

The Southwest Fisheries Science Center's

1997 Billfish Newsletter



Results of Cooperation 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.

■ Cover Photo - Black marlin off Tropic Start 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	2,161 (2,570)	0.37 (0.26)	BLM
So. California	1,372 (1,600)	0.13 (0.09)	SM
Baja California, Mexico	1,841 (1,103)	0.71 (0.77)	SM
Guaymas, Mexico	14 (34)	1.00 (0.56)	SM
Mazatlan, Manzanillo, Mexico	103 (85)	0.99 (0.67)	SF
Puerto Vallarta, Mexico	22 (46)	0.41 (1.33)	SF
Acapulco, Ixtapa, Zihuatanejo, Mexico	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

**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.

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.

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),

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

Marshall Islands (0.14), Mauritius (0.40) and Tahiti (0.40). Australia (0.11) and Panama (0.38) reported the highest catch rates for black marlin. Excellent fishing for sailfish was reported from Mazatlan, 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.

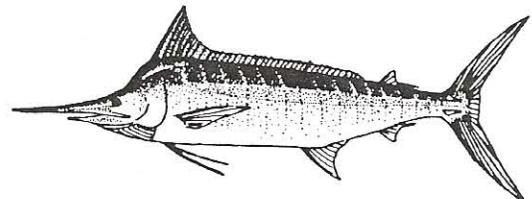
SURVEY RESPONSE

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.

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.



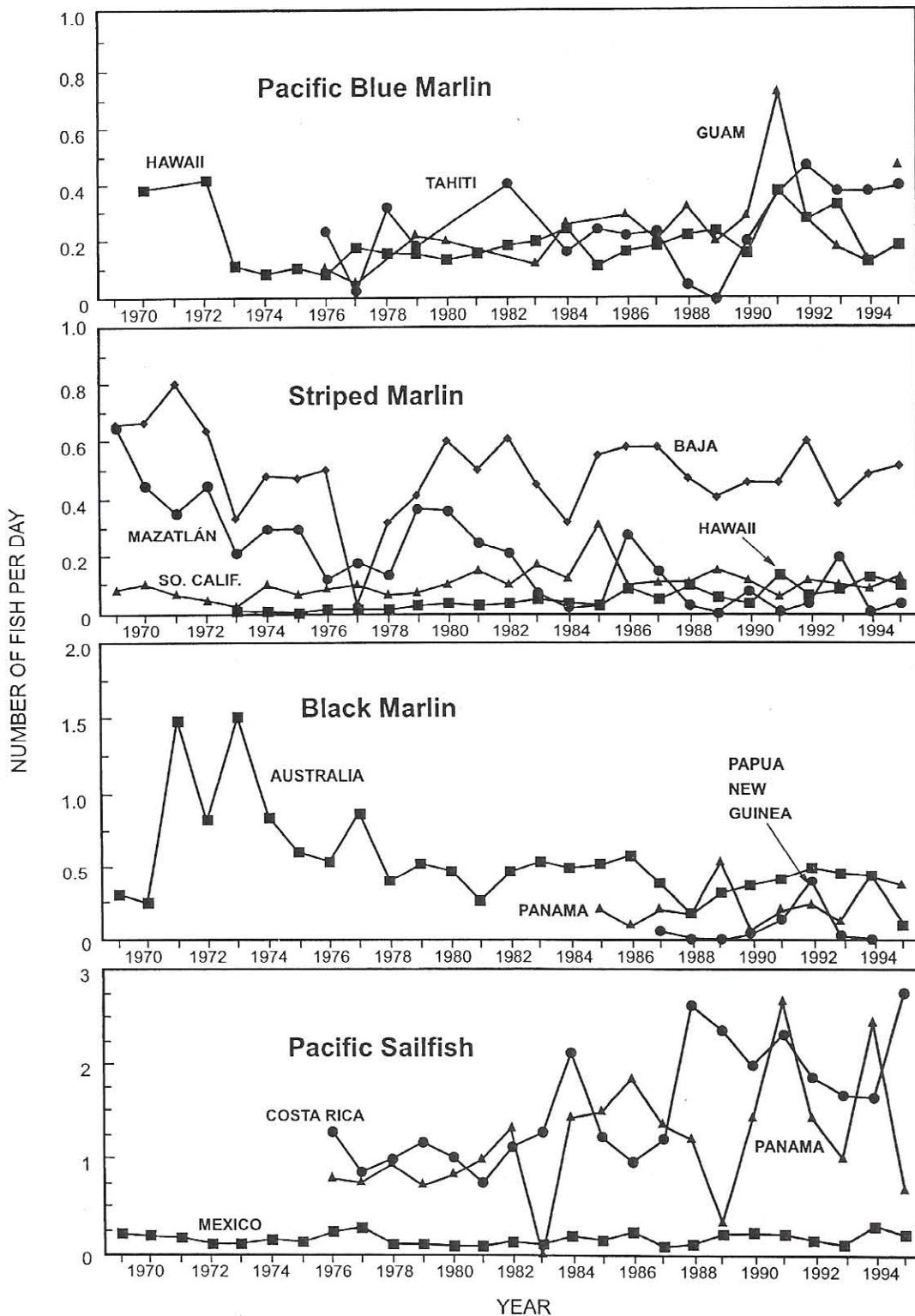


Figure 1. CPUE (number of fish/angler day) for A) striped marlin, B) blue marlin, C) black marlin, and D) sailfish reported by region, 1969-1995.

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.

Table 2. Summary of billfish tagged in 1996.

AREA	SPECIES	TOTAL
PACIFIC OCEAN		
Southern California, U.S.A.	Striped Marlin	104
	Marlin, unid.	13
Hawaii, U.S.A.	Blue Marlin	343
	Striped Marlin	193
	Short-Billed Spearfish	83
	Broadbill Swordfish	13
	Marlin	3
Baja California, Mexico	Billfish, unid.	1
	Blue Marlin	31
	Black Marlin	4
	Striped Marlin	165
	Sailfish	15
Mazatlan-Manzanillo, Acapulco, Mexico	Marlin	1
	Sailfish	20
	Striped Marlin	2
Panama	Blue Marlin	1
	Black Marlin	11
	Striped Marlin	42
Fiji	Striped Marlin	11
	Sailfish	70
	Sailfish	2
Tahiti	Blue Marlin	1
	Blue Marlin	55
	Billfish, unid.	3
Marshall Islands	Short billed Spearfish	1
	Blue Marlin	5
INDIAN		
Kenya	Black Marlin	3
	Sailfish	1
United Arab Emirates	Sailfish	1
TOTAL		1,199

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 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
Shortfin Mako Shark	2	1,080	24	2.22
Roosterfish	-	924	29	3.14
Short-billed Spearfish	84	590	0	0.00
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	0.00
Albacore Tuna	20	79	0	0.00
Bigeye Tuna	2	76	2	2.63
Hammerhead Shark	-	52	2	3.85
White Sturgeon	-	50	1	2.00
Black Sea Bass	-	40	8	20.00
Leopard Shark	-	39	1	2.56
Bronze Whaler Shark	1	35	1	2.94
Wahoo	-	33	2	6.06
Whitetip Shark	-	33	0	0.00
Jack Cravelle	-	32	0	0.00
Thresher Shark	-	30	1	3.33
Barracuda	-	23	2	8.70
Bluefin Tuna	-	19	1	5.26
Tiger Shark	-	17	2	11.76
Striped Bass	-	11	0	0.00
White Marlin	-	10	1	10.00
Whale Sharks	-	4	1	25.00
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	ANGLER NAME	BILLFISH TAGGED
HAWAII, U.S.A.		BAJA CALIFORNIA, Continued	
John Akina	3	Tony D' Agostino	2
Robert Anthony	2	Bob Denault	2
Doug Armfield	2	Dave Elm	2
John Baldasaro	2	Mike Fairchild	2
Pam Basco	3	Dennis Friedman	3
Bill Borkan	2	Dennis L. Gagnon	2
Bruce Carlson	2	Bernard A. Guentner	2
Ralph Conner	2	Emmelyne Hallford	2
Kenneth R. Corday	4	Blair W. Howard	4
Richard M. Devine	2	Roger Jackson	2
Cathy Ehrlich	2	Gary Jasper	2
Glyn Ferrell	5	Ron Johnson	3
Donald Frederickson	2	Paul Lepore	4
Terry Frederickson	2	Jerry Lewis	2
Jeff Gerner	2	Stephen R. May	2
Bill Gibson	2	Michael McGrade	3
Mike Gingerich	3	Tom McKeivitt	2
Rob Gollahon	2	Ron Moran	2
Michael Gunning	2	Bruce Nelson	2
George J. Harris	2	Chase Offield	4
Kevin Hiney	2	Larry Peabody	2
Takaro Hirabayashi	2	John Riordan	5
Bill Hoey	6	Dave Ryan	2
Keith J. Hollingworth	3	Clarke A. Smith	4
Les Hunter	2	Michael Stapleton	3
Greg Jackson	4	Michael Stern	3
Paula Jones	3	George Swierczynski	6
John Jordan	2	Kent M. Twomey	4
Daniel Krieger	3	Scott Weldon	3
Dennis H. Kusnierz	2	Emmett	2
Walt Laskey	2	Westenberger	2
Roy Laverty	2	David Wishney	2
Mark Mallet	3	Ken Youngchild	5
Charles M. Melhuish	2		
Jeff Meyer	2	SOUTHERN CALIFORNIA, U.S.A.	
Don Miller	5	Douglas A. Daniels	3
D. Brent Nelson	2	Gerald A. Garrett	2
Pat Ness	2	Eric Grennan	4
Kenzi Nishino	2	Danny Lee Jones	5
Grandy Perry	2	Phyllis Jones	2
Bill Prince	2	Bill Kakuk	2
Nicole Ribeiro	2	Karl Kogler	3
T. J. Rivas	2	Michele B. Kogler	2
Jon Schumacher	5	Reed Miller	3
Steve Schumacher	21	Jim Sieminski	3
D. Scott Scovira	3	Mark Warner	5
Pat Shannon	2	Mark M. Wisch	2
Kaarin Simpson	3	Barbara Yauchzee	2
Sue Stolzman	5	Eric Yauchzee	4
Lee Tew	2		
Ken Valder	2	PANAMA	
Jean Walter	2	Larry Aagesen	2
Debbie Williams	3	Don Aronson	2
Karen Williams	2	J. B. Bollman	2
Doug Zielke	3	George J. Bubrick	3
		Liz Bubrick	2
BAJA CALIFORNIA, MEXICO		Carolyn Burton	2
Don Anderson	15	Joseph A. Coffey Jr.	3
Cooke Bausman III	6	Larry Dahlberg	2
Donald V.T. Bear	4	Joseph Feeney	4
Russell V. Bear	3	Lance Glaser	4
Mel Bearns	2	Bill Gonsalves Sr.	3
Steve Brackmann	2	Tommy Greene	2
Barry Brightenburg	3	Patrick L. Kelley	2
James A. Clarke	2	Michael Kosmas	2

ANGLER NAME	BILLFISH TAGGED	ANGLER NAME	BILLFISH TAGGED
PANAMA, Continued		Sandra Moreland	2
Mr. Lankes	5	Taylor Poole	3
Mike Leech	2	Carl A. Posse	2
Jim Leighton	2	Oliver Riesch	4
Jay D. Levine	6	Jeffrey D. Riling	2
Terry Lubinsky	2	Bill Sions	2
Lewis M. Madeira Jr.	4	Boyd A. Skille	4
M. D. Magoffin	3	Chuck Vaughn	3
Bob Merrick	2	Wes Vaughn	2
John Merrick	3	Francis M. Vazza	2
Dwayne Moreland	2	Kathleen M. Vyborny	3

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

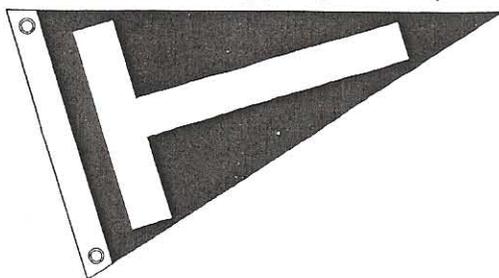
Table 5. Names of captains tagging substantial numbers of billfish, and the number of billfish tagged and released. From Billfish Tagging Report cards received for 1996 calendar year releases.

CAPTAIN NAME	TOTAL	CAPTAIN NAME	TOTAL
HAWAII, U.S.A.		HAWAII, U.S.A. (Continued)	
Capt. Peter Hoogs	38	Capt. Craig Forrest	2
Capt. Randy Parker	33	Capt. Bill Graham	2
Capt. Tom Siebler	29	Capt. Darrin Isaacs	2
Capt. Marty Sands	28	Capt. Ed Isaacs	2
Capt. Kelley Everette	25	Capt. Neal Isaacs	2
Capt. Dennis Harris	24	Capt. Leon Lange	2
Capt. Tad Luckey	21	Capt. Butch Losasso	2
Capt. Robert McGuckin	19	Capt. Jim Patterson	2
Capt. Randy O. Orkisch	19	Capt. Larry Pries	2
Capt. John Jordan	15	Capt. Gary Quam	2
Capt. Mark Shultz	15	Capt. Chris Rose	2
Capt. Guy Terwilliger	14	Capt. Joe Schloderer	2
Capt. Jerry Allen	12	Capt. Roy Tsutahara	2
Capt. Jeff Fay	12	Capt. Rick White	2
Capt. Mike Derego	12		
Capt. Scott Fuller	10	BAJA CALIFORNIA, MEXICO	
Capt. Darryl Chow	9	Capt. David Brackmann	26
Capt. Mike Rand	9	Capt. Peter Wishney	25
Capt. F. McGrew Rice	9	Capt. Cooke Bausman III	14
Capt. James G. Ward	9	Capt. Martin Verdugo Collins	14
Capt. Del Cannon	8	Capt. Jesus Agundez	9
Capt. Norm Isaacs	8	Capt. Congo Cosio	9
Capt. Mike B. Jacobsen	8	Capt. Jerry Lewis	9
Capt. Jerome Judd	8	Capt. Paulino Martinez	9
Capt. Dudley Worthy	8	Capt. Felipe	7
Capt. Charles E. Hauptert	7	Capt. Mike Libby	6
Capt. Bill Casey	6	Capt. Jesus Araiza	5
Capt. Kevin M. Hogan	6	Capt. James A. Clarke	5
Capt. Freddy Rice	6	Capt. Eric Grennan	5
Capt. Gene Vander Hoek	6	Capt. Tom Patierno	5
Capt. Marlin Parker	5	Capt. Thomas A. Shanahan	5
Capt. Rick Rose	5	Capt. Terry Bersuch	4
Capt. Bob Russell	5	Capt. Steve Sheldon	4
Capt. Doug Barna	4	Capt. Brad Titcomb	4
Capt. Bill Crawford	4	Capt. P. Neff Nash	3
Capt. Mike Holtz	4	Capt. Jimmy Panga	3
Capt. Steven D. Kaiser	4	Capt. Harold Schram	3
Capt. Richard Krupa	4	Capt. Geronimo Cosio	2
Capt. Rick Medenwald	4	Capt. Buz Guentner	2
Capt. Darren Oshiro	4	Capt. Martine Herrera	2
Capt. Doug Pattengill	4	Capt. Mike Jubinsky	2
Capt. Jack Ross	4		
Capt. Rusty Unger	4	SOUTHERN CALIFORNIA, U.S.A.	
Capt. Dennis Cintas	3	Capt. Ken Brookins	12
Capt. Mike Crawford	3	Capt. Kirk A. Yauchzee	8
Capt. Joseph Demarke	3	Capt. Tom Patierno	7
Capt. Daniel J. Harrigan	3	Capt. Jerry R. Austin	6
Capt. Mike Hasbrouck	3	Capt. Ron Johnson	6
Capt. Gary Hicks	3	Capt. Joe Catron	6
Capt. Danny Horimoto	3	Capt. Michele B. Kogler	4
Capt. Nobuhiro Isobu	3	Capt. Mark M. Wisch	4
Capt. Jeff Kahl	3	Capt. Danny Lee Jones	3
Capt. Mike Kenworthy	3	Capt. Phyllis Jones	3
Capt. Bob Larrabee	3	Capt. C. Neal Monte	3
Capt. Dale Leverone	3	Capt. Martin L. Morris	3
Capt. Chris Sheeder	3	Capt. Richard Sieminski	3
Capt. James M. Svetich	3	Capt. Gerald A. Garrett	2
Capt. Joseph Yurkanin	3	Capt. Joe Houck	2
Capt. Paul Abatie	2	Capt. Bill Kingsmill	2
Capt. Alan Abdill	2	Capt. Karl Kogler	2
Capt. Dave Adams	2	Capt. Jim Madden	2
Capt. Robert Bean	2	Capt. Ed Martin	2
Capt. C. Bruce Evans	2	Capt. James Thompson	2
Capt. Chip Fischer	2		
		KENYA	
		Capt. Peter Glover	4

Table 5. Continued.

CAPTAIN NAME	TOTAL
MARSHALL ISLANDS	
Capt. Ronnie Reimers	2
Capt. Bwiji Aliven	1
Capt. Emil DeBrum	1
Capt. Ada Eledui	1
FIJI	
Capt. Tooman Koons	2
TAHITI	
Capt. Yvonnice Allain	5
Capt. Alain Durand	5
Capt. Joseph Lis	5
Capt. Bernard Revel	5
Capt. Emile Soullier	5
Capt. Philippe Lis	4
Capt. Georges Poroi	4
Capt. Jean-Pierre Tanguy	4
Capt. Winiki Sage	2
Capt. Jacques Solari	2
Capt. Moana Allain	1
Capt. Pierre Blais	1
Capt. Bruno Champes	1
Capt. Justin Cheffort	1
Capt. Jacques Chongue	1
Capt. Yves Collenot	1
Capt. Steve Ellacott	1
Capt. Nicholas Leonsieff	1
Capt. Christian Lii	1
Capt. A. Machove	1
Capt. Moeino Parea	1
Capt. Tihoji Piroi	1
Capt. Philippe Siu	1
Capt. Emile Vongue	1
Capt. Ato Watanabe	1
Capt. Raphael Wong	1
PANAMA	
Capt. Fausto Martinez	18
Capt. Matias	15
Capt. Pacheco	15
Capt. Maso	13
Capt. Morito	13
Capt. Teodoro	11
Capt. Isauro	8
Capt. Mike	8
Capt. Gustavo	7
Capt. Placido	7
Capt. Chito	6
Capt. Cornelio Alvarez	2
Capt. Falto	2
Capt. Darien	1
Capt. Frank	1

Fly the Tagging Flag!



California and Baja California Sur, Mexico, although we have commonly observed such movements in the past.

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°353' 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 Brooks	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 Cape 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 Guy Terwilliger	?	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 Tomo 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	03/20/95	30°01' N 148°17' W NE of Hawaii	03/29/96	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 trans-oceanic 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.

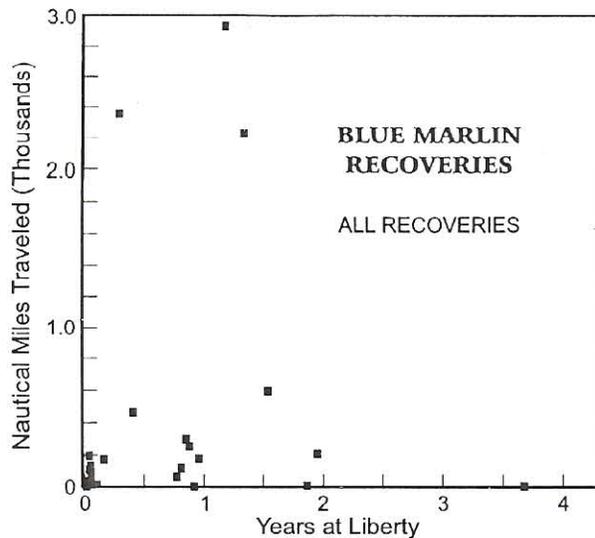


Figure 2. Blue marlin time at liberty and miles traveled.

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 of Hawaii and indicate considerable inter-island movement ranging from 1 to 1,503 days. Five others released off Kailua-Kona moved west and off-shore 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.

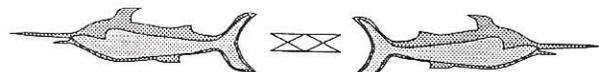
Three swordfish tagged north of Hawaii by longline vessel captains moved northeast toward the west coast of North America. One was recovered after traveling 1,852 nm near San Clemente Island, California, by a local drift net vessel fishing swordfish and sharks. This fish had grown 114 cm in 610 days 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.

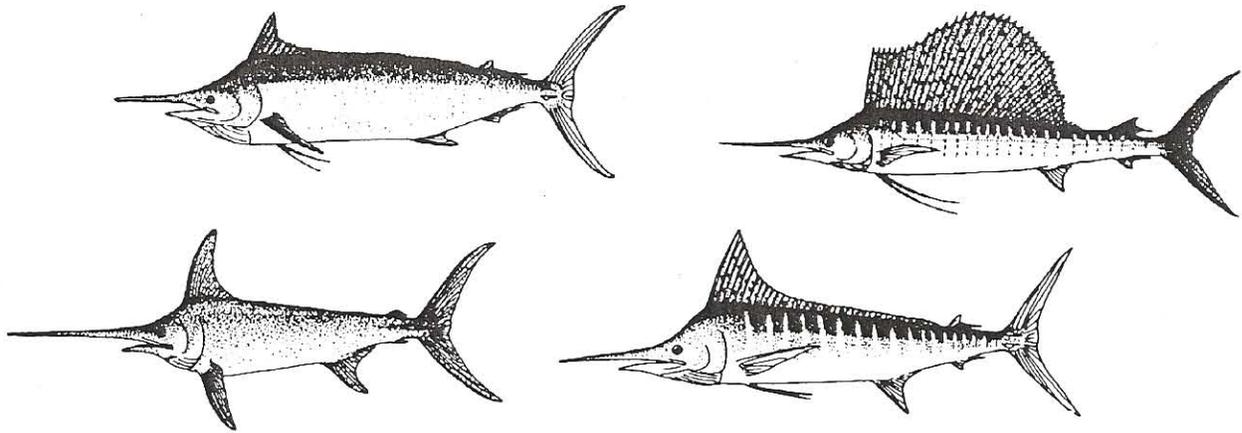
ADVANCES IN TAGGING

Recreational anglers world-wide 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 billfish 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:

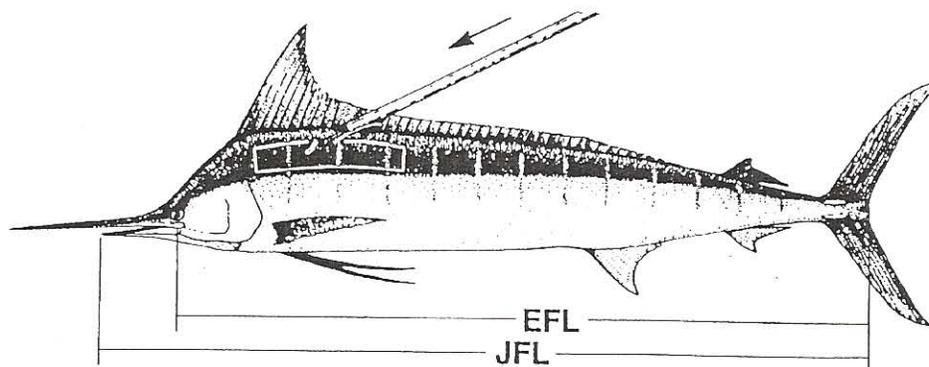
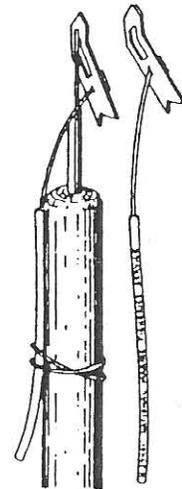
- Leader your fish quickly, usually within 20 to 30 minutes.
- Allow the fish to calm down prior to tagging. Do not attempt to tag a fish while it is jumping or thrashing about.

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
 1. "eye-to-fork" length (EFL)
 2. "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
 BILLFISH TAGGING REPORT

Please return card
 Otherwise tagging is of no value

PLEASE FILL IN DETAILS AND MAIL TODAY. Tag No. A28762

Position: 33°12'N 118°10'W SLIDE Catalina I

Species: Striped Marlin Date: 8/14/93

Estimate, length or weight. Inches 70" EFL Lbs. 105

Remarks: Good Shape - hook removed

Angler: Marla Marlin

Address: 1310 Broadbill Way SD Zip: 92111

Club: Anglers Bay Yacht Club

Captain: Bill Fish

Address: 214 Tagright St. SD Zip: 92111

Response to this form is voluntary.
 OMB 0648-0009, expiration date: 08/31/93
 NOAA 86-162, 4/93

Public requests for the collection of information are estimated to average 0.03 hours 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 or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Service, Department of Commerce, 4800 Marking Drive, Washington, DC 20503.

ACKNOWLEDGEMENTS

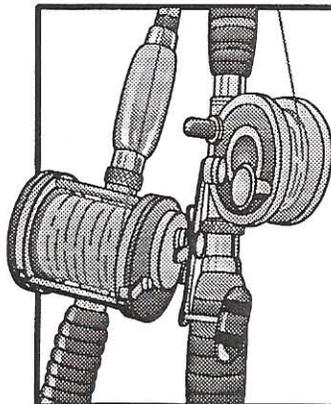
We wish to thank all the anglers, captains, commercial fishers and cooperating agencies for supporting the *International Billfish Angler Survey* and the *Cooperative Marine Game Fish Tagging Program*. Thanks to Roy Allen and Henry Orr for the design and production of this newsletter.

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 years *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 winning photographer.

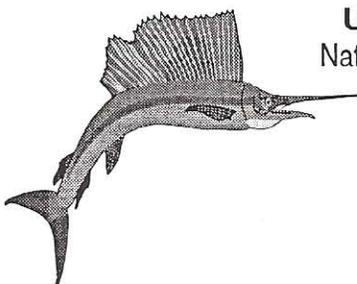
This year we recognize Dr. Hans Pfenninger, of Herrliberg, Switzerland for providing the 1997 Billfish Newsletter's cover photograph. Dr. Pfenninger is a world class sportfisher and photographer and serves on the International Committee of the IGFA.



Smooth seas and good fishing.

David B. Holts, Biologist
Douglas Prescott, Computer Specialist

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