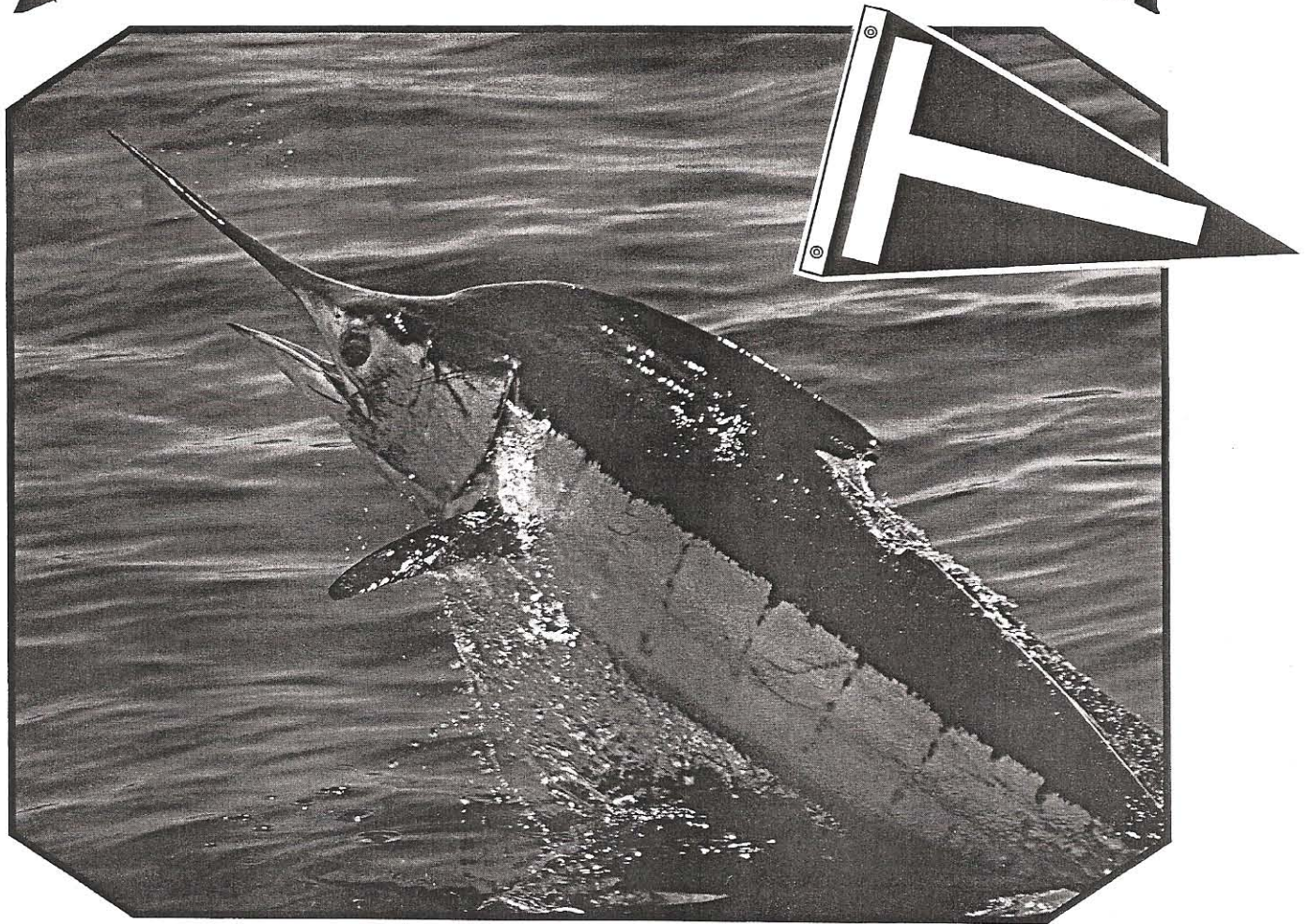


The Southwest Fisheries Science Center's

2001 Billfish Newsletter



- Draft Fishery Management Plan for Highly Migratory Species
- Data from Southern California Sportfishing Clubs Analyzed
- Trends in 2000 Billfish Angler Catch Rates
- 2000 Billfish Tagging and Recoveries
- Pacific Federal Angler Affiliation for Billfish



INTRODUCTION

The Southwest Fisheries Science Center's (SWFSC) billfish research programs provide information for the conservation and management of billfish resources in the Pacific. This *Billfish Newsletter* is an annual publication that describes the primary components of the SWFSC's billfish research. The International Billfish Angling Survey provides angler catch and fishing effort information. The Billfish Tagging Program provides data on the biology, distribution and migration patterns of Pacific billfish. The Federal-Angler Affiliation for Billfish (PacFAAB) is a cooperative program that focused scientific study on the billfish resource while making research results available to anglers on a timely basis. All investigations rely on continued cooperation from billfish anglers, sport fishing clubs, commercial fishers and agencies affiliated with the SWFSC.

This year, SWFSC biologists and staff spent considerable effort preparing information for the draft Fisheries Management Plan (FMP) for highly migratory species (HMS) within the U.S. West Coast Exclusive Economic Zone (EEZ). For the most part, West Coast fisheries have open access to highly migratory species such as tuna, swordfish and pelagic sharks. Management measures are needed to ensure that domestic and international management of these species is consistent, precautionary and based on the most accurate information available. The draft FMP document provides up-to-date information and data concerning 13 pelagic species including swordfish, striped marlin, yellowfin tuna, bluefin tuna, bigeye tuna, skipjack, albacore, thresher shark (3 species), mako shark, blue shark and dorado. Goals are to implement long-term conservation and sustainable use, prevent over fishing, provide diverse recreational and commercial fishing opportunities, and to minimize both bycatch and user conflicts.

The final draft FMP will contain extensive regulatory options for existing and potential future fisheries that will be considered by the Pacific Fishery Management Council. After extensive public comment during the summer of 2001, the Council may decide on any number of those regulatory options to manage West Coast fisheries targeting these species. Once the FMP is enacted, any regulatory actions taken by the Council to manage highly migratory species could impact recreational billfish anglers as well as commercial fishers along the West Coast.

Public input has been encouraged throughout the FMP development process, including development team meetings and constituent scoping meetings. Additionally an Advisory Panel was established early in the process to facilitate adequate representation by all

stakeholders. The draft FMP is currently scheduled to be presented to the Council during its June 2001 meeting. The draft FMP is available online at <http://www.pcouncil.org>. Should you want more information you can call or write the Pacific Fishery Management Council at 2130 SW Fifth Avenue, Suite 224, Portland OR 97201 (Phone 503/326-6352).

PACIFIC FEDERAL ANGLER AFFILIATION FOR BILLFISH (PacFAAB)

PacFAAB facilitates information exchange between scientists and recreational billfish anglers thereby improving stock assessment information for Pacific billfish. This research provides improved access to striped marlin and other pelagic species allowing for the collection of data on movements, growth, reproduction, and tagging mortality. Collaborative projects provide the means to acquire specific life history data, time series abundance estimates, movement patterns and stock boundaries, and measures of the physical condition of fish at time of release.

Implementation of activities noted below has shown great promise in 2000 while the more costly elements await additional resources:

- Web site was constructed as means of efficient information exchange is available at <http://swfsc.ucsd.edu/frd.PacFAABa.html>,
- Volunteer bridge log for time-series indexing of catch-per-unit of effort was developed,
- Better documentation of length of catch records achieved,
- Historic club records were obtained for time-series indexes of abundance (see below),
- Upgraded tournament data record keeping implemented to include measures of total fishing effort, and
- Tissue sampling was implemented for genetic and physiological studies.

We, at the SWFSC, want this new level of cooperation to continue to grow and encourage your individual and collective support and participation. We welcome your comments and ideas. Please feel free to call or email the SWFSC any time.

THE INTERNATIONAL BILLFISH SURVEY

The *International Billfish Angler Survey* began in 1969 and now provides a 32-year time series of angler catch rates in key locations throughout the Pacific. The post card survey provides catch and fishing effort data from individual anglers for billfish and swordfish in the Pacific Ocean. It provides the only estimates of recreational fishing effort for marlin and swordfish in many key Pacific locations. Catch per angler day, the measure of angler success, is a measure of local changes in catch rate and may indicate changes in stock size, environmental conditions or local depletion by a fishery. Such information is an important component of stock assessment models.

In 2000, 458 billfish anglers reported catching 4,432 billfish during 7,241 fishing days. Table 1 indicates fishing effort, in angler days, and CPUE for all billfish reported by location for the year 2000. The annual mean catch-per-effort (measured in catch per day fishing) for all billfish was 0.61 billfish per day in 2000 and 0.48 in 1999. This was an improvement over 1999 as anglers in 2000 fished a fewer number of days and caught more fish. The current mean catch rate of 0.61 is also greater than the prior five-year average of 0.50 (1995 to 1999) and higher than the all-time mean highs that occurred during the first years of this survey (1969 to 1971). The lowest catch rates averaged 0.34 during the mid-1970s.

Reported catch rates of blue marlin off Hawaii totaled 482 blue marlin in 3,408 days of fishing or 0.14 blue marlin-per-day. The catch rate remains fairly constant within a 20-year range (Figure 1a). Blue marlin are tropical and sub-tropical in habitat and rarely extend north of Magdalena Bay, Baja California Sur. The catch off Baja totaled 75 blue marlin in 1,335 days fishing (0.06 per day), which is consistent with prior years. Catch rates of blue marlin off Costa Rica (0.20), Mauritius (0.43), and Tahiti (0.23) also remain consistent with recent results.

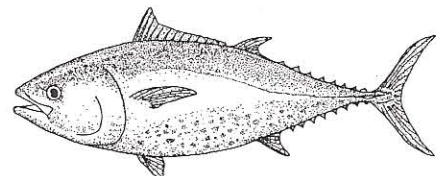
Trends in mean angler catch rates for striped marlin are shown graphically in (Figure 1b). Mean angler catch rate in Southern California (0.07) and Hawaii (0.06) declined slightly in 2000 but has remained fairly consistent since the mid-1980s. At the southern tip of the Baja California peninsula, but north of Mazatlan, 975 striped marlin were reported caught in 1,335 days of fishing. This catch rate of 0.73 striped marlin per angler day was slightly more than for all of Mexico (0.63). Baja California is a core area for billfish abundance and has always been a productive area for striped marlin. There appears no long-term trend for the period although several peri-

Table 1. Results of 2000 *Billfish Angler Survey*. Numbers indicate total days fished by location and catch-per-fishing day for all billfish reported. Data in parentheses are values recorded in 1999. Major species in each location are indicated; striped marlin (SM), blue marlin (BLM), black marlin (BKM), and sailfish (SF).

LOCATION	ANGLER FISHING DAYS	BILLFISH PER FISHING DAY	MAJOR SPECIES
PACIFIC OCEAN			
Hawaii, U.S.A.	3,408 (3,428)	0.29 (0.40)	BLM
Southern California, U.S.A.	1,365 (1,732)	0.07 (0.08)	SM
Baja California, Mexico	1,335 (1,469)	0.92 (0.62)	SM
Guaymas, Mexico	13 (12)	0.15 (0.17)	SF
Mazatlan, Mexico	31 (27)	1.00 (0.96)	SF
Manzanillo, Puerto Vallarta, Mexico	30 (33)	0.90 (0.73)	SM
Acapulco, Ixtapa, Zihuatanejo, Mexico	125 (177)	1.83 (1.93)	SF
Guatemala	123 (30)	10.27 (4.63)	SF
Costa Rica	71 (77)	2.31 (1.25)	SF
Panama	64 (79)	1.52 (1.20)	SF
Colombia	15 (8)	0.20 (0.62)	SF
Japan	89 (46)	0.22 (0.26)	BLM
Guam, U.S.A.	0 (5)	0 (0.60)	BLM
Papua New Guinea	2 (4)	0.50 (0.25)	BLM
Marshall Islands	0 (330)	0 (0.17)	BLM
Midway Island	19 (116)	0.11 (0.04)	BLM
Kiribati	62 (26)	0.45 (0.73)	SF
Fiji	5 (4)	0.20 (0)	SF
Tahiti, French Polynesia	22 (44)	0.23 (0.20)	BLM
Vanuatu	6 (270)	0.17 (0.57)	BLM
Australia	125 (110)	0.34 (0.36)	BKM
New Zealand	83 (89)	0.11 (0.25)	SM
INDIAN OCEAN			
Kenya	7 (80)	0.86 (0.94)	SF
Maldiv Islands	162 (194)	0.86 (0.70)	SF
United Arab Emirates	0 (95)	0 (3.97)	SF
Mauritius	30 (0)	0.60 (0)	BLM
ATLANTIC OCEAN			
Atlantic total	130 (93)	0.61 (0.95)	SF

Bluefin Tuna

Thunnus orientalis



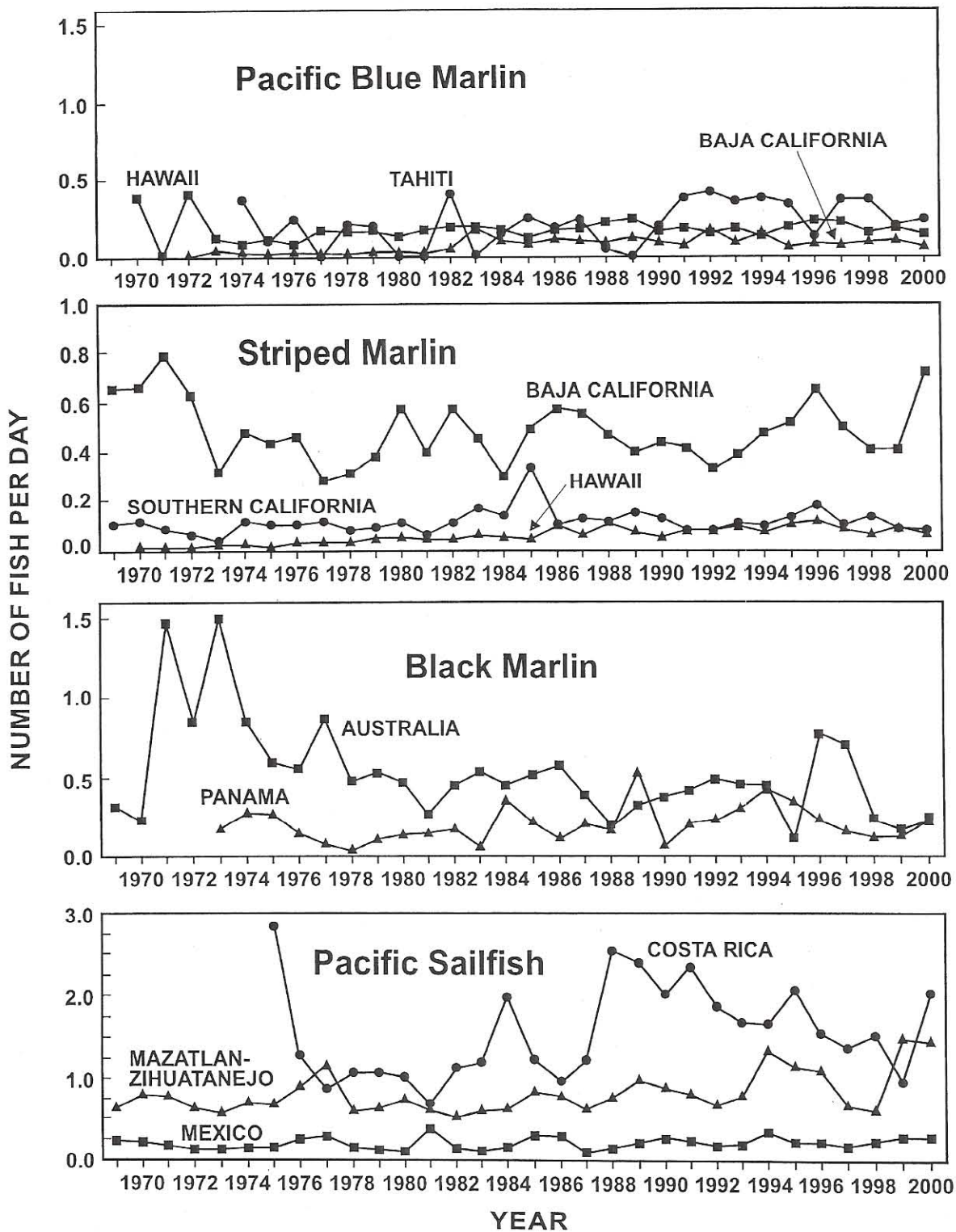


Figure 1. Catch per unit of effort (CPUE) in number of fish per angler day, for blue marlin, striped marlin, black marlin and Pacific sailfish reported by region, 1969 - 2000.

ods of highs and lows are evident. For example, during or immediately following strong El Niño episodes (1982-83, 1987, 1991-92, and 1997) were periods of lower catches off Mexico. Previous work has shown commercial longline fisheries operating off the coast of Baja California, Sur negatively impacted angler catch rates. The operation of joint-venture longline fisheries near Baja California in the 1970s coincided with declining angler catch rates for striped marlin. Mexico prohibited longline fishing in its EEZ for two years beginning in 1976. During that period the angler catch rate for billfish in that area increased by almost 60%. A period of limited longlining that began in 1982 was again correlated with a decline in angler catch rates. Mexican longline permits issued in late 1999 and 2000 have been revoked although some vessels continue to longline off Baja while appealing that action in Mexican courts.

Reported catch rates of black marlin in Australia (0.23) and Panama (0.22) increased in 2000 but are below recent highs (Figure 1c). Catch rates of sailfish throughout Mexico (0.29) did not reflect the greater success off the central coast from Mazatlan to Zihuatanejo (1.45). Catch rates here were generally better than in recent years (Figure 1d). Guatemala beat all records with 1,257 sailfish reported in just 123 days of fishing (10.22) and Costa Rica rebounded from a three-year decline in angler success to just over two sailfish per day (2.04). Anglers in the Indian Ocean reported 0.72 sailfish per angler day with excellent fishing in Kenya (0.86) and the Maldive Islands (0.85). Short-billed spearfish continued a strong run off Hawaii where anglers reported catching 302 in the 3,408 fishing days for a catch rate of 0.09.

THE BILLFISH TAGGING PROGRAM

The *Billfish Tagging Program* began in 1963. Release and recapture data from tagged billfish are used to determine movement patterns, geographic distribution and growth patterns of billfish. Since its inception more than 47,610 fish of 76 different species have been tagged and released (Table 2). The Billfish Tagging Report cards received for 2000 indicate a total of 636 billfish were tagged and released by 436 anglers and 173 fishing captains (Table 3). This is 6% fewer tag releases than in 1999 and 34% fewer than 1998. Only 38 striped marlin were tagged off southern

California. In Hawaii, 121 blue marlin and 65 striped marlin were reported tagged and released. This was another good year for tagging short-billed spearfish in Hawaii where 85 were tagged. Tagging off Mexico remained similar to past years with 185 billfish tagged from Magdalena Bay south to La Paz and 91 more tagged between Mazatlan, Zihuatanejo and Acapulco. Eight swordfish were tagged off Mexico in the year 2000.

Each year we recognize the anglers, captains and fishers who tag and release billfish. In 2000, 436 individual anglers reported tagging at least one billfish. Individual recognition of each angler who reported tagging two or more billfish in 2000 is presented in Table 4. Limited space prevents listing all 436 taggers. We want to acknowledge John Hoolihan who tagged the most billfish during the last five-year period and Don Anderson who was the most consistent tagger in each of the past five years. We also list the captains of charter and private boats who tagged significant numbers of billfish in specific regions (Table 5). Captain Mark Shultz tagged the most billfish during the last five-year period while Captain John Jordan was the most consistent tagger in each of the last five years. Continued interest and cooperation by these captains have greatly enhanced the *Billfish Tagging Program*, and their efforts are truly appreciated.

Table 2. Summary of all fish tagged in 2000 with releases and recoveries for 1963-2000.

SPECIES NAME	RELEASES	RELEASES	RECOVERIES	RATE
	2000	TOTAL	TOTAL	
Striped Marlin	249	20,503	327	1.59
Sailfish	128	7,749	45	0.58
Blue Marlin, Pacific	148	5,315	58	1.09
Billfish, unid.	13	4,292	5	0.12
Black Marlin	5	3,339	69	2.07
Shortfin Mako Shark	47	1,165	27	2.32
Roosterfish	-	920	29	3.15
Short-billed Spearfish	85	967	1	0.10
Broadbill Swordfish	8	504	15	2.98
Yellowtail	-	492	36	7.32
Dolphinfish (Mahi Mahi)	-	407	3	0.74
Yellowfin Tuna	3	345	25	7.25
Blue shark	-	316	5	1.58
Skipjack Tuna	-	97	2	2.06
Thresher Shark	30	127	13	10.24
Bat Ray	-	84	0	0.00
Albacore Tuna	6	85	0	0.00
Bigeye Tuna	1	79	2	2.53
Hammerhead Shark	-	52	2	3.85
Bluefin Tuna	-	50	5	10.00
White Sturgeon	-	50	1	2.00
Black Sea Bass	-	40	8	20.00
Blue Marlin, Atlantic	2	42	0	0.00
Leopard Shark	-	39	1	2.56
Whitetip Shark	-	39	1	2.56
Wahoo	-	38	3	7.89
Bronze Whaler Shark	13	50	1	2.00
Jack Crevalle	-	32	0	0.00
Blue Crevalle	-	30	1	3.33
Shark, unid.	-	26	0	0.00
Baracuda	2	25	2	8.00
Tiger Shark	-	17	2	11.76
White Marlin	1	13	1	7.69
Whale Shark	-	4	1	25.00
All Others	3	279	10	3.58

TAG RECOVERIES IN 2000

Seven (7) billfish were reported recaptured in 2000 including three blue marlin and four sailfish (Table 6). Two of the recaptured blue marlin were tagged off Kailua-Kona and one off Lanai, Hawaii. Two of the blue marlin were recaptured by longline fishers and one by trolling. One of these was at liberty for 1,288 days (3.5 years) during which time it traveled across the International Date Line, where it was recaptured near the Marshall Islands a distance of 1,769 nmi (Table 6). Two of the four sailfish were tagged and recaptured near Zihuatanejo, Mexico. Two additional recoveries of the 96 sailfish tagged in the Persian Gulf near Abu Dhabi (United Arab Emirates) in 1998 were recaptured in 2000. One sailfish was free for 1,148 days and traveled northwest 305 nmi. Iranian fishermen have now reported recapturing fourteen of the 96 tagged sailfish from the Persian Gulf.

We began supplying tag supplies for bluefin tuna in 1998. Two tagged bluefin tuna were recaptured in 2000. Both moved from Isla Cedros, Baja California Sur, north to just south of Ensenada, Mexico in 386 and 389 days,

Table 3. Summary of billfish tagged in 2000.

AREA	SPECIES	TOTAL
PACIFIC OCEAN		
Southern California, U.S.A.	Striped Marlin	38
	Marlin, unid.	9
Hawaii, U.S.A.	Blue Marlin	121
	Black Marlin	3
	Striped Marlin	65
	Marlin, unid.	1
	Short-billed Spearfish	85
Baja California, Mexico	Blue Marlin	9
	Striped Marlin	142
	Marlin, unid.	1
	Sailfish	33
Manzanillo, Zihuatanejo, and Acapulco, Mexico	Blue Marlin	1
	Black Marlin	1
	Striped Marlin	4
	Sailfish	85
Huatulco, Mexico	Blue Marlin	2
Eastern North Pacific Ocean	Broadbill Swordfish	8
Panama	Sailfish	3
Marshall Islands	Blue Marlin	1
Tahiti, French Polynesia	Blue Marlin	12
	Black Marlin	1
	Marlin, unid.	2
Fiji	Blue Marlin	2
	Sailfish	3
INDIAN OCEAN		
Maldiv Islands	Sailfish	4
ATLANTIC OCEAN		
Atlantic total	Blue Marlin	2
	White Marlin	1
Total		639

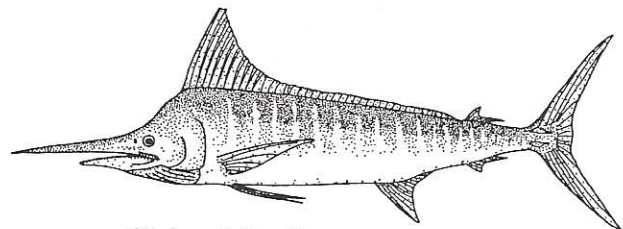
Table 4. Names of anglers tagging substantial numbers of billfish, and the number tagged and released. From *Billfish Tagging Report* cards received for 2000 calendar year releases.

ANGLER NAME	BILLFISH TAGGED
HAWAII, U.S.A.	
Henry Potts	11
James Karamouzis	4
Joey Posnick	4
Todd Crosland	3
John R. Ribeiro Sr.	3
Joe Sewell	3
Paul Arentsen	2
Darold Brandenburg	2
Ted Bukaske	2
Peter Clark	2
Brian Hickey	2
Robert Hilts	2
Tomas Irizarry	2
Steve Keinath	2
Janet B. Martic	2
Erhard Meixner	2
Michael Moskowitz	2
Petra Pryor	2
Bryan Rogers	2
Niklas Rosvall	2
Ryan Scott	2
David Trumbauer	2
BAJA CALIFORNIA, MEXICO	
Ralph Jim Konzal	19
R. David Verdugo	16
Don Anderson	13
Mark Brackmann	6
Chris Brown	6
Troy Grant	6
Joseph Reilly	5
Martha Warlaumont	5
Ken Warner	5
Wayne Slahor	4
Don Bear	3
Dennis L. Gagnon	3
Jerry Lewis	3
Josh Rosenstein	3
Donald E. Bentz	2
Steve Brackmann	2
Jill Brackmann	2
Argyle Campbell	2
Bob Hoose	2
Luis Ortiz	2
Mike Smith	2
James Wells	2
Ernest Wenzl	2
SOUTHERN CALIFORNIA, U.S.A.	
Gary Jasper	6
Reed Miller	5
Rich Duncan	3
Lynn Jasper	3
Milton S. Grier Jr.	2
MANZANILLO-ACAPULCO, MEXICO	
Bob Uliss	8
Don Anderson	3
Larry Covelli	3
Eric Holle	3
Catherine M. Ward	3
Matt Wilson	3
Patricia Holle	2
Chris M. Narwold	2
Furman Sheppard	2
Paul Taylor	2
Brenna Ward	2
NORTH EASTERN PACIFIC	
Tom Barrie	8
PANAMA	
Martha Warlaumont	2
FIJI	
Ben Wilson	2

Table 5. Names of captains tagging substantial numbers of billfish, and the number of billfish tagged and released. From *Billfish Tagging Report* cards received for 2000 calendar year releases.

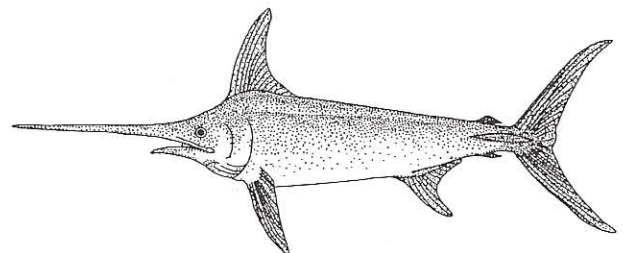
CAPTAIN NAME	BILLFISH TAGGED
HAWAII, U.S.A.	
Brian Van Mols	30
Sean Cleaver	18
Alan Abdill	13
Marlin Parker	11
Guy Terwilliger	11
Bill Casey	10
Jerry Allen	9
Mark Shultz	9
Kent Mongreig	8
James C. Dean	7
Jeff Fay	7
John Jordan	7
Robert McGuckin	6
Brian Wargo	6
Tony Clark	5
Fran O'Brien	5
Doug Armfield	4
John Bagwell	4
Frank R. Boyd	4
Bill Crawford	4
Neal Isaacs	4
Randy O. Orkisch	4
Freddy Rice	4
Marty L. Sands	4
Darryl Chow	3
Dennis R. Cintas	3
Darrin Isaacs	3
Kim Miyaki	3
Tom Siebler	3
Mike Derego	2
William Dorr	2
C. Bruce Evans	2
Chip Fischer	2
Scott M. Fuller	2
Lance Gelman	2
Kevin M. Hogan	2
Peter Hoogs	2
Scott Jones	2
John Llanes	2
Kevin Nakamaru	2
Larry Pries	2
Gary Quam	2
F. McGrew Rice	2
Reuben Rubio	2
BAJA CALIFORNIA, MEXICO	
Richard Hamilton	61
Jose Chacho Bojorquez	13
David E. Brackmann	11
Jerry Lewis	9
Martin Verdugo Collins	8
Jeff Hamm	8
Michel Arujo	6
Steve Murphy	6
Randy Rozell	6
Wayne Slahor	6
Troy Grant	5
Jorge Leon	5
Paulino Martinez	5
Felipe Glez Garcia	4
James Birschbach	3
Dave Harris	3
Sean Holden	3
Cissy Lewis	3
Harold Schram	3
Brad Titcomb	3
George T. Hollander	2
Steve Murphy	2
Felipe Redondan	2
Eric. A. Wahrenbrock	2

CAPTAIN NAME	BILLFISH TAGGED-
SOUTHERN CALIFORNIA, U.S.A.	
Thomas A. Shanahan	10
Steve W. Bledsoe	6
Ron Johnson	6
Stan Ecklund Sr.	2
Tom Patierno	2
MANZANILLO-ACAPULCO, MEXICO	
Jose Luis Servin Hernandez	18
Javier Vargas	12
Jose Angulo	10
Alfredo Vargas	9
Alfredo Vargas Lopez	8
Javier Vargas Lopez	6
Jose E. Vargas	4
Javier	3
Alejandro Vargas	3
Jay De Beaubien	2
Jeff Hamm	2
NORTH EASTERN PACIFIC OCEAN	
Betsy Welker	8
PANAMA	
Jeff Hamm	3
TAHITI, FRENCH POLYNESIA	
Alberto Bono	2
Serge Leontieff	2
Jacques Solari	2
FIJI	
Ben Mills	2
MALDIVE ISLANDS	
Gilles Sandrin	4



Striped Marlin

Tetrapterus audax



Broadbill Swordfish

Xiphias gladius

Table 6. Tag recovery information.

TAGGER/ CAPTAIN	RELEASE DATE	RELEASE LOCATION	RECOVERY DATE	RECOVERY LOCATION	DAYS FREE	MILES/ DIRECTION TRAVELED
BLUE MARLIN						
Glyn Ferrell Peter Hoogs	07/25/1996	19°30'N 156°00'W Kailua-Kona, HI	02/03/2000	10°25'N 174°54'E East of Marshall Islands	1288	1769 - WSW
Dale Berggren John Bagwell	03/06/2000	19°30'N 156°00'W Kailua-Kona, HI	03/24/2000	21°17'N 162°36'W Northwest of HI	18	386 - WNW
Eric Brown Kim Miyaki	02/21/2000	20°40'N 157°03'W K Buoy, Lanai, HI	03/30/2000	21°24'N 158°15'W S Buoy, Pokai Bay, HI	38	80 - WNW
SAILFISH						
Bob Uliss Chico	02/11/2000	17°39'N 101°54'W W of Zihuatanejo, Mex.	03/05/2000	17°38'N 101°34'W SW of Zihuatanejo, Mex.	23	19 - ESE-
John Hoolihan	02/07/1998	25°22'N 54°45'E Abu Dhabi	05/15/2000	27°23'N 51°43'E Persian Gulf	828	219 - WNW
John Hoolihan	04/05/1997	25°01'N 54°17'E Abu Dhabi	05/27/2000	28°17'N 50°23'E Persian Gulf	1148	305 - WNW
NO RELEASE DATA Tag # A-54072	-	-	07/18/2000	17°32'N 101°37'W SW of Zihuatanejo, Mex.	-	-
BLUEFIN TUNA						
Dan Griffith Norm Kagawa	07/09/1999	28°17'N 116°47'W Off Isla Cedros, Baja CA, Mexico	07/29/2000	30°23'N 117°29'W SW of Ensenada, Baja CA, Mexico	386	133 - NNW
Ann Seitz Norm Kagawa	07/09/1999	28°17'N 116°47'W Off Isla Cedros, Baja CA, Mexico	08/01/2000	30°38'N 117°27'W SW of Ensenada, Baja CA, Mexico	389	147 - NNW
MAKO SHARK						
NMFS Shark LL Research Cruise	07/11/2000	33°41'N 118°57'W NE of Santa Barbara Is., CA	08/14/2000	27°52'N 115°53'W SW of Isla Cedros, Baja CA, Mexico	34	383 - SSE
NMFS Shark LL Research Cruise	06/23/2000	33°37'N 118°34'W N of Santa Barbara Is., CA	11/19/2000	31°53'N 116°37'W Off Ensenada, Baja CA, Mexico	149	157 - ESE
THRESHER SHARK						
NMFS Shark LL Research Cruise	06/23/1999	33°29'N 117°45'W W of Dana Point, CA	01/17/2000	34°25'N 119°53'W W of Santa Barbara, CA	208	120 - WNW
NMFS Shark LL Research Cruise	07/12/1998	34°01'N 118°41' W Santa Monica Bay, CA	07/20/2000	33°53'N 118°35'W Santa Monica Bay, CA	739	10 - SSE
NMFS Shark LL Research Cruise	06/23/1999	33°28'N 117°44'W W of Dana Point, CA	12/12/2000	32°47'N 117°42'W W of San Diego, CA	538	41 - SSE

presumably after making the trip to the western Pacific and back. Additional non-billfish tag recaptures included three common thresher and two shortfin mako sharks, tagged during the SWFSC's annual shark abundance survey.

SURVEY OF SOUTHERN CALIFORNIA BILLFISHING CLUBS

The fishing records from three Southern California sport fishing clubs (Balboa Angling Club, San Diego Marlin Club and the Tuna Club of Avalon) were collected in 2000 and provide time series data on catch and size of catch. The Tuna Club began documenting catch in 1898 and recorded the first striped marlin catch in 1903 and the first swordfish in 1909. The Balboa Angling Club was organized in 1926 and has records since 1940. The San Diego Marlin Club was founded in 1931 and has documented striped marlin catches since 1952. The com-

bined records from the three clubs provide seasonal data on catch and size of catch for southern California striped marlin, swordfish and tuna taken by their membership over nearly 100 years of record keeping. Information and data collected by the clubs did not include measures of fishing effort such as number of anglers or number of days fished.

Members of the three clubs recorded 577 swordfish taken off Southern California between 1909 and 1996. Club data ranged from zero catch in several years to a peak of 127 swordfish reported in 1978. Periods of greatest swordfish catch occurred between 1915 to 1930 and from 1969 to 1981. The increased catches during the 1970s correspond to a similar increase in landings from California's commercial harpoon fishery and may reflect a generally higher abundance in southern California waters. Greater swordfish abundance coincided with warm periods associated with El Niño episodes.

The mean whole weight of 522 of the recreationally caught swordfish recorded between 1909 and 1996 was 116 kg or 255 lbs. (Figure 2). The documented weight of the swordfish taken by club members declined from 120 kg (265 lbs.) during 1909 to 1916 to 105 kg (231 lbs.) from 1986 to 1996 ($P = 0.01$, $R^2 = 0.052$).

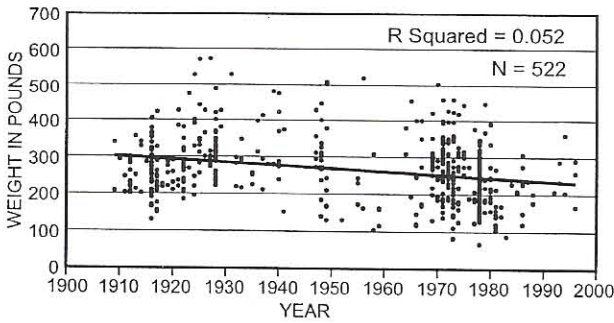
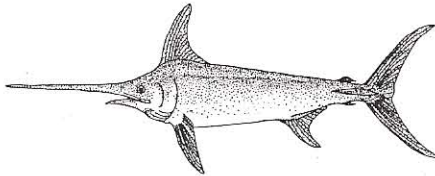


Figure 2. Weights of 522 swordfish weighed in at the Tuna Club, the Balboa Angling Club and the San Diego Marlin Club, 1906-1996. Data unavailable for some years.



Reported striped marlin catches from all three clubs (including landed, tagged and released) total 28,929 and ranged from 273 fish per year in the 1990s to 761 fish per year during the 1980s (Figure 3). The period between 1955 and 1965 had some of the highest catches in a single season although the 1980s had more consistent catches. The mean whole body weight of 21,501 striped marlin weighed at the sportfishing clubs averaged 68 kg (150 lbs.) and individual weights ranged from 22 kg to over 180 kg (48 to over 400 lbs.) from 1903 to 2000 (Figure 4). Larger striped marlin were taken off southern California through the 1940s than in subsequent years. The average weight of striped marlin from 1910 to 1915 declined from 83 kg (182 lbs.) to 57 kg (126 lbs.) during 1995 to 2000. There are no records of striped marlin in excess of 160-kg (350 lbs.) landed off southern California since the 1950s. Although early weight records possibly include a few blue marlin and/or swordfish incorrectly identified as striped marlin, those few numbers will not change the fact that the size of striped marlin declined significantly ($P = 0.01$, $R^2 = 0.037$) over the period. The International Game Fish Association's all tackle record for striped marlin is 224 kg (494 lbs.) taken off New Zealand. Club records also document a substantial increase in tag and release fishing. The number of striped marlin released, and/or tagged, increased from between 20% to 50% in the 1980s to nearly 90% in recent years (Figure 5).

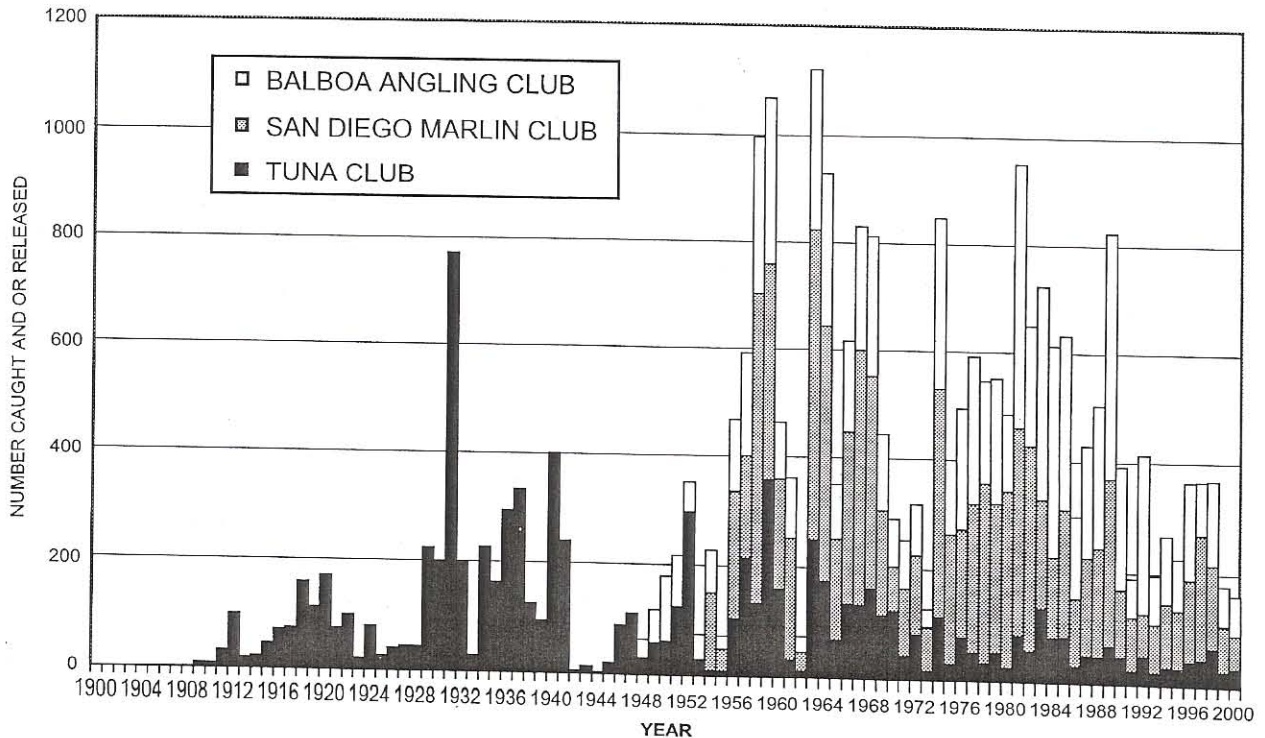


Figure 3. Numbers of striped marlin recorded at the Tuna Club, the Balboa Angling Club and the San Diego Marlin Club, 1903-2000. Data unavailable for some years.

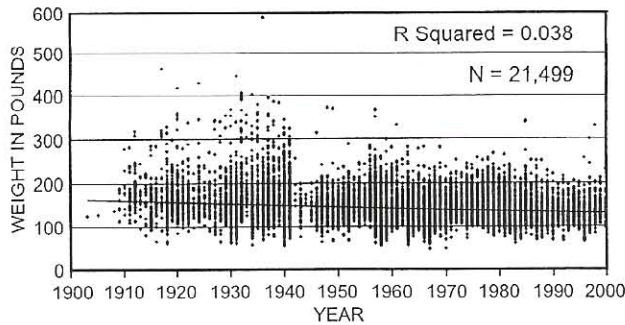


Figure 4. Weights of 21,501 striped marlin swordfish weighed in at the Tuna Club, the Balboa Angling Club and the San Diego Marlin Club, 1903-2000. Data unavailable for some years.

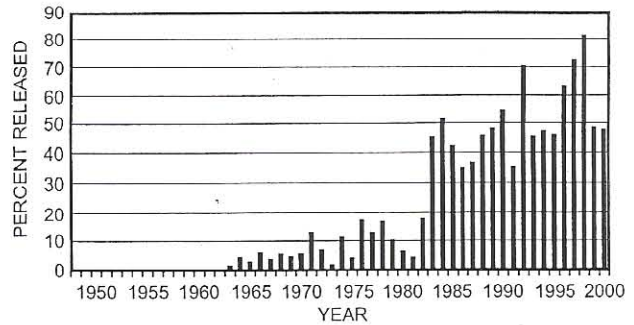


Figure 5. Percent of striped marlin recorded as tagged and/or released from the Tuna Club, Balboa Angling Club and the San Diego Marlin Club, 1948-2000. Data unavailable for some years.

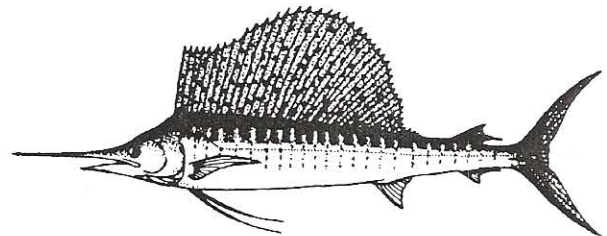
RESULTS OF AFTCO's 2000 PACIFIC TAG/FLAG TOURNAMENT

The third annual AFTCO Pacific Tag/Flag Tournament conducted from November 1 through October 31 includes all captains and anglers who tag and release fish in any of five categories. The SWFSC provides tagging supplies to participating anglers tagging billfish and bluefin tuna. AFTCO Tournament officials combine tagging results from the SWFSC with those of the CDFG and The Billfish Foundation to identify anglers and captains who tag and release the most fish in each of five categories.

Tournament winners for 2000 were recognized January 20, 2001 at the Billfish Foundation dinner at the Balboa Bay Club, Balboa CA. *Pacific Captain the Year* trophy went to Julio Cota, while *Pacific Angler of the Year* went to Michael Murray. Tournament tag winners in 2000 are shown below by category. Numbers in parentheses indicate numbers of fish tagged and released.

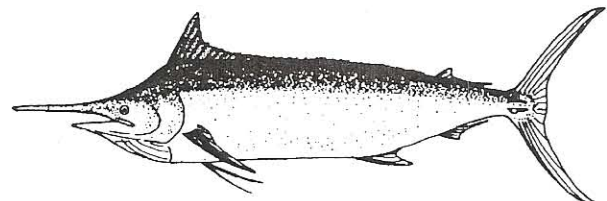
Tournament tag winners in 2000 are shown below by category. Numbers in parentheses indicate numbers of fish tagged and released.

CATEGORY	ANGLER	CAPTAIN
1. Blue Marlin Black Marlin	Mike Foster (3)	Jose Ibarquen (24)
2. Striped Marlin	Michael Murray (5)	Mike Adkins (133)
3. Sailfish	Enrico Capozzi (10)	Ron Hamlin (1,137)
4. Mako Shark Thresher Shark	Keith Poe (23)	Deana Poe (9)
5. Bluefin Tuna	none	



Sailfish

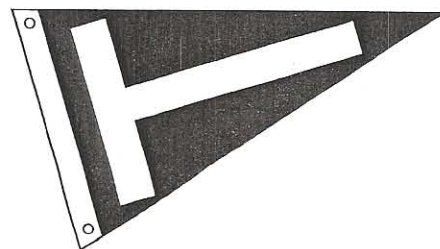
Istiophorus platypterus



Black Marlin

Makaira indica

Fly the Tagging Flag!



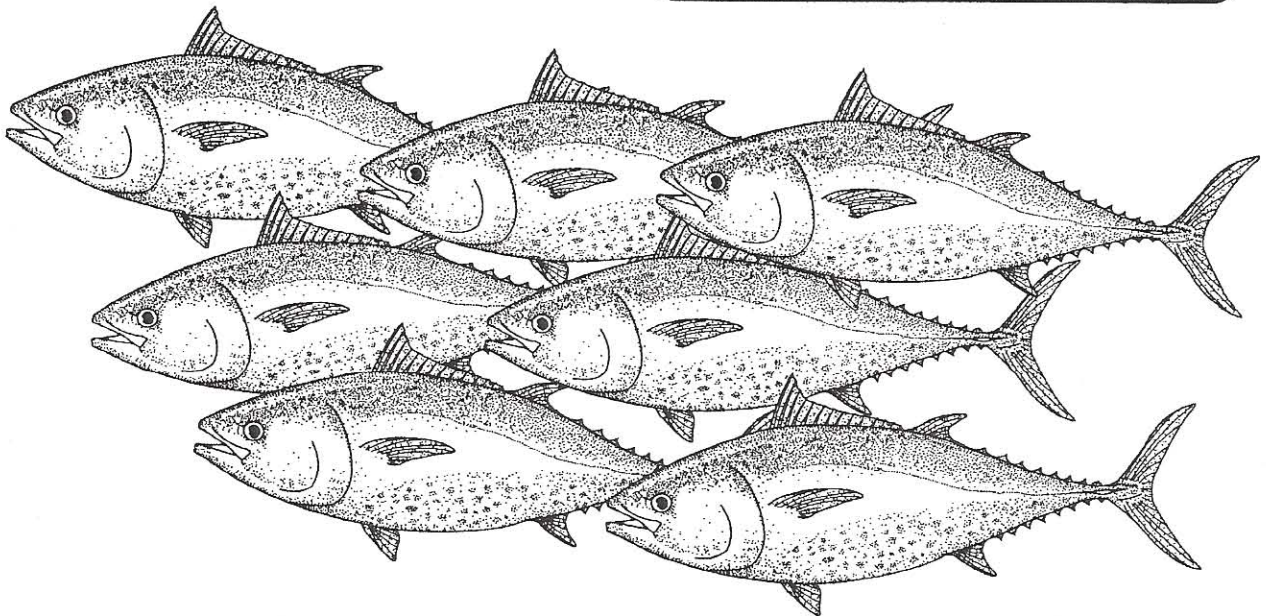
RETURN OF COMPLETED CARDS

PLEASE NOTE: Billfish recaptures for which the tag release information has not been received now number 64 or 12 percent. This also means nearly 5,100 additional billfish have been tagged without the release information being returned to the SWFSC. Every tag recapture is very important to this research effort. If you are going to take the time and make the effort to tag your catch, make it count. Tag and release your fish skillfully and return the yellow BILLFISH TAGGING REPORT. Though easily forgotten in the heat of battle and glow of success, returning the card is the most critical and final step in tagging your fish. This would be a good time to check your records, tackle boxes, salon cabinets, etc., for any of the Billfish Tagging Report cards from tagged fish not yet mailed to the SWFSC.

SURVEY RESPONSE

Trends in abundance indices are a key element in stock assessment models. This *Billfish Angler Survey* now provides a 32-year index of abundance in several high profile locations throughout the Pacific and has become most useful in the assessment process. Your continued response to the *Billfish Angler Survey* is still needed to better the index of the health of the billfish stocks important to recreational fisheries.

Billfish Angler Survey cards for fishing in the 2001 calendar year will be mailed out in December of this year. Please complete the survey and return the post-paid survey form by February 2002. Additional 2001 Survey cards will be available to all billfish anglers from this office. U.S. Government regulations require we purge our mailing list each year. If you wish to continue to receive the *Billfish Newsletter* but did not fish, please indicate "NO FISHING" on the *Billfish Angler Survey* form and return it to the Center. Your name will be retained.



PAPER REDUCTION ACT NOTIFICATION

The federal Paper Reduction Act requires we provide the reporting burden to all Survey respondents and billfish taggers. The reporting burden to complete the *Billfish Angler Survey* card and the Billfish Tagging Report is estimated to average five minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate to the SWFSC, P.O. Box 271, La Jolla, Ca 92038. Notwithstanding any other provision of the law, no person is required to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

SEND US YOUR PHOTOGRAPHS

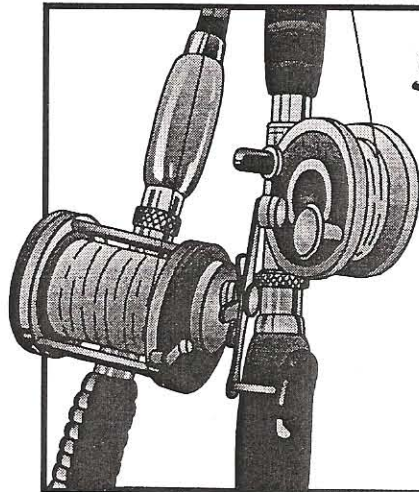
The Southwest Fisheries Science Center is looking for good photographs of billfish for the cover of next year's *Billfish Newsletter*. Color or black-and-white photos of billfish and/or fishing activities are appropriate. We would appreciate your sharing of photos and will give you full credit in the 2002 issue. A billfish baseball cap and plaque will be awarded to the winning photographer.

COVER PHOTOGRAPH

Cover photograph: This years cover is of a striped marlin caught and released by Dave Lite during the 1985 National Coalition for Marine Conservation Marlin Tournament off Baja California Sur, Mexico. Photo by Bill Beebe.

ACKNOWLEDGEMENTS

The information reported here would not be possible without the cooperation of thousands of anglers and volunteers who support these investigations. Your efforts and assistance are greatly appreciated. We welcome reader comments and suggestions concerning the content of the *Billfish Newsletter*. Roy Allen designed the newsletter. We also thank Randall Rasmussen for placing the *Billfish Newsletter* on the SWFSC's web page and to Chuck Oliver for constructing and managing the PacFAAB web page. The *Billfish Newsletter* can also be accessed on the Southwest Fisheries Science Center's home page under 'Publications' at <http://swfsc.ucsd.edu>.

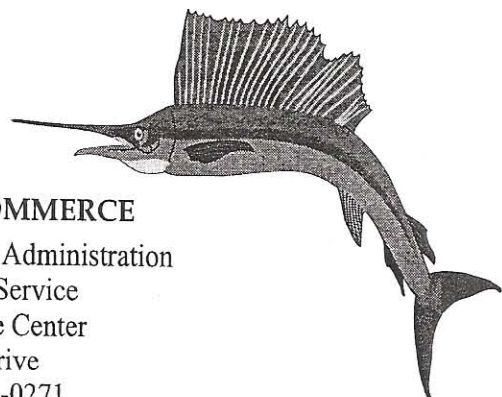


Smooth seas and good fishing,

David B. Holts, Fishery Biologist

Douglas W. Prescott, Computer Specialist

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