Assessment Update For Incidental Finfish Species

by

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INTRODUCTION

This report updates existing information on 60 finfish species or species groups in the Gulf of Maine to Cape Hatteras area for which individual species-stock assessments have generally been either unavailable or are available only in preliminary form. All finfish species reported to the International Commission for the Northwest Atlantic Fisheries (ICNAF) are included, with the exception of former ICNAF total allowable catch (TAC) species (cod, haddock, redfish, silver and red hake, pollock, flounders, sea herring and mackerel) and also billfish, tunas, large sharks, American eel, white perch, and menhaden. The latter species are either taken in inshore areas or are otherwise not normally subject to capture during demersal trawling operations. This assemblage was formerly managed under ICNAF as "other finfish" and the term is retained in this report. Species and species groups included in this category are listed in Table 1.

There is obviously little biological basis for considering this assemblage as a stock; numerous individual species-stocks are included, and substantial overlap into adjacent regions undoubtedly occurs both in the Gulf of Maine - Fundian Channel area (e.g., white hake, argentine, cusk, skates and rays) as well as in the Cape Hatteras area (e.g., bluefish, mullets, kingfish, king and Spanish mackerel). Many of these species also migrate extensively both across these boundaries as well as into or out of coastal waters. Consequently, the "other finfish" category has been and should be recognized as a convenient "catch-all" for which precautionary optimum yields (OYs) may be established either individually or for the resource as a whole until detailed assessment information becomes available.

Management of "other finfish" began in 1974, when a (commercial) TAC of 125,000 tons[1] (excluding argentine) was established under ICNAF based upon examination of historical catch data. TACS of 150,000 tons (including argentine) were subsequently established for 1975 and 1976. For 1977, an OY of 275,000 tons (150,000 tons commercial; 125,000 tons recreational) was set, the estimated MSY level based upon examination of commercial and recreational catch data for 1964-1975 (U.S. Department of Commerce 1977). Precautionary OYs were also established for butterfish (18,000 tons) and river herring (10,000 tons) within the above total OY figure (U.S. Department of Commerce 1977). These OY levels were maintained for 1978 and 1979, with the exception of a 1979 reduction to 16,000 tons for butterfish. A further reduction to 11,000 tons has been proposed for this species for the 1980-1981 fishing year (April 1 - March 31). A revised final FMP for butterfish is currently under secretarial review and this species will be removed from the "other finfish" category when the final version is approved. The Total Allowable Level of Foreign Fishing (TALFF) was also decreased from 66,000 tons in 1977 to 46,800 tons in 1978-1979.

COMMERCIAL AND RECREATIONAL FISHERIES

Commercial landings of "other finfish" species appear in Table 2. Total landings peaked at 212,700 tons in 1969, fluctuated between 122,200 tons and 170,400 tons from 1970-1972, and then steadily declined to 94,300 tons in 1976. During 1964-1976 the total international commercial catch averaged 147,700 tons, of which 75,700 tons (51%) was taken by

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[1] Tons in this report refers to metric tons.

the USA and 50,400 tons (34%) was taken by the USSR. The GDR, Japan, and Poland have on occasion taken substantial catches in recent years, and other nations, notably Bulgaria, Canada, and Romania, have taken smaller amounts.

Provisional statistics for 1977 and 1978 (incomplete) indicate commercial landings of 84,500 tons and 75,600 tons, respectively (Table 2); 85% of the combined total for these years was taken by the USA and 8% by the USSR, with Canada, Italy, Japan, and Poland accounting for most of the remainder. Almost 60% of the USA total during these years consisted of scup, white hake, butterfish, bluefish, alewife, croaker, and squeteague; dogfish accounted for almost 60% of the USSR total for 1977, but in 1978 USSR landings were more evenly distributed over several species.

Commercial landings data for species of major importance for 1964-1978 appear in Table 3. Considerable fluctuation is evident, with landings exceeding 20,000 tons in certain years for alewife, argentine, dogfish, and ocean pout, reflecting shifts in directed effort by distant-water fleets. Alewife landings increased from an average of 24,200 tons during 1964-1966 (USA fishery) to an average of 42,700 tons from 1967-1971, reflecting heavy offshore fishing by the USSR, the GDR, and Poland. Catches have subsequently declined more or less continually, apparently reflecting reductions in both abundance and fishing pressure. A continual decline in striped bass landings since 1973 (Table 3) also appears to reflect declining abundance. Declines observed for other species and species groups in Table 3 appear attributable primarily to reduced effort by distant-water fleets.

In addition to their commercial importance, many "other finfish" species are of considerable recreational significance and estimated recreational catches for some species (e.g., bluefish and striped bass) have considerably exceeded commercial landings. Marine angler surveys have been conducted for the USA coast for 1960, 1965, and 1970 (Clark 1962; Deuel and Clark 1968; Deuel 1973); a regional survey was also completed for the Northeastern USA in 1974 (Ridgeley and Deuel MS 1975). As survey coverage and methodology differed between the 1974 survey and those completed earlier results are not directly comparable, although results for 1974 do appear representative for more recent years in view of species composition and ancillary information relative to trends in abundance. Recreational catches of "other finfish" species comprised 60 and 65 percent of the estimated total, respectively, in 1970 and 1974. Estimates for all surveys were dominated by bluefish and striped bass which accounted for 55% of the total for these years (Table 4). Catches of scup, puffers, tautog and weakfish have also been significant.

Recreational landings of "other finfish" for the remainder of the 1964-1978 period were estimated by applying ratios between USA estimated recreational catches and commercial landings for 1965, 1970, and 1974 to USA commercial landings totals for the remaining years.[2] Total landings were then estimated by adding USA recreational catch estimates to total commercial landings for all nations (Figure 1). Estimated totals declined from 285,900 tons in 1965 to 196,000 tons in 1967

[2]The 1965 ratio was applied to USA commercial landings totals for 1964, 1966, and 1967; the 1970 ratio was applied to USA commercial landings for 1968, 1969, 1971, and 1972, and the 1974 ratio was applied to data for the remaining years.

and then rose very sharply to 381,200 tons in 1969 (Figure 1); subsequently, landings declined more or less continually to an average of 200,500 tons in 1977-1978. Since 1973 landings have been well below the calculated MSY level of 275,000 tons for this group (U.S. Department of Commerce 1977).

RESEARCH VESSEL SURVEYS

Trends in abundance have been monitored primarily by examination of Northeast Fisheries Center (NEFC) autumn bottom trawl survey data collected since 1966 in the Gulf of Maine - Cape Hatteras area. A stratified random sampling design has been used in this survey; abundance indices have been calculated as stratified mean catch per tow values (kg) for all species for the combined strata set used by Clark and Brown (1977) (strata 61-76, 1-30 and 36-40 used in NEFC offshore surveys). To reduce the impact of anomalous catch values in certain strata, data were transformed to logarithms and (retransformed) estimates of stratified mean catch per tow in original units calculated as suggested by Bliss (1967:128). See also Clark and Brown 1977. Results are given in Table 5 and Figure 2. Values for both indices declined more or less continually from 1967-1974; since that year, values for the linear index have fluctuated somewhat but still reveal an upward trend, while values for the retransformed index have steadily increased.

Indices for selected species (stratified mean catch per tow, kg, linear scale) appear in Table 6. Again, the general trend in recent years has been upward, e.g., abundance of angler, bluefish, scup, white hake, and wolffish appears to have increased markedly since the

late 1960's. Abundance of alewife also appears to have increased slightly since the early 1970's although this trend is not evident in commercial landings data (Table 3).

DISCUSSION

Available data suggest a general increase in abundance for this group of species as a unit since the mid-1970's. Current levels of exploitation for bluefish, butterfish, spiny dogfish, and weakfish appear to be at or below estimated MSY levels for these species (Anderson and Almeida MS 1979; Murawski and Waring in press; Murawski MS 1977; Grosslein 1974); furthermore, total landings for all species since 1973 have been substantially lower than the calculated MSY estimate of 275,000 tons for this group (U.S. Department of Commerce 1977). Research vessel survey data indicate a pronounced increase in overall abundance since 1974. In summary, available evidence indicates that this stock has been rebuilding coincident with declining foreign effort in recent years.

Although the overall condition of this resource appears to be generally good, river herring (alewife and blueback) and striped bass appear to be at low levels of abundance. Declines in stock abundance of river herring since the late 1960's were documented for Virginia (Loesch and Kriete 1976) and North Carolina (Street and Davis 1976); based upon studies by VIMS (Hoagman et al. 1974) and North Carolina Division of Marine Fisheries personnel (Street et al. 1975) it appears that the trend can be attributed to increased offshore catches by distant-water fleets (Johnson et al. 1977). Survey data suggest an increase since 1974 for alewife in recent years although as noted

previously, this has not been reflected in commercial landings. NEFC surveys have provided little information on trends in abundance for striped bass, but ancillary information (i.e., commercial landings and recent recreational fishery trends) indicate that this species has declined since the early 1970's (State-Federal Striped Bass Scientific Committee, pers. comm.). The status of both resources should be monitored closely by appropriate procedures in the immediate future.

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Table 1. Common and scientific names of species included in the "other finfish" category.[1]

Common Name	Scientific Name
Alewife[2]	*Alosa pseudoharengus*
Alfonsino	*Beryx* sp.
Amberjack	*Seriola* sp.
American conger[2]	*Conger oceanicus*
American angler[2]	*Lophius americanus*
American shad[2]	*Alosa sapidissima*
Atlantic argentine[2]	*Argentina silus*
Atlantic butterfish[2]	*Peprilus triacanthus*
Atlantic croaker[2]	*Micropogon undulatus*
Atlantic needlefish	*Strongylura marina*
Atlantic salmon	*Salmo salar*
Atlantic saury	*Scomberesox saurus*
Atlantic searobins[2]	*Prionotus* sp.
Atlantic silverside	*Menidia menidia*
Atlantic thread herring	*Opisthonema oglinum*
Bay anchovy	*Anchoa mitchilli*
Black drum	*Pogonias cromis*
Black seabass[2]	*Centropristis striata*
Blueback herring[2]	*Alosa aestivalis*
Bluefish[2]	*Pomatomus saltatrix*
Crevalle jack	*Caranx hippos*
Cobia	*Rachycentron canadum*
Common pompano	*Trachinotus carolinus*
Cunner[2]	*Tautogolabrus adspersus*
Cusk[2]	*Brosme brosme*

Table 1. (Cont.)

Common Name	Scientific Name
Dogfish (ns)[2]	Squalidae
Frigate mackerel	Auxis thazard
Gizzard shad	Dorosoma cepedianum
Grunts (=Grunters)	Pomadasyidae
Hickory shad	Alosa mediocris
King mackerel	Scomberomorus cavalla
Lumpfish (lumpsucker)[2]	Cyclopterus lumpus
Mullets	Mugilidae
North Atlantic harvestfish	Peprilus alepidotus
Northern kingfish[2]	Menticirrhus saxatilis
Northern puffer[2]	Sphoeroides maculatus
Ocean pout[2]	Macrozoarces americanus
Pigfish	Orthopristis chrysoptera
Rainbow smelt[2]	Osmerus mordax
Red drum[2]	Sciaenops ocellata
Red porgy	Pagrus sedecim
Rough scad	Trachurus lathami (Coryphaenoides)
Roundnose grenadier	Macrourus rupestris
Sandeels (Sand lances)[2]	Ammodytes
Sand perch	Diplectrum formosum
Sculpins[2]	Myoxocephalus sp.
Scup[2]	Stenotomus chrysops
Sheepshead	Archosargus probatocephalus
Skates (ns)[2]	Raja sp.
Spot[2]	Leiostomus xanthurus
Spotted Spanish mackerel[2]	Scomberomorus maculatus

Table 1. (Cont.)

Common Name	Scientific Name
Spotted weakfish[2]	Cynoscion nebulosus
Squeteague[2]	Cynoscion regalis
Striped bass[2]	Morone saxatilis
Sturgeons	Acipenseridae (Acipenser spp.)
Tarpon	Megalops atlantica
Tautog[2]	Tautoga onitis
Tilefish[2]	Lopholatilus chamaeleonticeps
White hake[2]	Urophycis tenuis
Wolffish (=catfishes)[2]	Anarhichas sp.

[1] Species and species groups recognized by ICNAF for reporting purposes

[2] Included in calculation of annual research vessel survey indices. The following are also included in these calculations as they are taken on occasion in industrial fisheries, although they are not specifically reported to ICNAF: round herring, Etrumeus teres; spotted hake, Urophycis regius, sea raven, Hemitripterus americanus, and toadfish, Opsanus tau.

f of Maine to Cape Hatteras by nation, 1964-1978.

YEAR[3]							
1971	1972	1973	1974	1975	1976	1977[5]	1978[5]
6,862	7,630	1,278	3,365	3,266	278	399	----
1,315	891	782	841	671	608	730	937
740	586	----	----	470	756	349	----
----	----	19	13	21	51	----	----
57	170	1,611	29	1,478	2,345	----	----
10,055	4,592	13,856	2,794	2,318	1,284	75	----
----	----	375	----	119	1,332	710	1,094
13,382	6,774	14,627	6,285	4,752	8,058	2,182	802
18,722	9,445	13,771	9,948	6,591	5,348	1,921	----
2,069	253	770	259	4	209	53	111
17	253	93	207	422	217	625	----
54,366	106,863	52,509	46,219	37,621	17,192	11,078	2,466
----	----	----	6	----	----	----	----
48,908	32,896	56,291	60,136	60,796	56,098	65,957	70,143
----	----	----	----	680	523	427	----
156,493	170,353	155,982	130,102	119,209	94,299	84,506	75,553

;hes, tunas, large sharks, American eel, and white perch.

ıg sources: 1964, ICNAF Summ. Doc. 75/10; 1965, ICNAF Summ. Doc. 76/V1/41; '9; 1978, ICNAF Summ. Doc. 79/V1/30.

and species groups from the Gulf of Maine to Cape Hatteras, 1964-1978.[2]

YEAR[1]								
1970	1971	1972	1973	1974	1975	1976	1977[2]	1978[2]
6,302	35,861	13,802	16,629	16,102	14,560	8,255	6,654	5,413
2,827	1,461	1,723	1,825	1,046	692	681	704	1,095
690	3,762	4,344	7,243	1,171	3,382	1,193	1,573	1,826
1,379	7,293	32,707	2,512	19,695	1,466	322	-----	-----
1,098	596	720	1,146	977	1,852	1,686	2,425	2,112
1,875	1,741	1,708	3,184	3,288	3,679	3,453	3,276	3,751
0,894	7,850	6,476	19,454	12,862	11,047	11,808	4,088	4,773
96	243	204	1,026	1,481	3,977	6,780	7,857	7,108
1,365	1,823	1,685	1,803	1,731	1,827	1,491	1,400	1,907
4,954	11,516	21,526	13,876	17,584	18,365	14,481	7,496	1,748
7,188	7,867	3,355	5,825	3,732	277	678	1,060	330
5,475	2,694	7,299	8,582	2,805	172	603	98	76
4,805	4,206	5,087	5,918	8,068	8,283	7,315	8,479	9,415
588	1,022	3,920	2,903	2,304	1,135	1,622	3,307	99
4,128	5,905	8,823	7,963	3,651	3,968	1,212	1,405	1,817
3,092	545	1,583	1,370	1,241	1,242	817	1,067	1,838
-----	-----	3,291	4,975	4,296	6,647	7,142	6,121	6,468
5,031	3,490	3,843	5,336	4,245	3,851	2,962	2,322	1,970
136	61	121	390	606	755	1,015	2,046	3,413
2,186	3,029	3,124	3,226	3,889	2,859	3,266	4,420	3,972
165	287	285	431	366	392	483	483	778
7,926	55,241	44,727	40,365	18,962	28,781	17,034	18,225	15,644
2,200	156,493	170,353	155,982	130,102	119,209	94,299	84,506	75,553

om ICNAF Summ. Doc. 75/10; data for 1973-1976 were taken from ICNAF Statistical
cs. 78/V1/28 and 79/V1/30.

Table 4. Recreational catches (tons) of "other finfish" species of major importance recorded in NMFS 1960, 1965 and 1970 saltwater angling surveys and the 1974 regional survey.

Species or species group	Saltwater angling surveys[1] 1960	1965	1970	Regional[2] survey 1974
Bass, black sea	5,398	4,172	3,323	1,603
Bluefish	16,765	35,932	45,305	57,952
Croakers	3,352	2,152	1,738	1,031
Puffers	2,232	10,794	11,098	584
Scup	7,530	6,529	2,006	2,776
Searobins	1,030	1,620	4,120	1,467
Spot	3,225	2,214	9,785	1,826
Weakfish	1,742	1,027	7,114	9,139
Striped bass	16,851	25,107	33,160	18,062
Tautog	9,244	5,082	7,824	4,900
Other	11,184	30,941	14,351	7,122
Total	78,553	125,570	139,824	106,462

[1] Maine to Cape Hatteras, North Carolina.

[2] Maine to Virginia. Methodology used in the 1974 survey differed from that used in preceding surveys and thus data are not directly comparable.

Table 5. Stratified mean catch per tow (kg) for selected[1] "other finfish" species (combined) taken in Albatross IV autumn bottom trawl surveys from the Gulf of Maine to Cape Hatteras,[2] 1967-1978.

Year	Stratified mean catch per tow (kg)	
	Linear Values	Retransformed[3] Values
1967	80.90	78.84
1968	47.67	57.26
1969	89.31	76.88
1970	49.31	68.96
1971	33.52	49.67
1972	43.48	51.24
1973	54.99	53.68
1974	27.97	39.35
1975	51.33	54.17
1976	50.87	61.98
1977	63.52	77.65
1978	53.69	79.32

[1]Species indicated in Table 1.

[2]Strata 1-30, 36-40, and 61-76, inclusive.

[3]Retransformed according to the relation $E(\bar{y}_{st}) = \exp(\bar{y}_{st} + S_2/2) - 1$ where $E(\bar{y}_{st})$ represents the retransformed stratified mean catch per tow and $\bar{y}_{st}$ and S^2 represent the stratified mean and estimated population variance, respectively, in logarithmic units.

Table 6. Stratified mean catch per tow (kg) of selected "other finfish" species in the Gulf of Maine - Cape Hatteras area[1] as recorded in Albatross IV autumn bottom trawl surveys, 1967-1978.

	YEAR														
Species	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	Mean 1967-69	Mean 1976-78	Percent Change
Alewife	0.51	0.14	0.11	0.13	0.06	0.09	0.05	0.02	0.04	0.12	0.10	0.11	0.25	0.11	-56%
Angler	1.24	1.50	2.23	1.76	1.70	3.56	2.51	1.24	1.96	1.96	3.45	2.84	1.66	2.75	+66%
Argentine	0.01	0.03	0.03	0.05	-[2]	0.04	0.02	-[2]	0.04	0.01	0.07	0.10	0.02	0.06	+200%
Black sea bass	0.04	0.04	0.12	0.05	0.03	0.04	0.02	0.11	0.03	0.07	0.06	0.03	0.07	0.05	-29%
Bluefish	0.07	0.01	0.37	0.04	0.45	0.55	0.58	1.05	0.64	0.55	0.60	0.51	0.15	0.55	+267%
Butterfish	1.44	5.02	2.51	1.45	2.75	1.76	3.94	2.59	1.63	3.63	3.25	2.29	2.99	3.06	+2%
Croaker	0.01	0.00	0.03	0.08	0.01	0.10	0.27	0.11	1.81	0.98	6.84	0.02	0.01	2.61	-
Cusk	0.36	0.72	0.52	0.69	0.53	0.92	0.48	0.15	0.73	0.25	0.72	0.76	0.53	0.58	+9%
Dogfish	38.71	24.15	58.75	22.98	8.30	16.41	24.39	8.86	27.91	22.62	22.55	25.28	40.54	23.48	-42%
Ocean pout	0.22	0.18	0.09	0.09	0.03	0.21	0.11	0.03	0.08	0.07	0.29	0.19	0.16	0.18	+13%
Sculpins	0.77	1.10	1.09	1.26	0.78	1.01	0.79	0.43	0.94	0.52	1.15	1.07	0.99	0.91	-8%
Scup	0.70	0.26	2.15	0.11	0.12	1.12	0.44	0.48	1.62	3.52	0.82	0.64	1.04	1.66	+60%
Sea robins	27.25	2.91	1.26	1.48	0.72	1.50	0.47	0.43	0.33	0.31	0.20	0.36	10.47	0.29	-97%
Skates	7.00	8.04	13.09	10.83	10.05	9.82	12.37	7.15	8.03	10.57	12.58	12.76	9.38	11.97	+28%
Spot	0.00	0.00	0.00	0.00	0.01	0.00	0.43	0.14	0.17	0.05	4.01	-[2]	0.00	1.35	-
White hake	2.02	2.28	5.78	5.48	5.14	5.59	5.56	4.59	3.21	4.43	5.35	5.26	3.36	5.01	+49%
Woffish	0.10	0.17	0.01	0.15	0.07	0.07	0.06	0.10	0.07	0.08	0.08	0.25	0.09	0.14	+56%

[1] Strata 1-30, 36-40, and 61-76, inclusive.

[2] Less than 0.005.

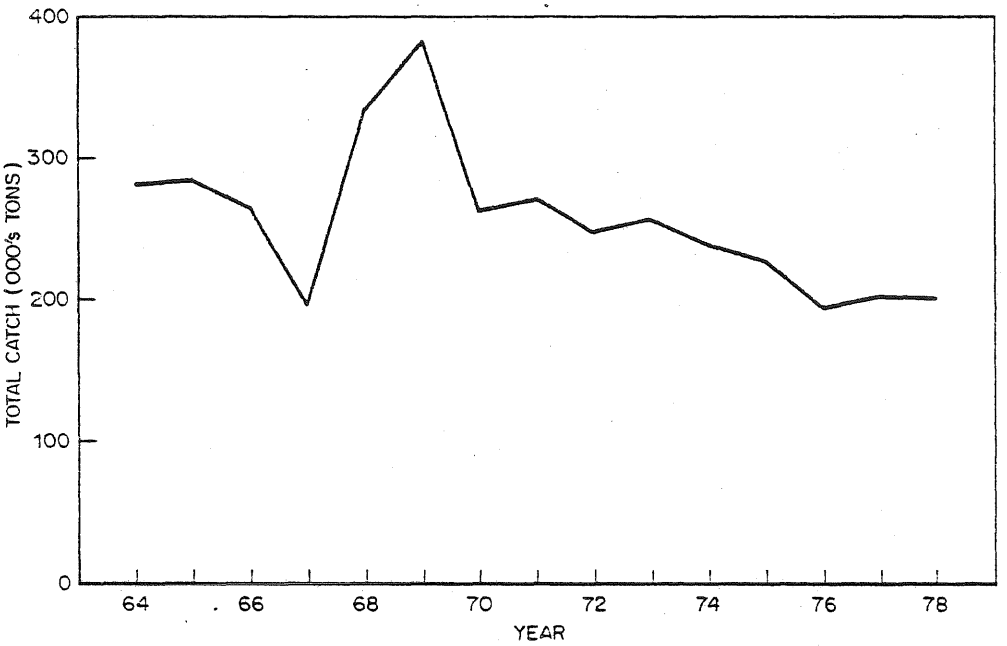

Figure 1. Total commercial and estimated recreational catches of "other finfish" species from the Gulf of Maine to Cape Hatteras, 1964-1978.

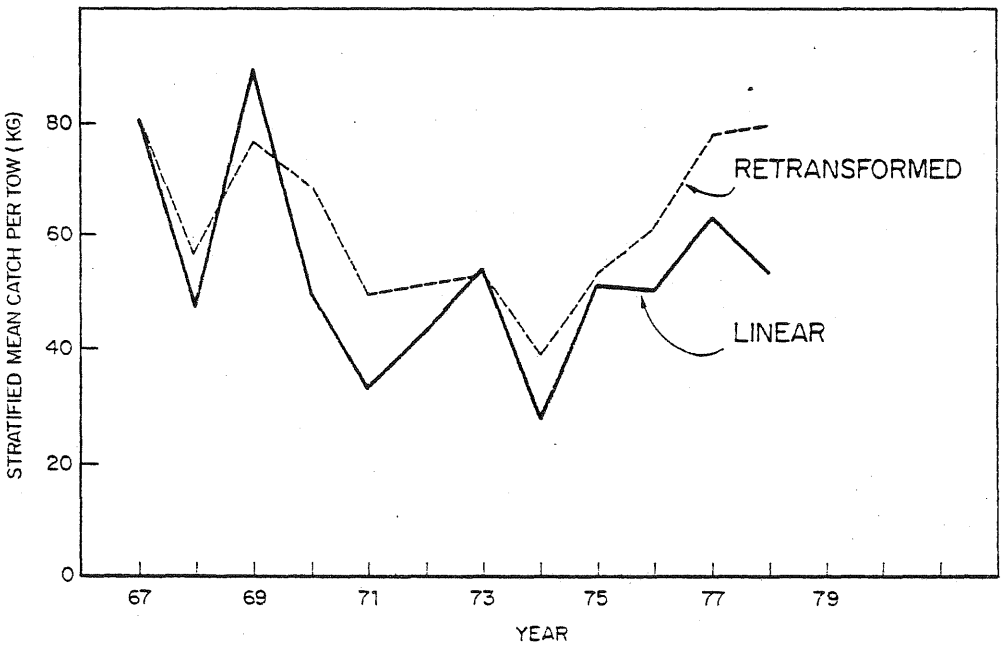

Figure 2. Stratified mean catch per tow (kg) for "other finfish" species from the Gulf of Maine to Cape Hatteras, 1967-1978.