compared to the annual CPUE reported over the last 20 years but below the 0.82 CPUE reported in 2006.

Central and Western Pacific Monitoring

The Western Pacific Fishery Information Network (WPacFIN) which manages data from most of the U.S. central and western Pacific fisheries has integrated Hawaii fisheries catch data (numbers) and fishing trip information from fishermen's reports with fish weight and sales data from dealers sales reports so that weight and value of most catches can be linked. Enhancements are under development to approximate weight of longline catch by geographic location. WPacFIN also completed the 24th edition of Fishery Statistics of the Western Pacific which was published as a NOAA report (Hamm et al., 2009).

Shark Catch Summary from Longline Observer Program Data

NOAA Fisheries has documented decreases in shark catches and mortality in the Hawaii-based longline fishery (Walsh et al. 2009). The report quantitatively describes 12 years of shark catch data from the Pacific Islands Regional Observer Program. The results include a detailed summary of the species composition of the sharks catch and additional information pertinent to either the management (e.g., nominal catch rates; disposition of caught sharks; distributions of shark catches relative to those of target species) or the basic biology (e.g., mean sizes; sex ratios) of the common species.

Fishing Costs in the Hawaii Pelagic Longline Fishery

Significant strides have been made recently to assess the change of important economic indicators of the Hawaii-based longline fisheries that target tuna and swordfish. Since the project was started in August 2004, data on fishing costs and other economic information have been collected by fishery observers for over 1,600 longline fishing trips. For example, the data showed an increasing trend in cost of tuna trips (not including fixed cost and labor costs) over the past six years. Over the period 2004-2009, the average trip cost in the Hawaii longline fishery for tuna target trip increased by about 60%, from $13,900 per trip in 2004 to $22,100 per trip in 2009. Fuel cost made up about 52% of the total trip cost in 2009. However, the trip expenditure in 2009 went down compared to that in 2008, mainly because the fuel price in 2009 went down from the peak in 2008. The economics data collection program is continuing with the Hawaii longline fishery and will be extended to other fisheries in Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

Relevant Publications

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1.2.2 Research on Biology, Bycatch, and Fishing Technology

BIOLOGICAL RESEARCH – TUNAS AND BILLFISH

North Pacific Albacore Archival Tagging

NOAA Fisheries and the American Fishermen's Research Foundation (AFRF) have worked together since 2001 to study migration patterns and general life history strategies of subadult (ages 2-5) North Pacific albacore using archival tags. Since 2001, 594 archival tags have been deployed along the Oregon and Washington coasts and off southern California, U.S.A. and northern Baja California, Mexico. Most fish were at liberty for over a year and have provided over 7,800 days of data. New analyses of tag returns indicate that: During summer and fall months off the coasts of Oregon and Washington, the mean daytime swimming depth of juvenile albacore was roughly 19 m and greater than 70% of their time was spent in the top surface mixed layer of the water column; during summer months off southern California and northern Baja California, Mexico, mean swimming depths were similar. In contrast, preliminary results indicate that in offshore areas during the winter and spring, the mean swimming depth ranged from 41 to 92 m depending upon the region, and average time spent in the upper isothermal layer ranged from 40% to 81%. In areas were chlorophyll-*a* concentrations were lower and the mixed layer depth was poorly defined, albacore spent more time at depth, suggesting a deeper foraging strategy where productivity in the top 50 m may be lower. A manuscript detailing results from this study has been submitted for publication.

Foraging Ecology of Tunas in the Southern California Bight

In an effort to collect biological data on the recreationally caught tuna and mahimahi that seasonally forage in the Southern California Bight (SCB), NOAA Fisheries and the Sportfishing Association of California initiated a biological sampling program in 2007 working with the commercial passenger fishing vessels. In 2009, the program was expanded to the northeast Pacific Ocean to collect samples from off Oregon and Washington. Species collected to date include albacore, bluefin (*T. orientalis*), yellowfin, skipjack, and mahimahi. Biological samples are collected from each fish caught, including stomach contents and tissue samples in order to understand both the daily and long-term feeding habits of tuna in the SCB. Preliminary analysis of stomach contents shows that tuna forage almost exclusively on juvenile fish and squid (average standard fish prey length of 5.3 cm, average squid lower rostral length of 0.34 cm). Studies over multiple years will help determine the impacts of short-term environmental variation on available forage and the implications for assessing habitat quality. This should help explain migration timing and patterns within the SCB and northern Baja California, Mexico.

Central Pacific Bigeye Tuna Tagging

The spatiotemporal variability in bigeye tuna dive behavior in the central North Pacific Ocean was investigated based on data from 29 pop-up archival transmission (PAT) tags deployed on commercial size tuna (mean fork length 122.2 +/- 7.8 cm SD) from 4ºN - 32ºN. Results published in Howell et al. 2010 indicate the following: During the day, bigeye tuna generally spent time in the 0 – 50 m and 300 – 400 m depth ranges, with spatial and temporal variability in the deep mode. At night, bigeye tuna generally inhabited the 0 – 100 m depth range. More shallow and intermediate dive type behavior was found in the first half of the year, and at latitudes between 14ºN and 16ºN and north of 28º N. A greater amount of deep dive behavior was found in south of 10ºN and between 18ºN and 28ºN during the third and fourth quarters of the year. Dive type also varied with oceanographic conditions, with more shallow and intermediate dive behavior found in colder surface waters. Sea surface temperature had the most significant effect on the pooled intermediate and deep dive behavior, and predicted that the largest percentage of potential interaction would be in the fourth quarter from 18°N to 20ºN, which corresponds to the time and place of the highest CPUE of bigeye tuna by the Hawaii-based longline fishery (Howell et al., 2010).

Oceanographic Influences on the American Samoa Longline Fishery for Albacore

The American Samoa longline fishery for albacore accounts for about 20% of all albacore caught in the South Pacific and supplies a significant portion of canned albacore to the U.S. market. A dramatic drop in albacore catch per unit effort (CPUE) -- preceded by an extraordinary expansion of the fleet in 1999-2001 -- and a slow recovery in recent years spurred an investigation of the oceanographic environment of the fishing grounds and its effects on albacore. Domokos 2009 describes the effects of currents, eddies, chlorophyll-*a* concentrations, and presence of forage on CPUE of the fishery. Results suggest that the strength of upwelling and resulting increase in chlorophyll a at New Guinea, as well as the Southern Oscillation Index, could be used to predict the performance of the American Samoa EEZ fishery (Domokos, 2009).

Recreational Billfish Tagging Program

NOAA Fisheries' Billfish Tagging Program has provided tagging supplies to recreational billfish anglers for 47 continuous years. Tag release and recapture data are used to determine movement and migration patterns, species distribution, and age and growth patterns. Since its inception, over 59,000 fish of 75 different species have been tagged and released. In 2008, 863 billfish and five other fish species were tagged and released by 550 anglers and 113 fishing captains.

Electronic Tagging of Swordfish

Since 2006, NOAA Fisheries has been studying swordfish in the Southern California Bight to examine migratory patterns, foraging ecology, and local stock structure. As part of this effort, electronic tags have been used to characterize swordfish habitat. Efforts are focused both on deploying archival tags and towed Fast-Loc GPS satellite tags that will provide regular, highly accurate locations. Of two archival tags deployed in 2009 in conjunction with the juvenile shark longline survey, one was recovered near the tagging location. The two swordfish tagged during the survey were the first longline-caught swordfish to be tagged in the Southern California Bight. The detailed temperature and depth data from the recovered fish reveal the typical day/night dive patterns observed in other records. Interestingly, however, the swordfish made only three basking events in 106 days resulting in very low vulnerability to the harpoon fleet. This rate of basking is less than expected based on data from fish tagged at the surface with pop-off satellite archival (PSAT) tags using a modified harpoon.

Billfish Life History Studies

NOAA Fisheries continued efforts to collect central North Pacific samples from striped marlin, *Kajikia audax,* for life history studies. Dorsal fins and head samples are collected at sea by observers onboard Hawaii-based longline vessels and the respective dorsal fin rays and otoliths extracted and processed in the lab for future age and growth study (Kopf et al., 2009). Gonad sub-samples are concurrently collected for determination of gender and sex-specific length at 50% reproductive maturity. Observers also continue to collect small (<110 cm eye-fork length) whole juvenile specimens; billfish of this size are rarely available. Future age and growth study of central North Pacific striped marlin will be conducted in close collaboration with a colleague in Australia who has recently completed a similar study on western South Pacific striped marlin.

NOAA Fisheries collaborates to archive billfish tissues sampled from regions across the Pacific, and particularly from early life stages collected in Hawaiian waters, for DNA-based stock structure analysis to be conducted in La Jolla. New information on billfish stock structure will assist current and future stock assessment studies conducted by NOAA and with other international partners across the Pacific.

Elemental composition analysis on the otoliths of young-of-year (YOY) swordfish *Xiphias gladius* has been conducted using the laser ablation-inductively coupled plasma-mass spectrometer (LA-ICP-MS) instrument at Oregon State University. The study is being conducted to determine whether otoliths contain trace elemental “fingerprints” unique to particular swordfish nursery regions in the Pacific. If nursery areas can be uniquely characterized, this could provide the ability to determine the origins of adult swordfish that compose the Hawaii-based swordfish fishery. LA-ICP-MS analysis runs have been conducted on 224 individual otoliths extracted from YOY specimens collected from the Main Hawaiian Islands (n=48), the equatorial central Pacific Ocean (n=35), French Polynesia (n=32), Japan (n=28), the subtropical convergence zone north of Hawaii (n=35), the western Pacific adjacent to the International Dateline (n=20), coastal Ecuador (n=20), and the western Indian Ocean (n=6). Sagittal otoliths were prepared to expose the otolith core region and the daily growth increments formed during the larval stage (ca. first 100 increments). The LA-ICP-MS instrument sampled otoliths for the presence of 12 trace elements (plus calcium and strontium); results of these sample runs continue to be analyzed.

BIOLOGICAL RESEARCH – PELAGIC SHARKS

Shark Abundance Surveys

To track trends in abundance NOAA Fisheries conducts annual fisheries independent surveys for juvenile and sub-adult blue and shortfin mako sharks and neonates of common thresher shark along the U.S. West Coast. In addition to the catch data, these cruises provide a valuable opportunity to conduct complimentary studies on age and growth, migrations, essential habitat and foraging ecology.

Juvenile Mako and Blue Sharks Surveys

In 2009, the sixteenth juvenile shark survey since 1994 was conducted for blue and mako sharks. Working aboard the *F/V Ventura II*, a total of 5,575 hooks during 27 daytime sets inside seven focal areas within the Southern California Bight were fished. From the catch data, the index of relative abundance for juvenile sharks, defined as catch per 100 hook-hours, was calculated for the seven target survey areas. The preliminary data indicate that the nominal survey catch rate was 0.453 per 100 hook-hours for shortfin mako and 0.314 per 100 hook-hours for blue sharks. The nominal CPUE for blue sharks dropped substantially from 2008 and was the second lowest in the survey's history. There is a declining trend in nominal CPUE for both species over the time series of the survey.

Additional research projects were also conducted during the cruise and after the shark survey was completed. An experiment directed by graduate student of the University of Hawaii was conducted to examine the potential for using rare earth metals to reduce shark bycatch. Preliminary analyses from over 25 sets indicate that the rare earth metals did not reduce the catch rate of shortfin mako sharks. Other objectives of the cruise were to deploy satellite tags and conventional spaghetti tags, continue age and growth studies, and collect biological samples from sharks and swordfish. A total of 337 conventional tags were deployed on a range of species.

For common thresher sharks, a pre-recruit index and nursery ground survey was initiated in 2003 and has been conducted each year since. In 2009, 50 longline sets were made over an 18-day cruise and 216 common thresher, 11 soupfin (*Galeorhinus galeus*), 7 shortfin mako, 3 spiny dogfish (*Squalus acanthias*), 1 leopard (*Triakis semifasciata*), and 1 Pacific angel (*Squatina californica*) shark were caught. Two hundred and six sharks were tagged with conventional tags; 190 sharks were marked with OTC for age validation studies; 212 DNA samples were collected. In addition, colleagues from Scripps Institution of Oceanography tagged 17 neonate common thresher sharks with mini PSATs. The preliminary survey data indicate that the average nominal catch rate by set was 2.13 per 100 hook-hours for common thresher sharks. This is down from 2008 when the catch rate was 3.32 per 100 hook-hours.

Shark Migration Studies

Since 1999, NOAA has used satellite technology to study the movements and behaviors of blue, shortfin mako and common thresher sharks and to link the data to physical and biological oceanography in the California Current. In recent years, tag deployments have been carried out in collaboration with the Tagging of Pacific Pelagics research program (www.topp.org), Mexican colleagues at CICESE (Centro de Investigación Científica y de Educación Superior de Ensenada) and Canadian colleagues at the DFO (Department of Fisheries and Oceans) Pacific Biological Station in Nanaimo, British Columbia. Since 1999, a total of 91 makos, 76 blue sharks, 27 common threshers, 2 hammerheads and 4 ocean sunfish have been satellite tagged through these collaborative projects.

SPOT tag deployments from 2009 provided relatively long-term records for 3 blue and 12 mako sharks whose tags were still transmitting in early 2010. Two satellite tags deployed in 2008 on mako sharks were also still reporting. These longer-term and multiyear records provide an opportunity to examine seasonal movement patterns and regional fidelity. An ongoing analysis of blue shark habitat use suggests a range of patterns: sharks moved offshore from July through October. As SST increased, the swimming depth increased. The archival record also suggests a distinct diel pattern with substantially deeper depths attained during the day than at night. The regular timing of the individual dives is consistent with behavioral thermoregulation; the shark returns to the surface mixed layer between foraging bouts to warm. The diel shift in depth distribution and increase in depth as sharks moved offshore is consistent with daytime foraging on organisms associated with the deep scattering layer (DSL) and similar to what has been observed for swordfish.

Age, Growth and Maturity Studies

Since 1997, NOAA Fisheries has validated aging methods for mako, common thresher, and blue sharks based on vertebral band deposition periodicity determined using OTC. When the shark is recaptured and the vertebrae recovered, the number of bands laid down since OTC injection can be used to determine band deposition periodicity. In 2009, OTC validation studies on mako, blue, and thresher sharks continued. Since the beginning of the program, over 2,000 OTC-marked individuals have been released during juvenile shark surveys. In 2009, 184 mako, 114 blue, and 186 common thresher sharks were tagged and marked with OTC. As of March 2010, recaptured OTC-marked sharks included 81 mako, 56 common thresher, and 56 blue sharks. Vertebrae were returned for roughly 60% of the recaptures. Time at liberty ranged from 1 to 1,938 days, and the maximum net movement for an individual shark was 3,410 nmi. An analysis of mako shark band deposition patterns is nearly complete and a manuscript is in preparation.

Foraging Ecology of Shortfin Mako, Blue and Common Thresher Sharks

Three of the most abundant juvenile sharks in the California Current are the shortfin mako, blue and common thresher sharks. To better understand niche separation and the ecological role of these overlapping species, NOAA Fisheries has been analyzing stomach content analyses since 2002. Stomachs are obtained primarily from the California/Oregon drift gillnet fishery observer program. To date, a total of 713 stomachs have been collected and analyzed. Stomach contents were identified to the lowest possible taxonomic level.
Of the 330 shortfin mako shark stomachs examined (sizes 53 to 248 cm FL), 238 contained 43 prey taxa. Jumbo squid (GII=46.0) and Pacific saury (*Cololabis saira*, GII=25.5) were the most

important prey. Of the 158 blue shark stomachs examined (sizes 76 to 248 cm FL), 114 contained 38 prey taxa. Jumbo (GII=33.9) and *Gonatus* spp. squids (GII=33.6) were the most important prey. Of the 225 thresher shark stomachs examined (sizes 108 to 228 cm FL), 157 stomachs contained 18 prey taxa. Northern anchovy (GII=68.4) and Pacific sardine (*Sardinops sagax*, GII=48.5) were the most important prey. Overall, results indicate that mako sharks have the most diverse diet, feeding on a range of teleosts and cephalopods; blue sharks generally prefer cephalopods; and thresher sharks are more specialized, feeding primarily on coastal pelagic teleosts. Despite similarities in life history characteristics and spatial and temporal overlap, diets of the three species are strongly differentiated.

Thresher Sharks Released by the Recreational Fishery

A collaborative project was initiated by NOAA Fisheries and Pfleger Institute of Environmental Research in spring 2007 to determine the survivability of thresher sharks caught and released by recreational fishermen. Resent analyses of data suggest a hooking mortality rate of 26%, with a post-release mortality estimate of 17% for adult and subadult thresher sharks. In addition, blood chemistry was analyzed to assess the stress response associated with tail-hook capture. The two parameters that showed a significant increase with fight time were lactate and hematocrit. In an effort to educate the recreational fishermen about the biology and conservation of the thresher sharks and to promote responsible fishing techniques, an outreach brochure was developed and distributed among the community. Outreach also included seminars and presentations at sport fishing club meetings, tournaments, and fishing/boating shows. Public education about effective catch and release methodologies and gear innovations to increase post-release survivorship and reduce trailing gear will continue in 2010.

Pelagic Sharks Released by the Longline Fishery

NOAA Fisheries have been developing biochemical and physiological profiling techniques for use in estimating post-release survival of blue sharks, which are frequently caught as bycatch of Pacific longliners. Using NOAA research vessels, they captured from longline sets, 211 sharks, of which 172 were blue sharks. Using blue sharks, NOAA scientists and collaborators developed a model to predict long-term survival of released animals (verified by PSAT data) based on analysis of small blood samples. These data suggest that a shark captured without obvious physical damage or physiological stress (the condition of 95 percent of the sharks they captured) would have a high probability of surviving upon release.

In addition, five species of pelagic sharks (bigeye thresher, blue shark, oceanic white-tip, short fin mako, silky shark) released from longline gear were tagged with PSATs. Of 44 PSATs reporting, there was definitive data for post-release mortality in only 2 cases (male blue shark after 7days, female oceanic white-tip after 9 days) for an overall mortality estimate of 4.5% (95% bootstrap CI, 0 to 11%). In summary, the studies demonstrate a high rate of post-release survival of pelagic sharks captured and released from longline gear fished with circle hooks (Musyl et al., 2009).

Meta-Analysis of Archival Tags

An analysis is underway on the performance of pop-off archival transmitting (PSAT) tags deployed on a wide array of highly migratory species. The study is designed to look for explanatory variables related to tag performance. By examining these factors and other information about PSATs attached to different pelagic species, it is anticipated certain patterns/commonalties may emerge to help improve attachment methodologies, selection of target species, and experimental designs, particularly with respect to post-release survival studies. Based on the fate of 1433 tags described in the literature and data from 731 tags provided by collaborators in a performance assessment database, there is a 77% overall reporting rate. PSATs in the performance assessment database had a very similar overall reporting rate. Shark species in the database include bigeye thresher, blue, shortfin mako, silky, oceanic whitetip, great white, and basking sharks. Other species include: black, blue, and striped marlins; broadbill swordfish; bigeye, yellowfin, and bluefin tunas; tarpon; and green, loggerhead, and olive Ridley turtles. Of the tags that recorded data, 106 (18 percent) hit their programmed pop-off date and 471 tags popped off earlier than their program date. The 154 (21 percent) non-reporting tags are not assumed to reflect fish mortality. Logistic regression models showed that reporting rates have improved significantly over recent years and are lower in species undertaking large vertical excursions. There is a significant interaction with respect to reporting rates between a species' depth classification (i.e., littoral, epi-pelagic, meso-pelagic, bathy-pelagic) and tag manufacturer. Lower tag retention rates could be linked to higher infection rates at the tag anchor site or bio-fouling, in areas of higher ocean productivity. Information derived from this study should allow an unprecedented and critical appraisal of the overall efficacy of the technology.

BYCATCH AND FISHING TECHNOLOGY RESEARCH

Longline Gear Modification to Reduce Turtle Bycatch

NOAA Fisheries is contracting or otherwise assisting in longline fishing vessel trials to test the efficacy of sea turtle bycatch mitigation methods in Costa Rica, Brazil, Uruguay, Spain, Cook Islands, Vietnam, and Italy. The trials will measure effects of gear modifications (e.g., use of large circle hooks, appendage hooks, hook offsets, rings) on the rates of hooking and entanglement of sea turtles in longline fisheries (Swimmer et al., 2010; Sales et al., *in press*). Research from the previous few years indicates that relatively large circle hooks effectively reduce the bycatch of both loggerhead and leatherback sea turtles (Piovano et al., 2009). These hooks have also shown to produce acceptable catch rates of tuna species, but slightly reduced catch rates of targeted swordfish. In addition, use of circle hooks has been found to reduce the rates of capture of pelagic stingrays, motivating some fishermen, particularly in Italy, to convert to circle hooks. Technical assistance was provided to numerous programs, both governmental and non-governmental, as experimental longline tests expand worldwide. A recently completed relational database linked to NOAA's bycatch web site provides public access to the data.

NOAA Fisheries also continues its investigations of the post-release mortality of sea turtles after their release from fishing gear. There are manuscripts in press regarding use of pop-up satellite archival tags (PSATs) and platform terminal transmitters (PTTs) to estimate post-release survival of loggerhead turtles caught on longline fishing gear in the North Pacific Ocean, South Atlantic Ocean and Mediterranean Sea. Preliminary results of tracking studies indicate no differences in duration of transmissions as a function of turtles 'severity' of injury, specifically deep or shallow hookings, and that most sea turtles were tracked for the duration of the tags' battery life.

American Samoa Study on Effects of Removing Longline Hooks Close to Floats

NOAA conducted a study involving observers to provide data on the efficacy of removing hooks adjacent to floats as a way to reduce turtle interactions and to estimate corresponding changes in CPUE of target fish species as well as incidental and bycatch species. They used time-depth recorders (TDRs) to measure hook depths in the fishery and determined the frequency distribution of "hook-at-capture" - the tendency of fish to be caught on a given hook in relation to the hook's proximity to the nearest longline float. The full results of the study are contained in a NOAA internal report issued in March 2009.

Longline Gear Effects on Shark Bycatch

A NOAA study using fishery observers was conducted to compare bycatch rates under different operational factors (e.g., hook type, branch line material, bait type, the presence of light sticks, soak time, etc.) in the longline fishery that might reduce shark bycatch. Following a preliminary analysis that compared the catches of vessels using traditional tuna hooks to vessels voluntarily using size 14/0 to 16/0 circle hooks in the Hawaii-based tuna fleet, 18 contracted vessels were used to test large (size 18/0) circle hooks versus tuna hooks in controlled comparisons. Preliminary results do not indicate these large circle hooks increase the catch rate of sharks, in contrast to findings of increased shark catch on circle hooks in studies comparing smaller circle hooks with J hooks in other fisheries. There was no significant difference in the catch of the target species, bigeye tuna (*Thunnus obesus*) by hook type. However, results showed strong statistical evidence that the use of large circle hooks would reduce the catch of incidental species such as billfish, pelagic sharks, opah, and dolphinfish in the Hawaii-based tuna longline fishery (Curran and Bigelow, 2010).

Chemical and Electromagnetic Deterrents to Shark Bycatch

Beginning in early 2007, the NOAA Fisheries began testing the ability of electropositive metals (lanthanide series) to repel sharks from longline hooks. Electropositive metals generate large oxidation potentials when placed in seawater, and may perturb the electrosensory system in sharks and rays, causing the animals to exhibit aversion behaviors. Since commercially targeted pelagic teleosts do not have an electrosensory sense, this method of perturbing the electric field around baited hooks may selectively reduce the bycatch of sharks and other elasmobranchs.

Feeding behavior experiments were conducted to determine whether the presence of these metals would deter sharks from biting fish bait. Experiments were conducted with Galapagos sharks (*Carcharhinus galapagensis*) and sandbar sharks (*Carcharhinus plumbeus*) off the coasts off the North Shore of Oahu. Results indicate that sharks significantly reduced their biting of bait in proximity to electropositive metal objects. In addition, sharks exhibited significantly more aversion behaviors as they approached bait associated with these metals. Further studies on captive sandbar sharks in tanks indicated sharks would not get any closer than 40 cm to baits in the presence of the metal objects (ingots approximately the same size as a 60g lead fishing weight used by Hawaii longline fishermen).

Initial experiments to examine the effects of Nd/Pr (Neodymiun/Praseodymium) alloy on the catch rates of sharks on bottom set longline gear and to examine the effects of Nd/Pr alloy and other lanthanide alloys on the feeding and swimming behavior of scalloped hammerhead

(*Sphyrna lewini*) and sandbar (*Carcharhinus plumbeus*) sharks are being conducted through a collaboration with the University of Hawaii's Hawaii Institute of Marine Biology (HIMB). Preliminary results from longline field trials in Kaneohe Bay, Hawaii suggest that catch rates of juvenile scalloped hammerhead sharks are reduced by 63% on branch lines with the Nd/Pr alloy as compared to lead weight-controls (Wang et al., 2009; Brill et al., 2009).

Testing Deeper Sets to Reduce Bycatch

Experiments with deeper-set longline gear conducted in 2006 have altered current commercial tuna longline setting techniques by eliminating all shallow set hooks (less than 100 m depth) from tuna longline sets. The objective was to maximize target catch of deeper dwelling species such as bigeye tuna, and reduce incidental catch of many marketable but less desired species (e.g., billfish and sharks). Catch totals of bigeye tuna and sickle pomfret were greater on the deep set gear than on the controlled sets; but the bigeye results were not statistically significant. Catch of several less valuable incidental fish (e.g., blue marlin, striped marlin, shortbill spearfish, dolphinfish, and wahoo) was significantly lower on the deep set gear than the controlled sets. No significant results were found for sharks (Beverly et al., 2009).

Seabird Regulations in the Hawaii Longline Fishery

Federal regulations were adopted in 2001 to reduce seabird bycatch in the Hawaii longline tuna fishery. NOAA evaluated the change in seabird bycatch rates from the pre- to post-regulation period, as well as the efficacy of alternative combinations of seabird bycatch reduction methods employed during the post-regulation period. Results indicate that there was a significant 67% (95% CI: 62 to 72) reduction in the seabird bycatch rate following the introduction of regulations (Gilman, et al., 2008).

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1.2.3 Statistical Data Systems

The primary monitoring system for the major U.S. fisheries (purse seine, longline, and albacore troll) fisheries in the WCPO consists of the collection of 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). The Hawaii-, American Samoa-, and California-based longline fisheries are monitored using the NOAA Fisheries Western Pacific Daily Longline Fishing Logs for effort and resulting catch. The coverage of logbook data is assumed to be complete (100%), except for the American Samoa fishery where under-reporting of a very small percentage of trips is estimated via a creel survey that includes 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.

Observer and port sampling programs collect scientific data including species and size of fish caught (Section 1.2.1). Fish sales records from the cannery landings data in American Samoa and the Hawaii Division of Aquatic Resources (DAR) Commercial Marine Dealer Report data are other important sources of data that supplement the logbook data. The number of individual fish weights recorded in the sales data far outnumber the fish measured by observers in the Hawaii-based longline fishery. Fish sales records cover 100% of landings for the purse seine fleet, and close to 100% of the albacore troll and Hawaii-based longline landings.

Small-scale fisheries in Hawaii, i.e., tropical troll, handline, and pole-and-line, are monitored using the State of Hawaii with Commercial Fishermen's Catch data and Commercial Marine Dealer data. The troll fisheries in American Samoa, Guam, and Northern Mariana Islands are monitored with a combination of Territory and Commonwealth Creel Survey and Market monitoring programs, as part of the Western Pacific Fishery Information Network (WPacFIN). WPacFIN has recently improved its basic procedures for integrating Hawaii fisheries catch data (numbers of fish caught) and information on fishing trips from fishermen's reports with fish weight and sales data from the dealers' sales 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 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 data, and the longline observer data. Information on these corrections is published (Walsh et al., 2007) but is not yet operationally applied to routine data reporting (i.e., the data reported here).