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DEVELOPMENT OF A MANAGEMENT REGIME FOR THE EASTERN PACIFIC TUNA FISHERY

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DEVELOPMENT OF A MANAGEMENT REGIME FOR THE EASTERN PACIFIC TUNA FISHERY

by

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Dedicated

to

Fulvia

and to

Marcus, Byron, Norman and Dora

Chapter I: INTRODUCTION

Of the changes in the world since the end of World War II, one of the most important is an increasing awareness of global interdependence. New issues of the world have arisen with increasing population and with increasing demands for the world's resources. Resource depletion, economic dislocations, famine and disaster have occurred with global effects. Major shifts in the balance of international political power have taken place. These global changes and issues demand intervention on a multi-national basis rather than on parochial national grounds.

Characteristics of those issues which require international intervention are several. These issues are technological and highly complicated; they are not subject to resolution by spending; they cut across the interests of a wide variety of interest groups; and they concern resources that seem to be shrinking rather than expanding. Above all, these issues are becoming increasingly pressing and demanding of action. Many of the traditional ways in which these affairs and problems have been handled on a narrower basis in the past may no longer serve in the future as a means of solution. The changing awareness of world events requires that values, methodologies, and institutions be reexamined to learn how they may be improved to resolve

or perhaps only to begin to attack these new issues. Solutions to these problems need to be developed from a view and a vision larger than that possible from parochial national interests. These solutions must incorporate an awareness of the interdependence of man, his resources, and his environment. We must recognize that rather than all taking as much as we can, a solution may require stabilizing or reducing our demands. The world needs new institutions with broadened abilities, responsibilities, duties, and obligations to deal with these new global understandings and requirements.

The use of the ocean is especially evident among those new internationally interdependent issues. This has been manifested by the conferences called since World War II in reference to the international regime of the sea; the concerns with property rights to the ocean resources; and the institution of 200-mile economic zones by coastal countries to preserve these property rights. More specifically, these global issues are also evidenced, perhaps on a narrower but equally important basis by the increased negotiations, tensions, incidents, and concerns within the realm of international fisheries and of the fisheries commissions associated with them. One of these fisheries and its concomitant Commission is that for tunas in the eastern Pacific Ocean and the Inter-American Tropical Tuna Commission (IATTC). The IATTC was formed in 1949

between Costa Rica and the United States of America for

> "the collection and interpretation of information which will facilitate maintaining at levels of maximum sustained yield the populations of tropical tunas in the eastern Pacific" (IATTC AR, 1952).

In 1949, when the Tuna Commission was formed, the tuna industry in the eastern Pacific Ocean was much simpler than it is today, although the basic problems and concerns in respect to conservation, management, allocation and regulation which led then to the development of the IATTC remain as cogent today as they were three decades ago. These problems and concerns have been exacerbated by changes in the fishery itself, and in its technology and complexity; in the economics of the tuna fishery, the changes in world supply and demand, and the global interrelationships with other tuna fisheries; in international social and political attitudes and actions; in scientific knowledge, methods of gathering information, communications, and managing of data; and in fisheries management theories and philosophies.

In 1950 the 271 vessels in the eastern Pacific fishery had a total carrying capacity[1/] of some 48,000 tons. In 1978 the 363 vessels in the fishery had a total carrying

1/The carrying capacity of an individual tuna vessel is the maximum number of tons of tuna which have been carried in its fish holds during a single trip.

capacity of more than 184,000 tons (Table 1). The early fishery for tuna was based largely on the use of bait boats dependent on bait resources of various Pacific coastal countries of Central and South America. Today huge modern tuna purse seiners dominate the fleet while bait boats and longline vessels have been reduced to a minor component. In 1949 the fishery was essentially a United States one with an estimated 95% of the catch being taken by U.S. based vessels and the remainder being taken by local vessels operating on a daily basis out of Mexico, Costa Rica, Ecuador and Peru (Shimada and Schaefer, 1956). Today the tuna fishery in the eastern Pacific Ocean is a multi-national one with 18 nations, 10 of them distant water (that is, for the purpose of this study, nations with no coastline adjacent to the Commission's regulatory area), participating in the fishery (IATTC AR, 1978). The coastal and distant water states today are developing their own fleets with modern purse seiners, and the United States' share of the total catch in the Commission's Yellowfin Regulatory Area (CYRA) dropped to 58% in 1978 (Table 2).

In 1949 the tuna clippers conducted essentially a coastal fishery in the eastern Pacific Ocean from northern Mexico down to about 10^{o}S and westward to about 200 miles offshore except for occasional trips to such islands as Galapagos and Clipperton (Figure 1). Today the eastern Pacific tuna fishery lies in the entire eastern Pacific area

Fleet	1950	1978
Carrying capacity (short tons x 10^3)		
Total	48.1	184.3*
Baitboat	40.0	5.6
Purse seine	8.1	175.6
Bolichero	-	0.3
Jig	-	0.7
Number of vessels		
Total	271	363 *
Baitboat	204	73
Purse seine	67	253
Bolichero	-	9
Jig	-	28
Flag distribution of capacity (tons x 10^3)		
United States	45.3	116.0
Coastal states	2.8	40.6
Distant water (except U.S)		27.7
Catches (short tons x 10^3)		
Inside CYRA		
Total	177.0	366.1*
Yellowfin	112.4	182.0
Skipjack	64.6	184.1
Outside CYRA to 150° W		
Total	-	18.8
Yellowfin	-	15.7
Skipjack	-	3.1
Participants		
Total	5	18
Coastal states	4	7
Distant water (including U.S.)	1	11
Division of total catch (short tons x 10^3)		
Inside CYRA		
United States	168.2	212.1*
Coastal states	8.8	94
Distant water (excluding U.S.)	-	61
Outside CYRA to 150° W		
United States	-	18.8
Coastal states	-	-
Distant water (excluding U.S.)	-	-

*Preliminary.

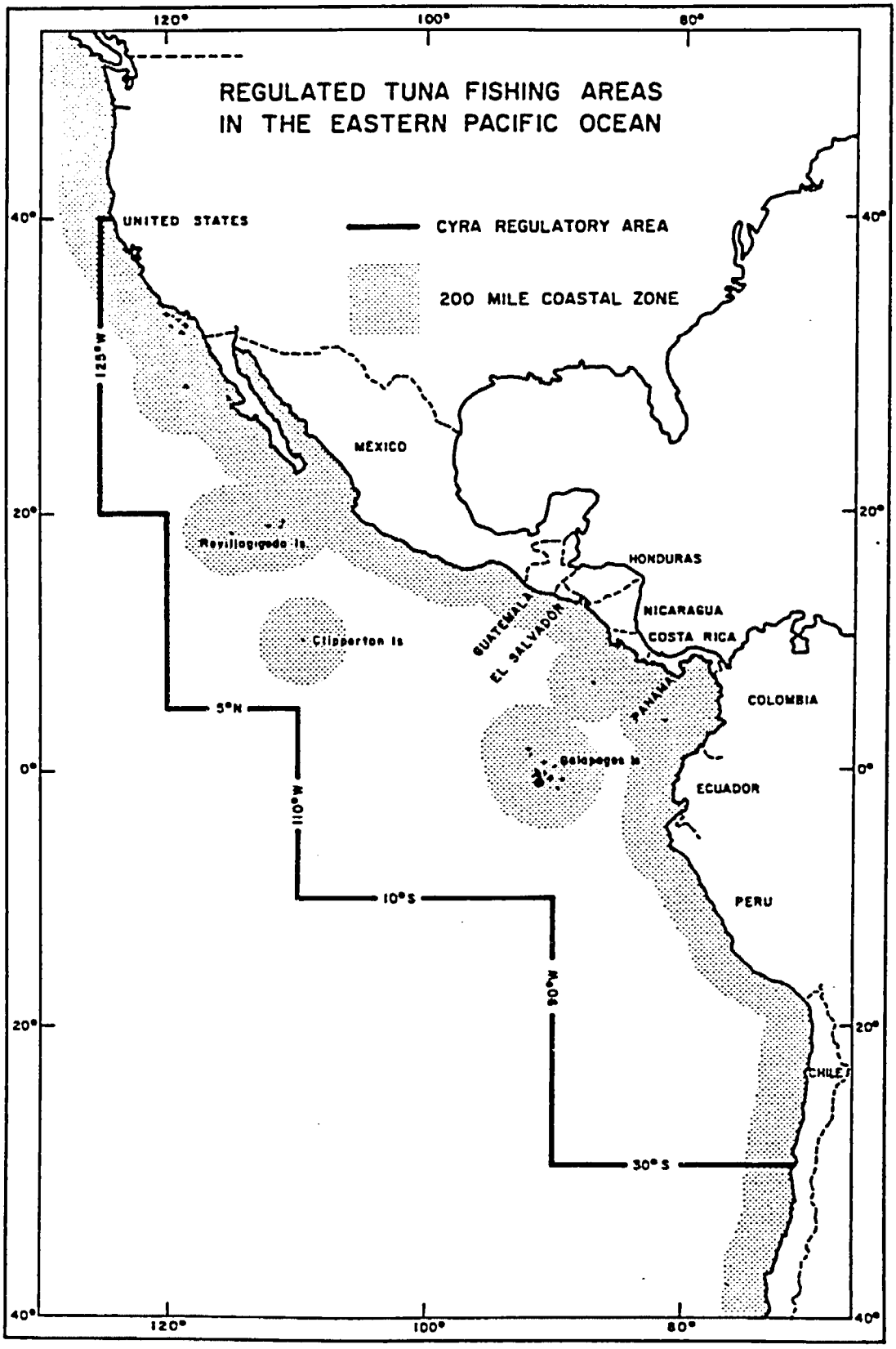
Table 1. The eastern Pacific tuna fishery, 1950 and 1978: A summary of significant changes. (Sources: Shimada and Schaefer, 1956; IATTC Annual Reports, 1950-51 to 1978).

Year / Fleets	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78*
US - catch	130.9	142.2	142.0	146.4	133.0	184.4	155.6	146.5	156.1	170.9	143.4	158.7	180.7	179.7	242.4	174.9	212.1
%	79.4	79.6	84.9	83.1	84.4	83.0	80.9	76.8	78.8	75.2	76.4	70.3	65.7	57.7	69.8	58.9	57.8
DW - catch	8	4	4	5	7	8	9	10	8	16	16	27	37	38	33	42	61
%	5	2	2	3	4	4	5	5	4	7	9	12	13	12	10	18	16
CS - catch	26	32	22	25	18	29	27	35	34	41	28	40	58	94	72	78	94
%	16	18	13	14	11	13	14	18	17	18	15	18	21	30	21	23	26

*Preliminary

Table 2. Total annual catch (yellowfin and skipjack) and percent share of catch by U.S., other distant water and coastal states' fleets in the CYRA, 1962-1978. Whole numbers are best estimates because of confidentiality reporting requirements. (Sources: 1962-1970, NMFS unpublished report; 1971-1978, IATTC Annual Reports.)

Figure 1. Tuna fishing areas, CYRA, and 200 mile coastal zone in the eastern Pacific Ocean.


REGULATED TUNA FISHING AREAS
IN THE EASTERN PACIFIC OCEAN
CYRA REGULATORY AREA
200 MILE COASTAL ZONE
UNITED STATES
MÉXICO
HONDURAS
NICARAGUA
COSTA RICA
GUATEMALA
EL SALVADOR
PANAMA
COLOMBIA
ECUADOR
PERU
CHILE
Revillagigedo Is
Clipperton Is
Galapagos Is
125°W
110°W
90°W
5°N
10°S
30°S
120°
100°
80°
40°
20°
0°

east of 150°W longitude. Three decades ago the tuna fishery and the vessels in it operated only in the eastern Pacific Ocean. Now the vessels fish in the eastern Pacific Ocean as only part of their total fishing strategy and carry on expanding fisheries in the Atlantic, and Central and South Pacific Oceans. In 1949 a major concern of the Latin-American Pacific coastal states was the possible overfishing of the bait resources. Today the concern on all parts is the conservation and protection of the tuna resource. In 1949 the eastern Pacific tuna fishery was an expanding one, both in terms of supply and demand. The attitude of the fishermen was highly entrepreneurial, fishing was wide open, and new tuna stocks were available to meet rising demands. Today the eastern tropical Pacific yellowfin tuna fishery is regulated and annual yellowfin quotas have been enforced since 1966. Other world fisheries for tunas are at or near their limit (Joseph, 1972).

In 1949 the demand for tuna in the United States was approximately 164,000 metric tons (Broderick, 1973). In 1978 U.S. processors utilized about 685,000 metric tons of tuna (Broadhead, 1979). The U.S. alone consumed about half of the world tuna catch. In 1949 the U.S. domestic fleet supplied essentially the bulk of the U.S. demands; in 1978 about half of the U.S. demands for tunas were supplied by imports (Broadhead, 1979). Similar dramatic changes have taken place in the world demand for tuna (Peckham, 1974)

with a concomitant quadrupling of the world catch of the six principal market species from 400,000 metric tons in 1950 to 1,600,000 metric tons in 1975 (Klawe, 1978).

In 1949 the industry of tuna was simple. Its major locus was in the United States. The main elements of the canning industry were there and the source of supply was essentially from the U.S. fishermen, with some limited imports and exports. Today the market and industry is a global one with complex interrelations among the suppliers, the canning industry and the consumers involving trans-shipments, multi-national companies, and a control of prices dictated by the world market. More and more countries are developing their own tuna industry, and tax and tariff arrangements are becoming increasingly complicated (King, 1978).

In 1949 the U.S. tuna fishery was expanding. There was no apparent limit to the number of boats that could enter the fishery; money flowed in freely, new vessels were built, and overcapitalization was of no concern, or even thought of. Today overcapitalization is a major concern in certain segments of the world tuna fleets, especially that of the United States (Broderick, 1973; Saila and Norton, 1974; Flagg, 1977). Problems of investment have developed along with increasing costs of operation in a period of inflation and of concern over fuel supplies (Broadhead and Peckham, 1974).

Scientific knowledge of the fishery has also expanded. In 1949 knowledge of the basic biology of the species of tunas involved in the fishery was rudimentary. Distribution of the stocks or the structure of the populations in the eastern Pacific Ocean were not known nor were many elements of the basic biology of the tunas clearly understood. Today considerable information on many of the basic biological elements of the tuna is readily available (see recent IATTC Annual Reports for summary information). Problems still remain, however, in terms of knowledge of stock size, stock delineation, and determination of yield from the fishery (Joseph, 1970, 1977; Gulland, 1978). In 1949 the techniques for handling fisheries data were basically hand methods with the use of electric calculators. Today computers permit the handling of large amounts of data in a rapid efficient manner, often on a real-time basis. In 1949 only the first elements of the theories of population dynamics were being applied to fisheries management, and no significant body of literature had been built up. Today, a large body of population dynamics literature exists, new concepts, theories, and models have been and are being developed, and the discipline is a burgeoning one.

Basic changes in the philosophy and objectives of fisheries management have also occurred in recent decades. In 1949 when the Tuna Commission was established, the main element and objective of management was conservation of the

resource and the attainment of the maximum sustainable biological yield (see IATTC AR, 1952). Today there is a broader philosophical view of the objectives of fishery management, to encompass social and economic considerations as well as biological ones (see, for example, the U.S. Fishery Conservation and Management Act (FCMA) of 1976).

In the social and political realm, fewer changes in the basic desires of the nations participating in the eastern Pacific tuna fishery have occurred since 1949 than might appear, although some new elements have been added to the concerns as a result of the regulation of the tuna fishery in the eastern Pacific and the near universal extension of coastal states' resource control to 200 miles offshore. Those concerns which continue from 1949 to the present involve such elements as access to the fishery; ownership and rights to the tunas; the conservation of the stocks and the possibility of overfishing (in respect to bait fishes in 1949 and in respect to tunas today); and the concern over the degree of jurisdiction of the coastal state over fisheries off its coast for highly migratory species. In 1949 these concerns, particularly those of the coastal states, could to some extent be minimized in the eyes of the United States because of her position in the world power structure and her obvious domination of the eastern Pacific tuna fishery. But the world has changed and these two factors have considerably less effect today. In addition to

the extension of coastal state control of marine resources seaward to 200 miles and the growing development, requirements, and abilities of the Pacific coastal states, many of the concerns of three decades ago still remain in 1979.

In the following study the tuna fishery in the eastern Pacific Ocean is reviewed from its beginning in the early 1900's to the present. The steps leading to and the founding of the Inter-American Tropical Tuna Commission in 1949 are documented. The operations of the IATTC, the development of the Inter-Governmental Meeting, and the regulatory regime for the eastern Pacific tuna fishery are outlined. Problems and issues which arose in the IATTC's management of the tuna fishery are examined, as is the developing inability of the IATTC to deal with them because of the constraints of the IATTC Convention. Negotiations from 1977 to 1979 to develop a new tuna management regime to deal with the unresolved issues are followed in some detail to the present (June 1979) impasse. The study then analyzes the effects on national objectives, management, the resource and scientific investigation of a new treaty likely to be developed in the long term, examines the possible consequences of no agreement in place for the 1980 tuna fishing season and predicts signing of a 3 to 5 year interim agreement to provide time for the evolution of the long-term management arrangement.

Chapter II: THE EASTERN PACIFIC TUNA FISHERIES

The Tunas

Tunas are pelagic fishes, characterized by having extensive population ranges, long migrations, and high mobility. They are found throughout the world's tropical and temperate oceans, mostly between 30°N and 30°S latitude. Their distribution is closely related to oceanic and environmental features such as temperature, food, upwelling and currents. Tunas are often found concentrated in certain areas with specific oceanographic features (Blackburn, 1965; Broadhead and Barrett, 1964; Barkley, Neill and Gooding, 1978), although the relationship between tuna and the ecological factors is not yet clearly understood. Tunas have a high metabolic rate, swim constantly, and grow rapidly (Sharp and Dizon, 1979). They are completely pelagic and are found mostly in the upper hundred fathoms of the ocean. They spawn in the open ocean and have a high fecundity rate. Tunas are predatory and are near the top of the food chain.

Of the forty species of true tunas and tuna-like fishes classed in the family Scombridae, six species made up about 73% (1,573,000 metric tons) of the world's catch of tunas in 1977 (Klawe, 1978) (Table 3). These six species, commonly

Species	%	Cumulative %
Skipjack	27.5	27.5
Yellowfin	23.3	50.8
Albacore	9.1	59.9
Bigeye	8.9	68.8
N. bluefin	2.0	70.8
S. bluefin	1.6	72.4
Bullet tuna	2.7	75.1
Black skipjack	1.2	76.3
Other tuna	3.1	79.4
Other tuna-like	20.6	100.0

1977	Marine catch (FAO)	63,000,000 tons
	Tunas & tuna-like	2,300,000 tons

Table 3. Percentage contribution of the catches of the principal, secondary and other species of tunas and of the tuna-like species to the total world catch of tuna and tuna-like species, 1977. (Source: R. Rinaldo, personal communication, 1979.)

known as the principal market species, include all members of the genus Thunnus and the single species of the family Katsuwonus. The specific and common names of these are:

Thunnus alalunga - albacore
Thunnus obesus - bigeye
Thunnus albacares - yellowfin
Thunnus thynnus - northern bluefin
Thunnus maccoyii - southern bluefin
Katsuwonus pelamis - skipjack

The secondary market species (bonito, Spanish mackerel, bullet tuna, black skipjack) and various tuna-like species make up the remainder of the world catch of tunas.

Of these six principal market species, the yellowfin and the skipjack form the basis of the tuna fishery in the eastern Pacific Ocean. Bigeye and bluefin tunas are also taken in the eastern Pacific fishery but to a lesser extent. Of the secondary species, bonito (Sarda chiliensis) are sometimes captured by purse seiners and in the last few years the black skipjack (Euthynnus lineatus) has been taken commercially in small quantities in the area.

Yellowfin are present in nearly all tropical waters of the world. In the eastern Pacific they are taken by the surface fishery in a roughly triangular area whose base extends from about 25°N to 10°S latitude along the west

coast of the Americas with the apex at about 10°N 145°W (Figure 2). The yellowfin are found in schools, either as single species ("pure") schools or mixed with skipjack (Orange, Schaefer and Larmie, 1957). Yellowfin are often found in association with porpoises, in the eastern Pacific region.

Tagging and morphometric studies, and examination of vital statistics indicate that stocks of yellowfin mix slowly and do not migrate great distances, although north-south coast-wise migrations occur (Bayliff and Rothschild, 1974). Yellowfin tend to remain within a thousand or two thousand kilometers of where they were spawned. There are likely a number of more or less discrete subpopulations in the eastern Pacific fishery (IATTC AR, 1976). The yellowfin within the CYRA are considered by the IATTC to be a single population for purposes of management (Bayliff 1975). Those yellowfin eastward of the CYRA to a 150°W are considered for management purposes to be separate from the coastal stocks (IATTC AR, 1976).

Skipjack, the other major species in the eastern tropical Pacific tuna fishery, are also found in nearly all the world's tropical waters. The areal distribution of the skipjack tends to be somewhat further northward and southward than is that of the yellowfin; they are occasionally found in subtropical or even low temperate latitudes. In the eastern Pacific fishery, skipjack are

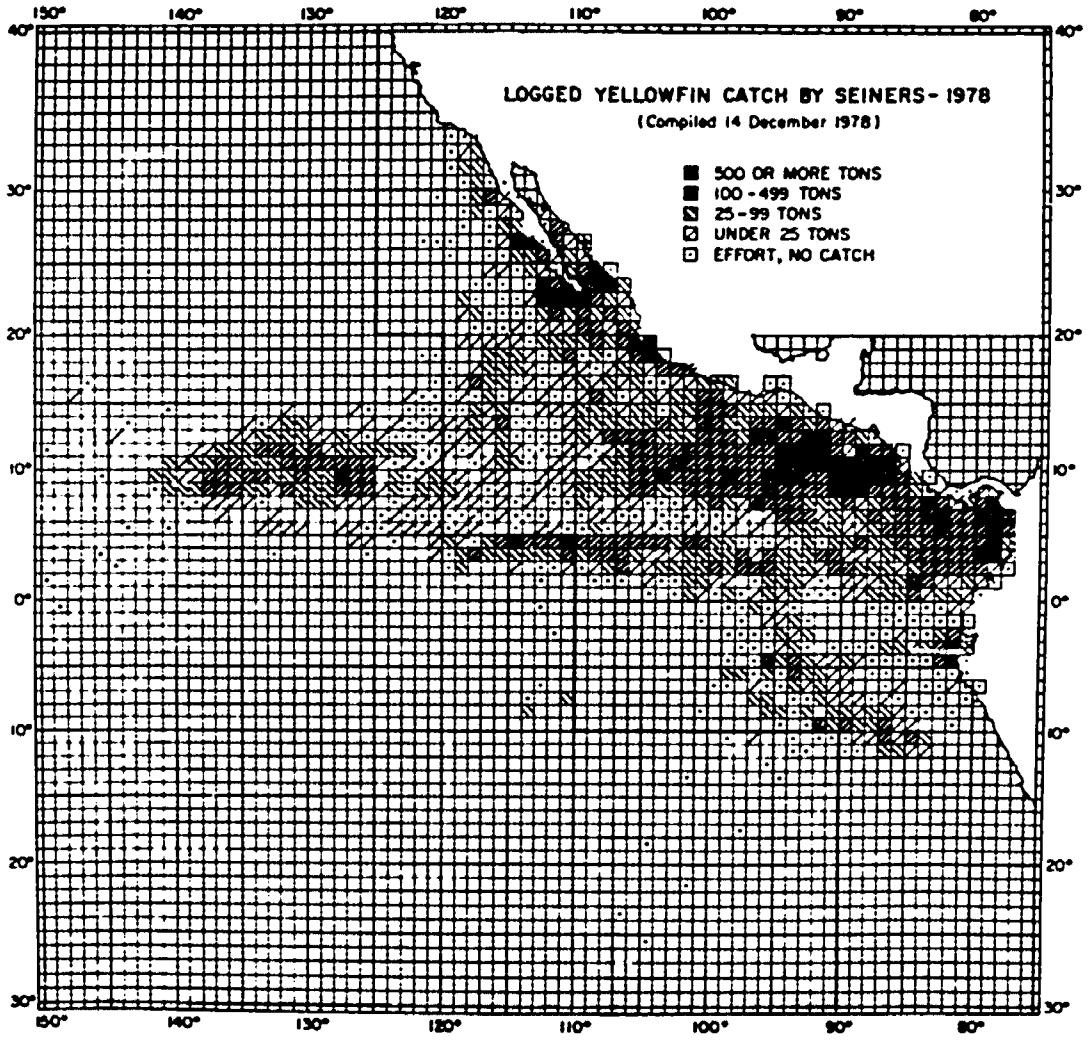


Figure 2. Catch of yellowfin tuna by the international purse seine fleet in the eastern Pacific Ocean, 1978 (from IATTC AR 1978, Figure 2).

found along the coast from about 30°N to about 10°S but are concentrated between 20° to 30°N and 15°N to 10°S, in two major areas (Figure 3). Some few skipjack have also been taken along the 10°N line out to about 145°W in recent years (IATTC AR, 1976). Skipjack rarely swim as deep as do the other major tuna species and are seldom taken in the longline fishery.

Skipjack appear to be temporary residents in eastern Pacific waters where they turn up as 1 to 1-1/2 year old fish which result from spawning in the central Pacific to the west. They stay in the eastern Pacific until they are about 2 to 2-1/2 years old and then move westward and spawn (Bayliff, 1975). Skipjack migrate extensively in the Pacific Ocean between the central waters of the Pacific and the coastal waters of the Americas.

Bigeye and bluefin tunas occasionally also contribute to the catches of tunas made in the area. The bigeye is a tropical species similar to the yellowfin and occurs in the warm upper waters. It is distributed continuously across the Pacific Ocean. It is in the longline fishery in the eastern Pacific that the bigeye tuna is important but it is also taken in small amounts incidentally by the purse seiners and bait boats in the surface fishery.

The bluefin tuna, in contrast to the other species discussed, is a temperate species and lives in cooler water. Little is known of its biology in the eastern Pacific,

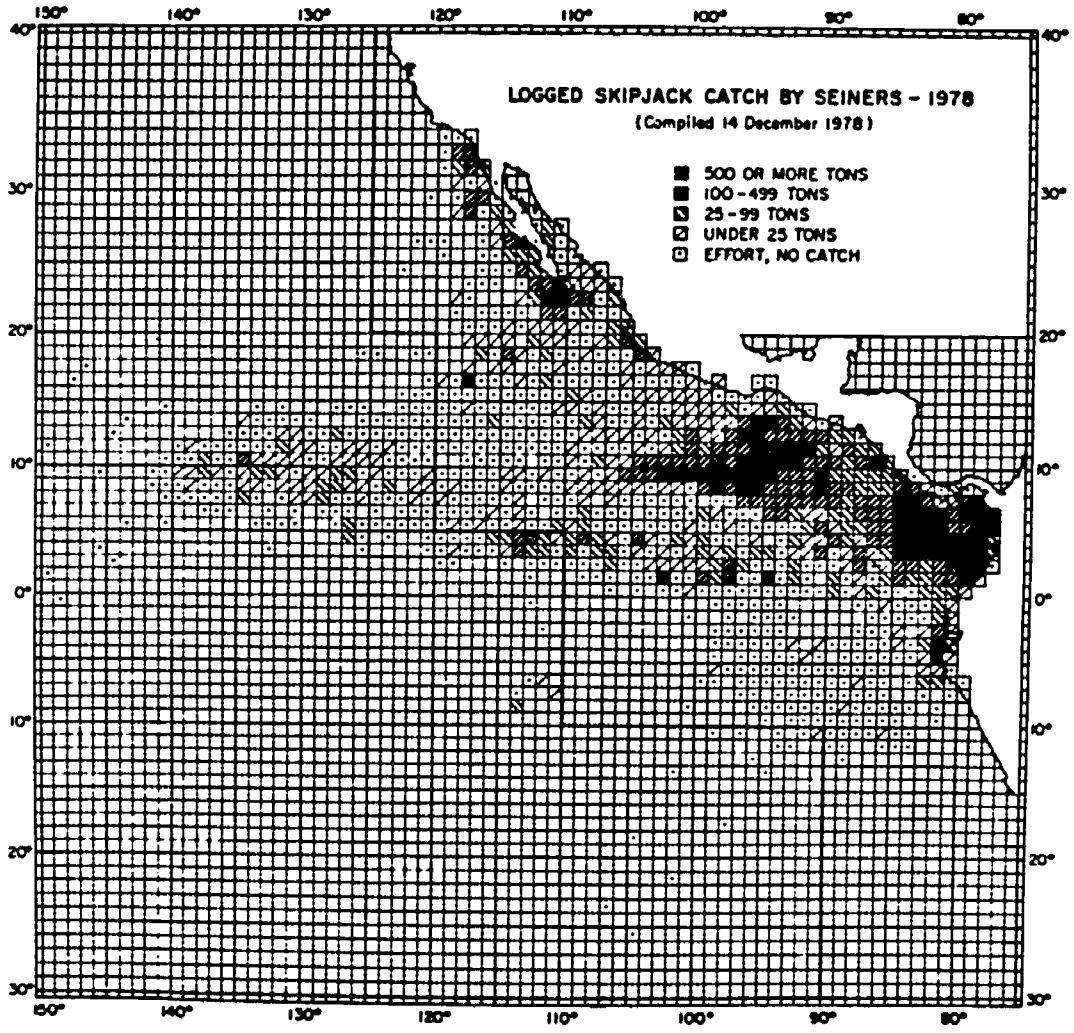


Figure 3. Catch of skipjack tuna by the international purse seine fleet in the eastern Pacific Ocean, 1978 (from IATTC AR 1978, Figure 3).

although studies are underway (see review by Bayliff and Calkins, 1979). Trans-Pacific migrations have been reported (Clemens and Flittner, 1969). The bluefin makes a seasonal appearance off northern Mexico and southern California during the summer and early fall months, when it becomes the target of a small opportunistic purse seine fishery.

Fishing Methods

The fishery for tunas is an ancient one and a variety of techniques has been used over the centuries to capture them. Tuna fishing is one of the most specialized of all fishing methods and has been revolutionized by technological changes which have occurred in the last twenty years. Among the techniques which have been and are being used to capture tunas are trolling, gill netting, trapping, harpooning, use of live bait with pole-and-line, purse seining, and longlining. It is these latter three which are the principal methods used in today's world tuna fisheries.

In the two techniques of surface fisheries--the live bait fishery and the purse seine fishery--tunas are located by searching visually with the aid of high-powered binoculars in ocean areas of known concentrations of tuna for signs of tuna schools. Evidence on the sea surface of the possible presence of tunas includes birds diving, porpoise schools, floating objects and surface disturbances

such as ripples and splashes made by the tunas themselves (Scott, 1969). The schools may be associated with porpoise, consist solely of tunas, or be associated with floating objects (Greenblatt, 1979). The schools themselves may be made up of only yellowfin, only skipjack, or yellowfin and skipjack tunas mixed (Orange, Schaefer and Larmie, 1957). Occasionally, bigeye tuna are also found in the schools.

In the live bait and pole-and-line method of fishing for tunas (Godsil, 1938; Shimada and Schaefer, 1956), bait such as anchoveta and similar small fishes is captured with lampara nets in coastal waters and bays or, occasionally, purchased from local coastal fishermen. Tunas, stimulated into a feeding frenzy by bait thrown overboard into a school, are captured with pole-and-line and feathered barbless hooks. This method of fishing for tunas actually involves two fisheries--one for bait and the other for tunas. Because of the need to take bait inshore, and the difficulties of keeping the bait alive after capture, the live bait and pole-and-line fishery in the eastern Pacific has tended to remain within 150 - 200 miles of the coast.

The other principal method in the surface fishery for tunas is that of purse seining, which operates without a need for bait. The purse seine technique involves encircling schools of tuna with a net, closing the bottom of the net, pulling the net aboard to reduce the size of the purse, and brailing the fish aboard (Green, Perrin and

Petrich, 1971). The techniques vary somewhat depending on whether the fish are schooling alone or in association with porpoise. In the latter case, the porpoise and yellowfin are herded with speed boats before being encircled, and various methods are used to release the porpoises unharmed from the net (Coe and Sousa, 1972). Purse seining is an extremely complex technological procedure and requires great skill and experience on the part of the master and crew, particularly when the tunas are associated with porpoises.

Longlining, the third principal method of fishing for tunas in the eastern Pacific, is a subsurface fishery based on the use of deep fishing gear (Suda and Schaefer, 1965). The technique captures larger, deeper-swimming tunas than those taken in the surface fishery. It also takes billfish and swordfish but does not take many skipjack. The technique essentially involves lowering baited hooks suspended from longlines to depths from 80 to 150 m. The longlines are set usually in the morning and then retrieved during the remainder of the day and the following night as necessary. Selection of fishing areas is based on a knowledge of seasonal changes in fishing success, which in turn are related to changes in availability of the tunas.

Two other smaller surface fisheries also operate in the eastern Pacific area. One is the near-shore day fishery with bait boats and purse seiners, operating mainly in Ecuador and to a lesser degree in Colombia. The vessels are

usually less than 25 tons carrying capacity without freezing facilities and take trips of one to a few days. The other surface fishery is that of jigboats which capture tuna by trolling. The fishery is carried out by U.S. albacore fishing vessels which fish off Mexico for tropical tunas in their northern range during the off-season for albacore. These vessels are also usually less than 25 tons carrying capacity but, in contrast to the small Latin-American vessels, have freezing facilities and can make extended trips.

Development of the Fishery

The fishery for tunas in the eastern Pacific Ocean was initiated and developed by United States fishermen. From the first tuna bait boats, through the development of the tuna clippers, and to the modern tuna purse seiner, American ingenuity and entrepreneurship can been seen at work. This genesis must be kept in mind in any examination of the attitude of the United States fishermen vis-a-vis international arrangements in the eastern Pacific tuna fishery.

Bait Boat Fishery

The beginnings of the entire eastern Pacific tropical tuna fishery can be traced to that for temperate albacore tuna in California which began to be taken at the turn of the century with handline and live bait.[2/] The first albacore were successfully canned in California in 1903. The handline was replaced with bamboo pole-and-line and chumming in about 1910. It was from this technological development that a canning industry was well started in California, based on the albacore. A need gradually developed for additional raw material to augment the seasonally-limited supply of albacore to the California tuna canneries and this led to the development of a small variable (because of migratory patterns) fishery for yellowfin and skipjack tuna in near-shore California waters.

This latter fishery started shortly after World War I with live bait methods. The first baiting areas were in southern California around San Pedro and San Diego. Failure of the albacore fishery in the late 1910's and early 1920's stimulated expansion of the yellowfin and skipjack fishery into Mexican waters. Several areas along the coast of Baja California were used extensively as baiting grounds; bait

2/ Much of the material in this section is based on Shimada and Schaefer, 1956; Alverson and Shimada, 1957; and Joseph, 1970.

was taken under permit, with a license fee paid to the government of Mexico. The tuna fishery was based partly on the use of large refrigerated motherships and small fishing boats. The tunas were delivered to the mothership where they were frozen and then shipped by tender to the California canneries.

By 1925 economic and legal problems had arisen with the use of the motherships in Mexican waters. The Mexican government greatly increased its fees for baiting to compound the difficulties of procuring bait. At the same time the albacore fishery continued to decline, to spur the need for yellowfin and skipjack to fill the growing demand for tuna. As a result, the first long-range tuna clipper was developed in the U.S. and went into operation in 1925.

The advantages of the new vessel design were several. The tuna clipper could operate independently, being able to hold its tuna catch frozen aboard; it could fish profitably on the more distant grounds; it could operate beyond the historical fishery in Mexican waters where legal problems had developed; and it could take advantage of plentiful supplies of bait in coastal waters farther to the south.

By 1930 the U.S. fleet was taking bait in coastal waters off Mexico, Costa Rica and Panama and around several offshore islands. The fleet continued to grow (Table 4) and by the end of the 1930's it was making bait along the coast of the Americas from San Diego to Panama and offshore to the

Type	Baitboat		Purse seiner		Bolichera		Jigboat	
Year	Number	Capacity	Number	Capacity	Number	Capacity	Number	Capacity
1932	81	9,950	28	1,925				
1935	72	9,675	9	825				
1940	104	14,300	75	7,225				
1945	86	8,700	50	4,775				
1950	204[3]	39,950[1]	67[3]	8,125[1]				
1955	200[2]	41,729	65	7,880	15[2]	375[2]		
1960	137	16,527	109	22,571	15[2]	375[2]		
1965	101	5,330	130	40,893	17[2]	395[2]		
1968	112	6,164	130	51,458	7	165		
1969	102	5,707	142	56,362	6	150		
1970	106	5,962	154	66,389	6	150	4	112
1971	104	5,646	172	87,690	6	150	69	1,549
1972	108	6,652	185	106,968	4	100	76	2,017
1973	104	7,007	201	129,222	22	1,194	28	729
1974	113	7,913	212	144,445	4	110	7	150
1975	100	7,250	224	161,825	4	105	6	120
1976	100	7,166	249	175,294	4	115	33	823
1977	79	5,421	246	176,862	3	87	27	772
1978*	73	5,627	253	177,640	9	278	28	714

[1]Approximate value backcalculated from number of vessels and mid-point of size class, for U.S. only (data from Broderick 1973).

[2]Estimated.

[3]U.S. fleet only.

*Preliminary.

Table 4. Total number and carrying capacity (short tons) of tuna vessels, by type, operating in the eastern Pacific tuna fishery, 1932-1978. (Sources: Broderick, 1973; IATTC Annual Reports.)

Galapagos Islands. After a curtailment of the fishery during World War II, an increased demand for canned tuna led to a great upsurge in the fishery. It expanded rapidly southward to the full range of the tropical tunas off the Pacific coast of the Americas and, in 1948, was off the coast of Colombia.

At the time of the discussions in the late 1940's for the Tuna Conventions with Mexico and Costa Rica, over 200 U.S. boats were taking bait in major quantities (Table 5) in the coastal bays of Mexico, Costa Rica, Panama and Colombia.

The bait fishery for tunas peaked in 1951 (Table 6), when the 225 U.S. tuna vessels took over 90% (145,000 tons) of the yellowfin and skipjack captured in the eastern Pacific that year (Shimada and Schaefer, 1956) within 250 miles of the coast from Mexico to Chile.[3/] The U.S. tuna clipper fleet had become a major and very important element in the Pacific coastal fisheries, both near-shore for bait and offshore for tuna.

After 1951 the United States bait boat fleet suffered a steady severe economic shrinkage, mostly as a result of a flood of imports of low-cost tuna into the United States from Japan. These imports started in 1952 when the Japanese fisheries were permitted to expand beyond the MacArthur

3/ This fishing area has since been termed the "historic grounds" (IATTC AR, 1973).

Year	All species		Anchoveta	
	Thousands of scoops	tons	Thousands of scoops	Percent of total
1946	1,344	5,376	398	29.6
47	2,116	8,464	836	39.5
48	2,983	11,932	964	32.3
49	2,747	10,988	1,079	39.3
1950	3,570	14,280	1,700	47.6
51	2,545	10,180	1,604	63.0
52	4,326	17,304	2,589	59.8
53	4,327	17,308	1,611	37.2
54	3,927	15,708	1,820	46.3
55	2,586	10,344	1,321	51.1
56	3,653	14,612	1,667	45.6
57	3,707	14,828	2,070	55.8
58	4,447	17,788	1,515	34.1
59	2,980	11,920	649	21,8
1960	1,193	4,772	416	34.9
61	650	2,600	211	32.5
62	414	1,656	123	29.7
63	241	964	56	23.2
64	224	896	37	12.1
65	308	1,232	34	11.0
66	284	1,136	49	17.3
67	238	952	61	25.6
68	271	1,084	37	13.7
69	249	996	25	10.0

*A scoop is the common measure of bait in the fishery, and represents the amount of bait, about 8 pounds, which is contained in the hand dipnet used to transfer the bait to the tuna vessel.

Table 5. Amounts (thousands of scoops and short tons) of all baitfish species and of anchovetas taken in the eastern Pacific, by year, 1946-1969.

Table 6. Total annual landings/catches (in short tons) by all nations of yellowfin and skipjack tuna in the eastern Pacific Ocean, 1918-1978; in the CYRA, 1966-1978, and in the area west of the CYRA to 150° W longitude, 1968-1978. (Sources: Shimada and Schaefer, 1956; IATTC Annual Reports, 1953-1978.)

Year	Eastern Pacific Ocean			CYRA			West of CYRA		
	Yellowfin	Skipjack	Total	Yellowfin	Skipjack	Total	Yellowfin	Skipjack	Total
1918		1,500	1,500						
19	150	3,450	3,600						
1920	1,000	3,950	4,950						
21	650	550	1,200						
22	3,700	6,950	9,650						
23	5,400	5,750	11,150						
24	1,500	1,900	3,400						
25	6,600	7,100	13,700						
26	6,300	10,450	16,750						
27	12,950	16,900	29,850						
28	16,150	7,950	24,100						
29	18,700	13,500	32,200						
1930	28,300	10,250	38,550						
31	18,300	8,250	26,550						
32	18,450	10,800	29,250						
33	25,550	8,350	33,900						
34	30,450	7,400	37,850						
35	36,150	8,600	44,750						
36	39,200	13,500	52,700						
37	45,750	23,550	69,300						
38	39,150	11,300	50,450						
39	55,200	15,050	70,250						
1940	57,300	28,800	86,100						
41	38,400	12,900	51,300						
42	21,000	19,500	40,500						
43	25,050	14,700	39,750						
44	32,050	15,600	48,200[2]						
45	44,600	17,000	61,600						
46	64,850	21,250	86,100						
47	80,050	26,750	106,800						
48	100,150	30,750	134,550[2]						
49	96,250	40,500	141,350						
1950	112,400	64,650	177,050						
51	91,850	60,550	154,250[2]						
52	96,100	45,400	143,750[2]						
53	69,450	66,850	137,100[2]						
54	69,300	86,850	156,900[2]						
55	70,450	64,000	134,450						
56	88,500	75,150	163,650						
57	81,500	64,150	146,300[2]	Landings					
58	74,200	80,550	154,750	Catch					
59	70,250	87,050	157,300						
1960	122,150	51,500	173,650						
61	115,450	76,350	191,800						
62	87,050	78,400	165,450						
63	72,750	106,100	178,850						
64	101,950	65,300	167,250						
65	90,050	86,100	176,150						
66	91,150	66,550	157,700	91,150	66,550	157,700			
67	89,650	132,500	222,150	89,650	132,500	222,150			
68	115,800	77,700	193,500	114,600	77,700	192,300	1,200		1,200
69	145,700	65,200	210,900	126,500	64,200	190,700	19,200	1,000	20,200
1970	172,500	61,850	234,350	142,700	55,450	198,150	29,800	6,400	36,200
71	136,850	115,000	251,850	113,500	113,850	227,350	23,350	1,150	24,500
72	197,200	36,400	233,600	152,450	35,150	187,600	44,750	1,250	46,000
73	227,050	48,800	275,850	178,250	47,350	225,600	48,800	1,450	50,250
74	232,400	86,800	319,200	191,300	84,000	275,300	41,100	2,800	43,900
75	224,500	136,150	360,650	177,200	134,000	311,200	47,300	2,150	49,450
76	260,100	141,900	401,800	209,400	140,600	350,000	50,700	1,100	51,800
77	220,500	94,800	315,300	203,600	92,100	295,700	16,900	2,700	19,600
78[3]	197,743	187,177	184,920	182,032	184,061	366,093	15,711	3,116	18,827

[1]Values for 1918-1957 are landings (may not have been captured in year of landing); for 1958-1978, are annual catches.

[2]Slight discrepancies in these totals result from inclusion of some tuna landings unidentified as to species.

[3]Preliminary.

line, and led to a sharp drop in the price of tunas to the U.S. fishermen (Broderick, 1973) and to a continuing reduction of the number of bait vessels in the U.S. fleet. The U.S. tuna fleet was saved from economic extinction by the dramatic technological improvements which occurred in the U.S. tuna purse seine fleet later in the decade (see below). The change-over to tuna purse seining as the dominant fishing method further hastened the decline of the U.S. tuna bait boat fleet. The present small bait boat fleet (Table 3) fishes mostly off Baja California, and around the Revillagigedo Islands.

Purse Seine Fishery

The purse seine fishery for tuna in the eastern Pacific is equally and perhaps even more dramatically a U.S.-developed one, characterized by technological and methodological innovations stemming from its major revitalization in 1958.[4/]

As early as 1914, U.S. fishermen on the Pacific coast in the albacore fishery tried to capture tunas with encircling nets but were relatively unsuccessful. After World War I, however, when experienced purse seine fishermen

4/ Much of the material that follows on the early history and development of the purse seine fleet is from Shimada and Schaefer, 1956; McNeely, 1961; and Broadhead, 1962.

from Alaska and the Pacific Northwest came south into the tuna fishery, purse seining became an effective technique and was adopted into that fishery. By the 1920's, the method (which used cotton linen netting and labor-intensive hauling of the purse seines on board) was well perfected and little or few changes in either the gear or techniques were made thereafter until about the mid-1950's. Vessels in the early purse seine fleet were generally small, of about 125 tons, and were poorly equipped for distant water fishing. Until about 1948, the purse seine fishery by the United States fleet was concentrated on northern grounds off Mexico. U.S. purse seiners fished regularly here during a February to August season and after that many fished off California in the local fisheries; tuna for many was a secondary fishery.

At the time of the Convention negotiations, the U.S. purse seine fleet was not particularly successful in the tuna fishery with 79 purse seiners taking about 11% of the total tuna landings. Its presence in Latin American waters was mostly limited to off Mexico, somewhat offshore, and for a short season, so it probably did not constitute as obvious a cause of concern to Latin countries as did the U.S. bait boat activities at that time.

It was not until 1957 and 1958 with the successful conversion of two bait boats to purse seiners equipped with hydraulic power blocks and nylon purse seines, that the

dramatic revitalization of the U.S. tuna fleet and fishery began (Orange and Broadhead, 1959; McNeely, 1961; Broadhead, 1962; Green, Perrin and Petrich, 1971). These two technological changes which increased the effectiveness of the purse seiners over the bait boats by a factor of about 2 at that time were sufficient to make the tunas taken by the purse seiners in the eastern Pacific fishery economically competitive with the low-cost tuna imports. In 1958 and 1959 the existing U.S. purse seine fleet of 44 to 50 vessels was modernized with the installation of power blocks and the replacement of cotton nets with ones made of nylon. At the same time the larger bait boats were converted to purse seiners. The rate of changeover peaked in 1960; by mid-1961, 75 of the larger bait boats in the fleet had been converted and only 10 other large bait boats considered suitable for conversion were left in the fleet (McNeely, 1961)[5/].

By the end of 1960 the fishery had rapidly expanded southward and had changed dramatically from a limited

5/ With time, moving to the present, the purse seine nets have been lengthened and deepened, new larger and faster vessels with more carrying capacity have been added to the fleet, and major technical improvements in navigation, fishing methodology, and freezing and holding tunas have been made so that the modern tuna purse seiner has become greatly liberated from shore-dependence for long periods of time. These U.S. developments and innovations in the eastern Pacific purse seine fishery for tunas have become a model and all tuna seiners built around the world in recent years are patterned on U.S. models.

seasonal purse seine fishery off northern Mexico to one which exploited the entire range of the eastern Pacific tuna fishery from Mexico to northern Chile on a year round basis. The purse seiners had replaced the bait boats on the historic grounds and by 1961, were capturing 83% (213,000 tons) of the yellowfin and skipjack taken in the eastern Pacific (Broadhead, 1962). The geographical areas covered by the fleet continued to expand and by 1969 the fishery had expanded westward to the boundary of the CYRA. Today the purse seine fishery in the eastern tropical Pacific extends beyond the CYRA (Figures 2 and 3) and in some locations is as far as 2,000 miles offshore. The U.S. purse seine fleet also, beginning with some early trips in 1960 and 1961, expanded its activities into Atlantic waters to fish for tunas off the west coast of Africa and, in the 1970's, to central and southern Pacific waters.

Participants and Catch Capacity

Twenty-two nations have participated at one time or another in the eastern Pacific yellowfin and skipjack fisheries since 1916. From 1916 when U.S. fisherman first brought yellowfin and skipjack tunas into the canneries for packing (Pacific Fisherman Yearbook, 1949; Shimada and Schaefer, 1956) until 1940 when Mexico made some landings of tuna (IATTC unpublished data), the U.S. fleet had the

eastern Pacific tuna fishery to itself. After Mexico's entry, several Central and South American countries during and after World War II started to develop local fisheries for the tunas (IATTC AR, 1952). Landings were made in Costa Rica in 1944 and in Peru in 1947. Chile, Colombia, Ecuador, and Panama entered the fisheries subsequently; Chile later left the tuna fishery in 1968. Until 1965, with the permanent entry of Canadian purse seiners into the fishery, the eastern Pacific tuna fishery was the domain of the U.S. and the Latin-American coastal states with one exception.

That exception was Japan which was the first nation whose coastline did not border on the eastern Pacific Ocean to break into the U.S.-dominated eastern Pacific tuna fishery with longline vessels in 1956. Canada was the next distant water (non-eastern Pacific) entrant with the landings of some skipjack in 1962 and the permanent deployment of purse seiners in the tuna fishery in 1965. Japan and Canada were the sole distant participants in the eastern Pacific tuna fishery (except for a single trip by a Cuban longliner in 1967) for the next five years until Spain's entry in 1970. Bermuda, Congo, France, Ghana, Korea, the Netherlands Antilles, New Zealand, Nicaragua, Senegal, and Venezuela have since also come into the fishery. In 1978, 18 nations were catching tunas in the eastern Pacific (IATTC AR, 1978).

From 1950 to 1967 the total carrying capacity of the international fleets in the eastern Pacific tuna fishery remained between 40,000 and 50,000 tons. In 1968 new vessel construction and new entrants sparked a rapid increase in the carrying capacity of the U.S. fleet (Table 7). By 1976 the carrying capacity of the fleets had more than tripled to 183,000 tons, at which level it has remained to date (June 1979). The amount of U.S. carrying capacity peaked in 1976, and then dropped, likely as a result of transfers of some U.S. vessels to other flags. Even though the actual carrying capacity of the U.S. fleet is 2-1/2 times what it was in 1968, its share of the total carrying capacity in the fishery is now 63%, down from 79% in 1968.

The tonnage carrying capacity of the distant water fleet has increased steadily since 1969 to some 28,000 tons in 1978. However, the distant water fleets' percentage share of the total eastern Pacific carrying capacity has stayed somewhat level since 1972, averaging 13%.

Both the tonnage carrying capacity and the percentage share of the total carrying capacity of the eastern Pacific coastal nations' (except the U.S.) fleets are increasing markedly; their fleets now make up 22% of the catch capacity in the area.

The catch of tunas (both yellowfin and skipjack) in the eastern Pacific dropped from 4.8 tons of yellowfin per ton of carrying capacity in 1967 to 2 tons per ton of carrying

Fleet	U.S.		DW		Coastal		Total Tons carrying capacity	Catch (tons) of tuna per ton c.c.
Year	Tons	Percent	Tons	Percent	Tons	Percent		
1967	41.7	89.9	**	-	**	-	46.4	4.8
68	44.9	78.6	**	-	**	-	57.1	3.4
69	53.2	85.4	3.3	5.3	5.8	9.3	62.3	3.4
1970	60.2	82.9	4.6	6.4	7.8	10.7	72.6	3.2
71	75.1	78.7	7.5	7.8	12.8	13.5	95.4	2.6
72	88.8	76.8	13.8	12.0	13.0	11.2	115.6	2.0
73	100.6	72.9	20.4	14.8	17.0	12.3	138.0	2.0
74	111.1	72.2	18.3	12.1	23.2	15.7	152.6	2.0
75	124.2	72.2	23.0	14.2	22.1	13.6	169.3	2.1
76	127.2	69.4	20.9	11.4	35.3	19.2	183.4	2.2
77	121.8	66.4	24.5	13.4	37.1	20.2	183.4	1.7
*78	116.0	62.9	27.7	15.0	40.6	22.1	184.3	2.1

*Preliminary.

**Data not available.

Table 7. Carrying capacity (thousands of tons), and percent of the total, of fleets of the U.S., other distant water countries and the coastal states fishing for tunas in the eastern Pacific, and catch of tunas (yellowfin and skipjack) per ton of carrying capacity, 1967-1978.

capacity in 1972, at which approximate level it remains today. As a consequence, the large purse seiners in the fleet are, on the average, limited to less than two fishing trips per year in the eastern Pacific. To break even financially, a new 1000 ton purse seiner must make two to two and a half trips per year (Joseph and Greenough, 1979).

Catches

Bait Fishes

From post-war 1946 to 1952, the use of the anchoveta and other bait fishes increased steadily (Table 5) emphasizing both the growth of the eastern Pacific fishery and its movement aggressively southward. In 1948 the total catch of bait - some 3 million scoops (an approximate 8 pound handnetful of fish) - was concentrated in Mexican and Central American waters. The high bait fish catches of 1952, 1953, and 1954 were made mainly in Mexico's Gulf of California and in the Gulf of Panama (Alverson and Shimada, 1957).

The peak harvest of bait fishes was in 1958, after which bait fish catches declined rapidly as a result of the shift of the tuna fishery to purse seines. Since 1963 about 1,000 tons of bait per year are taken in the eastern Pacific - in the northern region for use by the bait boats off Baja

California and the Revillagigedo Islands and, in the southern region, for use off Ecuador.[6/]

These heavy catches of bait fishes in the post World War II years of the fishery were important considerations on the part of Mexico and Costa Rica in the development of the Tuna Conventions with the U.S. and, on the part of Panama, in respect to her adherance to the IATTC in 1953.

Yellowfin and Skipjack

Total annual catches of yellowfin and skipjack in the eastern Pacific have increased from an early catch of 1,500 tons of skipjack in 1918 to a peak combined catch of both species of 402,000 tons in 1976 (Table 6, Figure 4). Catches rose steadily to some 86,000 tons annually in 1940, when they dropped as a result of the diversion of many U.S. vessels to war time activities. A post-war peak catch of 177,000 tons was obtained in 1950. The rate of increase leveled off somewhat, and then trended sharply upward in 1967. Catches west of the CYRA to 150°W have, since the first 1,200 ton catch in 1968, ranged from 19,000 to 52,000 tons annually.

6/ After 1969, baitfish catch and effort data were no longer published in the IATTC Annual Report. The data, however, are still collected and maintained, unpublished, by the Tuna Commission (C.J. Orange, personal communication, 1979).

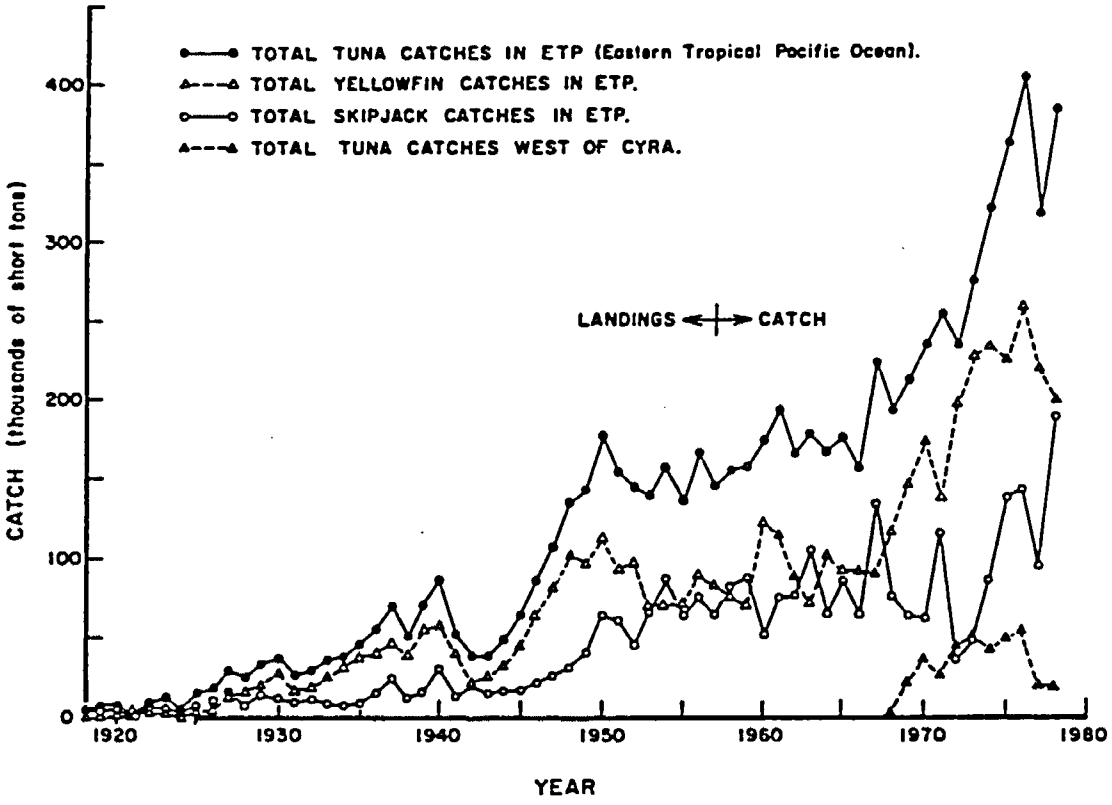


Figure 4. Annual landings (1918 to 1957) and catches (1957 to 1978) by fleets of yellowfin and skipjack tunas from the eastern Pacific Ocean, and from west of the CYRA to 150° W (1968-1978).

Except for occasional years, yellowfin have made up the greater portion of the total annual catches; the trend of the yellowfin catches approximately parallels the trends of the eastern Pacific tuna fishery. Catches of skipjack vary widely from year to year (for example, 66,550 to 132,500 tons from 1966 to 1967; 95,000 tons to 187,000 tons from 1977 to 1978). Yellowfin constitute the bulk of the tuna catch outside of the CYRA.

The U.S. share of the annual total catch of yellowfin and skipjack tunas in the CYRA trended downward from some 95% in 1950 to 80 to 85% in 1961; the share of the total catch taken by the coastal states increased from 5 to some 15% in the same period; and the share of the distant water states (only Japan in those years) went from 1% when the first catches were made in 1956 to 2 to 3% in 1961.7/ These trends in the shares of the total CYRA catch made by the three groups of participants in the eastern Pacific fishery have, in the main, continued from 1962 to the present (Table 2). In 1978, the U.S. fleet took about 61% of the tuna catches in the CYRA, the fleets of the other distant water countries took about 17% and the vessels of the coastal states took about 22%. Most of the catch by the coastal states was taken by Panama, Mexico, and Ecuador with

7/ The IATTC did not publish catches by countries prior to 1962; the figures given here are from Annual Reports from the period 1950 to 1961.

Peru and Costa Rica taking smaller shares (IATTC AR, 1961-1968).

In spite of the decreasing share of the total catch taken by the U.S. fleet in the CYRA, actual amounts of tunas taken by the U.S. fleet increased after 1962 (Table 3). To this amount must also be added the catches made in the eastern Pacific outside of the CYRA (Table 6) almost all of which is taken by the U.S. fleet (the total catch by the U.S. fleet in the eastern Pacific of 294,000 tons in 1976 set a record). Similarly the catch by the coastal states has tripled since 1962, to 78,000 tons, while the catch of the distant water fleet has gone from 8,000 to 42,000 tons in the 16 year period.

With the expansion of the tuna fishery offshore, away from the historic nearshore grounds, the share of the total tuna (yellowfin and skipjack) catch taken by all fleets within 200 miles of the coast in relation to the total catch in CYRA has declined from levels of 95 to 99% in the 50's and early 60's to levels of 59 to 83% in recent years (Table 7). Catches of yellowfin in the 200 mile zone have averaged, over the last 10 years, 67% of the yellowfin catch made in the CYRA. The amount of the catch of yellowfin in the zone jumped from 81,000 to 127,000 tons in 1973; yellowfin catches have stayed, with some variation (but not as much as that for the skipjack), around that general level since. Catches of skipjack in the 200 mile zone, on the

other hand, have averaged over the past 10 years, 85% of the skipjack catch made in the CYRA (99% in 1978). Skipjack catches in the zone are extremely variable and have ranged from 29,000 tons there in 1972 to a record 133,000 tons in 1978.

From 25 to 63% (average, 46%) of the yellowfin catch in the CYRA in the period 1961 to 1974 has been made in the 200 mile zone of just three coastal states--Mexico, Costa Rica and Ecuador (Table 8). From 26 to 98% (average 73%) of the skipjack caught in the same period in the CYRA came from the 200 mile zones of Mexico, Ecuador and Peru. There is a high variability among years in the share of the CYRA catch which comes from the zones of these countries, and a high variability within years in the share of the catch made in the zone of any particular country.

Other species

Catches of bigeye, bluefin, bonito and black skipjack are also made in the eastern Pacific tuna fishery.

Bigeye tunas are taken by baitboat and purse seine vessels incidentally to the capture of yellowfin and skipjack tunas. Most of the catch is taken off Peru, Ecuador, Colombia and the Galapagos Island (IATTC AR, 1972). From 1951 to 1966, the annual catch of bigeye tuna ranged up to 600 tons. In 1967, after the yellowfin tuna quota and

Year	Yellowfin catch by all flags in 200 mile zone	Percent of CYRA yellowfin catch	Skipjack catch by all flags in 200 mile zone	Percent of CYRA skipjack catch	Total tuna catch by all flags in 200 mile zone	Percent of total CYRA catch
1961	112,654	97.6	74,807	98.0	187,461	97.7
62	85,988	98.8	77,511	98.9	163,499	98.8
63	69,219	95.1	104,940	98.9	174,159	97.4
64	91,472	89.7	63,598	97.4	155,070	92.7
65	70,671	78.5	85,539	99.3	156,210	88.7
66	67,710	74.3	65,979	99.1	133,689	84.8
67	74,326	82.9	132,184	99.8	206,510	93.0
68	93,590	81.7	73,963	95.2	167,553	87.1
69	79,689	63.0	58,355	90.9	138,024	72.4
1970	96,881	67.9	49,864	89.9	146,745	74.0
71	84,967	74.9	101,946	89.5	186,913	82.2
72	81,692	53.6	28,875	80.9	110,567	58.8
73	126,889	70.6	45,166	95.3	172,055	78.8
74	153,729	81.1	73,178	87.0	226,907	82.9
75	125,821	71.0	111,082	82.9	236,903	76.1
76	128,420	61.3	97,254	69.2	225,674	64.5
77	112,960	55.5	62,239	68.7	175,199	59.2
*78	122,898	67.5	132,886	99.1	255,748	69.9

*Preliminary.

Table 8. Catches, by fleets of all flags, of yellowfin and skipjack tuna within 200 miles of the coasts of all countries bordering the CYRA, in short tons and as a percentage of the catch in the CYRA.

regulations were implemented, the catch increased to 1,800 tons, and then increased again, sharply, in 1976 to over 10,000 tons, at which general level it has since remained (Table 9).[8/]

The first commercial catch (3,000 tons) of bluefin tuna in the eastern Pacific Ocean was made off California in 1918 by the newly-introduced California tuna purse seiners (Whitehead, 1931). Since then, the purse seine catches of bluefin tuna have fluctuated greatly, with a low of 280 tons in 1933 and a record catch of 17,400 tons in 1966 (Frey, 1971). After regulation of the yellowfin fishery, annual catches of bluefin tuna in the eastern Pacific have ranged fom 4,500 to 14,700 tons (Table 9). The fishery is seasonal and variable; a fishery on the same populations occurs off Japan and Taiwan (IATTC AR, 1973). The international tuna purse seine fleet makes about 95% of the bluefin catch in the eastern Pacific.

Catches of bonito in the eastern Pacific have ranged from 5,300 to 18,800 tons in the 1967-1978 period (Table 9). The eastern Pacific tuna fleet, working mainly off northern Baja California and southern California, took 85% of the bonito catch in 1977 (Collins et al., 1979).

8/ Because of the 15% limit on the incidental catch of yellowfin inside the CYRA after season closure, it is useful to the fishermen to have as many non-yellowfin tuna species aboard as possible, to increase the tonnage of the 15% incidental yellowfin allowances.

Year	Species: Bigeye	Bluefin[1]	Bonito	Black skipjack
1967	1,800	7,301	12,541	
68	2,800	6,685	11,821	
69	600	7,908	12,752	
1970	1,600	4,450	7,025	
71	2,800	9,265	10,844	
72	1,700	14,748	12,832	
73	1,788	11,701	17,455	
74	934	6,394	10,419	>3,000
75	4,205	8,122	18,750	414
76	10,623	11,603	4,834	1,372
77	8,270	5,766	12,483	1,522
78	10,520	5,901	5,331	2,342

[1]Data to 1974 from Bayliff, 1979; data from 1975 from IATTC ARs.

Table 9. Catches (in short tons) by all nations of bigeye, bluefin, bonito, and black skipjack (landings only) tunas in the CYRA, 1967-1978. (Sources: Frey, 1971; IATTC AR, 1972, 1973, 1974; Bayliff, 1979; MacCall et al., 1979).

Black skipjack, traditionally discarded at sea when captured inadvertently by the eastern Pacific purse seine fleets, were first landed in commercial quantities--more than 3,000 tons--in 1974 (Table 9) (IATTC AR, 1974), as the species become more economically interesting with the increasing carrying capacity of the fleet. Although still mostly discarded at sea, annual landings increasing from 400 to 2,300 tons have been made since.

Chapter III: INTER-AMERICAN TROPICAL TUNA COMMISSION

Formation

The concerns raised on the part of the Latin American Pacific coastal states by the rapid post-WWII expansion of the U.S. tuna fishery, and those raised on the part of the U.S. by the overt reactions of these coastal states to that expansion led to the realization on both sides that some form of international order in the fishery was needed. As a consequence, not one but two Tuna Conventions were developed in 1949--one between the U.S. and Mexico (the International Commission for the Scientific Investigation of Tuna) and one between the U.S. and Costa Rica (the Inter-American Tropical Tuna Commission) (United States Code, 1950). Both Conventions were ratified by the signatories but only the IATTC was implemented, funded and staffed. The background of the development of the two Conventions, and the reasons for the survival of the Tuna Commission over the U.S./Mexico Convention are traced below.[9/]

The Latin-American coastal states, particularly Mexico and Costa Rica, in those early post-WWII years became

9/ Much of the material is based on letters and documents of Dr. W.M. Chapman, archived in the Suzzalo Library at the University of Washington.

increasingly concerned with several manifestations and results of the expanding U.S. bait and tuna fisheries off their coasts. One very apparent manifestation of the expansion was the worrying physical presence of an increasing number of U.S. tuna vessels (Table 4) in the coastal waters and bays, from Mexico southward, while making bait, and in the ports, while purchasing fuel, supplies and licenses.

This concern over the physical presence of the ships led to worry about the possibility of over-fishing the resources--both bait (as already had seemed to have happened in the Gulf of Nicoya (Peterson, 1956)) and tunas. Little biological information was available at that time on these stocks of fishes or on their biology and it was very easy to believe that the great number of tuna boats were possibly exerting damage on the bait and tuna stocks. The Latin American countries had little competent advice and few biologists who were able to deal with their problems or to tell them what was happening to the tuna and bait resources. The concerned countries could not determine whether there was over-fishing, whether the stocks were being damaged, or what the yields could be. Nor did they feel that they could rely on data from the U.S. fishermen or even on advice from scientists employed by the U.S. Government because of probable bias.

Another consideration of the Latin American Pacific coastal states in their decision to move toward international agreement on the bait and tuna fisheries was the perceived need to retain the bait and tuna resources off their coasts for their own future use. Even though these countries at the time were only limitedly capable of exploiting these resources, there was still a strong feeling among them that the resources should be conserved and held for their own future use.

Finally, the transaction cost to the coastal states of the U.S. bait and tuna fisheries was high. Considerable time and energy was being spent on diplomatic, political and internal domestic problems resulting from the presence of the U.S. fleets.

It rapidly became apparent among the coastal states that the only reasonable way any control could be exercised over the U.S. fleet and any safe-guarding of the coastal states' resources both at present and for the future would be through the establishment of an independent International Fisheries Commission. The efficacy of such Commissions was already evident in respect to halibut and salmon fisheries to the north. In such an International Fishery Commission, it was plain that each country, regardless of its scientific capabilities or fishing power, would have equal votes; Commission scientists would provide unbiased scientific advice; and recommendations based on professional and sound

scientific research would be made to member governments for regulation and management should the need ever arise.

On the U.S. side, equally cogent reasons existed for the establishment of an International Fishery Commission to deal with the problems generated by the expanding U.S. tuna fishery off Latin America. One reason was existing U.S. policy in regard to U.S. nationals fishing in international waters. The policy was two-fold: (1) there was to be no overfishing and (2) all necessary steps were to be taken towards the management of fisheries in international waters. This policy was apparent in the U.S.'s past actions in relation to, for example, the Halibut Commission and the Salmon Commission. In addition, the United States Government had a policy of protecting United States rights to prosecute fisheries and commerce in international waters along with the principle of open access to high seas fisheries.

For the U.S. Government, a fisheries convention would promote a sense of international amity in the hemisphere and would reduce the increasing number of tuna fishery-related incidents over licenses and bait and vessel restrictions which eventually and often came to the notice of the U.S. State Department. Such a fisheries convention, if concluded, would set a basis for future negotiations on these and other fisheries problems with Central and South American countries and would also provide an administrative

framework to handle future problems as they developed between those countries and the U.S tuna industry.

The U.S. tuna industry was especially interested in such a fisheries convention, to maintain its access to bait in the territorial waters of the Latin countries and also its access to the tuna resources in the expanding eastern Pacific fishery. A properly-executed convention would permit the U.S. industry to protect and possibly even control a protein source for the United States, and permit a peaceful expansion and development of a strong U.S. fishery. The number of incidents and conflicts in which, of course, the U.S tuna fleet was directly involved would also be reduced.

On another scale, but possibly equally important to the formation of an international fishery commission, was the desire of U.S. fishery scientists to study the fishery and the tunas for its own sake, to gain a better understanding of the factors influencing the abundance of tunas, and to gain knowledge of their ecology and population dynamics. Little biological information on the tunas was available at that time, and there was a considerable interest in pursuing biological and fisheries studies both per se and in terms of the conservation objective.

Some lesser U.S. considerations for an international fishery commission were: the desire of the U.S. defense establishment to maintain open access for U.S. fishing

vessels to waters off the Latin-American coasts because of any possible strategic information the boats may have been able to obtain; the consideration that an international fishery commission might either keep new entrants out of the eastern Pacific tuna fishery or at least permit their regulation and reduce competition; and the concern over the possibility of an FAO-sponsored regulatory fisheries council for Latin America where the U.S. would have considerably less influence than it might have in a U.S. - coastal states convention.

Thus, strong reasons existed on both sides for the development of some form of international fishery commission to deal with the bait and tuna problems. The first moves toward the regulation of the fisheries were made between Mexico and the U.S. In 1944, in California, the California Fisheries Advisory Committee (CFAC) was formally organized as a liaison between the United States Department of State and the tuna producing industry on the west coast. Its purpose was to foster the development of a convention between the United States and Mexico which would provide a mechanism to deal with and to ameliorate the differences on the management of the tuna fisheries in respect to the two countries. The Committee was made up of representatives of union, management and vessel owners all associated with the tuna industry, and of representatives from the California Department of Fish and Game and from the California Attorney

General's Office.

The U.S. State Department welcomed the formation of the California Fisheries Advisory Committee and had first formal contact with it in 1945. The U.S. State Department had a long history of trying to establish a fisheries convention with Mexico, dating back to the early 1920's. There actually was a Commission which operated for one year in 1926 under the aegis of a U.S.-Mexico Convention which had been set up to prevent smuggling, and for other purposes (Whiteman, 1965). The Commission ceased operations after only one year, mainly because of problems in the United States between Federal and State authorities and industry elements, and because of inadequate administrative machinery. In the interim, between the early 1920's and 1945, the International Pacific Halibut Commission and the International Pacific Salmon Commission with Canada had been established. The effective and competent administrative machinery developed and tested in those Commissions had shown itself to be adequate to resolve both international and internal domestic situations in respect to these fisheries.

Based closely on these successful administrative mechanisms, especially those developed within the Treaty for the International Pacific Halibut Commission, a preliminary U.S.-Mexico treaty was drafted. After some ground-work, a U.S. negotiating team (many of the members from the

California Committee) travelled at the invitation of the Mexican government to Mexico City where they participated with a Mexican delegation in exploratory discussions on management and study of the tuna and other fisheries of common interest to both countries, with a view to furthering scientific knowledge of the tuna fisheries of the eastern Pacific Ocean. The meetings were held from October 25 to November 4, 1948 and culminated in the signing of a joint report to the two countries.

The Convention proposed in the joint U.S./Mexico report contained several elements (also present in the Salmon and Halibut Commissions Treaties) which were important to the U.S. government and U.S. tuna industry:

1. The statistics of individual boat catches were to be kept confidential and information on these was not to be given to any member government. [This was of particular economic importance to the U.S. industry segment.]

2. The Commission was to have its own research staff responsible only to the Commissioners and not to member governments, with the research means and objectives to be chosen by the Commission and not by the participating governments.

3. Advisory committees from industry were to be established and be attached to each Section to provide advice, input and limits to the Commissioners.

4. The Commission was not to have any regulatory powers or the authority to promulgate regulations. It was agreed that if a scientific investigation showed a need for regulation then the kind and amount of regulations would be studied by the Commission which would then recommend these to member governments for consideration and action.10/

The U.S./Mexico proposed Convention also went into specific detail on how the work of the new Commission was to be carried out, so that there would be a clear and precise understanding on the part of the Mexican and U.S. Governments as to the duties of that Commission.

Important additional clauses in the proposed U.S./Mexico Convention were:

10/ This in contrast to the situation then prevailing in the Halibut Commission. Although the original Convention gave the Commission no regulatory powers, as research showed the need for regulation the Convention was renegotiated twice, to that time, to give the Commission broader regulatory powers.

1. The appointments to the Commission's scientific staff were to be distributed as equitably among U.S. and Mexican scientists as the availability of Mexican biologists would permit.

2. The Assistant Director of the Investigations of the Commission was to be a Mexican national.

3. The Mexican/U.S. Convention was to have a life of 6 years.

4. The Convention was limited to participation by the United States and Mexico.

5. The species to be dealt with included albacore, bluefin, bonito and yellowtail, and the baitfishes used to take them, and the yellowfin and skipjack tunas and the baitfishes used to take them.

After approval by the respective governments, the Convention for the Establishment of an International Commission for the Scientific Investigation of Tuna was signed by representatives of the U.S. and Mexican Governments in Mexico City, on January 25, 1949 and ratifications were exchanged on August 17, 1949 (Whiteman, 1965). The U.S. enabling legislation (United States Code,

1950) was approved on September 7, 1950, jointly with that for the Inter-American Tropical Tuna Commission.

Meanwhile, in Costa Rica, similar concerns about possible overfishing of the bait and tuna resources off Costa Rica by the expanding U.S. tuna fishery and about retention of options in regard to possible future exploitation of the tunas by Costa Rica itself, manifested themselves in several ways. Restrictive laws were imposed on baiting in Costa Rica; license fees were manipulated and often raised to very high levels; and, importantly, Costa Rica made some efforts to extend her territorial sea.

In 1947, Costa Rica rewrote her fisheries laws with the consultative services of an American fisheries biologist brought to San Jose for the purpose.11/ During the same period, a Committee appointed by the President of Costa Rica prepared the first draft of a Tuna Convention, again with the help of the U.S. consultant, and submitted that draft to the United States State Department in mid-1948 (Kask, 1967). No action was taken on this draft convention proposal.

The problems continued in Costa Rica as the bait and tuna fisheries intensified there and came to a head in 1949 when there was an apparent failure of the bait resources in

11/ The consultant was Dr. John L. Kask, who was then familiar with the workings of the Salmon and the Halibut Commissions because of his professional experience in the U.S. Pacific Northwest. Dr. Kask later served as Director of Investigations of the IATTC, from 1963 to 1969.

the Gulf of Nicoya (Peterson, 1956). Costa Rica felt that she needed impartial scientific advice and outside assistance on the bait problem. Early in 1949, after the U.S.-Mexico Tuna Convention was ratified, the Costa Rica Government requested that the United States and Costa Rica begin conversations leading to a U.S.-Costa Rica conservation treaty, generally along the same lines as the one recently concluded with Mexico. Costa Rica also wished to discuss other phases of the problems which centered about the tuna fisheries off Costa Rica, and which were of common concern to the two governments. Negotiations between the United States and Costa Rica started in late May 1949 in Washington, and on May 31 the Convention between the United States and Costa Rica for the establishment of the Inter-American Tropical Tuna Commission was signed in Washington.

The Costa Rica Government was anxious to move the implementation of the Convention along, in its need to assuage the fisheries-related problems. The U.S State Department was equally anxious to move the implementing legislation through Congress, in order to preserve the momentum of her diplomatic activities with respect to the tuna fisheries. Enabling legislation was passed by Costa Rica on November 7, 1949 and by the United States on September 7, 1950. The exchange of ratifications occurred on March 3, 1950, even before the U.S. enabling legislation

was passed.[12/] Costa Rica appointed its Commissioners almost immediately after her enabling legislation was passed in late 1949, and was followed by the United States with the appointment of her Commissioners in the spring of 1950. The first meeting of the Commission was held in San Diego, California on July 18, 1950. The Director of Investigations was appointed January 2, 1951, and at that time the Inter-American Tropical Tuna Commission began operations.

There was thus established a scientific commission for research on the tuna fisheries and the related bait fishes in the eastern Pacific Ocean which satisfied very well the needs and requirements, at that time, of both signatory governments and which was designed, on the basis of exerience gained from previous fisheries commissions in the Pacific northwest, to have administrative mechanisms which could handle possible future problems. The new Commission had no regulatory powers so that the governments were not

12/ In a March 30, 1950 press release (Whiteman, 1965), the U.S. State Department noted that the IATTC is "similar to conventions between U.S. and Canada regarding sockeye salmon and halibut, which were signed on May 26, 1930 and January 29, 1937, respectively in that objectives are to be attained through a Commission composed of representatives of both Governments and which shall have investigatory powers. Unlike the salmon and halibut commissions, however, the IATTC is purely an investigatory body and any regulatory measures which are indicated by the study would have to be the subject of future negotiations between the two countries."

immediately committed. It had an impartial research group. It's national sections had advisory committees which served as checks on each national section's activities. The fishing statistics of individual vessels were kept confidential. Provision was made for research on bait in Costa Rica. Each country had an equal vote in the planning of research, in the direction of the scientists, and in making recommendations.

In contrast to the U.S.-Mexico Tuna Convention, the IATTC Convention dealt basically with, although it was not limited to, the yellowfin and skipjack tunas and the bait used to take them; had no requirements concerning the nationality of the Assistant Director or of the researchers; and had a treaty with a 10-year base. Most importantly, the IATTC Convention was open-ended in contrast to the U.S.-Mexico one. Other governments whose nationals participated in the fisheries could adhere to the IATTC Convention merely by asking and being accepted. All of these elements served to make the IATTC a less restrictive, more flexible, and highly attractive treaty to the United States, with an excellent potential for handling any future developments in the tuna fishery.

Further, the IATTC was off to a faster and earlier start than was the Convention with Mexico. Mexico had delayed ratification of the treaty while Costa Rica had ratified her Convention promptly so that the IATTC came into

effect before the U.S.-Mexico Commission. The Mexican Congress had turned down the request to pay the Mexican share of the U.S.-Mexico Commission's expenses while Costa Rica had supplied funds for the IATTC promptly. By April 1951, Mexico still had not appointed Commissioners to the U.S.-Mexico Commission. The U.S. Government had delayed appointments to the U.S.-Mexico Commission until the winter of 1950, but had appointed IATTC Commissioners earlier, in the spring of 1950. For these reasons the IATTC was off to an excellent start and progressed rapidly.

The U.S.-Mexico Commission never became operative, but there was hope on the part of the United States that Mexico would eventually adhere to the IATTC (which she did in 1964). As a preliminary step to this adherence, the U.S.-Mexico Convention was abrogated by both countries in 1964 (Carroz, 1965).

Operation

Two formal sections of the IATTC and one ad hoc mechanism constitute the basic operational elements of the IATTC management regime. The two formal elements established in the Convention (IATTC AR, 1950-51) are the Commission itself, and its scientific staff; the ad hoc element is the Intergovernmental Meeting (IGM) (IATTC, 1974).

The Commission

The minimum life of the Tuna Convention was 10 years, after which withdrawal could be effected on one year's notice. Original signatories to the Convention were the United States and Costa Rica in 1950. The sequence of subsequent adherences to the Convention was: Panama (1953), Ecuador (1961), Mexico (1964), Canada (1968), Japan (1970), France (1973), and Nicaragua (1973). Ecuador, in arrears in her contributions to the Commission's budget, withdrew in 1968. Mexico and Costa Rica, in actions related to the negotiation of a new treaty (see below) withdrew in 1978 and 1979, respectively. Present Commission members (June 1979) are Canada, France, Japan, Nicaragua, Panama, and the U.S.A.

Commission meetings are held annually, but more often as necessary (Table 10). The national section of each member nation consists of up to four delegates, supported by advisors. Each national section has a single vote, and all decisions must be unanimous.

The budget is prepared and submitted annually to the Commission by the Director of Investigations. The share of the costs among the member governments is based on the utilization of tunas in each country, with the U.S. contribution equalling 100. In practice the amount of the U.S. contribution determines the annual funding levels; these annual levels have ranged from $12,000 in 1951-52 to

Year	IATTC Meeting No.	Date	Site	Inter-Governmental No.	Date	Site	Other Date	Remarks	Site
1950	1	7/18	San Diego, CA						
1951	2	2/1	San Jose, C.R.						
	3	9/1	San Diego, CA						
1952	4	8/13	San Jose, C.R.						
1953	5	8/14	San Diego, CA						
1954	6	8/11	San Jose, C.R.						
1955	7	7/14	Panama, R.P.						
1956	8	7/30	San Diego, CA						
1957	9	3/12	San Jose, C.R.						
1958	10	2/11	Panama, R.P.						
1959	11	2/5	San Pedro, CA						
1960	12	2/23-24	San Jose, C.R.						
1961	13	2/23-24	Panama, R.P.						
				1	2/25	Panama, R.P.			
	14	9/14	Long Beach, CA						
1962	15	5/16-18	Quito, EC						
				2	11/7-8	San Jose, C.R.			
1963	16	4/16-17	Panama, R.P.						
				3	4/18-19	Panama, R.P.			
1964	17	3/18-19	San Diego, CA						
				4	4/20	San Diego, CA			
1965	18	3/23-24	Mexico City						
				5	3/25-26	Mexico			
		3/26	Mexico						
1966	19	4/19-20	Guayaquil						
							4/19	U.S.-Mexico Informal	Guayaquil
1967	20	4/4-6	San Jose, C.R.						
				6	4/6-7	San Jose, C.R.			
1968	21	4/2-4	Panama, R.P.						
				7	4/4-5	Panama, R.P.			
1969	22	3/18-19	San Diego, CA						
				8	3/20-21	San Diego, CA			
		3/22	San Diego, CA						
1970	23	4/22-23	Ottawa, Canada						
				9	4/23-25	Ottawa, Canada			
		4/25	Ottawa, Canada						
1971	24	1/5-7	San Jose, C.R.						
				10(1)	1/	San Jose, C.R.			
		1/20	San Jose, C.R.						
				10(2)	2/16-20	Mexico			
	25	2/20	Mexico						

Table 10. Chronology of IATTC, Inter-Governmental and IATTC/IG-related meetings, 1950 to 1979 (June).

1972	26	1/6-7	Tokyo						
				11	1/7-13	Tokyo			
		1/13	Tokyo						
	27	11/7-8	Panama, R.P.						
				12	11/8-11	Panama, R.P.			
		11/11	Panama, R.P.						
				13	12/17-20	San Diego, CA			
	28	12/20	San Diego, CA						
1973	29	11/12-14	Washington, D.C.						
				14	11/14-16	Washington, D.C.			
		11/16	Washington, D.C.						
1974							1/29-2/1	U.S.-Mexico Bilateral	Mexico
				16	5/29-31	Washington, D.C.			
							10/8-9	U.S.-Mexico Bilateral	Mexico
	30	10/28-31	Ottawa, Canada						
1975	31	3/3	San Diego, CA						
				17	3/4(-5?)	San Diego, CA			
	32	3/5	San Diego, CA						
	33	10/13-15	Paris						
				18	10/15-17	Paris			
				19	12/15-19	Washington, D.C.			
1976	34	10/11-13	Managua						
				20	10/12-13	Managua			
1977		6/27-29	San Diego, CA						
	35	10/17-21	Mexico (Part I)						
				21	10/18-20	Mexico (Part I)			
1978		1/25-26	San Diego, CA (Part II)						
				22	1/25-26	San Diego (Part II)			
	36	10/16-18	Tokyo (Recessed)						
				23	10/17-18	Tokyo			
1979							5/4	U.S.-Mexico Bilateral	Mexico

Table 10. (Continued)

$1,225,000 (plus $500,000 for porpoise studies) in 1977-78 (Figure 5).

The Chairman and Secretary of the Commission are elected at each annual meeting; the nationalities of each are rotated based upon a specific formula. The place of the regular Commission meeting is also rotated by a specific formula, except that a new member nation hosts the meeting following its adherence to the Convention.

At a typical Commission meeting, the Director of Investigations reviews the research program and the status of the stocks, makes any special presentations requested by the Commission, and presents the budget (since 1965, the background documentation for the meetings has been written). Until 1961 Commission meetings and resolutions dealt with these and routine administrative matters. Substantive debate and Commission action in respect to management of the tuna resource occurred for the first time in 1961, when staff research indicated that regulations for conservation of the resource were required; a resolution was passed by the Commission requesting appropriate action by the member governments.

Commission meetings since 1965 have been recessed after the Director of Investigations' recommendations concerning the yellowfin quota for the coming fishing season have been made, so that the Inter-governmental Meeting (IGM) (see below) can take place. The Commission meeting is then

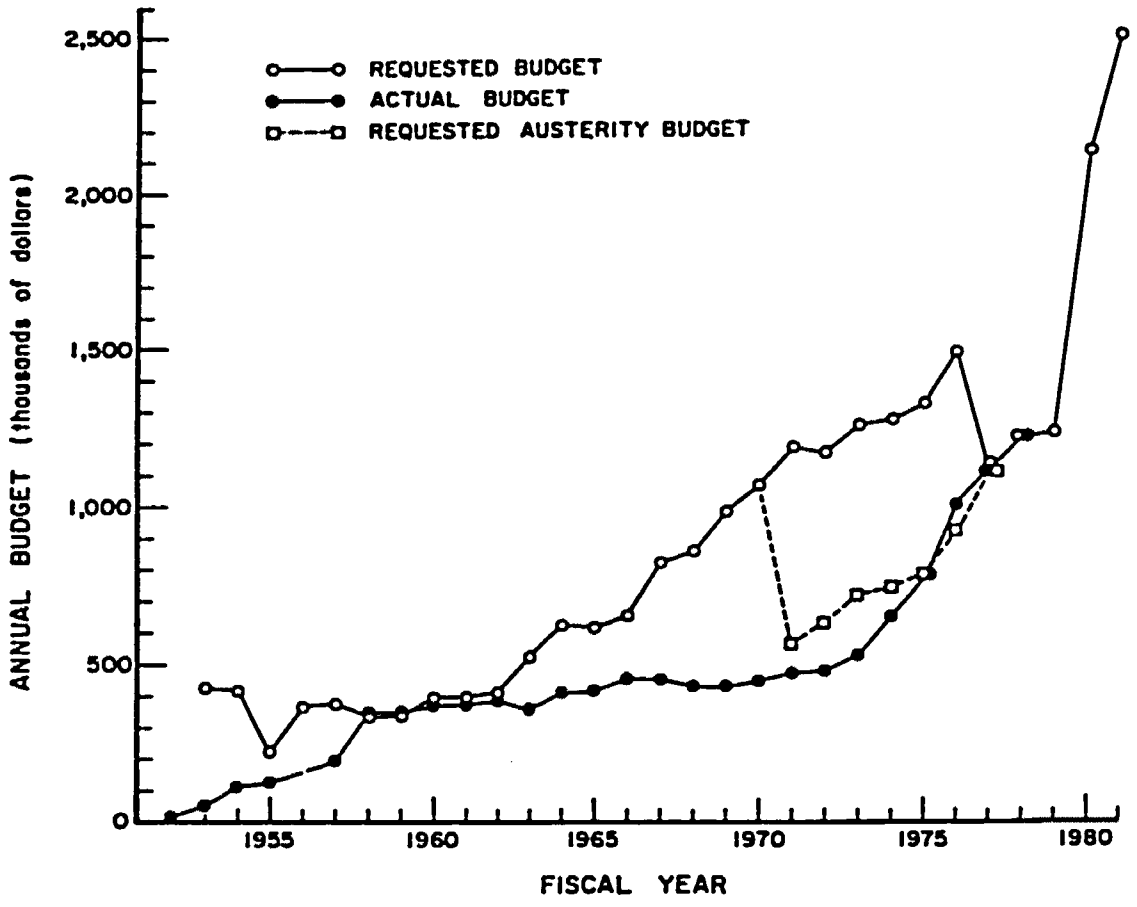


Figure 5. Requested and actual funding of the IATTC, FY 1952 to FY 1981 (requested) FY 1979 (actual). (For 1971 to 1976, both full and austerity funding were requested.)

reconvened, to accept the recommendations of the IG Meeting and promulgate them as an IATTC resolution. The minutes of the meeting are prepared and distributed by the Director of Investigations. Official languages are Spanish and English.

The Commission, by its Convention and as so carefully constrained by its developers, can only deal with scientific matters respecting the status of the tuna and associated stocks. It has no mandate to undertake studies on economic, political or social matters, nor to make recommendations on these. The Commission carries no regulatory authority. Any laws, regulation and enforcement in respect to the eastern Pacific tuna fishery are the sole responsibility of the individual member and cooperating governments, and not of the Commission.

Scientific Staff

The Commission's duties under the new Convention (in IATTC AR, 1950-51), among others, are to:

> "Make investigations concerning the abundance, biology, biometry, and ecology of yellowfin (Neothunnus) and skipjack (Katsuwonus) tuna in the waters of the eastern Pacific Ocean fished by the nationals of the High Contracting Parties, and the kinds of fishes commonly used as bait in the tuna fisheries, especially the anchovetta, and of other

kinds of fish taken by tuna fishing vessels; and the effects of natural factors and human activities on the abundance of the populations of fishes supporting all these fisheries."
(Article II, 1);

and to

"Recommend from time to time, on the basis of scientific investigations, proposals for joint action by the High Contracting Parties designed to keep the populations of fishes covered by this Convention at those levels of abundance which will permit the maximum sustained catch."
(Article II,5).

To do this, the Tuna Commission, as provided in the Convention, has an independent scientific staff which carries out its own research program.[13/] The Director of Investigations, appointed by the Commission on the basis of technical competency, develops and manages the Commission's research program. The international staff, also, is selected on the basis of technical competence in such fields as fishery biology, population dynamics, statistics, environment, and mathematical modelling. Headquarters is

13/ Only two other international fisheries commissions have independent research staffs--the International Pacific Salmon Fisheries Commission and the International Pacific Halibut Commission. The research organization of the IATTC generally follows that of the Halibut Commission.

in La Jolla, California, with field laboratories and port samplers throughout the range of the eastern Pacific tuna fishery.

Under the Convention, the staff undertakes studies on (1) yellowfin and skipjack in the eastern Pacific, (2) bait used in the tuna fishery, (3) other kinds of fish taken by tuna fishing vessels, and (4) effects of environment on fishing and abundance on all of the above species (Joseph, 1970). In 1977, after some years of consideration, the Commission also undertook responsibility for the study of marine mammals associated with the tuna fishery (Joseph and Greenough, 1979).

The core of the Commission's scientific activities, one which was established early in its development, is the collection of statistics of catch and effort in the fishery, now being done on a current basis through a logbook system and port samplers. A sophisticated, modern data management system has been developed, to provide current information on the fishery. The process is a model in the collection and handling of such data from an international fishery. Commission scientists have established a relationship between CPUE and abundance of yellowfin, and from this and other theoretical considerations have developed mathematical models to estimate the yields of the fishery for yellowfin in the eastern Pacific (Pella and Tomlinson, 1969). Researches have also been undertaken on stock delineation,

oceanography, and biology of the mandated species. The Commission has its own publication series (the IATTC Bulletin), the Annual Report, and other special publications; the staff also reports results of its researches in outside journals.

The Director of Investigations reports his research findings to the Commission and makes recommendations on them. The staff, acting in an advisory capacity, also prepares special reports upon the request of the Commission, for its consideration and formulation of regulations. The Director of Investigations also provides, on request, information and counsel to the Inter-Governmental Meeting and to individual member governments.

The Inter-Governmental Meeting

Because the Commission can only make non-binding recommendations to its member and cooperating governments for regulation of the tuna fishery, but cannot regulate per se, a mechanism to deal with regulations among the individual governments became necessary when regulation of the fishery was first proposed in 1961 by the Commission's staff. To meet this need, the Inter-Governmental Meeting was devised in 1961 as a unique mechanism to supplement the limited role of the IATTC (IATTC, 1974). The Inter-Governmental Meeting is an unofficial ad hoc

intergovernmental group of representatives of member[14/] and non-member governments, delegated to speak for their government; observers and advisors also participate. At the IG Meeting, the recommendations of the Commission's staff are debated (often based on presentations to the IG Meeting by the Director of Investigations). After agreement is reached among the affected nations, the IG Meeting drafts appropriate resolutions to reflect what would be acceptable to those governments in respect to the management regime for tunas for the coming fishing year. The resolutions are then referred to the IATTC for promulgation as a recommendation from it to the member governments. In effect, the ad hoc IG Meeting, because it has no legal status, uses the legal status of the IATTC as a means of promulgating quotas, allocations and enforcement procedures previously agreed to at the IG Meeting.

When first established in 1961, the aim of the IG Meeting was merely to attain appropriate regulatory legislation in each country participating in the tuna fishery, and cooperation with the management scheme, whether an IATTC member or not. With time, as changing circumstances dictated, the IG Meetings became a broader forum where non-member governments could present their views

14/ The IGM attendees are most often the IATTC Commissioners wearing a different hat, except in the case of the U.S., which is represented at the IG meetings by a U.S. State Department representative.

(as they could not do at the IATTC meetings) and be party to proposed conservation programs and decisions in the tuna fishery. Even more important, the IG Meetings became a forum for discussions of those issues--allocations, economics, politics--with which the Commission was not permitted to deal. The IG Meeting, as it became more deeply involved in regulation and management, even established working groups in an attempt to devise regulatory mechanisms to deal with developing management issues (IATTC, 1974).

Early in the process, the meetings were annual, at first separate from the IATTC, but later held during recesses of the Commission meetings (Table 10). As the issues became more controversial, two and three IG Meetings were sometimes held in a year and even an occasional bilateral meeting was called (Table 10) in attempts to settle differences on issues. On occasion, final agreement at the IG Meeting on the fishing regime was not arrived at until after the fishing season had opened, because of the intensity of the disagreements. Agreement on the 1979 regime had not been reached by June 1979, well past the expected closure of the season.

The IG Meeting, even though it was an informal ad hoc organization, became in effect the actual mechanism for allocative and management functions in the eastern Pacific tuna fishery. (The process became ineffective in 1979 because of the withdrawals of Costa Rica and Mexico from the

Commission.) The IG Meetings served, in an ingenious and unique way, to deal with and circumvent the lack of regulatory authority in the Tuna Convention, and to postpone for a considerable period the development of a new Convention more able to meet the demands arising from the changed ambiance of the eastern Pacific tuna fishery in the 1970's.

Regulation of the Fishery

Since 1961 (IATTC AR, 1961) the IATTC scientific staff has recommended an annual quota for yellowfin within the Commission's Yellowfin Regulatory Area (CYRA) (Figure 1).[15/] Quota determinations are based on maximum sustainable yield estimates derived from a combination of features of the yield per recruit and logistics models.

Each member country, based on the Commission's resolutions (developed as noted above) enacts specific domestic legislation to regulate its vessels fishing for tunas in the CYRA and to enforce those regulations. The fishery for yellowfin opens on January 1 of each year and

15/ No written record for the delineation of the CYRA exists, but it is generally agreed that because of morphometric and tagging evidence of an east-west separation of the yellowfin stocks and because the mathematical model then fitted the inshore fishery well, the boundaries were chosen to enclose the existing fishery and known stocks with room to spare for expansion.

closes on a date recommended by the Director of Investigations (and approved by the member Governments), based on estimates of catch to date and of projected catches under various exceptions after the closure. After the closure the vessels are permitted a 15% incidental catch of yellowfin in the CYRA and may fish unrestrictedly for yellowfin outside of the CYRA. The various exceptions after the closure have become progressively complex with time, to permit special allocations for a variety of circumstances (see, for example, the IATTC resolution for the 1978 fishery--IATTC AR, 1978). The fishery for 1979 is unregulated; no agreement was reached among the member nations because of the withdrawal of Mexico and Costa Rica and because of the continuing negotiations for a new treaty.16/

16/ The U.S. Tuna Conventions Act of 1950 provides that the U.S. may not apply its regulations to U.S. tuna fishermen in the CYRA until all countries fishing on a meaningful scale in the regulatory area also apply regulations to their fishermen. Assurance was needed from Mexico and Costa Rica, as meaningful participants, that their tuna fishermen would in fact be regulated during the 1979 tuna fishing season, even though both countries had withdrawn from the IATTC. At a bilateral meeting on May 4, 1979, held in Mexico City, the U.S. and Mexico came to an ad referendum arrangement. This involves the U.S. receiving diplomatic assurances from Mexico that it would honor a proposed IATTC tuna management regime for 1979, which would thus legally permit the U.S. to regulate its fleets' activities under the Commission resolution. The arrangement was contingent upon Costa Rica supplying similar diplomatic assurances in respect to compliance with the IATTC management regime (Rothschild, 1979b).

Annual yellowfin quotas from 1969 to the present represent an experimental program to test the validity of the stock assessments and to determine, in particular the yellowfin MSY in the CYRA (Bayliff, 1975). Annual quotas have ranged from 79,300 tons in 1966 to 175,000-210,000 tons (in increments of 20,000 and 15,000 tons) in 1978; closure dates have ranged from as early as March 5 (1972) to as late as September 15 (1966) (Table 11).

Year	Minimum	Quota[1]	Maximum	In increments[1] of	Actual[1] catch	Closure date
1966		79.3			91.2	Sep 15
67		84.5			89.6	Jun 24
68		106.0			114.6	Jun 18
69		120.0			126.5	Apr 16
1970		120.0			142.7	Mar 23
71	140		160	10 and 10	113.5	Apr 9
72	120		140	10 and 10[2]	152.4	Mar 5
73	130		160	10, 10, and 10	178.2	Mar 8
74	175		195	10 and 10	191.3	Mar 18
75	175		195	10 and 10	177.2	Mar 13
76	175		195	10 and 10	209.4	Mar 27
77	175		210	20 and 15	203.6	Jul 7
78	175		210	20 and 15	182.0	May 6

[1]In thousands of tons.

[2]Only year in which increments were implemented.

Table 11. Yellowfin quotas, actual catch and closure dates in the CYRA, 1966-1978 (adapted from IATTC, 1978a).

Chapter IV: PROBLEMS AND ISSUES

Four principal problem areas have emerged throughout the history of the IATTC management of the eastern Pacific tuna fishery. These have arisen because of changes in the methods of the fishery, because of changes in the fishing capabilities and economic constraints of the participants, and because of changes in and sharpening of perceptions regarding coastal states' rights to resources in their adjacent ocean areas. Discussion and need for action on one of these problem areas--allocation of the resource--have arisen on the initiative of and because of the deep concerns of the coastal states. The need for action on the three remaining--enforcement and surveillance, marine mammals, and licenses and fees--developed as a result of U.S. concerns and needs.

Allocation

The IATTC Convention does not provide for allocation of the resource among the participants in the eastern Pacific tuna fishery. This was of no consequence in the management of the fishery until 1961, when the scientific staff advised that the yellowfin catch in the convention area had exceeded the MSY and that the fishery had to be regulated to prevent

overfishing. What until then had been a boundless resource in which all could partake ad libitum became, with this finding, a finite amount that would eventually have to be somehow divided annually among the participants. Disagreement over the basis, methods and amounts of that division led to years of disagreement among the participants in the fishery (often particularly between U.S. and Mexico) (IATTC, 1961-1978); to an annual succession of ad hoc patchwork attempts (IATTC annual resolutions in the Annual Reports 1967 to 1978) to deal with the allocation issue; and the eventual withdrawal, in 1978 and 1979, of Mexico and Costa Rica from the Commission.

The source of the difficulties and disagreements lay in the basic differences in attitudes between the two sides in their perception of rights to use of the resource. The U.S. and the non-coastal states--the distant water fishermen --considered that tunas, as a highly migratory species, were a common resource, belonging to none and available to all. They believed that the resource should be harvested on the basis of the ability to catch, on a first come-first served basis, with complete and open access to all, wherever the fish occurred. The coastal states' position, on the other hand, was that social and political criteria beyond the simple physical ability to catch (such as geographical proximity to the resource, ownership of the resource in a resource zone, historical rights, special status as a

developing nation, inter alia) should be the basis for allocation. These opposing positions strengthened and became exacerbated with time, as feelings over historical rights deepened; as the capacities of the fleets increased (Table 4)(Gulland, 1972); as the numbers of participants in the fishery increased; as the U.S. share of the fishery declined (Table 2); as world demand for tunas increased; as trends towards coastal jurisdiction over fisheries developed (Miles, 1977); as U.S. capital investments and economic needs became increasingly urgent (NOAA, 1977; King, 1978; Broadhead, 1979); and as demands to satisfy the needs of the developing countries became more insistent.

The transactions costs, in terms of people, time, and money, to deal with the allocation issue was high. The IG Meetings on allocations were often difficult ones (see IGM minutes for 1971; IATTC, 1961-1978), with the coastal states requesting increasing allocations and special considerations, and the U.S. resisting until annual compromises, often unsatisfactory to both, were reached. A special Inter-Governmental Working Group to examine the problem was established in 1971, in an attempt to resolve the allocation and regulation issues. The group's report presented to the IG Meeting in 1974 (IATTC, 1974) was inconclusive; possibilities for management were presented but no recommendations were made. The Inter-Governmental Group took no action on the report.

The governments continued with the ad hoc subjective determinations of the allocations of the eastern Pacific tuna resource among themselves until development of the resolution for managing the 1979 fishery (Rothschild, 1978d; IATTC, 1978b). At that time the modus vivendi failed; the management regime for the 1979 fishery has not yet (June 1979) been resolved (see footnote 15).

Enforcement and Surveillance

The CYRA encompasses only a part of the distribution of the yellowfin fishery in the eastern Pacific (Figure 2). After closure of the yellowfin fishery, fishing for yellowfin is permitted without restriction outside the CYRA but is limited to a 15% incidental catch within the CYRA. Successful implementation of the IATTC conservation program requires that the activities of all large purse seiners be controlled as soon as closure is announced. Control is necessary because large vessels are capable, on the same fishing voyage, of fishing for tunas in the CYRA (where restrictions apply) or outside of the CYRA (where there are no restrictions). For management purposes, it is necessary both to enforce the 15% incidental catch limitation in the CYRA, and also to know what catches are being made outside the area. This requires that the vessels follow prescribed reporting procedures, that each country has satisfactory

procedures to monitor its fleets and catches, and that the fishing location of each vessel during the course of each closed season trip be known. Without the reporting and monitoring procedures violation by the large purse seiners of the regulatory system readily occurs.

To deal with the enforcement situation for its own fleet, the U.S. by 1970 had instituted a system based on the U.S. Navy high frequency direction finding network program (which gives a position fix derived from vessel radio reports) and on Coast Guard surveillance flights. To the present, no country other than the U.S. with large fishing vessels fishing in the CYRA has comparable adequate and effective regulations and enforcement procedures to control its vessels' operations during the closed season. Until recent years, because of the size of the fleets of the remaining countries, violations of the conservation regulations were relatively insignificant. In recent years with increasing vessel and fleet sizes, violations of the regulations by member and nonmember governments' fleets have taken on increased significance. This lack of regulation of other fleets has been of particular concern to the U.S. fleet and industry because of the inherent unevenness and unfairness in the application of the management regulations

among the international fleets.[17/]

As a consequence, the U.S. tuna industry and the U.S. Commissioners have historically supported and attempted to introduce an international enforcement surveillance system into the fishery. The U.S. first proposed a program for cooperative enforcement and for verification for landings at the November 1973 Inter-Governmental Meeting (IATTC, 1974) and has been doing so since through a variety of means (special Inter-Governmental Meetings, bilaterals, private discussions) but with no success. The issue remains unsolved within the IATTC mechanism.

Marine Mammals

One important issue in the early 70's was constructively handled and settled by the IATTC; that issue was the incidental mortality of porpoise during purse seining for yellowfin. The U.S. had in 1972 passed the Marine Mammal Protection Act (MMPA) which, among other requirements, mandated the maintenance of stocks of porpoises at optimum levels and which required an embargo on the importation into the U.S. of tunas not captured in conformity with U.S. regulations under the MMPA. Stringent

17/ Consideration of the amount of uncontrolled catch during the closed season is included in the Director of Investigations' determination of the closure date. This, however, is not a very efficient way to manage a fishery.

regulation, under the MMPA, of the U.S. fleet activities was operating to reduce the incidental porpoise mortality caused by the actions of the U.S. fleet, but a considerable amount of porpoise mortality was being caused by the unrestricted fishing of the non-U.S. fleet on tunas associated with porpoises. In addition to the requirements of the Act itself, to have the porpoise situation brought to the attention of international bodies, there was considerable pressure on the U.S. Commissioners to the IATTC both from environmentalists to act internationally to reduce porpoise mortalities in the fishery and from the U.S. industry to see that any limitations in respect to fishing tunas on porpoise were applied equally to the international fleet.

From a first notice by the U.S. of the problem at the 1972 IATTC meeting (IATTC, 1972), a series of subsequent discussions and studies (IATTC, 1976a) culminated in a special IATTC meeting in 1977 on the tuna-porpoise problem. It was agreed there that tuna-porpoise research was indeed an appropriate IATTC program element, because of the international nature of the problem, the migratory nature of the porpoise, and the close association with the eastern Pacific tuna fishery. Program funding was approved at the October 1977 Commission meeting, and research activities started in the fall of 1978 (Rothschild, 1978d).

The Commission's program focuses primarily on (1) the recruitment and training of scientific technicians who will

collect data from vessels at sea on the stocks of porpoise in the eastern Pacific and (2) workshops to evaluate and disseminate information on porpoise-saving techniques and gear technology (Keith, 1977a).

This issue was one of the few which arose during the management of the eastern Pacific tuna fishery which was successfully dealt with by the IATTC, in a spirit of cooperation and mutual interest.

Access, Licenses, and Fees

Access for fishing vessels to the tuna resource off the coastal states, and licenses and fees for that access were issues in the eastern Pacific tuna fishery of major concern to the U.S. side. Although not considered and treated as issues per se at the IATTC or the IG Meetings, they were a continuing and underlying problem which governed many of the actions of the governments and their fleets, from the early days of the Commission to the present. The access problem lessened considerably in the late 1970's, as new perceptions of the 200 mile zone developed and were clarified. The licensing and fee problems remain.

The access issue arises from the unilateral extension (especially after World War II) by several Latin American countries of their territorial seas (or other claimed maritime rights) for distances to 200 miles offshore, and

the refusal of U.S. to accept these extensions, instead preferring to abide by the customary international law of a 3 mile territorial sea (later added to within the U.S. by a 9 mile contiguous zone).[18/] The problem began early in the history of the eastern Pacific tuna fishery, in the 1920's and 1930's, when access by U.S. bait boats to the bait grounds was constrained by Mexico (see above).[19/] In 1947, Peru and Chile declared maritime zones of 200 miles; Ecuador followed suit in 1950. In 1952, the three nations, in the Declaration of Santiago, established a maritime zone of 200 miles off their coasts.

To enforce these unilateral extensions, the coastal countries at varying times and to varying degrees imposed licenses, registration and fishing fees, vessel size limits, and fishing area closures. Because of the conflict in views between the U.S. and coastal states on the 12/200 mile issue, the extended zones were ignored by U.S. (and other distant water) tuna fishermen, and tuna fishing by the non-coastal states continued in the 200 mile zones. The consequence of this was the so-called "tuna war", replete with seizures, fines (Table 12), shootings, sanctions, blandishments, threats, special U.S. legislation, and

18/ The historic development of the extensions and the views and positions of both sides during the ensuing confrontations are excellently documented in Loring, 1971.

19/ The access issue was a factor leading to the development of the 1925 and 1949 U.S.-Mexico Tuna Conventions.

By year	Total number of seizures	Total estimated fishing days lost from seizures	Total fines paid for release of vessel. Beginning 1969, includes licenses and matriculas	Total licenses and matriculas paid for release of vessels	Total other costs. Beginning 1971, including port charges and lost fishing time, 1975 confiscated fish	Grand total
1961	1	4	$ 2,500.00	$ 0	$ 714.85*	$ 3,214.85
62	10	75	17,427.90	5,180.00*	240.30*	22,848.20
63	11	59	20,688.00	8,350.50*	157.00*	29,195.50
64	2	2	0	0	0	0
65	10	51	19,312.00	28,942.20*	1,517.86*	49,772.06
66	14	54	80,636.00	2,900.00*	5,039.68*	88,575.68
67	16	63	106,352.00	39,898.20*	8,443.60*	154,693.80
68	10	35	305,235.00	23,726.00*	6,287.50	335,248.50
69	14	25	93,992.00	N/A	1,976.33*	95,968.33
1970	4	6	154,252.00	0	2,600.00*	156,852.00
71	53	64	2,504,190.00	N/A	393,268.00*	2,897,467.00
72	30	71	1,767,202-00	N/A	300,218.00*	2,067,420.00
73	28	77	1,065,004.00	N/A	229,515.00*	1,294,519.00
74	1	3	57,200.00	N/A	16,185.98	73,385.98
75	7	273	1,697,873.61	N/A	2,238,225.42	3,936,129.03
Total	211	862	$7,891,873.51	$108,996.90	$3,204,419.52	$11,205,289.93

*Estimated.

Source: American Tunaboat Association, 1975.

Table 12. Statistical summary of seizures of U.S. vessels and fines and other costs (Table 1 of Lane, 1976).

general mayhem and to-do (Loring, 1971; Lane, 1976).

The access issue was deflated when the U.S. passed the Fishery Conservation and Management Act of 1976 to assume control herself of coastal fishery resources out to 200 miles, even though the highly migratory tunas were excepted. The U.S. fleet began to purchase licenses at an increasing rate from the coastal states (Lane, 1976) in order to fish unrestrictedly in the 200 mile zones. The plethora of fee structures, fishing restrictions, and special conditions was complex and the fees (Table 13) imposed by the coastal states were variable and expensive. The issue of uniform licensing and documentation throughout the fishery and of standard non-punitive fees is one that remains open and unsettled today in the eastern Pacific tuna fishery, under the IATTC mechanism.

Coda

The current discouraging status of the IATTC and the management of the eastern Pacific tuna fishery wholly demonstrates the ineffectiveness of the IATTC Convention of the 1950's, and of the ancillary IGM, bilateral and other arrangements in managing the eastern Pacific tuna fishery of the 1970's. All of the arrangements to deal with the issues have been essentially ad hoc attempts to treat symptoms and not the basic problems which derive from the nature of the

COUNTRY	PRICE CHARGED FOREIGN VESSEL FOR COMMERCIAL FISHING LICENSE	DURATION OF LICENSE	PROCEDURES FOR OBTAINING LICENSE	LIMITATION ON SIZE OF FOREIGN FISHING VESSEL	LIMITATION ON TYPE OR MODE OF FISHING	ZONE RESERVED EXCLUSIVELY FOR DOMESTIC FISHING VESSELS	PENALTIES FOR COMMERCIAL FISHING WITHOUT VALID LICENSE	OTHER RELEVANT POLICIES AND PRACTICES
MEXICO (Source: Mexico) (13:30)	Tuna-$20 Shrimpers-Century-1538. Shrimpers-Tampico-2006. Snapper-Grouper-633. Inside 12:-$80.+$23.20/ Net Ton or $46.40/Net Ton/Trip	1 Year, except for inside 12 mi. which is by trip.	West Coast-In San Diego, San Pedro, or Ensenada. Gulf-Govt. to Govt.	None (but number of vessels limited by U.S.-Mexican Executive Agreement.	Purse seine net size limited by Executive Agreement. Long-line tuna fishing prohibited.	West coast fishing inside 12 mi. permitted by agreement	Confiscation of catch, plus fine	Catches of shrimp and tuna limited by tonnage
GUATEMALA (Source: Guatemala 7276)	US $40 if vessel has net weight of less than 50 tons; $60 for vessels between 50 and 100 tons; $180 for vessels greater than 100 tons	1 year	Must be obtained from Ministry of Agriculture	None	Use of poisons and explosives prohibited. No licenses issued for Pacific shrimp fishing.	None	Seizure of fishing gear, confiscation of catch, and $10,000 fine	Ship must pay $10 per ton fish storage capacity each time it puts out to sea from a Guatemalan port.
EL SALVADOR (Source: San Salvador 4460)	(Not available, but will be based on net registered tonnage of vessel)	(Not available)	Must be obtained from Department of Industrial Development and Control or from Salvadorean Consulate	None	(Not available)	First 12 miles: only Salvadoreans or companies at least 50% Salvadorean-owned. 12-60 miles: only companies domiciled in El Salvador	Payment of fine equal to US $80 per net registered ton; possible further punitive action	
NICARAGUA (Source: Managua 5138)	US $10 for boats up to 10 feet in length; $1 additional for each foot in excess of 16 feet	20 years	Must be obtained from Directorate General of Natural Resources	None (but number of licenses may be limited, as may be the number and size of vessels exploiting a given fishing area)	Use of poisons and explosives prohibited	None	Payment of $1,400 fine (doubled for subsequent violations), possible revocation of fishing license, and possible confiscation of fishing gear.	Fishing licenses are only issued to persons or corporations who have or promise to establish fish processing plants in Nicaragua
COSTA RICA (Source: MMFS)	US $30 for vessels up to 400 tons; $60 for vessels over 400 tons. Registry: 55 pesos/Net ton or $10/ Net ton if for same year of application. Bait boats pay 50% of above.	60 days or one trip	(Not available)	None	Vessels using live bait or harpoons instead of nets granted 50% fee reduction	None	(Not available)	Foreign vessels of less than 400 tons which sell at least 100 tons of catch to domestic canneries granted free extension of permit. Foreign vessels under contract to domestic company company given same treatment as national flag

Table 13. Fishing regulations of west coast Latin-American countries, 1978. (Prepared by U.S. Embassy, Quito, Ecuador, June 1978.)

COUNTRY	PRICE CHARGED FOREIGN VESSEL FOR COMMERCIAL FISHING LICENSE	DURATION OF LICENSE	PROCEDURES FOR OBTAINING LICENSE	LIMITATION ON SIZE OF FOREIGN FISHING VESSEL	LIMITATION ON TYPE OR MODE OF FISHING	ZONE RESERVED EXCLUSIVELY FOR DOMESTIC FISHING VESSELS	PENALTIES FOR COMMERCIAL FISHING WITHOUT VALID LICENSE	OTHER RELEVANT POLICIES AND PRACTICES
PANAMA (Source: Panama 6809)	US $30 per net registered ton. Navigation permit $600 (permit good for 6 months)	6 months	Must be obtained from Marine Resources Office	None	None	None	Vessels serving domestic market must pay fine of up to $1000. Vessels serving external market must pay fine of $10,000-$100,000	Vessel may be confiscated for repeated violations. Vessel must have agent in Panama
COLOMBIA (Source: 75 Bogota 4443)	100-200 pesos per gross registered ton for firms domiciled in Colombia; 2,000 pesos for others. Registration fee, $10,000 pesos, good for 30 days.	If domiciled in Colombia, 1 year (and one ocean); otherwise 30 days (and one ocean)	Must be obtained from the National Institute for the Development of Renewable Natural Resources	None	Shrimp fishing is temporarily banned and lobster fishing is regulated. Foreign nationals are legally domiciled in Colombia may fish only for cetaceans, tuna and live fish bait.	None	(Not available)	
ECUADOR (Source: Quito 6394)	US $80 per net registered ton, 60 day. Registration fee $1000	1 "voyage" (60 to 90 days depending on where license is obtained)	Must be obtained from Directorate General of Fisheries or from Ecuadorean Consulate. Permission to fish granted by radio.	None	Use of poisons and explosives prohibited. Foreigners not allowed to fish for lobster or shrimp.	60 miles	Payment of fine equal to $120 per net registered ton and confiscation of catch for first offense; increased for further violations.	Ships operating under association agreements must sell 20% of their catch in Ecuador.
PERU (Source: Lima 8624)	US $80 per net registered ton. Registration fee $1000	100 days and registration for one year	Must be obtained from Ministry of Fisheries or from Peruvian Consulate	None	Use of poisons and explosives prohibited. Foreigners not allowed to fish for anchovies.	None (but Ministry of Fisheries has authority to establish limits)	Payment of fine equal to $80 per net registered ton for first offense; increased for further violations.	Foreign commercial fishing vessel must have agent in Peru.
CHILE (Source: Industries Pesqueras)	US $60 per net registered ton	(Not available)	(Not available)	None	Licenses only granted for fishing south of 40° and west of 74° W between 37° and 40° S	None	Payment of fine equal to $120 per net registered ton.	$20 per ton of fish must be paid as a tax.

Table 13. (Continued)

Convention itself and from its institutional limitations. These limitations include:

1. The Inter-American Tropical Tuna Commission has no regulatory authority or power. This results in dependence of the IATTC conservation and management program on the degree of both the commitment which the IATTC member states care to give to the regulation and enforcement of IATTC recommendations and the cooperation which the non-member nations may or may not undertake for the same purposes.
2. The IATTC has no "ownership" of the eastern Pacific tuna resources which are presently considered a common property, so that the access to the fishery is open to all under the principle of free fisheries competition on the high seas among the states. This open entry and competition has led to pressures on and violations of the regulatory system.
3. The Commission's mandate is for only one facet of fisheries management--scientific study and research. Under this mandate the resource has been remarkably well conserved to date on the basis of exemplary biological research but the conservation program is under threat emanating from the breakdown in the management and regulation of the yellowfin fishery. In addition there is no provision for systematized input to the management system (except on an ad hoc and casual basis) of social,

economic, legal, and other pertinent data necessary for the management of the fishery.

4. Some nations participating in the tuna fishery or off whose coast tunas are taken in eastern Pacific are not formal parties to the management institutions, either as members of the IATTC or as delegates (as opposed to observers) to the Inter-Governmental Meetings. The states, as such, are under no formal obligation to implement any IATTC recommendations or to respect any which are instituted by IATTC member nations.
5. The Commission's yellowfin regulatory area does not presently encompass the entire area of the yellowfin fishery in the eastern Pacific Ocean. While the extent of the area is based on apparently reasonable biological criteria, the general non-consideration of political and regulatory realities in delineating the area has resulted in a costly complication to the regulation and enforcement procedures.
6. The role of the Inter-American Tropical Tuna Commission has become increasingly relegated to that of a forum for the orderly presentation and discussion of scientific matters and administrative details. The fundamental discussions and decisions concerning allocations and regulations of the tuna resource essentially take place within the ad hoc Inter-Governmental meetings. Consequences of this are not serious in respect to the

management of the resource (and, indeed, may have some advantages) but this situation raises the institutional and administrative issue of whether two bodies are required to deal with a single problem.

These institutional problems have been emphasized and aggravated by the present mode of regulation of the fishery under a first come-first served global quota system, which has led to excessive fleet carrying capacity, to an increasing number of participants, to demands by the participants for various rights to the resource, and to serious economic, social and political stresses. An augmenting perception of these shortcomings, a growing realization that the IATTC system could not be salvaged, and the growing pressures of the allocation and other issues on the rational management of the fishery led to the formal initiation in 1977, by Mexico and Costa Rica, of negotiations for a new tuna management regime in the eastern Pacific Ocean.

Chapter V: RENEGOTIATIONS

Prelude

As late as October 1974, Mexico still felt that it could work within the structure of the IATTC Convention to deal with the problems that had presented themselves in the late 1960's and the 1970's. At a U.S.-Mexico bilateral meeting held then in Mexico City to discuss the regulations for the forthcoming 1975 fishing season, both Mexico and the U.S. "did not discuss a renegotiation of the IATTC and made clear that they did not desire to change the basic terms of the agreement at this time" (Anonymous, 1974). Both felt that it was desirable to maintain the existing IATTC structure pending outcome of the Law of the Sea negotiations inasmuch as any new arrangement established before a final determination of the LOS Conference would only be a temporary one.

In October 1975 at the 18th Inter-Governmental meeting held in Paris (IATTC, 1961-1978) (and in an announcement repeated at the 19th Inter-Governmental Meeting (IATTC, 1961-1978) which was held in Washington, D.C. in December of the same year as part of the continuing arguments over the 1976 allocation) Mexico reversed her position in respect to remaining with the IATTC format and informed the delegates

that an invitation would be extended through official channels for a meeting of Plenipotentiaries to reconsider the yellowfin tuna problem. Mexico felt that it was desirable to revise the Tuna Convention and to adopt a new regulatory system which would be equitable and just. The U.S. Commissioner at the December meeting noted that it was perhaps necessary to create a new structure in view of the difficulties which had arisen. This was the first in a series of actions resulting in meetings ranging from bilateral consultations to full-scale Plenipotentiary Conferences from September 1977 to March 1979 (Table 14) to negotiate a new regime for managing tunas in the eastern tropical Pacific Ocean.

In spite of the Paris announcement by Mexico, no invitations for such a meeting were sent out in 1976. Mexico did, though, as a next step, add to the agenda of the 20th Inter-Governmental Meeting in Managua in October 1976 an item concerning the convocation of a regional convention to consider a new agreement on tropical tunas.

Mexico, in a prepared statement (Tello, 1976) to that Inter-Governmental meeting, noted that this was importantly the first Inter-Governmental Meeting that Mexico was attending after having declared her Exclusive Economic Zone (EEZ) on July 31, 1976, based on the emerging consensus at the Law of the Sea Conferences. Inasmuch as Mexico was now exercising sovereign rights for exploiting the resources in

Date	Place	Convenor	Participants		
Sep 19-23/77	San Jose	Mexico Costa Rica	Canada El Salvador Japan Honduras Panama	Colombia Spain France Mexico Peru	Costa Rica USA Guatemala Nicaragua IATTC
May 24-26/78	San Jose	USA	Costa Rica	USA	
Jun 28-29/78	San Jose	Costa Rica	Costa Rica USA	Nicaragua IATTC	Panama
Aug 8-10/78	Mexico City	Mexico	Mexico	Costa Rica	USA
Aug 17-18/78	New York	Costa Rica	Mexico Peru Nicaragua	Ecuador Colombia USA	Chile Panama Costa Rica
Sep 11/78	New York (United Nations)	USA	Chile Mexico	Costa Rica Peru	Ecuador USA
Sep 25-27/78	Lima	Permanent South Pacific Commission	Chile Colombia	Ecuador	Peru
Oct 9-10/78	Bogota	Colombia	Chile Ecuador USA	Colombia Mexico	Costa Rica Peru
Dec 11-14/78	San Jose	Costa Rica	Costa Rica Guatemala Colombia	Mexico Panama	USA El Salvador
Jan 15-19/79	Mexico City	Mexico	Mexico Colombia France Japan Peru	Costa Rica Ecuador Spain Nicaragua USA	Canada El Salvador Guatemala Panama IATTC
Mar 7-8/79	Washington, D.C.	USA	Costa Rica	Mexico	USA

Table 14. Dates and locations of re-negotiation meetings for a new tuna regime in the eastern Pacific, and participants, September 1977 to March 1979.

that zone, Tello stated that Mexico could no longer reasonably negotiate the tonnage of tunas which her own nationals might take from that EEZ. As a consequence, a new treaty was needed which would take into account existing realities. The basis for any new regime which might be developed would be three-fold, according to Mexico: (1) the allocation of country quotas based on the concentration of the resource in the area, (2) these quotas to be periodically modified in accordance with the harvesting capacity of the coastal states, and (3) the country quotas were to be established within the framework of an eastern Pacific global quota to ensure conservation of the resource. The Mexican delegate also announced at that meeting that a document prepared by Dr. Joseph of the IATTC entitled "Alternatives for the International Management of Tuna Resources" (IATTC, 1976b) would be one of the basic documents to be considered at the meeting to be called.20/

20/ This document was distributed in mimeograph form at the Commission's annual meeting in October 1976 in Managua. It was subsequently updated with material added on the tuna/porpoise problem and billfish management and published as a book in 1979 (Joseph and Greenough, 1979). Their study notes five essential features of a management system: (1) conservation and management must be applied to the exploited resource over its entire range, (2) some form of recognition should be given to resource adjacent nations' claims for special allocations or treatment as a result of their adjacency to the resource, (3) resource adjacent nations and non-resource adjacent nations alike should be guaranteed open access to all important fishing grounds including those within the resource adjacent nations' coastal zones, (4) effective means should be developed to limit fleet expansion, and (5) a capability should exist for providing uniform enforcement of conser-

The meeting to be called by Mexico was to be held at the United Nations in New York in the first months of 1977 to which all the coastal states and the members of the IATTC would be invited. Costa Rica strongly seconded the need for and move to renegotiations. Canada and the U.S. both agreed to participate in such a meeting, the U.S. suggesting that countries which had demonstrated an interest in the resource should also be invited.

In early August 1977, after delays resulting from the involvement of the various negotiators in the ongoing Law of the Sea Conferences, Mexico and Costa Rica simultaneously issued invitations to members of the IATTC for a Plenipotentiary Conference to take place in San Jose, Costa Rica from September 19 to 28, 1977. The purpose of the meeting was "to negotiate a new international instrument--to regulate the catch of tuna, both within and beyond the exclusive economic zones" (Weissman, 1977). At the time of the Plenipotentiary Conference Mexico and Costa Rica would submit a joint proposal to modify the existing IATTC agreement. It appeared unlikely, however, that the proposal would be circulated before the meeting. Because of the

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vation regulations. The authors examined a number of methods of managing the resource, such as: (1) the present system, (2) national management to 200-miles, (3) regional coalitions, (4) total allocation of the resources, (5) allocation by competitive bidding, and (6) partial allocation to resource adjacent nations. The authors considered that the partial allocation system offered the best chance of success.

complexity of the issues, it is likely that Mexico's expertise on the subject was a large element in the development of the joint Costa Rica-Mexico document.

In an attempt to get an advance view of the document to be presented at the San Jose meeting, a U.S. team visited Mexico in August 1977. However, they did not see the document (probably because it was not yet ready), but were given a summary of Mexican views at to what a new arrangement for managing the eastern topical tuna fishery might be. These views were essentially those of the partially allocated quota (PAQ) system developed in the IATTC (1976b) document (see following discussion). During this meeting the United States again reiterated its view that other countries with an interest in the fishery, and international organizations such as FAO and the International Commission for the Conservation of Atlantic Tunas (ICCAT), be invited.

Although the IATTC alternatives document had been distributed to the IATTC members in October 1976 at the Commission meeting in Managua and Mexico had at the subsequent Inter-Governmental meeting stated that that document would be the basis of the new arrangements in the eastern Pacific tuna fishery, it was only at the September 1977 Plenipotentiary Conference that the participants were provided with the formal initial position which served from then on as the base for subsequent negotiations and

disussions (Costa Rica and Mexico, 1977).

In these negotiations and discusssion, two fundamental groups of participants in the meetings from September 1977 to the present developed. These were the Latin-American Pacific coastal states (the resource-adjacent nations - RAN's - of Joseph and Greenough, 1979) and the U.S.[21/] and the non-coastal states fishing in the area. Among the RAN's, however, there was a fundamental philosophical split based on different concepts of sovereign rights over the migratory fishery resources within the 200-mile zone (of which more below) so that two Latin American camps developed--one including the RAN's, then members of the IATTC, and the other, the CEP (Chile, Ecuador and Peru) countries along with Colombia. Mexico quickly assumed the lead role for the former group and retained it during all of the renegotiation activities with Costa Rica participating to a lesser degree but nearly always involved. Ecuador was the main player for the CEP countries. On the other side, the USA was essentially the principal participant as the consultations and negotiations progressed.

Those countries attending the Conference of Plenipotentaries for the International Conservation and

21/ The U.S. was in an ambiguous position in that she was, under the Joseph and Greenough (1979) classification, considered to be a coastal state and a RAN but was treated during negotiations as a distant water state by the remainder of the RAN's.

Management of Tunas in the Eastern Tropical Pacific held from September 19-23, 1977, in San Jose, Costa Rica were: Mexico, Costa Rica, Canada, Japan, France, Panama, Nicaragua, the United States (all members of the IATTC), El Salvador, Guatemala and Colombia. Chile, Ecuador and Peru did not attend as participants. Peru, Spain and Honduras were represented by observers at the meeting.

The Costa Rica-Mexico Proposal

The joint Costa Rica-Mexico proposal (Costa Rica and Mexico, 1977a) represents the starting point for the subsequent renegotiation interactions. It will be useful to digress from the chronological series of events to examine the issues raised by the proposal so that the subsequent negotiations and events may be better understood. The proposals fell generally into four categories--those dealing with institutional matters (membership, voting, organizational structure, enforcement); management principles (area of application, species, limited entry, tuna/porpoise); resource allocation (guaranteed annual quota, disposition of remainder of total allowable catch); and permits and fees (participant fees, distribution of the income).

Institutional Proposals

The Costa Rica-Mexico proposal for membership in the new Organization was that those States which participate as parties in the Plenipotentiary Conference and which ratify the new treaty would become members of the new organization. This would exclude present participants in the fishery such as Bermuda, Congo, and the Netherlands Antilles from the organization, as well as the CEP countries. This proposed restriction was a concern to the United States because of the implications in respect to entry of U.S. vessels into tuna fisheries in other ocean areas, and because the U.S. wished to regularize the tuna fishery by its vessels in all the Pacific coastal waters as well as to rationalize the management of the species. This could not be done well were some coastal countries excluded from membership in the organization. Membership was not a major issue during the subsequent negotiations. However, the participation of the CEP countries in the new arrangements did become an issue and serious attempts through a series of meetings in 1978 on the part of both the United States and Mexico and Costa Rica were taken to get the CEP countries involved (see below).

For voting, Mexico and Costa Rica proposed that decisions would be taken by a majority of two-thirds or three-quarters unless otherwise provided in the new Convention. The United States, because of its concern of

being overwhelmed by the coastal states in the new organization, insisted that the principle of unanimity govern. This also never became an important issue throughout the discussions; although not completely agreed-upon by mid-1979, it was considered to be amenable to resolution.

The Costa Rica-Mexico document also proposed that the organization include an Assembly and a Secretariat as its organizational structure, the Secretariat to be divided into research and administrative sections. Again there was no serious issue raised by this proposal. The purposes served by such an arrangement would be to formalize the existing ad hoc Inter-Governmental mechanism through the new Assembly, preserve the present IATTC research organization[22/] as the new research section of the Secretariat and provide for the administrative mechanics of any new allocation and administrative system.

22/ The opportunity to examine the virtue of maintaining the present IATTC research mode (independent research group) versus that of introducing the International Commission for the Conservation of Atlantic Tunas mode (each country doing a share of the research) or some compromise mode (e.g., each country doing a share of the research plus a small central-core professional staff) was not taken. This implies a generally high confidence in the present scientific research arrangement of the IATTC, although Gulland (1978) has raised some questions in this regard. During the negotiating process, two separate proposals (one from the U.S. industry and one from the U.S. government) to establish a scientific review committee for the proposed research section never saw the light of international debate.

A fourth institutional proposal made in the Costa Rica-Mexico document was that enforcement of the proposed new organization's rules within the EEZ be undertaken by the coastal states with verification and confirmation of unloading the responsibility of the organization. As discussed in a previous section, this issue was an important one to the United States whose underlying assumption for a new convention was that it would contain a comprehensive surveillance and enforcement regime with sufficient authority to govern the activities of both member and non-member nations in the area of application and thus put all participants on an equal footing. The Costa Rica-Mexico proposal tabled at the San Jose meeting did not contain surveillance provisions, although this could readily be shown to be basic to an effective management system for the tunas. This issue was one of interest to both sides and, while an important element of the negotiations, never became a contentious one.

Management Principles

The Costa Rica-Mexico proposal regarding the area of treaty application defined it as the same as the present IATTC area (the eastern Pacific Ocean for investigation purposes, the CYRA for application of conservation measures) but beginning 12 miles from the coast. This latter, in an

attempt to implement the developing LOS tenets, would restrict access to the resources within the area and provide exclusive fishing rights for the coastal states. For the U.S. the 12-mile situation might better have been left to bilateral arrangements (as she presently had with Mexico) or to await a final LOS finding with subsequent treaty amendment. There was no great concern over this, however, and the issue remained minor throughout the negotiations.

The Costa Rica-Mexico document proposed that only selected tuna species be included; additional species could be added based on scientific study and assessment by the new organization. In the proposal, selected tuna species would be divided into: (a) those subject to conservation measures (yellowfin), (b) those not subject to conservation measures (skipjack), and (c) those not the object of international measures but regulated solely by the coastal states. The U.S. had difficulty with the third category since it gave management authority over other non-listed highly migratory species to coastal states, a situation inconsistent with the intent of the Single Negotiating Text of the LOS. The U.S. also wished to have marine mammals associated with the tuna fishery included among the species considered by the new organization. The issue of the inclusion of the marine mammals among the highly migratory species aroused no serious differences and was dealt with easily throughout renegotiation.

The Costa Rica-Mexico document proposed the "principle of saturation of the fishery"--a version of limited entry. The principle would recognize that some form of control over the number of vessels or number of states participating in the organization might be necessary. Although there was no important disagreement with the concept in principle, it disappeared from the discussions as the negotiations progressed.

The Costa Rica-Mexico working document further proposed that measures be adopted by the assembly to resolve, as soon as possible, the tuna/porpoise problem. This was consistent with the U.S. position which was to have specific language put into the new treaty which would satisfy the intent and requirements of the MMPA.[23/] Because of its common interest, the issue was satisfactorily dealt with throughout the discussions, and a U.S.-developed article dealing with this was incorporated into the Draft Convention (Costa Rica, Mexico and United States, 1979).

23/ Representatives of the U.S. environmental community were present at many of the international negotiating sessions, starting with San Jose in September 1977, to present the case for marine mammal protection within the impending new treaty.

Resource Allocation

The Costa Rica-Mexico working document presented at San Jose in September 1977 proposed a guaranteed annual quota of each regulated species for each coastal state based on the concentration of the resource in its economic zone, the quota to be equivalent to the average harvest captured by all tuna fleets within the coastal states' zone over the preceding five years. The allocation proposal was based on a selection of one of several developed in the IATTC 'alternatives' document (IATTC, 1976b). One of the models developed in that document involved allocations to coastal states (RANs) in relation to the average distribution of the tuna resources in each's coastal waters. Based on this principle, two allocation levels were developed--a maximum and a minimum. The high allocations involved shares equivalent to the average catch taken in coastal waters by the entire international fleet in the past five years. At this high level, the maximum emphasis is placed on the adjacency of the coastal states to the resource. The low allocation option involved shares equivalent to the average catch taken in recent years within the coastal zone by the nation's own fleet. This option gave maximum emphasis to historical catch levels and to harvesting capacity. In both the high and low options the remainder of the total quota for the CYRA was un-allocated. The allocations were

considered to be non-transferable guarantees of access and the portions of the allocations which were not utilized would be added to the un-allocated portion of the quota. This scheme was termed partially allocated quota (PAQ) management.

The Costa Ricans and Mexicans proposed the high option of the model, which would result in the coastal states being allocated approximately 69% of the catch in the CYRA.

The U.S. reaction to this was based on the desire to maximize the U.S. share of the yellowfin catch and thus minimize any economic dislocation to the U.S. flag fleet, fishermen and cannery workers. This required acceptance of some form of coastal preference which had, in effect, already been settled by both the U.S. position at the LOS Conferences, and by the present IATTC de facto allocation system. Given that, the next issue for the U.S. became provision for that coastal state preference. A first suggestion was to retain the present IATTC system but this was quickly discarded. After some examination of the several management alternatives, the U.S. internally accepted the principle of the PAQ. The issue then became determination of the relative shares of the resource which would go to the RAN's and to the non-RAN's.

As noted, Mexico and Costa Rica wished to use the average annual catch in the 200-mile zone by the international fleet as the index of concentration to

determine the quantities or allocations to which the coastal states were entitled. However, the U.S. considered that the historical distribution of catch was not a true measure of the concentration of the resource in the 200-mile zone. She argued that the historical catches resulted from: (1) the management system, (2) historical economics, (3) historical technology, (4) historical knowledge of the resource, and (5) strategy of the fishermen. As a consequence of these considerations, the 200-mile zone catches are related to but are not a true measure of the distribution of the yellowfin resources that exist there throughout the year.

A better way then to develop an index of concentration, the U.S. considered, would be one based on the concentration of density as measured by the catch per standard days fishing. The concentration index could be computed, for example, by multiplying the average annual density of fish in the coastal zone times the area of the resource in the coastal zone, and then dividing by the same statistics for the total area of the CYRA yellowfin. Recalculation on this basis of the relative concentration indices resulted in the U.S. determination that about 45% of the CYRA yellowfin resource existed on the average in the 200-mile zone (Fox, 1978) rather than the 69% which Costa Rica and Mexico claimed on the basis of historical catch.

This 45%-69% split in the two sides' positions on allocation of the yellowfin tuna resource became the

fundamental issue in the negotiations.

Associated with the guaranteed annual quota proposal, was the proposal in the Costa Rica-Mexico document that the remainder of the total allowable catch for each species plus that portion of the guaranteed quota which the coastal state is unable to catch be harvested by all states during the open season. The U.S. was in agreement to this provision. Costa Rica at one point in the negotiations reversed itself on the proposal but then reverted to the original position. It was a minor element in the negotiations[24]/

Permits and Fees

The Costa Rica-Mexico working document proposed the issuance of international fishing permits to vessels participating in the CYRA fishery, to identify participating vessels and to verify the catches unloaded by those vessels. For the U.S., based on its past experiences with the complexity of licenses and fee systems in the fishery, and its desire to internationalize and regularize the permit system throughout the entire eastern Pacific tuna fishery area, the permit proposal was both necessary and desirable. It was not a contentious issue during the negotiations.

24/ It was however one of the issues raised by the CEP countries in the discussions by Mexico, Costa Rica and the United States with them in 1978 (see below).

The Costa Rica-Mexico document also proposed a fee system based on the tonnage of tuna landed by vessels having international fishing permits. The regional organization would fix the fees per ton caught on the basis of 5% of the dockside value. The income derived would then be allocated to cover: (1) administrative expenses (20%) of the organization; (2) rebates to coastal states under a coastal state preference agreement; and (3) additional rebates to all members of any remaining surplus funds.

As originally proposed, the fee system was supportable by the U.S. provided that the amount was based on an average international price for tuna, and that unloadings were verified. During the course of the negotiations, however, the original Costa Rica-Mexico proposal was modified so as to increase considerably the cost of the fees. The amount, not the principle, became an important issue during the renegotiation processes.

The proposed distribution of the fees did not become an issue. It was considered by the U.S. to be a more equitable approach to financing the management system and the new organization than that used under the existing Convention, whereby the U.S. historically contributed well over 90% of the IATTC budget.

Meetings

San Jose, September 19-23, 1977

Because the participants saw the Costa Rica-Mexico working document for the first time at the San Jose meetings, response and comments on it were limited. After some long and essentially ineffectual plenary sessions, the heads of delegations established a working group to examine the Costa Rica-Mexico document to identify areas of agreement and disagreement. The smaller group produced a report which was specified not to be prejudicial to the future positions of the participating governments. As the Final Statement (Costa Rica and Mexico, 1977b) of the Conference indicated, the Plenipotentiary Conference was positive if only because it allowed for an examination of the positions of the negotiators and because the Costa Rica-Mexico document and the working group document indicated the need for continued negotiations.

An early tactic which the United States pursued in the negotiations was an attempt to continue the prevailing IATTC mechanism as the management organization, ostensibly to hasten the negotiating process, it being considered easier to modify an existing arrangement rather than develop a new one. This suggestion made at the conference brought the strong response that might have been expected from Mexico

and Costa Rica, namely that the IATTC mode no longer served the new needs of the members (Keith, 1977b). It was at the San Jose Plenipotentiary meeting that Mexico for the first time publicly declared that she would withdraw from the IATTC if an agreement on a new system were not forthcoming. Costa Rica followed suit more softly, indicating only that she would review her membership in the IATTC.25/

In a continuing attempt to include the CEP countries in any new arrangement, the U.S. in December 1977, requested the views of Ecuador on the Costa Rica-Mexico working document presented earlier that year in San Jose. Ecuador, in her reply (Ecuador, 1977), noted that she would not remain outside of a new regional organization to manage tunas, but noted a basic difference of view between the EEZ

25/ At the beginning of the 21st Inter-Governmental meeting held in Mexico City, October 18-20, 1977, both Mexico and Costa Rica formally announced that they would withdraw from the IATTC (Keith, 1977b). As the Convention provides, withdrawals are effective one year after notice is formally given to the depository government (USA). A formal Mexican note was delivered to the U.S. government on November 8, 1977; Mexico's withdrawal was effective November 8, 1978. The Costa Rican notice of withdrawal, even though announced in October 1977, was not delivered until April 1978. The delay may have been a reluctance on Costa Rica's part, as one of the original founders of the IATTC, to withdraw precipitously. The circumstances immediately leading to Costa Rica's withdrawal are interesting. Costa Rica, on April 20, 1978, seized two U.S. tuna clippers for fishing unlicensed in the Costa Rican EEZ. The release without penalty of the clippers five days later occasioned a political outcry in Costa Rica; a formal notice to the U.S. of intent to withdraw from the IATTC was dated two days later, April 27, 1978.

concept presented in the document and her own view of sovereign rights within the 200-mile area, so that she reserved the right of tuna management within that area to herself. Ecuador also stated that she could not accept the validity of any international permit within her own 200-mile zone considering this to be a prerogative of the sovereign coastal state. Ecuador also considered herself to be the owner of the tuna resource while it was in Ecuador's sovereign waters and thus could not participate in the assignment of allocation quotas (Ecuador, 1977). These views (repeated and stressed at meetings held later in 1978 with and among the CEP countries--see below) presaged the eventual removal of Ecuador and the other South American coastal states from the renegotiations.

San Jose, May 24-26,1978

The next public action (although private consultations were occurring) in the sequence of events was a bilateral meeting of the U.S. and Costa Rica on May 24-26, 1978, in San Jose. The meeting was an attempt by the U.S. to deal with both Costa Rica's recent unilateral introduction of a licensing scheme for tuna fishing in her EEZ and her withdrawal from the IATTC. The U.S. was still hopeful that a suitably-amended IATTC Convention might serve as a basis for a tuna management regime in the eastern Pacific instead

of a new treaty, and was attempting to arrive at mutually agreed measures within the IATTC format (e.g., a licensing scheme) that might persuade Mexico and Costa Rica to rescind their withdrawals from the Commission. Costa Rica, at the end of these bilateral talks, agreed to call a multi-national meeting in San Jose in June to discuss a possible regional licensing scheme for tuna vessels in the eastern Pacific and other matters, under the umbrella of the existing IATTC Convention.

San Jose, June 28-29, 1978

Participants in the multi-lateral meeting convened by Costa Rica in San Jose on June 28 and 19, 1978, were Costa Rica, Nicaragua, Panama and the United States (Rothschild, 1978a). Although Mexico was invited she deliberately did not attend the meeting--clear evidence of Mexico's rejection of any attempted arrangement which would perpetuate the IATTC format. Dr. James Joseph of the IATTC served as moderator of the meeting (Joseph, 1978). Contrary to expectations (and likely because of Mexico's non-participation), the licensing scheme was not discussed but instead Costa Rica tabled for discussion her own revision of the Costa Rica-Mexico document originally presented at the September 1977 San Jose Conference. The revision contained two important departures from the original document--one

suggesting that the RANs have exclusive rights to their guaranteed allocation including that of disposal of any surplus of that allocation and the other, that countries with allocations would begin fishing under those allocations after the season closed. The U.S. objected strongly to these variations.

Although the meeting eventually came to agreement on five general principles for a new management scheme (Joseph, 1978), no substantive issues were negotiated at the meeting, undoubtedly because of Mexico's absence (Rothschild, 1978a); the effect of this meeting on the progress of the renegotiations was neglible. However, shortly thereafter, Mexico proposed a meeting of the coastal state members of the IATTC, the U.S. and Ecuador and Peru, be held in Mexico City in August to continue the discussions on development of a new tuna management regime in the area.

The U.S. saw the proposed August meeting as important in determining the mode of tuna management in the 1979 season (Rothschild 1978b). If no substantive progress were made in Mexico at this meeting, the likelihood was that Mexico and Costa Rica, consistent with their announced withdrawal from the IATTC, would not participate in any management scheme for the 1979 fishing season and might undertake unilateral management of the tuna fishery in their respective EEZ's. Because of this and because of the imminence of the scheduled IATTC meeting in Tokyo in October

that year at which positions have to be taken in respect to 1979 management, there was a strong incentive on the part of all the participants to move forward at the August meeting to the development of a new treaty.

Mexico City, August 8-10, 1978

And, in fact, it was at the August 8-10 Mexico City meeting, convened by Mexico and participated in by Mexico, Costa Rica and the United States[26/] that substantial progress was made on a number of important issues toward development of a new tuna management regime (Rothschild, 1978c). The discussions were based on a U.S. document on conservation and management principles, with annexes on licensing and allocations and on a Mexican document dealing with management principles. The resulting report of the meeting (Rothschild, 1978c), while not binding, reached informal conclusions on some principles that could be included in a new treaty for tuna management in the area.

26/ Peru and Ecuador were invited to the meeting but did not attend. Panama and Nicaragua were not invited. As the U.S. negotiator later noted in reporting on these meetings to the IATTC meeting in Tokyo in October (IATTC, 1978b), the San Jose Plenipotentiary Conference showed that it was difficult and unwieldy to get agreement among 15-20 countries, therefore the approach of meeting in smaller informal groups was followed. He noted that when the stage of final elaboration of the Convention was arrived at, meetings involving all countries would be called.

However, the most troublesome issues were not resolved.

Of the institutional issues discussed, the U.S concern about open-ended membership was resolved by agreement that all coastal states and the present IATTC members could ratify the Convention, with participation by other nations to be permitted under a yet undeveloped process. Voting procedures, such as unanimity, various majorities, and weighted voting were discussed at the meeting but left unresolved.

All parties agreed on the organizational format presented in the original Costa Rica-Mexico working document, with the specification that the administrative section of the Secretariat would also be responsible for the international enforcement system. The U.S. concern over the need for a surveillance system to verify the location of all fishing vessels was recognized and included among the principles. Enforcement was to be the responsibility of the coastal states within the EEZs and of the flag states beyond them.

Among the management principles discussed, it was agreed that the area of the application of the treaty would be at three levels: 1) for research purposes encompassing the waters of the eastern Pacific Ocean, 2) for conservation purposes, within the CYRA but implemented through national legislation within 12 miles, and 3) for management purposes (licensing in particular), the CYRA beyond 12 miles from the

coast. Resolution on which species were to be covered by the organization was deferred; while yellowfin was agreed upon, the U.S. emphasized the need further to include all tuna and tuna-like species taken in the fishery (as in the present IATTC convention) rather than just skipjack as in the Costa Rica-Mexico working document. All agreed to include in the species list those marine mammals associated with the tuna fishery.

Dicussions on licensing resulted in consideration of a two-tiered fee system, consisting of a license fee based on the net registered tonnage of the vessel (the proceeds to go to financing the new organization) and a fee for fish caught, based on a percentage of its value, which would be re-distributed among the coastal states. The amounts of the fee were not agreed upon at the time and became a significant issue at subsequent meetings, as did the format of the licensing scheme.

Allocation of the catch between the RANs and the non-RANs was a central issue and was not resolved. Several issues were treated in the discussions. One was the conflicting views over the prerogatives of the RANs in respect to the highly migratory resources--the U.S. position being that the coastal state was eligible for certain <u>preferences</u> and the Costa Rica-Mexico position, that the RANs had a <u>right</u> to the tuna resource off their coasts in proportion to its concentration. Concentration of the

resource was another contentious issue, with the coastal states computing it on the basis of historical catch (to get a 69% share) and the U.S. presenting for the first time its computation on the basis of catch per unit of effort (to give the coastal states a 45% share). No agreement was reached on the criterion to determine the allocation or on the amount of the allocation, and this issue continued to be a fundamental source of difference between the sides. The variant proposals raised by Costa Rica at the June San Jose meeting were disposed of, with a return to the original position in the Costa Rica-Mexico working document that quota surpluses were to be made available to other states on a competitive basis and that fishing for the guaranteed allocation was to begin at the start of the open season.

In addition to the surveillance issue (first brought by the U.S. to the meeting and now included within the principles) two other issues new to the negotiations were introduced by the U.S. for consideration. The first was a request that a special total annual allocation of 6,000 tons during the closed season be given to those disadvantaged vessels of the U.S. fleet (small purse seiners, baitboats and trollers) which because of size or age and limited range could not fish competitively during the open season with the international fleet. The second was a U.S. request to consider the continuation of the last open trip after the season was closed: this concept was of considerable

economic importance to the United States industry. Although no substantive discussions on the two requests took place at the time of the presentation, they were the source of considerable discussion at the subsequent renegotiation sessions.

It was agreed that the countries would meet again to work on the outstanding issues, prior to calling a second meeting of Plenipotentiaries (Rothschild, 1978c). Following the meeting, Mexico, still concerned about the participation of the CEP countries in any new tuna management regime, suggested that serious efforts be made to sound them out and to get them actively involved in the ongoing negotiations.

The CEP Diversion

There followed, as a result of Mexico's suggestion at the August meeting, a series of four meetings among the various participants in the renegotiations and Chile, Ecuador and Peru and Colombia--two in New York, one in Lima and one in Bogota--in an attempt to determine the CEP views on the direction in which the renegotiation talks were going and the prospects for CEP inclusion in any new tuna management arrangements.

The first of these meetings was called by Costa Rica, in New York, on August 17 and 18, 1978 (Rothschild, 1978c). In addition to Costa Rica, representatives of Ecuador,

Chile, Peru, Colombia, Panama and Nicaragua attended; the U.S. was invited to attend the afternoon of the first day. The stated purpose of the meeting was to inform the coastal states which had not attended the August meeting in Mexico of the progress of the negotiations. Ecuador repeated her basic concern (noted previously in her last December's comments on the Costa Rican working documents (Ecuador, 1977)) about the developments of a treaty before the LOS negotiations were over, which in her view, could compromise Article 64 of the Informal Composite Negotiating Text of the LOS, or the view of coastal rights in the same document. Ecuador, as the principal commenter, along with Chile and Peru, also repeated her views that the coastal states had sovereign rights over the tuna resources within 200 miles and would have to set up a national scheme for tuna management within that area; any international arrangement would only apply outside the 200 mile zone.

The U.S., to continue the momentum of attempting to bring the CEP countries into the renegotiations, called a meeting some 3 weeks later in New York on September 11, 1978 with representatives of Chile, Ecuador, Peru, Mexico and Costa Rica again to review the status of the renegotiations of tuna management and to get the CEP views on them. Once again Ecuador, as a principal speaker, raised the same juridical questions to portend potentially insurmountable difficulties in having the CEP countries become a party to a

new tuna management scheme in the eastern Pacific. The CEP countries, however, did offer to consult among themselves on the tuna management issue at a meeting of the permanent South Pacific Commission to be held in Lima on September 25-27, and to develop a formal position. Mexico thereupon proposed an early October meeting (to follow the Lima meeting and prior to the IATTC Meeting later in October) of the same countries to examine the formal CEP position. If substantial progress were made in Lima, then perhaps Mexico's withdrawal from the IATTC might be reconsidered; this would prevent an unregulated tuna fishery in 1979 with all of its possible consequences.

The consultations among Chile, Ecuador, Peru and Colombia took place in Lima in September as scheduled and the promised formal position document was produced (Chile, Ecuador and Peru, 1978). Colombia convened a meeting in Bogota on October 9 and 10, 1978, to discuss formally the positions of herself, Chile, Ecuador and Peru in respect to the Mexico-Costa Rica proposal (IATTC, 1978b). The CEP countries and Mexico, Costa Rica and the United States participated in the meeting. The formal CEP position was a detailed reiteration of the previous CEP statements: a separation of the conservation zone into two zones, one inside the 200 mile area (with separate national licensing), and one outside the 200 mile area; a rejection of the concept of predetermining a guaranteed quota to the RANs

through a formula in the treaty; and, no matter what the new treaty contained, reservation of the right to declare exclusive fishing zones for its own nationals (Ecuador at that time had a 60 mile exclusive fishing zone). The intransigency of this position, its illogic, and its variation from the fundamental basic principles already agreed to by the U.S., Mexico, and Costa Rica for the common management of the highly migratory resources in the waters of a number of coastal states made it obvious to the participants that the series of attempts to bring the CEP countries into the renegotiation processes was fruitless.[27/] As a result, this strategy was abandoned and the further actions to attempt to establish a new tuna management regime were taken without active CEP participation.

San Jose, December 11-14, 1978

As had been proposed at the August meeting in Mexico and reiterated in private conversations in Tokyo at the IATTC meeting, another meeting in a series of negotiations

27/ An interesting difference in attitude about the results of this meeting surfaced during discussions on it at the October IATTC meeting in Tokyo (IATTC, 1978b). The U.S. representative spoke of "fundamental differences" between the positions of the CEP countries and that of Mexico and Costa Rica; the Costa Rica representative said that "significant progress had been made at the meeting."

for the new tuna management organization was held in San Jose, Costa Rica from December 11-14, 1978 (Rothschild and Hallman, 1978). At the earlier IATTC meeting in Tokyo in October, the Commission was unable to establish a tuna conservation regime for 1979 and, at the same meeting, both Mexico and Costa Rica reconfirmed their withdrawal from the Commission. The existence of a tuna regulatory program in 1979 was important to the U.S., to conserve the stocks, to provide a continuity of management during the renegotiation processes and possibly to avert any precipitous unilateral actions by the coastal states. The course of development of any tuna regulatory program in the area in 1979 seemed to be linked to progress on the development of the new treaty. As a result of the concerns, thorough and substantial efforts were made in San Jose in December toward resolution of the outstanding issues.

The major and most critical issue at the meeting again dealt with allocation. At the August sessions in Mexico, both the criterion for allocation (historical catch versus density based on catch per unit of effort) and the percentage allocation for the coastal state were left unresolved. At this meeting, the U.S. reversed its position and agreed that historical catch would be an acceptable criterion but only if the allocation to the coastal states did not exceed 50% of the total allowable catch. Upon rejection of the 50% limitation by Mexico, the U.S.

negotiator informally suggested 57%[28/] as the limit (midway between the original U.S. 45% and the Costa Rica-Mexico 69%), contingent upon other issues being settled satisfactorily.

Mexico remained adamant (although Panama accepted and Costa Rica seemed flexible) and the informal U.S. offer of 57% was informally withdrawn. Mexico countered with a phase-in proposal toward the 69% figure: this was rejected by the U.S. The discussions were left stalemated at this point on the allocation issue. In the 14 months of negotiations, Mexico had not moved from its original position as derived from the original management alternatives, that coastal state allocations should be 100% of the historical tuna catch in the 200 mile area (Rothschild and Hallman, 1978).

Of those new issues which had been presented by the U.S. at the previous working session in Mexico in August--enforcement and surveillance, disadvantaged vessels, last free trip--considerable progress toward agreement was made on the first. A treaty article providing for coastal state enforcement responsibility within 200 miles and flag state responsibility beyond 200 miles was tentatively agreed to. Further, of major significance to the United States,

28/ This compromise figure was not supported by the U.S. tuna industry. The U.S. formally withdrew this informal 57% offer at the January 1979 Plenipotentiary Conference in Mexico.

tentative agreement was reached on inclusion of an article developed by the U.S. which provided for a system of international surveillance, based on the use of transponders aboard the vessels and satellites, to be administered by the organization. The U.S. proposal to give some protection to its disadvantaged vessels through a 6,000 ton closed season allocation was opposed by Mexico because it would perpetuate inefficient vessels in the fleet. The issue was unresolved, as were also the questions raised by the U.S. request for a last free trip.

License fees became an issue at this meeting, in respect to both the method for calculating the fees, and their amount. New Latin American proposals, based on the net tonnage of the vessel, the number of trips, and a percentage of the dockside value of the catch resulted in the fees being triple those ($50/net registered ton) proposed by the U.S. This issue too, was left on the table for the next meeting.

Also left open, but being seen as issues which could be resolved once the basic allocation problem was settled, were some details on membership, and on the treatment of the marine mammal problem. Minor institutional arrangements were agreed upon.

Mexico City, January 15-19, 1979

Mexico convened a second Plenipotentiary Conference in Mexico City from January 15-19, 1979. Governments represented included Mexico, Costa Rica, Canada, Colombia, Ecuador, El Salvador, France, Spain, Guatemala, Japan, Nicaragua, Panama, Peru and the United States. Honduras, although invited, did not attend. The working documents used at the meeting were, officially, the Mexico-Costa Rica Draft Convention and the U.S. Draft Convention both of which were tabled at the December 1978 meetings in San Jose and, unofficially, a consolidated text (Costa Rica, Mexico and United States, 1979) prepared privately by the United States, Mexico and Costa Rica which presented the agreed-upon resolved issues between the two Draft Conventions and which listed, in columns, the differences between the two versions in respect to the unresolved issues.

Even after 3 days of private negotiations at the Conference between the U.S. and Mexico and Costa Rica, virtually no progress was made toward the resolution of the fundamental issue of allocation. The positions remained as before, with the U.S. officially resuming its original 45% offer as presented in the U.S. Draft Convention and Mexico and Costa Rica remaining steadfast at 69% as presented at the first Plenipotentiary Conference in 1977. Other major issues also unresolved at this meeting were: cost of

licenses, membership provisions, the last open trip, and closed season allocations although, as after previous negotiating sessions, it was generally agreed that these were amenable to solution given agreement on the fundamental issue of allocation.

In addition to these important differences among the major parties, concerns were expressed by other participants at the Plenipotentiary Conference on several elements in the consolidated text (Sakagawa, 1979). As they had indicated previously and often, Chile and Peru joined by El Salvador stated they could not sign a Convention which included international management of the resource within 200 miles of the coast. Nicaragua also would probably not sign a Convention as contemplated in the present consolidated text, not because of reasons related to sovereignty but because of implications in the document in respect to maritime boundary issues to which she could not ascribe. Canada had reservations arising from the proposed westward extension of the area of application to 145^{o} west meridian, which would include the migratory range for albacore and give open access to albacore within Canada's 200 mile zone. In Canada's view the Convention should only cover the geographic range of the yellowfin stocks. Panama, having just completed a major fishing port facility, had concerns about the sections in the Draft Convention dealing with denial of port facilities to non-member nations under

certain conditions.

Further complicating and polarizing the conference was the seizure two U.S. tuna vessels in the Costa Rican EEZ during the conference.[29/]

The second Plenipotentiary Conference thus ended, as a culmination to some 15 months of extensive discussions, negotiations, document preparations, travel, and honest concerns, with no agreement among the participants, primarily because Mexico and Costa Rica and the United States could not agree on the fundamental issue of allocation of the resource. In fact, the situation on January 1979 was worse than that in September 1977 at the first Plenipotentiary Conference. Positions on both sides had hardened, and it seemed most unlikely that any compromise could be reached. Further, there seemed little likelihood that the Convention put forth in the consolidated text could be signed by all the participants of the Conference, for the reasons noted above. The outlook for a

29/ As mandated under Section 205 of the Fishery Conservation and Management Act of 1976, these seizures of U.S. vessels by Costa Rica resulted in an embargo effective February 16, 1979, on importation into the U.S. of tuna and tuna-products from Costa Rica. This served to further complicate the issues. It also presumably acted as a deterrent to any precipitate Mexican actions in respect to U.S. vessels fishing in the Mexican 200 mile zone because of the large volume (some 14,000 tons by May 1979--A. Felando, personal communication), of tuna which was being exported to the United States through the Mexican port of Ensenada, and which had a considerable economic value for Mexico.

new tuna management regime in the eastern tropical Pacific in the near future was bleak.

Washington, March 7-8, 1978

Unwilling to leave the renegotiations in the polarized unresolved state which resulted from the second Plenipotentiary Conference, delegations from Mexico, Costa Rica and the United States met once again in Washington, March 7-8, 1979 (Rothschild, 1979a) to review the outstanding issues and, once again, to examine the national positions on these issues.

Mexico made substantive proposals on four issues. In the first break in her position on allocation since September 1977, Mexico proposed that the coastal states allocation be limited to 62.5% for the first 5 years of the new agreement (presumably derived as a mid-point between the--now withdrawn--57% proposal of the U.S. and the original 69% proposal of Mexico and Costa Rica) with subsequent options thereafter, one of which would have limited the coastal states' allocation to 65%. Mexico, in respect to the last free trip issue, agreed that vessels fishing at the time of closure might continue fishing but with the trip completed within 45 days. Mexico initially continued to oppose strongly the concept of a special allocation for the U.S. disadvantaged vessels, but finally

agreed to a 6,000 ton allocation under certain restricted conditions. On license fees, Mexico and Costa Rica indicated that new figures, to be developed in consultation with the other coastal states, would be lower than those tabled in the earlier discussion.

The U.S. rejected all of these proposals, on the grounds that they were almost as detrimental to U.S. interests as would be no agreement for tuna management. Thus, no progress was made; indeed the positions of the respective protagonists may have solidified even more.

Chapter VI: THE LONG-TERM FUTURE

At this writing four issues remain to be resolved. These are guaranteed allocation; licenses and access; a special allocation during the closed season for U.S. disadvantaged vessels; and the last open trip. Pending resolution of these issues among the participants, a variety of interim situations and short term arrangements may develop; these are explored in a subsequent chapter. In the long term, however, it can be assumed that a new formal agreement among the nations for the management of the eastern Pacific tuna fishery will be developed, in which these four issues are resolved. Given that such a new treaty is developed, one may speculate on the consequences of each of these issues as resolved in that future period from the point of view of national goals and objectives; of the management of the fisheries; of the fishery itself; and of the scientific study of the resource.

Guaranteed Allocation

Guaranteed allocation among the coastal states of a portion of the annually established yellowfin quota in the eastern Pacific, in whichever form that allocation

eventually takes (as a percentage of the quota, as a fixed unchanging amount, or as some semi-fixed amount which will change with changes in a range of quotas) will be an important victory for the coastal states, particularly Mexico, and will satisfy several long-term national goals and objectives. Importantly, guaranteed allocation will vindicate and formalize the long-standing contention of the coastal states that they are entitled to benefit from the presence of the highly migratory tunas wthin their EEZ's. There will be gains in terms of international status, particularly among the third world countries, for having won their case, for having changed the old order, and for having wrested something from the "haves". The development of national tuna fishing capabilities and a national tuna fleet, even if only symbolic, will also serve as an international status symbol. There will be internal national, economic and social gains in the creation of industry and employment, and in the production of hard currency through exports and joint ventures. And, the annual tribulation, with its high transactional costs, of the (in their eyes) debasing negotiations for a share of the tuna fishery will have disappeared, replaced by a routine agreed annual calculation much in their favor.

For the non-coastal states, particularly the U.S., the end of an era will have arrived. These fishermen will have lost their equally long-held objective of insuring that the

highly migratory tunas will belong to those who catch them first, irrespective of where in the ocean the tunas are caught. The U.S. fishermen will have lost their goal of retaining a major share of the eastern Pacific tuna fishery that was largely developed over the decades through their labors, ingenuity, perseverance and skills. They will have lost their attempt to keep the seas open unrestrictedly for tuna fishing, not only in the eastern Pacific but in other tuna fishing areas of the world where the new eastern Pacific treaty will serve as a model for new regional arrangements. On the positive side, there will have been a reduction of the transactional costs associated with the past ways of allocating the yellowfin resource although this may not be perceived as too great an advantage by those in the fishery. For the U.S. in particular, some element of hemispheric good will will also have been obtained, with possible spinoffs into another political and resource advantages for the U.S. in the region.

The implementation of guaranteed allocations will not change the basic management principles under which the eastern Pacific tuna fishery has operated since regulation was first initiated in 1966. An annual global quota for yellowfin will still be established in advance of the fishing season based on the concept of maximum sustainable yield; an open yellowfin season will continue to be declared within the same area as the present CYRA; the season will

still be closed in sufficient time to permit capture of post-season allocations (remainder of country quotas; 15% incidental take; last open trip catches) without exceeding the total annual yellowfin quota. Open skipjack fishing will still be permitted, as will be fishing for yellowfin outside the CYRA at any time during the year. Fish size, fishing area and effort limitations will still be available for application as management tools as recommended and approved by the new organization.

The major change, however, under allocation will be made when the coastal state's catch is considered to be part of its allocated catch. Under the present system, a coastal state's catch of yellowfin is not counted against the special country allocation until the yellowfin tuna season has been closed in the CYRA; the coastal states compete with other nations during the open season but are given a non-competitive fishing opportunity during the closed yellowfin season. Under the new agreement catches made by a coastal state beginning from the opening of the season on January 1st will count against the coastal state's national quota. If a coastal state does not take its national allocation during the open season, it will continue to fish under that quota during the closed season without restriction as to size of vessel. If a coastal state does capture its allocation of yellowfin before the season closes, then it will continue fishing competitively until the close of the

season, to take yellowfin beyond its allocated quota, and then abide by the 15% post-closure incidental catch rule.

Thus under the old system, a coastal state could take what it could in the open season and then be guaranteed an additional maximum allowance for certain vessels of 6,000 tons of yellowfin tuna beyond this open season catch. Under the new system this guaranteed additional allocation would be eliminated and the only take by coastal states which would be permitted after closure would be that amount necessary to attain the national allocation (if not reached during the open season) plus the 15% incidental catch allowance. The net effect, then, will be to remove any post-season guaranteed catch for any particular country or vessel class and to establish a minimum guaranteed allocation for each coastal state.

Introduction of guaranteed national allocations will increase the management responsibilities beyond those now presently permitted to the IATTC, and will take the successor organization into a new active management mode. New and timely monitoring and accounting procedures will be established within the successor organization to track pre- and post-season catches and landings of yellowfin by individual coastal states so that attainment of national guaranteed allocations can be tracked and announced as they occur. International sanctions, not now in place, possibly in the form of reduced shares in the annual distribution of

fees, or of reduced quotas in subsequent years will be developed for nations which exceed their quota during the fishing year as will be criteria to determine what level of excess catch will trigger such actions.

Within the fishery, the introduction of guaranteed national allocations to the coastal states will give those coastal states a fixed minimum amount of yellowfin which they may aspire to catch during the year. If their fleets are large and efficient, the coastal states may take their yellowfin quota in the open season plus whatever over that which they may be able to take during that period. If their fleets are less efficient, the coastal states are guaranteed essentially competition-free fishing for yellowfin during the closed season until the yellowfin quota is obtained. The yellowfin fishing season will thus be prolonged for the coastal states, the smaller and less efficient vessels will be given a chance to fish competitively, larger more efficient fleets will be developed, and planned, orderly development of the fishing and processing elements in the coastal country will be facilitated.

Under guaranteed country allocations, the amount of tuna available to the non-coastal states for competitive fishing during the open season will be reduced because of the need of the management organization to provide for the coastal state allocations after season closure (this will be balanced to some extent by the addition to the open season

of amounts previously allotted to the last open trip; see below). The individual shares of that reduced tonnage available to the non-RAN fleets will become smaller and smaller and the fishery will become even more competitive as the open fishery policy permits the entry of more vessels of more nations, and as the coastal states fleets become larger and more efficient. Older, less efficient and less competitive vessels of the non-RAN fleets will be eliminated from the competitive open season fishery through loss, or through sale or transfer to the coastal states for participation in their protected closed-season yellowfin fishery. Many non-RAN vessels will find themselves fortunate to be able to make one fishing trip in the CYRA in the open season. The result, for the non-coastal tuna fishing fleets, will be that fishing in the eastern tropical Pacific for yellowfin will be merely one element in a larger yet-to-be-developed global tuna fishing strategy, rather than the major element that it is for many vessels at present. Fishing pressures will increase on tuna stocks in other parts of the world, and new modes of thought, fishing strategies, and infrastructure patterns will be developed to compensate for the reduced amounts of yellowfin competitively available to non-RAN fleets in the eastern Pacific yellowfin fishery.

The introduction of guaranteed coastal state allocations under a new treaty will have little effect on the prosecution of scientific research within the eastern Pacific tuna fishery. The same data as at present - catch, effort, size composition, biological - will need to be collected, the same researches as to stock size and distribution, and analytic and management methodologies will require to be undertaken, and the same kinds of management advice will need to be given. The only changes necessary, as noted above, will be in the increased timeliness of some of the data collection and analyses as necessary under the new management requirements.

Licenses and Access

With the introduction under the new treaty of regional license fees and guaranteed access to the fishery within the 200 mile zones of the coastal states, the national goals and objectives of the both the coastal and the non-coastal states participating in the eastern Pacific tuna fishery will be satisfied. For both sides, once the basic levels of fees and the mechanisms for revision of those fees with changing economic circumstances have been established, one of the high transactional costs of fishing for tunas within the coastal state's EEZ's will disappear. The "tuna wars", vessel seizures, internal political problems, polemics, and

mandated reprisals by the U.S. will be things of the past. Costs of administering and managing the fishery will be derived from license fees on the fishery itself and will fall more equitably on the participants than under the present funding system. Each side will be a winner.

For the coastal states, the adoption and acceptance of license fees for the right to fish in the EEZ will be a vindication and reaffirmation of their long held position, even before renegotiations began, that coastal states held certain rights both to the natural resources found in their EEZ and to the opportunity by other nations to exploit those resources. National political advantage will have been gained by the elimination of a continuing source of internal political dissention in the form of the presence of the so-called "pirate" tuna vessels in the 200 mile zone. Economically, also, the coastal states will benefit by receiving income from the tuna fishing by other states in their waters, through each's share of the distribution of license fees. And, as noted, cash outlays for maintenance of the new fishery research and management organization will no longer be required.

For the non-coastal state participants in the eastern Pacific tuna fishery, guaranteed access to the tunas in the EEZ's will have been attained, without fear of seizure and the associated trauma. License applicants will be dealt with by a regional licensing body, under fixed, defined and

uniform rules of procedure. A single license will pertain, under a fixed fee, to reduce greatly the psychological, legal, economic, and transactional costs of following the fish, costs which surround the tuna fishery today.

For the U.S., payment of compensation to U.S. tuna fishermen from application of provisions of the Fishermen's Protective Act will be a thing of the past for the eastern Pacific tuna fishery, with major savings to the taxpayers. And, as for the coastal states, annual cash outlays by the governments for management of the fishery will be eliminated, with the shifting of the responsibility for management costs to the participants themselves.

The fishery will become a more efficient one, with the vessels now permitted, under license and within the limits of the yellowfin quota regulatons, to follow the fish openly where they travel and to take full advantage of the seasonally changing distribution and availability of both the yellowfin and skipjack tunas. Fishing time lost under the present conditions, as a result of seizures or evasive actions, will also be eliminated, to contribute to a more effective tuna fishery in the area.

Implementation of the license and fee system will put the new organization further into a new management mode, and will be a major departure from the present narrowly-constituted biological mode of the IATTC. Following the establishment of the fee levels by the policy element of the

new organization, provisions will be made for and mechanisms will be established by the successor management group to maintain detailed records of the amount of tuna catch and the location of that catch by individual vessels, both within the eastern Pacific fishing area and within the 200 mile zones; to calculate and collect the appropriate fees; and to disperse that income to the coastal states and to the management organization itself, under a fixed procedure - all new activities for the successor organization.

With no advantage for the falsification of records (because fees will be assessed on all fishing in the entire eastern Pacific region of the fishery) and with no limitation on the distribution of fishing effort (because access will be open under license), the logged data available to the fishery managers and scientists will reflect more accurately the true distribution and abundance of the tunas than in the past. Thus, the understanding of the biology of the tunas and the fishery for them will be enhanced under application of the new treaty, to the extent that such understanding is based on data from the fishing fleets.

U.S. Closed Season Special Allocation

The new treaty for managing the eastern Pacific tuna fishery will contain a clause which will provide a special

annual allocation of 6,000 tons of yellowfin tuna to the United States for its older (built prior to January 1, 1960), smaller (under 400 tons carrying capacity) boats, whose operating range is essentially limited to Mexican waters. The new treaty will also contain, through non-add restrictions and requirements for continuous participation in the fishery, provision for the gradual phase-out of this special allocation over time.

This issue is primarily a bilateral one between Mexico and the U.S. The Mexican policy was to work to eliminate U.S. competition with Mexican vessels in Mexican waters during the closed season. The preferred Mexican policy was to have this elimination occur sharply and Mexico has consistently worked toward this in the negotiations. The management agreement, however, will permit a gradual phase-out of these vessels with time. Thus, Mexico's objective will have been reached, but at a slower pace than desired.

The U.S. objective throughout the negotiations was to obtain the special allocation of 6,000 tons for the smaller, older U.S. boats, so that they could remain viable and compete economically with the remainder of the U.S. fleet. That objective will be obtained in the new agreement, but the advantage will disappear with the gradual elimination with time and age of the smaller, older vessels of that fleet.

Last Open Trip

Under the existing last open trip (LOT) regime, vessels at sea at the time of the closure of the yellowfin fishery in the CYRA may continue their fishing trip without restriction of yellowfin catch and those vessels in port at the time of closure may make a post-closure LOT provided that the trip begins within 30 days after the yellowfin season closure date. A similar basic provision will be carried into the new management agreement but with modifications which will limit and regularly reduce both the number of days that an "at-sea" LOT vessel may continue unrestricted fishing after closure, and the 30 day turn around period for "from-port" LOT's, with the end result that LOT's will be increasingly restricted and eventually phased out. The interim restrictions on the LOT (while moving toward elimination) will be so structured and determined to provide at least a 2 months open fishing season on yellowfin tuna. This will allow the new managing authority to gather sufficient fishery data during that open fishing period on catch rates, relative abundance of skipjack, size composition, etc. with which to project more accurately than at present the post-closure catches and to calculate reasonably accurately the closure date for the fishery.

As with the special U.S. closed season allocation discussed aboved, these elements in the new treaty will satisfy the coastal state's needs but at a much slower pace than would have the complete and immediate elimination which was insisted on during the renegotiations. The coastal state policy was based on two objectives: 1) to enhance the conservation of the yellowfin resource by giving the managers increased flexibility as a result of improved quantitives of open season fisheries data; and 2) to prolong the open season to the greatest extent possible so that the coastal states will have the opportunity and time to increase their catches beyond their guaranteed annual quota. Both of these coastal state objectives will be satisfied by the new agreement but at a slower pace than was originally desired.

For the U.S., the objective of having at least one unrestricted yellowfin fishing trip guaranteed during the year, as a form of insurance against the unpredictable nature of the fishery, will have been obtained in the short term, as a compromise by the coastal states toward early development of agreement and a new management regime. However, in the long term, the U.S. objective will not have been obtained, as a consequence of the provisions in the agreement for the successive restrictions on and the eventual elimination of the LOT concept.

For the U.S. mainly, but for some other non-coastal fleets, also, the reduction and phase-out of the LOT will serve to rid the fleets of their older less efficient vessels. The insurance factor of at least one unrestricted yellowfin fishing trip during the year will disappear and with it will disappear those vessels not able to fish competitively with the rest of the fleet during the open season. The hidden subsidies to the less efficient vessels in the form of less flexible management and potential less-than-optimum use of the yellowfin resource will be eliminated, in time, as the provisions of the agreement take effect. The short-term losses to individuals will be greatly outweighed by the long-term economic and resource benefits accruing to the participants as a whole from a longer open season, from fewer and more efficient vessels in the fishery, and from a more responsive management system.

A significant improvement in the capability to manage the fishery will be gained by the reductions/elimination of the last open trip. To calculate the closure data, the manager, in attempting to arrive at the annual quota, will no longer need to estimate and account for the post-closure catches made during the LOT. The amount of these former LOT catches will be applied to the open season, to lengthen it. This lengthening will improve the data base on the condition of the stocks, on the size composition and the year class strength of the resource, and on the yellowfin and skipjack

species mix so that the closure date may be more accurately determined than previously with fisheries data from a short open season.

Conclusion

In the long term, the coastal states will clearly be the victors in the new management regime for the eastern Pacific tuna fishery. They will have gained recognition of their claims within their EEZ's, will benefit economically from licensing procedures, will have greatly enhanced opportunities to develop their tuna fleets and industry, will see the continuation and improvement of the management of the fishery and the conservation of the resource, and will have seen tuna fisheries relegated to a minor element in their international concerns. For the U.S. and the other non-coastal fleets, to the extent that they can alter their fishing strategies to take advantage of tuna fisheries in other parts of the world, to the extent that they can compete effectively during the open season with the fleets of the RANs, to the extent that they can make joint venture and other arrangements with the coastal states, and to the extent that the changes brought about by the new management regime lead to a culling and pruning of the non-RAN fleets toward more efficient fleets - to that extent will the non-coastal states be able to salvage some share of the eastern

Pacific tuna fishery and to profit from tuna fisheries elsewhere in the world.

And yet, given these agreements and adjustments within the new management regime in the eastern Pacific tuna fishery, there will yet remain problems to be solved. Colombia, Ecuador, Peru and Chile will still remain outside the group of coastal states undertaking this new fishery management agreement. Their non-membership will provide a source of two important management problems: 1) The entire yellowfin resource in the eastern Pacific will not be under a single unified management regime so that management of the resource will be less than completely effective; and 2), a potentially serious problem, the fishing areas and ports of these non-member coastal states may well be developed and used in a variety of ways as a means of circumventing the management regime in force in the rest of the region. It will behoove the members of the new management organization to take concerted action toward enlisting the membership of these four countries. This task may be facilitated to some degree by the presence of a working and effective management organization in place which has made so many evident gains in respect to the tuna fishery for the coastal states.

Another problem which will face the new organization in time will be the entry of new nations to the fishery and the increasing carrying capacity of those fleets already in the fishery. It is likely that a new round of serious

negotiations and modifications in the agreement will deal with this problem. It is also likely that the results of those new negotiations will be the declaration by the original signers of the new agreement of "ownership" of the tuna resource and the declaration of a closed yellowfin fishing region larger than the CYRA, limited to certain countries and to a total catch capacity - an innovative extension of the 200 mile concept to cover the geographical range of the managed yellowfin resource.

And, more immediately, with the new management regime and the greatly extended responsibilities of the management organization will come the need to develop implementing regulations and new methodologies, to employ an augmented staff in new disciplines and to satisfy the space needs occasioned by these changes. The transition will not be simple but the gains are well worth the pains.

However, this new management is in the long-term future, some 3 to 5 years from now. What are the prospects for the near future?

Chapter VII: PROSPECTS FOR THE NEAR FUTURE

An interim management regime seems likely to be developed for the 1979 fishing season because of the strong commitment on the parts of both Mexico and the United States to the rational management and conservation of the tuna resources of the eastern tropical Pacific, and because of a desire to avoid open confrontation and its various consequences. Given the present positions (June 1979) of those nations involved in the renegotiations, however, the development of a new long-term tuna convention for the immediately coming years may be difficult. Should no such regime be in place for the 1980 tuna fishing season the immediate consequences will be the breakdown of the IATTC management regime leading to an unregulated fishery for yellowfin tuna in the CYRA and an exclusion by the coastal states of the international fleets from the coastal states' 200 mile zones. These circumstances could result in open confrontation among the participants in the eastern tropical Pacific tuna fishery and to a pressure for the development of alternate interim arrangements short of a completely new long-term tuna convention. These possibilities are examined below.

Unregulated Fishing

Without a tuna management regime in place which includes Mexico, the U.S. under Section 955 of the Tuna Conventions Act of 1950 could not regulate its own fleet. The yellowfin resource would, in essence, be subject to an unregulated fishery by the U.S. and the remainder of the international fleet, and by the fleets of the coastal states. The consequences of such an unrestricted fishery would be several.

The immediate result would be a short term increase in the catch of yellowfin tuna. Given the history of other unregulated fisheries, continued unrestricted fishing would eventually result in an overexploitation of the yellowfin resource and in depleted yellowfin stocks in the eastern tropical Pacific, the degree of which would depend on the yellowfin spawner-recruit relationship. Heavy unrestricted fishing on the smaller single-"school" yellowfin present within the inner areas of the 200 mile zone could hasten the rate of overexploitation, particularly if the unregulated fishing on the smaller yellowfin occurred during years of poor yellowfin recruitment.

A drop in the abundance and availability of yellowfin in the eastern tropical Pacific would lead to economic disruptions within the international and coastal nations' fleets and result in removal of vessels from the fishery, or

in transfer of the fishing effort to other world tuna fisheries. This possible transfer of fishing effort could not only act to affect the stocks of tunas in other areas but could also act to disturb any existing management arrangements in those other areas. Costs of tuna to the consumers worldwide would increase.

For the skipjack resource in the eastern tropical Pacific, any impact of unregulated fishing would likely not be seen under present fishing technology for skipjack tunas, inasmuch as no apparent relationship exists between the extent of the fishery in the eastern tropical Pacific and the abundance of the resource.

Another consequence of an unregulated yellowfin fishery would likely be an increase in the incidental kill of porpoises in the purse seine fishery for yellowfin tunas. Fishing effort would increase under this unregulated situation and the total number of porpoise deaths would increase with the increase in yellowfin catch during the first years of the unregulated fishery. In addition, with an unregulated fishery, a slackening of porpoise-saving activities and motivation aboard tuna purse seiners would occur with an increase both in total mortalities and in the mortalities of those stocks of porpoises presently specifically protected by U.S. regulations. This slackening of porpoise-saving actions would be abetted by the elimination of the international observer program and the

possible elimination of the U.S. observer program.

Unregulated fishing on the yellowfin in the eastern tropical Pacific could also have an adverse effect on the management of tunas in other fishing areas in the world. It could discredit the concept of international tuna fisheries management, raise doubts as to the need for or the efficacy of any tuna management regime in the eyes of nations of other areas, and delay the development of regional and multi-regional tuna management arrangements. Such a breakdown of management and regulation of the eastern tropical Pacific yellowfin fishery would also provide important support to the move within the U.S.A. to include tunas as coastal species within the FCMA. Should that happen, major support would be given to those nations presently advocating coastal management of tunas and the rational international management of tuna fisheries, consistent with the highly migratory nature of the tunas, would be seriously compromised.

Breakdown of the management regime would also greatly limit the acquisition of fishery data necessary to understand the fishery and would disrupt the long series of such data collected by the IATTC since its formation. The monitoring of the unregulated fishery would be extremely difficult and timely awareness of the consequences of the unregulated fishery and the condition of the yellowfin stocks in the area would not be available. Also, the

quality of any remaining scientific research on the yellowfin fishery would be greatly reduced, given a likely reduction in funding and expertise for such research.

Exclusion by the Coastal States

Without an international tuna management regime in place for the 1980 fishing season the international fleet would be excluded from fishing for tunas inside the 200 mile zones unless specific arrangements (see below) could be made. On the average, 87% of the skipjack and 57% of the yellowfin are taken within the 200 mile zones in the eastern tropical Pacific. Were the U.S. and the remaining international tuna fleets effectively excluded from fishing in the 200 miles zones, fishing would be limited to the areas beyond 200 miles and sharp declines in catch rates for yellowfin and skipjack would occur. This decline would be compounded for the international fleet by the problems resulting from frequently undesirable weather conditions in the area beyond the 200 mile zones. Depending on the amount of fishing effort on yellowfin beyond the 200 mile zone and the effort exerted within the 200 mile zone on the smaller "school" yellowfin, it is possible that a positive conservation effect on the yellowfin resource might result at the cost of a greatly reduced catch, a less than optimal yield from the resource, and an increase in the cost of tuna

to the consumer. Any increase in skipjack catches beyond the 200 mile zone would depend upon the development of fishing technology which would intercept the skipjack prior to their entry into the surface fishery closer to shore.

The increased fishing effort for yellowfin tuna beyond the 200 mile zone would also magnify the effect of unregulated tuna fishing on porpoise stocks. Because of the nature of the distribution of porpoises in association with the larger tunas in the areas beyond 200 miles from shore, an increase in the fishery-associated deaths of spinner and spotted porpoise would result from increased fishing effort in that offshore area.

The size of the international tuna fleet could be reduced by this exclusion if productive fishing areas were not readily available elsewhere in the world. The U.S. small boat fleet (baitboats, purse seiners and jigboats) which fishes in coastal waters and to a large extent off Mexico would probably be significantly reduced. This could have economic consequences in the Mexican port of Ensenada whose fishermen presently make up some 80 to 90% of the crews of U.S. baitboats fishing in Mexican waters.

Confrontation

The pressures emanating from the unregulated fishing on the eastern tropical Pacific tuna resource and the exclusion

from access by the international fleet to the 200 mile zones could lead to open confrontation among the participants in the fishery. The triggering action for confrontation vis-a-vis the coastal states and the U.S. tuna fleet will be the seizure by the coastal states of U.S. tuna vessels fishing without licenses within the coastal states' EEZ's. (The purchase of licenses by U.S. tuna fishing vessels is not sanctioned by U.S. law as it is considered recognition of coastal state jurisdiction over highly migratory tuna.) Such seizures would, under the FCMA, require the embargo of tuna importation from the seizing coastal state into the U.S. Similarly provisions of the MMPA could place an embargo on the importation of tuna against any coastal state not found in 'substantial compliance' with the U.S. marine mammal regulations. These Latin American coastal states export about 40,000 tons of yellowfin (fresh/frozen and canned) to the U.S. annually, valued at nearly 25 million dollars. In the case of Mexico, for example, such an embargo could have a serious economic consequence on income resulting from transshipments of tunas through the port of Ensenada (see footnote 29).

Such an embargo could also have a substantial effect, at least at first, on the availability of tuna to the U.S. and to other nations. New world markets would have to be developed, and the orderly international marketing of tunas would suffer disruptions. Tunas which might have entered

the U.S. might not be adequately distributed or used in other parts of the world. Eventually new supply lines to the U.S. would undoubtedly be developed, but at a cost of higher prices for tuna to the consumer.

Another consequence of these actions, although not mandated by U.S. law, could be a reciprocal closing to the Latin American coastal states of access to fishing in the U.S. 200 mile fishery conservation zone (FCZ). Such a closure would have particular effect, for example, on Mexico which for 1979 was allocated quotas for more than 46,000 metric tons in total of resources such as squid, pollock, cod, rockfish and hake in the U.S. FCZ. These allocations are being taken by Mexico under joint venture arrangements with other nations such as Spain and Korea: if all are taken in 1979 and sold at U.S. landings prices, their value could reach over 60 million dollars.

Other Arrangements

Such confrontations, seizures, embargos, and reciprocal limitations to access to the 200 mile zones would bring back vestiges of the 'tuna wars' (Lane, 1976) with its high diplomatic and transactional costs and its eroding effects on the broad spectrum of hemispheric relationships. The confrontations could, even more, polarize and harden the positions of the U.S. and the coastal states; renegotiations

might be considerably delayed; and a period of continued disruption and open unregulated, unmanaged fishing on the tuna resource might well occur. The confrontations could also force a series of attempts to come to some form of arrangement that would serve to alleviate some of the problems arising from the lack of an international tuna management regime in the area, without the necessity of renegotiating such a regime among all of the participants.

One possible such arrangement is for the present members of the IATTC (Canada, France, Japan, Nicaragua, Panama, and the United States) to attempt to maintain a regulated fishery, through some mechanism, by themselves. This is unlikely because of the application of Section 955 of the Tuna Conventions Act of 1950 which requires suspension of regulations on the U.S. tuna fleet when foreign fishing operations in the area constitute a serious threat to achieving the IATTC management objectives. Even if the Latin American coastal states gave assurances of complying with any management regulations (as with the probable interim arrangements for 1979) it is doubtful whether the U.S. industry would find such an arrangement palatable in the long term. Further it is doubtful that an IATTC with such limited membership could manage the international tuna fishery effectively without the membership and participation of Mexico and Costa Rica. Strategically, also, in terms of negotiating position, such

an arrangement would remove the U.S. bargaining chip from the negotiating table, that of the possibility of unleashing the large, highly competitive and efficient U.S. fleet to fish unrestrictedly on the tuna resource.

Another possible arrangement is that the Latin American coastal states form a coalition to manage the yellowfin resource internationally, within their own 200 mile zones (or perhaps even beyond). Objectives of such a management group could be to maximize revenue, control competition, manage the resource, or some combination of the three. One effect of a regional coalition might be to exclude the international fleet from the 200 mile zone, with the effects noted above on the fishery and the resource. On the other hand, such a coalition might act positively to stabilize license fees and fishing operations along the coast, and to manage the resource. In any event, it is unlikely that political and national considerations among the Latin American coastal states would allow such a coalition to form, given the fundamental differences of opinion between CEP countries and Mexico and the other coastal states in respect to the mode of international management of the highly migratory species.

Another possible arrangement could be that of management of the eastern tropical Pacific tuna fishery by individual countries within each's 200 mile zone, at the expense of international management and research. Under

this situation, and depending on the terms of access to the individual EEZs and the numbers of licenses issued, many vessels might experience a short term gain in catch due to almost unregulated fishing. However, the long-term result of individual country management would be instability of the fishery in the particular 200 mile zone, an erratic supply of fish to processors, increasing license fees and instability in the licensing system, no voice of the other involved nations in the management systems, and poor conservation of the resource. The indivdual coastal state would have difficulty in controlling fishing in her waters and might have considerable difficulties with intrusions of fishing vessels of neighboring states. Although such management is advocated to a degree by the CEP countries, it is doubtful if individual nation management can become a viable option, because of its inadequacies in attempting to manage unilaterally a resource which migrates extensively in the waters of various countries.

The development of bilateral agreements between the individual Latin American coastal states and the nations of the international fleets wishing to fish within the EEZ is another possible situation which might develop, in an attempt to regulate the eastern tropical Pacific tuna fisheries. Such agreements, which provide access to resources within the 200 mile zone in exchange for payment by vessel owners of reasonable license and other fees, have

been used by the U.S., for example, for access to shrimp resources off Brazil and increasingly, for example, by Japan, for access to tuna resources within the EEZ's of the South Pacific island nations. While such agreements would provide some stability of access to the eastern Pacific tuna resources within the EEZ's, they would not satisfy the requirements for the rational international management of those resources. However, absent the larger management mechanism, the bilateral arrangements could be an attractive short term solution.

Because most of the coastal state countries could not immediately take full advantage of the tuna resources in their 200 mile zones through lack of vessels, fishing expertise, processing facilities, infrastructure and developed markets, more direct forms of arrangements between the coastal states and the international fleets could also develop, short of formal government-to-government treaties. These might include joint ventures at all levels from fishing to processing; transfer of vessels to the flag of the coastal states; purchase of processing plants in coastal states by non-coastal state companies; payment of license fees by the international fleet; and any other viable arrangement of mutual economic advantage to the participants. These private arrangements would act, for the international fleet, to stabilize both access to the fishery within the 200 mile zones of individual coastal states and

the supply of tuna (to some extent) and, for the coastal nations, to provide the opportunity to maximize their benefits from the presence of the tunas within their 200 mile zones. The needed international management, however, would be lacking. The end result would probably be overexploitation of the resource, de[illegible] on the number and extent of the private arrangements. The immediate advantages, though, could appear very attractive, both because of the relative ease and rapidity of making such arrangements, and because of the prospects for short term increased catches and economic benefits in an unregulated fishery.

VIII: LIKELY OUTCOME

A critical examination by the nations now involved in the eastern tropical Pacific yellowfin fishery of the various possible results of a breakdown in negotiations towards a new tuna convention and the absence of an effective international management regime would readily show that none of the possible outcomes is satisfactory, some much less so than others. The outcomes would be patchwork, temporary, ad hoc solutions. Although some might appear to have efficacy and attraction in the near-term, all have some serious political, diplomatic, economic, social and management drawbacks from both the short- and long-term perspectives. And, importantly, none deals effectively with the fundamental issue - the conservation of the yellowfin resource in the eastern tropical Pacific. Without a long-term international conservation regime working to maintain a continuing sustainable yield from the yellowfin resource, any management mechanisms could not logically be sustained.

In addition to the awareness of the serious consequences of the absence of a management regime for the 1980 yellowfin tuna fishing season and the onset of unregulated fishing, there must also come the awareness that a breakdown in negotiations now would cause a loss of

negotiating momentum and create possible future political and social situations from which it might be difficult to recover. National actions and ad hoc arrangements, once taken and made, would be difficult to step back from, for some indeterminate period of time, and would prolong instability in the area and delay the return to the negotiating table.

For these reasons, the likely outcome of the present impasse is a return to renegotiation efforts, and a dedicated serious move to have some form of international tuna management regime in place before the start of the 1980 fishing season.

Much has been accomplished to date (Costa Rica, Mexico, and United States, 1979) among the participants in reaching agreement (or near agreement) on various institutional mechanisms and principles for managing the tuna fishery in the eastern Pacific Ocean, and in moving forward on the development of innovative and responsible management methodologies to meet the new requisites of developing international law and of the changes which have taken place since the IATTC was formed 30 years. The participants in the renegotiations to date should rightly take pride in their accomplishments along these lines. Much necessary detailed and important work has been done, and these will undoubtedly be let stand during the coming rounds of negotiations.

On those issues (allocation and licensing, in particular) which remain, giving and concessions on both sides should lead to the development of a modus vivendi which would permit a short- to medium-term (3 to 5 years) agreement to be signed among the participants. Although none of the nations would be completely satisfied with the provisions of such an agreement, there would be two major advantages. First, and immediate, the agreement would avert the consequences of no regulation of the tuna fishery in the region. Secondly, the agreement would stabilize the management of the fishery for its term, and provide a breathing space and a period of time in which to work toward a longer-term arrangement. During the 3 to 5 year life of the agreement, renewed attempts could be made to involve the CEP countries in the management of the tuna resources in the eastern tropical Pacific: management elements which are distasteful to the Latin American coastal states under the present IATTC management regime could be phased out in an orderly fashion, by common agreement among the participants, with a minimum of disruption to those being phased out; the coastal states could develop fishing skills and their own industry so as to take advantage better of the tuna resources in their zones and in the eastern tropical Pacific; new arrangements, most likely joint ventures, could be made for the future; and a new convention perhaps containing innovative political and economic elements (see,

for example, King, 1979) could be developed in an attitude of relative calm.

The time has arrived for an innovative move toward a new and broad view of the management of the tuna fishery in eastern Pacific Ocean. The time has arrived for the participants in the fishery to act in a positive, constructive manner and to set an example for world fisheries management as did the IATTC in 1949 when it was formed. Changes must come about in the management of the eastern Pacific tuna fishery. The participants in that fishery must decide whether these changes will come about on the basis of serious disruptions and conflicts in the fishery or on the basis of civilized and forward thinking, with political and technical arrangements and accommodations for the optimal benefit of all. Development, now, of a three to five year interim agreement could provide the atmosphere and conditions for such new long-term arrangements to be made for the management of the eastern tropical Pacific tuna fishery.

LIST OF REFERENCES

ALVERSON, F. G., AND B. M. Shimada.

1957. A study of the eastern Pacific fishery for tuna baitfishes, with particular reference to the anchoveta (Cetengraulis mysticetus). Inter-Am. Trop. Tuna Comm. Bull. 2:25-80.

ANONYMOUS.

1974. Report of the United States-Mexico bilateral meeting held in Mexico City, October 8-9, 1974 (unpublished), 3 p.

BARKLEY, R., W. H. NEILL AND R. GOODING.

1978. Skipjack tuna Katsuwonus pelamis habitat based on temperature and oxygen requirements. Fish. Bull., U.S. 76:653-662.

BAYLIFF, W. H.

1975. Organization, functions and achievements of the Inter-American Tropical Tuna Commission. Inter-Am. Trop. Tuna Comm., Spec. Rpt. 1, 58 p.

_____ AND T. P. CALKINS.

1979. Information and stock assessment of northern bluefin tuna, Thunnus thynnus, in the Pacific Ocean (unpublished). Inter-Am. Trop. Tuna Comm., Internal Rpt. 12. 78 p.

_____ AND B. J. ROTHSCHILD.

1974. Migrations of the yellowfin tuna tagged off the southern coast of Mexico in 1960 and 1969. Inter-Am. Trop. Tuna Comm., Bull. 16(1):1-64.

BLACKBURN, M.

1965. Oceanography and the ecology of tunas. In H. Barnes (editor), Oceanography and marine biology, pp. 299-322. Allen and Unwin, London.

BROADHEAD, G. C.

1962. Recent changes in the efficiency of vessels fishing for yellowfin tuna in the eastern Pacific Ocean. Inter-Am. Trop. Tuna Comm., Bull. 6(7):283-316.

_____.

1979. An overview of the tuna fishery. Tuna News 3 (1):1-5.

_____ AND I. BARRETT.

1964. Some factors affecting the distribution and apparent abundance of yellowfin and skipjack tuna in the eastern Pacific Ocean. Inter-Am. Trop. Tuna Comm., Bull. 8 (8):417-476.

_____ AND C. J. PECKHAM.

1974. The potential economic impact of a 200-mile fishery zone on the United States fisheries for tuna, shrimp and salmon (unpublished). Living Marine Resources, San Diego, CA. 8 p.

BRODERICK, D. G.

1973. An industry study: The tuna fishery. Ph.D. Thesis, Columbia University, 376 p.

CARROZ, J. E.

1965. Establishment, structure, functions and activities of international fisheries bodies: II. Inter-American Tropical Tuna Commission (IATTC). FAO Fish. Tech. Pap. No. 58.

CHILE, ECUADOR AND PERU.

1978. Position document presented at Intergovernmental Meeting (unpublished). Sept. 25-27, 1978, Lima, Peru. Unpaged.

CLEMENS, H. B., AND G. A. FLITTNER.

1969. Bluefin tuna migrate across the Pacific Ocean. Calif. Fish Game 55 (2):132-135.

COE, J., AND G. SOUSA.

1972. Removing porpoise from a tuna purse seine. Mar. . Fish Rev., 34 (11-12):15-19.

COLLINS, R., D. HUPPERT, A. MacCALL, G. STAUFFER, AND J. RADOVICH.

1979. Joint management information document for Pacific bonito. NMFS, SWFC Admin. Rpt. LJ-79-26, 89 p.

COSTA RICA AND MEXICO.

1977a. Working document proposed by the governments of Costa Rica and Mexico (unpublished). Plenipotentiary Conference for the International Conservation and Management of Tuna in the Eastern Pacific, San Jose, Costa Rica, 9 p.

_____ and _____.

1977b. Final report (unpublished), Plenipotentiary Conference for the International Conservation of Tuna in the Eastern Pacific, San Jose, Costa Rica, 6 p.

COSTA RICA, MEXICO AND UNITED STATES.

1979. Draft convention on tuna conservation and fisheries in the eastern Pacific Ocean (unpublished). 55 p.

ECUADOR.

1977. Document prepared in response to Costa Rica and Mexico, 1977a (unpublished). 8 p.

FLAGG, V. C.

1977. Alternative management plans for yellowfin tuna in the eastern tropical Pacific. Ctr. for Mar. Stud., San Diego State Univ., Proj. No. RME 3.

FOX, W. W., JR.

1978. Measurement of the average concentration of yellowfin tuna resources in 200-mile zones of eastern Pacific's coastal states (unpublished). Natl. Mar. Fish. Serv., La Jolla, CA, 4 p.

FREY, H. W. (editor).

1971. California's living marine resources and their utilization. Calif. Dep. Fish Game, Sacramento, CA, 148 p.

GODSIL, H. C.

1938. The high seas tuna fishery of California. Div. Fish Game Calif., Fish Bull. 51, 41 p.

GREEN, R. E., W. F. PERRIN, AND B. P. PETRICH.

1971. The American tuna purse seine fishery. In H. Kristjonsson (editor), Modern fishing gear of the world, vol. 3, pp. 182-194. Fishing News (books) Ltd., London.

GREENBLATT, P. R.

1979. Associations of tuna with flotsam in the eastern tropical Pacific. Fish. Bull., U.S. 77:147-156.

GULLAND, J.

1972. Some thoughts on a global approach to tuna management. Int. Symp. Fish. Econ., Organ. Econ. Coop. Dev., Paris, pp. 228-238.

_____.

1978. Alternatives for the organization of tuna management: A letter to the editor. Mar. Pol. 2 (2):161-163.

INTER-AMERICAN TROPICAL TUNA COMMISSION.

1950-1978. Annual Report. Inter-Am. Trop. Tuna Comm., Annu. Rpts. 1950-51 to 1978.

_____.

1961-1978. Minutes of Inter-Governmental meetings, 1961-1978 (unpublished). Inter-Am. Trop. Tuna Comm. Unpaged.

_____.

1972. Summary minutes of the twenty-seventh meeting, November 7-8 and 11, Panama (unpublished). Inter-Am. Trop. Tuna Comm., La Jolla, Ca. Unpaged.

_____.

1974. Special report on Inter-Governmental meetings for the conservation of yellowfin tuna in the eastern Pacific Ocean, and working groups established by these meetings, February 1961-February 1974 (unpublished). Inter-Am. Trop. Tuna Comm., Spec. Rpt. pp. 1-16 + Appendices.

_____.

1976a. The tuna-porpoise relationship and the IATTC (unpublished). Inter-Am. Trop. Tuna Comm. Unpaged.

_____.

1976b. Alternatives for the international management of tuna resources (unpublished). Inter-Am. Trop. Tuna Comm. Unpaged.

_____.

1978a. The 1978 fishing year (through September 18). Inter-Am. Trop. Tuna Comm., Background Pap. 1, 9 p. + attach.

_____.

1978b. Summary minutes of the thirty-sixth meeting (Part I), October 16-18, 1978, Tokyo, Japan (unpublished). Inter-Am. Trop. Tuna Comm. Unpaged.

JOSEPH, J.

1970. Management of tropical tunas in the eastern Pacific Ocean. Trans. Am. Fish. Soc. 99 (13):629-648.

_____.

1972. An overview of the tuna fisheries of the world. Int. Symp. Fish. Econ., Organ. Econ. Coop. Dev., Paris, pp. 203-219.

_____.

1977. The management of highly migratory species: some important concepts. Mar. Pol. 1 (4):275-288.

JOSEPH, J. (MODERATOR).

1978. Informal preliminary consultation on tuna conservation and management in the eastern Pacific Ocean. Inter-Am. Trop. Tuna Comm., La Jolla, CA, 1 p. + annexes.

JOSEPH, J., AND J. GREENOUGH.

1979. International management of tuna, porpoise and billfish; biological, legal and political aspects. Univ. of Wash. Press, Seattle, 197 p.

KASK, J. L.

1967. The tuna commission--an historical note (unpublished). Inter-Am. Trop. Tuna Comm., Background Doc. 1, 20th IATTC Meeting, San Jose, Costa Rica. Unpaged.

KEITH, B.

1977a. 34th meeting of the Inter-American Tropical Tuna Commission (unpublished). NMFS Foreign Ops. Brief 77-2, 4 p. + attach.

_____.

1977b. 35th meeting of the Inter-American Tropical Tuna Commission; 22nd Inter-Governmental meeting for the conservation of yellowfin tuna (unpublished). NMFS Rpt., 7 p.

KING, D. M.

1978. Measuring the economic value of the eastern tropical Pacific tuna fishery. Proc. West. Div. Mtgs., Am. Fish. Soc., July 1978, pp. 444-457.

_____.

1979. Centralized vs. decentralized economic decision-making in international management systems for highly migratory species. J. Mar. Pol., in press.

KLAWE, W. L.

1978. World catches of tunas and tuna-like fishes in 1975. Inter-Am. Trop. Tuna Comm., Internal Rpt. 11, 191 p.

LANE, B. R., JR.

1976. The tuna war: An analysis. Ocean Policy Project, Occas. Pap. Ser. 8, Johns Hopkins Univ., Baltimore, 42 p.

LORING, D. C.

1971. The United States-Peruvian "fisheries" dispute. Stanford Law Rev. 23 (3):391-453.

McNEELY, R. L.

1961. The purse seine revolution in tuna fishing. Pac. Fisherman 59 (7):27-58.

MILES, E. L.

1977. Changes in the Law of the Sea; impact on international organizations. Ocean Dev. Int. Law J. 4 (4):409-424.

NOAA, NMFS, SWFC.

1977. Prepared testimony submitted by SWFC staff at hearing to consider amendment of regulations governing incidental taking of marine mammals in the course of commercial fishing operations, August 22-29, 1977, in San Diego. NMFS Admin. Rpt. LJ-77-27, 199 p.

ORANGE, C. J., M. B. SCHAEFER, AND F. M. LARMIE.

1957. Schooling habits of yellowfin tuna (Neothunnus macropterus) and skipjack (Katsuwonus pelamis) in the eastern Pacific Ocean as indicated by purse seine catch records, 1946-1955. Inter-Am. Trop. Tuna Comm. Bull. 2(3):81-126.

ORANGE, C. J., AND G. BROADHEAD.

1959. 1958-1959--A turning point for tuna purse seine fishing. Pac. Fisherman 57 (7):20-27.

PACIFIC FISHERMAN YEARBOOK.

1949. Miller Freeman Publs., Seattle, WA., 324 p.

PECKHAM, C. J.

1974. International Trade - Tuna. FAO Rpt. FC/DEV/71.74, 28 p.

PELLA, J. J., AND P. K. TOMLINSON.

1969. A generalized stock production model. Inter-Am. Trop. Tuna Comm. Bull. 13 (3):419-458.

PETERSON, C. L.

1956. Observations on the taxonomy, biology and ecology of the engraulid and clupeid fishes in the Gulf of Nicoya, Costa Rica. Inter-Am. Trop. Tuna Comm. Bull. 1 (5):137-280.

ROTHSCHILD, B. K.

1978a. Tuna discussions in San Jose, Costa Rica. Letter (signed by Carmen Blondin) to David Wallace, July 10, 3 p.

_____.

1978b. Status of negotiations to renegotiate the Inter-American Tropical Tuna Commission. NMFS Memo. (T. Leitzell to J. Walsh), July 24.

_____.

1978c. Recent consultations on the conservation and management of tuna in the eastern Pacific Ocean. NMFS Memo. (C. Blondin to Distribution), Aug. 24, 5 p.

_____.

1978d. 36th meeting of the Inter-American Tropical Tuna Commission. 23rd Inter-governmental meeting for the conservation of yellowfin tuna. NMFS Rpt. Oct. 30, 7 p. + attach.

_____.

1979a. Eastern Pacific tuna negotiations. NMFS Memo. (J. Gehringer to J. Walsh), Mar. 14, 4 p. + attach.

_____.

1979b. U.S.-Mexico annual consultations on fisheries. NMFS Memo. (C. Blondin to Distribution), May 11, 2 p.

_____ AND B. HALLMAN.

1978. Meeting in San Jose, Costa Rica to continue tuna negotiations. NMFS Memo. (C. Blondin to Distribution), Dec. 20, 10 p. + attach.

SAILA, S. B., AND V. J. NORTON.

1974. Tuna: status, trends and alternative management arrangements. Resources for the Future, Inc., Washington, D.C., x + 59 p.

SAKAGAWA, G. T.

1979. Eastern tropical Pacific tuna negotiations, January 15-18, 1979. Trip report (unpublished). Southwest Fisheries Center, La Jolla, CA, Memo. (Sakagawa to Barrett), January 31. Unpaged.

SCOTT, J. M.

1969. Tuna schooling terminology. Calif. Fish Game 55 (2):136-140.

SHARP, G. D., AND A. DIZON (editors).

1979. The physiological ecology of tunas. Academic Press, N.Y., 485 p.

SHIMADA, B. M., AND M. B. SCHAEFER.

1956. A study of changes in fishing effort, abundance, and yield for yellowfin and skipjack tuna in the eastern tropical Pacific Ocean. Inter-Am. Trop. Tuna Comm. Bull. 1 (7):351-421.

SUDA, A., AND M. B. SCHAEFER.

1965. General review of the Japanese tuna long-line fishery in the eastern tropical Pacific Ocean 1956-1962. Inter-Am. Trop. Tuna Comm. Bull. 9 (6):305-464.

TELLO, M.

1976. Statement by Ambassador Manuel Tello during the 20th Inter-governmental meeting of the Inter-American Tropical Tuna Commission, Managua, Nicaragua, 13-15 Oct., 1976 (unpublished). Minutes, 20th Inter-governmental Meeting, Annex 3, 4 p.

UNITED STATES CODE.

1950. Title 16 § 951 et seq. Tuna Conventions Act of 1950.

WEISMANN, J.

1977. Annual Meeting of the Inter-American Tropical Tuna Commission (unpublished). Doc. [U.S. Emb., San Jose to Sec. of State], Aug. 12.

WHITEHEAD, S. S.

1931. Fishing methods for bluefin tuna (Thunnus thynnus) and an analysis of the catches. Calif. Div. Fish Game, Fish Bull. 33, 32 p.

WHITEMAN, M. M.

1965. Digest of International Law, 4. Gov't Print. Off., Washington, D.C.

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