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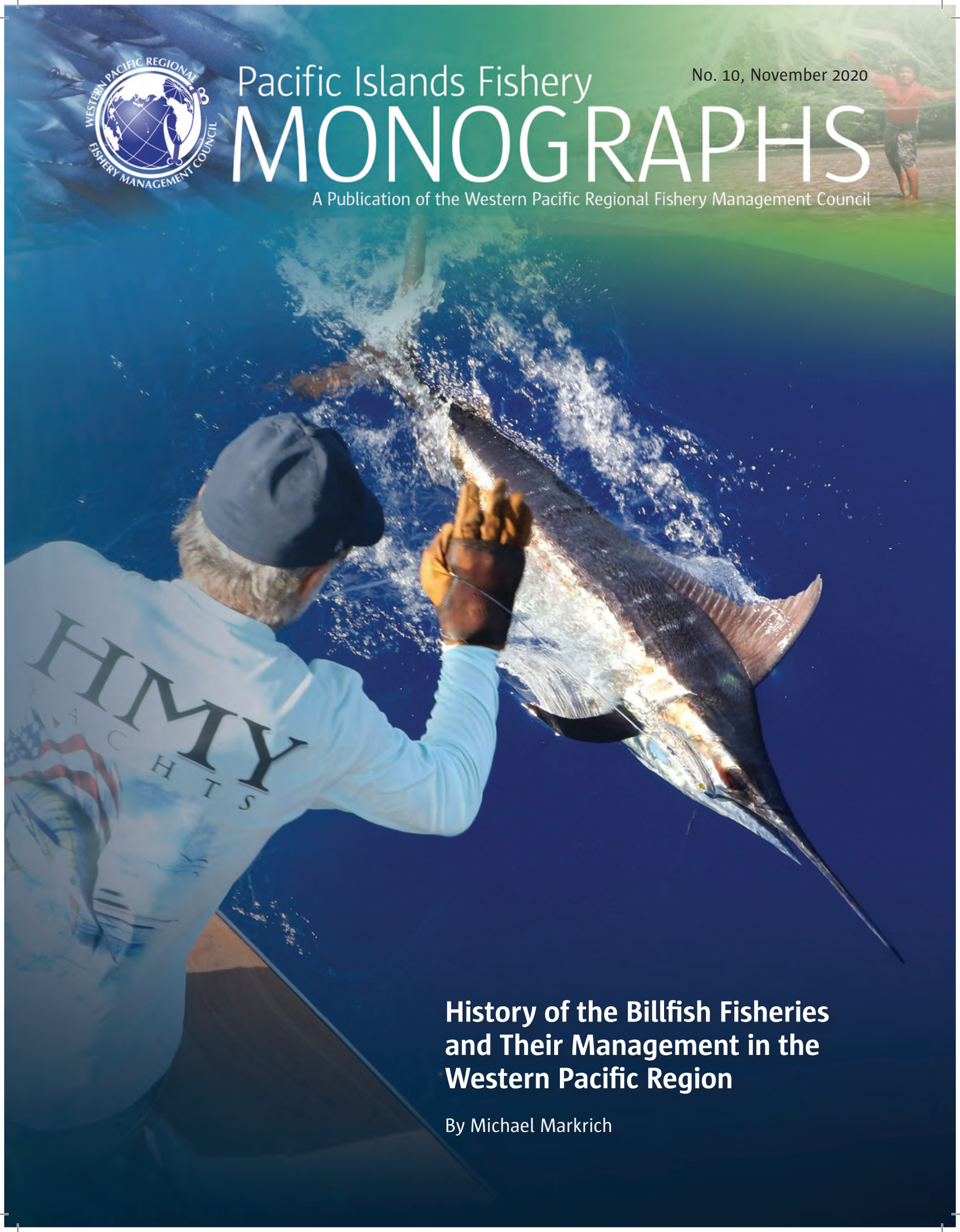

History of the Billfish Fisheries and Their Management in the Western Pacific Region

By Michael Markrich

ABOUT THE AUTHOR

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Cover photo: Sports fishing for billfish, Kona, Hawai‘i. Photo courtesy of Kevin Hibbard.

CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

List Of Abbreviations

BCA	Billfish Conservation Act
CNMI	Commonwealth of the Northern Mariana Islands
CPUE	catch per unit effort
EEZ	exclusive economic zone
ESA	Endangered Species Act
FCMA	Fishery Conservation and Management Act
FCZ	Fishery Conservation Zone
FMP	Fishery Management Plan
HIBT	Hawai'i Invitational Billfish Tournament
HMS	Highly Migratory Species
HVB	Hawaii Visitors Bureau
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IGFA	International Game Fishing Association
ISC	International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean
IUU	illegal, unreported and unregulated
MAFAC	Marine Fisheries Advisory Committee
MHI	main Hawaiian Islands
MPA	marine protected area
MNM	Marine National Monument
MSA	Magnuson–Stevens Fishery Conservation and Management Act
MSY	maximum sustainable yield
mt	metric tons
NCMC	National Coalition for Marine Conservation
NEPA	National Environmental Policy Act
NGO	non-government organization
nm	nautical mile
NMFS	National Marine Fisheries Service
NWHI	Northwestern Hawaiian Islands
OY	optimum yield
PFRP	Pelagic Fisheries Research Program
PIFSC	Pacific Islands Fisheries Science Center
PMP	Preliminary Management Plan
RFMO	regional fishery management organization (international)
SEZ	Southern Exclusion Zone (Hawai'i)
SPC	South Pacific Commission
TBF	The Billfish Foundation
UNCLOS	United Nations Convention on the Law of the Sea
USTF	U.S. Tuna Foundation
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean
WPRFMC	Western Pacific Regional Fishery Management Council

Photo: SBHawaii.com | Pinterest / Joel Villanueva

Preface

Western Pacific Islanders have been skilled deep-water fishermen for pelagic fish such as the blue marlin for hundreds of years. During the early twentieth century, a cultural clash occurred between Japanese longline fishermen and European and American big game fishermen. At the heart of the initial dispute was the Western cultural belief that marlin are beautiful, iconic and rare. Their aesthetic value encouraged the belief that the fish should be reserved as big game fish to provide exciting entertainment for the high-end recreational fishing market. This perspective contrasted sharply with the Japanese view. Japanese fishermen considered these fish as the unintended bycatch of their far more valuable tuna fishery, to be used most profitably in low-end processed fish meal products such as fish cake (*kamaboko*) for the masses.

Concerns over the survival of large gamefish led wealthy big game anglers—in alliance with recreational tackle manufacturers, mass market recreational fishermen, environmentalists and some commercial fishermen—to play a key role in the passage of the Fishery Conservation and Management Act of 1976, now known as the Magnuson-Stevens Act (MSA).

After implementation of the MSA legislation, a suite of federal fishery measures in the U.S. Atlantic and Gulf of Mexico, including calls for partial ban of swordfish fishing off Florida (Shillington 1983), led to economic hardships for commercial fishermen, compelling them to move thousands of miles to Hawai‘i where state and federal agencies were providing incentives for them to fish for pelagic fish (Wagner 2000). The result was a fourfold increase in the number of longline vessels fishing Hawai’i’s offshore waters, a situation for which the Western Pacific Regional Fishery Management Council (WPRFMC) was not prepared. The rapid growth in the fishery led to concerns about impacts to protected species such as monk seals and turtles as well as with the fishing practices of local fishermen.

The problem of longline vessels interacting with the local, small-boat fishermen was solved by the WPRFMC through the development of a longline exclusion zone that spanned from shore out to 50 to 75 nautical miles (nm) around the main Hawaiian Islands. The injuring of protected species was mostly solved by the sustained effort of the Council to ban longline fishing within 50 nm of the Northwestern Hawaiian Islands (NWHI). In addition, longline captains were required to alter their fishing practices and type of fish hooks. Billfish continued to be caught as incidental catch, but their numbers dropped as commercial fishermen targeted deeper waters for tuna. In the meantime, the recreational billfish industry thrived, and Hawai‘i remains one of the best spots for big game fishing in the world. However, cultural differences remain. While recreational fishermen practice catch-and-release, one Pacific Islander noted, “Gentlemen, we don’t play with our food.”

The protective exclusion of longline vessels from the waters 0 to 50 nm around the NWHI by the Council was held up as a model by the International Game Fish Association in the early 1990s. Ironically, what evolved was demands that huge areas of open ocean be set aside from fishing forever without compensating Hawai‘i’s indigenous people. Native Hawaiians have been deprived from from the income of one of their largest assets, the waters of the NWHI, renamed Papahānaumokuākea and designated a national marine monument through presidential proclamation. This was the first of what would be a series of similar closures of offshore federal waters in the name of protecting coral reefs, billfish and other pelagic species, taken at the expense of Pacific Islanders. Currently, 51% of the U.S. exclusive economic zone (EEZ, 0 to 200 miles from shore) surrounding Hawai‘i, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands and the Pacific remote island areas (collectively, the Western Pacific Region) is designated as marine national monuments and 83% of the U.S. EEZ surrounding Hawai‘i is closed to longline fishing.

The issue is at once economic and cultural. By forcing U.S. fishermen from federal waters, it unintentionally makes the plundering of these waters more viable by illegal, unreported and unregulated (IUU) fishermen.

The closures have resulted in loss of jobs and income for fishermen and their families in Hawai‘i and the U.S. Pacific territories. In terms of environmental safeguards, U.S. fisheries subject to strict regulations have been supplanted by foreign fisheries that are largely unregulated but are nonetheless able to sell their catches in U.S. markets. For U.S. Pacific Islanders who have few economic options other than fishing, these actions have had significant negative consequences.

The COVID-19 pandemic is altering familiar patterns for commercial and charter boat fishing throughout the United States. It remains to be seen what impact this will have on billfish management in Hawai‘i and the Western Pacific.

Fig. 1a. Shortbill spearfish (*hebi*).

Fig. 1b. Striped marlin (*nairagi*).

Fig. 1c. Broadbill swordfish (*shutome*).

Photos: Hawaii Seafood Council

1. Introduction

Since ancient times, flocks of black seabirds have indicated the presence of huge schools of tuna swimming off Hawai‘i (Glazier 2016a). Found among these tuna schools are Indo-Pacific (*Makaira mazara*) and Atlantic (*M. nigricans*) blue marlin (both here referred to as blue marlin, *kajiki* or *a‘u*), black marlin (*M. indica* or *a‘u*), striped marlin (*Kajikia audax* and *Tetrapturus audax, nairagi* or *a‘u*), shortbill spearfish (*T. angustirostris* or *hebi*), sailfish (*Istiophorus platypterus*) and broadbill swordfish (*Xiphias gladius*, *mekajiki* or *shutome*). (See Collette and Graves 2019 and HawaiiSeafood.org.) These pelagic fish have been well known to the fishermen of the Western Pacific for hundreds of years (Amesbury 2008) and have long played an important role in Pacific Island culture.

Longlining is an 18th century Japanese fishing technique—considered the most efficient means of subsurface fishing for tuna on the open sea—that found its way to Hawai‘i in the early twentieth century. As the longlining industry grew alongside the world’s demand for tuna, a number of big game fishermen on the U.S. mainland complained that the Japanese longline fishermen were taking too many prized large blue marlin, turning what could be rare and beautiful sport trophies into fish cake. A clash of cultures and classes developed.

Unlike their counterparts in Hawai‘i, who also caught marlin for sport, big game fishermen from the U.S. mainland did not normally eat the marlin and other fish they caught. They were not interested in the flavor of the fish but in the exhilaration of catching an elusive quarry and sharing the experience with their friends. They created yacht clubs, competitions and social gambling events around the catching of marlin and other billfish. Believing that marlin, like freshwater trout, were too valuable to be caught only one time for eating, they started the practice called catch and release, which allowed the same large marlin or other billfish to survive after being hooked so they might be caught multiple times.

Eventually, a pastime for the very rich evolved into a recreational charter and tournament industry associated with gaming that is today valued at more than $3 billion (Ditton and Stoll 2003).[1] As this elite industry grew in size and influence, it changed the nature of the sport and transformed the balance between recreational and commercial fishing in U.S. waters. The competition between U.S. big game fishermen and commercial fishermen, as it affects U.S. regulatory practices and the islands and peoples within the jurisdiction of the Western Pacific Regional Fishery Management Council (WPRFMC), is the subject of this history.

Fig. 2. Pacific blue marlin (*Makaira mazara*) is commonly known in Hawai‘i as *kajiki* or *a‘u* (the Hawaiian word applied to all marlin species). Photo: Hawaii Seafood Council

1. Their estimate of the economic impact for the United States in 2003 was $2.4 billion. In 2019 dollars, that number equates to $3.3 billion. Depending upon the multiplier, it may be even higher.

2. Big Game Fishermen

The recreational pursuit of trophy billfish such as marlin, spearfish, sailfish and broadbill swordfish is known as "big game fishing." This sport was helped in its development around 1900 by the creation of specially built fishing boats with inboard engines. (Holcombe 1923).

The social culture of the time embraced big game fishing as an exciting action sport. Anglers used carefully crafted fishing rods and reels with specially made fishing lines and baited hooks to troll for fish behind their boats. Photos of brave anglers standing next to enormous fish caught the world's imagination. Opinions differ as to when the first marlin was caught by a motor boat. Some say it was in Florida in 1900. However, following the establishment of the Tuna Club of Avalon in California, prominent big game fishermen who knew about the abundance of billfish and tuna in Hawai'i founded the Hawai'i Big Game Fishing Club in 1914, the second such club founded globally. The first motorized billfish fishing boat arrived in Hawai'i in 1916 from San Diego, California.

At the heart of this new sport was then and is today the marlin—beautiful fish, distinct in shape and color, that swim at 50 miles an hour or more among tuna schools, feeding off the tuna as they move beneath the surface. The catching of these large blue and black billfish by means of a lure trolled behind a motor boat produces a sense of euphoria that is difficult replicate in other sports pursuits. During the early part of the twentieth century in the U.S. Atlantic, the catch occurred seasonally. Blue marlin were sought from January to April in the southwest Atlantic and from June to October in the Atlantic northwest, as far south as Florida and as far north as New England. However, marlin are found throughout the world's seas, and the glamour that surrounded their catch spread as fishermen competed to catch the biggest fish and establish a world's record.

The sport was immortalized during the 1920s by celebrity writer Zane Grey, who wrote bestsellers such as *Tales of Fishing Virgin Seas* (1925) and *Tales of Tahitian Waters* (1931). Images of the sport became a mainstay of popular culture and were featured in Hollywood movies and sports magazines.

Although places such as Key West, Florida, offered at-will shared-cost charters aimed at attracting working- and middle-class participants, the demographics of big game fishing from its start was largely the wealthy and those with high levels of disposable income (Ditton and Stoll 2003). Part of the sport's appeal was that it emitted highly visible social signals of exclusivity, wealth and success. Men and women alike enjoyed the status and signature branding that came from being photographed standing, usually well dressed and fishing pole in hand, next to a huge blue marlin hanging from a steel hook, the fish dwarfing them in scale.

The sense of accomplishment did not end there. Many of these large trophy fish were cast in sand molds by taxidermists who hand painted them into brilliantly colored lifelike reproductions that could be hung on walls in prominent locations as a tangible symbol of success for everyone to see. This is true even today. Visitors to Saipan who visit the local McDonald's can admire a 239-pound Pacific blue marlin that was caught by the chairman of the McDonald's Corporation in August 1977 off Honolulu (Tuten-Puckett et al. 2003). Even after more than 40 years, its shining presence in the store fills visiting customers with awe and demonstrates like a talisman the proud connection between the Saipan McDonald's and the executive of its parent company.

A number of the big game fishermen of the early sports fishing era went on to participate in exclusive fishing tournaments with friends and family.

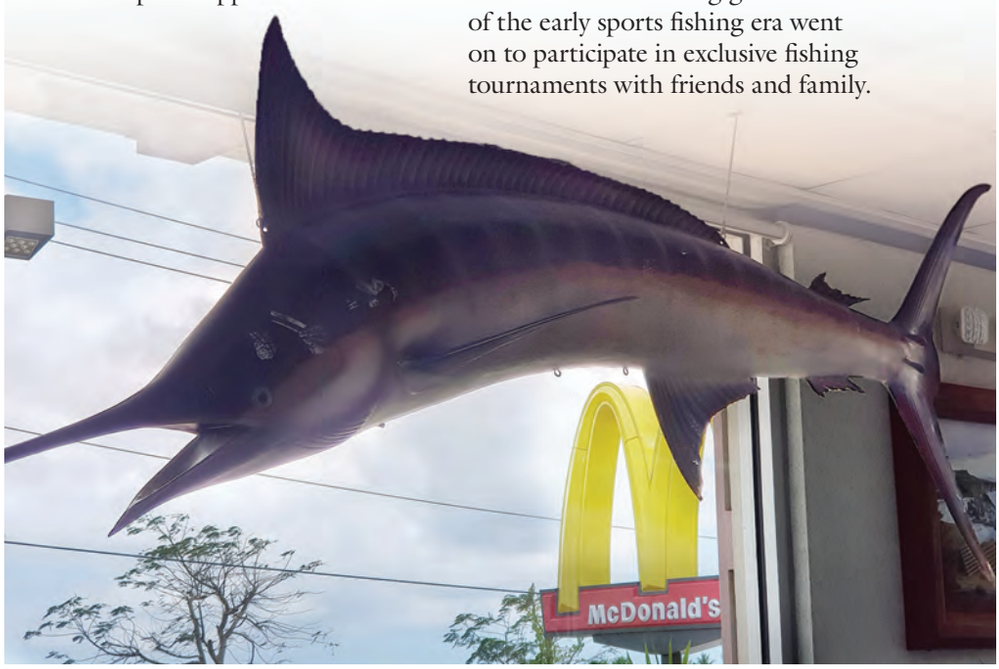


Fig. 3. A marlin hangs in the window of the McDonald's in Saipan, Commonwealth of the Northern Mariana Islands, and another hangs on the restaurant's wall. One of the marlin was caught by the chairman of McDonald's Corporation. Photo: WPRFMC.

These tournaments—with their protocols, carefully carved trophies and exotic rituals—were promoted as incentives for wealthy individuals to visit exclusive high-end resorts in Florida, Hawai'i, Cuba and other parts of the world.

Fig. 4. Striped marlin caught by wealthy angler, mid-twentieth century. Photo: Eugene Marie Marron (1957).

The sport also attracted busy executives, who could relax fishing for billfish on a small boat away from the demands of others. Alternatively, they could use the sport as an opportunity for negotiating exclusive business deals while they enjoyed the enhanced privacy the charter boats offered (TBP 2004).

Despite the economic downturn of the Great Depression (1929–1939), which caused many of the low-cost charter boats to go out of business, interest in the sport remained high, and, in 1939, the International Game Fishing Association (IGFA) was established. The IGFA was an organization of like-minded individuals from around the world who supported with annual dues the interests of big game fishermen, established a library and museum, and created protocols for world's record catches. The last included specifications for the reporting, weighing, certifying and recording of catches.

Through their international organizations, the big game fishermen of the Atlantic were encouraged to travel the world to catch the biggest marlin. Encouraged by their international social networks, a number of big game fishing celebrities, such as Ernest Hemingway, became interested in Hawai'i where the largest marlin were caught.

In the desire at the time to catch the biggest, few were troubled that the heaviest and largest fish taken were females. The maximum weight of male blue marlins is 300 pounds and rarely a few pounds more. Thus, they are generally not regarded as trophy fish.

The perceived need to protect and monopolize the biggest fish for the pleasure of their fellow upper-class sports fishermen would put big game fishermen on a collision course with Japanese fishermen who saw marlin and other gamefish as a catch less valuable per pound than tuna but important nonetheless as a source of revenue from fish-cake makers. This led to the controversy that followed.

3. Hawai'i Early Billfish History

Fig. 5. Hawai'i historic flagline/longline vessels were wooden sampans introduced by Japanese fishermen. Photo: NOAA Pacific Islands Fisheries Science Center (PIFSC).

Native Hawaiians used special hooks to catch billfish (*a'u*), tuna and other large pelagic fish for hundreds of years from outrigger canoes. The tuna and billfish schools, including those of blue marlin, were abundant and could be found close to shore. As it was among the Europeans and Americans later, the excitement and satisfaction of catching huge, fast-moving fish was considered such a rare experience that it was reserved exclusively for the *ali'i*, the Native Hawaiian nobility. Billfish such as marlin were especially prized for their long, spike-like bills, which, in ancient times, were turned into daggers and swords. The ancient Hawaiians knew how to catch billfish in the open sea and did not anticipate competitors from outside their world coming to fish for them.

In the early nineteen hundreds, two events occurred that would change that perspective.

From 1906 onwards, Japanese fishermen were searching the world for subsurface tuna schools. Information reached Japan about the proximity of

Fig. 6. Flagline gear included sections of tarred rope. Each section was kept in a basket. Photo: NOAA PIFSC.

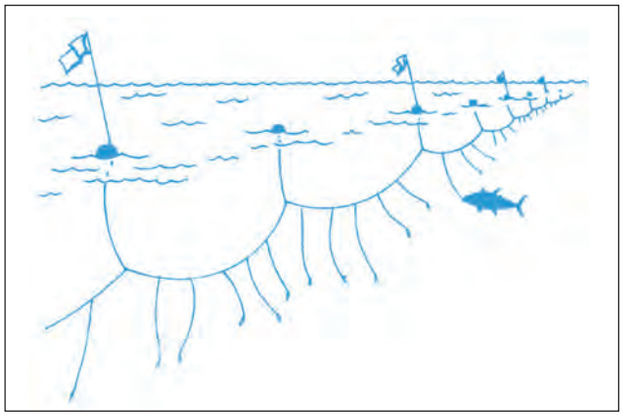


Fig. 7. Flagline/longline gear includes miles of line kept afloat by buoys. Source: WPRFMC.

bigeye and yellowfin tuna schools to Honolulu. Soon afterward, a fisherman from Wakayama, Japan, came to Hawai'i to explore its fishing possibilities. He was successful, and, in 1917, a fishing fleet was developed in Wai'anae that became the largest source of fresh tuna in Hawai'i (Otsu 1954).

This fleet was comprised of 40- to 63-foot motorized wooden sampans, vehicles introduced by Japanese fishermen that would become the standard in the Hawaiian longline industry for the next 50 years. The longline fishing technique imported from Japan was known as flagline. The fishing gear included sections of tarred ropes, known as "baskets" or "basket gear" as they were often stored in baskets. These sections were deployed connected to each other end to end to constitute a set. Flagged floats were attached at the juncture of each section. Numerous lines with baited hooks fastened to the mainline descended to depths of 150 to 300 feet. The average number of hooks was 300 per vessel. The flagline could spread for up to 8 miles behind the vessel.

By changing the depth of the hooks, the fishermen could target different species. On average, 7,000 pounds of fish were caught per 10-day trip, of which approximately 25% to 32% was billfish of various kinds, including marlin. In contrast to the relatively few large game fish caught by the troll fishermen in small boats, skilled professional flagline fishermen caught hundreds. The largest flagline fleet was in Honolulu on O'ahu, but other fleets were based in Hilo and Kona on the Hawai'i (locally called the Big Island) and in Port Allen on Kaua'i.

Fig. 8. (Right) Billfish would account for one-quarter to one-third of the flagline catch. Photo: NOAA PIFSC.

The catch of marlin by the local flagline fishermen was criticized by visiting recreational fishermen who feared that the billfish stocks would be overexploited. The recreational anglers, predominately upper-class Caucasians from the U.S. mainland, did not generally eat the billfish they caught. Instead, they posed with them for photos. Meanwhile, the local flagline fishermen sold their billfish to be ground up as fish meal and baked into *kamaboko*, or fish cake, which the working class plantation workers in Hawai'i during the 1920s and 1930s ate with thin noodles known as saimin. *Kamaboko* had both economic and political importance. It was one of the principal sources of protein for the plantation workers, many of whom could not afford other kinds of fish.

The dismay that sports fishing writer S. Kip Farrington expressed about the Honolulu fish market of the late 1930s was typical of the mainland writers of his era. He described the sight by saying, "… almost all of the fish brought in [to the fish market in Honolulu] are the magnificent game fish we so much desire to catch on rod and reel. Every morning there will be sampan after sampan tied up at the fishing piers with hundreds of these great fish iced down in their holds" (Farrington 1942). This cultural difference would have long-term political repercussions on billfish policy in Hawai'i.

Recreational anglers came to Hawai'i from California in search of blue marlin and giant tuna soon after these species were found in Southern California. Over the next 10 years, Hawai'i became

Fig. 9. Kajiki (blue marlin) fillet. Photo: Hawaii Seafood Council.

a premier global destination for big game fishing for marlin and other fish. The activity was heavily promoted to visitors who arrived on Matson luxury liner ships and stayed in Honolulu at the world-famous Royal Hawaiian hotel.

Big game fishing differed in Hawai‘i from other areas on the U.S. mainland. On the mainland, marlin may have been thrown away or sold for cat food after being photographed. However, Hawai‘i sports fishermen knew their crews needed to sell game fish at the local Japanese fish markets to pay their expenses. For this reason, most did not share the antagonism to longliners of their mainland counterparts. Besides, there seemed to be enough fish for everyone.

Likewise, recreational billfish played an important role in local society. Prominent members of Hawai‘i society such as Charles M. Cooke III, co-founder of the Cooke Trust, became involved in the sport and participated in local tournaments. The sport drew wealthy tourists, who looked at big game fishing as something to do in Hawai‘i and who posed with the large fish they caught as mementoes of their trips. The sport became so popular among wealthy visitors that the Kona Inn was built specifically to accommodate these visiting fishermen, who featured among them many famous people including President Franklin Delano Roosevelt.

Fig. 11. President F. D. Roosevelt offered gifts of octopus (squid) and fish while vacationing in Hawai‘i, July 1934. Photo: Franklin D. Roosevelt Library, National Archives.

Fig. 10. Ethnic Japanese, working-class women in Honolulu (circa 1930) shopped for items like fish cake to feed their families. Selling fish and fish cake from door to door on the plantation was a form of life insurance for fisherwomen and their families and provided a constant stream of income. If their husband was lost at sea, the family could survive by selling fish provided to them from someone else in their close social network. Photo: Hawai‘i State Archives.

Recreational billfish fishing also played a part in local business and commerce. Because the Hawai‘i tourism charter boat business was aggressively promoted by mainland writers, business was strong. Skilled boatmen of Japanese, Native Hawaiian, Chinese and Filipino ethnicities could earn significant tips from visitors who had high disposable incomes.

In addition, a small but highly skilled specialty lure business developed. Hawai‘i handmade lures were sold at high prices to sportsmen and fishing stores globally. As with the *ali‘i* of old, the sport of marlin fishing was reserved for the prominent in Hawai‘i society. Even the boats were moored at yacht clubs, which were privileged retreats for the elite.

Private-charter trolling boats found at small boat harbors in Honolulu, Maui, Kaua‘i and the Big Island of Hawai‘i catered to both the local elite and mainland visitors. In an effort to please their high-paying clientele who needed to hook up a marlin to be satisfied, charter boat crews developed special knowledge of marlin habits. They caught a disproportionate number of the blue and striped marlin in which their clients were interested. This was especially true off Kailua-Kona on the Big Island, where ocean eddies create unique currents where marlins tend to congregate (Seki et al. 2002).

Through much of the 1930s, 40s and 50s, the Kona area was known among the world’s billfish enthusiasts as a place where one was likely to catch a “grander,” a large billfish weighing over 1,000 pounds. Each year wealthy fishermen from California, including Hollywood celebrities, would hire famous local fishing boat captains like Henry Chee, whose vessel, *Malia*, was known as the “Grey Ghost of Kona.” But the fishing trips skippered by Chee and others, such as George Stevens Parker, catered to a small group of very wealthy people and did not have a significant impact on the island’s economy. Only four charter fishing boats worked regularly between 1945 and 1955. They anchored off the

Kona Inn, where deckhands doubled as waiters to drum up fishing clients among the visitors.

Fig. 12. Capt. Henry Chee. Source: IGFA.

For the few charter boat captains, business was difficult. The money they made came from the few tourists and from what they could make driving across the island to sell their fish at the Suisun fish auction in Hilo. There were few radios on boats. During the early days, captains like Chee carried pigeons. When he caught a marlin, he would write a note, put it in a capsule, tie it to the bird's leg and send the pigeon flying to the home of his partner's wife, Mrs. Charles

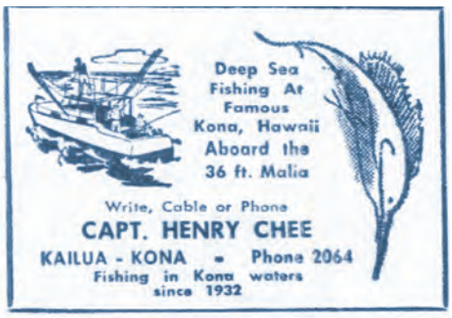


Fig. 13. Advertisement for Capt. Henry Chee's chartered fishing boat service aboard the *Malia*. Source: *Honolulu Advertiser,* Sept. 12, 1954.

Findlayson. She would read the note. If it was a big marlin, she would arrange for a photographer. The fish was hung from a hook attached to palm tree in front of the Inn. It was a simple life with the captains living on a narrow margin of income. It may have seemed idyllic to some, but, in fact, it was very stressful. One of the last things Chee said to his wife, before he died of a stroke at age 55 while gaffing a fish, was "Don't let Butch [their son] fish for a living" (Gutskey 1986).

The island of Hawai'i lacks beautiful beaches that are large and accessible, and it attracted few visitors during the early years of tourism development. Peter Fithian who arrived in 1955 decided that things could be different. He began promoting the concept to local businessmen that the Kona coast could become a year-round, high-end tourism destination if they created a prestigious international fishing tournament (Hogan 1983).

In 1958 he proposed the idea to the director of the Hawaii Visitors Bureau (HVB). The HVB agreed to make up any incurred losses. Support also came from local airlines, Big Island hotels and the Kona Jaycees.

While preparing for the tournament, Fithian discovered the need for billfish research in Hawai'i. "We had the species all screwed up because we didn't know one kind of marlin from another and we had different names for them. What was a black marlin, we called silver, and there was no recognition of the Pacific blue marlin. The Hawaiians called all the blues black (marlin)" (ibid). The recordkeeping did not meet IGFA standards. Deciding that the offshore anchorage at the Kona Inn was inadequate for world class destination, he began promoting the idea of a new small boat harbor.

Fithian persevered and ran the tournament out of his office. The first Hawaiian International Billfish Tournament (HIBT) was held in 1959 and attracted 20 Hawai'i teams, two foreign teams and two U.S. mainland teams. Most of the entrants had their own boats. There were only six or seven charter boats available in Kona for hire.

Fithian spent the next years actively promoting fishing charters in Kona

Fig. 14. Peter Fithian. Source: *Honolulu Advertiser,* Nov. 6, 1955.

with a travel and booking agency. He introduced a share concept so that a single fisherman could book a place on a charter boat. By making the experience more affordable for more people, he broadened the potential market for fishing boat captains.

In 1970, his push for a small harbor for Kona was successful. It took about 50 tons of dynamite to blast lava to create the harbor at Honokohau. It was a rough harbor without steps in some places, and people had to jump down from rock walls to get to the boats. However, despite these challenges commercial charter boat fishing in Kona began to grow

By the early 1970s Fithian's interest in building a reliable database on Hawaiian billfish attracted the attention of John C. Marr, one of the most influential biologists of the era and the former director of the Bureau of Commercial Fisheries (later renamed the National Marine Fisheries Service or NMFS) Biological Laboratory in Honolulu. The Honolulu Laboratory, as it was commonly called, began its work in 1949 under the leadership of Oscar Elton Sette and soon started what would become a long record of advanced tuna and billfish science. During Sette's time, the lab was known as the Department of the Interior's Pacific Oceanic Fishery Investigations. Its internationally recognized research in the 1950s included groundbreaking surveys of tunas and billfishes and their pelagic habitat in the equatorial Pacific with the research vessels *Smith* (which did oceanographic research) and *Manning* (which did longline gear work).

In the 1979s, NMFS was moving from an approach of fisheries management based solely on catch data by commercial fishermen to one in which models might be used to determine populations on the open sea. There was interest in getting more and new kinds of data based on the life history of fish, e.g., their ages, what they ate, how they reproduced, etc.

This need for improved information for management purposes led Richard Shomura, the director at the time of the Honolulu Lab, to hold the first international symposium on billfish in 1972. The meeting focused on the little known life history of billfishes and included panels of fishermen and scientists, including Fithian, international fisheries author Peter Goadby and Kona captains George Parker and Richard Stroud (Hawaii Tribune Herald 1972).

By 1975, Fithian's venture was a success. Thousands of visitors were coming to Kona to fish with their families and there were luxury resorts to cater to them. However, as this business developed there was increasing

Fig. 15. Peter Fithian's news column banner. Source: *Honolulu Star-Bulletin,* Jan. 21, 1966.

concern that commercial longliners from Japan were taking too many of the large gamefish on the open sea. The presence of these large fish was essential for the new ocean tourism luxury market that Fithian and his colleagues had created. If the granders were gone, the business could go too.

To garner the information needed to face this threat, Fithian and Marr formed the Pacific Gamefish Foundation. The foundation supported the work of researcher Charles Daxboeck, whose work in time moved from forensic examination of stomach contents of caught billfish toward eventual state of the art satellite tagging. The foundation eventually became known as the Pacific Ocean Research Foundation. Its goals were "Preservation, Knowledge and Management." The foundation's independent research and lobbying effort ensured that not all discussion dealing with the future of billfish would be dominated by the commercial fisheries and government fishing administrators. The big game fishing industry, which depended on tourism, would have a seat at the table. (Hogan 1983)

4. Longline Expansion in the Post–World War II Era

Partly subsidized by the U.S. and Japanese governments in an effort to prevent famine in occupied Japan after World War II, Japanese longline fleets re-geared and used their pre-war knowledge to search the world's ocean for tuna. Their quest for yellowfin and other species such as albacore as well as bluefin and bigeye tuna began in the Pacific and, in 1956, extended the Atlantic (NOAA 1978). They set 100 million hooks in a band between 40° N and 40° S. Fishing fleets from Korea and Taiwan soon followed their example (Beardsley 1989).

Fig. 16. Japanese longliner (circa 1946). Photo: U.S. NOAA NMFS; U.S. Fish and Wildlife Service; U.S. Bureau of Commercial Fisheries.

It did not take long for the South Atlantic big game fishermen to feel the effects of Japanese longlining. Their catches in the Caribbean Sea off Florida, Cuba and Puerto Rico decreased almost immediately. The results of the Japanese industrial fishing effort would soon be borne out by Japanese fisheries data, which indicated that, from 1958 onwards, the catch per unit effort (CPUE) of blue and white marlin in the Atlantic had decreased from its previous levels (Beardsley 1989).

Atlantic blue marlin commercial catches peaked at 9,000 metric tons (mt) in 1963 and then dropped to less than 2,000–3,000 mt from 1967 onwards, while white marlin catches peaked at 5,000 mt in 1965 and fell to approximately 1,000 mt by 1977 (Gentner 2007).

A sense of panic set in, reflected in articles in *Sports Illustrated*: "[The Japanese fishing industry] growth from 1956 to 1963 was astronomical. In 1956, when 164,000 hooks were set by the Japanese, they caught seven metric tons of striped marlin (100 fish) and 50 metric tons of blue marlin (400 fish). By 1963 they had more than 50 million hooks out and took 8,236 metric tons of striped marlin (126,700 fish) and 9,413 metric tons of blue marlin (75,300 fish). Not to mention countless other billfish and tuna." (Kane 1966).

The Japanese fleet alone in 1965 set almost 100 million hooks in the Atlantic, catching almost 300,000 marlins according to estimates (NOAA 1978).

Although other countries, including the United States, were involved with bycatch of marlin, Japanese longline fishing vessels became identified in the public mind with the issue of overfishing of the stock. Some of the recreational big game fishermen began to fear that billfish such as blue marlin, white marlin, sailfish and swordfish would be wiped out by 1970. Others, such as Winthrop P. Rockefeller Jr., a founder of The Billfish Foundation (TBF) and later to become governor of Arkansas, were more optimistic and predicted they would last until 2001 (Rockefeller 1989).

The fears of overfishing worsened as 100 to 300 foreign vessels from Russia, Poland, Spain and other nations joined the Japanese and developed factory-fishing industries off American shores: from Florida to Maine on the Eastern Seaboard and from California to Alaska on the West Coast (NOAA op. cit.). Many of these industries used huge drift and drag nets that caught everything in their path, including billfish (Kifner 1974).

Regional Fishery Management Organizations

The U.N. Convention on the Law of the Sea (UNCLOS) codified the rules of international law relating to the high seas. Signed in 1958 and entered into force in 1962, UNCLOS was superseded by UNCLOS III in 1982. Articles 116 to 120 of UNCLOS address the responsibility of states engaged in fishing on the high seas to negotiate with other states fishing in the same area or on the same stock to establish regional or sub-regional fisheries organizations to conserve these living resources. Today, there are about a dozen and half RFMOs globally. Of these, five manage fisheries for tuna and other large species such as swordfish and marlin, covering approximately 91% of the world's oceans.

The **Inter-American Tropical Tuna Commission (IATTC)** was established in 1949, primarily to manage bait fish resources for pole-and-line tuna vessels operating in the Eastern Pacific Ocean. The members of the IATTC are Belize, Canada, China, Colombia, Costa Rica, Ecuador, El Salvador, European Union, France, Guatemala, Japan, Kiribati, Korea, Mexico, Nicaragua, Panama, Peru, Chinese Taipei, United States, Vanuatu and Venezuela. Cooperating nonmembers include Bolivia, Chile, Honduras, Indonesia and Liberia. The focus on baitfish shifted as more industrialized methods of tuna fisheries, i.e., longline and purse-seine fishing, became prominent. Further information is available at **www.iattc.org**.

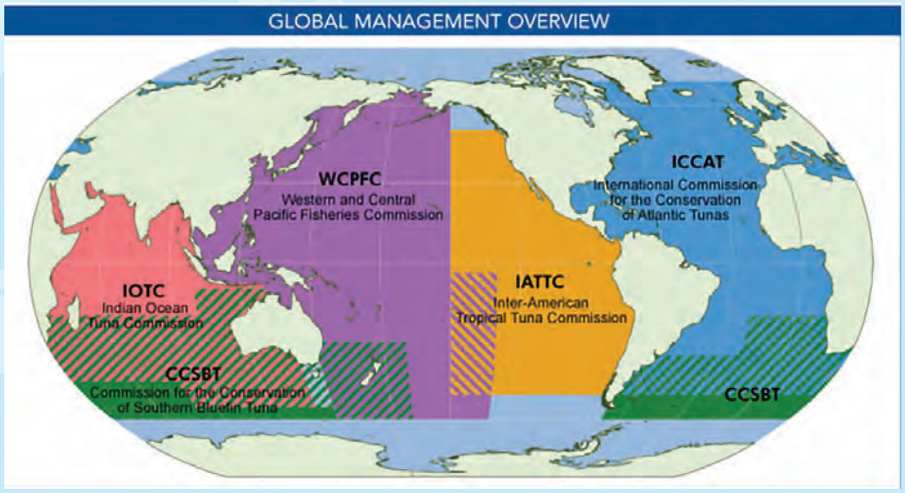


Fig. 17. The major regional fishery management organizations that focus on tuna and billfish. Illustration: PewTrusts.org.

The **International Commission for the Conservation of Atlantic Tunas (ICCAT)** was established in 1966. ICCAT is involved in management of 30 species, including swordfish, white marlin, blue marlin and sailfish as well as tuna and mackerels. The Commission is currently comprised of 53 contracting parties. The Commission may be joined by any government that is a member of the United Nations any specialized U.N. agency or any inter-governmental economic integration organization constituted by States that have transferred to it competence over the matters governed by the ICCAT Convention.

The **Western and Central Pacific Fisheries Commission (WCPFC)** was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (Honolulu Convention), which was signed in 2000 and entered into force on 19 June 2004. The members include Australia, China, Canada, Cook Islands, European Union, Federated States of Micronesia, Fiji, France, Indonesia, Japan, Kiribati, Republic of Korea, Republic of Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, United States of America and Vanuatu. Several French, U.S. and New Zealand territories (American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), French Polynesia, Guam, New Caledonia, Tokelau, and Wallis and Futuna) have a nonvoting seat at the table. Cooperating Non-members countries include Curacao, Ecuador, El Salvador, Nicaragua, Panama, Liberia, Thailand and Vietnam. **www.wcpfc.int.**

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) is the science provider to the members of the Northern Committee of the WCPFC. Membership is contingent on data indicating that fishing by a WCPFC member occurred at latitudes higher than 20°N. The ISC's main focus is on North Pacific albacore, Pacific bluefin tuna, blue marlin, swordfish, striped marlin, blue shark and shortfin mako shark. **http://isc.fra.go.jp/.**

The **Commission for the Conservation of Southern Bluefin Tuna** was established in 1994 and involves Australia, Japan, New Zealand, Korea, Indonesia, Taiwan, the European Union and South Africa.

The **Indian Ocean Tuna Commission** was founded in 1996 and is comprised of 31 members, including Indian Ocean coastal countries and countries or regional economic integration organizations that are member of the United Nations or one of its specialized agencies and are fishing for tuna in the Indian Ocean.

5. Change Brought by the Big Game Fishermen

One day during the 1960s, big game fisherman Christopher Weld encountered large foreign fishing trawlers off Georges Bank, one of his favorite fishing grounds. Concerned that the foreign industrial fishing fleets were threatening the very existence of marlin and other prized game fish, he decided that the laws governing U.S. ocean policies had to change. It was a daunting task. He believed the only way to resolve the problem was for the United States to adopt a 200-mile Fishery Conservation Zone (FCZ) off its shores, a suggestion that had been promoted by UNCLOS since 1958.

Weld had a unique perspective. In addition to being a big game fisherman and hunter, he was independently wealthy—a descendant of one Boston's oldest, wealthiest and most distinguished families; a Harvard College and University of Virginia law graduate; and a partner in one of Boston's most prestigious law firms. He was also an appointee of President Richard Nixon to the Department of Commerce's Marine Fisheries Advisory Committee (MAFAC). Established in 1970, it was the highest and most senior fisheries advisory committee in the United States at the time (Marine Biological Laboratory n.d.).

Weld was determined to use his connections and skills to pass a law in Congress that would force foreign fishermen from U.S. waters and promote the concept of a general marine conservation policy in the public interest. The number of elite big game fishermen upon whom he could draw for political support was very small, perhaps no more than 8,000 (Ditton and Stoll 2003). However, as a group, they were disproportionately wealthy, and many, like him, had significant political and economic ties.

In 1973, he founded the National Coalition for Marine Conservation (NCMC). His intent was to force foreign fishing vessels from U.S. waters and to give recreational anglers "a seat at the table" (Hinman 2017). To his way of thinking, "the table" was then dominated by U.S. fishery biologists and large commercial fishing interests. In an effort to empower recreational big game fishermen, he convened a meeting of the IGFA and the organizers of the 40 major fishing tournaments in the United States. To them he promoted several ideas:

- The need to protect Atlantic tuna from being overfished,
- The first major catch-and-release program for billfish, and
- A law that would push foreign fishermen away from U.S. shores.

These were major ideas at the time. Management of billfish such as marlin, which travel thousands of miles across the open ocean, involves sharing information and gaining cooperation from many nations. Most of the nations that had access to tuna and billfish subsidized the commercial fishing operations that sought pelagic fish. African states such as Senegal and Latin American nations such as Brazil and Venezuela allowed artisanal fishermen to target marlin and tuna. Organizations like ICCAT, the leading RFMO in the Atlantic, had difficulty getting the participating Atlantic nations to provide them with either good data or the authority to make management decisions.

Fishing agencies in most of the countries affected were small, if they existed at all, and underfunded. The different nation's political leaders competed with one another for fish or sold their fishing rights for hard currency to foreign fishermen. There was little incentive to cooperate.

Weld recognized that recreational fishermen would have little influence on the general public in regards to marine conservation unless they took steps to change their own culture first. For this reason, he began promoting the concept of catch and release.

At the time, catch and release was a known but not a common practice. A whole industry had been built around the killing of game fish: the taking and framing of photographs, the making of trophies and handing them out at tournaments, and the entire livelihood of taxidermists. All of these activities made money and returned it in the form of sales commissions to charter boat crews. These commissions and tips were vital to the business of the charter fishing boats. Big game fishermen were reluctant to push catch and release as it might alienate the captains and crews on whom they depended for successful fishing trips.

Still, Weld and his colleagues persisted. Over time, catch and release became a customary practice that demonstrated that recreational fishermen were not just catching billfish, they were doing their part for conservation.

Pushing foreign fishing vessels away from U.S. shores would prove more difficult. As a member of MAFAC, Weld was aware that Senator Warren Magnuson of Washington represented commercial salmon and crab fishermen. Weld also knew that Magnuson had been trying, unsuccessfully, to push a bill matching Weld's intentions through Congress since the early 1960s. However, Magnuson was opposed by powerful interests in the U.S. government: the office of the President, the U.S. Navy and the U.S. Department of State (Carmel 2012).

During the Cold War, the U.S. political and military establishments deemed it strategically preferable to allow the presence of foreign fishing fleets in U.S. waters. The alternative was to face reciprocal demands that would limit the ability of U.S. military and fishing vessels

to enter the coastal areas within 200 nautical miles (nm) of shores that were claimed by foreign nations. The U.S. government's official position could be summarized as follows:

> The U.S. wanted to send its military throughout the world's oceans, unimpeded by regulations as seemingly far-fetched as where a boat could fish. If a country could regulate where boats could fish, that could open the door to other restrictions. But the flip side of this policy was that other nations claimed the same rights, the freedom of the seas to navigate where they wanted, and to fish where they wanted, and to claim those fish resources for themselves. (Finley 2012)

The advocates for acceptance of UNCLOS were also opposed by the powerful U.S. Tuna Foundation (USTF). The USTF consists of individual U.S. flag vessels that use purse-seine nets to catch fish. At the time, they caught 70% of their fish in the Pacific Ocean and opposed any effort that could threaten their access to the fish off the coastline of any other nation. The USTF had a powerful lobby. They were supported by many members of Congress and were adamantly opposed to any change in U.S. law that would restrict them from fishing within 3 nm of a foreign shore.

When Weld began his campaign to protect Atlantic billfish, he knew he had to change the paradigm in which fishing research subsidies were awarded almost exclusively to subjects related to the success of the commercial fishing industry. He wanted the U.S. government to expend funds on scientific studies so billfish populations could be assessed properly. In the legislation he envisioned, the government would set careful targets based, not on the greatest catch possible, but on the maximum sustainable yield (MSY)[2] of the fishery. He wanted to ensure that large marlin, spearfish and swordfish—the world's pre-eminent game fish—would be not become overfished.

In 1975, Senator Magnuson joined Senator Ted Stevens of Alaska, whose son was a commercial crab fisherman off Alaska, in sponsoring a new bill called the Fishery Conservation and Management Act (FCMA) intended to protect Alaska's fish from the Japanese and Russians (Hinman 2017). Congressmen Don Young of Alaska and Gerry Studds of Massachusetts, representing New England fishermen, introduced it in the House of Representatives.

Weld was determined to push the FCMA through Congress. Using his base of big game fishermen, he built a coalition of non-tuna commercial fishermen, recreational fishing tackle manufacturers and ocean conservationists. They urged millions of recreational saltwater fishermen, who normally caught fish close to shore, to call their congressmen to protect marlin and other sports fish from foreign fisheries. These actions helped find the votes to make the FCMA a reality (ibid.).

However, there was a price to be paid. The USTF would not allow the bill to pass Congress without a compromise—tuna had to be exempt from regulation. This requirement created a dilemma because billfish and tuna not only inhabit overlapping depths of pelagic waters but also eat much of the same food, which means both have similar vulnerabilities to longline and troll fishing gear. One could not be managed reasonably on the open ocean without also managing the other.

Weld said, "The net result of the exclusion has been to defeat completely every attempt to regulate fishing for large pelagic species beyond the territorial seas pursuant to the […] Act" (ibid.). Nevertheless, reasoning that this compromise was better than no legislation at all, Weld supported the agreement. Thus, the revised act, called the Magnuson Fisheries Conservation and Management Act (ultimately known as the Magnuson-Stevens Act or MSA), passed through Congress in 1976 and took effect March 1, 1977.

The MSA established eight regional fisheries councils, and, at the urging of Weld and his associates, billfish fishery management plans (FMPs) began to be written. The legislation intended for all decisions to be based on scientific research, with catch targets for the different species to be managed based on information derived from stock assessment models of existing fish populations. The models were used to determine whether a stock was experiencing overfishing (too much fishing effort) and/or was overfished (below the stock level capable of yielding catch equal at MSY) and to provide the means to support the development of rebuilding overfished stocks.

However, soon after the MSA was passed and the regional councils were created, Weld and big game fishermen complained that their intentions were not being fulfilled. They expressed their dismay that the U.S. government was still biased in favor of commercial over recreational fisheries. Since tuna was the fish most sought after in offshore and distant-water fisheries, the tuna industry was driving U.S. policymakers. The regional councils could not manage tuna beyond their jurisdictions; they could only influence the management actions of the international RFMOs by working with the U.S. State Department and other stakeholders including the U.S. tuna fishing industry (primarily the purse-seine industry). NMFS collaborated with the U.S. State Department.

In response to criticism from big game fishermen, U.S. commercial fishermen responded that they had not suffered from years of foreign fishing so wealthy recreational anglers and large recreational tackle manufacturers could make fortunes at the expense of commercial fishermen. Commercial fishermen stated they had a right to catch fish, restaurants had a right to serve fish and consumers had a right to eat it. Commercial fishermen stated they would proceed along the lines agreed in the FCMA but argued that the ocean did not belong to any one group. This situation became a national controversy that soon found its way to Hawai'i. Here, billfish constituted an important part of the local diet.

2. The maximum sustainable yield (MSY) for a given fish stock means the highest possible annual catch that can be sustained over time, by keeping the stock at the level producing maximum growth.

6. The Recreational Billfish Controversy Comes to Hawai‘i

In 1976, the WPRFMC was formed as one of the eight U.S. councils created under the MSA. Its authority was the management of fisheries seaward of state/territorial waters of Hawai‘i, American Samoa and Guam and eventually the CNMI and the U.S. Pacific remote island areas as well. Although the Council was initially dominated by commercial fishing interests, among its members were charter boat fishermen State Sen. Wadsworth Yee (who would become the Council chair) and Peter Fithian. On the commercial side, the fishermen were represented by Frank Goto, the manager of the United Fishing Agency and the first Hawai‘i tuna fisherman to be appointed to the MAFAC. For the first time, Hawai‘i fishermen had influence at the highest levels of decision-making on fishery policies at the U.S. Department of Commerce.

After the Council was established, Council members were appointed and the Council staff was hired, the Council began to assist NMFS in the development of the Pacific Billfish and Oceanic Sharks Preliminary Fishery Management Plan (PMP). The PMP (1978) would be used to regulate foreign fishing in the Pacific U.S. exclusive economic zone (EEZ) until the Council completed its more comprehensive Billfish and Associated Species FMP (later named the Pelagic FMP) (1987), which would regulate both foreign and domestic fishing in the Western Pacific Region.

There was little question that, by 1976, the local recreational charter boat fleet and trollers were more valuable to the state's economy than the declining commercial longline fleet was. An estimated 1,500 private recreational boaters spent more than $1 million to operate 386 vessels (WPRFMC 1978). The total spent on recreational fishing for billfish and tuna in Hawai‘i was probably much greater.

Although the Atlantic was very far away from the Western Pacific, Weld felt compelled to comment on behalf of big game fishermen against foreign longline fleets operating in the newly established U.S. EEZ in the Western Pacific Region. He came to Hawai‘i to testify against longlining in front of the new Council (WPRFMC 1977). From his office in Massachusetts, he wrote to NMFS and recommended several changes to the 1978 draft Billfish PMP (Weld 1977). In particular, he wanted foreign longlining "prohibited altogether in the FCZ" and described longline as "an indiscriminate fishing gear which catches many species of fish …."

Compared to the Japanese fleet, the Hawai‘i longline fleet was insignificant. At the time Weld wrote his criticism of longlining in the Western Pacific, only 13 full-time domestic longline vessels were still operating in Hawai‘i. The industry had been in decline for 25 years, from 1950 to 1975, for a number of reasons: low prices for fresh tuna, the inability of Hawai‘i fish distributors to enter the Japanese market, better opportunities for young Japanese-American men and increasingly high fuel costs.

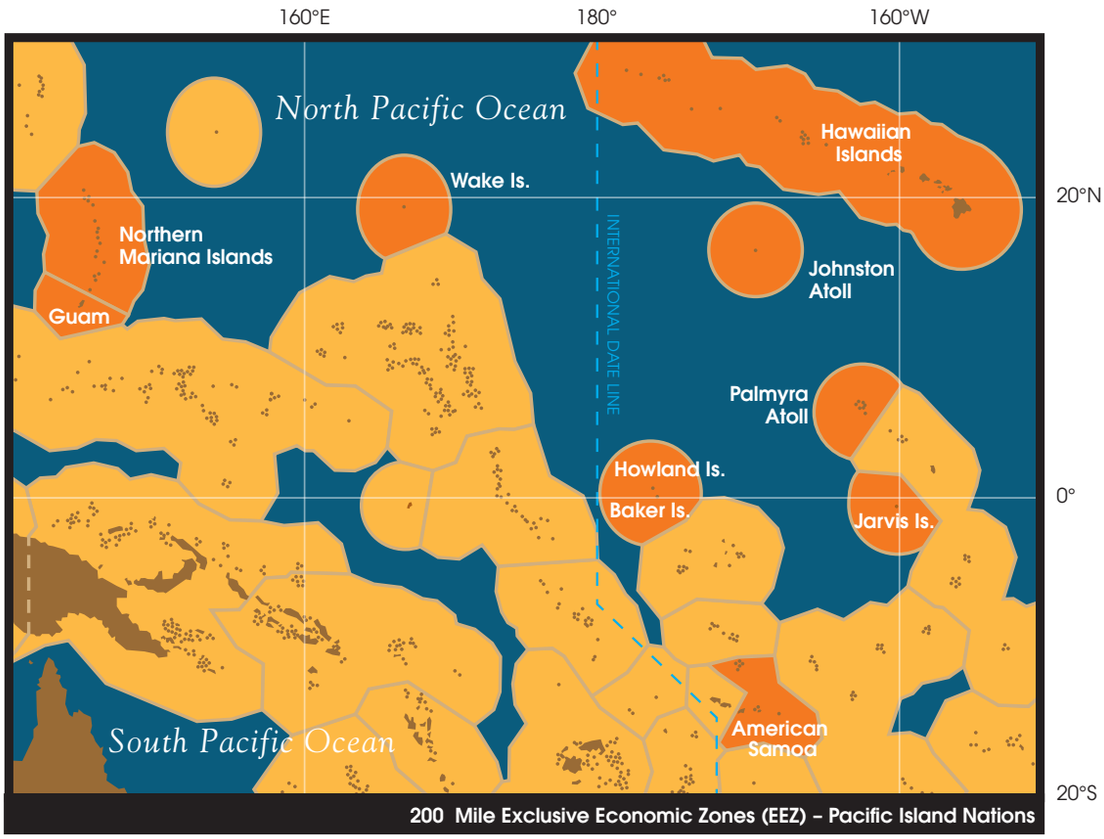


Fig. 18. U.S. EEZ in the Western Pacific Region in red. Source: WPRFMC.

7. Challenges in Developing of the Preliminary Management Plans

NMFS and the WPRFMC were in a particularly difficult situation because the PMP and FMP had strict time limits for development. In addition, the Western Pacific Region was huge. The U.S. EEZ in the Western and Central Pacific Ocean covers 1.5 million square miles.

Another problem developed as the statisticians began building their models. Billfish constitute a number of species, such as blue marlin, striped marlin and sailfish, that are familiar to recreational fishermen everywhere. Although billfish was officially termed bycatch, implying incidental catch to be discarded on the U.S. mainland, this was not the situation in Hawai'i. Here, billfish represented the second largest category in Hawai'i's reported commercial catch statistics, after skipjack tuna (Glazier 2016b). Moreover, a question remained regarding the other migratory species that traveled across the Pacific. The NMFS Southwest Regional Office was charged with providing a concise list of the species to include as migratory species under the billfish plans. Ultimately, six species of billfish (broadbill swordfish, sailfish, black marlin, blue marlin, shortbill spearfish and striped marlin) and four families of oceanic sharks (Carcharhinidae, Alopiidae, Sphyrnidae and Isuridae) were specified for the PMP.

NMFS was under pressure to complete the PMP by March 1, 1977. The newly appointed Council members worked closely with the staff of the NMFS Honolulu Laboratory (then part of the NMFS Southwest Fisheries Science Center based in La Jolla, California) and representatives from the Southwest Regional Office.

When the MSA came into force in 1976, Richard Shomura was the director of the Lab. Shomura was widely recognized as one of the world's experts on billfish, and his interest in the species went back many years. He had been instrumental in organizing the first International Billfish Symposium in Kailua-Kona, Hawai'i, in 1972. NMFS and the new Council used the information presented at the symposium (Shomura and Williams 1974, 1975a, 1975b) as the basis for the billfish PMP and FMP.

Jerry Wetherall, a Honolulu Laboratory employee, was assigned to the Billfish PMP. He recalls finding "only meager data" to put together a management plan (Glazier 2016b). The 1972 symposium had assembled an excellent collection of available information on billfish fisheries and billfish biology, but information on the status of billfish stocks in the Pacific was glaringly lacking.

To help fill the gap, Shomura convened an international workshop in 1977 to assess the status of billfish stocks in the Pacific Ocean. The Council was a partner in this venture and sponsored participation of scientists from Japan and Taiwan. It was reported at the workshop that the Pacific blue marlin appeared to have been "substantially overfished since the early 1960s" with overfishing apparently beginning in the 1960s" and that "continued fishing at high levels will continue to reduce the abundance of the stock and a recruitment failure will become a distinct possibility." Likewise, the black marlin data indicated a substantial decline in catch rates from the early 1950s to 1975. The draft report of the Pacific assessments was available for use in the PMP; the final report was published in 1980. (Shomura 1980)

Also included in the workshop report were studies on the length-weight relationships of billfishes (Skillman and Yong 1974) and age and growth of striped marlin and blue marlin (Skillman and Yong 1976). These biological studies used length measurements of the landed fish along with information on weight collected by Honolulu Laboratory scientists during the 1960s.

The international scope of the participants at the 1972 symposium and 1977 workshop reflected the emerging cooperation between U.S. scientists and their colleagues in Japan and Taiwan who held data on catch, effort and biological parameters essential to the assessments. Of critical importance to developing management policies for the U.S. EEZ in the Pacific Islands was information on the effort and catch in the 200-mile zone by foreign fishing fleets.

In spring of 1977 Wetherall hired numerical analyst Bill Lovejoy for a short-term job at the Honolulu Laboratory to build a simulation model of the billfish stock and fishery dynamics around Hawai'i. Lovejoy finished the work in August (Lovejoy 1977a). Later in 1977 the Council contracted him to do follow-up work with his simulator looking at recreational fishery impacts of longline fishery (Lovejoy 1977b). This work was referenced in the PMP.

Subsequently, in 1979, Wetherall and Honolulu Laboratory mathematician Marian Yong sought to estimate the fishing effort and catches of tunas and billfishes by foreign tuna longline and baitboat fleets within the U.S. EEZ waters of the central and western Pacific. They used data from a variety of data sources including the Honolulu Laboratory, published fishery statistics and unpublished data provided courtesy of fisheries agencies in Japan and Taiwan. Most data were aggregated in 5-degree cells of latitude and longitude, but some data in 1-degree and finer scales were also available. The results were published in 1980 (Yong and Wetherall 1980).

Christofer Boggs, former NMFS employee, recalled the following:

> … the [MSA] had been passed in 1976 and fishery management plans needed to be developed; there really wasn't any management per se. The plans were set up to monitor the fisheries. It wasn't seen there was any need to control them. But there was an interest in getting foreign fishermen out of the U.S. EEZ.… some of the earliest studies were to understand the dynamics between distant-water fishing and the local fish abundance [e.g., Lovejoy 1977a, 1977b].… even though we didn't have fishery management or stock assessments or catch limits we did have fishery data from the states and territories [which] had been collecting it for a long time. The State of Hawai'i had been collecting data since the 1940s.…Those data were analyzed to try and decide whether big foreign boats could have an effect on pelagic fisheries. (Glazier 2016a)

NMFS was not the only one making estimates of Japanese longline and other foreign catch in U.S. EEZ. In 1978, the South Pacific Commission (SPC) also produced such estimates for island countries and territories in the SPC region.

Researchers at the Laboratory were helped in their endeavors by the support of Frank Goto, who facilitated the cooperation of the Hawai'i fishermen and fish dealers. To obtain biological data on the catch, researchers went to the Honolulu fish auction in the morning and copied information from the fish buyers' receipts as fish were sold on the auction floor. These receipts contained information about the weight of the billfish sold, similar to the kind of data collected by the Japanese Fishery Agency.

In addition, efforts were made to include information on all other catch sources of billfish including trollers, handliners, charter boat fishermen and recreational fishermen. This effort was complicated because the catch of recreational fishermen (i.e., those who had no reported sales) could only be estimated because the State did not require reporting of recreational catch.

The PMP for Billfish and Oceanic Sharks in the Pacific Ocean was published on July 21, 1978. However, public concerns caused it to be withdrawn on Sept. 14, 1978. Among the concerns were insufficient recognition of the socioeconomic differences among the human populations of Hawai'i, American Samoa and Guam and the lack of management measures for wahoo (*ono* in Hawaiian) (*Acanthocybium solanderi*) and dolphinfish (mahimahi) and little dolphinfish (little mahimahi) (*Coryphaena hippurus* and *C. equisetis*, respectively). (NOAA 1978b).

That same year, the 20th anniversary of the HIBT was held in August 1978. The Council organized an international gathering of anglers and scientists to discuss the future of the blue marlin population. The symposium was led by Jim Sutherland. In addition to being director of the HIBT, Sutherland was the chair of the Council's Advisory sub-Panel on billfish. The symposium participants discussed the measures that should be taken to preserve blue marlin populations throughout the Pacific. The symposium was significant and began a process of networking scientists, government officials and big game fishing enthusiasts from around the world to work towards the common goal of promoting and protecting gamefish (Critchlow 1978). The 1978 event was successful in another way. It attracted Robert Campbell of Guam, a vessel captain and member of the Council's Advisory sub-Panel on billfish, and Robert Smith, team captain from the Northern Mariana Islands, to make recommendations regarding how the new 200-mile marine conservation zone might apply to their island entities (Eichner 1978).

The PMP was implemented on April 1, 1980. It allowed and managed otherwise prohibited foreign longline fishing for pelagic species within the EEZ of the Pacific, excluding Alaska. From a policy perspective, the PMP allowed an unlimited amount of foreign longlining in the newly declared FCZ; specified quotas on the amounts of billfish and oceanic sharks; established non-retention zones from shore out to 12 to 100 nm (depending on the area) in which all billfish had to be released; provided a system of reserves if domestic vessels did not meet expected levels; required data reporting by foreign vessels; and subjected foreign vessels to U.S. observers for onboard inspection and sampling. Japanese longliners continued to take tuna and billfish within the U.S. FCZ of Hawai'i until 1980 and reported catches of between 1,300 and 5,000 tons per year (Bienfang n.d.).

The PMP was supplanted by the FMP for Pelagic Fisheries of the Western Pacific Region, which managed all domestic and most foreign fishing for pelagic species off the coasts of Hawai'i and the U.S. territories in the Pacific

8. The Council's Fishery Management Plan

As the Council developed its Billfish FMP, it discovered substantial flaws in the PMP effort. Management measures were not intended to drive all foreign fishermen from U.S. waters in the Pacific. Nevertheless, the PMP restrictions on fishing were simply too burdensome for foreign fishing companies, and many of them chose to withdraw from the U.S. EEZ.

Opinions in the islands were different than they were on the U.S. mainland. The U.S. island territories of American Samoa, Guam and the CNMI welcomed the foreign fishing investors for the spending they did in the small island economies and the interesting economic possibilities that joint ventures raised.

The management objectives of the proposed Billfish and Associated Species FMP for the Western Pacific were very clear: 1) collect information on these species and their fisheries; 2) encourage increased domestic use; and 3) minimize the impact of regulations on the domestic industries (WPRFMC 1980).

The FMP was intended to be based on science so the fishing targets set for commercial fishermen would satisfy the demands established in the MSA to achieve both the MSY and optimum yield (OY)[3] for each fishery.

Japan continued to compute and print the yearbooks of longline statistics and to collaborate with NMFS in assessments of North Pacific albacore and annually shared data for that effort. However, after 1980, Japan ended external distribution longline statistics yearbooks (e.g., to the Honolulu Laboratory). Japan later explained that it feared it would be excluded from fishing in U.S. waters for tuna in the future in order to satisfy a new U.S. national agenda that specified "billfish should be reserved for recreational fishermen" rather than used for human consumption (Shima 1989). Japan vehemently objected to any plan that prioritized the release of fish for recreation over products it insisted were essential to Japanese culture such as *kamaboko* and other Japanese fish products. U.S. fishermen, on the other hand, had a long-standing fear that their prized fish were being turned into hot dogs (Kane 1966).

The loss of access to the Japanese billfish data placed the Council in a difficult situation. The process was doubly painful considering that the Japanese fishing data on billfish and tuna were considered the best in the world at the time.

Laboratory head Richard Shomura proved invaluable during this time. As WPRFMC Executive Director Kitty M. Simonds recalls, "You have to remember that we had been working with billfish statistics for 10 years. When the Japanese cut off the information, Richard still had contacts with Japanese scientists and was able to get data."[4]

Other sources of information were diverse and ranged from U.S. Coast Guard data on charter boat and fishing boat registrations to information from the State of Hawai'i and independent sources.

The Council also convened six meetings in Kailua-Kona between 1977 and 1981 to enhance participation of billfish fishermen in the fishery management decision-making process.

In 1981, while preparing the FMP, the Council contracted Lovejoy again for further work (Lovejoy 1981).

That same year, Council Chair Yee at the 23rd HIBT convened a special meeting where he fielded questions from local big game and artisanal fishermen who angrily said the U.S. government was not doing enough to protect them and that he was equivocating for fear of offending the State Department. They wondered if there would be enough marlin left to last another 23 years. It was time one charter boat captain said "to make a big stink" (Kwon 1981).

When the Council submitted the completed draft Billfish FMP to NMFS in 1981, the United States was in recession, the billfish angling business was down and so too was business in Kona. Worries continued about whether Japanese and Taiwanese longlining might ruin Kona's new big game fishing enterprise. The Council's draft FMP proposed prohibiting foreign fishing from shore out to 200 nm of the main Hawaiian Islands (MHI) from May through September and out to 100 nm from November through April; from shore out to 50 nm around Guam between November and June; and from shore out to 12 nm around the rest of the Hawaiian Islands, around Guam between July and October, and around other U.S. possessions in the Pacific except the Northern Mariana Islands, which was still subject to the PMP. Poundage fees of 50% ex-vessel value were to be assessed on the billfish taken within the FCZ except for those fish landed in American Samoa.

Unlike the PMP, the FMP rejected the use of non-retention zones for foreign longliners as being wasteful. Alternatives requiring extensive shipboard monitoring were also rejected because of the high cost of surveillance and enforcement.

3. Optimum yield means the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account protection of marine ecosystems.

4. Kitty M. Simonds in discussion with the author, Aug. 14, 2019.

To the Council's dismay, NMFS rejected the draft FMP on three grounds:

(1) The size of the proposed area closures for foreign longline fisheries exceeded necessary and appropriate measures for management of the billfish fishery. NMFS specifically said: "The closures are not necessary for conservation purposes because the billfish stocks are distributed broadly throughout the Pacific Ocean where U.S. jurisdiction does not extend. Neither are the closures justified as necessary to increase domestic catches since the evidence presented in the FMP does not indicate that the closed areas would produce measurable benefits in this regard."

(2) Other non-tuna species associated with billfish fishing were omitted from the management unit.

(3) The need for the FMP was not clearly demonstrated. NMFS said specifically, "Significant benefits to the national and regional economies or to the condition of the stocks are not identified in the FMP." (Gordon 1982)

Letters from Council Chair Yee to NOAA Assistant Administrator for Fisheries William G. Gordon followed questioning what appeared to be an unfair disapproval of the Council's Billfish FMP. Yee noted (March 31, 1982) that other Councils "(apparently with NMFS support)" were proceeding with separate FMPs for billfish, swordfish and sharks. Yee also noted that the NMFS's proposed amendments to its Atlantic Billfish PMP included closure of the Caribbean FCZ (i.e., EEZ) all year, which would make the Western Pacific Council's proposed closures appear "relatively mild" rather than "broad and sweeping" as NMFS had indicated.

In the ensuing years, as the Council worked to revise the draft FMP, it convened additional meetings in Kona in 1982, 1985 and 1986 (see Appendix 1 for a list of Council hosted meetings in Kona and about billfish). Research also continued including studies on the dynamics between foreign fishing and local fishing around Hawai'i (e.g., Wetherall and Yong 1983).

During this time, an estimated 30,000 anglers per year were coming to Kona (Hogan 1983). Things picked up even more after direct flights from California were started in 1984. A new gantry crane for showcasing fish was built at Kailua Pier, and an expensive 50-ton travelift, capable of hauling large boats out of the water for refurbishment at the new Gentry Marina was installed. It was part of the new Kona Marina, which had a tie to real estate development with 20,000 square feet of buildings available for lease. In addition, the Hawaii Big Game Fishing Club together with the Outdoor Circle beautified the then raw entrance to Honokohau Harbor with palm trees and memorial stones. Where there were no more than four regular Kona charter boats in 1954, by 1986 there were 60.

The final elements of the Billfish FMP, renamed the Pelagic Fisheries FMP, included a broader mix of management unit species (i.e., mahimahi, wahoo and oceanic sharks as well as billfish). The FMP prohibited foreign longline fishing within 12 nm of shore. It established foreign non-retention zones between 12 and 100 miles around the main Hawaiian Islands and between 12 and 50 nm of the rest of the Hawaiian Islands. Foreign vessels were allowed to retain catch beyond 100 nm of the main Hawaiian Islands, beyond 50 nm of the other Hawaiian Islands; beyond 50 nm of Guam; seaward of certain areas of American Samoa; and beyond 12 nm of shore around other U.S. possessions. Foreign longline vessels were required to have a permit; comply with vessel and gear identification requirements; comply with observer requirements; minimize catch or receipt of prohibited species; report catch data through daily fishing logs; and report and not retain incidental catch of marine mammals and sea turtles. The FMP was completed in 1986 and became effective March 23, 1987 (NOAA 1987).

The FMP's first measures also prohibited drift gillnet fishing within the region's waters of the U.S. EEZ. Large-mesh gillnet fisheries, which mainly targeted tuna and billfish in coastal areas around Japan, had begun in the early 1900s. Then Japan, and later Taiwan, started using them on the open ocean in in the North Pacific to target tuna and billfish and in the South Pacific to target albacore.

The Council's moratorium on the practice in U.S. waters of the Western Pacific Region was one of the first major conservation actions taken by any fishery management organization to protect billfish and tuna, which was later emulated by the United Nations. The drift gillnetting ban throughout the Western Pacific Region's entire 1.5 million square miles of EEZ waters predated Congress' passing of the Driftnet Impact Monitoring Assessment and Control Act in late December 1987. The Council's measure and the Congressional action were part of the global effort to curtail high seas driftnet fishing. South Pacific nations acted quickly to ban the nets in the region in 1989, and then the U.N. global moratorium was agreed to in 1991, effective Jan. 1, 1993.

Scientists from Canada, Japan, Korea, Taiwan and the United States had collaborated extensively during the international driftnet observer programs in the North Pacific. Afterwards, ties among the scientists remained, but collaborative work shifted to joint assessments of pelagic stocks in the North Pacific and sharing of data, which led to formal establishment of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific in 1995.

9. Competing Fishery Management Goals for Billfish in the U.S. Atlantic

From the outset, the fishery management goals of the U.S. Atlantic differed from those of the Western Pacific. The 1978 PMP for Atlantic Billfishes and Sharks, produced by NMFS, was far more difficult to implement than the Pacific PMP because the area was subject to overlapping jurisdictions not only among four U.S. regional councils (New England, Mid-Atlantic, Caribbean and Gulf of Mexico) but also with the U.S. State Department (which had its own fishery negotiators) and RFMOs, like ICCAT. It would prove so burdensome to reach policy agreement with so many of these agencies that the FMP for the Atlantic Billfishes would not be implemented until 1988. Ultimately, responsibility for the FMP would be taken over in 1990 by the NMFS Highly Migratory Species (HMS) Management Division, based in Silver Spring, Md.

Swordfish was included in the Atlantic Billfishes and Sharks PMP but not in the Atlantic Billfish FMP because relatively few were caught by rod and reel and they were deemed a fish caught by commercial fishermen. Their management, however, became an issue that would have long term effects on the management of billfish.

After 1978, the popularity of swordfish in Atlantic restaurants grew when the U.S. Food and Drug Administration increased the mercury content guidelines for fish moving in interstate commerce from 0.5 ppm to 1.0 ppm (Moore 2000). By the early 1980s, swordfish was so desired in restaurants that they were caught in far smaller sizes than many fishery managers thought healthy for the fishery. In addition, marlin steaks began to be introduced as an alternate dish to meet demand. This situation alarmed the big game fishermen who feared that it would be only a matter of time before their favorite big game fish followed swordfish in becoming a mass market restaurant staple. If that happened, they feared they would lose their ability to control fishing for billfish in the open sea.

New fishing methods had resulted in the dramatic reduction in the size of swordfish caught off the coast of Florida, and it was felt that something immediately had to be done to protect the stock. To deal with the issue, a special U.S. Atlantic Swordfish FMP (1985) was developed by South Atlantic Fishery Management Council in cooperation with the Caribbean, Gulf of Mexico, Mid-Atlantic and New England Councils. Among the steps taken to protect swordfish from longlining were minimum size limits. Other regulations, such as area closures, would be later implemented.

As for the Atlantic Billfish FMP, largely influenced by Weld, who was a member of the New England Fishery Management Council, and his fellow conservationists, its primary objective was not to promote the U.S. commercial fishery but "to maintain the highest availability of billfishes to the U.S. recreational fishery by implementing conservation measures that will reduce fishing mortality." Towards that end, commercial longline vessels (both domestic and foreign) had to release alive billfishes, which were always caught by Atlantic longliners as largely unwanted bycatch.

Another idea from big game fish activists incorporated in the Atlantic Billfish FMP was an objective that would never even have been considered in the Western Pacific: "Optimize the social and economic benefits to the nation by reserving the billfish resource for its traditional use, which in the continental United States is almost entirely a recreational fishery."

In Hawai'i, billfish were not reserved by government order for anyone. Nor would anyone have considered defining OY, a key element in scientific management, in qualitative rather than quantitative terms. In the Atlantic, billfish was prohibited for commercial longline and driftnet vessels, and an absolute prohibition was enacted on the sale of Atlantic billfish, with an exemption for Puerto Rican artisanal handline fishermen (South Atlantic FMC 1988).

These laws had far reaching impacts not only on the United States but on the member states of ICCAT and other international tuna commissions, which were forced to acknowledge that these efforts to protect highly migratory species had repercussions for them as well. The budget for ICCAT would be increased, and the management of highly migratory species would be upgraded to new levels that demanded greater participation and transparency in fishery management among the member nations.

During this time Winthrop P. Rockefeller Jr. was concerned that, while Japanese and Taiwanese longline vessels were forced from the U.S. Atlantic, their place was being taken by the more than 250 U.S. longline vessels that caught billfish and swordfish in the Atlantic. To him, foreign longlining had been replaced by U.S. commercial fishing, which was just as bad in terms of taking marlin and other billfish. He feared that the MSA had not been the safeguard for marlin he and Weld had originally sought and that the Council system left itself open to be dominated by commercial fishermen and careerist NOAA administrators who would only respond to political pressure. He was also frustrated that the tagging system developed to track the life spans of marlins and other billfishes by NOAA

showed very poor returns, implying that commercial fishermen were not reporting tags. He was determined to find the funds needed so that the science could be done correctly. Towards that end he founded The Billfish Foundation (TBF) in 1986 to promote and finance a more advanced tagging program (Rockefeller 1989). TBF grew into what is today a major sport conservation organization that promotes tagging technology and conservation of sports fishing not only in the United States but in Central America as well.

Fig. 19. Longliner heading out to sea from port of Honolulu. Photo: WPRFMC.

10. Inclusion of Tuna in the Magnuson-Stevens Act

By 1988, the initial Atlantic Billfish FMP was completed. The foreign vessels were removed, the recreational billfish fishery was recognized by the federal government, actions were taken to rebuild overfished stocks of blue and white marlin and swordfish, and efforts were begun to ban the sale of billfish in U.S. restaurants to eliminate the incentive for foreign or domestic longliners to catch them.

However, Weld and his associates were still not satisfied. They wanted tuna, which had been excluded from the 1976 MSA, to be managed domestically without interference from the tuna industry. He knew that, without the tools to manage tuna, billfish management would be ineffective, since marlin feed on tuna and make forays into tuna schools to eat them. However, the tuna industry continued to block his efforts.

Frank Goto convinced U.S. Sen. Daniel Inouye (D-Hawai'i), a former classmate, to use his influence in Congress to include tuna as a highly migratory species to be managed by the councils. The amendment bringing tuna under the MSA was enacted in late 1990, but the effective date for U.S. jurisdiction over tuna was delayed until 1992.

Fig. 20. Frank Goto, U.S. Daniel K. Inouye and Council Executive Director Kitty M. Simonds.

The inclusion of tuna under the MSA meant that the WPRFMC could obtain better scientific information, resulting in more accurate stock assessments. The Pelagic Fisheries Research Program (PFRP) was established in 1992 to provide scientific information on pelagic fisheries to the WPRFMC. The PFRP was administered through the University of Hawai'i and supervised by a Steering Committee that included representatives from the university, the NMFS Pacific Islands Fisheries Science Center (PIFSC) and the WPRFMC. The PFRP funded projects from 1994 through 2012 that researched tuna and tuna-like species in the Pacific Ocean, including projects on billfish and other pelagic fisheries around the Hawaiian Islands (Appendix 2).

In addition, the Council could work more closely with the RFMOs and their science providers to monitor catches of pelagic fish by foreign vessels and to track tuna and billfish on the open ocean.

11. Longline Impact on Hawai'i Fisheries

The Hawai'i longline fleet experienced dynamic growth during the 1980s. From the late 1970s, the number of vessels grew from 15 to 37 vessels as Hawai'i enjoyed a tourism boom from Japan and with with it a tremendous upsurge in the demand for fresh tuna. This was then followed between 1987 and 1991 in a quadrupling of the fleet to 156 permitted vessels (111 active). The reasons for this were mixed but included state and federal incentives for new entrants to the fishing fleet that attracted 60 Vietnamese-American boat owners from the Gulf of Mexico who were suffering economic hardship, 18 vessels from the U.S. West Coast and 23 of the most productive longline vessels from the U.S. Atlantic, which were leaving an atmosphere of dramatically declining swordfish stocks and increasing demands for bans of further swordfish fishing in the Atlantic and Gulf Coasts.

Fig. 21. Longliner from New Orleans in Honolulu. Photo: WPRFMC.

The influx of so many vessels in such a short time caused immediate conflict. The boats that came from the U.S. Atlantic were accustomed to fishing for swordfish using shallow-set longlines extending 35 miles. These longline vessels would fish north of the main Hawaiian Islands where they interacted with seabirds, turtles and monk seals. The other longline vessels targeting mixed species would operate in the same area as local trollers and handliners, resulting in gear conflict and even threats of violence. The Council had to react quickly.

As Boggs recalls, both the Lab and the Council switched from pure research and the exploration of fish life histories to fish monitoring: "When this longline fishery took off, in a huge way, it really upset the small local fishermen (the trollers and handliners). So, around 1990, my career starts to focus on whether large industrial scale fleets can have a depleting influence on the amount of tuna locally available to smaller fleets and participants" (Glazier 2016a).

Little evidence was found for reduced availability of tuna in Hawai'i as a consequence of increased longline fishing (Skillman, Boggs and Pooley 1993; He and Boggs 1997). Other researchers looked at other pelagic species including billfish. Robert Skillman reported that intense longline fishing pressure in the EEZ around Hawai'i might depress catch rates for blue marlin (Skillman and Kramer 1992). Other researchers found some evidence that reduced longline fishing increased local fishing success for striped marlin in Mexico's Pacific EEZ (Squire and Au 1990).

From 1991, the Council took immediate actions to amend the existing Pelagic FMP implemented in 1986. Eight amendments were made to redefine the fishery. Recruitment overfishing[5] and the OY for each managed billfish and pelagic species were defined. Logbooks were required; a 50-nm exclusion zone was created around the NWHI where evidence of monk seal interactions were reported; a three-year moratorium was established on new entry to the Hawai'i longline fleet; and each vessel was required to carry a NMFS vessel monitoring system to ensure it did not fish within prohibited areas.

In 1992, these requirements were extended to create a domestic longline exclusion zone ranging from 50 to 75 nm around the main Hawaiian Islands and a similar zone around Guam and its offshore banks. Moreover, in 1994, the Council changed the Hawai'i longline moratorium to a limited-entry system, restricting the number of vessels in the fishery to 164.

In 1997, Kona fishermen requested that the longline exclusion zone in the western part of the Big Island be extended from 50 nm from shore to 75 nm from shore.

In its response, the Council asked that a third billfish symposium consider the issue. The Council and a dozen partners sponsored the Pacific Island Gamefish Tournament Symposium: Facing the Challenges of Resource

5. Recruitment overfishing occurs when the mature adult population (spawning biomass) is depleted to a level where it no longer has the reproductive capacity to replenish itself—there are not enough adults to produce offspring.

Conservation, Sustainable Development and the Sportfishing Ethics, which convened July 29 to Aug. 1, 1998, in Kailua-Kona.

The Council at this time also requested that the issue of longlining and its impact on trollers be taken up internationally with the SPC, IATTC and the Japan Far Seas Research Laboratory. The WCPFC also thought this topic should be communicated through the Multilateral High Level Conference, which was in the process of developing an international convention for highly migratory species in the Western Pacific. The conference's Honolulu Convention in 2000 would establish the WCPFC

12. Legal Action Against the Hawai'i Swordfish Fishery

The expansion of the longline fishery in Hawai'i coincided with an effort by Weld and his NCMC advocacy group (now called Wild Oceans) to rewrite the laws of the MSA, so, when it was reauthorized in 1996, it would contain language that mandated bycatch reduction. Recreational anglers carefully allied themselves with professional advocacy organizations through an organization called the Marine Fish Conservation Network—which, among others, included Earthjustice, the Ocean Conservancy and other non-government organizations (NGOs) that received grants from the Pew Charitable Trusts. Their stated goal was the "conserving and revitalizing wild ocean fisheries" (Wild Oceans n.d.).

In 1998, NOAA NMFS Office of Protected Species compiled an Endangered Species Act (ESA) Section 7 biological opinion on the longline fishery with a focus on vessel–turtle interactions. It concluded that "the continued operation of the Hawai'i-based longline fishery for 1998–2001 is not likely to jeopardize the continued existence and recovery of loggerhead, leatherback, olive ridley, green or hawksbill turtles or adversely modify critical habitat (Diaz-Soltero 1998). One of the studies cited (Wetherall 1997) used a simulation model to examine the longline impacts on turtles. After the biological opinion was issued, a lawsuit was brought against NMFS by Earthjustice on behalf of several environmental NGOs. There were two aspects to the plaintiff's charges, one pertaining to violations of the ESA and the other pertaining to violations of the National Environmental Policy Act (NEPA). NMFS prevailed on the ESA matters but lost on NEPA issues (Laurs and Karnella 2001).

The fishery was heavily regulated from 1999 to 2001 and closed from 2002 to early 2004. Experimentation with circle hooks and changing the kind of baits used (Watson et al. 2005) showed that turtle bycatch in swordfish longline fishing could be greatly reduced. The Council was instrumental in seeing these methods applied to Hawai'i longline management, reducing turtle bycatch from 400 per year to several dozen.

The swordfish fishery was reopened in April 2004, and, to mitigate the taking of sea turtles, longline fishing vessels were required to use mackerel-type bait and 18/0 circle hooks. They were limited to a maximum effort of 2,120 sets per year, and hard caps were set on loggerhead and leatherback turtle interactions. If this hard cap was reached or exceeded, the fishery would close for the remainder of the year.

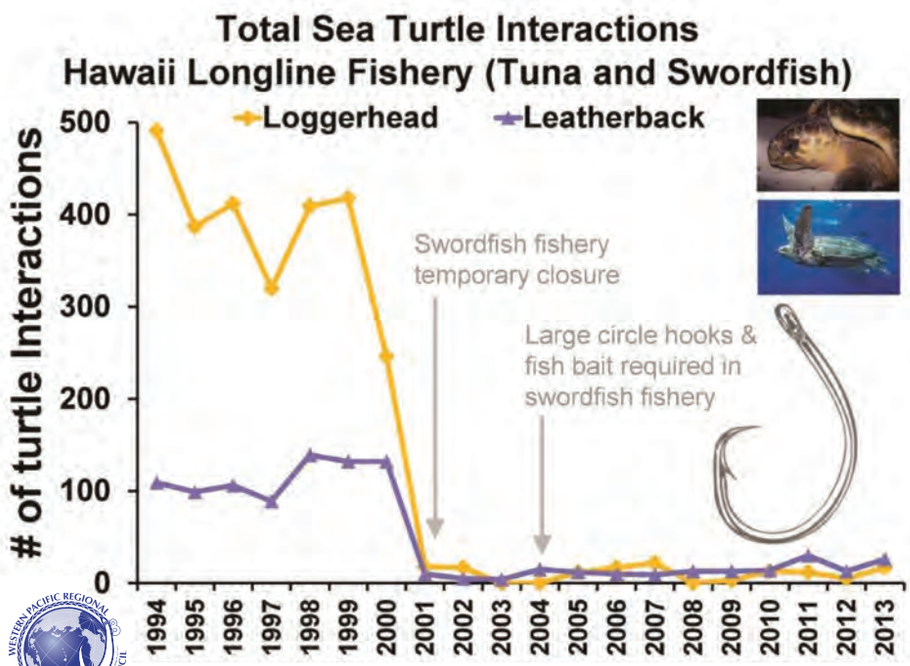
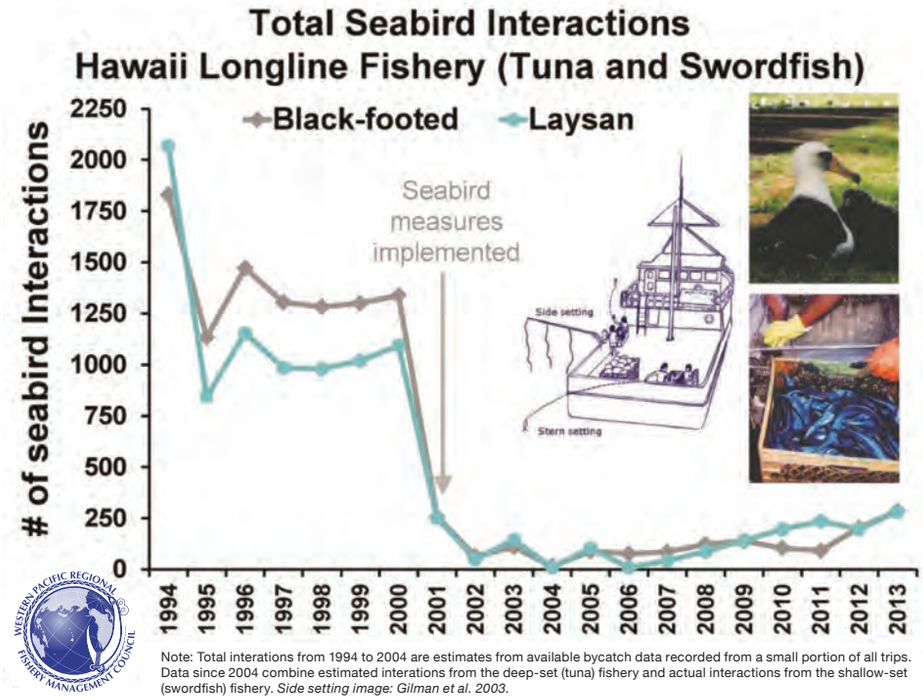


Fig. 22. Hawai'i Longline-Sea Turtle Interactions.

For seabirds, a series of experiments were conducted to determine how best to reduce the interaction rate (Garcia and Associates 1999; Boggs 2001). The resulting Framework Measure 2 required owners and operators of vessels registered for use under a Hawai'i longline limited access permit and operating with longline gear north of 23° N to employ a line-setting machine with weighted branch lines or use basket-style longline gear and to use thawed blue-dyed bait and strategic offal discards during setting and hauling of longlines. It also required these owners and operators to follow certain seabird handling techniques and complete a protected species educational workshop conducted by NMFS.



Note: Total interations from 1994 to 2004 are estimates from available bycatch data recorded from a small portion of all trips. Data since 2004 combine estimated interations from the deep-set (tuna) fishery and actual interactions from the shallow-set (swordfish) fishery. *Side setting image: Gilman et al. 2003.*

Fig. 23. Hawai'i Longline-Seabird Interactions

13. Marine Protected Areas and Their Impacts

During this time, Weld, Wild Oceans and Weld's environmental allies began to pressure federal administrators in the Atlantic to seek greater protections for pelagic species through time and area closures. Ultimately, a series of successful lawsuits against NOAA by Wild Oceans and its associated NGOs led to the closing of 133,000 square miles of the U.S. Atlantic to longline fishing. (Hinman 2000)

Marine National Monuments of the U.S. Western Pacific Region

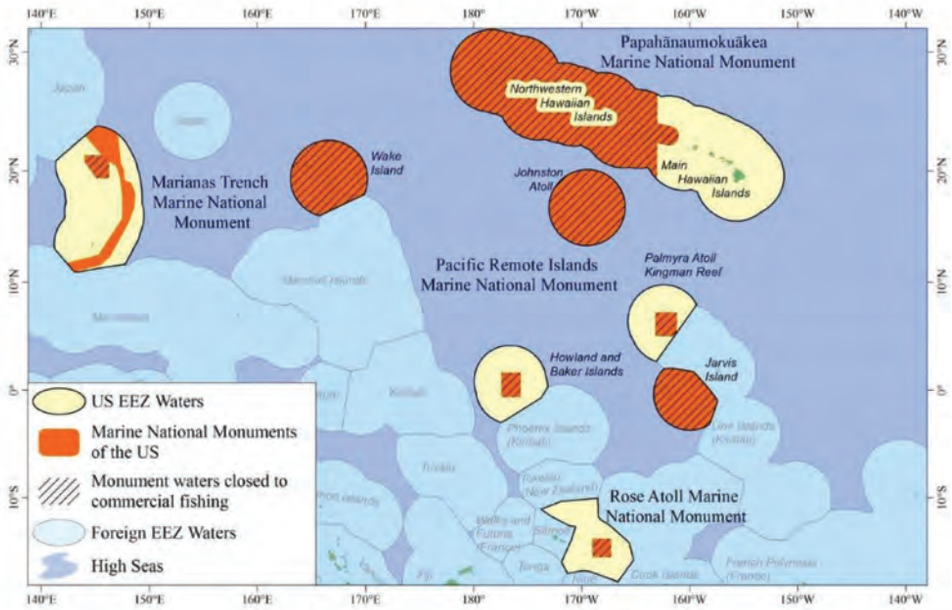


Fig. 24. Marine National Monuments in the U.S. Western Pacific Region. Source: WPRFMC

National environmental organizations would speak of a beneficial "spillover effect" from this policy. Theoretically, marine protected areas (MPAs) would cause an increase in the numbers of reproductive fish, thus providing more fish that would eventually emerge from the "no-take" areas and swim into the open waters where they could be caught. Although this theory has been widely touted by environmental groups, its effect has never been verified for highly migratory species like tuna and billfish. The principal argument against it is that commercial fishermen blocked from one area will soon move to an adjoining area to catch fish.

The WPRFMC has never opposed MPAs as a tool to meet specific management goals. In 1981, its draft Billfish FMP was rejected by NMFS on several grounds, one of which was that the proposed area closures to foreign longline fishing appeared to be larger than necessary to protect domestic fishing interests (Gordon 1982). One of the Council's first successful MPA actions was the Protected Species Zone, established in 1991, which banned domestic longline fishing within 50 nm around the NWHI.

The open-ocean campaigners continued their efforts by urging President Clinton in 2000 to designate the area of the Council's Protected Species Zone as the NWHI Coral Reef Ecosystem Reserve and President George W. Bush in 2006 to use the Antiquities Act to proclaim the Reserve as the Papahānaumokuākea Marine National Monument (MNM), closing (139,797 square miles) to fishing. This action was followed in 2009 by Bush's designation of the Marianas Trench (95,222 square miles), the Pacific Remote Islands (86,607 square miles) and the Rose Atoll (13,451 square miles) MNMs.

In 2014, President Barack Obama, by Executive Order, expanded the Pacific Remote Islands MNM sixfold to 490,000 square miles, the full extent of the U.S. EEZ around the NWHI.. In 2016, President Obama expanded the Papahānaumokuākea MNM to 583,000 square miles. Marine national monuments now accounted for 51% of the U.S. waters in the region.

This situation had immediate consequences for the Hawai'i fishery, which Simonds described in her May 1, 2019, testimony to Congress:

> Our U.S. fishermen are restricted not only from the huge area closures of the U.S. EEZ under the Marine National Monument prohibitions but also from areas closed under the Magnuson–Stevens and Marine Mammal Protection Acts. In Hawai'i, bottomfish and groundfish have been prohibited in the northernmost part of the archipelago since 1986, and longlining has been prohibited since the early 1990s in waters out to 50 to 75 m from shore. South of the main Hawaiian Islands, longline fishing is additionally prohibited in the Southern Exclusion Zone (SEZ) when the fishery interacts with two false killer whales in a manner determined to be a "mortality and serious injury," which includes any case in which an animal is released alive with gear remaining. When the SEZ is closed, as it is now, the Hawai'i longline fleet can operate in only 17% of the U.S. EEZ around Hawai'i. (WPRFMC 2019b)

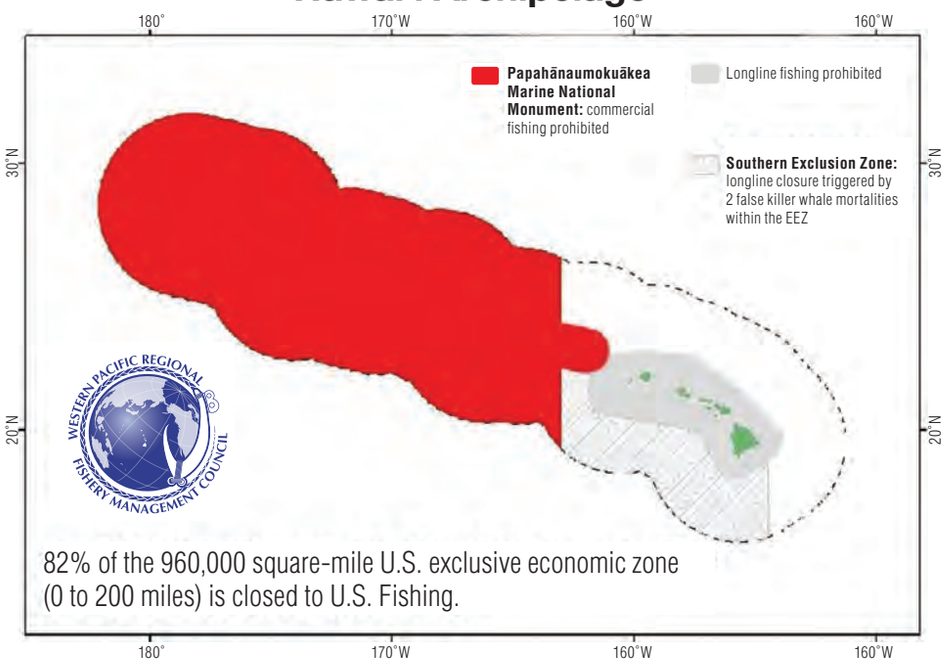


Fig. 25. Longline Exclusion Areas in the U.S. EEZ surrounding the Hawai'i Archipelago

Efforts are presently being made by the same environmental groups to restrict fishing in 30% of the high seas under the UN framework being developed by the Intergovernmental Conference on Marine Biodiversity of Areas beyond National Jurisdiction.

The intent behind the MNMs was to close off open ocean areas as the other MPAs had been closed off, but Council and its science advisors knew that this effort would be more difficult. The waters in the Western Pacific are under continuous pressure from illegal, unreported and unregulated (IUU) fishing. Although satellite monitoring capabilities are in place, they are insufficient to report the large number of IUU fishing events. IUU vessels capture as much as an estimated 30% of the total catch (Bray 2000).

Regulating fishing on the open ocean areas of the Pacific is a difficult reality:

(1) The area includes more than 50 nations with vastly different resources and priorities that compete for tuna on the open sea in the Western Pacific.

(2) Fishery reporting within the participating nations varies widely as does their reporting to RFMOs, such as the WCPFC.

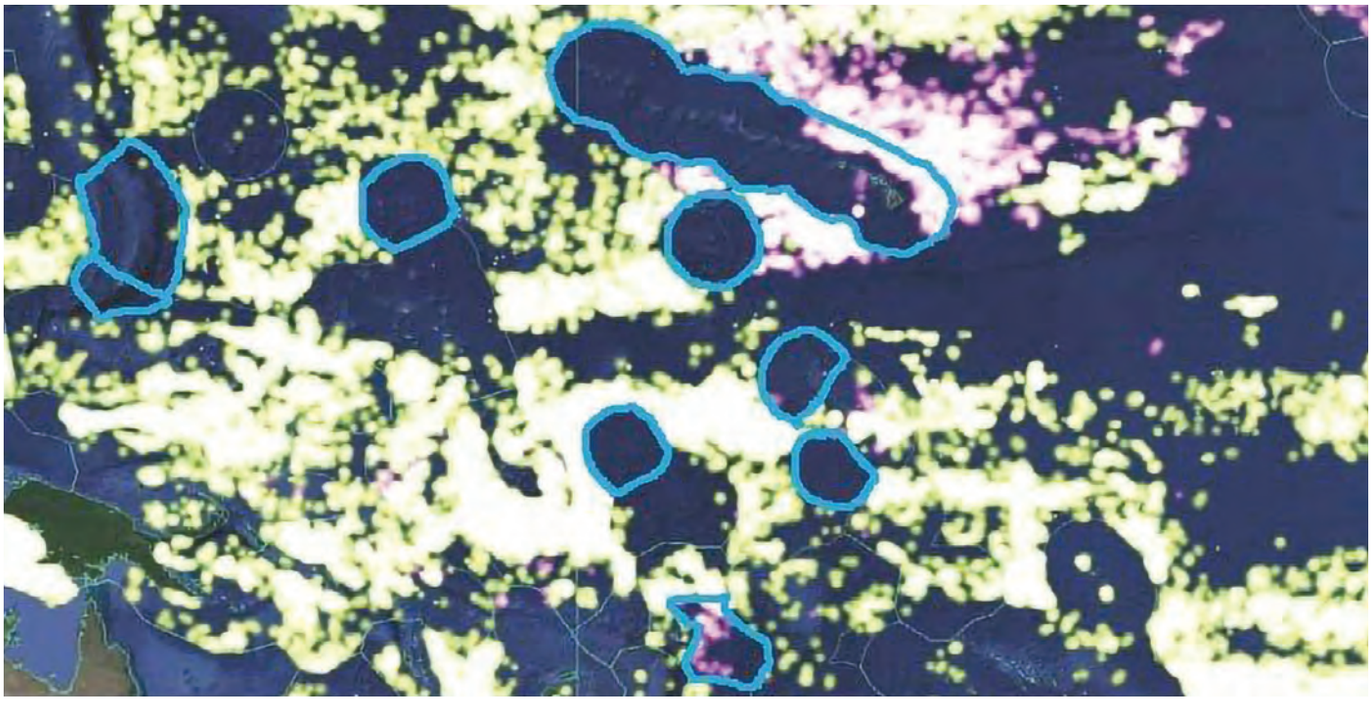
(3) Many of the same island nations that side politically with environmental organizations that received grants from NGOs such as the Pew Charitable Trusts also sell the fishing rights to their EEZs to large fishing nations such as China.

(4) Tuna longliners working out of Hawai'i may not be able to remain in business if increased regulatory obstacles are enacted on the high seas as well as within the U.S. EEZ. In that case, the Council would lose a vital source of information about the state of the fishery.

In regard to billfish and other highly migratory species in the Western Pacific, member countries compete for fish that swim freely across a wide area. The South China Sea has now been overfished so extensively that it was at 5% (Sumailia and Cheung 2015) of its productivity during the 1950s, and rising populations in China have increased movement by the Chinese, Taiwanese and other foreign fleets into the Western Pacific. Their longline vessels consistently catch billfish when pursuing tuna (Sala et al. 2018). Between 3,200 tons of blue marlin and 2,000 tons of striped marlin are currently estimated to be harvested in the Pacific region (IATTC 2016). However, this is likely a gross underestimate as Asian national fishing vessels routinely undercount their catches (Pauly et al. 2014).

Fishing Effort in the Pacific Ocean

and the U.S. Pacific Exclusive Economic Zone—1.5 million square miles



DATA SOURCE: GLOBAL FISHING WATCH

Three months fishing effort (October–December 2019)

Foreign fishing vessels U.S. fishing vessels U.S. exclusive economic zones

Vessels are predominantly purse seine, longline, and pole and line vessels targeting tuna and swordfish.

Fig. 26. U.S. and foreign fishing effort in the Western Pacific

14. Negative Impacts of the Billfish Conservation Act

The Billfish Conservation Act (BCA) of 2012 was proposed and lobbied for by recreational billfish anglers and their conservationist allies to ease the enforcement of the existing bans on marlin in the United States. Introduced by Congressman Jeff Miller (R-Fla.), it prohibited the sale or possession of billfish or billfish products in the United States.

The Florida representatives who supported the legislation were aware of the importance to their state of recreational charter boat fishing and fishing tournaments. They followed the IGFA's long-term push to create disincentives for marlin as a fresh fish consumer item. The idea was an old one, first proposed by Weld and Rockefeller during the 1980s.

The bill was passed, but with an exemption for Hawai'i and the U.S. Pacific territories proposed by Sen. Inouye. In late 2012, he passed away and then Lt. Gov. Brian Schatz was appointed to replace him in Congress.

In 2018, pro-recreational fishing political action groups re-mobilized and had new members of the Florida delegation introduce an amendment that would end the exemptions that allowed Hawai'i and the U.S. Pacific territories to sell marlin and billfish to customers outside of Hawai'i. With Inouye gone, only Congresswoman Colleen Hanabusa (D-Hawai'i), Aumua Amata Radewagen (R-American Samoa) and Madeleine Z. Bordallo (D-Guam) rose an objection. Thus, an amendment was passed to the BCA. Radewagen, in an Additional Views statement on H.R. 4528, said the legislation "will negatively impact the livelihoods of fishermen in Hawai'i, Guam and the Pacific Insular Areas by closing off the only off-island market for U.S.-caught billfish." Acknowledging that several Atlantic billfish species are subject to overfishing, the Congresswomen said, "We support needed conservation efforts in the Atlantic, but do not believe that Pacific fisheries need to be targeted in order to achieve these goals."

"When the BCA amendment passed prohibiting the sale of Hawai'i caught billfish to markets outside of Hawai'i, I felt betrayed by the IGFA and resigned my longtime membership with them,"

noted Roy Morioka[6], a former Council Chair, current coordinator of Fishing for Hawai'i's Hungry and member of the Hawai'i Fishermen's Alliance for Conservation and Tradition. "In Florida, big charter boats can go hundreds of miles out to sea and tournament fishermen play for big money. They have a million dollar prize for the biggest and most fish and Calcutta prizes (side bets), such as the first fish caught, worth $1 million to $6 million. It is disingenuous for those millionaires in the Atlantic spouting off about conservation to look down on us in the Pacific islands who make $6,000 a year and sell fish for food."

The 2018 BCA amendment had immediate consequences: Before the BCA amendment, Honolulu fish dealers could send Hawai'i billfish to markets in San Francisco, Los Angeles, Boston and Miami in the mainland United States as well as Toronto in Canada. One Honolulu fish distributor, who has been in the business for 40 years, estimated his losses from the BCA amendment at $4 million per year. He calculated this in terms of $2.5 million in billfish sales and $1.5 million in the sales of supplemental fish that fish distributors could sell as "other species," which were combined with regular orders to chefs on the U.S. mainland and Canada (see Appendix 3).

This fish distributer put the losses in excess of $20 million to the local industry. He said, "We have no one to speak for us, no one to protect us. People are saying the good days are over. We are all going to be buying fish from foreigners of lower quality." Then he added, "I am glad I am old and getting out." He said he tried numerous times to get the local media to cover the story, but no one was interested.

The BCA amendment requires the retention of locally caught billfish (excluding swordfish) in Hawai'i and the other U.S. Pacific Islands. In 2019, billfish sales dropped 51% compared to the prices prior to the BCA amendment (Chan 2020).

(1) a large loss of revenue to fishermen, including the Kona sportfishing captains, crews and their families, who depended on selling marlin for their livelihoods;

(2) economic losses to distributors and wholesalers who have limited markets; and

(3) environmental effects because some fish were discarded at sea.

The situation benefits local consumers who once paid a premium for orange *kajiki* at expensive restaurants because it was in high demand from mainland buyers. Today, *kajiki* is often sold as filler for cheap fish sandwiches. At some point, it may become so inexpensive that local fish cake makers may start using it again instead of *surimi*.

These kinds of losses are difficult to compensate for, and they have a knock-on effect on the entire longline business, which comprises 80% of fish sales in Hawai'i. Currently, the Hawai'i longline industry has an estimated landed value of $110 million (which does not include associated revenue) (WPRFMC 2019a) and involves approximately 1,000 people in fishing and the auxiliary businesses that support it (State of Hawai'i 2019). Many of these jobs and businesses are now at risk.

This BCA amendment led in 2019 to the removal of language in the Atlantic HMS regulations requiring that a Billfish Certificate of Eligibility accompany billfish product because sale of the product from the Western Pacific Region was now prohibited (NOAA 2019).

While the 2018 BCA amendment is another success for mainland big game fishing advocates, it will likely not have any impact on the protection of billfish internationally. Since 90% of U.S. seafood is imported and only 2% is inspected, the probability of mislabeled seafood leaking into the U.S. markets from countries where billfish sales are common is profound.

Fig. 27. Billfish selling at $4/pound retail after the BCA Amendment. Photo: WPRFMC.

6. Roy Morioka in discussion with the author, May 21, 2020.

15. Evolution of Billfish Tournaments and Recreational Fishing Policies

The HIBT, first held in 1959, is now considered one of the most important billfish tournaments of its kind. Like all of the billfish tournaments in the United States, the HIBT promotes both the catch-and-release and the tagging of billfish. The place of recreational fishing in Hawai'i has grown since the HIBT was initiated.

In 2011, the charter industry in the State of Hawai'i employed more than 800 people, involved 192 active vessels (106 in the County of Hawai'i, where Kona is located) and generated sales of nearly $50 million (Rollins and Lovell 2019). An estimated 26,000 people fish for billfish in the State of Hawai'i, representing approximately 10% of the U.S. total of 300,000 people who say they have caught a billfish or are interested in billfish fishing (Ditton and Stoll 2003, U.S. DOI and DOC 2018). The charter boat industry also attracts the members of this demographic who have very high disposable incomes. Thus, the industry represents an important market for high-end resorts. (Ditton and Stoll 2003, Carter and Conathan 2018).

Currently, approximately 215 to 300 billfish tournaments are held per year on the U.S. mainland and in Central America. These tournaments involve from 20 to 400 entries, with six people per team. Entry fees can be as high as $70,000 per boat (Brakhage 2019). Because of the "Calcutta" option, crews can win $1 million in a single contest. Hawai'i does not permit gambling but does have cash prizes in its "shoot out" (Miller et al. 2001).

The billfish contest organizers ask their members to practice catch-and-release fishing, so the fish will continue to live.

"It was the jackpot fishermen and their boat captains and crews who wanted catch and release because they didn't like the waste of fish when more fish were caught than could be sold and the fish were thrown away," explained Morioka. "However, most boat captains struggle except for those at the high end who take out millionaires or who are the best of the best and become 'hired guns' to work the big gambling tournaments on the U.S. mainland. The trend in Kona has been for boat slips to be purchased by millionaires who fish their own boats, leaving the six-pack charter-boat fishermen who take out middle-class people to endure as during the depression."

Furthermore, 14% of the marlin and other billfish that are caught and released are estimated to die from their wounds. This number remains stable regardless of the type of tackle used to catch the fish or whether they are released alive by commercial or recreational fishermen (Musyl et al. 2014). Other studies have placed the mortality rate as high as 26% (Domeir, Dewar and Nasby-Lucas et al. 2003).

Fig. 28. Tagging a striper in Hawai'i. Photo: David Itano.

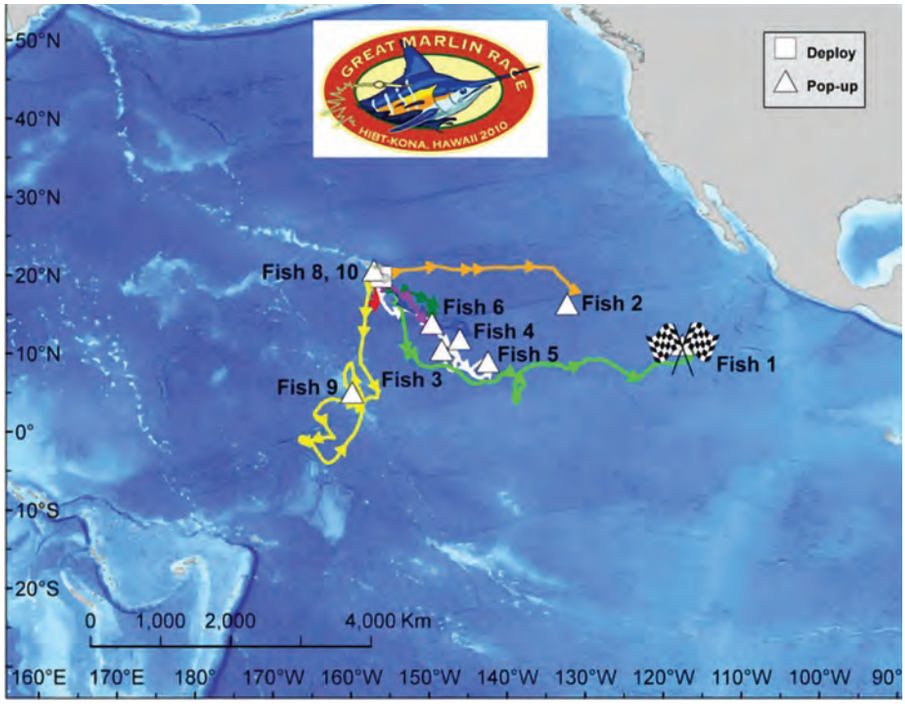


Fig.29. The Council sponsored the winner (Fish #1) of the 2010 Great Marlin Race. The fish in the contest were tagged during the HIBT and followed for 120 days.

On the other hand, the HIBT over the years has served as a major source of research information on billfish as a result of its tagging and other scientific programs. As a result of their cutting-edge research using satellite tags, it was discovered that marlin spend 75% of their time in the upper 10 meters of the water column and have specific circulatory adaptation that allows them to recover from long struggles like angling.[7]

Here, differences emerge with fishing practices in the U.S. Atlantic, where a hard cap of 250 blue and white marlin and roundscale spearfish is in place. The limit was exceeded for the first time in 2020. NMFS implemented mandatory catch-and-release only in the Atlantic for these species on Sept. 30, 2020, through the remainder of the year.

The passage of the Modernizing Recreational Fisheries Management Act of 2018, introduced by U.S. Sen. Roger Wicker (R-MS), is indicative of the continued interest of game fishermen in developing new NOAA directions for recreational fishing.

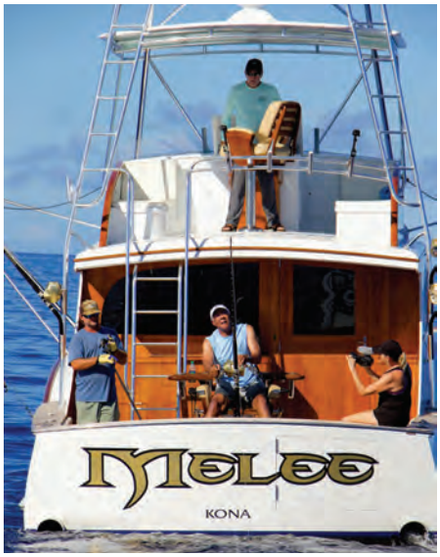


Fig. 30 and 31. Recreational fishing for billfish off Kona, Hawai'i. Photos: Kevin Hibbard.

16. Proposals for Longline Changes

Despite efforts to educate the general public and young people, the Council continues to face skepticism from environmental groups such as Wild Oceans (formerly NCMC), who say the Council's policies promote "unsustainable and unregulated bycatch" (Hinman 2015).

Opponents of longlining have not asked for an immediate ban on it, as was the case in the Atlantic. Instead, they have been asking for incremental changes in NMFS policy that would have the same effect. For example, they advocate that swordfish vessels stop putting out longlines 10 to 60 miles long with thousands of hooks and instead opt for a buoy system, with up to three hooks per buoy deployed in deep water during the day. They hope longliners can thus avoid interaction with unmarketable and protected species. Swordfish fishermen in the U.S. Pacific have experimented with this system with support from NMFS, the Pew Charitable Trust and others. NMFS reports that markets are receiving the product at a premium and early results of efficient swordfish catches and avoidance of non-target species are encouraging. (NOAA 2017).

Fig. 32. Serving blue marlin tempura at the Western Pacific Regional Fishery Management Council's booth during the 2003 NOAA Fish Fry are (l–r) Council Executive Director Kitty M. Simonds, then Secretary of Commerce Donald Evans, then NOAA Administrator Conrad C. Lautenbacher and Honolulu Chef Russell Siu. Photo: WPRFMC.

A related problem is the international reporting and management of billfish to the WCPFC. The WCPFC consists of 40 countries that include members, member territories and participating non-members. The WPRFMC has provided it with resources, technical expertise and hosting sites since 2004.

7. Charles Daxboeck, in discussion with the author, May 27, 2020.

Efforts are made to protect and manage tuna and billfish, but the motivations of participating countries are different. Despite some improvements, reporting remains inconsistent and incomplete.

These points were made by Simonds in her testimony to Congress:

> The U.S. fleet in the Western and Central Pacific Ocean (WCPO) is comprised of 30 purse-seine vessels targeting skipjack tuna, 144 Hawai'i-based longline vessels targeting bigeye tuna and swordfish, and 13 American Samoa longline vessels targeting albacore tuna. The U.S. fleet competes in the WCPO against much larger foreign fleets, such as China with 78 purse-seine and 524 longline vessels, Chinese Taipei with 34 purse-seine and 1,009 longline vessels, and Japan with 66 purse-seine and 434 longline vessels. With 2,425 longline vessels in the WCPO, foreign fleets comprise 94% of the longline vessels in the WCPO.
>
> The U.S. fisheries operating in the WCPO are among the most highly regulated, monitored and enforced fisheries in the world. Our fisheries adhere to a broad range of regulations compared to other nations. Besides the Magnuson-Stevens Act, they are subject to the Endangered Species Act, Marine Mammal Protection Act, National Environmental Policy Act and Antiquities Act, among others, as well as federal regulations implementing conservation and management decisions of the WCPFC. (WPRFMC 2019b)

Spicy A'u Tartare

Courtesy of Chef Grant Sato, Kapiolani Community College's Culinary Institute of the Pacific, Honolulu

Serves 6
Ingredients

1 lb small diced a'u (marlin or swordfish)
1 tbsp salt
2 tbsp water
½ cup green onions, chopped
2 tbsp wasabi tobiko
1 tsp sriracha sauce
1 tbsp oyster sauce
1 tbsp red ebi flakes
1 tbsp toasted seasame seeds
2 tbsp mayonnaise
¼ lb sweet potato or taro chips

Fig. 33 Spicy A'u Tartare. Photo: WPRFMC.

Preparation and Plating

Salt the a'u and sprinkle with water. Toss lightly and set aside for a minute. Place the a'u in a bowl, add all of the other ingredients and stir well to combine. Serve chilled with chips.

Simonds continued by saying, "the U.S. and foreign fleets in the WCPO operate in the same high seas waters up to the boundary of the U.S. EEZ. However, foreign vessels are required to have 5% observer coverage." Thus, as Simonds noted "the playing field is vastly uneven." In contrast, the Hawai'i longline fishery is subject to 100% observer coverage for its shallow-set sector and 20% observer coverage for its deep-set sector. It must report in near real time and has high levels of monitoring when it lands in port.

The consequence of this high level of regulation has ensured that, in the U.S. Western Pacific, blue marlin stocks are healthy and striped marlin are designated overfished but are actively monitored and part of an ongoing recovery plan. Unfortunately, the accomplishments of fishery managers in maintaining stocks while supplying U.S. markets have gone unrecognized by marine advocacy organizations. The common view seems to be that longlining anywhere poses an existential threat to existing billfish stocks. The cumulative effect of this advocacy is to push legal, regulated U.S. fishing efforts further to the margins and thereby expose both American consumers and our natural resources to unexpected risks. This presents a dilemma for fishery managers at the Council.

Fig. 34. Due to the BCA amendment, the ban on interstate commerce of Hawai'i-caught billfish (except swordfish) caused the price and demand for fresh marlin to fall, which led some in the industry to focus on other ways to prepare and market the fish. Source: Sylvia Spalding.

They realize that, when fewer fish are legally caught in U.S. waters, more fish will be caught by less regulated fisheries on the open ocean to fill the market need. In a world where people are hungry for protein, this situation creates further incentive for some foreign vessels to fish illegally.

However, they also realize that, after more than 70 years of careful research, if managed correctly, the U.S. zone has sufficient billfish for both recreational fishermen and consumers. With no outside markets in which to legally sell it at present, billfish are now in such a surplus that large amounts in Hawai'i have no value and are said to be thrown away at sea (see Appendix 3).

17. Conclusion

Since 1976 the Western Pacific Regional Fishery Management Council has played a key role in the development of billfish management in the United States. It was among the first to help federal regulators exclude foreign fishermen from the U.S. EEZ. The Council developed management policies that recognized and incorporated the different needs of the groups competing for billfish in the region: the artisanal fishermen, the high-end recreational fishermen and the local commercial longline fishermen. Council members were able to develop their initial policies by working closely with scientists and fishery analysts capable of using data from a multitude of Japanese, Korean, U.S. and other sources.

When conflicts over swordfish took place in the Atlantic Seaboard and the Gulf Coast, concurrently with the discovery of untapped swordfish stocks off Hawai'i, the result was a large-scale influx of fishing vessels that quadrupled Hawai'i's longline fleet within five years. It resulted in a major environmental crisis and a conflict between the new comers and local artisanal and recreational fishermen.

The Council took action and instituted one of the first large-scale open ocean closures in the United States. Its actions were praised by recreational fishermen in groups such as the IGFA, which held as a model the Council's 1991 Protected Species Zone, which excluded longline operations within 50 nm of the NWHI. The Council would later point out that despite this increase fishing pressure, 20 years later the Pacific blue marlin stocks which had been declared overfished in 1977 were declared healthy, while striped marlin is being put on a recovery plan. Hawai'i, which was always a popular fishing spot, continues to be world-renowned for producing more "granders" (billifish over a 1,000 pounds) than virtually any other place. Longliners and artisanal and recreational fishermen learned to coexist and sold locally caught marlin to buyers all over the world. The sale of the marlin, which was prohibited on the continental United States, helped sustain the local longline fleet, which currently contributes 1,134 jobs to the Hawaii economy. Many of the workers in the fleet are people from Hawai'i and the U.S. Pacific Islands.

Over time recreational fishing and environmental interest on the U.S. mainland, which once had worked with the Council to incorporate tuna into the MSA, came to criticize its actions. They successfully lobbied for a policy of closures to longline vessels that dictates that 51% of the U.S. EEZ in the Western Pacific Region are now marine national monuments, with bans on U.S. commercial fisheries, and up to 83% of the U.S. EEZ around Hawai'i is closed to U.S. long line fishing vessels—even though the longline vessels have 100% observer coverage on swordfish vessels and 20% coverage on tuna vessels. This forces all but a few of the Hawai'i-based longliners to transfer their efforts to the international waters of the high seas. There they must compete with largely unregulated fishing vessels from Asia and elsewhere, most of which do not report their billfish landings, do not have observer coverage and generally able to sell fish to U.S. consumers through a system in which as much as one-third of seafood imports may be from IUU fishing (Pramod et al. 2014).

The year 2020 has also had a number of negative impacts on all sectors of Hawai'i's billfish fishery. The effect of COVID-19 on Kona charter-boat fishermen in Honokohau harbor, which is largely dependent on tourism, has seen many local fishermen suffer from lack of clients, and the longline fishery has the double penalty of not only the pandemic but also the 2018 amendment to the Billfish Conservation Act, which alone dramatically dropped fish prices by more than 51%. All but those businesses catering to the ultrahigh-end recreational game fish market have suffered.

The combination of the BCA and COVID-19 have affected the ability of many local workers to remain employed in the fishing industry. There is a concern that the proposed large-scale closures will result in further unemployment because owners of fishing vessels will find themselves forced from the fishery. Because of the generally healthy state of the Western Pacific billfish stocks, the benefits of these new closure policies and others destined for the Western Pacific in name of conservation are unknown. However, what is recognized is that Hawai'i residents and Pacific Islanders who have few economic options other than fishing will likely disproportionately bear the burden of any economic costs from these policies.

Fig. 35. Orange-colored nairigi fillets indicate they are seasonally fatty. The prized fillets make excellent sashimi and poke. Photo: Hawaii Seafood Council.

Appendix 1: Meetings Convened by the Western Pacific Regional Fishery Management Council in Kona and about Marlin

Aug. 10–14, 1977	6th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Aug. 2–5, 1978	12th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Oct. 23, 1978	13th Council meeting	Kona Hilton Hotel, Kailua-Kona, Hawai‘i
Oct. 27–28, 1978	4th Council Chairmen’s Meeting	Kailua-Kona, Hawai‘i
Aug. 22–25, 1979	19th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
July 29–31, 1981	31st Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Aug. 16–18, 1982	37th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Aug.6, 1985	U.S. Tuna Association Meeting	Kailua-Kona, Hawai‘i
Aug. 7–8, 1985	50th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Jan. 27–Feb. 1, 1986	6th Western Pacific Regional Tuna Negotiations	Kona, Hawai‘i
Aug. 6–8, 1986	54th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Oct. 13–16, 1987	North Pacific Rim Fishermen’s Conference on Marine Debris	Kailua-Kona, Hawai‘i
July 31–Aug. 5, 1988	International Billfish Symposium	Kailua-Kona, Hawai‘i
Aug. 8–11, 1988	62nd Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Aug. 21–22, 1991	74th Council meeting	King Kamehameha Hotel, Kailua-Kona, Hawai‘i
Aug. 3–5, 1994	85th Council meeting	Royal Kona Resort, Kailua-Kona, Hawai‘i
July 27–28, 1998	97th Council meeting	King Kamehameha Kona Beach Hotel, Kailua-Kona, Hawai‘i
July 29–Aug. 1, 1998		Pacific Island Gamefish Tournament Symposium: Facing the Challenges of Resource Conservation, Sustainable Development and the Sportfishing Ethic — Kailua-Kona, Hawai‘i
Oct. 21, 2003	Fishers Forum–Marlin Management	Pagoda Hotel, Honolulu
July 22-25, 2009	145th Council meeting	King Kamehameha Hotel, Kailua-Kona
July 23, 2009	Fishers Forum–Marlin on the Menu	King Kamehameha Hotel, Kailua-Kona
April 30–May 3, 2012	Council Coordination Committee	Kohala Coast, Hawai‘i
Oct. 21, 2014	Fishers Forum-Hawai‘i Yellowfin Tuna and Striped Marlin Management	Laniakea YWCA-Fuller Hall, Honolulu

Appendix 2: Pelagic Fisheries Research Program Projects on Billfish and Hawai'i Pelagic Fisheries (1997–2012) Listed by Principal Investigator(s)

For a complete list of projects and links to the studies, go to http://www.soest.hawaii.edu/PFRP/allprojects.html.

Allen S. Sociological Baseline of Hawai'i-Based Longline Fishery: Extension and Expansion of Scope.

Amesbury J, Hunter-Anderson R. An Analysis of Archaeological and Historical Data on Fisheries for Pelagic Species in Guam and Northern Mariana Islands.

Bigelow K et al. Performance of Longline Catchability Models in Assessments of Pacific Highly Migratory Species.

Block B, Reeb C. Genetic Analysis of Population Structure in Pacific Swordfish (Xiphias gladius) using Microsatellite DNA Techniques.

Boggs C, Gunn J. Investigation of Pacific Broadbill Swordfish Migration Patterns and Habitat Characteristics using Electronic Archival Tag Technology.

Boggs C. Integration of Hawai'i Longline Fishery Performance Model with Environmental Information

Branch T, Hilborn R, Jensen O. Biological, Economic and Management Drivers of Fishery Performance: A Global Meta-Analysis of Tuna and Billfish Stocks.

Chow M, Grau EG. Developing Tools to Assess Sex and Maturational Stage of Bigeye Tuna (Thunnus obesus) and Swordfish (Xiphias gladius).

Dalzell P, Pooley S. Recreational Fisheries Meta Data - Preliminary Steps.

Dewar H, Polovina J. Long-Term Deployment of Satellite Tags using the California Harpoon Fleet.

Graves J, Block B. Analysis of Pacific Blue Marlin and Swordfish Population Structure using Mitochondrial and Nuclear DNA Technologies.

Hampton J, Pierre Kleiber and John Sibert. Addition of Multi-species Capability, Sex Structure and other Enhancements to the Length-Based, Age-Structured Modeling Software MULTIFAN-CL.

Holland K, Dagorn L. Instrumented Buoys as Autonomous Observatories of Pelagic Ecosystems.

Kaneko J, Bartram P. Factors Affecting Price Determinations and Market Competition for Fresh Pacific Pelagic Fish, Phase I: Tuna and Marlin.

Kaneko J, Bartram P. Local Fishery Knowledge: Its Application to the Management and Development of Small-scale Tuna Fisheries in the U.S. Pacific Islands.

Kleiber P, Nakano H. Incorporating Oceanographic Data in Stock Assessments of Blue Sharks and Other Species Incidentally Caught in the Hawai'i-based Longline Fishery.

Pooley S, Allen S. A Sociological Baseline of Hawai'i's Longline Fisheries.

Keller Kopf RK. Age and Growth of Striped Marlin, Kajikia audax, in the Hawai'i-based Longline Fishery

Kikkawa B. Rescue, Compilation, and Statistical Characterization of Historic Longline Data, Pacific Ocean Fisheries Investigation 1951-73

Kirby D et al. Regime Shifts in the Western and Central Pacific Ocean Tuna Fisheries.

Leung PS. Analyzing the Technical and Economic Structure of Hawai'i's Pelagic Fishery.

McConnell KT. The Economics of Recreational Fishing for Pelagics in Hawai'i.

Mitchum G, Polovina J. Evaluation of Remote Sensing Technologies for the Identification of Oceanographic Features Critical to Pelagic Fish Distribution around the Hawaiian Archipelago.

Musyl M, Malte H, Brill R. Modeling the Eco-physiology of Pelagic Fishes and Sharks with Archival and Pop-up Satellite Archival Tags (PSATs).

Musyl M, Moyes C, Brill R. Evaluating Biochemical and Physiological Predictors of Long Term Survival in Released Pacific Blue Marlin Tagged with Pop-Up Satellite Archival Transmitters (PSATs).

Myers R, Ward P. Causes of Rapid Declines in World Billfish Catch Rates.

Qiu B, Flament P. A Numerical Investigation of Ocean Circulation and Pelagic Fisheries around the Hawaiian Islands.

Pan M, Pooley S. Economic Fieldwork on Pelagic Fisheries in Hawai'i.

Pooley S. Hawai'i Pelagic Fishing Vessel Economics.

Polovina J, Seki M. Describing the Vertical Habitat of Bigeye and Albacore Tunas and Post-Release Survival for Marlins in the Central Pacific Longline Fisheries with Pop-Up Archival Transmitting Tags.

Walsh WA. Comparisons of Catch Rates for Target and Incidentally Taken Fishes in Widely Separated Areas of the Pacific Ocean

Walsh WA. Distributions, Histories, and Recent Catch Trends with Six Fish Taxa Taken as Incidental Catch by the Hawai'i-Based Commercial Longline Fishery

Walsh WA, Bigelow K. Evaluation of Data Quality for Catches of Several Pelagic Management Unit Species by Hawai'i-Based Longline Vessels and Exploratory Analyses of Historical Catch Records from Japanese Longline Vessels.

Walsh WA, Bigelow K. Investigation of Shark Bycatch in the Hawai'i-based Longline Fishery, and an Extension of Analyses of Catch Data from Widely Separated Areas in the Pacific Ocean.

Walsh W, Brodziak J. Analyses of Catch Data for Blue and Striped Marlins (Istiophoridae).

Appendix 3: Impact of the 2018 Billfish Conservation Act Amendment on Honolulu Fish Dealers—An Informal Survey, June–September 2019

Abstract

In August 2018, the U.S. Congress passed an amendment to the 2012 Billfish Conservation Act (BCA), which has repercussions for the Hawai'i fishing industry. Specifically, the August 2018 amendment prohibits the sale of all billfish, except swordfish, caught in Hawai'i and the U.S. Pacific Territories to off island markets. Because more than 550,000 pounds of billfish such as Pacific blue marlin were shipped to the U.S. mainland and Canada prior to this amendment, it had significant economic impacts on the Hawai'i fishing industry. According to the 2017 Stock Assessment and Fishery Evaluation report, more than 3.4 million pounds of billfish (not including swordfish) are landed in Honolulu each year. These were primarily Pacific blue marlin (*kajiki*), striped marlin (*nairagi*) and spearfish (*hebi*).

From June to September 2019, an informal survey was undertaken to determine the consequences of the amendment. Input from six fish dealers in Honolulu indicates that, as a consequence of the amendment, estimated losses are as high as $20 million among fish dealers and fishing boat owners. The numbers from one fish dealer indicated losses from 26% to 100% in the year after the amendment was passed.

Introduction

The Hawai'i fishing industry made several assumptions about the effect of the amendment to the BCA. Researchers commissioned by the billfish recreation industry estimated that billfish sales in Hawai'i had direct and indirect costs in 2005 of $12.05 million in total output (Gentner Consulting Group 2007). Other estimates were $830,000 at dockside for 2018 and wholesale and retail market values of $2.5 million for export (WPRFMC 2018). Still other sources from the industry estimated that the losses would exceed $10 million (Samiere 2018). It is estimated that the Hawai'i longline fishery directly employs 846 workers and has a total impact of 1,134 jobs.[8]

In an effort to understand this variation, an analysis was conducted by the Pacific Island Fisheries Science Center (PIFSC), which was urged by the WPRFMC to gauge the impact of the amendment.

The PIFSC analysis deduced that the amendment to the BCA in August 2018 caused a 51% price drop after the amendment was enacted, in comparison to prices during the same months from 2009 to 2017 (Chan 2020). From this data, the study estimated that the BCA amendment had a direct, quantifiable loss of $2.9 million on the economy.

The indirect effects of sales to mainland markets were not calculated as a means of determining true value.

Another, more direct means of approaching this subject would involve in-depth surveys and actual conversations with dealers and fishermen. Doing so would provide a broader understanding of the impact of the amendment to the BCA on the Hawai'i's fishing industry.

Methods

In April 2019, independent researcher Michael Markrich wrote an initial survey, to which the WPRFMC staff made editorial suggestions and comments. These were then incorporated into a revised survey that was mailed to nine fish dealers with stamped, pre-addressed envelopes and no identification of the respondent. Only one was returned.

Upon a follow up with the respondent, and in talks with subsequent respondents, the low rate of response was determined to be the result of a number of factors. Some respondents did not like the fact that the address on the envelope was handwritten. Others felt that "any disclosure of their business dealings would put them at a competitive disadvantage" or "that the information was nobody's business [other] than their own." One respondent said "it was too much work." Another expressed fear that the federal government might use the information to intimidate fishermen.

The researcher met with the single respondent, who is one of the larger fish dealers in the Honolulu area. After the meeting, the respondent contacted his fellow fish dealers and encouraged them to participate. Therefore, the researcher subsequently conduted a series of telephone conversations and two in-depth personal

8. Eugene Tian, chief state economist (Research and Economic Analysis Division, Hawai'i State Department of Business, Economic Development and Tourism) in discussion with the author, Nov. 15, 2019.

interviews with fish buyers, which revealed the following information. While one dealer refused to be interviewed, the comments from the six fish dealers who did are reported below anonymously and summarized as a group so no single company can be identified.

Comments from Fish Dealers

Markets

For certain markets like Miami and Denver, marlin is a popular fish for hotel and restaurant fish buffets and is much in demand by chefs. Hawai'i fish dealers commonly buy some marlin and then fill the rest of the shipping container with tuna and other fish.[9] The loss of not being able to sell blue marlin, striped marlin and shortbill spearfish to customers in Miami, Boston, New York, Denver and other markets had the added consequence of no longer being able to sell the additional fish. This is because, if the fish dealer is unable to make weight for a full container, the out-of-state buyer will sometimes opt to purchase nothing. One company saw its out-of-state sales drop from 50% of its business five years ago to approximately 35% at the time of the interview.

As for the local market, it was noted that Hawai'i can consume only a certain amount of product. One dealer bought large amounts of marlin at $0.10 per pound ex-vessel but was then forced to stop because of the lack of a market in local restaurants, as jerky or as any other fish product. Although one fish dealer said that he is working with local restaurants to develop new marlin dishes for visitors, other dealers said that they cannot find a sufficient marlin market among visitors to Hawai'i.

Revenue

The loss of revenue was significant for the majority of the companies. Only one company reported being financially unaffected due to being able to develop new ways to sell and prepare marlin. The other companies reported individual losses from $300,000 to $2.5 million annually from the sale of marlin and up to $4 million annually when the sale of "other fish" that would have been shipped with the marlin is included. One company did not estimate the monetary loss in revenue but noted that recovery took a year. The loss for the local industry as a whole was estimated to be in excess of $20 million.

Some fish dealers attribute their economic loss primarily to a drop in the price of marlin. One company's purchases dropped $3,000 in one week because of the drop in the price of the product and not because of less product being available. For example, after the ban was enacted, prized deep-orange *nairagi* fell from $6.00 to $3.00 per pound wholesale, leading one dealer to say that the only people who benefit from the billfish ban are Hawai'i consumers who can buy nairagi for next to nothing.

Employment

The BCA amendment led one company to lay off five employees and may have caused one fish dealer to move to the U.S. mainland after suffering a substantial loss in business. The other companies did not report having to lay off employees as a result of the BCA amendment.

Discards

Fish dealers reported that, as a result of the reduced value in marlin, a significant number of the fish are not harvested and are tossed back into the sea, generating much waste.

Conservation and Economic Competitiveness

The Hawai'i fish dealers who were interviewed are pro fish conservation and say they have learned to accept the stringent requirements and caps placed on the Hawai'i longline fleet in the interests of saving turtles. They noted that U.S. fishermen in Hawai'i face stringent quality-control requirements while supporting observers on board their boats. Because of the new technology and practices, few turtles are now impacted by the domestic fleet. However, it was noted that all area closures [swordfish] and quotas have a major effect on business. The dealers say they have adjusted to the high prices that result from the enforced fishing restrictions on the Hawai'i fleet. Ironically, they say, this is the price they pay for having the world's highest quality fish.

On the other hand, Hawai'i fish dealers question the fairness of a system that essentially allows unlimited foreign imports of frozen fish (excluding billfish) to mainland markets by foreign fishermen from countries, such as China and Indonesia, that have low levels of quality control and that pay minimal attention to the protection of sea turtles.

Negative effects of the BCA: Summarized

(1) Markets: Distributors and wholesalers have limited local markets and, due to the BCA amendment, out-of-state sales dropped by up to 15%.

(2) Revenues: Fish dealers have suffered a large loss in annual revenues, estimated to be up to $4 million individually and in excess of $20 million for the industry as a whole.

(3) Employment: The impacts of the BCA amendment caused reported layoffs of five employees in one company and potentially the relocation of one fish dealer to the U.S. mainland.

(4) Discards: Fish buyers said the number of bycatch discards of blue and striped marlin at sea has increased. Due to the drop in value of marlin, longline fishermen tended to keep storage space for tuna and other more valuable species.

9. This marketing strategy depends on the sale of a novelty item such as marlin that then stimulates the buyer to fill the remaining space in the container (i.e., to "top off") with other fish from Hawai'i. Hawai'i had spent more than two decades carefully building market share for its seafood industry through State-funded promotions in the form of trade shows and marketing materials for its seafood industry in mainland and international markets. Because Hawai'i is heavily dependent on tourism, developing the seafood industry was a way to diversify the economy, provide more jobs and, by stimulating demand, provide price support for Hawai'i caught seafood that might otherwise be sold at a loss.

(5) Conservation and economic competitiveness: Fish buyers are pro-conservation and accept the increased cost and restrictions due to the highly regulated, monitored and enforced nature of the Hawai‘i longline industry. However, they question the ability of less regulated, monitored and enforced foreign fisheries to have unlimited sales (excluding billfish) to the United States.

Estimated Losses

One fish dealer was asked to compare his revenues from August 2017 to July 2018 with those from August 2018 to July 2019 (see Table A-1). While the results represent a sample of one, they are likely to be representative. All losses were significant, but the highest losses were for blue marlin, which saw sales decrease from $668,020 to $246,860, a 63% loss. Striped marlin experienced less of a loss, perhaps because it has a greater appeal to local consumers. Its sales dropped from $379,570 to $282,140, or 26%. The market loss for shortbill spearfish was particularly hard to take because it had been difficult to develop on the mainland, finding favor only after mainland chefs discovered they liked working with it. Spearfish sales decreased from $306,260 to $177,870, a loss of 42%. The greatest loss by percent, at 100%, was among the miscellaneous other billfish that might have been sold on the mainland as filler but for which no market now exists.

Species	Before 2017/2018	After 2018/2019	Amount Lost	Percent Lost
Blue marlin (*kajiki*)	$668,020	$248,860	$419,160	–63%
Striped marlin (*nairagi*)	$379,570	$282,140	$97,430	–26%
Shortbill spearfish (*hebi*)	$306,260	$177,870	$128,390	–42%
Other (incl. sailfish)	$500	—	$500	–100%
TOTAL	**$1,354,350**	**$708,870**	**$645,480**	**–48%**

Table 1. Revenue comparison by billfish species before and after the BCA.

Fig. 36. Change in billfish sales by species following the BCA amendment.

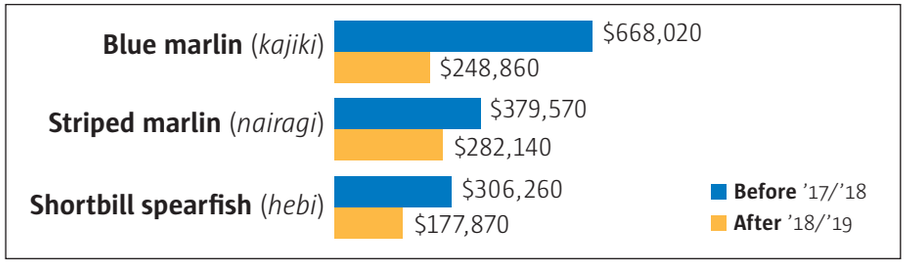


Fig. 37. Change in total billfish sales following the BCA amendment.

Conclusion

Fish dealers are still wrestling with the immediate impacts of the 2018 amendment to the BCA. The full consequences will not be known until a more comprehensive study is made of the impacts of the BCA on local Hawai‘i fish dealers and fishermen.

However, one local fisher expressed the view that total losses could be as high as $20 million. The losses are particularly felt in the sales of blue marlin, striped marlin and spearfish. The losses have been severe because no alternative market has been developed for the billfish in the local economy. This situation has resulted in a drop in both sales and employment.

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