

The Southwest Fisheries Science Center's

1997 Billfish Newsletter



Results of Cooperative Programs

- Trends in 1995 Billfish angler catch rates
- 1996 Billfish tagging and recoveries

Summary of Billfish Movements to Date

- Blue Marlin
- Striped Marlin
- Swordfish



INTRODUCTION

The Billfish Newsletter is published annually by the Southwest Fisheries Science Center (SWFSC), La Jolla, California, to report the results of billfish research conducted by the Center. The goal of the Center's billfish research program is to provide information for the conservation and rational management of billfish resources in the Pacific and Indian oceans. There are two components to the billfish investigations: the International Billfish Angling Survey which tracks changes in recreational angling catch and effort, and the Cooperative Billfish Tagging Program which provides information on the distribution, migratory patterns and growth rates of billfishes of the Pacific and Indian oceans. Both investigations rely on continued cooperation from billfish anglers, sport fishing clubs and agencies affiliated with the SWFSC. Results of the 1995 Angler Survey and summaries of billfish tags returned in 1996 are included in this issue of the Billfish Newsletter.

RESULTS OF THE 1995 INTERNATIONAL BILLFISH ANGLER SURVEY

The SWFSC has collected angler catch and effort survey data through the Billfish Angler Survey annually since 1969. The information developed from this survey is used to measure the trends in angler catch rates. The survey data are collected from cooperating international and national agencies, sportfishing clubs and individual anglers. Trends in the catch rates of billfish, or catch in number of fish per angler-day, are monitored for major billfishing areas throughout the Pacific. Trends by area are important in understanding the impact of fisheries on billfish resources, such as recorded off northern Mexico in the mid-1980s with heavy longline fishing. Long-term trends can also be used to identify emerging issues resulting from environmental, economic or other causes.

Results from survey cards sent out with last year's 1996 Billfish Newsletter are reported here for the 1995 fishing season. Billfish anglers responding to the Billfish Angler Survey for 1995 reported catching 3,318 billfish during 6,521 days of angling in the Pacific and Indian oceans. The overall success rate was 0.51 billfish per angler-day, or an average of 1.97 fishing days to catch a billfish. The 526 survey respondents reported catching 1,453 striped marlin, 1,020 sailfish, 609 Pacific blue marlin, 169 spearfish, 62 black marlin and 5 swordfish for the Pacific and Indian oceans.

Results for the 1995 fishing year by fishing location are presented in Table 1. The total number of angler days reported for 1995 (6,521 days) decreased 1.0% from 1994. The current overall catch per unit of effort (CPUE) of 0.51 billfish caught per angler-day is higher than the prior four-year average (1990 to 1993) of 0.43 billfish per angler-day, and nearly the same as the preceding five-year period (1985 to 1989) of 0.54. This five-year period had the highest

reported catch rate since the 1969 to 1971 period. The lowest catch rates occurred in the mid-1970s, averaging about 0.38 billfish per angler-day.

Cover Photo - Black marlin off Tropic Starr Lodge, Pinas Bay, Panama. Taken by Dr. Hans Pfenninger of Herrliberg, Switzerland

Table 1. Results of 1995 Billfish Angler Survey. Data in parentheses are values recorded in 1994. Species codes are striped marlin (SM), blue marlin (BLM), black marlin (BKM), and sailfish (SF).

LOCATION	ANGLER FISHING DAYS	BILLFISH PER FISHING DAY (CPUE)	MAJOR SPECIES
PACIFIC OCEAN	-	-	-
Hawaii, U.S.A.	2,161 (2,570)	0.37 (0.26)	BLM
So. California	1,372 (1,600)	0.13 (0.09)	SM
Baja California, MX.	1,841 (1,103)	0.71 (0.77)	SM
Guaymas, MX.	14 (34)	1.00 (0.56)	SM
Mazatlan, Manzanillo, MX	103 (85)	0.99 (0.67)	SF
Puerto Vallarta, MX	22 (46)	0.41 (1.33)	SF
Acapulco, Ixtapa, Zihuatanejo, MX	94 (103)	1.71 (2.01)	SF
Guatemala	21 (10)	3.95 (2.90)	SF
Costa Rica	111 (92)	3.06 (2.17)	SF
Panama	65 (67)	1.22 (2.93)	SF
Colombia	- (64)	- (0.13)	SF
Japan	10 (3)	0.10 (0.00)	BLM
Guam, U.S.A.	55 (7)	0.53 (0.14)	BLM
Saipan, U.S.A.	0 (250)	- (0.12)	BLM
Marshall Islands	22 (-)	0.14 (-)	BLM
Fiji	40 (32)	0.17 (0.16)	BLM
Tahiti, French Polynesia	10 (52)	0.40 (0.42)	BLM
New Caledonia, Solomon Islands	1 (12)	0.00 (0.17)	BLM
Australia	178 (164)	0.20 (0.56)	BKM
New Zealand	202 (32)	0.20 (0.19)	SM
Papua New Guinea	- (40)	- (0.08)	BLM
Malaysia	12 (16)	0 (0.00)	BLM
Hong Kong	5 (28)	0.00 (0.14)	BLM
INDIAN OCEAN	-	-	-
Kenya	115 (62)	0.68 (0.40)	SF
Mauritius	40 (32)	0.45 (0.22)	BLM
Seychelles, S.A.	10 (-)	0.30 (-)	SF

High catch rates for striped marlin were reported at the southern tip of Baja California Sur (0.52) and off Guaymas (1.00), Mexico. High catch rates were reported for blue marlin in Guam (0.47), Hawaii (0.19), Marshall Islands (0.14), Mauritius (0.40) and Tahiti (~.40). Australia (0.11) and Panama (0.38) reported the highest catch rates for black marlin. Excellent fishing for sailfish was reported from Mazatlán, Mexico, southward through southern Mexico (1.15), Guatemala (3.95), Costa Rica (2.77) and Panama (0.71). Thailand reported 4.80 sailfish per angler day and in the Indian Ocean, Kenya and the Seychelles reported 0.57 and 0.30 billfish per angler-day, respectively. CPUE trends recorded during the Billfish Angler Survey are shown graphically by location in Figure 1.

Catch rates shown here are annual means calculated over the entire 1995 reporting year. They are not indicative of seasonal highs or lows encountered in any particular region. Also, catch rates for regions reporting fewer than 100 angler-days (i.e., small sample size) may have a somewhat greater statistical error than for regions reporting more than 100 angler-days. The principal value of these data is in the trends observed over a long period of time. These trends can be analyzed and compared with other events such as regional commercial fisheries, weather patterns and local economic changes.

This is particularly important nowadays because many fishing nations throughout the Pacific area are expanding their pelagic fisheries beyond traditional waters. The trend analysis from this Survey assists in monitoring the impact of this expansion and highlights the importance of recreational fishing for billfish and the economic contribution to localized communities

INFORMATION FOR RECEIVING FUTURE NEWSLETTERS AND ANGLER SURVEY FORMS

The Billfish newsletter is sent to individuals who have within the past year tagged and released billfish, or have submitted the Billfish Angler Survey form to the Southwest Fisheries Science Center during the past year. 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 SWFSC. Your name will be retained. Your cooperation in the annual Billfish Angler Survey and the Cooperative Marine Game Fish Tagging Program is appreciated.

TAGGING PRIORITIES

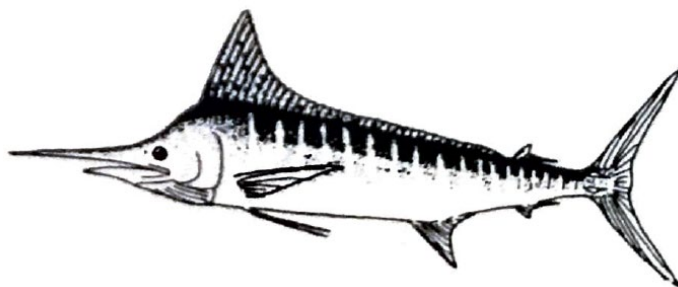
Unfortunately, the cost of Program supplies has exceeded available funds. Consequently, we are channeling our tagging efforts in the following priorities:

Southern California	Striped Marlin
	Broadbill Swordfish
Hawaii	Blue Marlin
	Striped Marlin
	Black Marlin
	Broadbill Swordfish
Mexico	Blue Marlin
	Black Marlin
Central America	All billfish
Indian Ocean	All billfish

SURVEY RESPONSE

Your response to the Billfish Angler Survey is needed to better determine the trend of angler catch rates and provide an index of the health of the billfish stocks important to recreational fisheries.

Enclosed you will find three copies of the Billfish Angler Survey card for fishing in the 1996 calendar year, one for your individual use and extras for family members or other anglers not familiar with the Survey. Please complete the Survey card and return it as soon as possible. Additional 1996 Survey cards are available to billfish anglers through this office.



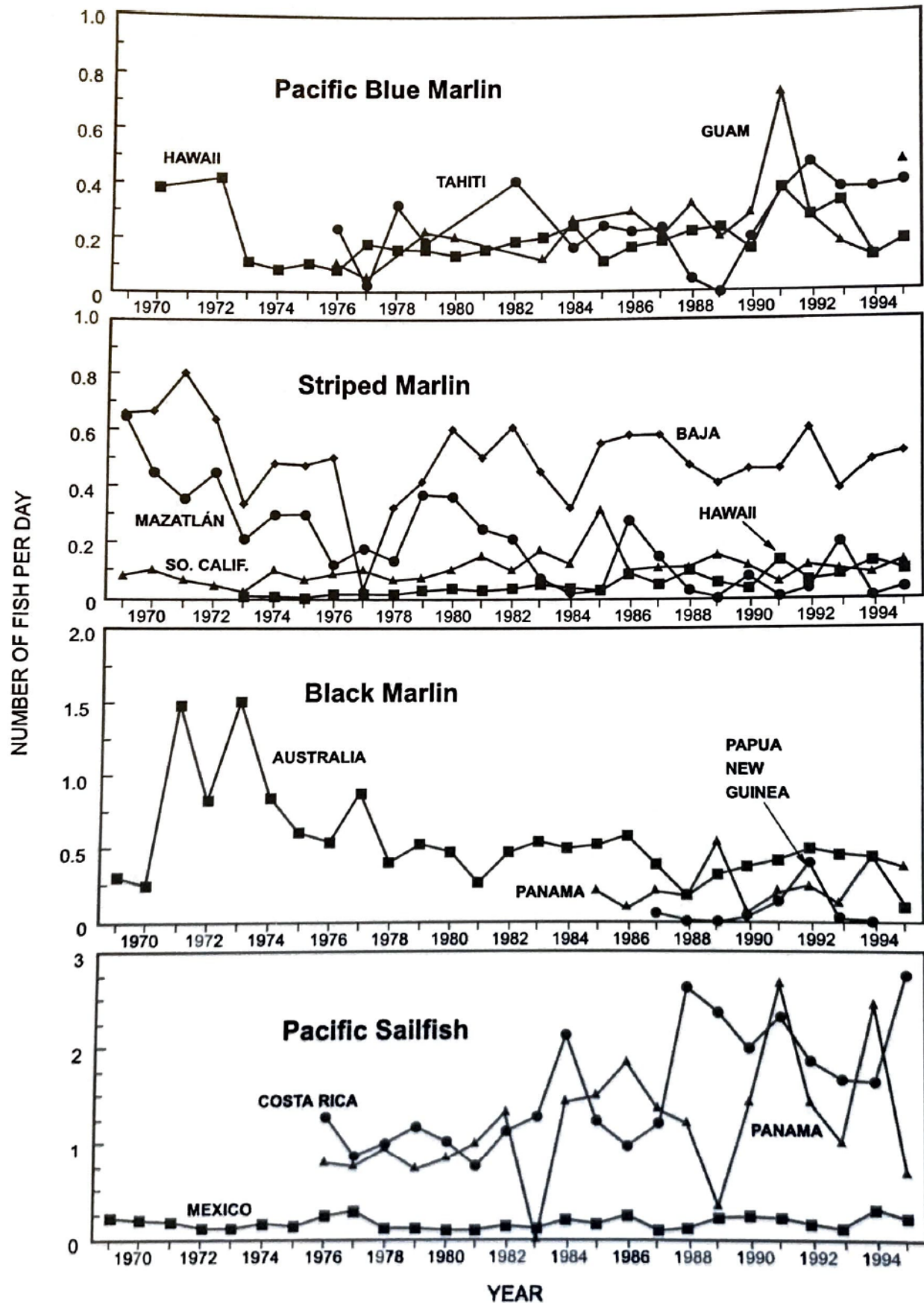


Figure 1. CPUE (number of fish/angler day) for A) striped marlin, B) blue marlin, C) black marlin, and D) sailfish reported by region, 1969-1995.

COOPERATIVE MARINE GAME FISH TAGGING PROGRAM

The Southwest Fisheries Science Center began its Billfish Tagging Program in 1963. The Program utilizes release and recapture data from tagged fish to help determine migration, distribution and growth patterns of billfish. The Program encourages the participation and cooperation of recreational anglers, commercial fishers and affiliated research agencies.

TAGGING RESULTS FOR 1996

The Billfish Tagging Report cards received in 1996 indicate a total of 1,199 billfish were tagged and released by 758 anglers and 254 fishing captains. This is 1% less than the 1,210 released in 1995 (Table 2). Increased tagging was

noted for blue marlin off Hawaii and striped marlin off Southern California and Mexico. However, there was a notable decrease in tagging of swordfish, in 1996 only 13 swordfish were tagged and released, compared to 73 in 1995 and 51 in 1994.

Although the focus of the Billfish Tagging Program is on billfish, a variety of other species have been tagged (Table 3). A total of 44,434 individual fish from 79 separate species have been tagged and released since 1963. There have been 625 recoveries for an overall recovery rate of 1.41%. Billfish account for 90% of the releases and 75% of the recoveries.

Table 2. Summary of billfish tagged in 1996.

AREA	SPECIES	TOTAL
PACIFIC OCEAN	-	-
Southern California, U.S.A.	Striped Marlin	104
Southern California, U.S.A.	Marlin, unid.	13
Hawaii, U.S.A.	Blue Marlin	343
Hawaii, U.S.A.	Striped Marlin	193
Hawaii, U.S.A.	Short-billed Spearfish	83
Hawaii, U.S.A.	Broadbill Swordfish	13
Hawaii, U.S.A.	Marlin, unid.	3
Hawaii, U.S.A.	Billfish, unid.	1
Baja California, Mexico	Blue Marlin	31
Baja California, Mexico	Black Marlin	4
Baja California, Mexico	Striped Marlin	165
Baja California, Mexico	Sailfish	15
Baja California, Mexico	Marlin, unid.	1
Mazatlan-Manzanillo, Acapulco, Mexico	Sailfish	20
Mazatlan-Manzanillo, Acapulco, Mexico	Striped Marlin	2
Mazatlan-Manzanillo, Acapulco, Mexico	Blue Marlin	1
Panama	Blue Marlin	11
Panama	Black Marlin	42
Panama	Striped Marlin	11
Panama	Sailfish	70
Fiji	Sailfish	2
Fiji	Blue Marlin	1
Tahiti, French Polynesia	Blue Marlin	55
Tahiti, French Polynesia	Billfish, unid.	3
Tahiti, French Polynesia	Short-billed Spearfish	1
Marshall Islands	Blue Marlin	9
INDIAN OCEAN	-	-
Kenya	Black Marlin	3
Kenya	Sailfish	1
United Arab Emirates	Sailfish	1
TOTAL	-	1,199

Table 3. Summary of all fish tagged in 1996 with releases and recoveries for 1963-1996.

Species Name	Releases 1996	Releases Total	Recoveries Number	Rate %
Striped Marlin	475	19,534	319	1.63
Sailfish	110	7,307	28	0.38
Blue Marlin, Pacific	447	4,410	38	0.86
Billfish, Unidentified	21	4,242	3	0.07
Black Marlin	49	3,331	69	2.07
Shorlfm Mako Shark	2	1,080	24	2.22
Roosterfish	-	924	29	3.14
Short-billed Spearfish	84	590	0	0
Yellowtail	-	491	36	7.33
Broadbill Swordfish	13	466	11	2.36
Dolphinfish (Mahi Mahi)	-	405	2	0.49
Yellowfin Tuna	5	323	25	7.74
Blue Shark	-	297	5	1.68
Skipjack Tuna	-	96	2	2.08
Bat Ray	-	84	0	0
Albacore Tuna	20	79	0	0
Bigeye Tuna	2	76	2	2.63
Hammerhead Shark	-	52	2	3.85
White Sturgeon	.	50	1	2
Black Sea Bass	.	40	8	20
Leopard Shark	.	39	1	2.56
Bronze Whaler Shark	1	35	1	2.94
Wahoo	-	33	2	6.06
Whitetip Shark	-	33	0	0
Jack Gravelle	-	32	Q.	0
Thresher Shark	-	30	1	3.33
Barracuda	-	23	2	8.7
Bluefin Tuna	-	19	1	5.26
Tiger Shark	-	17	2	11.76
Striped Bass	.	11	0	0
White Marlin	-	10	1	10
Whale Sharks	.	4	1	25
All Others	1	271	9	3.32
TOTAL RELEASES	1,230	44,434	625	1.41

Table 4. Names of anglers tagging substantial numbers of billfish, and the number of billfish tagged and released. From Billfish Tagging Report cards received for 1996 calendar year releases.

ANGLER NAME	BILLFISH TAGGED						
HAWAII, U.S.A.	-	Don Miller	5	Blair W. Howard	4	Barbara Yauchzee	2
John Akina	3	D. Brent Nelson	2	Roger Jackson	2	Eric Yauchzee	4
Robert Anthony	2	Pat Ness	2	Gary Jasper	2	PANAMA	-
Doug Armfield	2	Kenzi Nishino	2	Ron Johnson	3	Larry Agesen	2
John Baldasaro	2	Grandy Perry	2	Paul Lepore	4	Don Aronson	2
Pam Basco	3	Bill Prince	2	Jerry Lewis	2	J.B. Bollman	2
BillBorkan	2	Nicole Ribeiro	2	Stephen R. May	2	George J. Bubrick	3
Bruce Carlson	2	T.J. Rivas	2	Michael McGrade	3	Liz Bubrick	2
Ralph Conner	2	Jon Schumacher	5	Tom McKevitt	2	Carolyn Burton	2
Kenneth R. Corday	4	Steve Schumacher	21	Ron Moran	2	Joseph A. Coffey Jr.	3
Richard M. Devine	2	D. Scott Scovira	3	Bruce Nelson	2	Larry Dahlberg	2
Cathyj Ehrlich	2	Pat Shannon	2	Chase Offield	4	Joseph Feeney	4
Glyn Ferren	5	Kaarin Simpson	3	Larry Peabody	2	Lance Glaser	4
Donald Frederickson	2	Sue Stolzman	5	John Riordan	5	Bill Gonzalves Sr.	3
Terry Frederickson	2	Lee Tew	2	Dave Ryan	2	Tommy Greene	2
Jeff Gerner	2	Ken Valder	2	Clarke A. Smith	4	Patrick L. Kelley	2
Bill Gibson	2	Jean Walter	2	Michael Stapleton	3	Michael Kosmas	2
Mike Gingerich	3	Debbie Williams	3	Michael Stern	3	Mr. Lankes	5
RobGollahon	2	Karen Williams	2	George Swierczynski	6	Mike Leech	2
M'Chael GuMing	2	Doug Zielke	3	Kent M. Twomey	4	Jim Leighton	2
George J. Harris	2	BAJA CALIFORNIA, MX	-	Scott Weldon	3	Jay D. Levine	6
Kevin Hiney	2	Don Anderson	15	Emmett Westenberger	2	Terry Lubinsky	2
Takaro Hirabayashi	2	Cooke Bausman III	6	David Wishney	2	Lewis M. Madeira Jr.	4
Bill Hoey	6	Donald V.T. Bear	4	Ken Youngchild	5	M.D. Magoffin	3
Keith J. Hollingworth	3	Russell V. Bear	3	SOUTHERN CALIFORNIA, USA	-	Bob Merrick	2
Les Hunter	2	Mel Bears	2	Douglas A. Daniels	3	John Merrick	3
Greg Jackson	4	Steve Brackmann	2	Gerald A. Garrett	2	Dwayne Moreland	2
Paula Jones	3	Barry Brightenburg	3	Eric Grennan	4	Sandra Moreland	2
John Jordan	2	James A. Clarke	2	Danny Lee Jones	5	Taylor Poole	3
Daniel Krieger	3	Tony D' Agostino	2	Phyllis Jones	2	Carl A. Posse	2
Dennis H. Kusnierz	2	Bob Denault	2	Bill Kakuk	2	Oliver Reisch	4
Walt Laskey	2	Dave Elm	2	Karl Kogler	3	Jeffrey D. Riling	2
Roy Laverty	2	Mike Fairchild	2	Michele B. Kogler	2		
Mark Mallet	3	Dennis Friedman	3	Reed Miller	3		
Charles M. Melhuish	2	Dennis L. Gagnon	2	Jim Sieminski	3		
Jeff Meyer	2	Bernard A. Guentner	2	Mark Warner	5		
		Emmelyne Hallford	2	Mark M. Wisch	2		

Striped marlin account for 44% of all fish tagged while sailfish account for 16%, blue marlin 10% and black marlin 7%. Of the billfish, swordfish and black marlin have the highest rates of return (2.36% and 2.07%, respectively) followed closely by striped marlin with 1.63% returns.

Each year we attempt to list the name of each angler who tagged and released a billfish. This year 758 individual anglers recorded tagging at least one billfish. This year we list all anglers who reported tagging two or more billfish in 1996 (Table 4). We do recognize and appreciate the efforts of all billfish taggers and regret not being able to acknowledge each by name in this year's Billfish Newsletter. We also list the captains of charter and private boats who tagged significant numbers of billfish in their region (Table 5). Their continued interest and cooperation have greatly enhanced the Billfish Tagging Program and their efforts are appreciated. Finally, we acknowledge the efforts of the sportfishing clubs, fishing resorts, affiliated organizations and others involved in this truly cooperative Billfish Tagging Program.

TAG RECOVERIES IN 1996

Eleven (11) striped marlin, 5 blue marlin, 1 black marlin, 1 swordfish and 1 shortfin mako shark were recaptured in 1996. Unfortunately, the release information (Billfish Tagging Report) has not yet been received for the black marlin and shortfin mako (Table 6).

Ten (10) of the 11 striped marlin recaptured during 1996 were tagged and recaptured in the waters surrounding Hawaii. They varied in time at liberty from 4 to 217 days. The other striped marlin was released off San Clemente Island, California, and recaptured near Santa Catalina Island only 30 nm away after being at liberty for 369 days. None of the striped marlin recaptured this year moved between Hawaii and California or between California and Baja California Sur, Mexico, although we have commonly observed such movements in the past.

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 1996 calendar year releases.

CAPTAIN NAME	TOTAL	Capt. Mike Crawford	3	Capt. Jesus Araiza	5	TAHITI	-
HAWAII, U.S.A.	-	Capt. Joseph Oemarke	3	Capt. James A. Clarke	5	Capt. Yvonnec Allain	5
Capt. Peter Hoogs	38	Capt. Daniel J. Harrigan	3	Capt. Eric Grennan	5	Capt. Alain Durand	5
Capt. Randy Parker	33	Capt. Mike Hasbrouck	3	Capt. Tom Patierno	5	Capt. Joseph Lis	5
Capt. Tom Siebler	29	Capt. Gary Hicks	3	Capt. Thomas A. Shanahan	5	Capt. Bernard Revel	5
Capt. Marty Sands	28	Capt. Danny Horimoto	3	Capt. Terry Bersuch	4	Capt. Emile Soullier	5
Capt. Kelley Everette	25	Capt. Noblhiro Isobu	3	Capt. Steve Sheldon	4	Capt. Philippe Lis	4
Capt. Dennis Harris	24	Capt. Jeff Kahl	3	Capt. Brad Titcomb	4	Capt. Georges Poroï	4
Capt. Tad Luckey	21	Capt. Mike Kenworthy	3	Capt. P. Neff Nash	3	Capt. Jean-Pierre Tanguy	4
Capt. Robert McGuckin	19	Capt. Bob Larrabee	3	Capt. Jimmy Panga	3	Capt. Winiki Sage	2
Capt. Randy O. Orkisch	19	Capt. Dale Leverone	3	Capt. Harold Schram	3	Capt. Jacques Solari	2
Capt. John Jordan	15	Capt. Chris Sheeder	3	Capt. Geronimo Cosio	2	Capt. Moana Allain	1
Capt. Mark Shultz	15	Capt. James M. Svetich	3	Capt. Buz Guentner	2	Capt. Pierre Blais	1
Capt. Guy Terwilliger	14	Capt. Joseph Yurkanin	3	Capt. Martine Herrera	2	Capt. Bruno Champes	1
Capt. Jerry Allen	12	Capt. Paul Abatie	2	Capt. Mike Jubinsky	2	Capt. Justin Cheffort	1
Capt. Jeff Fay	12	Capt. Alan Abdill	2	SOUTHERN CALIFORNIA, USA	-	Capt. Jacques Chongue	1
Capt. Mike Derego	12	Capt. Dave Adams	2	Capt. Ken Brookins	12	Capt. Yves Collenot	1
Capt. Scott Fuller	10	Capt. Robert Bean	2	Capt. Kirk A. Yauchzee	8	Capt. Steve Ellacott	1
Capt. Darrly Chow	9	Capt. C. Bruce Evans	2	Capt. Tom Patierno	7	Capt. Nicholas Leonsieff	1
Capt. Mike Rand	9	Capt. Chip Fischer	2	Capt. Jerry A. Austin	6	Capt. Christian Lii	1
Capt. F. McGrew Rice	9	Capt. Craig Forrest	2	Capt. Ron Johnson	6	Capt. A. Machove	1
Capt. James G. Ward	9	Capt. Bill Graham	2	Capt. Joe Catron	6	Capt. Moeino Parea	1
Capt. Del Cannon	8	Capt. Darrin Isaacs	2	Capt. Michele B. Kogler	4	Capt. Tihoji Piroi	1
Capt. Norm Issacs	8	Capt. Ed Isaacs	2	Capt. Mark M. Wisch	4	Capt. Philipe Siu	1
Capt. Mike B. Jacobsen	8	Capt. Neal Isaacs	2	Capt. Danny Lee Jonesf	3	Capt. Emile Vongue	1
Capt. Jerome Judd	8	Capt. Leon Lange	2	Capt. Phyllis Jones	3	Capt. Ato Watanabe	1
Capt. Dudley Worthy	8	Capt. Butch Losasso	2	Capt. C. Nell Monto	3	Capt. Raphael Wong	1
Capt. Charles E. Hauptert	7	Capt. Jim Patterson	2	Capt. Marlin L. Morris	3	PANAMA	-
Capt. Bill Casey	6	Capt. Larry Pries	2	Capt. Richard Sieminski	3	Capt. Fausto Martinez	18
Capt. Kevin M. Hogan	6	Capt. Gary Quam	2	Capt. Gerald A. Garrett	2	Capt. Matias	15
Capt. Freddy Rice	6	Capt. Chris Rose	2	Capt. Joe Houck	2	Capt. Pacheco	15
Capt. Gene Vander Hock	6	Capt. Roy Tsutahara	2	Capt. Bill Kingsmill	2	Capt. Maso	13
Capt. Marlin Parker	5	Capt. Rick White	2	Capt. Karl Kogler	2	Capt. Morito	13
Capt. Rick Rose	5	BAJA CALIFORNIA, MEXICO	-	Capt. Jim Madden	2	Capt. Teodoro	11
Capt. Bob Russell	5	Capt. David Brackmann	26	Capt. Ed Martin	2	Capt. Isauro	8
Capt. Doug Barna	4	Capt. Peter Wishney	25	Capt. James Thompson	2	Capt. Mike	8
Capt. Bill Crawford	4	Capt. Cooke Bausman Ill	14	KENYA	-	Capt. Gustavo	7
Capt. Mike Holtz	4	Capt. Martin Verdugo Collins	14	Capt. Peter Glover	4	Capt. Placido	7
Capt. Steven D. Kaiser	4	Capt. Jesus Agundez	9	MARSHALL ISLANDS	-	Capt. Chito	6
Capt. Richard Krupa	4	Capt. Congo Cosio	9	Capt. Ronnie Reimers	2	Capt. Cornelio Alvarez	2
Capt. Rick Medenwald	4	Capt. Jerry Lewis	9	Capt. Bwiji Aliven	1	Capt. Fallo	2
Capt. Darren Oshiro	4	Capt. Paulino Martinez	9	Capt. Emil DeBrum	1	Capt. Darien	1
Capt. Doug Pattengill	4	Capt. Felipe	7	Capt. Ada Eledui	1	Capt. Frank	1
Capt. Jack Ross	4	Capt. Mike Libby	6	FIJI	-		
Capt. Rusty Unger	4			Capt. Tooman Koons	2		
Capt. Dennie Cintae	3						

All five blue marlin were tagged and released off Hawaii. Time at liberty for these blue marlin ranged from 16 to 1,503 days. The only swordfish recovery of the year was tagged near the Maher Seamount, northeast of Hawaii, and recaptured 375 days later 394 nm to the west. One black marlin and one shortfin mako shark were recaptured near Fiji, but we have not yet received the tag release information. We are hopeful that this information will soon be received

SUMMARY OF BILLFISH MOVEMENTS TO DATE

Several important facts are apparent from our tag-recapture data. Billfish are robust and resilient to the stress of post-capture and tagging trauma. Our data show that billfish often begin feeding within hours after being tagged and released. 2.1 % of striped marlin, recaptured with sportfishing gear, were recaptured within 2 days; some within hours of release. Others at liberty up to 4 years have shown no adverse consequence of tagging and had gained considerable weight.



TAGGING SUPPLIES are available to billfish anglers through this office and the following locations:

Southern California

- San Diego Marlin Club, San Diego, California
- Balboa Angling Club, Newport Beach, California
- Catalina Seafood, end of Avalon Pier. Catalina Island

Hawaii

- Pacific Ocean Research Foundation (PORF), Kailua-Kona
- SWFSC, Honolulu Laboratory
- Lahaina Yacht Club, Maui, HI

Baja California, Mexico

- Rancho Buena Vista, East Cape
- Rancho Leonero, East Cape

Panama

- Tropic Star Lodge

Tahiti

- Haura Fishing Club

Table 6. Tag recovery information.

TAGGER/CAPTAIN	RELEASE DATE	RELEASE LOCATION	RECOVERY DATE	RECOVERY LOCATION	DAYS FREE	MILES & DIRECTION TRAVELED
STRIPED MARLIN	-	-	-	-	-	-
R. Scott Krizek Mark Shultz	01/03/96	21°13'N 156°45'W Molokai, HI	01/07/96	21°15'N 156°40'W Molokai, HI	4	5 – ENE
Kristi Fehr Chris Sheeder	01/01/96	21°18'N 157°49'W Honolulu, HI	01/10/96	21°19'N 162°06'W W of Hawaii	9	257 – WNW
Matt Lieto Mark Shultz	12/29/95	20°45'N 156°41'W Maui, HI	02/02/96	18°35'N 157°50'W SW of Kailua-Kona, HI	35	132 – SSW
Kuniko Yoshikawa Tom Siebler	01/03/96	19°39'N 156°02'W Kaiwi Point, HI	02/20/96	23°13'N 154°49'W NE of Hawaii	48	226 – NNE
Marco Fehr Chris Sheeder	01/15/96	21°25'N 158°16'W SW of Oahu, HI	02/23/96	19°51'N 159°48'W W of Hawaii	39	132 – SSW
Pete Petersen Mike Derego	11/22/95	21°13'N 158°05'W S of Oahu, HI	04/03/96	21°30'N 163°12'W W of Hawaii	133	307 – WNW
Yoshiki Kinjo Gary Hicks	01/23/96	21°08'N 157°49'W Diamond Head, HI	05/06/96	22°08'N 166°37'W W of Hawaii	104	531 – WNW
R. Scott Krizek Mark Shultz	01/03/96	21°13'N 156°45'W Molokai HI	05/26/96	24°40' N 160°15' W NW of Hawaii	144	295-WNW
Hamilton Barnard Ken Brookins	09/03/95	32°49'N 118°17'W San Clemente Is. CA	09/06/96	33°19' N 118°17' W Santa Catalina Is. CA	369	30- NNE
Jean Walter Jerry Allen	03/13/96	19°43' N 155°59' W Kailua-Kona HI	10/16/96	24°22' N 158°18'W N of Hawaii	217	312 – NNW
Todd Roberts Gene Vander Hoek	11/26/96	19°30' N 156°00' W Kailua-Kona. HI	12/10/96	18°42' N 162°22' W SW of Hawaii	14	385-WSW
BLUE MARLIN	-	-	-	-	-	-
Michael Fuze -	01/05/96	22°10' N 156°33' W Cane Halawa HI	01/21/96	20°01' N 156°01' W Kailua-Kona, HI	16	133-SSE
Malcolm Bevan Gene Vander Hoek	06/23/92	19°50' N 156°04' W Kailua-Kona HI	02/22/96	19°44' N 156°03' W Keahole Point, HI	1339	6-SSE
Bill Gibson Guv Terwiliger	?	20°16' N 155°52' W Keahole Point HI	05/20/96	21°10' N 154°20' W E. of Hawaii	?	141-ENE
Loel Thompson Torno Rogers	07/27/92	19°30' N 156°00' W Kailua-Kona HI	09/07/96	19°11' N 155°54' W Milolii HI	1503	20-SSE
Brian Buchheit Mike Rand	04/28/96	19°43' N 155°59' W Kailua-Kona HI	10/16/96	24°22' N 158°18' W N of Hawaii	171	312- NNW
SWORDFISH	-	-	-	-	-	-
Robert Vacchetta	3/20/95	30°01' N 148°17' W NE of Hawaii	3/29/96	29°30' N 154°50' W NE of Hawaii	375	394-WSW

Distance traveled compared to time at liberty can indicate seasonality in movements. Billfish are often recaptured near the original tagging location after being at liberty for approximately one-year intervals. A striped marlin tagged off San Clemente Island, California, was recaptured a year later only 30 nm away, and a sailfish at liberty 4 years was tagged and recaptured at the East Cape off Baja California Sur, Mexico. The same is true for blue marlin. Several blue marlin recaptured at half-yearly intervals indicate movement away from the original tagging location, while yearly intervals show they return to approximately the same location tagged (Figure 2).

Blue marlin, striped marlin and swordfish travel long distances and may have established, but as yet undefined, seasonal migratory patterns. These patterns include transoceanic and trans-equatorial crossings that expose them to many international commercial and recreational fisheries. Fish taken by the high seas fisheries in the North Pacific are being recaptured in the central and western South Pacific by vessels operating in both coastal and international waters. This information is used by resource managers working with international fisheries agencies for the sound management and conservation of billfish resources.

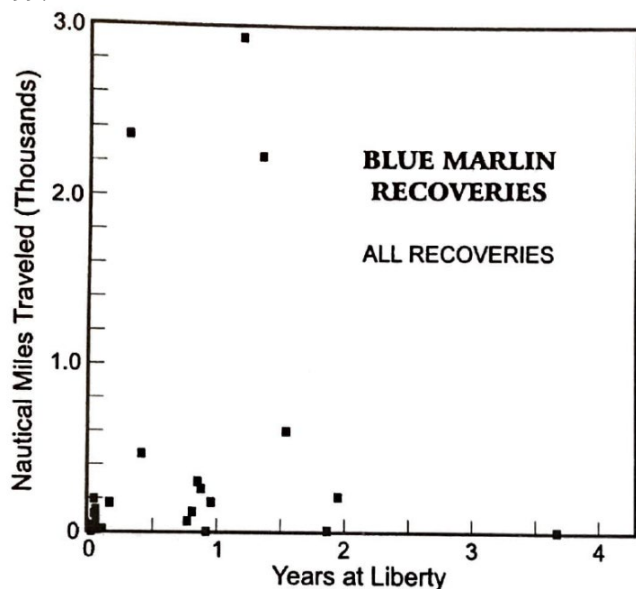


Figure 2. Blue marlin time at liberty and miles traveled.

BLUE MARLIN MOVEMENTS

A total of 4,410 blue marlin have been tagged, with 38 recaptures indicating a 0.86% return rate. Of those, 25 were released and recaptured within 200 nm off Hawaii and indicate considerable inter-island movement ranging from 1 to 1,503 days. Five others released off Kailua-Kona moved west and offshore from 208 to 597 nm. One blue marlin tagged off Kailua-Kona was recaptured after traveling 2,357 nm to the Marquesas Islands in the South Pacific.

Five recaptured blue marlin were tagged near the tip of Baja California Sur, Mexico. Of these, two traveled long distances: one was recaptured near Oahu, Hawaii, 2,929 nm to the west after 427 days, and the other was recaptured near the Marquesas Islands in the South Pacific, 2,228 nm southwest after 484 days.

STRIPED MARLIN MOVEMENTS

Striped marlin releases total 19,534 with 319 recaptures (1.63%). The majority were released off Hawaii, Southern California and Baja California Sur, Mexico. Thirteen tagged off Southern California were recaptured off Baja California Sur, but only one moved from Baja to Southern California. Six striped marlin tagged off Southern California were recaptured after making considerable movements. Four were recaptured near Hawaii, one off Peru 3,693 nm to the southeast after only 141 days, and another was recaptured near Pitcairn Island, 3,290 nm to the south after 116 days at liberty.

SWORDFISH MOVEMENTS:

A total of 466 broadbill swordfish has been tagged and released by cooperating billfish anglers and U.S. commercial fishermen. Eleven (11) have been recaptured for a return rate of 2.36%. The SWFSC, along with cooperating recreational anglers and commercial harpoon fishers, tagged 17 swordfish in 1978 in an effort to identify movement patterns in the Southern California Bight. Six, or 35.3%, of those were recaptured all within 35 days, and none had moved more than 30 nm.

Three swordfish tagged north of Hawaii by longline vessel captains moved northeast toward the west coast of North America. One was recovered after traveling 1,852 nm near San Clemente Island, California, by a local drift net vessel fishing swordfish and sharks. This fish had grown 114 cm in 610 days at liberty. Another was recaptured near the Erben Tablemount, a net distance of 899 nm. It grew 57 cm in 287 days and was recaptured by a Japanese longline vessel fishing in international waters. The third was also recaptured by a longline vessel. It had a net movement of only 321 nm in 364 days and increased in weight by 25 kg.

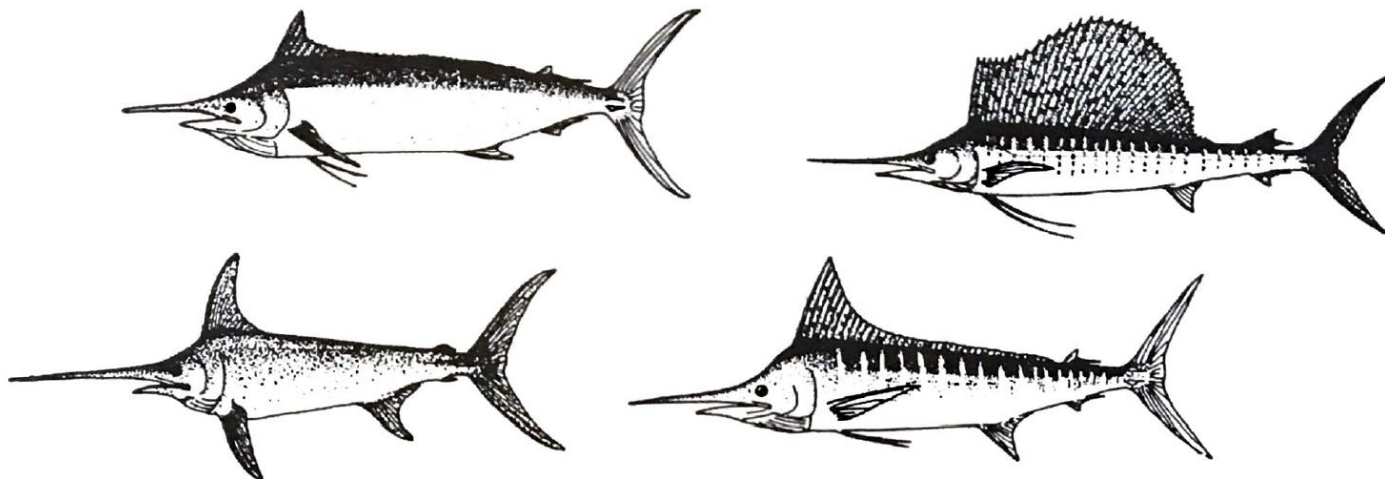
ADVANCES IN TAGGING

Recreational anglers worldwide are becoming more conservation minded through catch and release programs. Billfish tagging increases the anglers' awareness of resource conservation and the importance of tag-recapture data to resource managers. Because billfish are large, highly mobile and widely dispersed, it is difficult to determine the impact fishing has on their populations. Billfish, skillfully tagged and quickly released, have an excellent chance for survival, and their recapture increases our knowledge of these magnificent fish.

As tagging technology improves and tag design evolves into archival and satellite tags, valuable new information will become available. This exciting new technology is certain to expand our understanding of billfish ecology and bluefish resources worldwide.

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. The Billfish Newsletter can also be accessed on the Southwest Fisheries Science Center's home page under 'Publications' at <http://swfsc.ucsd.edu>.





TIPS TO SUCCESSFULLY TAG YOUR BILLFISH

BEFORE YOU CATCH YOUR FISH:

- First decide if this fish is to be tagged and released.
- Rig terminal tackle with a single hook.
- Attach the tag to the tagging stick and stow in a safe place.
- Place the BILLFISH TAGGING REPORT card in a safe, dry location.

WHILE HOOKED-UP:

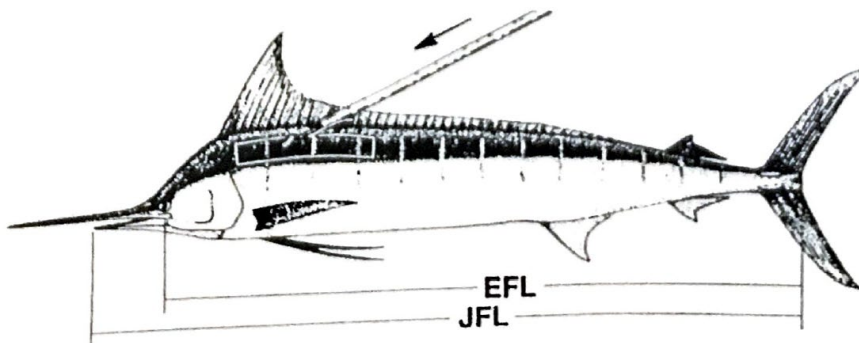
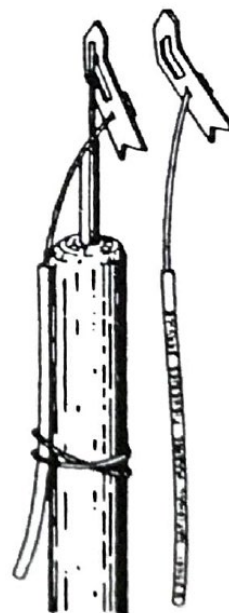
- Leader your fish quickly, usually within 20 to 30 minutes.
- Allow the fish to calm down prior to tagging. Do not attempt to tag a fish while it is jumping or thrashing about.

TAGGING:

- Lead the fish alongside the boat.
- Once the fish calms down, insert the tag in the dorsal (back) muscle just below and behind the tallest part of the dorsal fin. Avoid any chance of inserting the tag in the gill, head or below the lateral line.
- Insert the tag a full two inches into the muscle at an angle matching the flow of water over the fish's back.
- The fish should be tagged without excessive handling or allowing it to injure itself on the vessel's hull or transom.

RELEASING:

- Remove the hook with a good pair of pliers. If deeply hooked in the throat or stomach, release it by cutting the leader as close to the hook as possible.
- A fish that appears lethargic, but otherwise uninjured, can often be revived by slowly towing it through the water, forcing water through the gills until it begins to swim on its own. Even a fish that has thrown its stomach can still be released.
- **Last but most important.** Fill out the BILLFISH TAGGING REPORT card and mail it to this office.



COMPLETING THE BILLFISH TAGGING REPORT CARD

- Fill out the card completely and as accurately as possible.
- Indicate latitude, longitude and locally known fishing area.
- Estimate the length of the fish as
 - "eye-to-fork" length (EFL)
 - "tip of lower Jaw-to-fork" length (JFL).
- Estimate weight of the fish.
- Include any remarks, club name and complete address of the angler and the boat captain.
- Return cards promptly to the Southwest Fisheries Science Center. Tagging is of no value unless this Billfish Tagging Report card is returned. Postage is paid if mailed in the U.S.A.

NOAA, National Marine Fisheries Service		Please return card Otherwise tagging is of no value	
BILLFISH TAGGING REPORT		Tag No: <u>A28762</u>	
PLEASE FILL IN DETAILS AND MAIL TODAY.			
Position:	<u>33°12'N 118°10'W</u>	<u>"SLIDE" Catalina I</u>	
Species:	<u>Striped Marlin</u>	Date:	<u>8/14/93</u>
Estimate, length or weight:	Inches <u>70" EFL</u> Lbs. <u>105</u>		
Remarks:	<u>Good Shape - hook removed</u>		
Angler:	<u>Marla Marlin</u>		
Address:	<u>1310 Broadbill Way S.D.</u>	Zip:	<u>92111</u>
Club:	<u>Anglers Bay Yacht Club</u>		
Captain:	<u>Bill Fish</u>		
Address:	<u>214 Tagright St. S.D.</u>	Zip:	<u>92111</u>
Response to this form is voluntary. OMB 0648-0009, expiration date: 08/31/93 NOAA 88-162, 4/93			

Public reporting burden for this collection of information is estimated to average 0.8 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to David B. Holtz, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038-0271, and to the Office of Management and Budget, Paperwork Reduction Project (0648-0009), Washington, DC 20503.

ACKNOWLEDGEMENTS

We wish to thank all the anglers, captains, commercial fishers and cooperating agencies for supporting the International Billfish Angler Survey and the Cooperative Marine Game Fish Tagging Program. Thanks to Roy Allen and Henry Orr for the design and production of this newsletter.

We welcome your comments concerning both the Survey and Tagging programs as well as the contents of this Newsletter.

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 1998 issue. A billfish baseball cap and plaque will be awarded to the winner photographer.

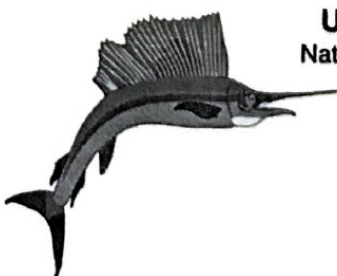
This year we recognize Dr. Hans Pfenninger, of Herrliberg, Switzerland for providing the 1997 Billfish Newsletter's cover photograph. Dr. Pfenninger is a world-class sportfisher and photographer and serves on the International Committee of the IGFA.



Smooth seas and good fishing.

David B. Holtz, Biologist
Douglas Prescott, Computer Specialist

Southwest Fisheries Science Center
P.O. Box 271
La Jolla, CA 92038-0271
Phone - (619) 546-7112
FAX - (619) 546-7003



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, California 92038-0271

