SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

OCEANIC FISHERIES IMPACT ON THE ENVIRONMENT IN THE SOUTH PACIFIC

from

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These readers are asked to recognize the considerable difficulties in assessing the impact on the environment of fisheries working on the high seas, exploiting resources of unknown magnitude with nomadic or ranging behaviours and broad distributions.

SPECIES, FISHING METHODS AND THEIR STRATIFICATIONS

There are several levels of fisheries operating on the oceanic species, comprising primarily tunas, billfishes, sharks and two frequently encountered but not generally preferred or targeted species, the dolphin fish (Coryphaena hippurus) and the rainbow runner (Elegatis bipinnulatus). First, there are "local" artisanal and commercial tuna fisheries exploiting surface schools of mostly skipjack tuna (Katsuwonus pelamis), the yellowfin tuna (Thunnus albacares), and the long tail tuna, also known to some fishermen influenced by Australian vernacular names as northern bluefin (Thunnus tonggol). Also the dolphin and rainbow runner often comprise considerable portion of these fisheries'catches. These "local" fleets are varied, including small pole and line, trolling, handlining, and even small purse seine vessels, i.e., New Zealand's fleets.

Then, there are the "high seas" fleets. These comprise pole and line, longline and modern super-seiner vessels, which exploit different segments of broadly ranging populations of several species. These fleets are owned by both regional and extraregional nations.

Terminal Project

A project of the Governments of the Pacific Islands

The pole and line vessels and super-seiners operate predominantly on skipjack, with some catches of yellowfin in various areas and seasons. The longlines catch adults of many species of tunas and billfishes, but their target species are predominantly bigeye (Thunnus obesus), albacore (Thunnus alalunga) and yellowfin in the tropics and subtropical areas, and southern bluefin (Thunnus maccoyii) in the temperate seas. Northern bluefin (Thunnus thynnus oreintalis) are caught in the tropical longline fishery, but are a minor component.

The billfish catches total less than 20% of the entire catch by longlines. Shomura and Williams (1972) giver a historical review of the expansion of the longline fisheries into the South Pacific up until 1970. Shomura (1980) provides a more recent review of the fisheries and catches of the billfishes. Only about 100,000 to 300,000 individuals of each species are captured in the south Pacific each year.

Sport fisheries for large billfishes exist in the region, but contribute very few in numbers caught to the total.

For a more complete resume of the south Pacific billfish fisheries refer to Shomura (1980). Little is known regarding the biology, migrations and ecology of south Pacific billfishes.

Table 1 is taken from FAO (1980) and summarizes the information on the Thunnus species catch estimates for the entire Pacific Ocean; information sources are given. Only the data labelled south Pacific albacore and southern bluefin tuna are directly attributable to catches in the region. Catches labelled north Pacific albacore and northern bluefin tuna are not significantly affected by fisheries in the south Pacific region.

TEMPERATE TUNAS

The south Pacific albacore fishery is predominantly by longline gear, with some pole and line fishing and trolling in areas between Australia and New Zealand, and off Chile. No concern is expressed over apparent abundance trends in either the surface or longline fisheries.

The southern bluefin tuna is considered to comprise a single circumpolar stock which is exploited primarily in the southern Pacific and Indian Oceans. Japan and Australia are collaborating in a voluntary regulation scheme to limit fishing in certain areas seasonally in an effort to evaluate the fisheries impact on this resource.

TROPICAL TUNAS

For the yellowfin, bigeye and skipjack tunas, it is difficult to separate the western central Pacific and south Pacific into distinctly isolated cases considering the wide-ranging nature of these three species and the complexities of their population structures.

Yellowfin and bigeye tuna are both exploited by fisheries in the western and south Pacific. The primary fisheries comprise longliners operated by extra-regional nations. Neither species is in any apparent stress, and in fact, if surface fisheries for smaller yellowfin and bigeye tuna were to be developed, a larger catch could be expected without necessarily initiating biologically significant perturbations. This, of course, implies controlled fishing activities and fishery development in this region.

Yellowfin Tuna

The longline fisheries, although by no means trivial, capture only about 100 thousand tons of yellowfin tuna in the entire Pacific Ocean, of which only a portion is caught in the western and south Pacific.

Klawe (1979) reported longline catches of yellowfin ranging from about 8,000 to 24,000 metric tons in the western Pacific, and surface fisheries account for another 100,000 metric tons or more in that area. In the south-eastern and southern Pacific, longline catches peaked at about 20,500 metric tons in 1976, a rather small percentage of the approximately 500,000 metric tons caught each year in the Pacific Ocean, or less than 20 percent of that caught in the western and south Pacific regions combined.

There is no apparent reason for concern about the status of this species under present exploitation patterns.

Bigeye Tuna

The catches of bigeye by longline in the western Pacific peaked at about 33,000 metric tons in 1977, whereas catches in the south-eastern and southern Pacific attained 16,000 metric tons combined in 1975. Few bigeye are caught or reported from surface fishery catches in this region. The most effective (efficient) fishing operations are found in the region east of 160°W and between the equator and 15°S. However, far more effort is applied to the west of this area, hence greater total catches are observed. The higher catch rates for yellowfin and albacore account for the pattern of effort distribution, hence the higher total catch of bigeye in the western south Pacific.

Skipjack Tuna

Skipjack tuna are caught predominantly by surface fishing methods. Reported catches of skipjack tuna in the south Pacific are increasing steadily as the distribution of fishing effort expands. Since the developments of the Papua New Guinea and Solomon Island fisheries in the early to mid 1970's, a remarkable intensification of interest and joint venture exploration of potential for growth of skipjack fisheries has occurred, particularly in the south-western Pacific. Papua New Guinea's skipjack catch has ranged from about 15-45,000 metric tons in the period from 1975 to 1978, with the Solomon Island catch ranging from about 7,000 to over 17,000 in the same period. The total catch in the western Pacific has reached values of about 400,000 metric tons from the 205,000 metric tons recorded in 1975.

The south-eastern and southern Pacific fisheries produce another 10,000 metric tons, depending primarily on the variations in both the seasonal New Zealand fishery, and catches off Peru. The resources fished by these nations have their sources in the tropical central Pacific, and as such they represent portions of a greater whole, also exploited by other nations in different areas and fisheries.

Although there must be a limit to the ability of these fisheries to grow, it is not presently clear where that limit might be. There are no indications that these fisheries have reached the situation where competition is resulting in either decreased production or relative efficiency.

OTHER OCEANIC SPECIES

The records of captures of sharks, dolphin fishes or rainbow runner are sparse and generally poor. That the Philippines alone reports more than 5,000 metric tons is some years of rainbow runner, and a few hundred rons of dolphin fish is a sign that there are significant abundances of these species. Only some 10,000 metric tons of sharks, rays, and their relatives, are reported caught from the south Pacific, but none of the longline captures are in this figure, making it an absolute minimum value to consider.

SUMMARY OF ECOLOGICAL INTERACTIONS AND IMPACT

The oceanic fisheries of the south Pacific Ocean harvest predators whose position in the oceanic ecosystem is fairly terminal. Billfishes, in fact, eat small to medium size tunas, as well as many other oceanic and mesopelagic species which are relatively unaccessible to man.

Tunas are opportunistic omnivores, eating what is abundant, or present, including their own kind. Among the foods commonly encountered in tuna stomachs, squids of various species represent a substantial portion. In the south Pacific Ocean only some 30-40,000 metric tons of squids are commercially harvested, and about 20-25,000 metric tons of these come from around New Zealand.

From a rough approximation of the total annual removals of large tunas and skipjack from the western and south Pacific Ocean, 250,000 and 400,000 metric tons respectively, one can estimate that annually about 4-5 million tons of tuna food species are left unconsumed by the captured large tunas, and about three times that amount fromt the harvested skipjack. Where this ecological "slack" is taken up, or even if it is, is not known. Generally it can be stated that the ecological effects of harvesting tunas or squid are not assessable given present knowledge about oceanic ecosystems.

Table 1 Estimated catches of tunas in the Pacific Ocean*

Year	North Pacific albacore	South Pacific albacore	Bigeye tuna	Northern bluefin tuna	Southern bluefin tuna	Yellowfin tuna
		(thousand metric tons)				
1949					0.3	
1950					0.1	
1951					0.1	
1952	93.9	0.2	29.6	13.6	0.8	115.8
1953	76.7	1.1	25.4	21.0	4.2	103.2
1954	61.5	10.2	29.1	24.5	2.8	107.5
1955	54.4	8.4	44.3	28.5	3.4	103.5
1956	76.4	6.2	36.9	33.5	15.8	110.8
1957	92.2	9.8	70.5	29.5	22.9	145.9
1958	55.6	21.7	91.7	22.0	14.4	144.0
1959	51.2	19.8	81.8	14.8	65.9	137.5
1960	63.3	24.4	89.9	19.3	78.7	189.6
1961	52.6	26.0	135.6	19.8	80.9	205.4
1962	47.2	39.5	124.2	25.0	46.0	184.9
1963	68.8	35.5	149.8	24.1	65.4	172.6
1964	62.3	25.0	104.3	19.9	50.5	188.2
1965	72.9	27.4	79.1	18.9	47.7	173.8
1966	65.9	41.4	83.9	28.2	47.7	193.1
1967	82.7	45.4	88.7	15.5	66.2	158.7
1968	69.0	32.4	73.6	15.8	57.9	194.9
1969	75.1	25.4	99.7	13.3	59.4	220.2
1970	67.3	30.7	79.0	8.6	46.8	241.4
1971	92.5	38.6	76.3	17.0	46.6	200.1
1972	105.9	41.9	100.0	19.0	50.9	279.3
1973	107.5	48.8	105.8	15.5	40.2	329.3
1974	114.8	32.3	102.6	16.2	47.1	372.6
1975	86.3	26.8	113.8	16.4	32.2	357.6
1976	123.7	34.4	141.9	15.8	41.2	417.0
1977	61.6	40.2	140.4	13.6	43.5	394.4
1978	96.8				31.8	

* Source :

North Pacific albacore : Data for Canada, Japan, Taiwan and United States from the report of the Fifth North Pacific Albacore Workshop, La Jolla, California, 30 June to 3 July 1980. In N. Bartoo and S. Kume (eds), Southwest Fish. Cent. Admin. Rep. (in preparation).

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Bigeye tuna : Data for IATTC 1967-77, Japan 1952-77, Korea 1965-70, and Taiwan 1954-77 (from SAWS/BP/6); and Korea 1971-77 (from B.Y. Kim, Pers. commun., July 1979).

Northern bluefin tuna : Data for IATTC 1952-77 (from SAWS/BP/9); Japan 1952-77 (from SAWS/BP/10); and Korea 1971-77 (from B.Y. Kim, Pers. commun., July 1979).

Southern bluefin tuna : Data from G.I. Murphy, Division of Fisheries and Oceanography, CSIRO, Cronulla, N.S.W., Australia. Pers. commun., July 1980. The combined southern bluefin tuna catch is reported here with the Pacific Ocean catches, but includes fish taken in the Indian and Atlantic Oceans also.

Yellowfin tuna : Data for IATTC and Japan 1952-77, Korea 1964-70, and Taiwan 1954-77 (from SAWS/BP/2); Korea 1971-77 (from B.Y. Kim. Pers. commun., July 1979); Australia, Fiji, Kiribati, New Zealand, Papua New Guinea, and Philippines 1967-69 (from FAO, 1974a), 1970-72 (from FAO, 1976), 1973 (from FAO, 1977), and 1974-77 (from FAO, 1978).

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