



Modifying the Swordfish Trip Limit in the American Samoa Longline Fishery

Purpose and need

The **purpose** of this measure by the Western Pacific Regional Fishery Management Council (Council) is to modify the maximum number of swordfish that can be landed on a per trip basis by vessels holding an American Samoa limited entry longline permit that operate south of the Equator. The intent of the proposed action is to optimize fishery resources by reducing regulatory discards of swordfish and increase efficiency of the fishery, while maintaining safeguards for sea turtles and other protected species.

The **need** for this measure stems from comments by American Samoa longline claim that the 10-fish limit occasionally forces them to throw away swordfish caught in excess of the limit (“regulatory discards”). The current trip limit for the deep-set fishery may result in an inefficient use of fishery resources and may lead to wasteful regulatory discards and lost revenue, which are contrary to several National Standards in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Background

In 2009, the Council recommended an amendment to the Pelagic Fisheries Ecosystem Plan (PFEP) to require all hooks set below 100 meters (m) in depth by gear modifications in order to minimize the incidental catch of green sea turtles by the American Samoa longline fishery. Since NMFS implemented this measure in 2011, the fishery has not caught any green sea turtles through May 2013.

The measure includes a trip limit of 10 swordfish per trip to discourage fishermen from setting their gear shallow to target swordfish on the same trip. The swordfish trip limit is an additional safeguard to prevent targeting swordfish and reduce the potential for incidental interactions with sea turtles, especially shallower in the water column. The limit was adopted directly from the Hawaii deep-set longline fishery as a disincentive for fishermen to surreptitiously switch from deep setting to shallow setting on unobserved trips and thus maximize swordfish catches.

This measure means that American Samoa longliners are unable to set shallow for swordfish unlike Hawaii where two longline fisheries operate with deep-set vessels targeting bigeye tuna and shallow-set vessels targeting swordfish. The American Samoa longline fishery is dependent primarily on catching South Pacific albacore for the Pago Pago based cannery, with a smaller amount of additional revenue from sales of other species to the cannery and into the local market.

Despite their being a proven swordfish resource at higher latitudes than American Samoa and

surrounding US EEZ, American Samoa fishermen would be unable to target this species with shallow sets because of the gear requirements designed so that fishermen set hooks at least 100 m deep. Accordingly, the Council took action between 2010 and 2012 to amend the Pelagics Fisheries Ecosystem Plan (PFEP) to provide for shallow set longline fishing by the American Samoa longline fishery.

In the draft PFEP amendment the American Samoa vessels making shallow sets would have to use large (18/0 or larger) circle hooks and mackerel-type fish bait and carry an observer. The Council’s recommendation would not be subject to annual sea turtle interaction limits like the Hawaii shallow-set fishery, which shuts the Hawaii swordfish fishery down for the rest of the year if any limit is reached.

To-date there has been little interest in developing a shallow set fishery for swordfish based in American Samoa. Some earlier fishing for swordfish proved that swordfish could be caught south of the US EEZ around American Samoa, but the economics of marketing the catch proved to be discouraging.

American Samoa fishermen on the margins of the 156th Council and Advisory Panel Meeting asked that the current trip limit of 10 swordfish be increased, as it was in the Hawaii deep set longline fishery. Currently, the Hawaii deep-set longline fishery, are permitted to retain 25 swordfish per trip. If the vessel has an observer aboard then there is no limit for swordfish.

Swordfish catches by the American Samoa longline fishery

A summary of recent swordfish catches (2007-2011) is given in Table 1. This recent catch data comes predominantly from conventional monohull longline vessels, with three of fewer alia catamaran vessels operating between 2006 and 2011. The average number of swordfish caught per trip includes unmarketable fish, either too small or damaged by a shark, etc. In addition, the market for swordfish is not as developed as in Hawaii, so bottom line, the average per trip includes some unmarketable fish due to size, damage, and limited marketing opportunities.

Table 1. Swordfish catches and landings by the American Samoa, 2007-2011.

Year	Pounds	Caught (N)	Kept (N)	Discards (N)	Mean weight (lb)	Trips (N)	Catch per trip
2007	28,287	403	219	184	70.19	377	1.07
2008	14,889	215	117	98	69.25	288	0.75
2009	27,615	307	217	90	89.95	193	1.59
2010	24,816	301	195	106	82.44	264	1.14
2011	26,979	318	213	105	84.83	274	1.16
Mean	24,517	309	192	117	79.34	279	1.14

Source:

Total swordfish catches over this period amounted to between 215 and 403 swordfish, with a mean of about 309 swordfish of which 117 or 38% were discarded. Landings into Pago Pago of swordfish ranged from 14,889 lb to 28,287 lb, with a mean of 24,517 lb. The mean catch per trip was 1.14 swordfish per trip, with a range of 0.75 to 1.59 swordfish per trip.

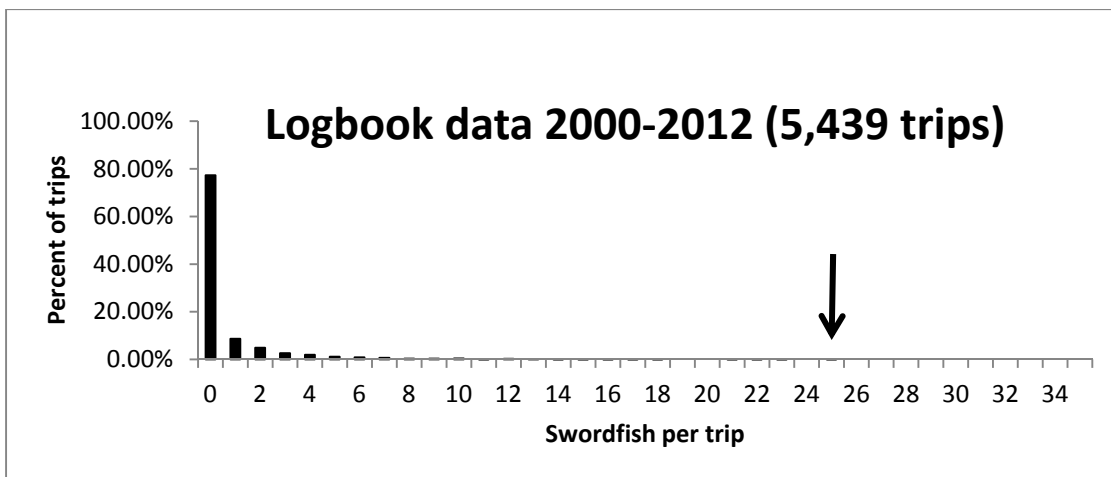
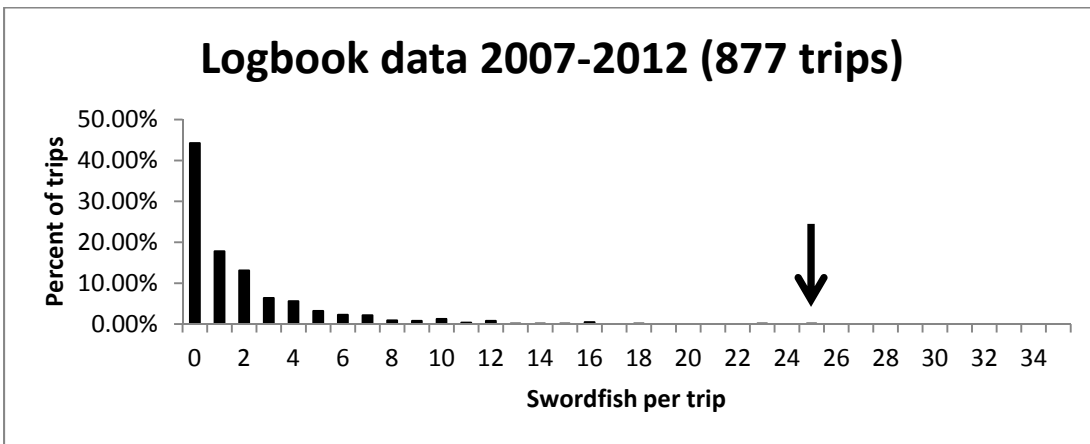
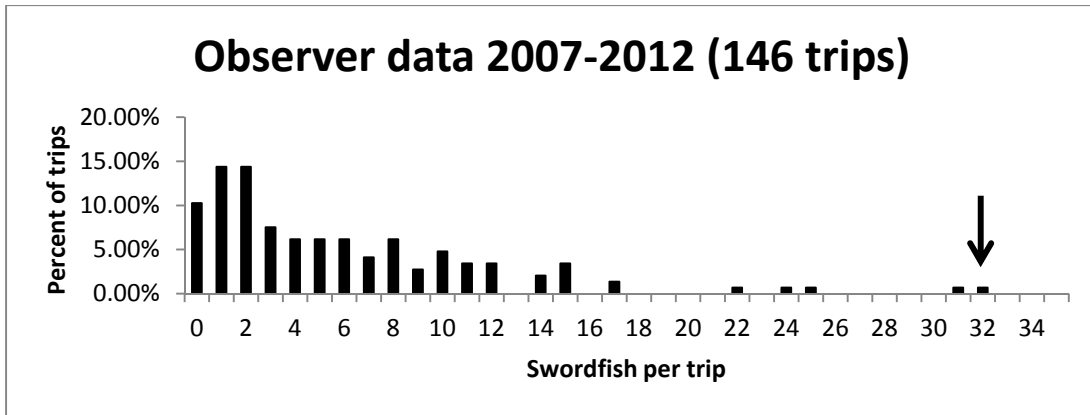


Figure 1. Frequency distributions of numbers of swordfish caught per trip from observer data (top), logbook data over the same time period as the observer data (middle), and logbook data between 2000 and 2012. Arrows indicate the end of the distribution. Source: NMFS PIFSC unpublished data

Figure 1 shows frequency distributions of the number of swordfish caught per trip from American Samoa Observer Program records and the logbook data. The logbook data from 2000-2012 is presented for the time period that overlaps the commencement of the observer program in 2006, although the first complete year of data was 2007. The data from small alia catamarans have been omitted from the data set, as have several sets that were shallow sets legally targeting swordfish.

The longer time series for the logbook data (Figure 1, bottom) covers the period when the conventional monohull longline fishery (vessels greater than 50ft) expanded from a 2-3 vessels before 1990 to between 20 and 30 vessels after 2000.

The logbook data, especially over the long term (Figure 1 bottom) indicates that about 77% of trips catch no swordfish, and only 0.84% of trips catch greater than 10 swordfish. The period of logbook data that overlaps the observer data (Figure 1 middle) also indicates that 44% of trips catch zero swordfish and that 2.3% of trips catch more than 10 swordfish per trip.

The observer data from 2007 to 2012, though based on a much smaller number of trips, suggests that swordfish catch per trip vary more than what is reported in logbooks. The observer data distribution also shows that 17% of trips caught more than 10 swordfish per trip, whereas the logbook data shows 2.3% of trips caught more than 10 swordfish per trip. The maximum number of swordfish on observed trips was 32 swordfish, versus 25 per trip in the logbook data.

Council action

Based on the data presented here it is clear from the observer data at least that there may be sufficient justification to modify the current 10 swordfish per trip limit to provide for occasions when American Samoa longline vessels encounter swordfish in abundance, and so that they can land more than 10 swordfish and thus minimize bycatch discards. The following alternatives are presented for Council deliberation:

1. No action

Under this alternative the Council would take no action and maintain the 10 swordfish trip limit.

Pros: requires no additional action by the Council and incurs no additional administrative burden.

Cons: American Samoan longline fishermen would have to continue discarding swordfish caught once the ten fish trip limit is reached, thus being unable to improve revenues from additional landings of swordfish for the local markets in American Samoa

2. Increase the trip limit to 25 swordfish

Under this alternative, the trip limit of swordfish for the American Samoa longline fleet would be

increased to 25 per trip for vessels using circle hooks¹.

Pros: Would reduce the volume of swordfish discarded if the vessel already had retained 10 swordfish onboard and contribute to longline fishery revenues from additional landings of swordfish for the local markets in American Samoa

Cons: Incurs additional regulatory burden to the Council and NMFS since the Council would need to amend its Fisheries Ecosystem Plan to implement the new swordfish limit.

3. Increase the trip limit to 32 swordfish

Under this alternative, the trip limit of swordfish for the American Samoa longline fleet would be increased to the upper bound of the observed trip swordfish catch of 32 per trip for vessels using circle hooks.

Pros: Would reduce the volume of swordfish bycatch caught and contribute to longline fishery revenues from additional landings of swordfish for the local markets in American Samoa.

Cons: Incurs additional regulatory burden to the Council and NMFS since the Council would need to amend its Fisheries Ecosystem Plan to implement the new swordfish limit.

3. Increase the trip limit (25, 32 or ???) and include a provision for unlimited swordfish catch if the vessel is carrying an observer

Under this alternative, the trip limit of swordfish for the American Samoa longline fishery would be increased to some new fixed limit, but would be unlimited for vessels carrying an observer.

Pros: Would reduce the volume of swordfish discarded if the vessel already had retained 10 swordfish onboard and contribute to longline fishery revenues from additional landings of swordfish for the local markets in American Samoa. Further, as the current limit is part of a measure to minimize sea turtle interactions, the presence of an observer negates the need for a limit since fishing operations would be observed and hooks would not likely be set shallower than 100 m.

Cons: Incurs additional regulatory burden to the Council and NMFS since the Council would need to amend its Fisheries Ecosystem Plan to implement the new swordfish limit. This measure may also create statistical problems for monitoring the fishery or modify fishermen's behavior on observed trips such that they target swordfish (see Appendix 1).

After review of the data on swordfish incidental catch by the American Samoa longline fleet, the SSC and Council may wish to recommend a modification of the current 10 swordfish per trip limit. The SSC and Council may also want to recommend whether this measure be packaged along with the draft shallow set PFEP amendment for the American Samoa fishery or should be developed into a separate PFEP amendment.

¹ Prior to 2013 the Hawaii deep set longline fishery operated with a mix of vessels using tuna J-hooks and circle hooks with a swordfish trip limit of 10 per trip for vessels using tuna hooks, 25 for vessels using circle hooks and an unlimited limit on swordfish if the vessel was carrying an observer. All the American Samoa longline fleet use circle hooks

Appendix 1. Bias from swordfish trip limits applied only to unobserved trips.

Regulating fishing behavior of vessels with observers differently than those without observers creates a situation where the basic statistical assumptions for unbiased estimation of interaction and bycatch are violated. Prior to new regulations (77 FR 43721) that changed swordfish trip limits in the Hawaii-based deep-set fishery (effective August 27, 2012), the deep-set fishery was monitored by a random sample of all trips fishing under a uniform set of regulations. Now, a trip without a swordfish landings limit has a probability of 1 of being observed and a trip with a swordfish landings limit had a probability of 0 of being observed. We no longer have a random sample. A solution to this problem would be to have both the observed and unobserved portions of the fleet operate under uniform regulations.

Another way to state the problem is that when an observed sample of the fleet is being used to estimate catch and interactions by the unobserved portion of the fleet, a basic assumption has to be that the observed and unobserved portions of the fleet are the same (operate in the same manner). A regulation that allows the observed portion of the fleet to operate in a different manner, (i.e., they can keep more swordfish), violates this assumption. Any difference in fishing behavior by the observed portion of the fleet (i.e., without a swordfish limit) creates a likely bias in the estimate for the total fleet which includes the unobserved vessels. Such bias cannot be empirically determined, since there is insufficient information for comparison with the unobserved portion of the fleet.

Using the longline logbook database and landings data that cover the entire fleet, one might attempt to establish that there are no differences in fishing behavior or catch between the observed and unobserved portions of the fleet. This is not possible. Logbook data do not record many fishing behaviors and do not reliably record catch, in particular the amount that is discarded. If logbooks show the observed portion of the fleet catches more swordfish than the unobserved, it might be that the unobserved portion is not reporting all swordfish discards. Or it might be that the unobserved or the observed portion is altering fishing in some way not recorded by logbooks. An example would be the shortening rate of the longline, which alters the tension and sag in the mainline, changing fishing depth. Longline tension and sag are difficult to quantify, even for experts, and are not recorded. Yet fishermen can alter the shortening rate to target species at certain depths. And this is just one possibility for altering operations in ways that are obscure.

Arguments that fishing behavior should not change, or that there is no incentive for different behavior between the observed and unobserved portions, do not address the violation of the basic principle that observation should be random. The justification for no trip limit removal with observers aboard assumes that observers will somehow ensure that fishing depth and many other fishing properties are not altered. However these properties can't be accurately quantified by observers. And since the portion of the fleet that is under swordfish trip limits is no longer observed at all, there is no unbiased sample of that portion or its behavior.

PIFSC now provides a formal explanation with its protected species interaction and fish bycatch estimates for the deep-set fishery that describes this potential bias to the observed sample, and the resulting unknown bias for the estimates for the entire deep-set fishery.