

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE REPORT ON BAG REDUCTION
 OPTIONS FOR THE RECREATIONAL TAKE OF PACIFIC BLUEFIN TUNA

Introduction

At the June 2014 PFMC meeting, the Council directed the Highly Migratory Species Management Team (HMSMT) to develop a suite of potential management measures to reduce the take of Pacific Bluefin Tuna (*Thunnus orientalis*) (PBF) by recreational anglers landing off the West Coast of the United States. The purpose of this report is to provide information to the Council on the California fishery, the state management and monitoring context, and fishery data and analyses to inform the Council’s decision making on PBF bag limits off California.

Sport fishery Management Background

Management under the Highly Migratory Species Fishery Management Plan

The measures covered in the West Coast Highly Migratory Species Fishery Management Plan (HMS FMP) for recreational fisheries are largely administrative in nature, having to do with permitting and logbooks that do not directly affect fishing operations. Management of recreational fishing is essentially deferred to the states in the FMP, reflecting the mainly localized nature of sport fishing issues and values that are best addressed by state management entities.

Table 1 summarizes management measures limiting the take and possession of PBF for the state managed fisheries along the US West Coast. Regulations for recreational take in Mexico are also relevant due to the high level of catch and effort from southern California anglers fishing in Mexican waters.

Table 1. Pacific bluefin tuna daily bag and possession limits for US West Coast fisheries

	Daily Bag Limit	Possession Limit
California	The bag limit for bluefin tuna is 10, which may be taken or possessed in addition to the overall general daily bag limit of 20 finfish	Up to three daily bag and possession limits of saltwater fin fish are allowed for a person fishing during a multi-day trip in ocean waters from a boat whose owner or operator has filed a Declaration for Multi-Day Fishing Trip
Mexican Waters	In ocean waters and estuaries the limit is a total of 10 fish per person per day, with no more than 5 catches of a single species.	Where sport fishing is conducted from boats out at sea for longer than three days, the bag limit will be the equivalent of three times [the daily bag limit]
Oregon	Daily catch limit is 25 fish in the aggregate of Offshore Pelagic Species.	No possession limit.
Washington	Daily Bag Limit of 2.	No possession limit.

Regulation of the California Recreational Fishery

Authority for managing sport fishing activities lies primarily with the Fish and Game Commission (FGC). The FGC adopts regulations for fisheries, including all sport fisheries, using authority deferred to it by the Legislature. When adopting regulations, the Commission must comply with requirements of the state’s Administrative Procedure Act and the California Environmental Quality Act. A Fish and Game Code

statute also requires the FGC to hold at least three hearings to gather public input on any proposed sportfish rulemaking. After regulations are adopted by the FGC, they undergo procedural review by the Office of Administrative law before becoming part of Title 14 of the California Administrative Code.

Since 2007, California has had a daily bag limit of ten PBF (in conformance with federal regulations). Prior to 2007, there was no bag limit in place. Existing regulations also allow tuna species to be filleted at sea so long as a skin patch is present. California anglers are allowed a three day possession limit with appropriate documentation (see Table 2), and may be in possession of PBF catch caught in Mexican waters in compliance with Mexican bag and possession limits.

Table 2. California sport fishing regulations for take of Pacific bluefin tuna

Statute or Regulation	Title	Description
14 CCR §28.38b	Bag & Possession Limits - Tunas	<ul style="list-style-type: none"> - The daily bag limit for bluefin tuna is 10. - These may be taken or possessed in addition to the overall general daily bag limit of 20 finfish.
14 CCR §27.65a, b(11)	Filleting of Fish on Vessels	<ul style="list-style-type: none"> - All species of tuna may be filleted on a vessel. - Each fillet shall bear intact a one-inch square patch of skin. - The fillets may be of any size.
14 CCR §27.60, c(1)-c(4)	Boat Limit	<ul style="list-style-type: none"> - In ocean waters, when two or more persons that are licensed to sport fish are angling for finfish aboard a vessel, fishing by all authorized persons aboard may continue until boat limits of finfish are taken and possessed aboard the vessel. - Boat limit = number of licensed persons aboard a vessel multiplied by the individual daily bag limit. - Upon completion of a trip, each angler may not possess more than the individual daily bag and possession limits. - All persons aboard a vessel may be cited where violations involving boat limits are found.
14 CCR §27.15	Multi-Day Fishing Trips	<ul style="list-style-type: none"> - Up to three daily bag and possession limits of saltwater fin fish are allowed per person fishing on a multi-day trip from a boat that has filed a Declaration for Multi-Day Fishing Trip.
FGC §2353	Dead Fish - Declaration of Entry	<p>Importation of dead fish require the following:</p> <ul style="list-style-type: none"> - The fish were legally taken and possessed outside of this state. - Their possession is not prohibited in this state. - A declaration is submitted to the department or a designated state/federal agency at or immediately before the time of entry, in the form and manner prescribed by the department (FG 901).

Fishery Description

The California recreational bluefin fishery is based largely in southern California. Anglers fishing from commercial passenger fishing vessels (CPFVs) and private boats target and catch PBF in the offshore waters of northern Mexico and southern California; typically beginning in June. Bluefin are most commonly found along the coast as they follow schools of bait fish north when warm water pushes up from the south and intersects the cold water of the California current. Areas with underwater plateaus are particularly productive. The season most commonly peaks in August or September, and can last through the fall into October.

Anglers target PBF primarily from CPFVs and private boats, often in combination with other large pelagic species such as yellowfin tuna, albacore, dorado, and yellowtail. The CPFV fleet targeting PBF operates mainly out of San Diego County, with some effort originating in Los Angeles and Orange counties. In most years, the majority of recreational PBF effort and catch occurs in Mexican waters and is landed in southern California.

Fishery Monitoring Data Used in this Report

The California Department of Fish and Wildlife (CDFW) collects data on catch and effort for marine recreational fisheries, including PBF. The best available data for CPFV trips is the Department's mandatory Logbook Program. CPFV landings represent a large proportion of the total catch and effort for PBF in the California fishery. Additionally, there is catch and effort occurring from private vessels embarking from numerous public launch sites, marinas, and private residences throughout southern California. The California Recreational Fishery Survey (CRFS) is the primary source of data in California for private boat trips.

The CPFV Logbook Program

Since 1936 skippers of CPFVs (also known as "party boats") have been required to submit logbooks with information such as target species, fishing method, locations fished, and quantity of each species taken. CDFW's Marine Fisheries Statistical Unit enters the data into CDFW's commercial fishing database, providing a valuable history of CPFV landings in California. CDFW requires all CPFV operators to complete logbooks for each day of fishing effort (FGC 7923; FGC 8026; Title 14, CCR, §190; §195), as well as possess a commercial boat registration (FGC 7881(a)), and a commercial passenger fishing boat license (FGC 7920). The CPFV logbook database represents the most comprehensive picture of recreational fishing catch and effort available in California for tuna trips. Compliance for CPFV logbooks varies by geography and vessel type, but statewide exceeds an estimated 80 percent by the end of the year based on validation studies conducted over the past ten years. On average, records are available for over 104,000 angler days a year.

CDFW relies on this logbook information as the estimate of PBF catch for the CPFV component of the fishery, as very low CRFS sampling coverage rates on HMS CPFV trips result in CRFS/RecFIN standardized catch estimates that are unreliable for this mode.

Recreational Fishery Sampling Programs (CRFS and former MRFSS)

The California Recreational Fishery Survey (CRFS) is the method for estimating total marine recreational finfish catch and effort in California. The CRFS is a coordinated sampling survey designed to gather catch and effort data from anglers participating in all modes of marine recreational finfish fishing. This program incorporates and updates the comprehensive sampling methodologies of the former Marine Recreational Fisheries Statistics Survey (MRFSS) and the CDFW's Ocean Salmon Project. The CRFS program incorporates many changes and improvements over previous surveys, including high frequency onsite sampling, onsite estimates of skiff effort for public access sites, and use of an angler license database for effort estimates. The CRFS sampling and estimation program has been peer reviewed by the National Science Foundation as part of the federal MRIP program for data collection on recreational fisheries. The CRFS program is federally peer-reviewed and certified.

Private and Rental Boat Data Collection

There are hundreds of sites for launching, mooring, and docking private and rental boats along the California coast and within its harbors and bays. In designing CRFS, a decision was made to stratify the

access sites for private and rental boats based on access type (public vs. private) and relative catch of species under active management. Public access sites are stratified into primary sites (PR1) and secondary sites (PR2). PR1 sites are sampled at a high rate of 20% of days to cover sites with high effort for species of management concern. PR2 sites are minor sites sampled 3 days in the month. It is not feasible to sample the private access sites for catch in the field, and the estimated catch rates from public access sites are used as a proxy for the boats returning to private access sites. An under-coverage adjustment is made to the estimate from the field survey to account for private-access effort and night effort that occurs at both private and public sites but cannot be sampled by CRFS personnel. Effort estimates from the Angler License Directory Telephone Survey are used to make these under-coverage adjustments.

IATTC Tuna Sampling Program

Estimates of U.S. recreational landings by weight are based on CPFV logbook numbers of bluefin landed into California, and fish size information from IATTC sampling data¹.

In Appendix Table A of the June 2014 HMSMT Report (Agenda Item E.4.b), annual estimates of U.S. recreational landings in metric tons are provided for 2000-2012, as reported by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific (ISC). These estimates represent only the CPFV landings into California and do not include the comparatively minor estimated landings by anglers fishing from private vessels. Using the same estimation methods, the HMSMT, in consultation with National Marine Fisheries Service (NMFS) staff, provided a preliminary estimate for 2013 of 985 mt.

The average monthly weight of bluefin landed was applied to the 2013 estimate calculation, with an annual average of 15.5 kg, based on Inter-American Tropical Tuna Commission (IATTC) sampling data from 2011. IATTC sampling for size of bluefin tuna was discontinued in 2011, and was limited in geographic coverage and time of day. This may result in a bias toward sampling long-range trips with larger average sizes of tuna, although juvenile bluefin comprise the majority of recreational catch.

Estimates of recreational landings from U.S. waters are also available from RecFIN, although these estimates are incomplete, as they do not include landings of fish caught in Mexico and landed in California – which in most years comprise the majority of catch observed or reported by CRFS samplers.

Landings Statistics from Logbooks and CRFS/MRFSS

CPFV Logbooks

Over the past thirty years, recreational CPFV logbook data shows PBF landings peaked at over 35,000 fish caught annually during the period from 1999-2002, and then declined to an annual catch below 10,000 fish until 2011 when landings again reached over 30,000 fish annually and continued to rise into 2013 with 65,000 fish (Figure 1). To date, 2013 catch levels were the highest on record.

¹ United States Catch Time Series for Pacific Bluefin Tuna in the North Pacific Ocean, A.L. Coan, Jr., and J.F. Childers, Dec. 2007. A Working document submitted to the sixth meeting of the Pacific Bluefin Tuna Working Group of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC), 11-19 December 2007, Shimizu, Japan. Document not to be cited without author's permission.

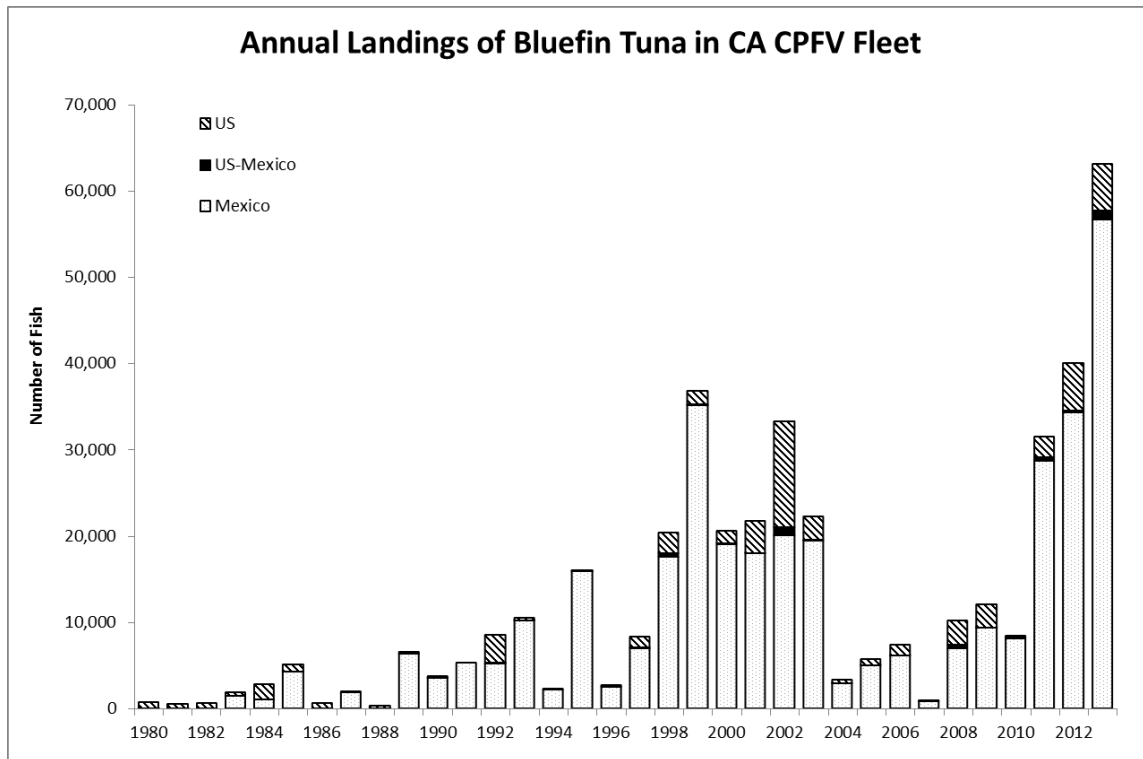


Figure 1. Annual landings of Pacific bluefin tuna in the California CPFV fishery, 1980- 2013. (Source: CDFW Marine Logs System (MLS), CPFV Logbooks; extracted August 15, 2014.)

Notes:

US waters defined as CDFW blocks ≤ 899 except for 877-882, and 950; US-Mexico waters defined as blocks 877-882 which are divided by the US-Mexico border; Mexico waters defined as blocks ≥ 900 except for 950.

The increasing success in catch rates in recent years has been attributed to the increase in fishing effort in the vicinity of floating grow-out pens off northern Baja, which could be a contributing factor. These pens hold PBF taken in the Mexican commercial purse seine fishery, and appear to have the effect of serving as fish aggregation devices. California landings have also increased during the same period.

Table 3. Annual CPFV landings of bluefin tuna and estimated weight, by region, 1990-2013

Year	Number of Bluefin				Number of IATTC Fish Sampled n =	Weight Range (kg)	Average Weight (kg)	Total Weight (mt)			
	US	US-Mex	Mexico	Total				US	US-Mex	Mexico	Total
1990	197	1	3,557	3,755	*	*	21.3	4.2	0.0	75.7	80.0
1991	0	0	5,330	5,330	*	*	17.7	0.0	0.0	94.4	94.4
1992	3,295	30	5,261	8,586	*	*	21.1	69.4	0.6	110.8	180.8
1993	309	7	10,219	10,535	1,260	6.5 - 66.4	28.4	8.8	0.2	290.6	299.6
1994	10	0	2,233	2,243	293	11 - 90.7	38.3	0.4	0.0	85.6	85.9
1995	96	4	15,925	16,025	750	5 - 87.6	15.9	1.5	0.1	253.6	255.2
1996	50	34	2,585	2,669	240	7.4 - 35.5	14.9	0.7	0.5	38.6	39.8
1997	1,187	167	6,983	8,337	409	6.3 - 31.4	18.5	22.0	3.1	129.2	154.3
1998	2,378	450	17,596	20,424	683	6.5 - 53.2	24.4	58.1	11.0	429.5	498.6
1999	1,504	119	35,174	36,797	723	3.9 - 65.2	13.8	20.7	1.6	485.1	507.5
2000	1,466	98	19,100	20,664	3,968	5.2 - 77.7	17.6	25.7	1.7	335.3	362.8
2001	3,754	33	18,019	21,806	6,578	5.2 - 98.9	17.6	65.9	0.6	316.5	383.0
2002	12,224	979	20,079	33,282	2,713	4 - 77.7	19.6	239.3	19.2	393.0	651.5
2003	2,733	125	19,433	22,291	4,325	5.2 - 90.6	18.1	49.4	2.3	351.1	402.7
2004	438	47	2,906	3,391	255	6.3 - 117.2	19.5	8.5	0.9	56.6	66.0
2005	686	37	5,034	5,757	109	5 - 37.2	13.5	9.3	0.5	67.9	77.7
2006	1,271	78	6,124	7,473	670	5 - 35.6	13.4	17.0	1.0	81.8	99.8
2007	185	2	841	1,028	45	6 - 18.7	13.0	2.4	0.0	10.9	13.3
2008	2,800	359	7,028	10,187	732	4.4 - 38	7.3	20.5	2.6	51.3	74.4
2009	2,718	70	9,350	12,138	684	5.7 - 23.7	13.1	35.7	0.9	122.9	159.6
2010	150	156	8,153	8,459	894	5.3 - 27.4	11.7	1.8	1.8	95.7	99.2
2011	2,305	438	28,751	31,494	1,919	3.9 - 45.1	9.5	21.9	4.2	273.7	299.8
2012	5,485	142	34,386	40,013	3,533	4.7 - 46.2	11.8	64.6	1.7	404.9	471.2
2013	5,419	1,054	56,681	63,154	*	*	15.5	84.3	16.4	881.3	981.9

Notes:

US waters defined as CDFW blocks ≤ 899 except for 877-882, and 950; US-Mexico waters defined as blocks 877-882 which are divided by the US-Mexico border; Mexico waters defined as blocks ≥ 900 except for 950. (Source: CDFW Marine Logs System (MLS), CPFV Logbook Data; extracted July 18, 2014. Weights from IATTC dockside sampling).

*Numbers not currently available to CDFW staff

CRFS

Although CPFVs represent the majority of PBF catch and effort in US and Mexican waters for California based anglers, it is important to note that there is also a private boat component to this fishery. According to CRFS recreational fishery monitoring data collected in California, private boat anglers catch an average of about 400 PBF annually, with the majority of catch occurring in Mexican waters (Table 4).

Table 4. Estimated recreational landings (number of fish and metric tons from average weight) of Pacific bluefin tuna by California private/rental vessels, 2008-2013.

Year	US Waters				Mexico Waters			
	Estimated Number of Bluefin	Number CFRS Fish Measured	Weight Range (kg)	Average Weight (kg)	Estimated Number of Bluefin	Number CFRS Fish Measured	Weight Range (kg)	Average Weight (kg)
2008	399	5	3.8-16.5	8.4	499			
2009	210	5	5.5-20.5	9.7	420			
2010	20	3	7.8-9.5	9.1	377			
2011	29	3	6.0-8.0	6.9	115			
2012	10*				0	2*	15.3-15.5	15.4*
2013	233				323	2*	6.7-6.8	6.75*

Notes:

Estimates produced by CDFW staff from CRFS data, August 14, 2014. Includes estimates of A+B1 fish (sampler observed and angler reported fish). Average weights are from CRFS sampling of Private/Rental boats landing bluefin tuna. Where no PR1 fish were measured - weight comes from PR1 fish caught in Mexico.

*Samplers obtained measurements from only US fish in 2008-2011 and only from fish caught in Mexican waters for 2012 and 2013. Because there were no US measured fish in 2012, there was no estimate generated for that year, although there were 10 A (2 measured) and 20 B1 fish from Mexico waters.

Bag Analysis

CDFW conducted an analysis of a bag limit reduction ranging from 10 (no change) to zero retention for catch landed off California. A change in the allowed bag size for PBF would reduce catch in US waters only, as catch originating in Mexican waters would not be subject to a California bag limit.

CDFW provided an original bag limit analysis for Table 6 of the June 2014 Supplemental HMSMT Report (Agenda Item E.4.b) based on RecFIN data for CPFV and private boat catches combined. Due to the relatively small sample available of PBF catch records for US waters, CDFW expanded their analysis to examine CPFV logbook records as a more robust data source, and re-structured the CRFS bag analysis for the private boat component (Table 7). The bag analyses cover the period from 1990 through 2013 for the CPFV log dataset. Since a more limited time series was available for CRFS data, 2008 through 2013 was used, after the 10 fish bag limit on PBF became effective in US waters off California.

Methods

CPFV Logbook Analysis

CDFW primarily relied upon CPFV logbook data to analyze bag reduction options due to the robust data set for PBF compared to RecFIN.

Four primary data components of the CPFV logs were used to stratify PBF catch and effort for which the effects of bag limit changes for bluefin tuna could be accurately evaluated. These were:

- Fishing Effort Area: Records were assigned to US or Mexican waters based on reported fishing block locations. CDFW blocks which overlapped the US-Mexico border and to which effort could not be assigned were separately defined. While effort occurring in both Mexico and US waters was examined, only fishing days in US waters were considered in bag reduction analyses.

- Catch Composition: Records of fishing days that contained PBF catch of at least one fish were examined, as the presence of PBF catch indicates the species was available as a possible target on the trip. Although trips containing other HMS catch compositions were considered (i.e., trips that had no PBF but were positive for albacore, yellowfin, etc.), PBF may or may not have been available or sought as a target species on these trips, and available data did not allow for any further refinement of these trips.
- Effort: Catch per angler for days bluefin were landed. Catch is averaged by species across all anglers.
- Years Analyzed: 1990-2013

Caveats:

- CPFV logbook compliance rates are estimated at 80 percent per year over the last decade. Catch and effort has not been expanded to account for noncompliance in this analysis.
- Trips specifically targeting PBF tuna are not specified on CPFV logs. Trip target species can only be indicated as a general tuna category by vessel operators.
- Actual bag size per angler is not recorded on logs; rather, total anglers and total fish per species per day are recorded.

Table 5. Frequency of occurrence for bluefin tuna in CPFV angler landings* in California waters during 2013.

Potential Bag Size Scenarios 0-10 fish, 2013									
CPFVs in US Waters									
<i>Total Number Anglers (bags) = 4,037</i>					<i>Total Number of Fish = 5,419</i>				
Bag Composition Analysis						Reduction Analysis			
Bag Size	Bag Frequency in Sample	Bag Percentage of Sample	Number of Fish	Percentage of Fish	Cumulative Percentage of Fish	Number of Bags Affected	Percentage of Bags Affected	Reduction in Number of Fish	Percent Reduction
0	1,576	39.0%	0	0.0%	0.0%	4,037	100.0%	5419	100.0%
1	1,255	31.1%	1,255	23.2%	23.2%	1,206	29.9%	2958	54.6%
2	439	10.9%	878	16.2%	39.4%	767	19.0%	1752	32.3%
3	291	7.2%	873	16.1%	55.5%	476	11.8%	985	18.2%
4	168	4.2%	672	12.4%	67.9%	308	7.6%	509	9.4%
5	215	5.3%	1,075	19.8%	87.7%	93	2.3%	201	3.7%
6	30	0.7%	180	3.3%	91.0%	63	1.6%	108	2.0%
7	24	0.6%	168	3.1%	94.1%	39	1.0%	45	0.8%
8	33	0.8%	264	4.9%	99.0%	6	0.1%	6	0.1%
9	6	0.1%	54	1.0%	100.0%	0	0.0%	0	0.0%
10	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%

*Numbers reported on CPFV logbooks. Bag size determined by average fish-per-angler per log. Limit of 10 bluefin tuna from US waters. Bag analysis tool developed by CDFW staff. (Source: CDFW Marine Logs System (MLS), CPFV Logbook data; extracted July 18, 2014).

The bag analysis above for CPFV data (as well as the analysis below for private boat catch) illustrates anticipated savings, in number of fish, at lower daily bag limit levels. As shown above, at a 2-fish daily bag limit, the total catch in 2013 would have been reduced by 32.3 percent, though that would have affected only 19 percent of the anglers that were on a trip where PBF was recorded in the catch. Trips where PBF was targeted but none were taken would not have been affected by a bag limit reduction.

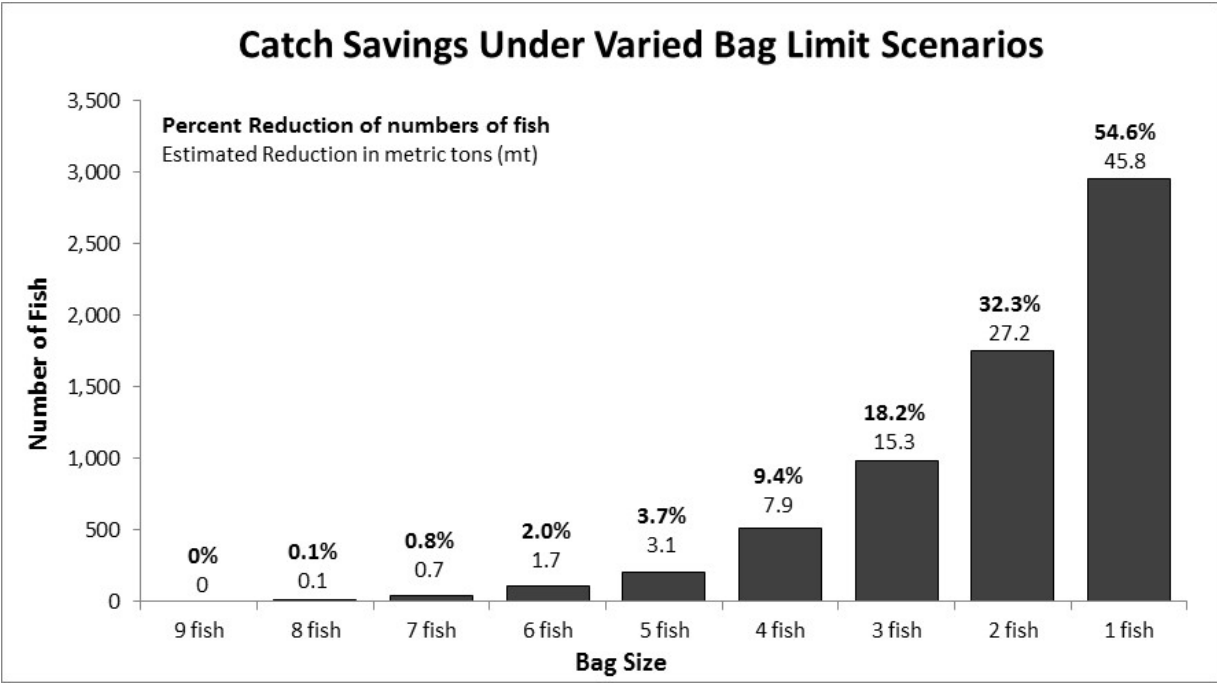


Figure 2. Potential annual reduction in number of fish, percent of number of fish, and metric tons as affected by reduced bag limits for bluefin tuna kept by CPFV anglers in US waters, based on landings data from 2013. (Source: CDFW Marine Logs System (MLS), CPFV Logbook data; extracted July 18, 2014.)

Table 6. Annual catch savings of PBF in US waters by CPFV fleet with reduction in bag size from 10 to 5-1 for 1990 to 2013. Weights are estimated from averages of sampled fish. (Source: CDFW Marine Logs System (MLS), CPFV Logbook data; extracted July 18, 2014; weights from IATTC dockside sampling. 2012-2013 weights derived from 2011 data.)

CPFV Catch Savings Under Varied Bag Limit Scenarios in US Waters													
Year	Number of Fish						Avg. Weight (kg)	Total Caught (mt)	Weight (mt)				
	Total Caught	10 fish to 5 fish	10 fish to 4 fish	10 fish to 3 fish	10 fish to 2 fish	10 fish to 1 fish			10 fish to 5 fish	10 fish to 4 fish	10 fish to 3 fish	10 fish to 2 fish	10 fish to 1 fish
1990	197	0	0	0	0	12	21.30	4.20	0.00	0.00	0.00	0.00	0.26
1991	0	0	0	0	0	0	17.72	0.00	0.00	0.00	0.00	0.00	0.00
1992	3,295	15	67	277	663	1,400	21.06	69.39	0.32	1.41	5.83	13.96	29.48
1993	309	0	0	6	33	71	25.84	7.99	0.00	0.00	0.16	0.85	1.83
1994	10	0	0	0	0	0	27.65	0.28	0.00	0.00	0.00	0.00	0.00
1995	96	0	0	0	0	15	16.77	1.61	0.00	0.00	0.00	0.00	0.25
1996	50	0	0	0	0	1	18.07	0.90	0.00	0.00	0.00	0.00	0.02
1997	1,187	93	131	180	271	406	21.23	25.19	1.97	2.78	3.82	5.75	8.62
1998	2,378	29	75	156	313	641	20.92	49.74	0.61	1.57	3.26	6.55	13.41
1999	1,504	8	29	67	153	382	18.59	27.96	0.15	0.54	1.25	2.84	7.10
2000	1,466	59	146	280	440	720	22.73	33.33	1.34	3.32	6.37	10.00	16.37
2001	3,754	143	207	312	524	1,089	21.07	79.10	3.01	4.36	6.57	11.04	22.95
2002	12,224	284	676	1,398	2,687	5,143	19.63	239.99	5.58	13.27	27.45	52.75	100.97
2003	2,733	35	113	239	449	1,045	21.28	58.16	0.74	2.40	5.09	9.56	22.24
2004	438	0	17	59	101	165	25.73	11.27	0.00	0.44	1.52	2.60	4.24
2005	686	0	8	29	53	123	15.77	10.82	0.00	0.13	0.46	0.84	1.94
2006	1,271	42	107	173	263	446	15.76	20.04	0.66	1.69	2.73	4.15	7.03
2007	185	0	0	0	0	12	14.26	2.64	0.00	0.00	0.00	0.00	0.17
2008	2,800	61	143	290	647	1,257	15.69	43.93	0.96	2.24	4.55	10.15	19.72
2009	2,718	361	485	631	877	1,380	14.92	40.54	5.38	7.23	9.41	13.08	20.58
2010	150	0	0	0	4	36	19.22	2.88	0.00	0.00	0.00	0.08	0.69
2011	2,305	129	293	502	789	1,234	18.49	42.62	2.39	5.42	9.28	14.59	22.82
2012	5,485	69	296	734	1,463	2,818	15.30	83.94	1.06	4.53	11.23	22.39	43.12
2013	5,419	201	509	985	1,752	2,958	15.55	84.25	3.13	7.91	15.31	27.24	45.99
Avg 90-13	2,111	64	138	263	478	890	19.36	39.20	1.14	2.47	4.76	8.68	16.24
Avg 11-13	4,403	133	366	740	1,335	2,337	16.45	70.27	2.19	5.95	11.94	21.41	37.31

Data Source: MLS CPFV Logbook Database. Average weights from IATTC dockside sampling

Private Boat Analysis from CRFS

CDFW conducted a separate bag frequency analysis for the private boat component of the fishery, since catch rates are likely to be different from the CPFV fleet due to vessel size and range, and other factors.

Catch and effort data was stratified from CRFS data available through the RecFIN database. The following stratifications were used:

- Fishing Effort Area: Trips in the RecFIN database were assigned to US or Mexican waters based on the primary effort area reported in angler surveys
- Catch Composition: A + B1 catch data (available and unavailable dead) was used.
- PBF Trips: Fishing days that caught PBF and/or days where PBF was indicated as the primary or secondary target species were examined.
- Effort: Catch per angler day for days on which PBF was caught or PBF was indicated as the target species.
- Years Analyzed: 2008-2013

Caveats

- There are sparse records of PBF catch and effort in the sample data and most fish encountered in the field survey originate in Mexican waters. This results in a very limited sample for lengths and weights for US fish.
- CRFS sample data for PR mode is collected from public access sites such as launch ramps during daylight hours. There may be a bias in catch composition since private access and night effort are not sampled directly in the field. (Effort on private access and night fishing are collected through a phone survey of licensed anglers)

Table 7. Frequency of bluefin tuna occurrence in angler landings*1 off California waters during 2008-2013 (not expanded). (Source: Recreational Fisheries Information Network (RecFIN), extracted August 8, 2014).

Potential Bag Size Scenarios 0-10 fish, 2008-2013									
Private Vessels in US Waters									
<i>Total Number Anglers (bags) = 633</i>					<i>Total Number of Fish = 88</i>				
Bag Composition Analysis						Reduction Analysis			
Bag Size	Bag Frequency in Sample	Bag Percentage of Sample	Number of Fish	Percentage of Fish	Cumulative Percentage of Fish	Number of Bags Affected	Percentage of Bags Affected	Reduction in Number of Fish	Percent Reduction
0	551	87.0%	0	0.0%	0.0%	82	13.0%	88	100.0%
1	76	12.0%	76	86.4%	86.4%	6	0.9%	6	6.8%
2	6	0.9%	12	13.6%	100.0%	0	0.0%	0	0.0%
3	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
4	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
5	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
6	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
7	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
8	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
9	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%
10	0	0.0%	0	0.0%	100.0%	0	0.0%	0	0.0%

*Type A+B1 data: Type A are fish actually observed by the sampler and type B1 are fish reported by anglers (as distinguished from fish released alive). Limit of 10 bluefin tuna from US waters, San Diego sub-regions, only PR1 fishing modes. 33 records outside District 1 (San Diego) (only 3 of which had fish) were excluded. Bag analysis tool developed by CDFW staff.

As shown above, if the private boat fleet were reduced to a 1-fish daily bag limit in US waters, the total catch in 2008-2013 would have been reduced by 6 fish, or 6.8 percent of the total, though that would have affected less than one percent of the anglers that were on a trip where PBF was recorded in the catch. Trips where PBF was targeted but none were taken would not have been affected by a bag limit reduction.

Conclusions

Based on the recreational fishery monitoring data collected by the state of California through CPFV logbooks and the CRFS sampling program, the CPFV component of the fishery accounts for the large majority of PBF catch in Mexican and US waters (approximately 65,000 CPFV fish compared to an estimated 400 private boat fish in 2013). Additionally, catch rates are higher in the CPFV component than the private boat component based on the comparative bag analysis results.

Potential catch savings achieved through reducing the current California bag limit of ten fish per angler might best be based on the CPFV logbook data as the most representative source of recreational catch and effort for this species. Landings of PBF have been increasing the past few years, with 2013 CPFV

landings estimated at 985 mt. Due to the recent trends in high catches, 2013 data was used to examine potential catch savings with the assumption that trends of high availability of PBF to the recreational fishery will continue.

If California were to harmonize its PBF bag size with Mexico's limit of five fish (when Mexico's recreational fishery is open), a reduction from the current limit may result in a catch savings of an estimated 201 fish from the total 5,419 fish, or 3.13 mt of the 84.25 mt; a 3.71% reduction (Table 3). At the same time, it would affect 2.2% (or 193) of the total 4,037 bags for the same time period (Table 5).