“Fishing on Porpoise:”
The Origins, Struggles, and Successes of the Tuna-Porpoise Controversy

by

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Abstract

Since the 1950s, more than 6 million dolphins have died as by-catch in the American yellowfin tuna fishery. These deaths were not caused by accidental incidents between fishermen and dolphins but resulted from a method of fishing that purposefully targeted these animals in order to catch yellowfin tuna. Referred to as "fishing on porpoise," this technique remained an industry secret for decades. By the early 1970s, however, dolphin by-catch had become a major environmental issue in the United States, thanks to the work of William F. Perrin. In the following years, politicians, scientists, environmentalists, and members of the tuna industry struggled with how best to resolve the problem. While the debates that arose from the "tuna-porpoise controversy" helped to dramatically reduce dolphin by-catch, these solutions did not come easily. This thesis looks to bring this forgotten moment in American environmental history to the historical forefront by exploring the origins and early years of the tuna-porpoise controversy. By examining this period, this thesis will show why fishermen first used dolphins to catch tuna in the 1950s, how and why dolphin by-catch became such a major environmental issue in the 1970s, and what various groups and individuals did to ameliorate the problem during the period.

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Introduction

In October 1969, a young scientist named William F. Perrin shocked the American public when he announced that American tuna fishermen were responsible for killing hundreds of thousands of dolphins in the Pacific Ocean each year. Perrin estimated that "244,000 or about a quarter of a million" dolphins died during the 1968 fishing season.[1] Perhaps more worryingly, he revealed that these mass mortalities were not caused by accidental incidents between fishermen and dolphins but were in fact the result of a common fishing method used to catch large yellowfin tuna in the Eastern Tropical Pacific Ocean (ETPO). Taking advantage of a unique association between dolphins and tuna in the region, fishermen had developed a technique called "fishing on porpoise," in which they relied on dolphins to locate and catch tuna. Once spotted, fishermen used large purse seine nets to encircle and catch the tuna found among the dolphins. The dolphins caught in these nets often died during the capture process. By the time Perrin presented his findings in 1969, fishing on porpoise had been used for more than a decade and was the dominant method used to catch yellowfin tuna in the ETPO.

Perrin's findings brought one of the least known, yet most ecologically damaging, fishing practices to the public and scientific forefront. His preliminary research on dolphin by-catch hinted at mortality rates that greatly exceeded those caused by industrial whaling. In the years that followed, dolphin protection became a major topic of debate and discussion for politicians, environmentalists, animal-rights activists, scientists, and the American tuna industry. These debates contributed to the passage of the Marine

[1] William F. Perrin. "The Problem of Porpoise Mortality in the U.S. Tropical Tuna Fishery," (paper presented at the sixth annual Biological Sonar and Diving Mammals Conference, Stanford University, California, October 17-18, 1969, 45).

Mammal Protection Act (MMPA) in 1972, the most sweeping marine mammal conservation legislation in American history.

While the so-called "tuna-porpoise controversy"[2] remained a major environmental issue throughout the remainder of the 1970s, few Americans were aware of the economic pressures that had led fishermen to fish on porpoise in the first place. Indeed, prior to the late 1950s, very few tuna fishermen relied on the technique, as it often proved to be too difficult and inefficient. It was only in response to certain external pressures that fishermen developed new technologies that allowed them to take advantage of the association between dolphins and large, mature yellowfin tuna. These adaptations allowed them to remain economically competitive with foreign importers and led to a revolution in the way Americans fished for tuna. For those individuals concerned with dolphin protection, however, the factors that contributed to these mortalities meant little. What mattered was that, by the 1970s, American tuna fishermen were responsible for the deaths of millions of dolphins – almost certainly the largest by-catch of a marine mammal in history.

This thesis examines the origins and early years of the American tuna-porpoise controversy – a period that stretches from the beginning of the twentieth century to 1980. Despite the attention the issue received in American society during the 1970s, historians have written virtually nothing on the topic. The vast majority of scholarship has come from fields such as economics, international relations, and environmental studies.[3] Most

[2] Scholars and later observers have referred to the debates and arguments surrounding dolphin by-catch and dolphin protection as the 'tuna-porpoise controversy.' For the purposes of this paper, the 'tuna-porpoise controversy' refers primarily to the periods of debate and collaboration that occurred in the United States during the 1970s. Through this definition, the tuna-porpoise controversy is solely an American issue. The controversy continued after the 1970s but, by this point, it had evolved into an international problem.
[3] James Brown. "An Account of the Dolphin-Safe Tuna Issue in the UK." *Marine Policy.* 25 (2005): 39-46; Martin A. Hall. "An Ecological View of the Tuna-Dolphin Problem: Impacts and Trade-offs." *Reviews in*

of this literature begins in the 1970s, specifically in the years following the passage of the MMPA in 1972. Few scholars have explored why dolphin by-catch first began and those that do mention it only in passing. Generally, they focus on the period between the late 1970s and mid-1990s, when the tuna-porpoise controversy shifted from a largely American issue to an international problem.

Among these few historical works is Andrew F. Smith's *American Tuna: The Rise and Fall of an Improbable Food.* Smith's work provides an in-depth analysis of the growth of tuna in the American diet, from a little known fish in the early-twentieth century to a staple food product by the end of the century.[4] Smith's chapter on the tuna-porpoise controversy offers the best short analysis of the topic to date. While much of his focus is still largely on the post-MMPA era, he does discuss the factors that led fishermen to fish on porpoise in the first place. His work is a good starting point for scholars interested in the topic; however, the fact that it is embedded in a much larger book that focuses specifically on tuna in the American diet limits his analysis on the topic.

The only book to focus exclusively on the tuna-porpoise controversy comes from former American Tunaboat Association general manager August Felando and retired tuna boat captain Harold Medina. *The Tuna/Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive* provides the most in-depth

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Fish Biology and Fisheries. 8 (1998): 1-34; John Haraden, et al. "Economic Benefits of Dolphins in the United States Eastern Tropical Pacific Purse-Seine Tuna Industry." *Environmental & Resource Economics.* 28 (2004): 451-468; Chris Hedley. "The 1998 Agreement on the International Dolphin Conservation Program: Recent Developments in the Tuna-Dolphin Controversy," *Ocean Development & International Law* 32 (2001): 71-92; Achim Korber. "Why Everybody Loves Flipper: the Political-Economy of the U.S. dolphin-safe laws." *European Journal of Political Economy.* 14 (1998): 475-509; Denis A. O'Connell, "Tuna, Dolphins, and Purse Seine Fishing in the Eastern Tropical Pacific: the Controversy Continues." *UCLA Journal of Environmental Law* 23 no. 1 (2005): 77-100; Mario F. Teisl et al. "Can Eco-Labels Tune a Market? Evidence from Dolphin-Safe Labeling." *Journal of Environmental Economics and Management.* 43 (2002) 339-359; Brian G. Wright. "Environmental NGOs and the Dolphin-Tuna Case," *Environmental Politics* 9, no. 4 (2000): 82-103.

[4] Andrew F. Smith, *American Tuna: The Rise and Fall of an Improbable Food* (Berkeley: University of California Press, 2012).

analysis on this topic to date.[5] Written by two men intimately involved in tuna fishing and the ensuing controversy in the 1970s, it explores the topic from the authors' unique point of view. Felando and Medina devote a considerable amount of their work on the decades prior to the passage of the MMPA, discussing when fishermen first learned of the association between tuna and dolphins and how and why they began to exploit that relationship during the 1950s and 1960s.

Yet, Felando and Medina's account offers an interpretation of the controversy from the perspective of tuna fishermen and industry supporters. For these men, the tuna-porpoise controversy was a period of intense conflict in which some scientists, environmentalists, and government agencies attempted to destroy the industry's economic prosperity through increased government regulation. As Felando acknowledges, "this book presents our views on a controversy related to the destruction of an industry that was born in southern California during the early 1900s…Discussed is the complex web of government actions… that entangled the industry and eventually drove it to near extinction."[6]

Although their story offers unique insight into this historical period, it does have its limitations. This thesis aims for a more balanced interpretation. The tuna industry remains a key player in this story, but this thesis brings environmentalists, scientists, and politicians to the forefront and situates them as major actors alongside the industry. At the same time, this paper looks to address a gap in the historiography by focusing explicitly on the origins and early years of the tuna-porpoise controversy – a period that has largely been ignored by historians. By examining this period, this thesis will show

[5] August Felando and Harold Medina, *The Tuna/Dolphin Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive* (San Diego: Western Sky Press, 2011).
[6] Ibid, vii.

why fishermen first began to fish on porpoise in the 1950s, how and why dolphin by-catch became such a major environmental issue in the 1970s, and what various groups and individuals did to ameliorate the problem during the period.

Furthermore, this thesis also aims to contribute to the growing body of scholarship on marine environmental history, which has flourished over the past two decades. This is partly in response to the growing number of dangers facing the world's marine environments. Climate change, over-fishing, pollution, coral reef bleaching, and the rapid increase in "dead zones" all threaten the state of the world's oceans. As historian W. Jeffrey Bolster observes, "the recent crisis in the ocean has been regarded rightfully as an ecological and political problem, but rarely understood in light of history – as if nature and science were somehow realms separate from the study of the past."[7] Perhaps more than any other sub-discipline in history, marine environmental historians have been driven to place these present day threats in a deeper, more historically rooted context. "If there was ever a dilemma crying out for historians' sensibilities," notes Bolster, "this is it."[8]

Concern for the current state of the world's oceans is not the only contributing factor to this scholarly turn. The acknowledgement among environmental historians that the marine environment and the nonhuman beings that live within it are not timeless or static has driven this focus on marine environmental history. This realization has helped bring the ocean and its inhabitants into the historical realm. While this has opened the door for new and exciting scholarship, Bolster argues that marine environmental historians must "keep people and human cultures squarely in their sights, and… capitalize

[7] W. Jeffrey Bolster. "Opportunities in Marine Environmental History." *Environmental History* 11 no. 3 (2006): 567.
[8] Ibid, 571.

on their storytelling abilities" in order to create compelling narratives that explore questions that differ from those of historical marine ecologists. [9] For Michael Chiarappa and Matthew McKenzie, this means "[situating] people and all their social and cultural baggage squarely within the wider nonhuman environment."[10] By historicizing the world's oceans, and placing human actions squarely within this framework, historians can better understand how the ocean and its nonhuman inhabitants have shaped human history and how human actions, in turn, have shaped the marine environment.

While the scholarship in marine environmental history has grown significantly during the twenty first century, gaps in the historiography remain. To start, marine environmental historians have largely focused on the Atlantic Ocean, to the neglect of the Pacific.[11] Even in texts that explore the relationship between humans and marine environments through a global context, the Atlantic generally dominates.[12] In recent years however, scholars have begun to direct greater attention to the relationship between humans and nature along North America's Pacific coast.[13] Work by scholars such as

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[9] Ibid, 579.
[10] Michael Chiarappa and Matthew McKenzie. "New Directions in Marine Environmental History: An Introduction." *Environmental History* 18 no. 1 (2013):
[11] Some works on the Atlantic include: Dean Bavington, *Managed Annihilation: An Unnatural History of the Newfoundland Cod Collapse* (Vancouver: UBC Press, 2010); W. Jeffrey Bolster, *The Mortal Sea: Fishing the Atlantic in the Age of Sail* (Cambridge, Mass.: Belknap Press of Harvard University, 2012); James E. Candow and Carol Corbin, *How Deep is the Ocean?: Historical Essays on Canada's Atlantic Fishery* (Sydney: University College of Cape Breton Press, 1997); Jennifer Mary Hubbard, *A Science on the Scales: The Rise of Canadian Atlantic Fisheries Biology, 1898-1939* (Toronto: University of Toronto Press, 2006); Christopher Paul Magra, *The Fisherman's Cause: Atlantic Commerce and Maritime Dimensions of the American Revolution* (Cambridge: Cambridge University Press, 2009); Bill Parenteau, "A 'Very Determined Opposition to the Law': Conservation, Angling Leases, and Social Conflict in the Canadian Atlantic Salmon Fishery, 1867-1914," *Environmental History* 93 (July 2004): 436-63.
[12] Some of these works include: Joseph Gough, *Managing Canada's Fisheries: From Early Days to the Year 2000* (Sillery, Que: Editions de Septentrion, 2007); Callum Roberts, *The Unnatural History of the Sea* (Washington, D.C.: Island Press/Shearwater Press, 2007). Briton Cooper Busch presents a more balanced approach in his book, *The War Against the Seals: A History of the North American Seal Fishery* (McGill-Queens University Press, 1985).
[13] Some of these works include: David F. Arnold, *The Fishermen's Frontier: People and Salmon in Southeast Alaska* (Seattle: University of Washington Press, 2008); Kevin McLean Bailey, *Billion-Dollar Fish: The Untold Story of Alaska Pollock* (Chicago: University of Chicago Press, 2013); Connie Y. Chiang.

Arthur F. McEvoy, Carmel Finlay, and James E. Taylor III in particular reveal the intimate and complicated relationships humans have had with nonhumans in the Pacific Ocean.[14] This thesis adds to this growing literature on Pacific marine environmental history.

This thesis also contributes to the history of by-catch. Although scholars such as McEvoy, Finlay, and Taylor have produced groundbreaking research on fisheries histories, few have written on the by-catch associated with the world's fisheries. Among the exceptions is Glenn M. Grasso, who explores how, during the nineteenth century, halibut transformed from a nuisance fish and worthless by-catch product in the Atlantic cod fishery into a valuable commodity.[15] In doing so, he highlights just how little is written on the history of by-catch. While much has been written on fisheries collapses and the dangers of over-fishing, few historians have explored the ecological impact of by-catch.

Finally, this thesis looks to address a gap in the scholarship regarding the historical relationships between humans and cetaceans in the twentieth century. Like marine environmental history as a whole, the literature on human-cetacean interactions has grown substantially in the past two decades. The vast majority of this research has

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"Monterey-by-the-Smell: Odors and Social Conflict on the California Coastline." *Pacific Historical Review* 73 (2004): 183-214; Douglas C. Harris, *Fish, Law, and Colonialism: The Legal Capture of Salmon in British Columbia* (Toronto: University of Toronto Press, 2001); Dianne Newell, *Tangled Webs of History: Indians and the Law in Canada's Pacific Coast Fisheries* (Toronto: University of Toronto Press, 1993); M.P. Shepard and A.W. Argue, *The 1985 Pacific Salmon Treaty: Sharing Conservation Burdens and Benefits* (Vancouver: UBC Press, 2005); Ryan Tucker Jones, *Empire of Extinction: Russians and the North Pacific's Strange Beasts of the Sea, 1741-1867* (New York: Oxford University Press, 2014).

[14] Arthur F McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980* (Cambridge: Cambridge University Press, 1986); Carmel Finlay, *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management* (Chicago: The University of Chicago Press, 2011); Joseph E. Taylor III, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington Press, 1999). It is worth acknowledging that McEvoy does mention the tuna-porpoise controversy in his work, but it is mentioned briefly (pages 238-239).

[15] Glenn M. Grasso. "What Appeared Limitless Plenty: The Rise and Fall of the Nineteenth-Century Atlantic Halibut Fishery." *Environmental History* 13 no. 1 (2008): 66-91.

focused on the world's largest whales and the complicated relationship that Europeans and Euro-Americans have had with these animals through commercial whaling and later conservation efforts.[16] Much of this scholarship shows how public attitudes toward large cetaceans changed dramatically in the late twentieth century – from commodities to cultural icons and environmental symbols.

This focus on the world's largest cetaceans has unfortunately led to the exclusion of other, smaller species. It is only recently that historians have begun to expand their scope of analysis to include these smaller cetaceans. For example, scholars have shown how the relationship between orcas and humans in the Pacific Northwest has changed as a result of captures and display. [17]

But, while the literature on human-orca relations is growing, historians have directed little attention to specific human-dolphin interactions during the twentieth century. Often, studies exploring this relationship have been lumped together with analyses of other cetaceans. These texts examine how human attitudes toward cetaceans as a whole transformed during this period. Much of what has been written on specific human-dolphin relationships during the twentieth century has come from individuals who

[16] Some of this research includes: D. Graham Burnett, *The Sounding of the Whale: Science and Cetaceans in the Twentieth Century* (Chicago: University of Chicago Press, 2012); Anthony Bertram Dickinson and Chelsey W. Sanger, *Twentieth-Century Shore-Station Whaling in Newfoundland and Labrador* (Kingston: McGill-Queen's University Press, 2005); Kurkpatrick Dorsey, *Whales & Nations: Environmental Diplomacy on the High Seas* (Seattle: University of Washington Press, 2013); Frank Zelko, "From Blubber and Baleen to Buddha of the Deep: The Rise of the Metaphysical Whale." *Society & Animals.* 20 no.1 (2012): 91-108.

[17] Jason Colby. "The Whale and the Region: Orca Capture and Environmentalism in the New Pacific Northwest." *Journal of the Canadian Historical Association.* 24, no. 2, (2013): 425-454; Sandra Pollard, *Puget Sound Whales For Sale: The Fight to End Orca Hunting* (Charleston: The History Press, 2014); Mark Leiren-Young, *The Killer Whale Who Changed the World* (Vancouver: Greystone Books Ltd., 2016); Frank Zelko, *Make it a Greenpeace!: The Rise of Countercultural Environmentalism* (Oxford: Oxford University Press, 2013).

were intimately involved with dolphins through popular culture, scientific research, or conservation initiatives during the latter half of the century.[18]

This thesis seeks to add to this historiography by exploring the dynamic and complicated relationship between dolphins and various human groups in the United States during the mid-twentieth century. Indeed, the tuna-porpoise controversy highlights the multiple ways different human groups have viewed and interacted with dolphins during this period. It reveals how different economic, social, and cultural contexts affected how individuals perceived of these animals and their relationships to dolphins.

This thesis examines the topic in three parts. Chapter one explores the origins of the tuna-porpoise controversy. During the first half of the twentieth century, people's perceptions of tuna changed, as it evolved from a relatively unknown fish into a staple food source in the American diet. As the demand for tuna grew so too did the southern-California based American tuna industry. Originally a coastal fishery, by the 1930s fishermen were traveling to the waters off Central and South America for tuna. It is here in the ETPO that fishermen encountered schools of yellowfin tuna. While yellowfin initially brought the industry new wealth, restricted access to fishing grounds and economic challenges in the United States crippled the industry during the early 1950s. The development of the Puretic power-block and adoption of nylon netting helped the industry overcome these obstacles in the late 1950s. These gear developments also transformed the way humans fished for yellowfin and allowed American tuna fishermen

[18] Some of this work includes: Denise L. Herzing, *Dolphin Diaries: My Twenty-Five Years with Spotted Dolphins in the Bahamas* (New York: St. Martin's Press, 2012); Richard O'Barry and Keith Coulbourn, *Behind the Dolphin Smile: A True Story That Will Touch the Hearts of Animal Lovers* (N.a.: Renaissance Books, 2000); Richard O'Barry and Keith Coulborn, *To Free a Dolphin* (New York: St. Martin's Press, 2000); Karen Pryor, *Lads Before the Wind: The Adventures in Porpoise Training* (New York: Harper & Row, 1975); Diana Reiss, *The Dolphin in the Mirror: Exploring Dolphin Minds and Saving Dolphin Lives* (Mariner Books: Boston, 2011).

to take advantage of the well-known tuna-dolphin relationship to catch large yellowfin tuna. By the 1960s, fishing on porpoise had become the dominant method of catching yellowfin tuna in the ETPO. While the technique directly contributed to the deaths of millions of dolphins, fishing on porpoise helped to revive an industry that had faced serious economic challenges less than a decade earlier.

Chapter two turns to the late 1960s and early 1970s, when scientists and members of the American public first became aware of mass dolphin by-catch. While scientists at the U.S. Bureau of Commercial Fisheries (BCF) had known of the problem for most of the 1960s, no action was taken. The BCF, and Americans as a whole, only took interest in the problem after Perrin's presentation at Stanford University in October 1969. His findings forced the BCF to act and brought the issue to the American forefront. This publicity helped make dolphin by-catch a major issue during the debates on the Marine Mammal Protection Act (MMPA) in 1971 and 1972. Indeed, by the early 1970s, many Americans were increasingly concerned for the future of the world's marine mammals, particularly cetaceans, which had come to hold greater cultural value in American society. This growing environmental awareness, coupled with cetaceans' new cultural prominence, helped make dolphin by-catch a major environmental issue in the United States during the early 1970s.

Chapter three explores the remaining years of the 1970s and investigates the various challenges that the parties involved in the tuna-porpoise controversy faced as they attempted to reduce dolphin by-catch in the post-MMPA era. This period is filled with conflict and debate, caused primarily by the failure of the National Marine Fisheries Service (NMFS) to properly regulate dolphin by-catch in the ETPO. Indeed, between

1972-1976, the NMFS failed to establish dolphin population estimates and set quota levels to regulate dolphin by-catch. This failure to regulate the industry, coupled with an increase in dolphin by-catch totals during the 1975 fishing season, led many environmental and animal-rights groups to initiate legal action against the NMFS and the tuna industry. By mid-1977, these legal challenges had been settled in a way that appeased both industry supporters and environmentalists. At the same time, new gear developments helped to drastically reduce dolphin by-catch – by 1980, total mortalities in the yellowfin tuna fishery had dropped by 300,000 animals. While the period was full of confusion and conflict, the debates surrounding the tuna-porpoise controversy in the 1970s led to dramatic reductions in dolphin mortality by the end of the decade. A story filled with complicated beginnings and shocking death tolls, the tuna-porpoise controversy reveals what can be accomplished through disagreements, collaboration, and human ingenuity and serves as a rare success story for those concerned with current by-catch problems and the fate of the world's oceans.

Chapter One

To understand the origins of the tuna-porpoise controversy in the United States, one first needs to understand how the southern California tuna industry emerged in the twentieth century.[19] Indeed, although the tuna-porpoise controversy has conventionally been told as a story of humans and dolphins, it began years earlier as a story of humans and tuna. Eaten by very few Americans prior to the first decades of the twentieth century, tuna quickly became a staple food in the American diet by the 1950s. As this U.S. market for tuna expanded, so too did American fishing grounds throughout the Pacific Ocean. Originally focused in coastal waters, by the 1950s American tuna boats fished in waters as far south as Chile and hundreds of miles west into the vast Pacific. Equipped with some of the most advanced fishing vessels in the world, American tuna fishermen of the early to mid-twentieth century dominated the tuna fishing grounds in the Eastern Tropical Pacific Ocean (ETPO).

By the mid 1950s, however, the southern California tuna industry faced serious and potentially catastrophic challenges. The importation of cheap tuna from Japan and the expansion of territorial sea claims by Central and South American nations threatened the operations of the American tuna fleet. Fishermen struggled to make a living, and as a result, many were forced from the industry. Between December 1951 and October 1954, the southern California-based tuna fleet shrank from 210 vessels to 168.[20]

[19] While this historical event has traditionally been referred to as the tuna-porpoise controversy, the types of cetaceans involved are now identified as dolphins**.** Fishermen used the term "porpoise" to describe both dolphins and porpoises to avoid confusion with the "dolphin fish", also known as a mahi-mahi. I have decided to keep the title "tuna-porpoise controversy" as this is how the episode is best known but I will refer to the marine mammals involved throughout this text as dolphins.

[20] H.L. Cary, "Tariff Points By Tunamen." *Pacific Fisherman* February 1955, 9.

In spite of this negative outlook, the difficulties of the postwar period contributed to the development of new fishing technologies that revolutionized and revitalized the American tuna industry. The invention of the Puretic power-block and the adoption of nylon netting in the mid-1950s boosted the industry's efficiency. Within just a few years, the entire southern California tuna industry had shifted from using live-bait to large purse seine nets. Commentators at the time hailed this transformation as the "Purse Seine Revolution."

Although these new technologies revitalized the tuna industry, the use of purse seine nets changed the way Americans fished for tuna and altered their relationship with many aquatic species in the ETPO. This was most evident in the case of dolphins. Known to associate with schools of yellowfin tuna, fishermen had utilized dolphins to locate tuna since at least the 1930s. During this time, dolphins were generally unaffected by live-bait fishing techniques and were passive actors in the yellowfin tuna fishery. The developments of the purse seine revolution radically altered this relationship, however, as dolphins were encircled and subsequently netted by fishermen to catch the profitable tuna that swam among them. Indeed, the mass number of dolphin deaths publicized in the late 1960s was a direct result of the purse seine revolution and the devastating new relationship it created between humans, dolphins, and tuna.

Prior to the twentieth century, few Americans ate tuna in any form. The main consumers at the time included upper-class Americans, who had travelled to the Mediterranean and acquired a taste for the fish, and immigrants to southern California from places such as Portugal, the Azores, Italy, and Japan, where tuna was a more

popular and traditional food choice. For the broader American public, however, tuna held little appeal. As George Brown Goode, the U.S. Commissioner of Fish and Fisheries, reported in 1887, tuna was occasionally "used for food for chickens, but seldom, if ever, for human consumption."[21]

By the first decade of the twentieth century, tuna had become much better known throughout American society. As Andrew F. Smith notes, sports fishermen played a major role in elevating tuna from its place of relative anonymity.[22] Stories of anglers fighting with large tuna off the coasts of California made news across the country. On top of these reports, famous American writers, such as Charles Holder and Zane Grey published their stories fishing for tuna in the Pacific. As Smith argues, these turn-of-the-century sports fishermen introduced tuna to the American public and laid the groundwork for a shift in the public's perception of tuna "from repulsive bottom-feeder to tasty, inexpensive food."[23]

Around the same time, enterprising canning companies were busy introducing the public to tuna as a nutritious food source. Tuna was first packed in southern California in 1903 by the California Fish Company (CFC) following the disappearance of sardines from the coast that same year. By canning tuna, the CFC was able to stave off closure until sardines returned in larger numbers the following years.[24]

The CFC packed 700 cases of tuna that year and although sales were not initially strong, the CFC had shown that there was at least some market potential for tuna. Even when sardines returned to the coast, the company continued to can tuna. Soon, new firms

[21] George Brown Goode, as quoted in Andrew F. Smith, *American Tuna: The Rise and Fall of an Improbable Food*, 5.
[22] Ibid, 8.
[23] Ibid, 23.
[24] Ibid, 30.

such as the Pacific Tuna Canning Company, White Star Canning Company, and Avalon Brand Tuna joined the southern California tuna packing industry. By 1913, nine companies in the region put up 128,000 cases of tuna – a growth in production of more than 18,000 percent within a ten-year period.[25]

The outset of the First World War further increased sales and consumption of canned tuna. Troops fighting on the front lines in Europe relied on tuna as a cheap source of protein. In America, tuna also provided a good high-protein alternative for rationed foods. In the first year of the war, southern California canning production increased to 325,000 cases. Three years later, in 1917, thirty-six canneries in Southern California produced 700,000 cases of tuna. Within the span of three years, production of tuna had doubled, setting new records along the way. It was during these few years in particular that tuna became a mainstay in the American diet.[26]

Tuna continued to climb in popularity during the 1920s. Sales of canned tuna experienced a slight decline following the 1929 stock market collapse but quickly rebounded, as it proved to be a cheap protein source that could be eaten directly out of the can. When World War II broke out and food was once again rationed, tuna figured prominently in the American diet, surpassing sales of salmon for the first time ever. By the 1950s, tuna, a little known and little consumed fish half a century earlier, was a staple in the American diet.[27]

As the market for tuna grew, so too did the American tuna fleet. Much like early consumers, the first non-Indigenous groups to catch tuna in southern California were predominantly Japanese, Portuguese, Azorean, and Italian immigrants for consumption

[25] Ibid, 35.
[26] Ibid, 75.
[27] Ibid.

within their own communities. When canneries began packing tuna in 1903, these immigrant fishermen, based in port cities like San Pedro and San Diego, became the main suppliers for the industry.

For the first two decades of the twentieth century, albacore tuna was king. During the late nineteenth and early twentieth centuries, albacore was abundant along the California coast and was especially plentiful in sites such as Monterey Bay and San Diego, where they had seldom been seen before. Arthur F. McEvoy attributes this abundance to cooler temperatures in southern California during the period, as albacore prefer "cool water and congregate near upwelling currents where the schooling fishes on which it feeds are abundant."[28]

Of equal importance, this newfound resource concentrated itself within a few miles of the coast, making them easily accessible for fishermen. During the early years of the albacore fishery, southern California fishermen worked along a narrow 300-mile stretch of coastline that extended from Point Conception to the Mexican border. While catches were initially small they grew rapidly and in 1917, tuna fishermen in the region landed a record 34 million pounds of albacore tuna.[29]

The following year, total tuna landings in southern California plummeted to 10 million pounds. While overfishing of the local stock may have been a major contributing factor, McEvoy argues that environmental changes (such as warmer summer temperatures) likely played a key role as well.[30] Regardless of the cause, following 1917

[28] Arthur F McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980,* 130.
[29] Geraldine Conner, "The Five Tunas and Mexico." In *The Commercial Fish Catch of California for the Year 1928.* Fish Bulletin No. 20. (California, Division of Fish and Game of California, 1930), 75.
[30] Arthur F McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980,* 136.

albacore catches in the region became sporadic and unreliable. By 1926, landings in southern California had collapsed to 3 million pounds; two years later the catch plummeted to 315,000 pounds.[31]

The decline of the albacore fishery forced tuna fishermen to expand both their fishing grounds and the species of tuna they targeted. In 1919, southern California purse seine fishermen landed 15 million pounds of bluefin tuna off the California coast. While bluefin had been caught in low totals in the past, it had previously been listed as an "unclassified" species. Despite this initial success, bluefin tuna catches proved just as erratic and unreliable as albacore. In 1933, for example, bluefin catches dipped below a million pounds before rising to a record total of 25 million pounds two years later.[32]

Continuing their search for new sources of tuna, some fishermen began exploring the waters off the coasts of Central and South America, where they found large stocks of skipjack and yellowfin. Neither species had been caught (or at least had not been recorded) prior to the collapse of the albacore fishery. In a bulletin for the Division of Fish and Game of California in 1930, Geraldine Conner argued that the decline of the albacore catch and the sporadic nature of bluefin tuna stocks in local waters prompted fishermen to expand their efforts toward skipjack and yellowfin.[33]

In 1918, fishermen landed over 3 million pounds of skipjack. A year later, fishermen landed yellowfin for the first time ever, with a total of close to 350,000 pounds offloaded at southern California canneries. Catches increased rapidly in subsequent years

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[31] Geraldine Conner, "The Five Tunas and Mexico," 79.
[32] Bureau of Commercial Fisheries, *The Commercial Fish Catch of California for the Year 1935.* Fish Bulletin No. 49 (Sacramento: Division of Fish and Game, 1937), 29.
[33] Geraldine Conner, "Comparison of the Catches North and South of the International Boundary, Including Fish Taken in the Territorial Waters of the United States and Mexico and on the High Seas." In *The Commercial Fish Catch of California for the Years 1926 and 1927.* Fish Bulletin No. 15 (California: Division of Fish and Game of California, 1929), 53-54.

as fishermen directed more attention toward both species. By 1922, landings of skipjack approached 12 million pounds and those of yellowfin neared seven and a half million pounds. By the end of the decade, skipjack landings reached more than twenty million pounds while yellowfin numbered well over 56 million pounds - a new record for the fishery.[34]

As the above data indicate, during the 1920s fishermen began gearing their efforts more toward yellowfin. The species' large size and prominence throughout the ETPO most likely contributed to this shifting focus. Indeed, yellowfin migrate throughout the region and are often found within the upper 100 metres of the ocean's water column. In addition, yellowfin grow rapidly and are generally much larger than skipjack, with the former measuring between 60-150 centimetres long and weighing up to a maximum of 175 kilograms once mature.[35] For an industry searching for a new and reliable source of tuna, the discovery of yellowfin in the ETPO was an encouraging sign.[36]

This new emphasis on yellowfin spurred fishermen to move further south along the Mexican coastline, to areas where the species was more abundant. In order to reach these new waters, boat owners and canning companies invested thousands in new tuna vessels. In 1923, investments from the Halfhill Tuna Packing Company and the Curtis Corporation led to the construction of the *Oceania Vance* and the *Monfalcone,* two vessels that the companies hoped could supply their canneries with tuna throughout the year. In 1924, Manuel O. Medina and Joe V. Soares spent $15,000 to build the 58-foot

[34] Bureau of Marine Fisheries, *The Commercial Fish Catch of California for the year 1947 with an Historical Review 1916-1947.* Fish Bulletin No. 74 (California: State of California Department of Natural Resources, Division of Fish and Game, 1949), 13.
[35] According to the FAO, skipjack are normally between 40-80 centimetres in length and have a maximum weight of 33 kilograms.
[36] Atilio L. Coan Jr., *California's Living Marine Resources and their Utilization: Eastern Pacific Yellowfin Tuna.* (NOAA: La Jolla, CA), 2000; "Biological Characteristics of Tuna" *Food and Agriculture Organization of the United Nations,* http://www.fao.org/fishery/topic/16082/en

Oceana. Its initial success influenced the building of another 16 vessels "specifically designed for operation off the Mexican coast" over the next three years.[37]

Advances in refrigeration played a pivotal role in this expansion. Prior to the 1920s, fishermen relied on ice to keep fish frozen. As they pushed farther south, ice proved to be inadequate at preserving fish in hotter climates. In place of ice, tuna fishermen shifted to refrigeration coils and wells filled with brine to store fish for prolonged periods. As Oscar Edward Anderson Jr. observes, by the 1920s and 1930s, the southern California tuna industry had some of the most advanced shipboard refrigeration technology in the world.[38] These modern systems allowed fishermen to transport frozen tuna from the ETPO to southern California canneries without spoiling and helped drive the industry's expansion southward.

By 1925, areas of the Mexican coastline such as Turtle Bay, Magdalena Bay, and Cape San Lucas had become the centres of American tuna fishing operations. By 1927, 77 percent of all tuna delivered to American canners was caught from these areas and other regions of the Mexican coast.[39] While these areas were highly productive, fishermen continued to push farther south in the following years. In early 1929, the tuna vessel *Hermosa* became the first to fish for tuna at Isla Cocos, off the coast of Costa Rica. It delivered 28 tons of yellowfin and skipjack to San Pedro, California.[40] Later that same

[37] August Felando and Harold Medina, "The Origins of California's High-Seas Tuna Fleet." *The Journal of San Diego History*. 58 nos. 1-2 (2012): 15-18.
[38] Oscar Edward Anderson Jr., *Refrigeration in America: A History of a New Technology and its Impact* (Port Washington: Kennikat Press, 1972), 270.
[39] Geraldine Conner, "Comparison of the Catches North and South of the International Boundary, Including Fish Taken in the Territorial Waters of the United States and Mexico and on the High Seas;" United States Tariff Commission, Report to the United States Senate on Tuna Fish, S. Rep. No. 109, at 25 (1936).
[40] Geraldine Conner, "The Five Tunas and Mexico," 76.

year, American fishermen also began fishing at the Galapagos Islands– roughly 2,500 miles from California canneries and about 500 miles from the Ecuadorean coast.[41]

These new fishing grounds off the coast of Central and South America rapidly became the most productive tuna regions for American fishermen. As a 1936 report to the U.S. Tariff Commission noted, in 1931, 30 percent of all tuna catches came from the waters off the coast of Costa Rica, Panama, and Ecuador. By 1933, that number had climbed to 50 percent.[42] At this point, the areas fished by the southern California tuna fleet had increased, from a 300-mile stretch of the United States coast in 1916, to a 3000-mile Pacific coast area, which extended within a short distance of the Equator and out for hundreds of miles into the high seas.[43] By the 1930s, the once coastal tuna fleet had transformed into a long distance, high-seas industry.

Yellowfin landings continued to climb throughout the 1930s as more and more fishermen travelled to the new fishing grounds off the coasts of Central and South America. Between 1928-1931, 42 new tuna vessels entered the industry.[44] In 1935, American fishermen landed more than 72 million pounds of tuna from these waters; this total climbed to 110 million pounds in 1939 – by far the highest catch yet. Within the span of twenty years, yellowfin landings had grown by more than 3000 percent, becoming the most important fish for American tuna fishermen. Government officials

[41] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 14.
[42] United States Tariff Commission, Report to the United States Senate on Tuna Fish, S. Rep. No. 109, at 26 (1936).
[43] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 14.
[44] August Felando and Harold Medina, "The Origins of California's High-Seas Tuna Fleet," 20.

believed that, at least for the foreseeable future, "the backbone of the business will doubtless continue to be the catch of yellowfin… in the more southern waters."[45]

It is during this expansion southward into the ETPO that fishermen first encountered mixed schools of dolphins and yellowfin tuna. Felando and Medina argue that this relationship was most likely discovered in the 1920s, when fishermen began travelling south of Cabo San Lucas.[46] By the 1930s, this tuna-porpoise association was well known by many fishermen in the industry. After returning from a fishing trip to Isla Cocos in March 1930, Captain Manuel K. Freitas reported to the *Pacific Fisherman* that, "in the transparent deep ocean blue, into which the eye could pierce many feet, he saw tier after tier of porpoises, moving restlessly. When the gliding bodies parted he saw the tuna; great fish magnified in the water, but which he judged averaged over 100 pounds."[47] *Los Angeles Times* reporter Edsel Newton also commented on this relationship following his trip aboard a tuna boat in 1933. He noted that, "perhaps one of the most interesting things about fishing for tuna is that they are often caught just ahead of a school of porpoise."[48] Indeed, it seems that by the 1930s, fishermen were well aware of this bond and were fishing for tuna associated with dolphins.

This relationship between yellowfin tuna and dolphins, although found in other areas of the world, is particularly strong in the ETPO.[49] Here, yellowfin tuna associate primarily with three species of dolphin: spotted (*Stenella atenuatta*), spinner (*Stenella*

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[45] United States Tariff Commission, Report to the United States Senate on Tuna Fish, S. Rep. No. 109, at 4 (1936).
[46] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 57.
[47] Arts Ponsford, "Treasure Island Yields Rich Cargo to the Exploring 'Navigator'." *Pacific Fisherman* April 1930, 38.
[48] Edsel Newton "Down to Sea in a Tuna Boat." *The Los Angeles Times* September 10, 1933.
[49] Lisa T. Balance, Robert L. Pitman, and Paul C. Fiedler, "Oceanographic Influences on Seabirds and Cetaceans of the Eastern Tropical Pacific: A Review." *Progress in Oceanography.* 69 nos. 2-4 (2006): 362.

longisrostris), and, to a lesser extent, common (*Delphinus delphis*) dolphins. In the ETPO, both spotted and spinner dolphins can grow to more than two metres in length. In contrast, common dolphins are generally larger, reaching closer to three metres and weighing almost one hundred kilograms more. All three species can be found throughout the region, although common dolphins are only found close to the coast at the northern and southern end of this area. In the ETPO, it is not uncommon to find all three species in schools numbering in the hundreds or even the thousands of animals.[50]

While scientists are still not entirely certain as to why these dolphins swim and hunt with tuna, most believe it is due to enhanced abilities to detect predators or prey. Other scientists have hypothesized that the region's shallow thermocline is a key feature that may constrain yellowfin tuna to areas near the surface of the water, thereby allowing for the association with dolphins.[51] Generally, the yellowfin tuna found with these dolphin schools tend to be much larger than yellowfin found in other aggregations.[52] This factor, and the fact that dolphins need to breathe at the surface and are thus much easier to locate than tuna schools alone, played a key role in the development of the fishery in the ETPO.

During the early years of the yellowfin tuna fishery, when live-bait fishing dominated the industry, dolphins were passive actors in tuna fishing operations. Once a tuna school was spotted, a "chummer" threw live-bait into the water, causing the tuna to

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[50] "Pantropical Spotted Dolphin (*Stenella attenuata)* NOAA Fisheries: Office of Protected Resources http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/spotteddolphin_pantropical.htm; "Short-Beaked Common Dolphin" (*Delphinus delphis)* NOAA Fisheries http://www.fisheries.noaa.gov/pr/species/mammals/dolphins/short-beaked-common-dolphin.html; "Spinner Dolphin" *(Stenella longirostris)* NOAA Fisheries http://www.fisheries.noaa.gov/pr/species/mammals/dolphins/spinner-dolphin.html.

[51] The thermocline is a subsurface vertical gradient in temperature

[52] Lisa T. Balance, Robert L. Pitman, and Paul C. Fiedler, "Oceanographic Influences on Seabirds and Cetaceans of the Eastern Tropical Pacific: A Review." 362; Inter-American Tropical Tuna Commission, 2000 Annual Report, 2002.

go into a feeding frenzy. As soon as the tuna began to take the bait, the fishermen, equipped with seven or eight-foot long bamboo poles, climbed onto the steel racks that were hinged to the outside of the guardrail just above the water level. From here, fishermen worked alone and in tandem, pulling tuna from the water as the fish struck the fishermen's hooks.[53]

When live-bait fishing for tuna alongside dolphins, a tuna vessel would move slowly into the middle of the dolphin school, looking for a "black spot" in the water (signifying that tuna were present). If they were, Medina explained that the skipper: "Would position the vessel just ahead of the porpoise herd, and then stop and let the porpoise go by, fishing and chumming as the porpoises went by. Then, he would 'kick' the vessel ahead and repeat the above procedure."[54] Through this form of fishing, dolphin schools were indirectly involved in the fishing process. Although they helped fishermen locate tuna and were in the vicinity that tuna fishing took place, they were not caught by fishermen nor are there any reports that indicate that these human activities negatively impacted their movements.

Despite the discovery of the tuna-dolphin relationship, and the expansion of the American tuna fleet into the ETPO throughout the 1930s, the yellowfin tuna fishery stagnated during the Second World War. While landings reached an all-time high in 1940, they rapidly plummeted during the later war years, especially after the United States joined the war in 1941. The military seized numerous boats for use during the war,

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[53] Bureau of Marine Fisheries, *The Commercial Fish Catch of California for the year 1947 with an Historical Review 1916-1947.* Fish Bulletin No. 74 (California: State of California Department of Natural Resources, Division of Fish and Game, 1949), 18-19; Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food,* 53.

[54] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 61.

including those from the tuna industry. At the same time, the industry lost numerous fishermen due to certain wartime policies that limited the movements and freedom of specific ethnic groups that dominated the tuna fishing industry in southern California. Many Italian and Japanese immigrants in particular were forced from the industry. Wartime production dropped considerably due to the absence of these fishermen and their vessels.[55]

Following the war, the American tuna industry quickly rebounded, and by the 1950s, yellowfin tuna catches peaked at well over 200 million pounds.[56] With Japanese fishing vessels restricted by the Allied powers, the American tuna fleet ruled the Pacific Ocean in the postwar years. Indeed, at the time, the future looked bright for American tuna fishermen.

While the industry experienced a significant postwar resurgence, American fishermen faced newer challenges. Perhaps most threatening was the decision of many Central and South American nations during the late 1940s and early 1950s to extend their territorial sea claims, from three miles to 200 miles from shore. As Bobbie B. and Robert M. Smetherman argue, these actions were taken to protect coastal resources from offshore "imperialist" exploitation.[57] By extending their territories further into the Pacific Ocean, these nations claimed jurisdiction over the natural resources in these waters. To the chagrin of American tuna fishermen, these claims created greater restrictions and difficulties on tuna fishing operations and, of equal importance, the collection of baitfish

[55] Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food,* 104.
[56] United States Tariff Commission, *Tuna Fish: Report on Investigation Conducted Pursuant to a Resolution by the Committee on Finance of the United States Senate* (Washington, 1953), 19; Inter-American Tropical Tuna Commission, 1950-1951 Annual Report, 1952, 16.
[57] Bobbie. B. Smetherman and Robert M. Smetherman, *Territorial Seas and Inter-American Relations: With Case Studies of the Peruvian and U.S. Fishing Industries* (New York: Praeger Publishers, 1974), 2.

for tuna fishing. Baitfish[58] were vital to American fishing operations at the time, as the majority of the fleet used live-bait pole-and-line techniques to catch tuna. Between 1931-1954, live-bait boats accounted for anywhere between 86-90 percent of the annual landings of skipjack and yellowfin in southern California.[59] While tuna could be caught outside of the three-mile territorial boundaries claimed by many nations in the preceding decades, baitfish could only be found in large numbers close to shore.

Unfortunately for American tuna fishermen, the waters outside of the three-mile territorial limit became restricted in the postwar period. On October 29, 1945, Mexico declared extended jurisdiction over waters twelve miles from its coast. In 1947, Chile claimed the waters within 200 miles from its coast. Peru, Ecuador, and Costa Rica followed suit later that year. [60]

These claims came in response to earlier American policies regarding national jurisdiction over the high seas. On September 28th, 1945, President Harry S. Truman issued two proclamations regarding the continental shelf and territorial seas. In the first, he declared that all "natural resources of the subsoil and sea bed of the continental shelf beneath the high seas but contiguous to the coasts of the United States as appertaining to the United States, [are] subject to its jurisdiction and control." In regards to coastal fisheries and territorial waters, Truman declared that the United States had the right to establish both unilateral and bilateral conservation zones on the high seas where fishing activities had been, or in the future would be, developed or maintained on a substantial

[58] "Baitfish" was a term used by fishermen that encompassed all of the different types of fish they used to catch tuna at the time. As the IATTC reported in 1959, the most common baitfish used by fishermen included anchovetta, sardines, and anchovies. Tuna fishermen also used herring on occasion.
[59] Richard L. McNeely "Purse Seine Revolution in Tuna Fishing." *Pacific Fisherman.* June 1961, 29.
[60] David C. Loring, "The United States-Preuvian 'Fisheries' Dispute." *Stanford Law Review.* 23 no. 3 (1971), 399.

scale. As long as the United States still had access to these areas, Truman declared that any nation had the right to establish these types of conservation zones, so long as they operated under joint control.[61] As Carmel Finlay notes, these proclamations looked to balance the interests of the salmon, tuna, and oil industries by protecting newly discovered oil reserves and productive Alaskan salmon stocks from foreign competition while at the same time allowing tuna fishermen to continue to fish off the coasts of Central and South America.[62]

Following the U.S. declarations, many Central and South American governments justified their extended territorial sea claims with the conservation rhetoric utilized in the Truman proclamations. The Mexican government used the same language as Truman barely a month later to justify its jurisdictional expansion on the grounds that American fishermen were overfishing local baitfish stocks.[63] Chile's 200-mile figure was chosen to protect against foreign whaling, which was believed to be killing between 15,000 to 20,000 whales off the Chilean coast every year, and to protect marine species found along the rich Humboldt Current.[64]

While conservation may have indeed been a primary justification for these increased territorial claims, the Smethermans argue that this motive was entangled with nationalistic and anti-imperialistic aspirations intended to protect coastal resources, develop export industries, and feed domestic populations.[65] Some individuals involved in the American tuna industry at the time also suspected that many Central and South

[61] Proclamation No. 2667, 10 Fed. Reg. 12303 (1945); Proclamation No. 2668, 10 Fed. Reg 12304 (1945).
[62] Carmel Finlay, *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management,* 48.
[63] Ibid, 48
[64] Bobbie. B. Smetherman and Robert M. Smetherman, *Territorial Seas and Inter-American Relations: With Case Studies of the Peruvian and U.S. Fishing Industries,* 14; Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food,* 120.
[65] Ibid, 15.

American nations had ulterior motives for extending their territorial jurisdictions. Dr. Wilbert M. Chapman, fisheries scientist and president of the American Tunaboat Association (ATA) at the time, called the conservation claims a "smokescreen" for other policy objectives. In a 1955 article in the *Pacific Fisherman*, tuna fisherman James T. Hill reasoned that the fight for a 200-mile territorial limit was partly influenced by the growing Communist element in South America, "whose main purpose, we know, is to belittle our country in every way they can."[66]

Regardless of the reasons, the expansion of territorial waters along the western coast of many Central and South American nations altered the context in which U.S. vessels fished for yellowfin tuna. Although American fishermen had traditionally paid fees to gather bait from waters within three-mile limits, they refused to pay to fish in these larger territorial zones, as many argued that it would only recognize and strengthen these claims.[67] The results could be contentious. Between 1951 and 1956, Ecuador seized 13 American tuna vessels. In 1955, Peru seized six tuna boats for fishing illegally in their territorial waters.[68] Detained boats often remained in foreign ports for days and owners paid substantial fees for their release. For example, in 1954, the owners of the American tuna vessel the *Sun Streak* paid the Ecuadorean government $12,000 after it was detained for fishing in extended territorial waters.[69]

While interactions between American fishermen and Central and South American patrol boats were generally peaceful, violent outbreaks were not unknown to the region.

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[66] James T. Hill, "200-Mile Limit - What Brings it? And What Will it Bring?" *Pacific Fisherman.* May, 1955, 39.
[67] "Your Move, Mr. Dulles." *Pacific Fisherman.* May, 1955, 13.
[68] Bobbie. B. Smetherman and Robert M. Smetherman, *Territorial Seas and Inter-American Relations: With Case Studies of the Peruvian and U.S. Fishing Industries*, 19.
[69] *To Protect Rights of United States Vessels on High Seas: Hearings on H.R. 5526, Day 1, Before the Subcommittee on Fisheries and Wildlife Conservation,* 85th Cong. 1st sess., 68 (1957) (statement of W. M. Chapman, Director of Research for the American Tunaboat Association).

On March 28th, 1955, the *New York Times* reported that an American fisherman was injured following an altercation with an Ecuadorean patrol boat for allegedly fishing illegally in Ecuadorean waters. According to the report, the patrol boat fired upon, and later seized, the American freezer boat *Arctic Maid* near Dead Man's Island, outside the Gulf of Guayaquil – roughly 27 miles off the Ecuadorean coast. After the *Arctic Maid* refused to leave the area, the Ecuadorean patrol boat fired upon the freezer ship "at least 50 times." During the encounter, engineer William Peck was shot in his hip and leg. He was treated for his injuries once the boat landed in Guayquil, Ecuador, before being airlifted to the Panama Canal Zone for surgery and then later flown to his homeport of Seattle for further treatment. The incident left Peck crippled for life and unable to support his wife and four children.[70] Following the incident, the *Pacific Fisherman* highlighted the anger and uneasiness felt by many in the Pacific fishing industry, noting that many wanted the United States to "take a firm position in the matter," and, should it be required, unleash their Naval might to protect American fishermen.[71]

The American government and the ATA attempted to stabilize the situation in the ETPO throughout the late 1940s and early 1950s. In 1949, the United States and Costa Rica created the Inter-American Tropical Tuna Commission (IATTC) to assess skipjack, yellowfin, and baitfish populations in the ETPO to ensure that their populations were being maintained at levels that would produce maximum sustained yield (MSY) [72] for

[70] "Ecuador Captures Two U.S. Vessels." *The New York Times*. March 29th, 1955, 14; *To Protect Rights of United States Vessels on High Seas: Hearings on H.R. 5526, Day 1, Before the Subcommittee on Fisheries and Wildlife Conservation,* 85th Cong., 1st sess., 46 (1957) (statement of Warren G. Magnuson, Congressman); Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food,* 116-117.
[71] "Your Move, Mr. Dulles." *Pacific Fisherman.* May, 1955, 13.
[72] Maximum Sustainable Yield (MSY) is the maximum level at which a natural resource (in this case, yellowfin tuna) can be exploited without long-term depletion of the stock.

fishermen.[73] As Finlay argues, the use of MSY rhetoric in bilateral agreements such as the IATTC was part of a broader scheme used by the American government to restrict foreign access to profitable domestic fisheries and, at the same time, allow Americans to fish in newly claimed Central and South American waters. So long as a fishery was not shown to be over-fished, then there was no basis for denying entry to boats from other countries; intervention to restrict fishing could only be made with scientific evidence of depletion.[74] So long as the IATTC found that baitfish and yellowfin populations were not being over-fished, there was no scientific or conservation premise to prevent American fishermen from fishing the rich bait and tuna grounds off the coast of Costa Rica. While it is unclear what Costa Rica directly gained through the IATTC, the agreement no doubt helped to strengthen its historically good relationship with the United States – an important development at a time when the Central American nation faced threats from supporters of recently ousted President Rafael Angel Calderon and neighbouring Nicaragua.[75]

In 1954, Congress passed the Fishermen's Protective Act, establishing the unique precedent of compensating vessel owners for fines paid to foreign governments as a result of unlawful seizures.[76] Following the *Arctic Maid* incident, American officials also met with representatives from Chile, Ecuador, and Peru in an attempt to calm the situation.

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[73] Convention for the Establishment of an Inter-American Tropical Tuna Commission, United States-Costa Rica, May 31st 1949, Washington, D.C. http://www.iattc.org/PDFFiles/IATTC_convention_1949.pdf

[74] Carmel Finlay, *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management,* 95.

[75] Graeme S. Mount, "Costa Rica and the Cold War, 1948-1990" *Canadian Journal of History* 50 no. 2 (2015): 295-296. Fabrice Edouard Lehoucq, "Class Conflict, Political Crisis and the Breakdown of Democratic Practices in Costa Rica: Reassessing the Origins of the 1948 Civil War *Journal of Latin American Studies* 23 no. 1 (1991): 37-60 and Kyle Longley "Peaceful Costa Rica, the First Battleground: The United States and the Costa Rican Revolution of 1948" *The Americas* 50 no. 2 (1993): 149-175 also explore the relationship between the United States and Costa Rica at the end of the 1940s and during the Costa Rican Civil War. Longley specifically argues that the United States worked (directly and indirectly) with the rebels to remove Calderon, who they believed at the time to be a Communist.

[76] David C. Loring, "The United States-Preuvian 'Fisheries' Dispute." 40.

Smith highlights that, "the Americans offered these countries the right to the fish within 12 miles of their coasts, as well as shared fishing responsibility with the United States for the remaining 188 miles. The three South American countries refused, and negotiations broke down."[77]

After the government failed to come to an agreement with these countries, the ATA began meeting with them and other Central and South American governments to attempt to alleviate conflict in the oceans. In 1955, representatives of the ATA met with Peruvian officials in Lima to discuss and resolve fee payments to fish in Peruvian waters. Highlighting that fishermen had to catch bait close to Peruvian shores, Chapman, then President of the ATA, persuaded Peruvian officials to phrase the licenses in such a way that U.S. fishermen could buy them to fish in "Peruvian waters" without implying the acceptance of the legitimacy of the offshore claims. The licenses simply stated that fishermen had the right to fish in Peruvian waters, but did not specify the boundaries. A similar agreement was signed between the ATA and Chile following the seizure of American vessels off that country's coast in 1957.[78]

While these initiatives alleviated some of the tension in the region, fishing in the ETPO had become a dangerous business for many tuna fishermen by the mid-1950s. Although violent confrontations were rare, the potential for a serious altercation between fishermen and Central and South American patrol boats was a reality. Much more frequent and equally harmful were seizures and detention by patrol boats, which resulted in hefty fines for fishermen and valuable lost fishing days. As Washington State Congressman Warren G. Magnuson declared, these incidents upon the high seas "threaten

[77] Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food,* 123.
[78] Ibid, 123; Bobbie. B. Smetherman and Robert M. Smetherman, *Territorial Seas and Inter-American Relations: With Case Studies of the Peruvian and U.S. Fishing Industries,* 24.

to deprive our fishermen of the privileges and rights they long have enjoyed under international law."[79]

While tuna fishermen were experiencing serious challenges in the ETPO, they also faced problems at home. Throughout the 1950s, imports of foreign tuna, specifically from Japan, grew significantly. Imports of fresh or frozen tuna from Japan, which in 1949 accounted for 3 percent of all tuna supplied to the United States, rose to 16.9 percent in 1952; during the same period, imports of tuna canned in brine jumped from 11,250 pounds to 18,573,070 pounds.[80] Still worse, these products sold for less than American-caught tuna, undercutting the American product. For U.S. tuna fishermen, who had long supplied American consumers with the overwhelming majority of tuna, the rise in Japanese imports posed a serious threat to their industry.

This increase in tuna imports to the American market signified the resurgence of Japanese fishing power in the Pacific Ocean. While the country's fishing fleet was severely curtailed immediately following the Second World War, the Japanese fleet had dominated the Pacific Ocean during the first three decades of the twentieth century. Finlay argues that, as an island nation, the sea had always been of great importance to the Japanese, especially as a food source and as a platform for imperialism.[81] In the late-nineteenth and early-twentieth centuries, "fishing was so important to the Japanese that it was imbedded into government policy and the educational system to a degree unmatched

[79] *To Protect Rights of United States Vessels on High Seas: Hearings on H.R. 5526, Day 1, Before the Subcommittee on Fisheries and Wildlife Conservation,* 85th Cong., 1st sess., 46 (1957) (statement of Warren G. Magnuson, Congressman).
[80] United States Tariff Commission, *Tuna Fish: Report on Investigation Conducted Pursuant to a Resolution by the Committee on Finance of the United States Senate.* (Washington, 1953).
[81] Carmel Finlay, *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management,* 29.

in any other country, save perhaps Iceland after 1945."[82] Aided by both a traditional attachment to the sea and government support, by the 1930s Japan had become the world's largest fishing nation.[83]

While Japan relied on fishing to feed its own population, not all fish were intended for domestic consumption. In 1923, a series of government subsidies encouraged the construction of refrigerated boats and ice-making systems to allow the Japanese to carry their fish to other countries.[84] Following the collapse of the southern California albacore fishery in 1926, canners looked to Japan to supply them with albacore tuna.[85] Imports of frozen tuna climbed steadily into the 1930s. In 1931, total imports of canned tuna accounted for just 3 percent of American consumption. Over the next three years, these totals jumped to 18 percent, then to 31 percent, before falling back to 15 percent of American consumption in 1934.[86]

The growth of tuna imports raised concerns among both fishermen and government officials – so much so, that in 1936, the United States Senate requested that the Tariff Commission investigate "the importation into the United States of fresh and frozen tuna fish and its effects on the production of tuna fish by United States fishing vessels."[87] After examining the growth of Japanese tuna into the American market, the investigators concluded that, "the importation of fresh and frozen tuna into the United States has had relatively little effect on the production of tuna by United States fishing vessels but that the importation of canned tuna has had a more important effect" on the

[82] Ibid, 20.
[83] Ibid, 22.
[84] Ibid, 22.
[85] United States Tariff Commission, Report to the United States Senate on Tuna Fish, S. Rep. No. 109, at 69 (1936).
[86] Ibid, 71.
[87] Ibid.

industry. [88] In the end, however, investigators admitted that it was difficult to determine how and if these imports hurt fishermen.

Anxieties about Japanese imports disappeared with the outbreak of the Second World War, as Americans looked to friendly nations such as Peru to help supply tuna for the domestic market and for consumption by soldiers. Following the conclusion of the war, the Japanese fishing fleet, the largest in the world less than a decade prior, was a shell of its former self. As concerns about food security in Japan grew immediately following the war, so too did the understanding that Japan's fishing fleet needed to be re-built to help feed its population. General Douglas MacArthur and other leaders of the Japanese Occupation undertook this task of re-building the Japanese fishing industry by providing the Japanese with access to many of the raw materials that made them a global fishing power in the prewar period.[89] Throughout the remainder of the 1940s, the United States encouraged the expansion of the Japanese fleet and gradually extended the area that Japanese fishermen were permitted to use in the Pacific Ocean. Following successful negotiations between the Occupation leaders and the United States government in 1949, Japanese tuna was once again allowed entry in the American market.[90]

Yet the economic landscape of the American tuna market was much different than it had been prior to the Second World War, especially for canned tuna imports. In 1943, the United States signed a trade agreement with Iceland that lowered the tariffs on tuna not canned in oil from 25 percent to 12.5 percent. In contrast, imported tuna canned in

[88] Ibid, 1.
[89] Carmel Finlay, *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management,* 75.
[90] Ibid, 105.

oil, which carried a tariff of 22.5 percent in the immediate postwar period, was increased to 45 percent in 1951.[91]

Under these terms, Japanese imports of tuna canned in brine skyrocketed. Between 1950 and 1952, imports of brined tuna climbed from 73 thousand pounds to nearly 19 million pounds, exceeding imports of tuna canned in oil for the first time.[92] Tuna canned in brine also sold on American grocery shelves for much less than American-caught-and-canned tuna. In the early 1950s, a can of imported brined tuna sold for between 19 to 21 cents a can, while an American can, packed in oil, sold for between 35 to 39 cents.[93] A product that had not been imported at all prior to the Second World War was now a major source of competition for the American tuna industry.

Anxiety among fishermen and government officials grew accordingly, and in 1952, the United States Senate once again asked the Tariff Commission to examine, "the effect of imports of fresh or frozen tuna fish on the livelihood of American tuna fishermen."[94] The report found that the increased tariff of 45 percent on tuna canned in oil caused importers to shift toward tuna canned in brine, with its much lower tariff rate. The Commission concluded, however, that the product, "[was] not being imported in such increased quantities, either actual or relative, as to cause or threaten serious injury to the domestic industry producing like or directly competitive products."[95]

American fishermen, boat owners, and canners disagreed. By 1955, many in the industry had reached their boiling point. That year, many returning American tuna boats

[91] United States Tariff Commission, *Tuna Fish: Report on Investigation Conducted Pursuant to a Resolution by the Committee on Finance of the United States Senate.*
[92] Ibid, 105-106.
[93] Carmel Finlay, *All the Fish in the Sea: Maximum Sustainable Yield and the Failure of Fisheries Management,* 105.
[94] United States Tariff Commission, *Tuna Fish: Report on Investigation Conducted Pursuant to a Resolution by the Committee on Finance of the United States Senate*, i-6.
[95] Ibid, i-70.

were forced to wait in port for up to six or seven weeks at a time, with thousands of tons of tuna in their collective holds before they were able to offload their catches to canneries inundated with imported tuna.[96] For many fishermen, this delay in port was disastrous as it resulted in less time fishing for tuna and, ultimately, less profit for those on the vessel. Even when they did offload their product, the prices they received were relatively low. As Richard L. McNeely of the U.S. Bureau of Commercial Fisheries noted, while most fishermen were able to operate at "a near break-even point," these lower prices and lost fishing days forced others to fish at a loss and, ultimately, drove some fishermen from the industry.[97]

In response to these hardships, the California Fish Canners Association pressed the United States government in court, arguing that tuna canned in brine was being imported at a tariff rate below the legal duty (which they argued was 25 percent). In conjunction with the actions taken by fishermen and canners, the *Pacific Fisherman* noted that many of the men's wives had "marshaled themselves for a campaign seeking a quota on tuna imports, and initiated it by writing thousands of letters to congressmen."[98] On June 3rd 1955, 40 women from San Pedro and San Diego took direct action, picketing the Japanese freezership, the *Banshu Maru,* as it attempted to offload tuna at Long Beach Harbour.[99]

By the mid-1950s, the future for the American tuna industry did not look promising. Fishermen faced serious threats at home and on the open ocean that directly

[96] Montgomery Phister, "What are the Four Vital Ingredients of Tuna Industry's Faith and Future." *Pacific Fisherman.* January, 1955, 16; "Tensions in Tuna." *Pacific Fisherman.* July, 1955, 13
[97] Richard L. McNeely, "Purse Seine Revolution in Tuna Fishing." *Pacific Fisherman.* June 1961, 30.
[98] "Tensions in Tuna." *Pacific Fisherman.* July, 1955, 13.
[99] "Tuna Wives Fight Hard for a Quota." *Pacific Fisherman.* July 1955, 17; "Wives of Fisherman Halt Tuna Unloading." *The Los Angeles Times.* June 3rd, 1955, 2.

affected their livelihoods. License payments to fish in foreign waters, potential conflict with foreign patrol boats, boat seizures, competition from cheaper tuna products, and lengthy waits to offload catches were costly for fishermen and made tuna fishing less lucrative than it had been a few years earlier. In these challenging times, many fishermen were forced to leave the industry. Between 1951 and 1954, the number of American tuna boats fishing in the ETPO fell from 210 vessels to 168.[100]

Those who remained were forced to adapt and evolve in order to survive. For these fishermen, this meant finding a way to increase efficiency in order to lower production costs to compete with foreign tuna imports while, at the same time, avoiding conflict with Central and South American nations. The answer came in the form of two major technological advances that revolutionized the industry: the Puretic power-block and nylon netting.

As mentioned earlier, prior to these innovations, live-bait pole-and-line fishing was the dominant technique used by American fishermen in the ETPO. Despite its widespread use, it was not a very efficient method for catching tuna. As the name implies, having live-bait was vital to the fishing process – without it, fishermen "[were] derelict."[101] This dependence on baitfish limited live-bait fishermen to waters relatively close to prime baitfish areas.[102] Furthermore, trips between tuna grounds and baiting grounds were costly, both in terms of time and fuel – a trip to gather more baitfish could mean a lost opportunity to fish a large school of yellowfin tuna. Even when fishermen had ample bait at their disposal, there was no guarantee that tuna could be stimulated into

[100] H.L. Cary, "Tariff Points By Tunamen." *Pacific Fisherman.* February 1955, 9.
[101] H.C. Godsil, *The High Seas Tuna Fishery of California,* 18.
[102] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 13.

a feeding frenzy. In fact, Felando and Medina argue that, "most of the schools of tuna encountered rejected human efforts to be stimulated into a feed frenzy" and that this was "an experience not uncommon to tuna baitboat fishermen."[103]

Despite these inefficiencies, at the time, live-bait fishing was a more effective method for catching tuna in the ETPO than purse seining. Through the latter method of fishing, tuna captains relied on large nets to capture their intended targets. Once tuna were spotted, the captain would use his vessel, and a smaller "skiff" boat launched from the main vessel, to encircle the fish with a deep wall of webbing, making a large "set" around the animals. The drawstring or "purse line" that ran along the bottom of the net would then be pulled together by the crew from the deck, thus closing the net and trapping the fish inside. The net was then brought alongside the vessel for unloading.[104] While purse seiners could catch large numbers of fish at one time, they did so indiscriminately and this could result in the catching of unintended or unwanted species.

During the first half of the twentieth century, purse seiners accounted for a very small component of the southern California-based tuna industry, fishing primarily for bluefin tuna in the waters off the southern California coast. Outside of this species, purse seining was not viewed as an effective technique for catching the more profitable and important yellowfin tuna stocks in the ETPO. To start, the warmer more southerly waters of the ETPO wrecked havoc on the fleet's cotton nets, often leading to rapid rotting and deterioration.[105] As an article in *Modern Fishing Gear of the World* noted, "nets were constantly being repaired [by fishermen]. Whenever there were spare moments, men were

[103] Ibid, 6.
[104] W.L Scofield, *Purse Seines and Other Roundhaul Nets in California.* Fish Bulletin No. 81 (State of California Department of Fish and Game: California, 1951), 9.
[105] Richard L. McNeely, "Purse Seine Revolution in Tuna Fishing." *Pacific Fisherman.* June 1961, 29.

replacing panels, shifting rotten netting to areas of lesser strain and sewing holes and rips in badly decayed cotton."[106] While fishermen used tar to try and preserve net longevity, the product only made the nets heavier and harder to pull in; many nets failed to last two years in these warmer waters.

Sharks also posed a real threat to purse seiners, as they had the ability to (and occasionally did) slice open nets and spoil large tuna catches before they could be hauled aboard. Fishermen further required favourable weather conditions to set their nets, which severely limited the number of days they could fish. Finally, purse seine nets, which could be filled with hundreds of pounds of tuna, had to be pulled in by hand – an arduous and highly labour-intensive task for fishermen.

Despite the many practical challenges of purse seining for tuna year-round in the ETPO, some fishermen did attempt to make a living doing so. In 1937, the first steel hulled purse seiner, *Paramount*, was built to fish tuna on the high seas of the ETPO. After three years of poor fishing, the 121-foot seiner was sold and converted to a live-bait boat. That same year, a 156-foot converted Navy tug named the *Falcon* made its maiden voyage. After six months of poor fishing, the *Falcon* returned to port with half of its 600-ton hold filled with tuna. It too converted to a live-bait vessel.[107]

Two key technological innovations marked the end of bait-boat dominance and the beginning of purse seine superiority. In 1954, Mario Puretic, an experienced tuna and sardine fishermen from San Pedro, invented the power-block, a large metal pulley designed to lessen the amount of manual labour involved in loading and unloading purse

[106] R.E. Green, W.F. Perrin, and B.P. Petrich, "The American Tuna Purse Seine Industry." in *Modern Fishing Gear of the World 3* (London: The Whitefriars Press Ltd., 1971), 183.
[107] Ibid, 184; August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive*, 8.

seine nets. In essence, the power-block was simply a large V-sheave that hung from an elevated free-swinging position aboard the vessel. Driven by a hydraulically-powered winch, the purse seine net would pass through the power-block upon being pulled from the ocean and then lowered down to men below for piling on the vessel's turntable.[108]

The first power-block, tested that year aboard the *Anthony M.*, proved to be a major success. For fishermen, it offered a number of vital advantages that made purse seining much more efficient and effective. First, the power-block significantly lessened the amount of manual power required to load or unload nets in the open ocean. It also increased the speed in which nets could be retrieved from the ocean, allowing a seiner to set their nets more frequently for tuna or re-attempt a missed set. *Modern Fishing Gear of the World 1* reported that a 300-fathom long net could be retrieved within a 10-minute span – a much faster time compared to manual power. Finally, the power-block made fishing in rough weather possible because of the greater force exerted on the net and stabilizing influence of the net on the vessel.[109] As the *Pacific Fisherman* noted in 1955, the power-block was so effective and so easy to use that, "if you've ever strapped a net you have nothing to learn." "In short, buy a powerblock and you're in the power seining business."[110]

While the Puretic power-block was not the only technological innovation that made seining easier, its rapid acceptance among American fishermen is notable. Within three years, more than 1,000 purse seine vessels were using the device in various fisheries

[108] "Boom-Point Power Offers New Angle for Seine Fishing." *Pacific Fisherman.* May 1955, 26; Peter G. Schmidt Jr, "The Puretic Power Block and its Effect on Modern Purse Seining." In *Modern Fishing Gear of the World 1* (London: Fishing News (Books) Ltd., 1959), 401; August Felando and Harold Medina. "The Origins of California's High-Seas Tuna Fleet." 24.
[109] Peter G Schmidt Jr., "The Puretic Power Block and its Effect on Modern Purse Seining." 401.
[110] "Boom-Point Power Offers New Angle for Seine Fishing." *Pacific Fisherman.* May 1955, 26.

throughout the Pacific. In 1960, the *Pacific Fisherman* hailed Puretic as a revolutionary.[111] When asked about whether he took personal satisfaction in seeing how the use of his power-block had grown so rapidly, Puretic commented that: "It warms a man's heart to feel that he has had a part in making fisherman's hard work easier – and more productive. Better shares from more fish in less time… When you think of these things it warms your heart; and it keeps you humble."[112]

At the same time, advances in net material also helped to make purse seining in the warmer waters of the ETPO much more realistic. In 1956, the *Anthony M.* once again made news when it became the first American purse seine vessel to use an all-nylon net. Manufactured by the A.M. Starr Net Company and made of DuPont nylon twine, the net measured 410 fathoms long by 34 fathoms deep and cost roughly $38,000.[113]

Like their first trip with the Puretic power-block, the *Anthony M.* reported great success using the new net in the waters off South America as it offered numerous advantages to traditional cotton netting. To start, nylon proved to be much more durable, stronger, and lighter than cotton. When wet, nylon netting absorbed much less water than traditional cotton netting.[114] The *Anthony M.'s* captain, Anton Misetich, noted that the net weighed virtually the same when it was wet as when it was dry.[115] Additionally, nylon nets had greater longevity than cotton, especially in the warm waters of the ETPO, where cotton nets were constantly afflicted by rot and wear.

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[111] "Mario Puretic: He set into motion an industrial revolution." *Pacific Fisherman.* July 1960, 14.
[112] Ibid, 14.
[113] "*Anthony M.* Pioneers All-Nylon Tuna Seine." *Pacific Fisherman.* April, 1956, 38.
[114] E.I. Du Pont De Nemours and Co., "Synthetic Fibres in the Fishing Industry." In *Modern Fishing Gear of the World 1* (London: Fishing News (Books) Ltd., 1959), 148.
[115] "*Anthony M.* Pioneers All-Nylon Tuna Seine." *Pacific Fisherman.* April, 1956, 38.

What made nylon netting even more attractive for fishermen, however, was Misetich's optimistic report on its successful use with the Puretic power-block. Commenting that the power-block handled the nylon net "with speed, ease, and thoroughly relaxed operation," Misetich noted that, in his opinion, nylon netting coupled with the power-block was the "salvation of the tuna purse seine industry."[116]

Misetich could not have known how true his words were when he spoke them in 1956. The creation of the power-block and advances in nylon netting made purse seining the most viable, efficient, and productive method to fish for tuna. Through purse seining, vessels no longer relied on bait to catch tuna and thus did not have to pay fees to fish in Central and South American waters. No longer tied to baitfish areas, fishermen could fish further out to sea, away from patrol boats. The mechanically driven power-block also made seining less labour-intensive than live-bait fishing and less men were required to catch large quantities of tuna. Finally, purse seining was much more efficient than live-bait fishing, since tuna could be caught more consistently - whether or not tuna could be stimulated into a feeding frenzy to bite hooks was redundant for purse seiners.

Between 1955 and 1961, 75 live-bait vessels were converted or were undergoing conversions to become purse seiners.[117] In addition, other fishermen invested hundreds of thousands of dollars to produce large modern purse seine vessels. In 1961, the 142-foot *Royal Pacific* cost Captain Lou Brito over $700,000 to build, highlighting his confidence in the advantages promised by the power-block and nylon netting. With her modern design and equipment and 450-ton cargo hold, the *Royal Pacific* was hailed in the *Pacific*

[116] Ibid, 38; While nylon netting helped revitalize the American tuna industry, it also played a major role in the expansion of the Peruvian anchovetta/fishmeal fisheries. For more information, please see Michael Roemer, *Fishing for Growth: Export-Led Development in Peru, 1950-1967* (Cambridge, Mass.: Harvard University Press, 1970), 80-83.
[117] R.E. Green, W.F. Perrin, and B.P. Petrich, "The American Tuna Purse Seine Industry." 185.

Fisherman as "the forerunner of the new fleet, the pacemaker, the pathfinder, the pioneer."[118] Other new vessels would continue to join the fleet in the following years. By 1964, 76 percent of all vessels in the tuna fleet were purse seiners – a stark contrast to the decade earlier, when live-bait vessels accounted for 73 percent of the fleet.[119]

While the power-block and nylon netting were the driving forces of change, it seems that favourable environmental factors contributed to the growth in the purse seine fleet. In 1959, IATTC scientists reported that during the previous two years, yellowfin tuna had been found in greater abundance in the northern areas of the ETPO, where some purse seine vessels had traditionally fished in small numbers for bluefin tuna.[120] Strong El Niño conditions in 1957-58 seem to have played a role in this shift. In their study examining the effects of El Niño on yellowfin tuna stocks near the Gulf of California in the 1990s, Torres-Orozoco et al. found that while the relative abundance of yellowfin in the ETPO decreased overall, the fishing effort required to catch yellowfin via purse seine methods in these traditional fishing grounds actually decreased. While yellowfin were apparently less abundant in the region as a whole, they were more abundant, and thus easier to catch, by purse-seine vessels in these areas.[121] J. Joseph and F.R. Miller discovered that large recruitments of yellowfin occurred following El Niño events (i.e. in 1958-59 following the 1957-58 El Niño).[122] The increased presence of yellowfin schools in these northern stretches of the ETPO, coupled with the advantages provided by both

[118] "Royal Pacific: First of the New Fleet." *Pacific Fisherman.* October, 1961, 13.
[119] Inter-American Tropical Tuna Commission, 1965 Annual Report, 1966, 6.
[120] Inter-American Tropical Tuna Commission, 1959 Annual Report, 1960, 42; Inter-American Tropical Tuna Commission, 1970 Annual Report, 1971; Bureau of Marine Fisheries, *The Commercial Fish Catch of California for the year 1947 with an Historical Review 1916-1947,* 27.
[121] Ernesto Torres-Orozco et al., "Variation in Yellowfin Tuna Catches Related To El Niño-Southern Oscillation Events at the Entrance to the Gulf of Mexico." *Fishery Bulletin* 104 no. 2 (2006), 198.
[122] J. Joseph and F. R. Miller, El Niño and the surface fishery for tunas in the eastern Pacific. In Proceedings of Tuna Fish. Res. Conf., 1988, 199−207

the power-block and nylon netting, no doubt solidified fishermen's confidence in purse seining.

As more vessels converted to purse seining, the percentage of yellowfin tuna caught by these vessels rose substantially, from 14 percent in 1954 to 94 percent in 1964.[123] At the same time, more purse seine vessels joined the ETPO yellowfin fishery. While scientists at the IATTC had believed that the chances of over-fishing yellowfin stocks were quite low in the 1950s, in 1961 the Commission announced that they would look to curtail future catches in order to rebuild the stock, as they believed yellowfin tuna were "slightly overfished" and therefore "no longer capable of supporting the maximum sustainable yield."[124] In conjunction with increased fishing effort, yellowfin catches climbed as well, exceeding 200 million pounds for the first time since 1950. Catches fluctuated throughout the 1960s, but averaged 202.23 million pounds per year during the decade.[125]

Commentators at the time marveled at the industry's transformation. In a 1961 *Pacific Fisherman* article, Richard L. McNeely dubbed the late 1950s and early 1960s the "Purse Seine Revolution." For McNeely, "the mass conversion… of the California [live bait] fleet, which progressed at an almost unbelievable rate, is an unparalleled event in the history of major United States fisheries."[126] Indeed, by the mid-1960s, the American Pacific tuna fleet looked radically different than it had less than a decade earlier.

[123] Inter-American Tropical Tuna Commission, 1964 Annual Report, 1965, 96.
[124] Inter-American Tropical Tuna Commission, 1961 Annual Report, 1962, 21.
[125] Inter-American Tropical Tuna Commission, 1970 Annual Report, 1971.
[126] Richard L. McNeely, "Purse Seine Revolution in Tuna Fishing." *Pacific Fisherman.* June 1961, 27.

While the purse seine revolution revitalized the tuna industry, it dramatically altered the relationship between fishermen and aquatic animals in the region.[127] This was especially true for dolphins. As mentioned earlier, when live-bait tuna vessels dominated the industry, dolphins were relied on to locate schools of yellowfin tuna but were not negatively affected by tuna fishing operations. The purse seine revolution changed this relationship. Like live-bait fishermen, purse seine captains were well aware of this tuna-dolphin association and the larger tuna that these mixed schools produced. In order to take advantage of this relationship, purse seine fishermen developed a fishing technique that they referred to as "porpoise fishing" or "fishing on porpoise." Using this technique, fishermen searched the ocean for schools of dolphins. If tuna were found to be associated with these dolphins, the purse seine vessel made a set around the entire school, capturing tuna and dolphins in its nets. Through this method of fishing, capturing dolphins became the most important task for purse seine fishermen, as it was found that an entire tuna set could be lost if even a few dolphins escaped the net. Observations from fishermen and later scientific research revealed that yellowfin tended to follow dolphins closely, chasing after the dolphins if they escaped.[128] By the 1960s, fishermen relied on speedboats to corral dolphin schools together and ensure that none escaped before the set was made.[129]

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[127] One key relationship that transformed following the "Purse Seine Revolution" was that between humans and baitfish. When live-bait boats dominated the industry, baitfish were collected and used by fishermen in substantial numbers. In 1956 for example, American live-bait fishermen caught and used 3.6 million "scoops" of bait in their tuna fishing operations. (The IATTC reported that a "scoop" was roughly ten pounds – so 3.6 million scoops were equivalent to roughly 36 million pounds of baitfish). As purse seiners became the dominant method for catching tuna in the ETPO, the number of live-bait boats decreased and, subsequently, the collection and use of baitfish by fishermen declined as well.

[128] Michael D. Scott et al., "Pelagic Predator Associations: Tuna and Dolphins in the Eastern Tropical Pacific Ocean." *Marine Ecology Progress Series*. 458 (2012): 292-293; National Research Council. *Dolphins and the Tuna Industry* (National Academy Press, Washington, D.C., 1992), 46. During the early twentieth century, live-bait fishermen believed that the dolphins followed yellowfin. It was only when the fleet changed to purse seining that fishermen noticed that yellowfin actually followed the dolphins.

[129] "Porpoise fishing" or "fishing on porpoise" is described in more detail in: R.E. Green, W.F. Perrin, and B.P. Petrich, "The American Tuna Purse Seine Industry." in *Modern Fishing Gear of the World 3,* 191;

While these "porpoise sets" resulted in catches of larger yellowfin tuna, they also produced high-numbers of dolphin mortalities. Many dolphins died when their snouts, or rostrums, got stuck in the netting or drowned as the net tightened and closed around them. Prior to the mid-1950s, very few purse seiners fished the ETPO and even fewer utilized this technique, as dead dolphins in the net were more likely to cause damage to the gear and possibly to crew members bringing the net aboard. It also required a great deal of time to remove these dolphins from the nets. As such, it seems likely that dolphin by-catch totals were unsubstantial prior to the late 1950s.

However, following the purse seine revolution, more and more purse seiners began fishing in the ETPO and, aware that larger tuna associated with dolphins, many of these captains adopted and utilized porpoise fishing. The stronger nylon netting and strength and speed of the power-block alleviated some of the earlier concerns fishermen had previously had with porpoise fishing. Throughout the 1960s, fishing success on tuna-dolphin schools rose substantially, jumping from a .48 success rate per set in 1962 to a .80 success rate in 1967. More importantly, fishermen had become so adept at fishing on porpoise that by 1966 it carried a higher success rate per set than tuna fishing via any other method.[130] By the late 1960s, it is clear that fishing on porpoise had become the dominant form of tuna fishing in the ETPO. As such, the use of dolphins in the fishing process, and the purposeful by-catch and incidental killing of countless individual animals that this technique produced, became a hallmark of the American Pacific tuna industry.

August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive.*

[130] Inter-American Tropical Tuna Commission, 1967 Annual Report, 1968, 47.

By the late 1960s, dolphins were an integral part of the fishing process in the ETPO. The purse seine revolution of the late 1950s and early 1960s had completely and drastically altered the extent and ways in which fishermen interacted with these marine mammals through the region's yellowfin tuna fishery. While the revolution had revitalized the American Pacific tuna industry, the same external pressures and economic hardships that had led to the industry's transformation directly contributed to the high number of dolphin deaths that dominated newspaper headlines in the 1970s.

Chapter Two

Perhaps the most sensitive issue I had to deal with in the scientific programme was Bill Perrin's exposure of porpoise mortality in the tuna fishery… I can't think of any scientific paper in the marine sciences that has greater political and economic consequences. – Dr. Alan Longhurst, 1970[131]

By the late 1960s, "fishing on porpoise" had become the dominant technique used by American fishermen to catch yellowfin tuna in the ETPO. Yet, outside of the tuna industry, very few Americans were aware of this tuna-dolphin connection or the high dolphin mortality rate. While consumption of tuna continued to rise into the 1970s, American consumers remained oblivious to the countless dolphin deaths occurring at the hands of American fishermen each year.

As highlighted earlier, this all changed in 1969, when a young scientist named William F. Perrin took the stage at the sixth annual Biological Sonar and Diving Mammals Conference at Stanford University. In a presentation entitled, "The Problem of Porpoise Mortality in the U.S. Tropical Tuna Fishery," Perrin shared his findings from research aboard a tuna purse seiner with his fellow scientists in attendance. His conclusions shocked the audience and brought the issue of dolphin by-catch to the scientific forefront. Based on his results, Perrin postulated that approximately "244,000 porpoise, about a quarter million" were dying at the hands of American tuna fishermen every year. In addition, the gendered breakdown of the dolphin catches shared similarities with that of the Russian Black Sea dolphin fishery in 1964 – a time when catches of female and juvenile dolphins greatly outnumbered those of males. The Russian fishery collapsed just two years later. "You must understand that this is a very crude estimate,"

[131] Lillian L. Vlymen, *The First 25 Years* (National Oceanic and Atmospheric Administration: La Jolla, 1989), 29.

Perrin admitted, "but I am sure that it is of the correct order of magnitude. In any case, it is evident that there is something here worth looking into."[132]

Perrin's talk was a seminal, if rather unacknowledged, moment in U.S. environmental history. In the years that followed, dolphin protection and the amelioration of dolphin by-catch in the American tuna industry became key issues for scientists, politicians, environmentalists, the tuna industry, and members of the American public. Perrin's findings resulted in increased research in dolphin-saving techniques and technologies; new legislation and regulations to prevent dolphin by-catch and protect global dolphin populations; and greater awareness among the American public for the plight of the world's dolphins. And while the American Tunaboat Association (ATA) and American tuna fishermen remained skeptical of Perrin's results, his findings forced them to defend their fishing practices to the American public and develop new ways to save dolphins from their tuna nets.

Although Perrin considered his findings preliminary, his conclusions made dolphin by-catch a key environmental issue in the United States. The debates and discussions on how to best address the issue of dolphin by-catch in the American tuna industry became especially prominent in the United States in 1971 and 1972, as American politicians debated various bills designed to protect the world's marine mammal populations. While the debates focused on many marine mammal species, the need to prevent the useless slaughter of dolphins, and at the same time preserve the tuna industry, was a major point of contention. As these debates unfolded, the plight of the world's dolphins received greater coverage in newspapers across the United States. By the time the Marine Mammal Protection Act (MMPA) passed on October 21st, 1972,

[132] William F. Perrin, "The Problem of Porpoise Mortality in the U.S. Tropical Tuna Fishery," 45.

dolphin mortalities linked to the American tuna industry were well-known throughout the United States. Thanks to Perrin's findings, within the span of three years, mass dolphin by-catch had transformed from an industry secret to one of the most important environmental issues in the United States.

While Perrin was the first scientist to publically raise concern over mass dolphin by-catch in the ETPO, he was not the first individual to examine the tuna-dolphin relationship, nor was he the first to study the mortalities that resulted from fishing on porpoise. Indeed, scientists had been interested in the tuna-dolphin relationship since the beginning of the 1960s. In 1961, two scientists with the United States' Bureau of Commercial Fisheries (BCF), Dr. Richard J. Whitney and Dr. Frank J. Hester, accompanied the tuna purse seiner *West Point* to observe fishing operations in the ETPO. Seemingly aware of the tuna-dolphin connection, Whitney brought along sound equipment to test whether sonar could be used as a way to scare dolphins away from tuna nets.[133] While these tests failed, Whitney believed the tuna-dolphin relationship required further research. In his report to the Third Annual Government-Industry Tuna Meeting the following year, Whitney stressed that, "we need to investigate the nature of the relationship of porpoise and tuna. If we knew more about this we might be able to suggest a way to avoid taking so many porpoise in the net and still take the tuna."[134]

The BCF agreed. The following year, the Bureau hired David Waller, a graduate student from the University of Wisconsin, to develop research on dolphins involved in the tuna fishery. Over the next three summers, Waller worked aboard various tuna purse

[133] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive.* 120.
[134] Ibid, 122.

seiners, testing acoustic experiments on dolphins caught in the nets and collecting specimens for further study. During his research trip in 1964, Waller also recorded the number of dolphin mortalities he observed while aboard the purse seiner *Independence.* Waller's data revealed that dolphin mortalities were present in almost every set made by the crew. He estimated that approximately 25 dolphins died in each set.[135]

Despite Waller's findings, it appears that neither he, nor the BCF, considered dolphin by-catch a serious problem. In the same year that Waller completed his research aboard the *Independence*, the BCF received a letter from an American tuna fisherman named Gerald Lopes. In his letter, Lopes described his experiences fishing for tuna off the coast of Mexico aboard the purse seiner *Concho* and commented on the use of dolphins by fishermen. Shocked by the mortalities he witnessed, Lopes wondered what effect current fishing practices could have on dolphin populations in the ETPO. Lopes also provided estimates on how many dolphins he believed were dying at the hands of American tuna fishermen each year. Based on 21 observed sets that caught 198 tons of tuna, Lopes concluded that at least 1,229 dolphins had died – roughly 59 dolphins per set or 6 dolphins per ton. For a fleet that had caught roughly sixty seven thousand tons of yellowfin tuna in 1963, this meant that more than 400,000 dolphins had died in a single year.[136] "Will this cause depletion or perhaps extinction of porpoise?" Lopes wondered. "Is there anything that can be done about it?"[137]

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[135] David Waller to Nancy C. H. Lo, June 25, 1979, in *Some Data on Dolphin Mortality in the Eastern Tropical Pacific Tuna Purse Seine Fishery Prior to 1970,* Tim D. Smith and Nancy C. H. Lo. https://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFC-34.PDF

[136] Inter-American Tropical Tuna Commission, 1963 Annual Report, 1964, 44. During that year, American fishermen landed close to 134 million pounds of yellowfin tuna. I took that number and divided by 2,000 (since there are 2,000 pounds in an American ton) to reach 67,000 tons.

[137] Gerald H. Lopes to Department of Conservation, Division of Fish and Game, June 8, 1964, in *Some Data on Dolphin Mortality in the Eastern Tropical Pacific Tuna Purse Seine Fishery Prior to 1970.* Tim D.

Waller replied that the government was looking into the association between tuna and dolphins but suggested that Lopes' estimates might be unrealistically high. In Waller's opinion, dolphin mortalities were much lower – his research suggested that roughly 25 dolphins were killed per set, in contrast to the 59 deaths per set argued by Lopes. Despite Waller's assurances, Lopes responded that his figures were much more indicative of the true scale of the issue. "I want you to understand that my figures were way under actual, I'm sure. I think from 8 to 10 porpoises killed per ton of tuna would be a lot closer to the truth."[138]

Despite Lopes' concern, the issue of dolphin by-catch faded from the BCF's list of priorities in the mid-1960s. Following his research trip in 1964, Waller left for a teaching position at Kent State University. With its leading researcher on the topic gone, the BCF appears to have devoted little attention or resources to the topic in the following years. By 1966, all "studies on porpoises associated with tuna [had] been discontinued."[139]

At the same time, very little was being done by scientists at the Inter-American Tropical Tuna Commission (IATTC). Their only investigations into the tuna-dolphin relationship focused on the success fishermen achieved when fishing on porpoise. In the early 1960s, when the technique was relatively new, fishermen experienced greater success fishing on pure yellowfin schools than tuna schools that associated with dolphins. As fishermen became more accustomed to fishing on porpoise, the success rate rose

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Smith and Nancy C. H. Lo. https://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFC-34.PDF

[138] William F Perrin, "Early Days of the Tuna/Dolphin Problem." *Aquatic Animals* 35 no. 2 (2009): 298.

[139] Laboratory Director's Reports to the Conference. Bureau of Commercial Fisheries Tuna Resources Laboratory. Proceedings from the Seventh Pacific Tuna Conference, October 17-19, 1966, Lake Arrowhead, California: 37-39.

dramatically. By 1965, scientists found that, for the first time ever, this method produced a higher success rate per set than those made on pure tuna schools.[140]

Although the IATTC continued to measure the success rate for this technique throughout the 1960s, no further research was conducted on the tuna-dolphin relationship or dolphin mortalities associated with fishing on porpoise. There are a few reasons why this may have been the case. To start, by-catch research was not originally conceived as a major point of emphasis for the IATTC. Indeed, the issue was not included in the original agreement between Costa Rica and the United States and no IATTC annual report between 1950-1965 mentions it as a topic of study. Further, research as a whole was quite limited at the IATTC during the 1960s, due in large part to the organization's financial difficulties. Throughout the decade, member governments consistently denied the organization's budget requests. The situation was so bad that by 1966, only two of sixteen budget requests had been approved in the organization's short history. Between 1963-1966, the IATTC's staff fell from 49 to 34 individuals.[141] With few researchers and limited funding, the organization instead focused research on issues directly related to tuna and baitfish. Even if the IATTC wanted to conduct further research into dolphin by-catch, there was little ability to do so. By 1966, neither the BCF nor the IATTC had conducted much research on the tuna-dolphin relationship nor had either organization directed much attention toward dolphin mortalities in the American tuna industry.

It is during that same year that William F. Perrin accepted a summer position with the BCF and unknowingly began down a path that would bring him, and the problem of dolphin by-catch, to the forefront of American society. A recent biology graduate from

[140] Inter-American Tropical Tuna Commission, 1966 Annual Report, 1967, 42.
[141] Ibid, 43-44.

San Diego State University and a former member of the United States Air Force, Perrin's initial work with the BCF had nothing to do with dolphins or by-catch issues in the American tuna industry. Indeed, Perrin was hired to collect data on the sinking rate of purse seine nets so that manufacturers could re-design them to help fishermen more efficiently catch tuna.[142] It was only once aboard the tuna purse seiner *Conte Bianco* that Perrin became aware of massive by-catch associated with the industry. As Perrin later recalled:

> The most amazing part [of the trip] was the use of dolphins… many dolphins died despite the crew's best efforts… I started to keep track of the number of dolphins captured and the larger dolphin kills. I estimated that up to a thousand dolphins, mostly [spotted dolphins], were captured at a time and that 150 to 400 dolphins were killed in some sets. The total for the 20 sets, or those for which I made rough notes, was more than 1,200 killed, perhaps as many as 2,000. I didn't know what to make of the whole thing. I had never heard of the involvement of dolphins in fishing for tuna and vowed to myself to read up on it when I returned to San Diego.[143]

For Perrin, the trip aboard the *Conte Bianco* was a pivotal moment in his young career as a scientist. Following up on the issue once he returned to San Diego, Perrin was shocked to learn that nothing had been published on dolphin by-catch in the ETPO.[144] While scientists he talked to at the BCF's Fishery-Oceanographic Centre in La Jolla commented that they were aware of the problem (due in part to Waller's earlier research), they did not consider it a major issue. As Perrin later reflected, "it slowly dawned on me that maybe I had been witnessing a huge ecological happening that hardly anyone in the public or the scientific community knew about."[145]

[142] William F Perrin, "Early Days of the Tuna/Dolphin Problem." 293.
[143] Ibid, 294.
[144] Ibid, 295.
[145] Ibid, 295.

Perrin's first-hand observations of dolphin deaths aboard the *Conte Bianco,* coupled with the realization that he had stumbled upon a little-known ecological catastrophe, spurred him to pursue the issue further through his graduate studies. He began his doctoral studies at UCLA in the fall of 1967, under the supervision of Dr. Kenneth Norris. A renowned cetologist, Norris had pioneered work on dolphin echolocation and behaviour during the 1960s as Director of the Oceanic Institute in Hawaii. Although Norris himself had not conducted research on the tuna-dolphin relationship, he had been made aware of the association, and subsequent by-catch issues, through correspondence with Waller when the latter worked at the BCF.[146] Aware of the harm American tuna fishing practices could have on the ETPO's dolphin populations, Norris agreed to supervise Perrin's work and encouraged him to investigate the issue further.[147]

Over the next two years, Perrin conducted two more research trips. In June 1967, he worked aboard the *Independence*, the same boat that Waller had conducted research upon three years earlier. Unfortunately for Perrin, the *Independence* remained in the waters near southern California and northern Mexico – too far north to encounter schools of tuna with dolphins. The following April, Perrin set out again aboard the *Carol Virginia*, travelling farther south to the waters off Central America. During the thirty-day trip, the *Carol Virginia* made 15 sets on dolphin schools, catching 312 tons of yellowfin tuna. Taking more accurate observations than he had on his first trip, Perrin recorded that

[146] Ibid, 298.
[147] Randall Jarrell and Irene Reti, *Kenneth S. Norris: Naturalist, Cetologist, & Conservationist, 1924-1988. An Oral History Biography* (Berkeley: University of California Press, 2010), 92.

the crew killed 1,697 dolphins, or roughly 5.44 dolphins per ton – almost an identical figure to Lopes' estimates from 1964.[148]

Despite Perrin's findings, scientists at the BCF remained skeptical about the true extent of the by-catch problem. Discussing his observations later that year in a meeting with regional director Gerald V. Howard, Perrin recalls that "[Howard] raised his eyebrows and said that it was 'just a horseback estimate' (very crude) and that I should not talk it around or 'first thing you know, we'll have a big porpoise program here."[149] While it is unclear why Howard did not want a "big porpoise program" at the BCF, his concerns regarding Perrin's estimates seem understandable. At that point, Perrin's conclusions were based on a limited sample size. In 1968, the American tuna industry consisted of 104 purse seine vessels with captains that utilized individual variations of the fishing on porpoise technique to catch yellowfin tuna. The 312 tons of yellowfin tuna captured by the *Carol Virginia* during Perrin's research trip represented less than 1 percent of all yellowfin tuna caught by American tuna fishermen in 1968.[150] Even if one included Perrin's earlier observations, and those from Waller and Lopes, the total sample size was still quite small. Perrin's findings from the 1968 trip were indeed indicative of a major by-catch problem, but whether these figures were representative of the whole fleet or just for a few ships like the *Carol Virginia* was unknown at the time.

Further, Howard's motivation for keeping Perrin's work out of the spotlight may have also come from his position as a senior member of the BCF. Indeed, it is important to note that the BCF fell under the Department of the Interior and had a "clear mandate to

[148] William F Perrin, "Early Days of the Tuna/Dolphin Problem." 295.
[149] Ibid, 296.
[150] Inter-American Tropical Tuna Commission, 1968 Annual Report, 1969, 122. These catch totals are for the area managed by the IATTC and do not include catches made outside of the Commission's Yellowfin Regulatory Area (CYRA).

promote the special interests of the commercial sector."[151] Perhaps Howard believed that acknowledging and publicizing the existence of these mass dolphin mortalities could harm the public's perception of the industry and thus the industry's economic prosperity.

Although Perrin himself admitted that his data were "quite crude," and his findings rough and preliminary, he believed they were worth sharing with the broader scientific community. When the chance came to present his research at the sixth annual Conference on Biological Sonar and Diving Mammals at Stanford University in 1969, Perrin jumped at the opportunity. He had written articles about the use of dolphins by American fishermen in journals such as *Sea Frontiers* and *Modern Fishing Gear of the World*, but he had yet to publish anything about mortality rates associated with the tuna industry. The conference provided Perrin with a platform to share his results with his fellow scientists in a more direct fashion than his written articles had allowed.

For Perrin, the purpose of his talk was to "stimulate interest in the problem and to obtain constructive feedback from [those in attendance]." Aware of the BCF's skepticism (as embodied by Howard's earlier remarks) and of his limited sample size, the young scientist cautioned his audience that "the data I am using are preliminary and few in number and inferences that I draw from them should not be construed as conclusions."[152] Perrin began by describing how American fishermen utilized dolphins to catch yellowfin tuna and showed a short film he had shot aboard the *Carol Virginia* that highlighted the process. He then proceeded to explain the statistics he had collected in 1968. Again noting his small sample size, Perrin argued that, based on his results, roughly "244,000

[151] Arthur F McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980,* 195.
[152] William F. Perrin, "The Problem of Porpoise Mortality in the U.S. Tropical Tuna Fishery," 45.

porpoise, about a quarter of a million" died at the hands of American tuna fishermen each year.[153]

For the cetologists in the audience familiar with the impacts of commercial whaling, Perrin's estimates of dolphin kills must have seemed alarming. Perrin's "quarter of a million" figure for one year of dolphin kills in the American yellowfin tuna fishery equaled the total number of baleen and sperm whales killed by the international commercial whaling industry between 1960-1969.[154] If the sheer magnitude of dolphin kills was not enough to capture the audience's attention, the young scientist pressed forward, arguing that current by-catch rates were greater than the dolphins' rate of reproduction. Furthermore, Perrin noted that the structure of dolphin catches in the ETPO shared parallels with the Russian Black Sea dolphin fishery in the years before it collapsed in 1966. In the Russian fishery, the percentage of male dolphins caught fell from 40-60 percent of the total catch in 1930s to 20-25 percent by 1964. Based on Perrin's sexing of 423 spotted dolphins, only 15.7 percent of those sampled were adult males. This meant that the vast majority of the catch was made up of female and juvenile dolphins – an ominous sign for the future of the population.[155]

In addition to the current pressures exerted on dolphins in the ETPO, Perrin argued that these dolphins faced even greater pressures if a country chose to develop a dolphin fishery in the region. Indeed, Perrin highlighted that dolphin fisheries existed across the globe, in places such as Japan, the Solomon Islands, New Guinea, the Black Sea, and South America.[156] These dolphins were used for both oil and human

[153] Ibid, 45.
[154] This figure was determined by examining IWC catch totals between 1960-1969.
[155] William F. Perrin. "The Problem of Porpoise Mortality in the U.S. Tropical Tuna Fishery," 46.
[156] Ibid, 45.

consumption. While Americans had historically not consumed whale or dolphin meat, it did not seem unrealistic to assume that a foreign nation, such as the Japanese, could establish a dolphin fishery in the ETPO. [157] Already fishing for tuna in the ETPO, it would be easy for the Japanese to also establish a dolphin fishery in the region. As the world's whale populations continued to fall, the potential to turn to dolphins and other small cetaceans as food sources did not seem so farfetched.[158]

For the marine mammal scientists in the room, Perrin's speech came as a shock. Although some may have been aware that fishermen utilized dolphins to catch yellowfin tuna, no one had guessed just how harmful American fishing practices were on dolphin populations. And yet, according to this scientist, spinner and spotted dolphins in the ETPO faced possible extinction in the foreseeable future if American tuna fishing operations continued as they did. By the end of his presentation, Perrin had taken a little known issue and framed it as one of the most pressing environmental problems of the period.

It is important to note that while Perrin's findings shed light on a relatively obscure issue, some American tuna fishermen had been attempting to ameliorate dolphin mortalities in their industry for decades. Although environmentalists and many Americans later vilified American fishermen for fishing on porpoise, preventing dolphin deaths was a priority for purse seine fishermen as early as the 1940s. After all, dolphins were vital to the industry's success. The ability to fish on porpoise provided American

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[157] Nancy Shoemaker's "Whale Meat in American History." *Environmental History* 10 no. 2 (2005): 269-294 examines the reasons why whale (and dolphin) meat never became a staple food source in the American diet. According to Shoemaker, cultural unfamiliarity with whale meat, and its association with poverty and barbarism, led to its absence on many Americans' kitchen plates during the nineteenth century.
[158] George Getze, "Seining of Schools Told: Porpoises Threatened with Extinction, Professor Says." *The Los Angeles Times*. April 17th, 1971.

fishermen with an advantage over foreign competitors and the adoption of this technique had, in part, helped revive the industry following the economic difficulties of the early 1950s. By the 1960s, the economic prosperity of the industry was linked to the long-term survival of dolphin populations. If the industry was to continue to be competitive and profitable into the future, dolphin populations needed to be sustained. For tuna fishermen, this meant limiting the number of dolphin mortalities.

In addition, many fishermen looked to avoid dolphin by-catch for more immediate and practical reasons. A large catch of dolphins in a purse seine net could slow fishing operations significantly and reduce the amount of time spent catching more tuna. While the use of dolphins allowed fishermen to track schools of tuna, separating them from dolphins proved to be both difficult and dangerous. Dolphins caught in the nets placed greater strain on the power-block, significantly slowing the retrieval of the net. The longer it took to bring a catch onboard, the greater the chance that the load might spoil in the warm tropical waters. Moreover, any dolphins brought through the power-block (which was positioned high above the deck) could potentially break the machinery or could fall and injure fishermen below.[159]

In order to save dolphins, avoid damage to gear, and speed up the retrieval process, some courageous tuna fishermen jumped into the nets to free dolphins by hand. August Felando, general manager of the ATA during the 1970s and son of an immigrant purse seine fisherman, remembers jumping into the water to help dolphins over the cork line as a young boy in the 1940s.[160] American fishermen Harold Cary, Ed Silva, Vincent

[159] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 91.
[160] August Felando, Interview with Robert G. Wright, September 5th, 1995. *San Diego History Center Oral Histories.*

Battaglia, and Larry Canepa, also recall seeing men jump into the purse seine nets in order to save dolphins.[161] As Canepa remembers:

> We'd take out as many as we could. We'd have a man on each side -- the net was in a circle with the big skiff out there tied to it to keep it up and the rest on the boat. So here we had this big net full of tuna and porpoise with a shark or two mixed in, and we used to get right in there with them.[162]

Ed Silva recounted that "[fishermen] tried to save every one. We even put men in the water pushing them over the side, the ones (porpoises) that got stuck in the nets." Vincent Battaglia reflected that "everybody on those boats went into the nets… maximum effort was made to save the porpoise." While these fishermen remember seeing men jump into the water, it is difficult to tell whether this practice was widespread throughout the fleet or confined to a few courageous individuals. There were many risks that may have deterred many fishermen from leaping into the water. For example, the presence of sharks inside and outside of the nets made the process especially dangerous for fishermen and dolphins. Even when fishermen did get dolphins out of the nets, some still died from exhaustion and lack of oxygen. "We'd slide a lot of them over, but a lot of them was too late. They'd be dead already."[163] Removing dolphins by hand also took considerable time – time that could be spent searching for more tuna. While some individuals may have tried all they could to save dolphins, it is difficult to believe that all captains or fishermen would consistently risk their lives for these animals.

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[161] Harold F. Cary, Interview with Robert G. Wright, November 19th, 1988. *San Diego History Center Oral Histories*; Edward Silva, Interview with Robert G. Wright, January 6th, 1990. *San Diego History Center Oral Histories*; Vincent Battaglia, Interview with Robert G. Wright, March 3rd, 1991. *San Diego History Center Oral Histories*; Larry Canepa, Interview with Robert G. Wright, June 11th, 1988. *San Diego History Center Oral Histories*.

[162] Larry Canepa, Interview with Robert G. Wright, June 11th, 1988.

[163] Larry Canepa, Interview with Robert G. Wright, June 11th, 1988; Edward Silva. Interview with Robert G. Wright, January 6th, 1990; Vincent Battaglia. Interview with Robert G. Wright, March 3rd, 1991.

As more fishermen converted to purse seine vessels during the "Purse Seine Revolution" of the late 1950s and early 1960s, newer and safer techniques were developed to separate dolphins from tuna catches. Some of these were technological innovations, like the "Shark-dumper," a "wire mesh belt conveyor built almost flush with the deck" from which unwanted sharks and dolphins could be sent overboard. The first "sharkveyor" was installed upon the tuna purse seiner the *Royal Pacific* in 1961.[164]

While the shark-dumper was one innovative technique for returning dolphins to the ocean, it still did not address the problem of separating dolphins from tuna while the nets were still in the water. Captain Anton Misetich of the *Anthony M*. developed the most effective method for this in 1959. Referred to as the "back-down" procedure, the maneuver aimed to separate the two species while the nets were still in the water, thus relieving the time and energy spent removing dolphins by hand. The back-down procedure began after a set had been made on a school of dolphins and tuna. Once the set had been secured, the captain would retrieve two-thirds of the net, leaving the rest in the water on the boat's port side. At this point, the captain would put his vessel into reverse, causing the net to narrow and forcing the far end of the net's corkline to sink just below the water line. This allowed the dolphins to escape without the loss of the tuna, located deeper in the net.[165]

For Misetich, the development of the back-down procedure was spurred by immediate and practical concerns. Like other captains, he worried about high dolphin mortalities, the damage dolphins could cause to his equipment, and possible injury to his

[164] "Royal Pacific: First of New Fleet." *Pacific Fisherman.* October 1961, 19.
[165] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 91-92.

crew.[166] The procedure greatly reduced these risks and proved to be an immediate success. Following his first test, he was able to report that, "most of the porpoise [escaped] alive from the net."[167]

Word of Misetich's new technique spread throughout the fleet. By the time Perrin gave his speech in 1969, the overwhelming majority of tuna fishermen in the ETPO were using the back-down procedure.[168] Although scientists at the BCF and the IATTC were unaware of the sheer magnitude of dolphin mortalities in the early- to mid-1960s, they were well-aware of the back-down procedure. Whitney, Waller, and Perrin all witnessed it in action and commented on its ability at removing dolphins from purse seine nets. Perrin highlighted the procedure in his talk at Stanford University but believed it came too late in the fishing operation. "It can take 30 minutes or more to get half or three quarters of the net in, and by that time, a lot of animals have already died."[169] For Perrin, other dolphin saving initiatives needed to occur before fishermen started backing-down. Although the procedure helped prevent some dolphin deaths, incidental kills still numbered in the hundreds of thousands ten years after the technique was first developed.

In the months following Perrin's presentation, dolphin by-catch became a greater priority for the BCF. At the request of Dr. Alan Longhurst, Director of the BCF Fishery-Oceanographic Center in La Jolla, a research program was established in February 1970

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[166] Ibid, 91.
[167] Ibid, 92. It is not surprising that Captain Misetich developed the "back-down" procedure. Indeed, Misetich was a pioneer in the tuna industry throughout the 1950s, as he looked for new ways to efficiently catch yellowfin tuna in the ETPO. As mentioned in the previous chapter, he was the first tuna captain to test the Puretic power-block and to utilize nylon netting in the mid-1950s. His positive endorsements of both products helped spur the "Purse Seine Revolution."
[168] Ibid.
[169] William F. Perrin, "The Problem of Porpoise Mortality in the U.S. Tropical Tuna Fishery," 48.

to develop methods to reduce dolphin mortality.[170] Due to financial constraints, only $30,000 was provided for the initial program. The BCF suggested that Howard and Perrin, the leaders of the project, proceed under Perrin's assumptions, that "dolphin kill was high, that dolphin schools were important to the fishery, and that we give immediate priority to the proposed mitigation and gear research."[171] For Howard and Perrin, their first tasks were to:

> (1) contract an engineering firm for development of an electronic sound emitter to herd dolphins and test it in the net at sea, (2) pay overtime for observers on tuna boats said to be particularly skilled at "backing down" to remove dolphins from the net, (3) test reactions of captive dolphins to the concept of a quick-opening gate, and (4) build an experimental gate in the net for testing at sea in the 1971 season.[172]

The use of sound emitters and a hydraulic gate were two ideas that the BCF felt could work well with the back-down procedure. Building upon Whitney's earlier work, Howard and Perrin hoped that the sound emitters could herd dolphins away from the boat and toward the back of the net. Here, the dolphins could escape through a small opening that could be quickly opened or closed to prevent the loss of tuna with the dolphins.[173] Placing observers on board tuna vessels could also provide information on how many dolphins died during each set, how dolphins behaved in the net, and how they responded to certain stimuli and rescue methods. As most of these initiatives required the co-operation of tuna fishermen, Longhurst reached out to the ATA's general manager, August Felando, to develop a partnership between scientists and fishermen.[174]

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[170] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 104.
[171] William F Perrin, "Early Days of the Tuna/Dolphin Problem." 299.
[172] Ibid, 299-300.
[173] Ibid, 301.
[174] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 103.

Like the BCF, the ATA had also become aware of Perrin's research by early 1970, even before Longhurst contacted the industry. For the ATA, Perrin's conclusions that fishermen were killing a quarter of a million dolphins each year came as a complete shock. As Felando reflected:

> The Staff and Officers of the ATA could not accept Perrin's estimate that for every ton of yellowfin landed, over 5 porpoise had died… the question was whether the porpoise mortality experience aboard the *Conte Bianco* in 1966 and on the *Carol Virginia* in 1968 could be used to estimate the porpoise mortality experience for the entire fleet in 1970.[175]

The ATA worried that Perrin's experiences aboard the two vessels were a poor reflection on the rest of the fleet. Despite their rejection of Perrin's findings, there was no way to verify or discredit his results. American tuna captains at the time maintained detailed logbooks that recorded when tuna were caught with dolphins, but they were not required to record dolphin mortalities.[176] As such, even the ATA was unsure how many dolphins died in their industry each year. For an industry that relied so heavily on these marine mammals, this lack of information worried some members. Although the ATA believed that dolphin mortalities were an internal problem best solved by tuna fishermen, they agreed to work with the BCF "to reduce porpoise mortality to its lowest practical level."[177]

The first joint test between the BCF and the ATA occurred in December 1970. Organized by Felando, the tuna purse seiner *Conquest,* captained by Richard Madruga and his brother Joseph, made a one day-trip off the coast of San Diego to test the BCF's sound emitters and hydraulic gate on a pod of long-beaked common dolphins, a sub-

[175] Ibid, 103.
[176] Ibid, 103.
[177] Ibid, 104.

species of dolphin that did not commonly associate with yellowfin. By this point, the BCF had spent two months testing their equipment on five captive spinner dolphins at Norris' Oceanographic Institute in Hawaii. While the tests produced mixed results, the team from the BCF believed that, provided the right stimuli, the wild dolphins would be able to escape through the gate and back into the open ocean.[178]

As Perrin later recalled, the initial sea trial was less than successful. "The gate worked well mechanically, and the emitters had a repelling effect inducing [the dolphins] to swim away. It was impossible to herd them toward the gate, however, as they seemed more afraid of the net's corkline than the emitters."[179] After several unsuccessful attempts to herd the dolphins toward the gate, Captain Madruga used the back-down procedure to remove them from the net. All but seven dolphins escaped alive.[180]

The fact that the team chose to set on long-beaked common dolphins instead of spotted or spinner dolphins may have negatively affected the experiment. As Perrin later noted, different species of dolphins reacted differently once captured in the nets. For example, spotted and spinner dolphins often "rafted" near the surface of the net when caught by fishermen. In contrast, common dolphins constantly dove to the bottom in an attempt to escape.[181] This action could result in higher mortalities if these animals got caught in the webbing. While it is unclear whether these tests may have been more successful on spotted or spinner dolphins, the fact that they chose to work with a sub-species not commonly used by fishermen may have affected the outcome.

[178] William F Perrin, "Early Days of the Tuna/Dolphin Problem." 302.
[179] Ibid, 301.
[180] Ibid, 301.
[181] Ibid, 302.

For Perrin, the sea trial produced mixed results. The tests had shown that the sound emitters were indeed effective at keeping dolphins near the top of the net's water column but not at driving them toward the gate's opening. In addition, "it was obvious that the prototype system was too cumbersome and potentially unsafe for the operating crew."[182] Adjustments would need to be made for future tests. Further, Perrin noted that Madruga "dislike[d] the complexity of the 'gate' idea, but showed considerable interest in the use of sound devices."[183]

The second joint experiment did not occur until the following year. In September 1971, BCF scientists, accompanied by a *Life* magazine photographer, set out aboard the *Westport* to test their re-worked system on schools of short-beaked common dolphins. For this test, Perrin and his team had re-configured the hydraulic gate and changed the sound used to repel dolphins from the net. This time, Perrin opted to use the calls of killer whales, banking on the recent success achieved by scientists with the Naval Undersea Research and Development Centre (NURDC) at driving beluga whales from salmon streams in Alaska.[184]

Despite Perrin's high hopes, the second experiment was a disaster. On the first day, Perrin reflected that "the dolphins responded with more alacrity to the killer whale screams than the long-beaked common dolphins had to the white noise [the year prior], but their behaviour was erratic; they refused to be herded to the gate, and, again, had to be released with a backdown. Fifteen dolphins died."[185] The second day proved to be even worse than the first. While the orca calls drove the dolphins to the gate, they

[182] Ibid, 300.
[183] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 106.
[184] William F Perrin, "Early Days of the Tuna/Dolphin Problem." 301.
[185] Ibid, 301.

slammed into the netting just below the opening. The tests left 71 dolphins dead in the nets. The *Life* photographer on board took numerous photos of the dolphins that lay dead in the net and later on the deck but, "perhaps luckily, the pictures never appeared; the story was preempted by the death of Khrushchev the next week."[186]

At the same time that the ATA and BCF were testing the Bureau's experimental devices, tuna captains continued to explore new ways to remove dolphins from their nets. Captain Harold Medina made the most promising breakthrough during the 1970 fishing season. A second generation tuna fisherman, Medina had seen how dolphins had often gotten their rostrums stuck in the netting, both before and during back-down operations. Medina believed that dolphin entanglements could be greatly reduced by changing the netting size in the area where the corkline sank below the water during the back-down procedure. For Medina, a smaller netting of two inches (as opposed to four and one-fourth inches) in this area of the net, "would allow the porpoise to escape from the netting. They would be able to use the netting to slide over the sunken floats, clear and free."[187]

Medina tested the new smaller mesh panel in January 1971, less than a month after the BCF's first failed experiment. As he later reported to Felando, his first tests were a great success, "as it had virtually eliminated porpoise entanglement before and during 'Back-down'."[188] By that fall, ten other vessels had inserted or ordered the so-called "Medina Panel" for their own vessels.[189] For tuna fishermen, the Medina Panel was a simpler innovation than the BCF's hydraulic gate. It was much easier to install on pre-

[186] Ibid, 301.
[187] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 105.
[188] Ibid, 107.
[189] Ibid, 107.

existing nets and produced better results than the hydraulic gate had up to that point. Much like the back-down procedure, the Medina Panel was yet another innovative development created by tuna fishermen to reduce dolphin mortalities within their industry.

While this gear modification offered promising results, it is unclear whether fishermen would have experimented with new dolphin saving initiatives had the industry's by-catch problem not been publicized by Perrin. By his own account, Medina had captained a tuna purse seine vessel since 1961 and had made more than 750 sets on tuna-dolphin schools prior to the Medina Panel's creation.[190] It seems curious that, after all of these sets, Medina only conceived of this new net modification in 1970. Perhaps Perrin's presentation, or fears of a potential public relations nightmare, made saving dolphins a priority for the captain and led him to explore new initiatives to show that fishermen were committed to saving these animals. Regardless of his motivations, it appears that, following the disastrous second experiment by the BCF in December 1971, the Medina Panel was the most viable method to alleviate dolphin mortalities in the ETPO.

Despite the public nature of Perrin's presentation in 1969, and the subsequent work done by both scientists and the tuna industry to alleviate dolphin by-catch during 1970-71, the problem remained largely outside of America's political sphere. Most U.S. politicians did not become aware of mass dolphin mortalities in the yellowfin tuna fishery until the summer of 1971. The issue was first raised that July, during Congressional hearings on a proposed moratorium on whaling. Held by the Subcommittee on International Organizations and Movements, the hearings were organized to consider

[190] Ibid, 24 and 28.

proposed legislation that would instruct the Secretary of State to call for an international moratorium of 10 years on the killing of all species of whales. As the Committee's Chairman, Donald M. Fraser, highlighted:

> The need for more effective measures to protect the whale is obvious, for humanitarian and ecological reasons. Some of the larger species of whale are already virtually extinct, and the highly mechanized methods of modern whaling have accelerated the steady downward trend in world whale populations, particularly during the past 10 years… Today, this subcommittee hopes to find the best course of action for the US Government to take to protect this unique mammal from extinction.[191]

With the subcommittee concerned primarily with whales, the protection of smaller cetaceans, such as dolphins, remained largely off the agenda. Carleton Ray, a biologist at John Hopkins University and a witness for the hearings, was the first to raise the issue of dolphin protection and mass dolphin by-catch. Ray commented that the wording of the proposed bill created serious problems for the American tuna industry. In his opinion:

> I think, as Congressman Dingell pointed out, this bill needs to be expanded to include many of the things that this does not include. For instance, the first sentence, "Moratorium on the killing of all species of whales." That sentence alone kills off the America tuna industry, because the industry uses small whales to find tuna.[192]

Perplexed by the comments, Congressman Bingham pushed the scientist to elaborate on the subject. Ray proceeded to explain how fishermen utilized dolphins to catch tuna in the ETPO and noted that scientists and fishermen were attempting to ameliorate the situation. In Ray's opinion, "if you pass this resolution as it stands, whales include porpoises; and you can't kill a whale, therefore, you can't go tuna fishing."[193]

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[191] *International Moratorium of Ten Years on the Killing of all Species of Whales. Before the Subcommittee on International Organizations and Movements,* 92nd Cong., 1st sess., 2 (1971) (statement of Donald M. Fraser, chairman).
[192] Ibid, 36, (statement of Carleton Ray, biologist).
[193] Ibid, 36-37, (statement of Carleton Ray, biologist).

In addition to raising the issue of dolphin by-catch, Ray also highlighted the dangers facing dolphin and porpoise populations on a global scale. His sentiments echoed those raised by Perrin during his presentation in 1969. Like Perrin, Ray noted that other countries purposefully targeted dolphins for various reasons. Through these fisheries, Ray postulated that approximately 500,000 dolphins died in the world's oceans each year. On top of these current pressures, he believed that dolphin populations faced greater threats from humans in the near future, especially as countries like the United States placed greater emphasis on the protection of whales and phased out their use of whale products. "People are starting to catch [dolphins] now. The porpoises are going to be under the same gun as the whales are very soon."[194]

While Congress passed the resolution that June, "requesting the Secretary of State to call for an international moratorium of ten years on the killing of all species of whales," the lack of explicit protection for the world's dolphin and porpoise populations troubled some politicians.[195] On August 4th, New York Congressman Ogden R. Reid introduced legislation in the House of Representatives calling for a ten-year moratorium on the willful killing of porpoises and dolphins. In addition to the moratorium, Reid called on the Secretary of State to "encourage the development and implementation of international controls to minimize the incidental killing of porpoise and dolphins in conjunction with the catching of tuna." [196] Much as Ray and Perrin had done, Reid explained to his colleagues the relationship between dolphins and tuna in the ETPO and how hundreds of thousands of dolphins died as by-catch each year. "These friendly and intelligent mammals are being decimated because of commercial fishing practices… too

[194] Ibid, 52, (statement of Carleton Ray, biologist).
[195] This discussion continued and the U.S. pushed for a moratorium in 1972.
[196] 117 Cong. Rec. 29626 (1971) (statement of Rep. Ogden R. Reid)

many die before they can be released."[197] Again echoing Ray and Perrin, Reid also voiced his concern about the future of the world's dolphin populations:

> There has also been some speculation that since a 10 year moratorium on whales would mean that pet food products containing whale meat could not be imported into or sold in the United States, pet food manufacturers may turn to the harvesting of porpoises to make their products. This does not mean that I oppose a 10-year moratorium on the killing of whales. I support it most strongly, but feel that porpoises and dolphins, which are also members of the cetacean family, should be given equal protection.[198]

In Reid's opinion, his moratorium would not only protect the world's dolphins but also provide scientists with the time to properly study these animals. "There are no accurate figures available as to the number of porpoises and dolphins in our oceans; only the knowledge that the schools are becoming smaller and wilder, and that the population structure is changing… a moratorium is the only way to ensure that disaster does not await the porpoise and dolphin in the future."[199]

Reid's bill was forwarded to the House's Committee on Foreign Affairs for further review, yet it appears that the Committee took no further action on the matter. Although Reid's bill did not make it through the Committee, dolphin protection was still a key priority for American policy-makers in the early 1970s. By the end of the summer, more than forty bills had been introduced before both the House and Senate to protect dolphins and other marine mammals from destructive human activities.

It is important to acknowledge that Reid's bill, and the dozens of pieces of legislation dealing with dolphin and marine mammal protection, were introduced at a time in which many Americans were becoming more concerned about environmental issues and increasingly aware of the plight of many of the world's marine mammals. The

[197] Ibid, 29626.
[198] Ibid, 29626.
[199] Ibid, 29626.

practice of sealing in Alaska and Newfoundland gained notoriety during the 1960s, thanks in large part to the work of Brian Davies and the growing media attention the topic received in both countries.[200] The decimation of many of the world's baleen and sperm whale populations at the hands of the international whaling industry, and the failure of the International Whaling Commission (IWC) to protect these cetaceans, was also well-documented by 1971.[201]

In contrast, the plight of the world's dolphin populations was a relatively new revelation. The mass killing of dolphins by American fishermen was yet another example of the devastating impacts that humanity was inflicting upon the world's marine mammal populations. Despite Perrin's earlier cautioning that the information provided in his 1969 presentation was preliminary, newspapers across the country fixated on his estimates that over 200,000 dolphins died each year in the tuna industry. Some articles had this number closer to 400,000; one article in the *Los Angeles Times* stated that "the Smithsonian Institution estimated that 900,000 porpoises a year are drowned in the nets…"[202] These exaggerated figures only intensified the public's outrage toward tuna fishermen and heightened their concern for the future of the world's dolphin populations.

While the American tuna industry was indeed responsible for hundreds of thousands of dolphin deaths each year, newspaper articles in the early 1970s also emphasized the other dangers facing the world's dolphin populations, in much the same way Ray and Reid did in the political arena. On April 17, 1971, the *Los Angeles Times* carried a story entitled "Seining of Schools Told: Porpoises Threatened with Extinction,

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[200] Frank Zelko, *Make it a Greenpeace!: the Rise of Countercultural Environmentalism,* 243-245.
[201] Kurkpatrick Dorsey, *Whales and Nations: Environmental Diplomacy on the High Seas* (Seattle: University of Washington Press, 2014).
[202] Lynn Lilliston, "Battling Cruelty to Animals." *The Los Angeles Times.* March 16th, 1972.

Professor Says." Quoting Norris at length, the article worried that dolphins, like whales, faced extinction at the hands of American tuna fishermen and Japanese dolphin fishermen. With whale products banned in the United States, Norris also worried that "cat and dog food manufacturers will turn to porpoises as a substitute for the whales."[203] Similar articles appeared in *The New York Times* and *The Washington Post* later that summer.

As news of these threats became more well-known, American citizens, especially those in southern California, grew increasingly vocal in their concern for the fate of the world's dolphin populations. In response to an article on dolphin by-catch in the *Los Angeles Times*, Rita Rossol felt "total sadness and horror to [the killing of dolphins by American fishermen]. The willful killing of so many creatures seems unbelievable." In Michael Schwartz' opinion, dolphins were "truly incredible creatures – in many ways as remarkable as man himself; their slaughter should be a criminal act and one with significant penalties."[204]

This rising concern for dolphins and their protection in the world's oceans parallels the growing degree of cultural significance that cetaceans had gained in American society by the late 1960s and early 1970s. Historians, such as Jason Colby, Kurkpatrick Dorsey, Gregg Mitman, and Frank Zelko have argued that the relationship between humans and cetaceans underwent a drastic transformation in the middle part of the twentieth century. Many historians have traced the beginning of this change to the late 1930s, when Marine Studios in Florida became the first aquarium to display captive

[203] George Getze, "Seining of Schools Told: Porpoises Threatened with Extinction, Professor Says." *The Los Angeles Times.* April 17th, 1971.
[204] Rita Rissol, "Save the Dolphins." Editorial in *The Los Angeles Times.* February 22nd, 1972; Michael Schwartz, "Save the Dolphins." Editorial in *The Los Angeles Times.* February 22nd, 1972.

dolphins.[205] In the following decades, other aquaria throughout the United States, such as Marineland of the Pacific and Seaworld, acquired dolphins for their shows and exhibits. As the popularity for dolphin shows grew, aquaria throughout North America captured other cetaceans, such as orcas, belugas, and narwhals for their exhibits. These captive displays brought cetaceans into closer proximity with the American public and helped generate new understandings of these animals. Jason Colby has shown how the capture and subsequent display of orcas in the Pacific Northwest inspired new perceptions of these animals.[206] The live exhibiting of whales and dolphins in aquaria provided many Americans with the ability to view and interact with cetaceans in ways that had previously been impossible.

These captive settings provided scientists and environmentalists with the ability to develop new understandings about cetacean intelligence and humanity's relationship to these animals. Research by scientists like Norris, John Lilly, and Paul Spong uncovered new information about cetacean communication and intelligence. Inspired by their revelations, and the growing countercultural environmentalism of the 1960s, both Lilly and Spong believed that cetaceans represented a unique form of intelligence that came to symbolize an idealized form of ecological harmony that humans had yet been unable to achieve.[207] For other scientists and counter-culturalists that adhered to this philosophical view, the destruction of the world's cetacean populations by humans was

[205] Frank Zelko, *Make it a Greenpeace!: The Rise of Countercultural Environmentalism,* 183-4; Gregg Mitman, *Reel Nature: America's Romance with Wildlife on Film* (Seattle: University of Washington Press, 2012), chapter 7.
[206] Jason Colby, "The Whale and the Region: Orca Capture and Environmentalism in the New Pacific Northwest." 425-454.
[207] Frank Zelko, *Make it a Greenpeace!: The Rise of Countercultural Environmentalism*, 183.

incomprehensible and deplorable. This emerging philosophy influenced the future direction of Greenpeace during the mid- to late 1970s.[208]

Cetaceans, especially dolphins, also became more apparent in popular culture during the middle part of the twentieth century. Many popular books, like Robert Merle's *The Day of the Dolphin*, Farley Mowat's *A Whale for the Killing,* John Lilly's *Man and Dolphin,* and Joan McIntyre's collection *Mind in the Waters* helped re-shape Americans perceptions of cetaceans and humanity's relationship to these animals.[209] The growing presence of dolphins in film and television helped to further cement these animals in American culture. Films and television series such as *Marine Circus, Marineland Carnival,* and *Revenge of the Creature* helped to "[familiarize] mass audiences with the charismatic dolphin."[210] The 1946 Walt Disney film, *The Whale Who Wanted to Sing at the Met,* "created a sympathetic view of a creature whose only goal was to please humans and live in peace and harmony with the rest of nature"[211] By the time the hugely popular movie *Flipper*, and subsequent television series under the same name, were released in the mid-1960s, "Flipper's character as a playful, communicative, highly intelligent creature of the sea had been [already] been typecast."[212]

This growing presence in American popular culture, coupled with new scientific research, new environmental philosophies, and the continued growth of aquaria across North America, helped create new images and understandings of dolphins during the mid-twentieth century. As Mitman argues, "the dolphin's affectionate image was made,

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[208] Ibid, chapter 7.
[209] Frank Zelko, *Make it a Greenpeace!: The Rise of Countercultural Environmentalism*,189.
[210] Gregg Mitman, *Reel Nature: America's Romance with Wildlife on Film,* 168-169.
[211] Frank Zelko, *Make it a Greenpeace!: The Rise of Countercultural Environmentalism*,183.
[212] Gregg Mitman, *Reel Nature: America's Romance with Wildlife on Film*, 178.

not bestowed by nature."[213] By late 1971, these new cultural attitudes toward dolphins and other cetaceans were firmly entrenched in American society. As historian D. Graham Burnett argues, by this time, "cetaceans – an anomalous order of elusive, air-breathing marine mammals – had begun to serve as nothing less than 'a way of thinking about our planet.'" [214] These developments, coupled with the rising concern for the future of dolphins and other marine mammals, helps to explain the dozens of marine mammal protection bills introduced in the fall of 1971.

Hearings on Legislation for the Preservation and Protection of Marine Mammals began before the House's Subcommittee on Fisheries and Wildlife Conservation on September 9th, 1971. Over the course of four days, subcommittee members listened to testimony from politicians, conservationists, environmentalists, scientists, and industry experts as they voiced their support or opposition for the 36 bills before the House's Subcommittee.[215] At issue was the question of how best to preserve and protect marine mammal populations into the future. On the one side were bills that called for the outright protection of the world's marine mammals from all human activities. The most widely endorsed bill of this type was H.R. 6558, the so-called Ocean Mammal Protection Act (OMPA), introduced by Senator Fred Harris and House Representative David Pryor. Sponsored by 90 members of Congress, the bill called for a worldwide ban on the slaughter of all ocean mammals. In addition to its backing in Congress, Congressman Pryor noted that he had received signatures from more than 1,100 Americans in support

[213] Ibid, 158.
[214] D. Graham Burnett, *The Sounding of the Whale: Science and Cetaceans in the Twentieth Century,* 329.
[215] G. Carleton Ray and Frank M. Potter, Jr., "The Making of the Marine Mammal Protection Act of 1972." *Aquatic Mammals* 37 no.4 (2011): 523. Another six were also introduced in the Senate.

of the bill.[216] Under the regulations outlined in the OMPA, the tuna industry would be prohibited from using dolphins to locate, chase, or catch yellowfin tuna.

In contrast to the OMPA, other bills called for increased regulation and the scientific management of marine mammal populations. The most notable of these was bill H.R. 10420, sponsored by Congressmen Glenn Anderson of California and Thomas Pelly of Washington State, who were both strong supporters of the tuna industry. Indeed, Pelly had been a vocal ally of the industry during conflicts with Central and South American countries during the 1950s, while Anderson's representation of his southern California constituents had gained him a reputation as a "great friend" of tuna fishermen. Their bill H.R. 10420, also known as the Marine Mammal Protection Act (MMPA), called for the scientific management of all marine mammal populations. The MMPA introduced the idea of managing resources through their optimum sustainable population (OSP), as opposed to maximum sustained yield (MSY). As defined in the Act, OSP represented "the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the optimum carrying capacity of the habitat and the health of the ecosystem of which they from a constituent element." As Carleton Ray and Frank M. Potter Jr. argue, OSP, and its focus on the ecosystem as a whole, reflected a major change in the way scientists and governments managed marine mammal populations, "from the simplistic, narrowly based logistic equations of population dynamics" of MSY to a broader, more holistic approach.[217]

At the same time, the MMPA stated that no person would be allowed to take or kill a marine mammal without a permit or international agreement; these permits would

[216] Ibid, 523.
[217] Ibid, 544-545.

be subject to public review. Fines would be imposed on those who took or killed a marine mammal without a permit or above a set quota limit. Through the MMPA, all permits and quotas for cetaceans and pinnipeds (with the exception of walruses) would be overseen by the Department of Commerce while all other marine mammals would be overseen by the Department of the Interior. Finally, the MMPA would create a three person Marine Mammal Commission which, assisted by a nine-member Committee on Scientific Affairs, would review and oversee the entire program.[218]

The debates that occurred during the hearings centered predominantly upon the OMPA and the MMPA, and the question of whether marine mammal populations should (and could) be sustainably and scientifically managed for future human use or whether marine mammals should be placed under complete protection for various ethical and moral reasons.[219] In regards to the protection of the world's dolphin populations, the debates were further complicated by the fact that dolphins were vital to the survival of the American purse seine tuna industry. Any legislation that limited the ability for the American tuna fishermen to fish on porpoise could dramatically impact the future of the industry.

For groups and individuals concerned about negative human actions on marine mammal populations, the slaughter of dolphins by American fishermen highlighted the need for bills such as the OMPA. In her statement to the subcommittee, Alice Herington, a member of Friends of Animals, called for a complete ban on the killing of dolphins by American fishermen, arguing that "200,000 porpoise deaths is extremely high to be called 'accidental'… it is unconscionable that our Government permits the use of these nets…

[218] Ibid, 536.
[219] Ibid, 524.

with the passage of [bill H.R. 6558] this 'accidental' slaughter of porpoises will be eliminated."[220]

The Society for Animal Protective Legislation called the development of the purse seine net "an unecological triumph of efficiency." "Why is our country guilty of the most enormous killing of small cetaceans in the history of the world? Because the use of purse seine nets to save labour in the capture of tunafish."[221] Tom Garrett, a wildlife consultant with Friends of the Earth, argued that, "the killing of 200,000 or more *stenella* dolphins annually by the tuna industry requires immediate special attention."[222] Friends of the Sea Otter also voiced concern about the future of dolphin populations in the ETPO if no action was taken on the matter.[223] For supporters of the OMPA, the only way to save dolphins in the ETPO was to prevent American fishermen from fishing on porpoise.

In defense of their fishing practices and the tuna industry, ATA general manager August Felando and Captain Joe Medina highlighted for the Subcommittee the advancements the industry had made to save dolphins through the use of the back-down procedure and the Medina Panel. Although only ten vessels had modified their nets to include the Medina Panel by this point, Medina argued that, "I think this new net has been the salvation for us and I think we have the problem [of dolphin by-catch] licked."[224] Furthermore, the industry representatives stressed the dolphin's importance to their industry and the love that tuna fishermen had for their aquatic companion. In Medina's opinion, tuna fishermen did not want to kill dolphins but "will do anything to

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[220] *Legislation for the Preservation and Protection of Marine Mammals: Hearings before the Subcommittee on Fisheries and Wildlife Conservation,* 92nd Cong.., 1st sess., 89 (1971) (statement of Alice Herington, Friends of Animals member).
[221] Ibid, 491 (statement of the Society of Animal Protective Legislation).
[222] Ibid, 521 (statement of Tom Garret, Friends of the Earth member).
[223] Ibid, 125-126 (statement of Judson E. Vandevere, Friends of the Sea Otter member).
[224] Ibid, 348 (statement of Joe Medina, tuna captain).

save the porpoise." Adding to Medina's sentiments, Felando highlighted instances before the back-down procedure was developed, when fishermen had jumped into the nets to save the dolphins. "It is to our economic interest to keep the porpoise helping us and it is also extremely important to… get them out of the way as quickly as possible."[225]

The industry representatives also expressed their opposition to any legislation that limited the fleet's ability to utilize dolphins to catch yellowfin tuna. For Felando, the language used in OMPA that made it illegal to "take" or "harass" dolphins destroyed the technique that had made their industry competitive with foreign producers. Bills that utilized this type of language, and had fines associated with the killing or harassment of dolphins, "would be almost fatal to the U.S. fishing fleet."[226] In contrast, the MMPA would allow fishermen to continue to fish on porpoise under certain quota restrictions and Department of Commerce permits. Despite this accommodation, the industry representatives still believed that any regulation that limited their ability to use dolphins could severely hurt the American tuna industry and the livelihood of their fishermen.

While Felando and Medina argued that dolphin mortalities could be solved by industry initiatives, many scientists at the hearings stressed the need for greater government regulation and scientific research in order to sustainably manage dolphin populations in the ETPO. In their testimony to the subcommittee, Ray, Norris, and William E. Schevill voiced their support for the MMPA. As Ray argued, "it is important that the taking of marine mammals incident to commercial fishing operations be regulated. We feel that all individuals or groups taking marine mammals should be

[225] Ibid, 352 (statement of August Felando, American Tunaboat Association General Manager)
[226] Ibid, 355 (statement of August Felando, American Tunaboat Association General Manager)

brought under permit."[227] Howard Pollock, Deputy Administrator of the National Oceanographic and Atmospheric Administration (NOAA - formerly the BCF) also echoed Ray's sentiments and voiced his support for the MMPA, which would make NOAA, a branch of the Department of Commerce, responsible for dolphin capture permits and quotas. Conservation groups such as the National Wildlife Federation and American Humane Association also advocated the need for more science-based management and "not on the basis of emotional, philosophical, or moral judgments."[228]

Although the scientists in attendance agreed that management of dolphin populations was required to avoid mass mortalities, greater research was needed before this could be achieved. Indeed, their testimony reveals just how limited knowledge on dolphin populations was to that point. When asked by subcommittee members what population figures were in the ETPO, both Pollock and Norris had to admit that these totals were unknown. In Norris' opinion, "there has not been an opportunity to find out, really. The governmental program, while working in porpoises, is very small and lodged in very few individuals… without really much in the way of resources to see, to look at the animals, or with funds to develop technology in order to make reasonable counts."[229] Norris noted that this limited knowledge was also due to limited collaboration between NOAA and the ATA and NOAA's emphasis on dolphin saving technologies such as the hydraulic gate and sound emitters. The creation of the Marine Mammal Commission and a greater emphasis on scientific research and population studies would allow American

[227] Ibid, 404 (statement of Carleton Ray, scientist)
[228] G. Carleton Ray and Frank M. Potter, Jr., "The Making of the Marine Mammal Protection Act of 1972." 540.
[229] *Legislation for the Preservation and Protection of Marine Mammals: Hearings before the Subcommittee on Fisheries and Wildlife Conservation,* 413 (statement of Kenneth Norris, scientist)

scientists to learn more about dolphins in the ETPO and the effect that mass by-catch was having on their populations.

After the four days of testimony concluded, the Subcommittee chose to support the MMPA for consideration in the House. The House of Representatives passed the bill in April of 1972, forwarding it to the Senate for further review and debate. For those who had supported the OMPA, the protection of the world's marine mammals, and dolphins in particular, had been sacrificed for industry greed and scientific management. The *Baltimore Sun* argued that the bill was a "sell out" and that "anyone backing the [MMPA] must have ulterior motives."[230]

The *New York Times*, which had initially endorsed the OMPA, was especially critical of the House's decision, arguing that the MMPA "protects the profits of the tuna fish industry and means death for thousands of dolphins and porpoises every year." "What the public received in the House was blather about the need for more research, about better 'management' of these mammals, about a licensing system, and the creation of a totally unnecessary commission and advisory committee."[231] Congressman Burke of Florida contested that, "the committee-approved bill is about what the commercial fishing industry and hunters wanted. It provides a framework for protection of endangered animals, but it is full of loopholes and leaves us right where we started." The fact that the management of cetacean populations would fall to NOAA, which was under the Department of Commerce, and not to the Department of the Interior, did little to quell Burke's sentiments.[232]

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[230] *The Baltimore Sunday Sun.* December 19th, 1971.
[231] "Death for Dolphins." *The New York Times.* April 9th, 1972.
[232] Ibid.

As the MMPA progressed through the Senate, the bill underwent various amendments that gave the Departments of Commerce and Interior more discretion to issue permits and waive restrictions. Members in the Senate gave the tuna industry a two-year window in which they could continue to fish on porpoise without permits or quota levels. Following that period of time, the industry would need to obtain permits from NOAA and reduce their impact on dolphin populations "to insignificant levels approaching a zero mortality and serious injury rate."[233] Under these regulations, the industry would have more time to further develop dolphin-saving techniques and technologies on their own and in collaboration with scientists. Researchers would also have more time to study dolphin populations in the ETPO, develop OSP figures, and gain more accurate reports on dolphin kills before being required to regulate the tuna industry.

For the *New York Times,* these amendments weakened the "already unsatisfactory bill passed by the House." [234] For the tuna industry, however, these actions offered immediate relief from various aspects of the MMPA. The two-year exemption period, for example, gave fishermen time to prepare for and adjust to new fishing on porpoise restrictions – an important amendment for an industry that relied so heavily on dolphins to catch tuna. At the same time, fishermen, and scientists, now had more time to search for ways to reduce dolphin by-catch while still using the animals to fish for tuna. While the industry still faced greater restrictions in the near future, the Senate amendments helped fishermen avoid immediate regulatory action.

The amended version of the MMPA passed the Senate in July of 1972. President Nixon signed the MMPA into law on October 21st – one year after the first hearings in

[233]August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 127.
[234] "Dolphin Slaughter." *The New York Times.* July 25th, 1972.

front of the Subcommittee on Fisheries and Wildlife Conservation. As Ray and Potter later reflected, the passage of the MMPA was the legislative equivalent of a 100-yard dash.[235]

The speed at which the MMPA progressed from the Subcommittee on Fisheries and Wildlife Conservation and into law reflects both the growing concern many Americans had for the future of the world's marine mammal populations and the new cultural value that dolphins and other cetaceans possessed. Marine mammal protection was so important to Americans that during the hearings before the Subcommittee on Fisheries and Wildlife Conservation, Congressman Edward Garmatz remarked that:

> During my 24 years as a Member of Congress, I have never before experienced the volume of mail I have been receiving on the subject of ocean mammals. During the past few months, a steady flow of letters and telegrams has inundated my committee, they have averaged 200 a day, and all of them express concern over the way in which man is treating his fellow creatures of the earth – the ocean mammals.[236]

By the early 1970s, concern for many of the world's marine mammals, and cetacean populations in particular, was at an all time high in the United States. While this was partly due to the many dangers facing these animals, it is important to remember that, by the 1970s, whales and dolphins possessed greater cultural significance in American society than they had at the beginning of the century. Cetaceans were no longer viewed as potential commodities but as valued cultural and environmental symbols. Their captivity and prominence in American popular culture brought them into closer proximity with many Americans in a way that had not been possible in previous years. As such, the way

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[235] G. Carleton Ray and Frank M. Potter, Jr., "The Making of the Marine Mammal Protection Act of 1972." 543.

[236] *Legislation for the Preservation and Protection of Marine Mammals: Hearings before the Subcommittee on Fisheries and Wildlife Conservation,* 84 (statement of Edward Garmatz, Congressman and Chair of the Committee on Merchant Marine and Fisheries).

people perceived of and related to cetaceans changed drastically. Dolphins in particular were seen as friendly, helpful, and highly intelligent animals who lived in perfect harmony with their marine environment. For some Americans, dolphins were seen as humanity's aquatic cousins.[237]

It is unsurprising, then, that Perrin's revelation of mass dolphin by-catch in the ETPO generated the backlash and attention that it did in the early 1970s. The notion that American tuna fishermen knowingly killed hundreds of thousands of dolphins each year for their own commercial interests did not sit well with a society that had grown up watching *Flipper* and had witnessed dolphin shows at one of America's many aquariums. Reports by Perrin, Ray, Reid, and Norris that dolphins faced possible extinction because of these fishing practices, and other human activities, only heightened American sympathies for the dolphin and antipathies toward American tuna fishermen. For those Americans concerned about the plight of the world's dolphin populations, their protection from destructive human actions, such as fishing on porpoise, was vital if dolphins were to survive into the future.

Perrin's findings on dolphin mortalities in the American tuna industry brought one of the world's least known ecological catastrophes to the forefront of American society. In the years that followed, dolphin by-catch became an important environmental issue for scientists, politicians, environmentalists, conservationists, the tuna industry, and others concerned about the plight of the dolphin. Without Perrin's research, and the public nature of his findings, it is quite possible that dolphin by-catch in the ETPO may have remained an industry secret. It is clear that, prior to his presentation, neither the BCF nor the IATTC considered dolphin by-catch a serious problem. And while the tuna industry

[237] "To Kill a Cousin." *The New York Times.* November 8th, 1971.

had indeed developed initiatives to reduce dolphin mortality, Perrin's findings forced it to defend its fishing practices to scientists, government officials, and the American public.

Perrin's research also prompted politicians to find ways to prevent or at least reduce dolphin mortalities in the tuna industry. Environmentalists, conservationists, and many members of the American public also latched on to Perrin's dolphin mortality estimates in order to highlight the destructive nature of the American tuna industry and push for greater protection of the world's dolphin populations. Indeed, his research not only introduced the American public to the issue of dolphin by-catch but also to the other human-induced dangers that threatened these small cetaceans.

While the passage of the MMPA signaled a new era of dolphin protection and placed greater regulation on the America tuna industry, dolphin by-catch continued to be a major environmental problem into the mid- to late 1970s. Those who had supported the OMPA and the outright protection of the world's dolphins continued to attack American tuna fishing methods and called for even greater regulation to be placed on the industry. At the same time, scientists and the tuna industry looked to refine their dolphin-saving techniques to reduce mortalities to "insignificant levels approaching zero." In the years that followed, dolphin by-catch remained one of America's most important, and most pressing, environmental issues of the 1970s.

Chapter Three

Debates surrounding the tuna-porpoise controversy persisted throughout the remainder of the 1970s, as scientists, politicians, environmentalists, and the tuna industry attempted to navigate the new regulatory landscape set out by the MMPA. Following the Act's signing by President Nixon on October 21, 1972, the tuna industry was granted a two-year exemption from the MMPA's moratorium on the taking of marine mammals. During this time, tuna fishermen were free to fish on porpoise without permits and in the absence of catch quotas, so long as they worked to reduce dolphin by-catch to "insignificant levels approaching zero." Scientists at the National Marine Fisheries Service (NMFS), a division of NOAA, assisted fishermen with these efforts. At the same time, these scientists worked to develop information on population levels and OSP figures for dolphins in the ETPO, in order to determine appropriate dolphin catch quotas for the industry following the end of the exemption period.

Despite a significant drop in dolphin by-catch in 1973 and 1974, environmentalists, animal-rights activists, government agencies, and some politicians contended that the NMFS and ATA had not made adequate progress on the issue. These complaints and concerns were further driven by the fact that near the end of the two-year exemption period, NMFS scientists had failed to determine population levels or OSP figures for spotted, spinner, or common dolphins. With so little known about these dolphins, and with the end of the two-year exemption period looming, scientists granted the tuna industry a general permit, which allowed them to take an unlimited number of marine mammals from October 21, 1974 to December 31, 1975. For those concerned

with dolphin protection, the issuance of this general permit seemed incomprehensible, even negligent.

These concerns escalated in early 1976, when the NMFS reported that dolphin by-catch totals had increased during the 1975 fishing season. In response, more than a dozen environmental, conservation, and animal-rights groups launched legal action against the NMFS, arguing that the industry was not fulfilling its responsibilities under the MMPA. On May 11th, 1976, District of Columbia District Court Judge Charles R. Richey ruled in favour of the plaintiffs, asserting that the NMFS had failed to properly regulate the tuna industry and protect dolphins. Richey's decision marked the beginning of months of new legal challenges, stays, and injunctions as politicians, scientists, environmentalists, and the tuna industry argued their cases in court. At the same time, these groups continued to look for ways to ameliorate dolphin by-catch while also protecting the thousands of individuals who worked in the American tuna industry. Indeed, Richey's ruling kept the fleet in port for much of the 1976 fishing season and the first half of the 1977 fishing season. These months in port created uncertainty for fishermen and boat owners who were unable to make a living at sea and struggled to maintain the large upkeep associated with their tuna vessels.

While these court cases negatively impacted the American tuna industry, they resulted in the development of OSP figures for spotted, spinner, and common dolphins and the creation of government regulations that protected these animals and, for the most part, appeased both environmentalists and the tuna industry. This information, alongside new gear developments and stronger regulations, allowed the industry to reduce dolphin by-catch while continuing to fish on porpoise in accordance with the MMPA. By 1980,

these factors helped reduce dolphin by-catch in the American tuna industry to 15,305 animals – down from 315,000 in 1970.[238]

This reduction in dolphin by-catch did not come easily. This chapter explores the tuna-porpoise controversy of the 1970s and examines how various groups and individuals struggled to navigate the new regulatory landscape set out by the MMPA. While the MMPA created new guidelines and mechanisms to protect dolphins, certain groups involved in the controversy debated the effectiveness of these regulations and the NMFS' ability to enforce those policies. Indeed, the failure of the NMFS to quickly develop information on dolphin populations and propose specific quota levels hurt its legitimacy in the eyes of its critics. At the same time, the tuna-porpoise controversy was further complicated by the desire of certain groups to balance the economic considerations of the American tuna industry with dolphin protection. Although most hoped to see dolphin by-catch quickly come to an end, very few wanted to shut down the American tuna industry. A story filled with cooperation and conflict, the heated debates, gear developments, and scientific uncertainties of the 1970s led to a dramatic reduction in dolphin mortalities by the 1980s.

The fact that the MMPA made NOAA responsible for the regulation of dolphin by-catch and the enforcement of all permits and quotas spurred the agency to act on the problem. In the summer of 1972, as politicians continued to debate the MMPA in Congress, NOAA formed a Tuna-Porpoise Review Committee to assess the relationship

[238] Inter-American Tropical Tuna Commission, 1980 Annual Report, 1981.

between dolphins and the tuna industry and to determine a path for future research.[239] The Committee was comprised of seven scientists, including individuals such as Perrin and Norris, statistician Douglas Chapman, gear specialist Richard L. McNeely, and marine biologists William Fox and Dayton Lee Alverson.

After months of research, the Committee released its final report on September 8th, 1972. It revealed that Perrin's initial estimates on dolphin kills were generally correct, if not slightly underestimated. The Committee found that in 1970 and 1971 American fishermen killed approximately 315,000 and 205,000 dolphins, respectively.[240] Of the dead dolphins identified by observers aboard tuna vessels, spotted dolphins accounted for 74.5 percent of all dolphin by-catch while spinner and common dolphins accounted for 22.6 percent and 2.9 percent of total kills, respectively. Despite these high figures, and the large percentage of spotted dolphins taken as by-catch, the scientists argued that there was no supporting evidence to suggest dolphin schools in the ETPO were decreasing or that certain species faced potential extinction.[241]

As such, the scientists recommended that NOAA invest additional resources in assessing dolphin populations in the ETPO and acquire more information on their biology and life histories. The Committee also suggested that scientists continue to improve and develop new fishing gear and assist in the training of tuna captains and crew to more efficiently use the back-down procedure. Finally, the Committee emphasized that NOAA encourage all tuna purse seiners to utilize the Medina Panel, as their research showed that

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[239] Tuna-Porpoise Review Committee, *Report of the Porpoise Committee – Observation on the Status of Stocks and a Recommended Program to Reduce the Incidental Kill of Porpoise Taken in the Eastern Tropical Pacific Tuna Seine Fishery.* (San Diego: National Oceanic and Atmospheric Administration, 1972), 1.
[240] Ibid, 26. These estimates were based on 19 observed sets – Perrin's trip in 1968, 6 observer trips in 1971, and 12 observer trips in 1972.
[241] Ibid, 35.

it had the ability to reduce dolphin deaths in a normal set by as much as 36 percent on average. While the Committee's scientists believed these recommendations were indeed achievable, they stressed that any future solutions to the by-catch problem needed to be practical for implementation by the American tuna fleet. "Failure to recognize this fact will result in a severe blow to the U.S. industry and will almost certainly be counter-productive as regards the goal of substantially reducing loss of porpoise associated with tuna seine fishing."[242]

The findings and recommendations set out by the Tuna-Porpoise Review Committee provided a starting point for NOAA's dolphin by-catch program and coupled well with the requirements set out for the agency by the MMPA. As mentioned earlier, the MMPA granted the tuna industry a two-year exemption from the Act's moratorium on the taking of marine mammals. During this time, the tuna industry, in collaboration with scientists at NOAA and the NMFS, were directed to reduce dolphin mortalities "to insignificant levels approaching zero."[243] Noting the scare information available on dolphins in the ETPO, scientists with NOAA were further required to develop population figures and OSP levels for these animals.

Efforts progressed quickly. In December of 1972, the ATA hosted a workshop with gear experts, NMFS scientists, and tuna fishermen in order to develop new techniques and gear modifications to reduce dolphin mortalities. Another three workshops were held between then and August 1973.[244] In conjunction with these meetings, NOAA placed two new regulations on the tuna industry. The first required the

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[242] Ibid, 47-48.
[243] Marine Mammal Protection Act of 1972, 92nd Cong. (1972).
[244] *Oversight of the Marine Mammal Protection Act of 1972: Hearings Before Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 93rd Cong. 16 (1973-4) (statement of Frank G. Alverson, American Tunaboat Association Representative).

insertion of the Medina Panel on all tuna purse seiners by April 1st, 1974. The second required that all captains be trained on how to execute the back-down procedure.[245]

Observer reports from aboard tuna vessels revealed wide discrepancies in the skill level of tuna captains when using the method. NMFS observers reported that, while 10 percent of 211 observed sets resulted in no mortality, 15 percent of all observed sets accounted for 75 percent of the total dolphin kill. Although the ATA linked the majority of these deaths to gear failures and conditional factors such as strong tidal currents, the industry also noted that not all captains were equally capable of performing the back-down procedure.[246] In order for the industry to reduce dolphin by-catch, it was essential that all captains be able to perform it efficiently. This increased training, coupled with the growing adoption of the Medina Panel throughout 1973, produced immediate results – during the 1973 fishing season, mortalities fell by 20,000 animals, to a total of 175,000 dolphins.[247]

While the industry succeeded in reducing mortalities during 1973, scientists struggled to develop information on dolphin populations. The pelagic nature of spinner, spotted, and common dolphins, coupled with the fact that the American tuna fleet fished throughout roughly five million square miles of the ETPO, made the process especially challenging. On August 21st, 1973, during oversight hearings on the MMPA before the Subcommittee on Fisheries and Wildlife Conservation and the Environment, Brian Rothschild, Director of the Southwest Fisheries Center (SWFC - another branch of NOAA), commented that scientists had no information on whether dolphin populations

[245] Ibid, 6 (statement of Frank G. Alverson, American Tunaboat Association Representative).
[246] Ibid, 15 (statement of Frank G. Alverson, American Tunaboat Association Representative).
[247] Administrative Law Judge Recommended Decision in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 95th Cong., 1st sess., 307 (1977).

were increasing or decreasing. The SWFC's Director also acknowledged that little progress had been made in terms of the Tuna-Porpoise Review Committee's recommendations to investigate population size, natural mortality, or age and sex structure. Perhaps more worryingly, Rothschild noted that it was "difficult for [him] to say" whether scientists would have this information by October 1974, when NOAA was to begin establishing quotas on dolphin by-catch and grant permits for fishermen to fish on porpoise.[248]

These fears were echoed during oversight hearings in January 1974, when NMFS Director Robert W. Schoning commented that scientists still did not know the size and composition of spinner, spotted, or common dolphin populations. Schoning noted that the two-year period was an "unrealistically short time" in which to develop accurate population and OSP figures and to reduce dolphin mortality to levels approaching zero. Although he advised against it, Schoning worried that without this information, an extended timeline, or a drastic reduction in dolphin by-catch in 1974, politicians might be forced to shut down the industry.[249]

While members of the subcommittee recognized the decrease in dolphin mortality from 1972 to 1973, many worried about the future of the tuna industry. Subcommittee member Frank Potter, Jr., who had helped draft the MMPA, felt that NOAA's progress on dolphin by-catch was moving too slowly. "It seems to me this is a matter of considerable urgency. I am not sure of the degree of urgency that is perceived by the gnomes in Washington, but I can tell you that it seems to me at least to be a matter of

[248] Ibid, 64-66 (statement of Brian Rothschild, Director of the Southwest Fisheries Center).
[249] Ibid, 366 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).

considerable urgency."[250] Potter further commented that without the needed scientific information on dolphin populations, the subcommittee would have to shut down the industry or amend the MMPA. However, the scientist was quick to note that "I don't think it is the intention of the committee or the Congress to shut down the tuna fleet."[251]

Conservationists, environmentalists, and animal-rights activists present at the hearings echoed Potter's sentiments. Christine Stevens, Secretary for the Society for Animal Protective Legislation (SAPL), testified that she was encouraged by the industry's reduction in dolphin kills but felt that fishermen and scientists had still not done enough. While she and other members of SAPL planned to boycott tuna so long as dolphins continued to die in the nets, "we are not aiming to put the tuna fish industry out of business."[252]

In light of these concerns, the NMFS invested more funding and research into their population studies in order to develop accurate figures before the October 21st deadline. In early 1974, the NMFS began conducting aerial surveys over the ETPO. The agency also contracted a research vessel, the *David Starr Jordan,* to undertake sea-level observations. Scientists hoped that these observations, coupled with reports from observers aboard tuna vessels, could help provide more accurate population estimates.[253]

Despite these new initiatives, the NMFS made little headway. In March 1974, less than seven months before the expiration of the exemption period, the agency described existing dolphin population levels, population dynamics, and OSP figures as

[250] Ibid, 70 (statement of Frank Potter, Jr., scientist).
[251] Ibid, 66 (statement of Frank Potter, Jr., scientist).
[252] Ibid, 420 (statement of Christine Stevens, Secretary for the Society for Animal Protective Legislation).
[253] Ibid, 385 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).

"unknown."[254] Observers outside of the federal agency commented that the NMFS was moving too slowly and would not be able to fulfill its responsibilities by the October deadline. The most critical of these assessments came from the Marine Mammal Commission (MMC). Created through the MMPA to oversee the Act's execution, the agency was also responsible for monitoring other government agencies' work on marine mammal protection and to provide recommendations for future research. In a letter to Schoning on July 30th, 1974, MMC Executive Director John R. Twiss Jr. criticized the agency's work on the tuna-dolphin problem. The Director argued that "neither the kill statistics program nor the aerial reconnaissance program provides reliable data on the frequency of capture of individual animals, population sizes, population movements, or age related mortality." Twiss worried that, under the NMFS' current program, the impact of tuna fishing on dolphin populations "will be, at best, crudely and inadequately known."[255] Pressing his critique, Twiss further condemned the NMFS' work on reducing dolphin mortalities in the yellowfin tuna fishery. Commenting on the 1973 statistics, Twiss noted that "although progress has been made… the total kill and serious injury levels remain unacceptably high."[256]

Indeed, while dolphin kills in the American tuna fleet had fallen in 1973, mortality figures still numbered close to 200,000 animals. Recognizing the need to further reduce by-catch totals, fishermen, gear experts, and scientists searched for new ways to address the problem. Most importantly, NMFS scientists looked to prevent net

[254] Committee for Humane Legislation, Inc. v Richardson, 414 F. Supp. 297 (D.D.C. 1976).
[255] John R. Twiss Jr. to Robert W. Schoning, July 30th 1974, in *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 94th Cong. 275 (1975).
[256] Ibid, 275.

collapses during purse seine operations, as fishermen identified this as a leading gear malfunction in their industry. If a net collapsed or "rolled-up" while dolphins were still inside it the animals frequently became trapped and drowned in the netting. In response, scientists developed anti-torque purse lines, which they hoped would prevent net collapses. In addition to these new cables, scientists explored the use of speedboats as "miniature tugboats," which could be used to hold the net open during rough weather or if a collapse appeared imminent.[257] Initial tests found that these developments, alongside others like water current indicators, helped reduce dolphin mortalities by roughly 50 percent. In Schoning's opinion, the results "[were] encouraging."[258]

While these early assessments showed promise, they proved unsuccessful and divisive. Upon further use in the ETPO, tuna fishermen reported that the anti-torque cables broke more readily than normal cables. These breaks led to lost fishing time, costly repairs, and collapses that could be worse than conventional roll-ups. As a result, scientists and fishermen stopped using the modified netting.

Likewise, the use of speedboats proved to be contentious. In April 1974, the NMFS regulated that speedboats be used on every "problem" set. This was later amended to require speedboats on every set, regardless of weather or water conditions. Although speedboats had indeed been shown to prevent roll ups and help reduce dolphin mortalities during problem sets, many captains were reluctant to use the boats on every set. McNeely, considered by Schoning to be the NMFS' "top gear expert" argued that, "the use of speedboats on every set is unnecessary, unreasonable, and punitive. On most sets

[257] *Oversight of the Marine Mammal Protection Act of 1972: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 9 (statement of Frank G. Alverson, American Tunaboat Association Representative).
[258] Ibid, 212 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).

such use would have no effect on the porpoise mortality."[259] Others voiced concern that the sounds of the speedboats might scare dolphins and cause confusion in the netting, resulting in a wasted effort and higher mortalities.[260] This debate surrounding the effectiveness of speedboats continued throughout the remainder of the 1970s.

Despite these setbacks, the industry continued to make progress. Throughout 1974, it expanded its training programs and workshop sessions with tuna captains. In conjunction with earlier regulations, by April 1st 1974, all tuna vessels had modified their nets to include the Medina Panel – the best gear modification to date for reducing dolphin by-catch. By the end of the 1974 fishing season, dolphin mortalities had fallen once again, to 99,000 animals – a reduction of 76,000 deaths from the previous year.[261]

While fishermen, with the help of gear experts and scientists, had successfully lowered dolphin mortalities for a second year in a row, NMFS scientists failed to develop much needed information on dolphin populations. Yet even without these figures, the MMPA stated that the agency was required to regulate the American tuna industry's annual dolphin by-catch through a quota and permit system by October of that year. On September 5th, 1974, the NMFS issued a general permit, that, "allowed [tuna fishermen] to take, subject to [future] restrictions… an unlimited number of marine mammals during the period from October 21, 1974, to December 31, 1975."[262]

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[259] *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 94th Cong. 51 (1975) (statement of Richard L. McNeely, NMFS Gear Specialist).
[260] Ibid, 50 (statement of Glenn Anderson, Congressman).
[261] Administrative Law Judge Recommended Decision in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 95th Cong., 1st sess., 307 (1977).
[262] Committee for Humane Legislation, Inc. v Richardson, 414 F. Supp. 297 (D.D.C. 1976).

Supporters of dolphin protection, and those critical of the NMFS, were stunned. In response, the Environmental Defense Fund (EDF) sent a letter of protest to the NMFS, opposing the general permit. The MMC also responded critically to the permit, and to the NMFS' research on dolphins more broadly. Norris, then a member on the Committee of Scientific Advisors under the MMC, argued that while the NMFS "has assembled a remarkable body of useful information… crucial inadequacies exist and must be rectified."[263] Furthermore, he argued that:

> While the level of incidental kill has been declining in this portion of the fishery… the results simply do not appear to us to satisfy the requirements of the Act… We do not feel confident that the current regulatory and research program can be said to insure that incidental take will not be to the disadvantage of the porpoise stocks.[264]

Twiss echoed Norris' sentiments, criticizing the new regulations and the agencies work on dolphin by-catch. "The current program is not adequate to develop a solution or information which will alleviate our concerns [regarding dolphin by-catch]…" he argued. "Existing plans will produce no adequate data on… population trends due to fisheries impact." For Twiss, the NMFS' dolphin by-catch program "should be restructured to remedy these inadequacies."[265] Despite this opposition from the MMC and EDF, the regulations remained in place for the 1975 fishing season.

As the season progressed, concerns over the general permit and the state of the ETPO's dolphin populations continued to grow. The MMC in particular became increasingly worried about the state of spinner and spotted dolphins in the region. By the

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[263] *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 51 (1975) (statement of Kenneth Norris, scientist).
[264] Ibid, 285-289 (statement of Kenneth Norris, scientist).
[265] John R. Twiss Jr. to Robert W. Schoning, December 27th, 1974, in *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 94th Cong. 289-290 (1975).

beginning of 1975, the MMC argued that, based on the data available to them, "the spotte[d]… porpoise population is either, at best, under moderately heavy impact, or, at worst, just barely holding its own. The spinner porpoise… population seems to be in moderate to strong decline."[266] In light of these assertions, the MMC requested that the NMFS provide them with additional data on dolphin populations. Despite months of attempted communication, by May the MMC had received none of the information it had requested. As such, the MMC concluded that, on the basis of the best available data, spinner dolphins, and possibly spotted dolphins, were in decline. "The Committee recommends that the eastern spinner dolphin be designated as 'depleted' while the trends in the spotted dolphin population be carefully monitored in view of its apparently precarious state."[267] Robert Eisenbud, the General Counsel for the MMC, reiterated these concerns later in the year during the 1975 oversight hearings on the MMPA.[268]

The NMFS held a much different view on the state of these dolphin populations. A NMFS research report published in August 1975 showed "that the principal porpoise stocks concerned are either stable, or increasing or decreasing slightly… there are no conclusive indications that the populations are being depleted."[269] This position was also repeated at oversight hearings later that October. According to the MMC, the NMFS' contradictory position came from data that had not been made available to the MMC and that, in their opinion, was questionable. The differences between the NMFS and MMC's

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[266] Ibid, 290.
[267] Annual Report of the Marine Mammal Commission, Calendar Year 1976; a Report to Congress – January 31st, 1977, in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 95th Cong., 1st sess., 45 (1977).
[268] *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 17 (statement of. Robert Eisenbud, General Counsel of the Marine Mammal Commission).
[269] Ibid , 28 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).

conclusions seemed to have partly stemmed from to a lack of communication between the two agencies. Following the release of the NMFS' new research that August, the MMC requested a meeting to discuss the findings, only to be told that it would have to wait until December.[270] As Twiss later reflected, for the latter part of 1974 and much of 1975, "the NMFS, on a number of occasions, thwarted Commission efforts to gain data relevant to the tuna-porpoise situation."[271] Frustrated by this lack of cooperation and communication, Twiss threatened to file a statement with Congress to the effect that the NMFS was unable to fulfill its responsibilities under the MMPA. As a result, data was released.[272]

The lack of cooperation between the NMFS and the MMC likely resulted from the two very different mission statements that both agencies acted under. The MMC was primarily responsible for the protection of the world's marine mammals. In contrast, the NMFS, as a division of the Department of Commerce, was concerned with the protection of American fisheries and fishing interests. Any admittance by the NMFS that dolphins were indeed threatened by tuna fishing operations could negatively impact the profits of the American tuna industry. With no definitive information that dolphin by-catch depleted dolphin populations, the NMFS was not as willing as the MMC, who was not concerned with the commercial interests of the tuna industry, to list spotted and spinner dolphins as "depleted" or in danger. These conflicting mission statements contributed to

[270] Ibid, 3 (statement of Victor B Scheffer, Chairman of the Marine Mammal Commission).
[271] John R. Twiss, Jr. to Robert L. Leggett, November 11th, 1975, in *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 94th Cong. 274 (1975).
[272] Ibid, 274.

poor communication between the agencies and ultimately resulted in confusion over the state of spotted and spinner populations.

Concern for dolphins was also growing outside of the MMC. By 1975, environmental groups, such as Save the Whale and Project Jonah, had joined SAPL's lead and declared a boycott on all tuna products. As Project Jonah founder Joan McIntyre explained, "we could easily do without tuna sandwiches until they catch tuna in a better way. If tuna tastes like chicken, well then, eat chicken."[273] Later that year, the EDF and Save the Dolphins helped fund and produce *The Last Days of the Dolphins?*, a documentary that aired on national television showcasing the relationship between fishermen and dolphins in the ETPO. Among other things, the documentary showed dramatic footage of dolphins swimming and screeching in the tuna nets and being dragged, often injured, off the decks of the tuna boats. Narrator Bill Wattenburg accompanied these sensationalist scenes with commentary describing dolphins, in the eyes of tuna fishermen, as "an inconvenience, a worthless by-product." "Unless something is done to stop the slaughter," he concluded, "we may be presiding over the last days of the dolphins."[274]

This growing concern for dolphins was further heightened in October, during the 1975 oversight hearings on the MMPA. In his testimony, Schoning reported that, in spite of positive developments in recent years, "total porpoise mortality from U.S. fishing in 1975 will probably be greater than in 1974, likely in the range of 81,000 to 186,000."[275]

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[273] Harriet Stix, "Project Jonah a $15,000 Campaign: Stumping World to Save the Whale." *The Los Angeles Times.* November 20th, 1974.
[274] *The Last Days of the Dolphins?*. Youtube. Directed by Jim Crum. (KPIX, Westinghouse Broadcasting Co., Inc. 1975).
[275] *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife*

For Schoning, this increase in dolphin mortality was linked to a number of factors, such as an increase in the average number of sets made on dolphins and a slight rise in the number of dolphins killed per ton of yellowfin tuna (from 1.1 in 1974 to 1.2 in 1975). Most significantly, however, was a rise in the number of sets made on mixed tuna-dolphin schools. Schoning reported that, in 1974, only 48 percent of all yellowfin tuna was caught in association with dolphins; during the 1975 fishing season, that number neared 65 percent.[276]

This rise in the percentage of yellowfin caught with dolphins seems to have been caused in part by factors outside of the American tuna industry's control. Since the early 1950s, many Central and South American countries had extended jurisdiction over their territorial waters to 200 miles offshore. While tuna fishermen did their best to avoid altercations with foreign patrol boats, between 1961 and 1972 Central and South American patrol boats seized 175 American tuna vessels for fishing in disputed waters without licenses. Ecuador seized the overwhelming majority (125) of these vessels.[277] According to tuna captain Edward Silva, during the 1975 fishing season, Ecuador seized several tuna vessels, "harassed the crewmen, beat some of them up, took some of them to jail…" As such, tuna fishermen concentrated their efforts away from the Ecuadorean coastline and away from an area where they often caught "a large supply of fish not in association with porpoise."[278] Indeed, later research revealed that dolphins associate with yellowfin more frequently further away from shore in the ETPO. As such, on average, the

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Conservation and the Environment, 28 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).
[276] Ibid, 33. Later research revealed that this figure for the 1975 fishing season was lower, roughly 57%.
[277] Bobbie. B. Smetherman and Robert M. Smetherman, *Territorial Seas and Inter-American Relations: With Case Studies of the Peruvian and U.S. Fishing Industries,* 16.
[278] *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 211 (1977) (statement of Edward Silva, tuna captain).

percentage of yellowfin taken in association with dolphins increased as fishermen moved further from the Central and South American coastline.[279]

For those concerned for dolphins, the rationale behind this increased mortality was irrelevant – what was significant was the lack of progress. Conservationist Thomas Gause argued that, "the continued killing of porpoise and dolphins during tuna-fishing operations is a clear violation of the law. It is intolerable and indefensible from any standpoint whether humanitarian, ecological, or economic."[280]

Despite this backlash, the overwhelming majority of groups involved in the oversight hearings commented that they still supported the well being of the American tuna industry, so long as they stopped killing dolphins. As retired colonel and president of the conservation group Monitor, Milton Kaufmann, stated, "the environmental community has never taken the position that we want to drive the tuna industry to the financial wall."[281] Even Gause, who was especially critical of the industry's use of dolphins, proposed that the industry return to live-bait hook and line fishing methods, so as to avoid dolphin by-catch altogether.[282] While dolphin mortalities had increased in contradiction to the guidelines of the MMPA, subcommittee Chairman Robert L. Leggett asserted that "we are not going to destroy the tuna industry."[283] Indeed, it appears that very few individuals felt comfortable with the idea of shutting down one the country's

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[279] *Bills to Amend the Marine Mammal Protection Act of 1972 with Respect to the Taking of Marine Mammals Incidental to the Course of Commercial Fishing Operations: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 94th Cong., 2nd sess., 232 (1976) (statement of James Joseph, IATTC Director). Joseph noted that, for the five years prior to 1976, more than 90% of all yellowfin tuna caught outside of the Commission's Yellowfin Regulatory Area was taken on porpoise.
[280] *Oversight of the Marine Mammal Protection Act of 1972; To Review the Implementation, Administration, and Enforcement of the Act: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 28 (statement of Thomas Gause, the Northern Virginia Conservation Council member).
[281] Ibid, 63 (statement of Milton Kaufmann, Monitor President).
[282] Ibid, 98 (statement of Thomas Gause, the Northern Virginia Conservation Council member).
[283] Ibid, 10 (statement of Robert L. Leggett, Chairman of the Subcommittee on Fisheries and Wildlife Conservation and the Environment).

largest fishing industries. By 1975, roughly 30,000 Americans worked in the southern-California based tuna industry, either directly as fishermen or indirectly as canners and packagers.[284] While environmentalists and animal-rights activists wanted to see dolphin by-catch eradicated, very few groups wanted to see the industry shut down.

As the October hearings came to an end, scientists and the tuna industry continued to explore new ways to reduce dolphin by-catch. In late 1975, fishermen tested the "Bold Contender" system, which made use of a web "chute" to direct dolphins toward the portion of the net which would be lowered during the back-down procedure. On top of this, the experimental system used a smaller mesh netting of 1¼ inch in this area, as opposed to the two inches used in the original Medina Panel. As Schoning later highlighted, the Bold Contender tests resulted in an average kill per set of 0.7 dolphins - well below the average of 17 dolphins killed per set in 1975.[285] In conjunction with these tests, scientists and industry experts looked to strengthen their cooperation, in order avoid unproductive and duplicate research efforts. On January 2nd, 1976, representatives from the Tuna Research Foundation, the MMC, ATA, Fishermen's Union of America, United Cannery and Industrial Workers of the Pacific, and NMFS signed a cooperative agreement, in which they agreed to exchange relevant data and develop and coordinate future research and development projects.[286]

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[284] Jane Weisman Stein, "The Plight of the Tuna Fishermen." *The Los Angeles Times.* January 7th, 1976.
[285] *Bills to Amend the Marine Mammal Protection Act of 1972 with Respect to the Taking of Marine Mammals Incidental to the Course of Commercial Fishing Operations: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 203 (1976) (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).
[286] August Felando and Harold Medina, *The Tuna-Porpoise Controversy: How Tuna Fishermen Were Caught in the Government's Net and Fought to Survive,* 144.

Although progress was being made, dolphin population levels and OSP figures were still unknown at the end of 1975.[287] In light of this, the MMC recommended that the NMFS restrict dolphin by-catch to no more than 85,000 individuals for the 1976 fishing season - a number originally proposed by the ATA.[288] Despite this recommendation, the NMFS announced that it would not set a quota for the 1976 fishing season until May of 1976 and only if the total dolphin kill exceeded 70 percent of the (then still unknown) total kill in 1975.[289] According to the NMFS, their approach "represents, at this time, the most reasonable way that it can meet its responsibility to reduce porpoise mortality incidental to yellowfin tuna fishing and its responsibility not to shut down or significantly curtail the activities of the tuna fleet as set forth in the [MMPA] and its legislative history."[290] The NMFS issued the ATA its general permit for the 1976 fishing season on December 19th, 1975.

For members of the environmental, conservation, and animal rights communities, the NMFS' inability to develop dolphin population figures and set a quota level for a second year in a row seemed incomprehensible and in direct violation of the MMPA. By this point, the NMFS also confirmed their earlier estimates that dolphin mortalities had indeed increased during the 1975 fishing season. The agency reported that mortality figures for 1975 totaled more than 134,000 animals – an increase of 35,000 dolphins from the previous year.[291] In response, the EDF, representing more than a dozen other groups, filed legal action with the federal district court in Washington, D.C., in early January

[287] Committee for Humane Legislation, Inc. v Richardson, 414 F. Supp. 297 (D.D.C. 1976).
[288] Ibid.
[289] Annual Report of the Marine Mammal Commission, Calendar Year 1976; a Report to Congress – January 31st, 1977, in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 95th Cong., 1st sess., 46 (1977).
[290] 40 Fed.Reg. 56899 (1975).
[291] Administrative Law Judge Recommended Decision in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 307.

demanding that the NMFS immediately set specific quota levels to reduce dolphin mortalities. The EDF proposed that the quota be set at 65,000 dolphins for the 1976 fishing season and that it be halved each successive year, until the industry achieved zero mortality.[292]

District court judge Charles R. Richey announced his decision on May 11th - five months after the EDF first took legal action against the NMFS. After reviewing thousands of pages of documents and listening to testimony from dozens of witnesses, Richey ruled in favour of the plaintiffs, finding that the NMFS had "acted unlawfully and contrary to their duties under the MMPA." As such, Richey ordered that the killing of dolphins in the yellowfin tuna fishery be stopped, "unless and until the defendants are able to determine, as the Act plainly requires, that such killing is not to the disadvantage of the porpoise."[293]

Explaining his rationale, Richey highlighted that, while tuna fishing may become more expensive and difficult in light of his ruling, "steps which ensure the protection and conservation of our national environment must, almost inevitably, impose temporary hardships on those commercial interests which have long benefitted by exploiting that environment." As the Judge noted, the passage of the MMPA signaled that "the people of this country… declared that porpoise… must be protected from the harmful and possibly irreversible effect of man's activities." [294]

Members of the EDF and other environmental groups involved in the case hailed Richey's ruling as a "landmark decision."[295] Although the Judge's decision would not

[292] "Energy, Environment." *The Los Angeles Times.* January 26th, 1976.
[293] Committee for Humane Legislation, Inc. v Richardson, 414 F. Supp. 297 (D.D.C. 1976).
[294] Ibid.
[295] "San Diego Fleet's Tuna Porpoise Fishing Barred." *The Los Angeles Times.* May 12th, 1976.

take effect until May 31st, his ruling prevented the use and killing of dolphins until such a time that the NMFS could determine the impacts that fishing on porpoise was having on dolphin populations – something that they were supposed to have known 18 months earlier.

While environmentalists celebrated, tuna fishermen and members of the ATA condemned the decision. This "could mean an end to the industry," worried Felando. "If we can't fish on porpoises, we're in trouble."[296] In Joe Finete's opinion, "If you cannot fish on porpoise, we go out of business. That's it… it definitely will put me out of work if they do this. I don't know what to do."[297]

In the days following the ruling, the NMFS and ATA filed an appeal with the district court and requested a stay on the effective date of the order pending an appeal. While the appeal was denied by the District Court, the appellants forwarded their case to the U.S. Court of Appeals for the District of Columbia. At the same time, industry supporters looked to other means to allow the industry to continue to fish. On May 20th, Leggett, Chairman of the Subcommittee on Fisheries and Wildlife Conservation and Environment and a representative from southern California, introduced an amendment on the MMPA to the subcommittee. Leggett's amendment aimed to allow fishermen to continue to fish on porpoise for the remainder of the year. While noting that the protection of dolphins was of prime importance, Leggett stressed the progress made on dolphin by-catch to date and that "the [MMPA] was never intended to destroy our

[296] Ibid.
[297] Jerry Belcher, "Ruling Snares Tuna Fishermen in their Own Nets: Court Order Protecting Porpoises Cost Jobs." *The Los Angeles Times.* May 17th, 1976.

commercial fishing industry."[298] Congressman Glenn Anderson, a prime sponsor of the MMPA, echoed Leggett's sentiments, commenting that "the original act was never intended as a cudgel with which to beat our tuna industry to death."[299] While visiting tuna boats in the San Diego harbour that month, President Gerald Ford also voiced his support for Leggett's amendment and criticized Richey's earlier ruling, arguing that "it is wrong and must be reversed, by legislative action if necessary, or the tuna industry will be destroyed."[300]

Representatives from the ATA also voiced similar sentiments. Tuna fisherman Manuel Silva argued that, "completely lost sight of, and ignored in Judge Richey's findings, are the really amazing results of new seining techniques that are drastically reducing porpoise deaths."[301] In Harold Cary's opinion, Richey's decision would have a "violently destructive impact" on the industry.[302] Gordon Broadhead argued that Richey's decision could result in the loss of hundreds of thousands of dollars for each tuna vessel and thousands of lost jobs. Frank Alverson argued that, within the span of three months, the industry could miss out on upwards of 56 million dollars in revenue.[303]

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[298] *Bills to Amend the Marine Mammal Protection Act of 1972 with Respect to the Taking of Marine Mammals Incidental to the Course of Commercial Fishing Operations: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 173 (1976) (statement of Robert L. Leggett, Chairman of the Subcommittee on Fisheries and Wildlife Conservation and the Environment).
[299] Paul Houston. "Dispute over Killing of Porpoises Move to House." *The Los Angeles Times.* May 21st, 1976.
[300] "Energy, Environment." *The Los Angeles Times.* May 25th, 1976; Everett R. Holles. "Tuna Fleet Rush to Get Yellowfins: Hundreds of American Boats Race to Fill Cargo During 10-day Reprieve from Fishing Ban." *The New York Times.* October 24th, 1976.
[301] Everett Holles, "Tuna Group Fights Porpoise Ruling: Boat Owners to Challenge Judge's Order to Halt Accidental Trapping. *The New York Times.* May 16th, 1976.
[302] *Bills to Amend the Marine Mammal Protection Act of 1972 with Respect to the Taking of Marine Mammals Incidental to the Course of Commercial Fishing Operations: Hearings before the Subcommittee on Fisheries and Wildlife Conservation and the Environment,* 241 (statement of Harold Cary, American Tunaboat Association Representative).
[303] Ibid, 250 (statement of Frank Alverson, American Tunaboat Association Representative).

Schoning also expressed his opposition of Richey's ruling and support in keeping the industry afloat. In the NMFS Director's opinion, both fishermen and the NMFS had made significant progress in reducing dolphin mortalities. At the same time, however, Schoning noted that the agency was still "unable to determine the optimum sustainable population and the effect of porpoise mortality on it." While OSP was still unknown, Schoning noted that the agency had developed rough population figures for both spotted and spinner populations. According to the NMFS, between 1.1-1.2 million spinner dolphins lived in the ETPO with another 3.1-3.5 million spotted dolphins in the same region. As Schoning argued during the hearing, the 1975 kill of 134,000 animals represented a small percentage of the total population.[304] Without knowing the OSP of either dolphin population, the director felt that, "at the present time, we have no reason to believe that the stocks of porpoises associated with tuna fishing are not in a healthy state… we have no evidence that they are now endangered or depleted."[305]

For the various environmental groups that had filed the original lawsuit, Judge Richey had made the right decision; there was no need for Leggett's amendment. As Kaufmann highlighted, the NMFS had violated the MMPA by giving the tuna industry a general permit. "The permit provisions [under the MMPA] clearly require that one of the things that must be stated in the permit is the number of animals that can be taken. Now, that was not done in the permit for 1975… It was not done in 1976."[306] In Kaufmann's opinion, Leggett's amendment might as well be called a tuna industry protection act. Sierra Club Chairman Robert C. Hughes highlighted that Richey's decision "confirms what conservationists have been saying for many years – that this law is not being

[304] Ibid, 204 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).
[305] Ibid, 183 (statement of Robert W. Schoning, Director of the National Marine Fisheries Service).
[306] Ibid, 257 (statement of Milton Kaufmann, Monitor President).

properly implemented or enforced, that this industry must find some way to fish for tuna without killing porpoise."[307] For EDF general counsel William Butler, "[the MMPA] has never been enforced until the court's recent ruling."[308]

Leggett's amendment eventually passed to the Committee on Merchant Marine and Fisheries where it quietly died.[309] Meanwhile, the U.S. Court of Appeals granted the NMFS and ATA's earlier appeal, preventing Judge Richey's initial decision from taking effect on May 31st. With the new ruling in place, the NMFS rushed to develop new regulations and OSP figures for the current year. In early June, the NMFS proposed a quota of 78,000 dolphin kills for the 1976 fishing season – a reduction of roughly 42 percent from the previous year.[310]

Later that July, the NMFS held three days of workshops in La Jolla, California to define OSP and develop figures on spotted, spinner, and common dolphins. At the end of the workshop, the NMFS concluded that OSP was "a range of populations between that giving the maximum net productivity [MNP] and the maximum population possible within the carrying capacity of the ecosystem."[311] Furthermore, "any population whose abundance is less than 50 percent of their unexploited level is probably below the [maximum net productivity] level," and thus below OSP levels. The workshop found that, as of 1976, the population of spinner dolphins was estimated to be between 0.37 and 0.75 of its 1959, or pre-exploitation, population. This indicated that spinners "could be

[307] Ibid, 284 (statement of Robert C. Hughes, Sierra Club Chairman).
[308] Ibid, 291 (statement of William Butler, General Counsel for the Environmental Defense Fund).
[309] Annual Report of the Marine Mammal Commission, Calendar Year 1976; a Report to Congress – January 31st, 1977, in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 95th Cong., 1st sess., 50 (1977).
[310] "Limit Set on Porpoise Kills." *The Los Angeles Times.* June 11th, 1976.
[311] *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 4 (statement of Robert M. White, Administrator of the National Oceanic and Atmospheric Administration).

within, but very close to the lower end of the range of OSP… however… the stock could well be below the range of OSP."[312] This finding confirmed the MMC's earlier fears that spinner dolphins were probably in decline.

While scientists had developed new and vitally important information on OSP figures, environmentalists continued to challenge the agency and the ATA. In response to the U.S. Court of Appeals reversal of Judge Richey's decision, the EDF and other environmental groups filed an appeal with the U.S. Circuit Court of Appeals. On August 7th, the Circuit Court Judge upheld Richey's initial decision, re-instating the fishing on porpoise ban but delayed the effective date of his ruling until January 1st, 1977. The judge commented that the delay was necessary, since he believed the immediate impact of his decision "would be disastrous" to the fishermen.[313] With this decision in place, fishermen were permitted to continue fishing for tuna in association with dolphins until the end of the 1976 fishing season.

Despite this victory, fishermen still had to fish in accordance to the NMFS' new quota of 78,000 dolphin kills for the rest of the season. In mid-October, the agency announced that, as of the following week, fishermen would no longer be allowed to fish on porpoise, as the NMFS believed fishermen would reach the quota limit that month.[314] The ATA was quick to challenge the decision. On October 22nd, the day the ban was to take effect, U.S. District Judge for the Southern District of California, William B. Enright, issued a ten-day restraining order against the NMFS, allowing fishermen to

[312] Ibid, 4 (statement of Robert M. White, Administrator of the National Oceanic and Atmospheric Administration).
[313] "Energy, Environment" Judges Ban on Porpoise Killing Upheld." *The Los Angeles Times.* August 8th, 1976.
[314] "Primary Tuna-Catching Method Banned by U.S. Agency to Protect Porpoises." *The Los Angeles Times.* October 16th, 1976.

continue to use dolphins in the intervening period. Following the ten-day grace period, and upon hearing further arguments, Judge Enright upheld the NMFS' decision to ban further dolphin kills for the remainder of the year. As Enright explained, tuna fishermen had had one of their best years ever to date, "and the forced layoff will not harm the industry irreparably."[315]

Representatives from the ATA did not share Judge Enright's optimism, though. Appealing their case further up the justice system, federal judge James Carter once again halted the government's ban minutes before it took effect. Carter asked that three judges be empaneled to consider whether the tuna-fishing ban would be enforced.[316] Judges Eugene Wright, Joseph Sneed, and Anthony Kennedy of the Ninth Circuit Court of Appeals met the following week. After reviewing the evidence, the judges upheld the government agency's October ban, arguing that the quota limit for 1976 had been reached.[317] While EDF attorney Tom Graff hailed the ruling, ATA lawyer David G. Burney called the decision "devastating to the industry."[318] As Edward Silva commented a few days later, at least twenty-four tuna boats returned to port virtually empty of tuna. Since they could no longer fish on porpoise he explained that, "they just decided to forget it and come home."[319]

While the federal courts had upheld the NMFS' ban and cut the 1976 fishing season short, legal battles between environmentalists, scientists, and tuna fishermen continued throughout the remainder of 1976. In November, the NMFS stated that it would propose a quota of 29,900 dolphin kills for the 1977 fishing season. In response,

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[315] "Ban on Fishing for Tuna Upheld." *The Los Angeles Times.* November 3rd, 1976.
[316] "Ban on Tuna Fishing Blocked." *The Los Angeles Times*. November 6th, 1976.
[317] The ATA appealed to the Supreme Court but the Ninth Circuit Court of Appeals decision was upheld.
[318] "Around the Nation." *The New York Times.* November 12th, 1976.
[319] "24 Tuna Boats Halt all Fishing Because of Ban." *The Los Angeles Times.* November 20th, 1976.

the ATA challenged the NMFS, arguing that the quota was unrealistic and would severely hurt the American tuna industry. The ATA asked instead for a quota limit of 85,000 – the same level that it had asked for the previous year. Taking the middle ground, the MMC recommended that the quota be placed at 50,158 animals, believing this was in line with OSP figures and would not be "to the disadvantage of the affected populations."[320]

In response to the disagreement over quota totals, the parties brought in Judge Frank W. Vanderheyden to settle the issue. During two weeks of hearings in both San Diego and Washington, D.C. in late November and early December, he listened to dozens of individual testimony and reviewed thousands of pages of evidence. Announcing his recommendations on January 17th, 1977, Vanderheyden found that the NMFS' quota level of 29,900 could cause "severe" economic impact on the American tuna industry. He noted that under the proposed quota, the total catch of yellowfin tuna could drop by almost 85,000 tons, representing a 33 percent reduction from previous years. In the judge's opinion, this reduction could "lead to the collapse of much of the U.S. fleet."[321]

Furthermore, Vanderheyden went on to recommend that the quota for the 1977 fishing season be set at 96,100 animals – more than three times what the NMFS had recommended. Vanderheyden argued that, based on his reading of the scientific material and testimony from various scientists, this quota level would not disadvantage various dolphin populations and still numbered less than the approximate kill total for the 1976

[320] Annual Report of the Marine Mammal Commission, Calendar Year 1976; a Report to Congress – January 31st, 1977, in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 51.
[321] Administrative Law Judge Recommended Decision in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 350.

fishing season, which the NMFS estimated at roughly 112,000 individuals.[322] At the same time, he noted that, while he did not believe that spinner dolphins were depleted, they were approaching the lower levels of the OSP threshold. As such, the judge recommended that fishermen not fish on pure schools of spinner dolphins.[323]

The MMC quickly filed a notice with the NMFS in opposition to various aspects of Vanderheyden's decision. The oversight Commission recommended that the NMFS reach a different conclusion than the judge when issuing their quota level. Stressing their earlier position, the MMC recommended that the total quota for 1977 be set around 50,158 animals or half of Vanderheyden's proposed quota.[324]

Despite the MMC challenge, the courts moved quickly to act upon his recommendations. On January 21st, Enright reversed his earlier decision, allowing fishermen to continue to fish on porpoise until the issuance or denial of an official permit for the 1977 fishing season. While no quota level had been officially set yet, Enright explained that he was now "virtually certain that a quota of some measure" would be imposed for the year. Even if fishermen killed some dolphins in the interim period, he did not feel that these totals would near the eventual quota level. At the same time, Enright found that the tuna industry "risked irreparable injury if it were prevented from fishing on porpoise during the prime tuna season."[325]

Following Enright's decision, the Committee for Humane Legislation filed a motion in the U.S. Court of Appeals for the District of Columbia Circuit court, seeking an

[322] Ibid, 323.
[323] While fishermen were not allowed to fish on pure schools of spinner dolphins, they were able to fish on mixed schools, or groups that contained spinner, spotted, and common dolphins.
[324] Annual Report of the Marine Mammal Commission, Calendar Year 1976; a Report to Congress – January 31st, 1977, in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 76.
[325] Ibid, 77.

injunction prohibiting the NMFS from carrying out the terms of Judge Enright's order. After listening to testimony, the Court of Appeals gave their ruling on February 3rd, restraining the NMFS from issuing any permit or other authorization for the taking of dolphins incidental to tuna fishing until all MMPA requirements were complied with. Furthermore, members of the tuna industry were restrained from fishing on porpoise until such time as a valid permit was issued to them. The NMFS requested a stay from Judge Enright's decision but this was denied on February 7th. The Department of Justice, now involved in the tuna-porpoise controversy, filed an appeal of Judge Enright's decision to the Ninth Circuit Court of Appeals. The Court granted the stay on February 24th. Through this stay, fishermen were permitted to fish on porpoise in alignment with Judge Enright's earlier January 21st decision.[326]

This reprieve was short lived, however. While various groups had been navigating their way through the American legal system, the NMFS had been working to develop final regulations for the 1977 fishing season, in line with their own research and the recommendations of both the MMC and Vanderheyden. On March 2nd, the NMFS published their final regulations for the tuna industry in the *Federal Register*. Accepting Vanderheyden's recommendations "in part," the NMFS proposed a quota of 59,090 dolphin kills for the 1977 fishing season. Moreover, the NMFS argued that, based upon their OSP figures for spinner dolphins, the species "should be considered depleted at this time" and, as such, "no incidental take of the eastern spinner can be permitted."[327]

In response to these regulations, the Committee for Humane Legislation once again filed court action against the NMFS with the U.S. District Court for the District of

[326] Ibid, 77.
[327] 42 Fed. Reg. 1977.

Columbia, alleging that the regulations were defective under the MMPA. As Bernard Fensterwald Jr., highlighted during the 1977 oversight hearings on the MMPA, "the Committee for Humane Legislation believes that these new regulations are fatally deficient."[328] In contrast, other environmental and animal-rights groups, such as Friends of the Earth, the EDF, and the Humane Society of the United States, argued that the quota level was still too high, but made it clear that "we will try to live with them."[329]

While these groups were willing to concede on some issues, members of the tuna industry were unwilling to accept the government's newest regulations. By the time the oversight hearings commenced on March 9th, American tuna fishermen had been in port for six months, due to the early closure of the 1976 fishing season and the on-going legal battles and quota issues during the early months of 1977. Captain Edward Silva highlighted that, without the ability to fish on porpoise, many fishermen and boat owners could not survive financially. Some had gone without pay for much of the period. As Silva noted "some [fishermen] are in trouble now. For my two vessels alone, I have payments of $225,000 coming this May and June, plus 6 months interest to pay. The vessels have not earned the money to meet this obligation."[330] Members from the Panel of Tuna Fishermen's Wives also voiced their concern. As Mrs. Gavin noted, "90 percent [of fishermen's wives] have not had a check since October of last year and we don't

[328] *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 197 (statement of Bernard Fensterwald Jr., Counsel for the Committee for Humane Legislation, Inc.
[329] Ibid, 144 (statement of Milton Kaufmann. Christine Stevens, Patricia Forkan, William Butler, Juanita Alvarez, Tom Garrett, and Cliff Mitchell, representing ten different environmental and conservation groups)
[330] Ibid, 209 (statement of Edward Silva, tuna captain).

know when our next check is coming… I ask you, sir, to protect the marine mammals but don't forget about another type of mammal, the U.S. tuna fishermen."[331]

For ATA General Manager August Felando, the problem between fishermen and their opponents was that:

> Fishermen believe that the problem can be solved by continuing research and continuing improvement in fishing techniques and education. Environmentalists believe it can be solved immediately or very rapidly through multiple restrictions placed upon the U.S. fleet… Fishermen and environmentalists have the same goal – to preserve porpoise stocks… it is a shared concern.[332]

As Felando highlights, while dolphin protection was of prime importance for fishermen, they wanted to see dolphin by-catch reduced through technological developments that allowed them to continue to use these animals. Indeed, the development of the back-down procedure and the Medina Panel had helped reduce dolphin mortalities before the MMPA even existed. New gear modifications such as the Bold Contender system showed promise that it could help lower dolphin by-catch even further. Noting its success, fishermen and scientists continued to search for improved gear developments. During the fall of 1976, the ATA, alongside NMFS scientists such as Norris and Perrin, had tested a new version of the Bold Contender system aboard the *Elizabeth C.J.* The tuna vessel was fitted with the Bold Contender's 1¼ inch Medina panel mesh at the back, alongside special netting below and to the sides. As the back-down process began, the hope was that the fine mesh netting would prevent the dolphins' rostrums and fins from getting stuck in the mesh and allow them slide overtop of the netting to freedom. With the new system in place, the *Elizabeth C.J.* made 21 sets on more than 20,000 dolphins, catching more than 550 tons of yellowfin tuna. As the *Wall Street Journal* reported, only four

[331] Ibid, 226 (statement of Mrs. Gavin, Panel of Tuna Fishermen's Wives member).
[332] Ibid, 223 (statement of August Felando, American Tunaboat Association General Manager).

dolphins died in the entire trip, or roughly 0.004 dolphins for every ton of yellowfin tuna.[333] For tuna fishermen, the *Elizabeth C.J.* results were extremely impressive and showed that gear modifications could help reduce dolphin by-catch without harming the industry.

While opponents argued that this research trip was a success only because of the experienced captain and crew on board, the industry was quick to point out that many of its fishermen often achieved very low mortality figures. It was only a very few number of vessels which contributed to the overall mortality levels. As Silva highlighted during the 1977 oversight hearing, 40 percent of all sets made while fishing on porpoise resulted in zero mortality. Furthermore, only five vessels were responsible for 45 percent of the observed dolphin kills during the 1976 fishing season; one vessel in particular, named the *Motor Vessel City,* was responsible for 15 percent of all observed dolphin mortality during that season.[334] For members of the ATA, it seemed unfair that the entire fleet be penalized for the actions of the few. With more training for these captains, and the adoption of gear modifications, officials argued that dolphin mortalities could be further reduced without harming the industry.

By late April 1977, the American tuna fleet still remained in port, out of protest to the NMFS regulations for the 1977 fishing season. At issue were the quota levels for the year, especially the quota prohibiting the catching of spinner dolphins. In response to the

[333] Roy J. Harris Jr., "Must Porpoise Die for a Tuna on Rye? Maybe Not, After All." *The Wall Street Journal.* March 4th 1977, in *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 118-121.
[334] *Oversight into the Marine Mammal Protection Act: Hearings before the Committee on Commerce, Science, and Transportation,* 215 (statements of Manuel Silva, Steven Medina, Manuel Vargas, Julius Zolezzi, Oliver Verissimo, Andrew Castagnola, and Tom Crivello, tuna captains). This percentage came from NMFS observer reports for that fishing season.

protest, the Department of Commerce announced on April 21st that fishermen would not be prosecuted for incidentally catching spinner dolphins.[335]

Despite the concession, the tuna industry refused to sail during the first few days of May, arguing that the overall quota limit was still too low. On May 2nd, thousands of tuna industry workers in southern California joined together to protest the regulations. Many of the demonstrators carried signs that read "Environmentalists, meet us halfway" and "Save porpoises but save humans too."[336] Recognizing the continued economic harm that this stand-off was causing the industry and its employee's families, local Congressmen and industry supporters introduced legislation in the House to raise the limit on allowable dolphin kills for the 1977 fishing season to 78,900 individuals. At the same time, each boat would only be allowed to take a maximum of 1,110 dolphins. Any vessels that went over this limit would be penalized, while those who stayed below it would be rewarded financially. In light of this support, industry leaders called off their protest, in hopes that current regulations would soon be overturned.

Despite opposition from environmental groups, the House's Committee on Merchant and Marine Fisheries approved the legislation on May 18th and forwarded it to the House, which approved it by an overwhelming vote of 334 to 20. Noting concern from environmentalists over the increased quota, the House amended the quota, lowering it from 78,900 to 68,900. Despite its support in the House, the bill did not pass through the Senate during the remainder of the Congressional period. As such, the NMFS'

[335] Don Shannon, "U.S. Moves to Ease Ban on Porpoise Killing." *The Los Angeles Times.* April 22nd, 1977.
[336] Harry Bernstein, "Tuna Fleet Will Return to Sea." *The Los Angeles Times.* May 3rd, 1977.

original regulations and quota level of 59,090 remained in place for the remainder of the 1977 fishing season.[337]

At the end of the 1977 fishing season, the NMFS revealed that dolphin mortalities in the American tuna industry totaled 24,143 individuals – well below the quota figure for the year. While much of this was the result of six months of inactivity by the fleet, industry supporters quickly attributed this reduction, in part, to the increased care fishermen took in avoiding mixed tuna-dolphin schools and the use of the *Elizabeth C.J.* gear system aboard many tuna boats. Noting the dramatic reduction in tuna kills for that year, the NMFS set new kill quotas for the next three years. These totaled 51,930 for 1978; 41,600 in 1979, and 31,140 in 1980. As a *Los Angeles Times* article highlighted, both "environmentalists and tuna officials… indicated Friday that they are relatively satisfied with the new porpoise kill quotas."[338]

Dolphin mortalities continued to fall well under quota levels the following year, to an estimated 19,00 animals, in spite of the fact that the fleet fished for an entire season.[339] Felando attributed the reduction to "new gear experimented with in 1976 and installed throughout the fleet last year." He highlighted that "about 99.7 percent of all porpoises encircled (in nets) are released unharmed."[340] Dolphin mortalities continued to fall in both 1979 and 1980 as captains became more proficient with the *Elizabeth C.J.* system and more capable at releasing dolphins from their nets. In 1979, the American

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[337] Grayson Mitchell, "House Oks Higher Quota of Porpoise Kills but Votes Stiffer Penalties for Violators." *The Los Angeles Times.* June 2nd, 1977.
[338] Ellen Hume, "Porpoise Kills by U.S. Tuna Fleet Decline Sharply." *The Los Angeles Times.* January 7th, 1978.
[339] Bruce E. Wahlen, "Incidental Dolphin Mortality in the Eastern Tropical Pacific Tuna Fishery, 1973 Through 1978." In *Fishery Bulletin* Vol 84., No. 3 (Southwest Fisheries Services Center: La Jolla, 1986), 568. https://swfsc.noaa.gov/publications/CR/1986/86135.PDF
[340] Barbara Baird, "Postscript: Tuna Fleet Having Banner Year Despite Fears of New Laws." *The Los Angeles Times.* June 2nd, 1978.

tuna fleet killed 17,084 dolphins while fishing on porpoise; the following year, that number fell to 15,305 animals.[341]

Annual dolphin mortalities in the American yellowfin tuna fishery fell by 300,000 animals between 1970 and 1980. This reduction did not come easily, however. The 1970s was a period of intense debate. While the passage of the MMPA was intended to make dolphin protection and the regulation of the American tuna industry easier, the inability of the NMFS to properly enforce the Act made its implementation much more confusing and ineffective. During the two-year exemption period in 1972-1974, the NMFS failed to develop population levels and OSP figures for dolphins in the ETPO. Thereafter, the NMFS refused to set specific quota levels for the tuna industry until mid-1976, and only did so following court order. By that point, politicians, environmentalists, and animal-rights groups had grown frustrated with the NMFS and ATA's inability to reduce dolphin mortalities to "insignificant levels approaching zero." Although considerable progress had been made, proponents of dolphin protection argued that these mortality reductions were not nearly enough. The growth in dolphin mortality during the 1975 fishing season, coupled with lack of information on dolphin populations and the vague and ineffective quota levels set by the NMFS, led to the flurry of court cases that occurred throughout late 1976 and early 1977. While these court cases eventually resulted in the development of much needed scientific data and new gear modifications, they also resulted in economic hardships on the American tuna industry and its thousands of employees.

Indeed, it is important to note that while the tuna-porpoise controversy is a story about dolphins, it is also a story about people, specifically the men and women associated with the American tuna industry. Throughout the 1970s, very few groups or individuals

[341] Inter-American Tropical Tuna Commission, 1980 Annual Report, 1981.

called for the complete closure of the industry. For the most part, the various groups and individuals involved in the controversy looked for ways to balance the economic well being of the industry with dolphin protection. Many environmentalists and politicians voiced this position throughout the period, especially during oversight hearings on the MMPA. That being said, not all groups agreed on how to achieve this goal. Disagreements and different perspectives on how best this balance could be reached and how quickly dolphin mortalities could be reduced often complicated the tuna-porpoise controversy. For example, the tuna industry, environmental organizations, and various government agencies all proposed different quota levels that they believed would best protect dolphins but still allow fishermen to profitably catch tuna. While those involved hoped to achieve some balance, certain groups, such as the tuna industry and many environmentalists, still placed greater emphasis on one issue over the other. An already complicated matter, this struggle to find middle ground and balance the economic considerations of the tuna industry with the protection of the ETPO's dolphin populations made the tuna-porpoise controversy of the 1970s a much more difficult problem for the various groups involved to resolve. In spite of these complications and disputes, the conflicts surrounding the tuna-porpoise controversy of the 1970s led to a dramatic and unprecedented reduction in dolphin by-catch totals for the American tuna industry.

Conclusion

By the early 1980s, the annual dolphin by-catch in the American tuna industry had fallen by more than 95 percent since 1970. Innovative gear developments, new scientific research on dolphin populations, and conflict and collaboration between environmentalists, politicians, scientists, and the tuna industry contributed to this dramatic decrease. For those worried about dolphin by-catch, it seemed that the problem was largely resolved.

Yet this optimism was short-lived. In November 1980, Ronald Reagan was elected President of the United States. Seeking favour with the southern-California based tuna industry, Reagan looked to relax MMPA regulations on dolphin by-catch. During the economic recession in 1981, Congress passed an amendment slashing NMFS funding for dolphin-saving gear research and increasing the annual dolphin kill quota to 20,500 animals – a figure that represented a twenty-five percent increase from the number of dolphins killed the year earlier.[342] Despite this change, dolphin by-catch totals remained low, closer to 18,000 animals for the 1981 fishing season.[343] The total mortality figure for the American fleet averaged just above 16,000 animals for the remainder of the decade.[344] While dolphin by-catch in the 1980s did not decrease as dramatically as it had during the 1970s, it is clear that mortality rates in the American tuna industry had stabilized.

More concerning for proponents of dolphin protection was the growing number of dolphin mortalities caused by foreign fishermen. While the American tuna industry had

[342] Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food,* 141; Brian G. Wright. "Environmental NGOs and the Dolphin-Tuna Case," 82-103.
[343] Inter-American Tropical Tuna Commission, 1981 Annual Report, 1982.
[344] Marine Mammal Commission, 1996 Annual Report, 1997.

successfully reduced mortalities, dolphin by-catch had begun to rise significantly in the nets of other international fleets. Indeed, the late 1970s and early 1980s marks an important transitional period in the tuna-porpoise controversy, as the issue shifted from a largely U.S. problem to a global crisis. For example, during the 1986 fishing season, the international fleet killed approximately 124,000 dolphins; non-American fishermen accounted for more than 82 percent of this total kill.[345]

There are a few factors that contributed to this change. One of the most significant was the rapid expansion of many tuna industries in Central and South America. During the early 1980s, the fishing capacity of Ecuador, Costa Rica, Mexico, Panama, Peru, and Venezuela's tuna industries grew immensely as these countries took advantage of the coastal resources that had long been exploited by American tuna fishermen. Between 1980-1983, Mexico added 38 tuna vessels to its fleet. During the same period, Venezuela added seven ships to its tuna industry. And while the exact number of vessels added by other Central and South American countries is unclear, IATTC records indicate that these nations also experienced significant increases in their fishing capacities.[346]

Part of this growth can be attributed to the construction of new large "Class 6" purse seine vessels, with carrying capacities of more than 400 tons. The construction of these vessels reflects a growing interest from countries such as Mexico and Venezuela to take advantage of the tuna resources off their shores. Another important factor that contributed to this expansion was the conversion of some American tuna boats to foreign flags. During the late 1970s and early 1980s, some U.S. tuna captains converted their

[345] Ibid.
[346] Inter-American Tropical Tuna Commission, 1981 Annual Report, 1982; Inter-American Tropical Tuna Commission, 1982 Annual Report, 1983; Inter-American Tropical Tuna Commission, 1983 Annual Report, 1984.

boats to Central or South American countries in order to avoid dolphin quota restrictions and other MMPA regulations. Indeed, it is important to note that, outside of the United States, no other country had legislation restricting the use of dolphins to catch tuna. For those captains who seemingly did not care about dolphin mortalities, struggled to perform the back-down procedure, or did not want to invest additional resources in dolphin-saving equipment, switching to a foreign flag allowed them to avoid U.S. regulations.

The conversion of these American vessels to foreign flags, coupled with the construction of new purse seine vessels, led to massive increases in the amount of yellowfin tuna caught by many Central and South American nations. In 1981, Mexico increased its overall catch of yellowfin tuna by 97 percent over its 1980 figures. Mexico's catch increased another 143 percent in 1984, after two years of small losses. In that same year, Costa Rica's annual catch rose by 272 percent. In 1983, the IATTC reported that Peru's annual catch had increased by 635 percent.[347] Panama's annual catch grew by 995 percent in 1985.[348]

As annual catches increased, so too did dolphin mortalities. In 1980, dolphin mortalities by non-U.S. vessels totaled 29,598 animals. The number grew to 103,000 by 1986. This growing divide between American and non-American fishermen, coupled with the fact that many nations had no regulations to protect dolphins, concerned many Americans, especially groups and individuals that had been involved in the tuna-porpoise controversy during the 1970s. By the late 1980s, U.S. environmentalists initiated a

[347] This growth is due to the fact that Peru did not have any boats in the fishery the year prior.
[348] Inter-American Tropical Tuna Commission, 1981 Annual Report, 1982; Inter-American Tropical Tuna Commission, 1982 Annual Report, 1983; Inter-American Tropical Tuna Commission, 1983 Annual Report, 1984; Inter-American Tropical Tuna Commission, 1984 Annual Report, 1985; Inter-American Tropical Tuna Commission, 1985 Annual Report, 1986.

nationwide tuna boycott on any product that was not deemed to be "dolphin-safe."[349] Responding to increasing pressure from these groups and other members of the American public, Congress amended the MMPA yet again in 1988, requiring any foreign fleet wishing to export tuna to the United States to comply with American regulations.[350] This action spurred a court challenge by Mexico under the General Agreement on Tariffs and Trade (GATT). At the same time, the United States and other Central and South American countries looked for ways to end the tuna embargo and reduce dolphin mortalities. As a result of these discussions, the United States, France, and several Central and South American countries signed the Panama Declaration in 1995. Through the declaration, "the United States agreed to end boycotts of tuna from those countries, and it accepted purse seining of yellowfin tuna, provided that no more than 5,000 dolphins were killed annually."[351] The agreement also provided Mexico, now home to one of the biggest tuna industries in the region, with American technology to help its fishermen reduce dolphin mortalities. By 1996, Martin A. Hall, head of the IATTC's Tuna-Dolphin program, announced that the estimated number of dolphins killed in the ETPO that year totaled 2,600 individuals. In Hall's opinion, this kill was "not significant from the population view."[352] By 2013, total dolphin mortality for the international fleet totaled 801 dolphins – less than a third of one percent of the estimated dolphin kill in 1970.[353]

[349] According to the IATTC, any tuna caught in purse-seine nets in which dolphins are not killed or seriously injured is defined as "dolphin-safe."
[350] Andrew F Smith, *American Tuna: The Rise and Fall of an Improbable Food*, 144.
[351] Ibid, 145.
[352] Ibid, 145.
[353] Inter-American Tropical Tuna Commission, Executive Report on the Functioning of the AIDCP in 2013, 2013.

Dolphin mortalities in the American yellowfin tuna fishery have fallen dramatically over the past 50 years. While fishermen continue to use dolphins to catch yellowfin tuna, advancements in purse seine gear, better captain and crew training, public awareness, and the enforcement of strict regulations have made fishing on porpoise one of the most sustainable and least ecologically harmful methods for catching yellowfin tuna in the ETPO.[354] This success has its roots in the origins and early years of the tuna-porpoise controversy – a period of American environmental history that has largely been forgotten and ignored by scholars. This thesis has looked to bring this moment to the historical forefront to show how and why dolphin by-catch began, why it became such a major issue in the United States, and what was done to ameliorate the problem. An issue that emerged from the economic challenges of the 1950s, dolphin by-catch was virtually unknown by many Americans during the 1960s. By the 1970s it had become one of the most pressing environmental issues in American society, thanks largely to the work of William F. Perrin. The ensuing controversy produced groundbreaking legislation, such as the MMPA, and led to periods of debate and collaboration between groups with very different views on how best to address the problem. By the beginning of the 1980s, the American tuna industry had, in collaboration with scientists, politicians, and environmentalists, achieved massive and unprecedented reductions in dolphin by-catch. For all those involved in the tuna-porpoise controversy, these results were nothing short of a success.

And indeed, this is how later observers should perceive the tuna-porpoise controversy. While annual dolphin mortalities numbered in the hundreds of thousands for

[354] Martin A. Hall, "An Ecological View of the Tuna-Dolphin Problem: Impacts and Trade-offs." *Reviews in Fish Biology and Fisheries.* 8 (1998): 2-3.

many years, these figures fell dramatically in a ten-year period and did so in a way that both protected dolphins and allowed the tuna industry to continue to use these animals. Yet, the incidental taking of marine life continues in many, if not all, of the world's fisheries today. In 1994, the Food and Agriculture Organization of the United Nations estimated that an average of 27 million tons of marine life were discarded as by-catch every year.[355] The incidental killing of dolphins in particular plagues a number of global fisheries. The International Whaling Commission's Scientific Committee cites fisheries by-catch as the most serious and direct threat to cetaceans globally.[356] Both the IWC and the World Wildlife Fund (WWF) estimate that 300,000 animals are killed as by-catch each year, largely due to entanglements in fishing gear such as gill nets.[357] Studies by Read et al. and Reeves et al. put this number closer to 600,000 animals.[358]

These interactions have proved disastrous for numerous dolphin populations throughout the world. In the Gulf of California, the totoaba gill net fishery has decimated vaquita populations. According to the WWF, the vaquita was abundant in the region until the early twentieth century, when commercial fishing operations increased and modernized in the Gulf. Subsequent entanglements have dramatically reduced the overall

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[355] Dayton L. Alverson, Mark H. Freeberg, Steven A. Murawski, and J.G. Pope (Food and Agriculture Organization of the United Nations, A Global Assessment of Fisheries Bycatch and Discards, 1996). A later study issued by the FAO in 2005 estimated that average discards numbered closer to 7.3 million tonnes each year. As lead author Kieran Kellher noted, while by-catch totals were lower in this report, this more recent report used a different methodology than the 1994 study and is thus not directly comparable. R.W.D. Davies et al. argue that these differences may also indicate that yesterday's bycatch has become today's target catch. "Defining and Estimating Global Marine Fisheries Bycatch." *Marine Policy* 33 no. 4 (2009): 661-672.

[356] "Bycatch," *International Whaling Commission,* accessed March 9th 2017, https://iwc.int/bycatch

[357] "Bycatch Victims," *World Wildlife Fund,* accessed March 9th 2017, http://wwf.panda.org/about_our_earth/blue_planet/problems/problems_fishing/fisheries_management/bycatch222/bycatch_victims/

[358] Andrew J. Read, Phebe Drinker, and Simon Northridge, "Bycatch of Marine Mammals in U.S. and Global Fisheries." *Conservation Biology* 20 no. 1 (2006): 163-169; Randall R. Reeves, Kate McClellan, and Timothy B. Werner, "Marine mammal bycatch in gillnet and other entangling net fisheries, 1990 to 2011." *Endangered Species Research* 20 (2013): 71-93.

population. A 2017 report estimated that only 30 individuals remain in the Gulf of California.[359] While plans are currently underway to capture these animals for a captive breeding program, in the wild "the species stands little chance of survival."[360]

In New Zealand, both Hector's and Maui's dolphins have been severely impacted by coastal gill net fisheries. The WWF estimates that these populations may have declined by about a third or half of their pre-exploitation size since 1970 because of gill net entanglement.[361] Certain populations of the Irrawaddy River dolphin are also seriously threatened by fisheries by-catch. The Mahakam river population in Indonesian Borneo, for example, has been reduced to 34 animals. Populations in Malampaya Sound, the Mekong River, and Australia are also threatened by fisheries by-catch.[362] In China, the Yangtze River dolphin, or baiji, was the first dolphin declared extinct in 2006. Its demise was primarily attributed to unsustainable by-catch in local fisheries, caused specifically by the use of rolling hook long-lines.[363]

While pollution and habitat degradation have contributed to the decimation of the world's dolphin populations, the most harmful factor has almost certainly been commercial fisheries by-catch. Many species face serious depletion, and in some cases, imminent extinction, because of these wasteful and destructive human practices. And yet,

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[359] Virginia Morrell, "World's Most Endangered Marine Mammal Down to 30 Individuals." *Science,* February 1, 2017, http://www.sciencemag.org/news/2017/02/world-s-most-endangered-marine-mammal-down-30-individuals

[360] "Vaquita," *World Wildlife Fund,* accessed March 9th, 2017, http://wwf.panda.org/what_we_do/endangered_species/cetaceans/about/vaquita/; Virginia Morrell. "World's Most Endangered Marine Mammal Down to 30 Individuals." *Science,* February 1, 2017, http://www.sciencemag.org/news/2017/02/world-s-most-endangered-marine-mammal-down-30-individuals

[361] "Hector's Dolphins," *World Wildlife Fund,* accessed March 9th, 2017, http://wwf.panda.org/what_we_do/endangered_species/cetaceans/about/hectors_dolphin/

[362] "Irrawaddy Dolphin," *World Wildlife Fund,* accessed March 9th, 2017, http://wwf.panda.org/what_we_do/endangered_species/cetaceans/about/irrawaddy_dolphin/

[363] "The Baiji – The First Dolphin to be Declared Extinct in Modern Times," *Whale and Dolphin Conservation Society,* accessed March 9th, 2017, http://uk.whales.org/case-study/baiji-first-dolphin-to-be-declared-extinct-in-modern-times

public awareness and concern for fisheries by-catch, especially as it relates to dolphins, lags in comparison to the publicity surrounding other dangers facing the marine environment today. Threats from pollution, climate change, and over-fishing have been focal points for those concerned with the fate of the world's oceans. Unfortunately, this has led to the over-shadowing of fisheries by-catch problems. In order to make real, positive change in the world's oceans, by-catch problems must be publicized and addressed alongside these other dangers. As complicated as these issues are, focusing on one issue, such as over-fishing, without also acknowledging the impacts of subsequent by-catch, does little to help solve the problems plaguing many marine environments.

The tuna-porpoise controversy has shown that increased public awareness and concern for fisheries by-catch can produce positive and tangible results. In the years following Perrin's presentation in 1969, dolphin by-catch became a major environmental issue in the United States. During the 1970s, different groups mobilized in an attempt to solve the problem. The ensuing debates not only showcased the complex relationships that existed between humans and dolphins at the time but also the ones that existed between the various human groups involved with the problem. A growing concern for the environment and the greater cultural significance that cetaceans possessed in the United States during the 1970s pulled more Americans into the controversy. Writing on fisheries in postwar California, McEvoy has argued that this heightened environmental consciousness among many Americans altered public strategies for addressing various resource issues.[364] This can be seen in the tuna-porpoise controversy. The involvement of various environmental, conservation, and animal-rights organizations helped keep the

[364] Arthur F McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980,* 15.

issue at the public forefront and forced the tuna industry and various government agencies to use new technological and regulatory strategies to remedy the situation. These developments led to solutions that both protected marine life and the long-term commercial interests of fishermen. If dolphin populations are to be protected from destructive human practices, the public needs to become more aware and involved in these issues in order to help drive this positive change. At the same time, solutions need to be crafted and implemented in a way that takes into consideration both the well-being of dolphins and the interests of commercial fishermen, who depend upon the fisheries for their livelihood. In the absence of these types of solutions, or strong government intervention, little progress can be made on the issue.

That being said there is no reason that the success achieved in the ETPO's yellowfin tuna fishery cannot be accomplished in other parts of the world. While dolphins may not possess the same cultural value or environmental symbolism in certain parts of the world as they do in North America and other Western countries, there is no denying that they are valuable parts of marine ecosystems. By protecting dolphins and other marine life from fisheries by-catch, humans can drastically reduce the negative impact we cause many marine environments while at the same time preserving the natural world around us. Indeed, some fisheries are currently taking important steps to reduce by-catch associated with their industry. In New Zealand, the government has closed gill netting in parts of the North Island while setting an allowable level of fishing-related mortality for Hector's and Maui's dolphins caught in parts of the South Island.[365] In Western Australia, government scientists, university researchers, and commercial fishing associations have

[365] "Hector's Dolphins," *World Wildlife Fund,* accessed March 9th, 2017, http://wwf.panda.org/what_we_do/endangered_species/cetaceans/about/hectors_dolphin/

been looking at various gear modifications to reduce dolphin mortalities in the Pilbara Finfish trawl fishery.[366] These initiatives aim to reduce dolphin mortalities in a way that both protect marine mammals and the people who make their living among these animals.

While these are promising examples, the incidental taking of dolphins and other marine animals still plague fisheries around the globe. As concern for the world's oceans continues to grow, it is important that fisheries by-catch become a top of mind issue for groups and individuals looking to protect these marine environments. The wasteful and deadly discarding of incidentally caught marine life can, and must, end if we are to preserve these species and their natural environments. This history of the tuna-porpoise controversy has shown that, when driven by sufficient interest and concern from the general public, politicians, environmentalists, scientists, and even fishermen, by-catch problems can be dramatically reduced and virtually eliminated from a fishery. Repeating a similar success will require a great deal of cooperation among various groups and will undoubtedly be fraught with much difficulty but by-catch reduction initiatives must be attempted in order to save the world's marine wildlife from destructive human actions.

[366] Simon J. Allen and Neil R. Loneragan, *Reducing Dolphin Bycatch in the Pilbara Finfish Trawl Fishery.* (Murdoch University: Western Australia, 2008).

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