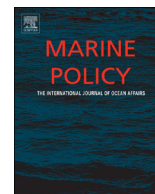




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# Full retention in tuna fisheries: Benefits, costs and unintended consequences



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## ABSTRACT

Several tuna regional fisheries management organizations (t-RFMOs) have adopted retention requirements for skipjack, bigeye and yellowfin tunas caught by purse seine vessels to reduce discards, create disincentives to catch small fish, and incentivize the development and adoption of more selective technologies. Although retention policies in the t-RFMOs have been limited to target tunas in purse seine fisheries, some have advocated for an expansion of those policies, and t-RFMOs could consider expanding retention policies to a greater number of species and/or to other gear types. This paper discusses the benefits and costs of broader retention policies for purse seine and longline tuna fisheries in the western and central Pacific Ocean (WCPO). Using bycatch data from observers and logbooks from the U.S. purse seine and longline fleets operating in the WCPO, this paper documents the types and magnitude of fish discarded. For the purse seine fishery, this information was used to estimate direct impacts of having to off-load at the initial point of landing in key Pacific Island ports. For the longline fishery, estimates of direct impacts were limited to Honolulu and Pago Pago, American Samoa, the two primary ports where U.S. catch is landed. Expanding retention policies beyond the target tunas and to other gear types would further reduce discarding and possibly provide stronger incentives to develop and use more selective techniques. Beyond impacts to the ecosystem and fisher behavior, adopting broader retention policies may have other implications, and this paper explores those implications on vessels, processors, and communities. In general, as is the case with most direct interventions on fishing operations, there will be both benefits and costs, and the magnitude of those impacts will depend on the scope and extent of any expanded retention policy.

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## 1. Introduction

Fishery discards occur for a number of reasons including small size, damage that makes the catch unfit for human consumption, and catch of fish that are not the target or are not marketed species [1,2]. Concerns over discarding have led to the inclusion of statements encouraging the minimization of discards into many international agreements, including the United Nations Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fisheries. In the tuna-regional fishery management organizations (t-RFMO), concerns over waste have resulted in the adoption of agreements requiring purse seine vessels to retain all catches of skipjack

(*Katsuwonus pelamis*), bigeye (*Thunnus obesus*), and yellowfin (*Thunnus albacares*) tunas, except when catch is considered unfit for human consumption for reasons other than size, on the last set if a vessel becomes fully loaded, or if there is a serious equipment malfunction. In 2000, the Inter-American Tropical Tuna Commission (IATTC) was the first t-RFMO to adopt a catch retention policy for tuna species in purse seine fisheries, followed by the Western and Central Pacific Fisheries Commission (WCPFC) in 2008, and the Indian Ocean Tuna Commission in 2010.

Recently, some have advocated expanding retention policies to include more than the three principal tuna species in purse seine fisheries. In 2011, the International Sustainable Seafood Foundation (ISSF) announced that one of its “commitments” for its participating members<sup>3</sup> would be to source from vessels retaining all fish, including sharks caught by purse seine vessels, by January 2014. World Wildlife Fund (WWF) issued a similar statement in a

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<sup>3</sup> Processors who are ISSF members agree to comply with ISSF conservation measures and standards of practice.

position paper released in 2011 encouraging “retention of all bycatch except living and healthy individuals able to survive if thrown back” for tuna fisheries using fish aggregating devices (FADs). Additionally, an early draft of a revised conservation measure for tuna in the WCPFC circulated in November 2011 contained provisions proposing full retention of all catch by both purse seine and longline fisheries in the WCPFC. Although the full retention provisions were not included in the interim measure that was adopted by the WCPFC in March 2012, full retention policies gained greater attention. Furthermore, the European Union Council recently agreed to revise its Common Fisheries policy to include a phased ban on discarding in its fisheries, and this discarding ban has the potential to impact its vessels operating in the WCPO.

Proponents of full retention argue that this policy is necessary particularly in purse seine fisheries to better understand ecosystem effects of fishing. Full retention of catch may also allow for better estimates of total catch, which can in turn lead to more accurate estimates of fishing mortality in stock assessments [3]. Additionally, broader retention policies in other fisheries provide incentives to develop more selective fishing methods, and a full retention policy could possibly create a similar incentive [4].

One of the challenges of full retention to fishing operations is dealing with the catch of nonmarket species, and aside from acknowledging the need to develop markets for such species, few advocates consider and document other implications of a full retention policy in tuna fisheries. The WCPFC draft conservation measure also included longline fisheries, which would have been a major expansion, since the current retain-all policies only apply to purse seine vessels.

This paper considers potential impacts of a full retention policy on tuna purse seine and longline fisheries in the WCPO. Using logbook and observer data from the U.S. purse seine and longline fleets, this paper estimates discards for the U.S. purse seine and longline fleets, and for purse seine fisheries only, extrapolated to estimate discards for the entire WCPO purse seine fishery. This paper also qualitatively – and where possible quantitatively – considers the benefits and costs to producers, processors, consumers and the ecosystem. As a significant portion of tuna catch is harvested in waters under the jurisdiction of Pacific Island countries and unloaded/transshipped in Pacific Island ports, this analysis considers implications of retain-all policy on developing nations.

## 2. Methods

### 2.1. Overview of tuna fishing in the western and central Pacific ocean

The WCPO contains the largest tuna fisheries in the world, with catches in 2011 contributing over 55% of the global tuna catch [5]. Most catch comes from four gear types, purse seine (75%), longline (11%), pole and line (7%), and troll (< 1%) [5].

The WCPO purse seine fishery targets schools of skipjack and yellowfin tuna [5]. Other species often also caught in association with these schools include bigeye, silky shark (*Carcharhinus falciformis*), rainbow runner (*Elagatis bipinnulata*), dolphinfish (*Coryphaena hippurus*) and wahoo (*Acanthocybium solandri*) [6–8]. Purse seine vessels in the WCPO historically retained most skipjack, yellowfin and bigeye caught, and beginning in 2010 were required, with limited exceptions, to retain all skipjack, yellowfin and bigeye caught. Most other incidentally caught species are discarded except for those retained for crew consumption [1,8].

The longline fishery in the WCPO generally targets tunas and swordfish (*Xiphias gladius*) with hooks typically set deep for sets targeting tuna and shallow for sets targeting swordfish. Other

species often caught in the longline fishery include blue marlin (*Makaira mazara*), blue shark (*Prionace glauca*), wahoo and dolphinfish [1]. Longline vessels typically retain most tuna and swordfish caught, and unlike purse seine vessels are not required to retain all target tunas caught. Longline vessels do tend to retain other incidentally caught fish, with retention depending on a variety of factors including marketability, timing caught in trip, hold space, availability of ice, etc. [9,10].

This paper refers to the catch of other highly migratory species (HMS) as incidentally caught species rather than the more traditional terms of bycatch or non-target species. This study focuses on the incidental catch of those individuals that are discarded as it was interested in the additional tonnage that would be retained; thus estimates are not estimates of total catch of other HMS as the estimates do not include fish retained for crew consumption and/or already retained for commercial use. Furthermore, the analysis was limited to catch of fish, and did not include catches or interactions that vessels may have with sea turtles, seabirds, cetaceans and whale sharks.

### 2.2. Estimating purse seine discards

Since 1988, the South Pacific Tuna Treaty has authorized U.S. purse vessels access to fish in the exclusive economic zones (EEZs) of 16 Pacific Island countries. Participation in the U.S. fleet has varied over time, and in 2012 there were 39 licensed vessels (~13% of WCPO purse seine fleet). As part of the treaty, observers from the Pacific Islands Forum Fisheries Agency (FFA) have been placed on U.S. purse seine vessels. Observer coverage on U.S. purse seine vessels was 20% from 1988 to 2009 and increased to 100% in January 2010. Annual unpublished summaries of observer data prepared by the Secretariat of the Pacific Community (SPC) were obtained for 2006–2010. These summaries provide information on the catch and discard fate of the main target species as well as incidentally caught species. The total weight of discards and ratio of discards by species (mt)/1000 mt of landed tuna were estimated from the observed trips. Landings information was obtained from receipts issued when the catches of tunas from U.S. vessels were unloaded at the cannery. These total landings were multiplied by the discard ratios to derive an estimate of the amount of discards that would have been retained if the U.S. fleet was compelled to retain-all catch during that period. Historically, U.S. purse seine vessels unloaded their catches to the canneries in American Samoa, and more recently have transshipped their catch from various Pacific Island ports. As only four vessels solely offloaded their catch in American Samoa from 2006 to 2010 and due to limited observer data from 2006 to 2009, this paper was unable to examine whether operational differences affected discard rates. This paper assumed that if a retain-all policy was implemented, any incidentally caught fish would also be unloaded at the same time in the same port,<sup>4</sup> and this paper estimated what the weight of fish would be from the U.S. fleet in that particular port and also extrapolated to the WCPO catch using landings information obtained from SPC for the WCPO for 2007–2010.

### 2.3. Estimating longline discards

U.S. longliners fishing in the WCPO primarily operate out of Hawaii and American Samoa, and generally fish within the U.S. EEZ and high seas. In 2012, 129 vessels held Hawaii longline permits and 53 vessels held American Samoa permits with some vessels holding both American Samoa and Hawaii permits. Vessels

<sup>4</sup> Some vessels reportedly store incidental catch on the vessels for offloading in home ports.

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