

U.S. ATLANTIC BLUEFIN TUNA TAGGING, OCTOBER 1971 THROUGH OCTOBER 1974

by

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Results, since October 1971, of bluefin tuna tagging by United States programs in the Atlantic are presented in order to update the bluefin section of the "Final report of the working party on tuna and billfish tagging in the Atlantic and adjacent seas" (FAO Panel of Experts for the Facilitation of Tuna Research, La Jolla, California, U.S.A., 8-12 November, 1971 (1972) FAO Fish. Rep. (118), Supl. 1:37).

The new data includes 2,265 releases of smaller (4-70 kg) bluefin tuna and 194 releases of giant (<122 kg) bluefin. Recoveries during this same period were reported for 288 school tuna and 21 giants. Some of these recoveries were from fish released prior to October 1971.

The total return rate for school bluefin having been at liberty for at least one year is now 25.3% with all new recoveries showing a seasonal return to the release area off the northeastern U.S. Four of these recoveries have indicated the possibility of extended times at liberty with two returns coming after approximately 48 months and two others after 72 months at large. In addition the first indication of winter locations for these smaller bluefin was provided by two recoveries of fish in January 1974, over 200 miles east of Nantucket Island.

Recoveries for giant tuna have been increasing in recent years. Four returns from fish released in the Bahamas have provided: 1) the most southward movement and longest migration recorded for an Atlantic bluefin to 40°S, off Argentina; 2) the seventh trans-Atlantic migration to Norway; and 3 and 4) confirmation that fish from the Bahamas enter the fishery from the New York Bight to Newfoundland. Returns from fish released in Newfoundland increased from three to eight and four of the five new recoveries showed movement out of the tagging area - two to Massachusetts waters, one to off Nova Scotia and the fourth off the Grand Banks. Most significant in this increase are the recoveries from fish released in New England coastal waters. Eleven of the twelve recoveries reported are new. All have come from the same general release area.

RESUME

Les résultats tirés depuis 1971 du marquage de thon rouge dans le cadre des programmes américains dans l'Atlantique sont présentés dans le but de mettre à jour la section sur le thon rouge du "Final report of the working party on tuna and billfish tagging in the Atlantic and adjacent seas" (FAO Panel of Experts for the Facilitation of Tuna Research, La Jolla, California, U.S.A., 8-12 November, 1971 (1972) FAO Fish. Rep. (118), Supl. 1:37).

Ces nouvelles données comprennent 2.265 relâchages de petit thon rouge (4-70 kgs) et 194 de thon rouge de très grande taille (<122 kgs). La récupération de 288 thons provenant de bancs et 21 de très grande taille a été signalée au cours de cette même période. Certaines récupérations portaient sur des poissons relâchés avant octobre 1971.

Le taux total de récupération pour les thons rouges en provenance de bancs, après au moins une année dans l'eau est maintenant de 25,3 %, et toutes les nouvelles récupérations indiquent un retour saisonnier à la zone de relâchage au large du nord-est des Etats-Unis. Quatre de ces récupérations ont signalé la possibilité de séjours prolongés dans l'eau, deux récupérations ayant eu lieu au bout d'environ 48 mois et deux autres après 72 mois en liberté. De plus, les premiers indices de l'endroit où se trouvent en hiver ces petits thons rouges ont été fournis par deux récupérations de poisson en janvier 1974 à plus de 200 milles à l'est de l'île de Nantucket.

Les récupérations de thon rouge de très grande taille ont augmenté ces dernières années. Quatre récupérations de poissons relâchés aux Bahamas ont: 1) signalé le déplacement le plus méridional et la migration la plus longue jamais enregistrés pour un thon rouge atlantique à 40°S au large de l'Argentine, 2) indiqué la septième migration trans-océanique vers la Norvège, et 3 et 4) confirmé le fait que le poisson des Bahamas entre dans la pêcherie de la rade de New York à Terre-Neuve. Les récupérations de poissons relâchés à Terre-Neuve ont augmenté de trois à huit, et quatre des cinq nouvelles récupérations ont signalé des déplacements hors de la zone de marquage - deux vers les eaux du Massachusetts, un autre vers le large de la Nouvelle-Ecosse et le quatrième vers les Grand Banks. L'aspect le plus frappant de cet accroissement est la récupération du poisson relâché dans les eaux côtières de Nouvelle-Angleterre. Onze des douze récupérations signalées sont nouvelles, et toutes provenaient du même secteur général de relâchage.

RESUMEN

Se presentan los resultados de los programas de marcado de atún en el Atlántico, efectuado por los Estados Unidos desde Octubre de 1971, a fin de poner al día la sección sobre el atún del "Informe final del Grupo de Trabajo para el marcado de túnidos y marlín en el Atlántico y mares adyacentes" (FAO Panel of Experts for the Facilitation of Tuna Research, La Jolla, California, U.S.A., 8-12 Noviembre 1971 (1972) FAO Fish. Rep. (118), Supl. 1:37).

Los nuevos datos incluyen 2.265 ejemplares marcados de atún pequeño (4-70 kg) y 194 ejemplares marcados de atún gigante (<122 kg). Se ha comunicado la recuperación durante este mismo periodo de 288 atunes procedentes de cardúmenes y 21 de talla gigante. Algunas de estas recuperaciones corresponden a peces marcados antes de Octubre de 1971.

La tasa total de recuperación de atunes procedentes de cardúmenes que vivieron en libertad por lo menos un año, es ahora de 25,3%, y en todas las recientes recuperaciones se observa un retorno estacional a la zona donde fueron soltados, frente al nordeste de los Estados Unidos. En cuatro de dichas recuperaciones se revela la posibilidad de extensos periodos en libertad, unos 48 meses en dos casos, y más de 72 meses en alta mar en las otras dos recuperaciones. Además, las dos recuperaciones de peces que tuvieron lugar en Enero de 1974 a unas 200 millas al este de la isla de Nantucket proporcionaron por primera vez información respecto al lugar donde invernan estos pequeños atunes.

La recuperación de atunes gigantes ha ido aumentando en los últimos años. Cuatro devoluciones de peces soltados en Las Bahamas han revelado datos sobre: 1) la migración más larga y hacia el sur registrada para un atún Atlántico, a 40°S, frente a las costas de Argentina; 2) la séptima migración transatlántica hacia Noruega; y 3 y 4) confirmación de que los peces de Bahamas entran en la pesquería desde la rada de Nueva York a Terranova. El número de devoluciones de peces soltados en Terranova que era de 3, aumentó a 8, y 4 de las 5 últimas recuperaciones mostraron desplazamientos fuera de la zona de marcado: dos a aguas de Massachusetts, una a aguas frente a Nueva Escocia y la cuarta frente a los Grandes Bancos. La nota más saliente de este aumento lo constituye las recuperaciones de peces marcados en aguas costeras de Nueva Inglaterra. A este respecto hay que decir que 11 de las 12 recuperaciones eran recientes, y todas provenían de la misma zona de marcado.

The Cooperative Game Fish Tagging Program which has been carried on by the Woods Hole Oceanographic Institution (WHOI)¹ for the past 20 years has recently provided additional valuable information in the continuing studies of the bluefin tuna. The data gathered on the bluefin by this program from its inception to 1971 has been presented in the Final Report of the Working Party on Tuna and Billfish Tagging in the Atlantic and Adjacent Seas (FAO Panel of Experts - 1972). This paper is intended to update these data with additional results gathered through the WHOI program to October 1974. Additional results from the tagging by the Narragansett Sport Fisheries Marine Laboratory of the National Marine Fisheries Service (NSFML) are also included through the kind cooperation of John Casey.

All of the tagging accomplished by these programs since 1971 has been in the western North Atlantic. This work includes 2,265 releases of smaller bluefin tuna (4-70 kg) between Cape Hatteras, North Carolina and Cape Ann, Massachusetts, and 194 releases of giants (>122 kg) primarily off the Bahamas but also in New England coastal waters and off Newfoundland (Tables 1, 2, 3, 4). Of the releases of

¹As of 1974 a joint National Marine Fisheries Service (NMFS)-WHOI Cooperative Tagging Program .

small bluefin, 1,815 were tagged by WHOI and NMFS personnel from purse seine catches. The remaining small fish and all of the giants were tagged by cooperating sport fishermen.

Returns during this same period have been continuous. There have been 288 recoveries of tagged school tuna reported and 21 of giants. Some of these recoveries were from fish whose releases in 1971 and earlier were previously reported.

Recaptures of the smaller bluefin continue to show seasonal returns to the release area with no transatlantic migrations having been recorded since the previously reported 1969 recovery in the Bay of Biscay of a 1967 release.

Tag return rates of the WHOI program have remained high and we now have a second year for which more than 40% of the school fish tagged have been recovered (40.4% of 1970 releases) (Table 1, Figure 1). In addition, the total return rate for school bluefin with the opportunity to be at liberty for at least one year is now 25.3% (2,395 recoveries of 9,473 releases).

These new results, together with the shedding rates shown by Lenarz, Mather, Beckett, Jones and Mason (1973) and the tagging mortality indicated by Beckett (MS), suggest an even higher exploitation rate in the western North Atlantic than indicated earlier (FAO, 1968; Mather, Rothschild, Paulik and Lenarz, in press). Thus over-exploitation may be a problem of even greater concern than previously believed.

Four long term recoveries from taggings of small bluefin were recorded in the WHOI program. Two were released from purse seine catches in August 1966, south of Cape Cod, one from a purse seine catch in July

1969, south of Long Island, and the fourth from a rod and reel catch in August 1970, off Cape Cod. All four of these fish were age I when released. The first two, recaptured by longline in August 1972, off the southern tip of the Grand Banks of Newfoundland, and by purse seine in September 1972, off Gloucester, Massachusetts, respectively, had reached a reported length of 180 cm. The third and fourth, recaptured by purse seine off the central New Jersey coast in July 1973 and August 1974, respectively, had grown to reported sizes of 45 and 56 kg.

Interesting migrations were recorded for three small bluefin released in the northwestern Atlantic fishery. For the first time in 10 years a fish released south of Cape Cod, off Montauk, Long Island, in September 1972, was recovered well inside Cape Cod Bay, after 24 months at liberty. The two other recoveries gave the first indication of winter locations for these smaller bluefin. Both fish were recaptured over 200 miles east of Nantucket Island in January 1974. The first had been released in July 1972 from a rod and reel catch off Cape Henry, Virginia, and the second, from a purse seine catch in August 1973 off central New Jersey.

A marked increase in the recoveries of giant (122 kg) bluefin tuna in the western Atlantic has occurred in recent years. This may be due at least in part to the increased effort exerted on the fish in these waters which has resulted from a rising demand from the Japanese market and the correspondingly higher prices offered for the fish,

Releases of giant bluefin in the Bahamas have provided some of the most outstanding migrations (Figure 2). The most southward movement, as well as the longest migration ever recorded for an Atlantic bluefin came from a June 1969 release which was recaptured in February 1973 at 40°S, off Argentina, (6,600 nautical miles, or 12,200 km away), by a Japanese longliner. For the first time since 1967 a recovery was recorded off Norway in August 1973, from a May 1972 release off Cat Cay.

Two other returns have finally confirmed the hypothesis (Rivas, 1955) that fish from the Bahamas enter the fishery for giant bluefin from the New York Bight to Newfoundland. One, released in May 1971, was recovered off the coast of Maryland, inside the Gulf Stream, by a midwater trawl in April 1973. The other, released in June 1973, came from a handline catch off Gloucester, Massachusetts in July 1974 (Table 2).

Returns from fish released in Newfoundland (Table 3) have reached eight including one for which the release date is uncertain. Four of the new recaptures, however, have shown the first movements out of this general tagging area. Two traveled from Newfoundland to the waters off Massachusetts and one left Newfoundland to be recaptured off Nova Scotia. One of the Massachusetts recoveries was released in August 1971 and recaptured in October 1973. The other fish recaptured off New England and the one recaptured off Nova Scotia were released in August 1970 and recovered in July 1974. The fourth fish released in August 1972 was

recaptured by a Japanese longliner in December 1973, 300 miles southeast of Newfoundland off the Grand Banks.

The area in which the most numerically significant increases in recaptures of giant bluefin have been recorded is the New England coastal waters (Table 4). Prior to 1972 only 1 of 23 fish released in this area had been recaptured and it was in the same location off Rhode Island where it was tagged 23 months earlier. Since 1972, 42 fish have been released and 11 definite returns and 1 probable recapture have been recorded. Only one of these recoveries was from a release prior to 1972.

The releases and returns for all 12 of these fish have been from the same general area off New England. The fish considered a probable recapture had shed the tag but was identified by the crew which had most likely tagged it 8 days before on the basis of a deformed pectoral fin and a wound on the lateral line where the tagging data indicated the tag had been placed. Including this return, 6 of the 12 recoveries were from fish tagged after being fought on a rod and reel while the remaining 6 were from free tagged fish.

Due to the recent interest and support generated in the National Marine Fisheries Service for bluefin tuna research, we were given funding to greatly step up the WHOI participation in this phase of the cooperative NMFS-WHOI tagging Program. As a result of this welcome support nearly 1,750 bluefin have been tagged in 1974 and length frequency data has been collected from over 6,300 fish by WHOI personnel. Both of these figures are the second largest in the history of the program. We welcome this additional support and anticipate that this cooperation between the WHOI and NMFS bluefin tuna programs will continue to grow and provide the much needed data to obtain a better insight into the bluefin tuna situation.

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Table 2

Releases and returns for giant bluefin tuna (over 120 kg.) tagged off the Bahamas by year of release, months at large, and area of recapture

Year	Releases	Returns					Total
		Months at large					
		0-5.9	6.0-17.9	18.0-29.9	30.0-41.9	42.0-53.9	
1954	21	0	0	0	0	0	0
1955	14	0	0	0	0	0	0
1956	41	0	0	0	0	0	0
1957	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0
1959	25	0	0	0	0	0	0
1960	13	0	0	2 N	0	0	2 N
1961	34	2 N	0	0	0	0	2 N
1962	45	1 N	0	0	0	0	1 N
1963	147	0	0	1 B	0	0	1 B
1964	41	0	0	0	0	0	0
1965	55	0	0	0	0	0	0
1966	105	0	0	0	0	1 A	1 A
1967	82	1 N	0	0	0	0	1 N
1968	57	0	0	0	0	0	0
1969	47	0	0	0	0	1 B	1 B
1970	182	1 A	0	0	0	0	1 A
1971	49	0	0	1 A	0	---	1 A
1972	32	0	1 N	0	---	---	1 N
1973	47	0	1 A				1 A
1974	31	0					

Table 1

Woods Hole Oceanographic Institution
Cooperative Game Fish Tagging Program.

Releases of young bluefin tuna in coastal waters between Cape Matteras, North Carolina, and Cape Ann, Massachusetts, by years, and returns in percent of releases by region of recapture, and by time at large for local returns. Bay of Biscay returns were after from 11 to 60 months at large.

Releases		Returns							Bay of Biscay
Year	Number	Local, by months at large						Total	
		0-5.9	6.0-17.9	18.0-29.9	30.0-41.9	42.0-53.9	56.0-77.9		
1954	169	0.6	0	0	0	0	0	0.6	1.2
1955	215	0	0	0	0	0	0	0	0
1956	58	0	0	0	0	0	0	0	0
1957	34	0	2.9	0	0	0	0	2.9	0
1958	38	0	0	0	0	0	0	0	0
1959	25	0	0	0	0	0	0	0	0
1960	15	0	0	6.7	0	0	0	6.7	0
1961	150	0	1.3	2.0	1.3	0	0	4.7	0
1962	77	0	5.2	0	0	0	0	5.2	0
1963	29	24.1	6.9	0	0	0	0	31.0	0
1964	465	21.3	6.9	0	0	0	0	28.2	0
1965	1672	9.8	2.9	1.9	0	0	0	14.5	1.1
1966	3959	13.4	14.4	1.3	0.2	0.1	<0.1	29.4	0.4
1967	628	15.4	9.4	2.4	2.1	0	0	29.3	0.3
1968	260	33.8	7.3	3.1	0	0	-	44.2	0
1969	336	3.6	24.4	3.6	0.6	0.3	-	32.4	0
1970	458	10.9	25.8	2.0	1.5	0.2	-	40.4	0
1971	342	3.2	17.3	2.6	0	-	-	23.1	0
1972	193	4.7	26.4	2.6	-	-	-	33.7	0
1973	350	11.4	5.4	-	-	-	-	16.8	0
1974	1701	4.1	-	-	-	-	-	4.1	0

* Areas: A = Northeastern North America
B = Brazil and Argentina
N = Norway

Table 3

Releases and returns for giant (over 120 kg) bluefin tuna tagged in Newfoundland waters, by year of release, months at large, and area* of recapture.

Year	Releases	Returns					Total
		Months at large					
		0-5.9	6.0-17.9	18.0-29.9	30.0-41.9	42.0-53.9	?
1962	6	0	0	0	0	0	0
1963	3	0	0	0	0	0	0
1964	41	0	0	0	0	0	0
1965	47	0	0	0	0	0	0
1966	49	0	0	0	0	0	0
1967	6	0	0	0	0	0	0
1968	193	1 L	0	0	1 L	0	2 L
1969	166	0	0	0	0	0	0
1970	79	1 L	0	0	0	1M, 1N	3 LMN
1971	39	0	0	1 M	0	-	1 M
1972	42	0	1 G	0	-	-	1 G
1973	0	0	0	-	-	-	0
1974	0	0	-	-	-	-	0
Unknown	1						1 L 1 L

*Areas: L = Local
M = Massachusetts
N = Nova Scotia
G = Grand Banks

Table 4

Releases and returns for giant (over 122 kg) bluefin tuna tagged in New England coastal waters, by years of release and recapture. Returns expressed in numbers (numerators) and percent of releases (denominators), were all from New England waters.

Year	Releases Number	Returns, by year of recapture									Total
		1966	1967	1968	1969	1970	1971	1972	1973	1974 ^a	
1966	2	0	0	0	0	0	0	0	0	-	0
1967	0	-	0	0	0	0	0	0	0	-	0
1968	6	-	-	0	0	1/16.7	0	0	0	-	1/16.7
1969	1	-	-	-	0	0	0	0	0	-	0
1970	4	-	-	-	-	0	0	0	0	-	0
1971	10	-	-	-	-	-	0	0	1/10.0	-	1/10.0
1972	17	-	-	-	-	-	-	1/5.0	1/5.9	-	2/11.3
1973 ^b	15	-	-	-	-	-	-	-	5/33.3	1/6.7	6/40.0
1974 ^c	10	-	-	-	-	-	-	-	-	2/20.0 ^d	2/20.0
Total						1		1	7	3	12

Footnotes:

^a Incomplete.

^b Includes 6 releases of, and 4 1973 returns from, fish tagged while swimming free.

^c Includes 4 releases of, and 2 returns from, fish tagged while swimming free.

^d Another fish, tagged in 1974 after capture by rod and reel, has very probably also been recaptured after shedding the tag. It was identified by the crew which had probably tagged it on the basis of a deformed pectoral fin, and a wound on the lateral line where the tagging data card indicated that the tag had been placed. This probable recapture occurred 8 days after the release.

