PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

U.S. COMMERCIAL FISHING FOR TROPICAL TUNA IN THE EASTERN PACIFIC OCEAN

PREPARED BY:

DEPARTMENT OF COMMERCE
NATIONAL MARINE FISHERIES SERVICE
WEST COAST REGION
LONG BEACH, CALIFORNIA

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LIST OF ACRONYMS AND ABBREVIATIONS

CCS- California Current System
CFR- Code of Federal Regulations
DOL- dolphin set
DML- Dolphin Mortality Limit
DSLL- deep-set longline
EEZ- Exclusive Economic Zone
EPO- eastern Pacific Ocean
ESA- Endangered Species Act
FAD- fish-aggregating device
FMP- fishery management plan
HMS- highly migratory species
HMS FMP- Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species
IATTC- Inter-American Tropical Tuna Commission
IUU- illegal, unreported, and unregulated
LL- longline
MMPA- Marine Mammal Protection Act
MT- metric ton
NMFS- National Marine Fisheries Service
NOA- unassociated
NOAA- National Oceanic and Atmospheric Administration
OBJ- floating object
PDO- Pacific Decadal Oscillation
PFMC- Pacific Fishery Management Council
PEA- Programmatic Environmental Assessment
PS- purse seine
RVR- Regional Vessel Register
TAC- total allowable catch
TRT- Take Reduction Team
WCPFC- Western and Central Pacific Fisheries Commission
WCPO- Western Central Pacific Ocean

GLOSSARY

Biomass: The estimated amount, by weight, of a highly migratory species (HMS) population. The term biomass means total biomass (age one and above) unless stated otherwise.

Bycatch: Animals which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

Commercial fishing: Fishing in which the fish harvested, either in whole or in part, are intended to enter commerce through sale, barter, or trade.

Endangered Species Act (ESA): Enacted in 1973, the ESA directs Federal departments and agencies to conserve endangered species and threatened species, and utilize their authorities in furtherance of the purposes of the ESA.

Exclusive Economic Zone (EEZ): The zone established by Presidential Proclamation 5030, dated March 10, 1983, is that area adjacent to the United States which, except where modified to accommodate international boundaries, encompasses all waters from the seaward boundary of each of the coastal states to a line on which each point is 200 nautical miles (370.40 km) from the baseline from which the territorial sea of the United States is measured (3 Code of Federal Regulation (CFR) part 22).

Fish-Aggregating Device (FAD): A manmade raft or other floating object used to attract tuna and make them available to fishing vessels.

High Seas: All waters beyond the EEZ of the United States and beyond any foreign nation's EEZ, to the extent that such EEZ is recognized by the United States (PFMC 2011b) (Note: this definition is used in the HMS FMP and differs from the definition in the Magnuson-Stevens Act, which defines "high seas" as waters beyond the territorial sea).

Highly Migratory Species (HMS): Pelagic species of fish (those that live in the water column as opposed to on the surface or on the bottom) including tunas, sharks, billfish/swordfish and which undertake migrations of significant but variable distances across oceans for feeding or reproduction.

Incidental take: "Take", as defined under the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect, or to attempt to engage in any such conduct", individuals from a species listed under the ESA. Incidental take is the non-deliberate take of ESA-listed species during the course of an otherwise lawful activity (e.g., fishing under an FMP).

Incidental Take Statement: A requirement under the ESA Section 7 consultation regulations and provided following the conclusion of a biological opinion that specifies the impact of any incidental taking of endangered or threatened species, and provides reasonable and prudent measures that are necessary to minimize impacts.

Retention/Retaining: The process of maintaining possession an animal (fish) once the animal is harvested as part of a fishery.

Stock: A group of fish with some definable attributes which are of interest to fishery managers; for example, the bigeye tuna stock.

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1 INTRODUCTION

This Programmatic Environmental Assessment (PEA) analyzes fishing for tropical tunas (bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*), and skipjack tuna (*Katsuwonus pelamis*)) by U.S. commercial fishing vessels in the eastern Pacific Ocean (EPO) under regulations proposed by the National Marine Fisheries Service (NMFS) in accordance with resolutions of the Inter-American Tropical Tuna Commission (IATTC). The IATTC Convention Area includes the waters of the EPO bounded by the west coast of the Americas, the 50° N. and 50° S. parallels, and the 150° W. meridian. IATTC Resolutions on tropical tuna have been adopted by the IATTC since 1998. Resolutions for bigeye and yellowfin have been revised through the years to also include skipjack tuna and to implement both catch and effort controls for commercial purse seine (PS) and longline (LL) vessels fishing in the IATTC Convention Area. These resolutions are agreed upon through consensus from all IATTC members, after scientific review of the IATTC Scientific Advisory Committee and the IATTC scientific staff. NMFS is obligated to implement and enforce regulations consistent with IATTC resolutions. Given that the EPO stocks of bigeye and yellowfin tuna are near fully exploited (Aires-da-Silva, Minte-Vera, & Maunder, 2017; Minte-Vera, Aires-da-Silva, & Maunder, 2017), NMFS anticipates that the IATTC (with input from the U.S. Department of State and the U.S. Delegation) will continue to adopt a suite of management measures for tropical tunas into the future. Therefore, this PEA analyzes a broad range of alternatives. The PEA will assess the potential environmental impacts on the human environment that could result from fishing by U.S. commercial vessels under the 2017 IATTC resolution, as well as similar actions in future years. If future IATTC resolutions fall within the scope of those analyzed in this PEA, and the impacts or the affected environment have not significantly changed, this document may be used to analyze the impacts of those actions.

1.1 Current Fishery

In the EPO, tropical tuna are commercially targeted by purse seine (PS) and longline (LL) vessels of several different member countries of the IATTC. Most of the total tropical tuna catch in the EPO is caught by PS vessels: 62% of bigeye, 95% of yellowfin, and 99% of skipjack. While there are presently no total allowable catch limits in place, all IATTC PS vessels have caught an average of 567,545 metric tons (mt) of bigeye, yellowfin, and skipjack tuna from 2012-2015. As such, most IATTC management measures, and, therefore, alternatives in this PEA, pertain to PS vessels.

1.1.1 Purse Seine Fishery

Within the category of PS vessels, the fleet can be broken into subgroups by vessel size and set type. Purse seine vessels are classified by size in the IATTC as follows:

Class Size	Carrying capacity (mt)	Fish Hold Volume (m^3)
1 (‘small’)	<46	<54
2 (‘small’)	46-91	54 – 107
3 (‘small’)	92-181	108 – 212
4 (‘large’)	182 – 272	213 – 318
5 (‘large’)	273 – 363	319 – 425
6 (‘large’)	>363	>425

In recent history, small PS vessels have not been subject to management measures in IATTC resolutions pertaining to tropical tunas. Small U.S. PS vessels predominantly target other unrelated species, but catch tropical tuna opportunistically in summer and fall months when warmer waters bring them in range. Currently, on the IATTC Active Vessel Register, there are nine small U.S. PS vessels (November 24, 2017).

Currently, on the IATTC Active Vessel Register, there are 16 large U.S. PS vessels (November 24, 2017). However, vessel participation ranges from year to year and sometimes can also change within a given year. The fishing season for these vessels is year-round, beginning January 1 and ending December 31, regardless of set type employed. Purse seine set types include:

- Floating objects (OBJ) sets: floating objects can be natural (e.g., a floating log) or fish–aggregating devices (FADs) that have been purposefully deployed and tracked by a vessel. They attract fish—mainly skipjack, some yellowfin, and scant bigeye—and make them available to vessels. FADs are usually manmade from materials readily available to vessels and crew like wood, nets, PVC, etc. Such materials have been observed to entangle non-target species in FAD fisheries around the world. While presently there are no restrictions on the number of FADs that can be deployed, amongst all IATTC vessels that deploy FADs, the average amount deployed in 2015 was 146, with most deploying 450 or fewer FADs (Hall & Roman, 2017). The large U.S. PS vessels predominantly make OBJ sets to target skipjack tuna. 74 percent of the total weight of tropical tuna retained by large U.S. PS vessels from 2012-2016 was caught in OBJ sets. Since at least 2005, the observer coverage on all class size 6 vessels in the EPO has been 100 percent.
- Dolphin (DOL) sets: yellowfin tuna tend to school with dolphins in the EPO. Vessels of size class 6 may apply for and receive a dolphin mortality limit (DML) from the Agreement on the International Dolphin Conservation Program so they may set on yellowfin that school in association with dolphins. No U.S. vessel had a DML assigned until 2017, when one vessel received one.
- Unassociated (NOA) sets: setting on free schools of tuna does not yield as much catch as OBJ sets—the catchability in NOA sets is about 50 percent as compared to 90 percent in OBJ sets (Fonteneau, Pallares, & Pianet, 2000) (Suzuki, Miyabe, Ogura, Shono, & Uozumi, 2003) (Miyake, Guillotreau, Sun, & Ishimura, 2010). As such, though large PS vessels make NOA sets, they are not nearly as frequent as OBJ sets. Skipjack are the target species in NOA sets.

In the last fifteen years, large PS vessels have been subject to IATTC tropical tuna management measures including:

- 31-72 days of closure to fishing
- 31 days of closure in the corralito area
- Full retention of tropical tunas, with minor exceptions

1.1.2 Longline Fishery

Similar to PS, LL vessels can be broken down into subgroups as well: deep-set longline (DSLL) and shallow-set longline (SSLL). Vessels with DSLL gear target bigeye tuna beginning around May through the end of the calendar year within the action area between the U.S. West Coast EEZ and 150^{o} W, and between 35^{o}N and the parallel extending from the U.S./Mexico border. Though DSLL gear targets bigeye, yellowfin and skipjack may be caught as well, along with a variety of other incidentally caught species. SSLL is not used to target tropical tunas, rather swordfish, but does catch a small amount of tropical tunas incidentally. Vessels using SSLL gear are indirectly affected by the proposed actions being analyzed in this PEA and will not be discussed in the same detail as DSLL vessels.

Neither SSLL nor DSLL gear are permitted inside the EEZ off of the U.S. West Coast. Therefore, most vessels that participate in this fishery are based out of Hawaii, though there are some vessels that are based out of southern California ports. 156 longline vessels were on the IATTC Regional Vessel Register as of November 24, 2017. Of these, 117 vessels are over 20 meters (m) in length, and therefore are required by the IATTC, under another Resolution, to maintain 5% observer coverage; the U.S., however, reaches 20%.

Historically, longline vessels less than 24 m in length have been considered by the IATTC as artisanal and, therefore, not managed with measures under IATTC tropical tuna resolutions. Since 2003, longline vessels greater than 24 m in length, have been subject to country-wide catch limits. U.S. LL vessels greater than 24 m have been subject to a cumulative annual catch limit of 500 mt. Between 2012 and 2016, the catch of bigeye by U.S. LL vessels of all sizes ranged from 827 mt (a low outlier) to 3,050 mt, with an average of 2,026 mt per year. The catch of 500 mt (annual limit) by large longline vessels is included in these total numbers.

1.2 Purpose and Need

The purpose of the proposed action is to monitor and manage fishing mortality by U.S. commercial vessels of exploited tropical tuna stocks in the IATTC Convention Area to ensure that fishing effort and catch do not result in a significant reduction of the potential production of these resources. Science-based catch and effort controls on commercial fishing of tropical tuna in the EPO are needed to ensure overexploitation of the stocks does not occur. The U.S. domestic implementing regulations fulfill the obligations of the United States toward that goal as a Contracting Party to the Antigua Convention.

1.3 Action Area

The IATTC Convention Area is the proposed action area analyzed in this PEA. The IATTC Convention Area includes the waters of the EPO bounded by the coast of the Americas, the 50° N. and 50° S. parallels, and the 150° W. meridian (Figure 1). This area includes the U.S. West Coast Exclusive Economic Zone (EEZ). Currently, NMFS regulations do not require that IATTC regulations, with the exception of those that implement the IATTC Regional Vessel Register requirements, apply in the area of overlapping jurisdiction between the convention areas for the IATTC and Western and Central Pacific Fisheries Commission (WCPFC). The convention areas overlap in the Pacific Ocean waters within a rectangular area bounded by 50° S. latitude, 150° W. longitude, 130° W. longitude, and 4° S. latitude (see the rectangle outlined by the red and black dashed lines in Figure 1). These regulations may be reviewed in the future, at which time, NMFS may revise the regulations in the Area of Overlap so that IATTC regulations apply, and not WCPFC regulations.

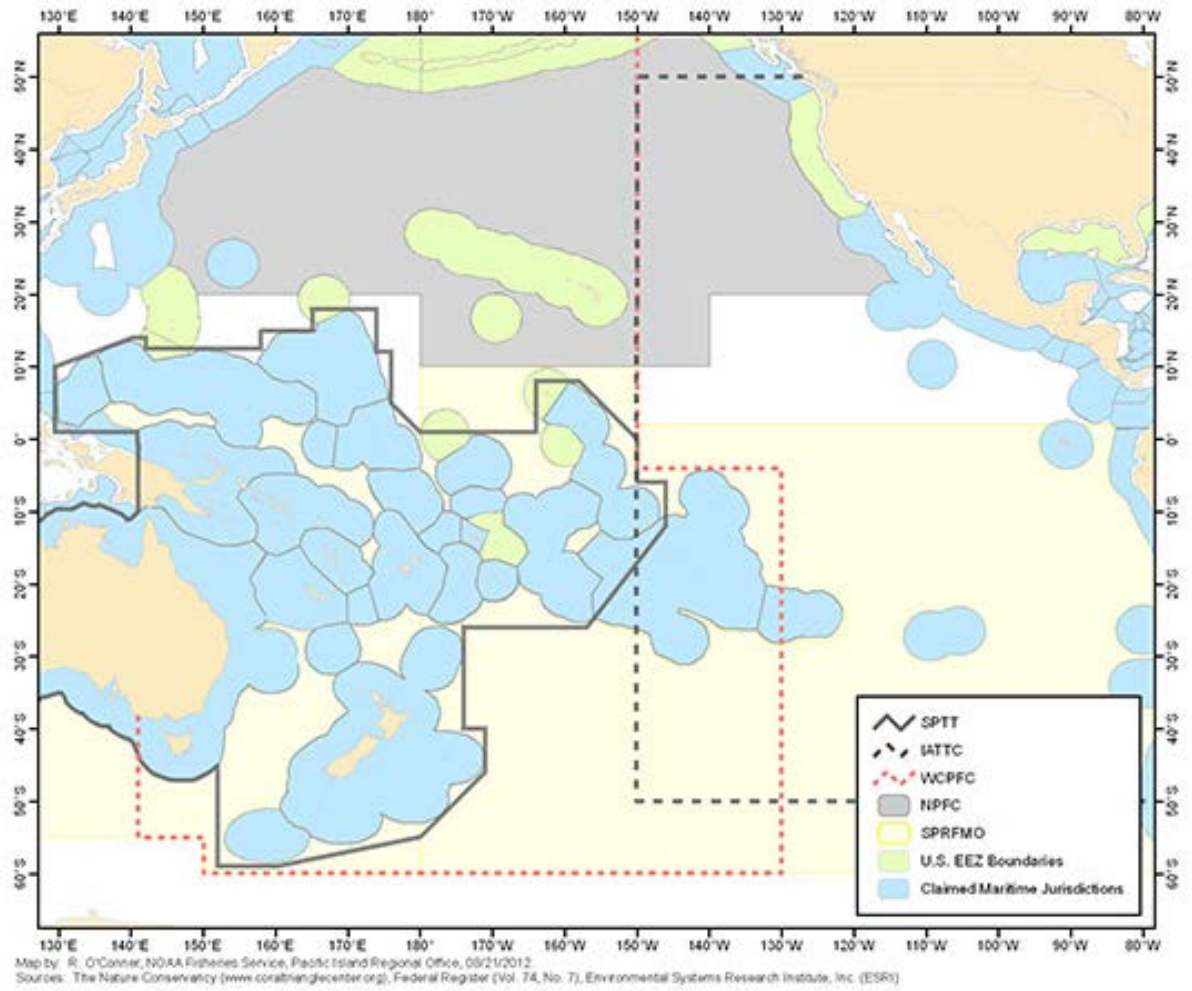

Figure 1: Map of Action Area including the IATTC Convention Area and the Area of Overlap

2 ALTERNATIVES PROPOSED FOR THE U.S. COMMERCIAL FISHERY

Several different management measures and associated alternatives are being considered for implementing IATTC resolutions for commercial fishing for tropical tunas in the IATTC Convention Area. When implemented together, these measures comprise comprehensive tropical tuna management in the EPO. Since this EA is programmatic in nature, the alternatives below include ranges of options of the various management measures.

2.1 Purse Seine Closure Period *(1 is Preferred Alternative)*

1) A purse seine closure, meaning no fishing, for a period of up to 260 days out of 365.
2) No-action: no fishing closure period for purse seine vessels.

2.2 Purse Seine Time/Area Closure *(1 is Preferred Alternative)*

1) A fishing closure in the corralito (area that encompasses 96º and 110ºW, and between 4°N and 3°S - Figure 2) for purse seine vessels for a period of 31 to 181 days per calendar year.
2) No-action: no corralito closure for purse seine vessels.

Figure 2: Corralito Closure

2.3 Retention of Tropical Tunas *(1 is Preferred Alternative)*

1) Purse seine vessels must retain on board and land all tropical tuna caught, except in cases when fish are unfit for human consumption or when, on the last set of the trip, the well is full and no more fish will fit.
2) No-action: no mandate for purse seine vessels to retain any specified amount of tropical tunas.

2.4 Purse Seine Total Allowable Catch Limits for Tropical Tunas *(2 is Preferred Alternative)*

1) A convention-wide total allowable catch (TAC) for tropical tunas caught by all IATTC purse seine vessels of up to 650,000 mt per calendar year.
2) No-action: no TAC limits for tropical tunas caught by purse seine vessels.

2.5 Purse Seine FAD Limits *(1 is Preferred Alternative)*

1) Each purse seine vessel will have no more than 500 active FADs at any one time.
2) No-action: no limit on the number of active FADs a purse seine vessel could have active at any one time.

2.6 FAD Reporting *(1 is Preferred Alternative)*

1) Daily information, including, but not limited to, identification number and location, for all active FADs belonging to a purse seine vessel shall be reported in monthly batches no later than 90 days after the month covered under the report.
2) No-action: no reporting of daily FAD information.

2.7 FAD Deployment and Retrieval *(1 is Preferred Alternative)*

1) Purse seine vessels must cease deploying FADs for a period of time each calendar year, and retrieve a percentage of the total FADs it deploys each calendar year. Under normal circumstances, these requirements would occur in the time period prior to the purse seine closure period, but could occur in other situations as needed.
2) No-action: no mandate to limit deployment or retrieval of FADs.

2.8 FAD Design *(1 is Preferred Alternative)*

1) FADs on board or deployed must comply with design standards specified by NMFS to reduce the entanglement of sharks, sea turtles, and other species.
2) No-action: no mandate for FAD design.

2.9 Longline Catch Limits for Bigeye Tuna *(1 is Preferred Alternative)*

1) U.S. longline vessels have a cumulative annual catch limit for bigeye tuna of up to 4,000 mt per calendar year.
2) No-action: no longline catch limit for bigeye tuna.

3 AFFECTED ENVIRONMENT

This chapter describes current conditions for three categories of resources that may be affected by the alternatives described in this PEA. The categories include target stocks, non-target stocks, and the socio-economic sector (fishermen, processors, etc.).

3.1 Target Stocks

3.1.1 Bigeye Tuna

Bigeye tuna in the Pacific Ocean are separated into two designated stocks for management purposes, one in the Western and Central Pacific Ocean (WCPO) and the other being in the EPO; the delineating boundary between each stock is the 150°W meridian. Therefore, the fishing in the IATTC Convention Area is on the EPO stock of bigeye tuna. An area off the coast of Ecuador, known as the corralito (see Figure 2), has been identified as important for the spawning of bigeye tuna. Recent assessments indicate a recovery trend for bigeye tuna in the EPO for a five-year period in the 2000s before spawning biomass declined between 2010 through 2013. The period of decline is hypothesized to be related to below-average recruitments coinciding with a series of strong La Niña events. The most recent stock assessment, based on 2016 data shows that bigeye in the EPO are not overexploited: fishing levels are below the maximum sustainable fishing level, and the biomass of bigeye is greater than the lowest sustainable biomass level (Aires-da-Silva, Minte-Vera, & Maunder, 2017). At current levels of fishing, effort, and catchability, and if stock recruitment remains average, the spawning biomass is predicted to continue rebuilding.

IATTC scientific staff conducted an assessment in 2017 for the EPO stock under the assumption that there is minimal interaction with the WCPO stock. The WCPFC science provider, Oceanic Fisheries Program Secretariat of the Pacific Community, has hypothesized that although bigeye tuna in the far eastern and western Pacific Ocean may have little exchange, stocks close to the WCPO/EPO boundary of 150°W may have a more rapid rate of exchange (Harley, Davies, Hampton, & McKechnie, 2014). Assessing the stock health in the future may call for examining bigeye tuna on a Pacific-wide scale, using a spatially-structured model. According to the data available from the Pacific Tuna Tagging program, which has focused its effort between 180° and 140°W since 2008, results indicate large longitudinal movement occurs across the IATTC's management boundary (Schaefer, et al., 2014) (Aires-da-Silva, Minte-Vera, & Maunder, 2017).

3.1.2 Yellowfin Tuna

Yellowfin tuna in the Pacific Ocean are comprised of two designated stocks, one in the WCPO and the other being in the EPO; the delineating boundary between each stock is the 150°W meridian (Minte-Vera, Aires-da-Silva, & Maunder, 2017). Movement rates between both stocks cannot be estimated with current data. Based off of values in the 2017 IATTC updated stock assessment, yellowfin tuna are being fished sustainably: fishing levels are below the maximum sustainable fishing level. The biomass of yellowfin tuna, while currently less than the lowest sustainable biomass level, will likely reach it in the next two years because of large recent recruitments.

3.1.3 Skipjack Tuna

Skipjack tuna is likely to be a continuous stock throughout the Pacific Ocean (Maunder, 2016), but is assessed separately in the EPO and WCPO. Assessing the status of the stock has been difficult due to uncertainties about the natural mortality, growth, and the detection of the effect of fishing on the population using standard fisheries data and stock assessment methods. As part of the tropical tuna fishing portfolio, all inferences about the health of skipjack tuna are made by comparing it to bigeye tuna and evaluating indicators each year. In addition to having a higher productivity than bigeye tuna, exploitation rates and the average weight have been stable in recent years. The IATTC concluded that there is no credible risk to skipjack (Maunder, 2017). Although the IATTC scientific staff has not been able to conduct a full stock assessment on skipjack in the EPO, the IATTC scientific staff has concluded that they do not have strong concerns of it being overexploited based on the stock status indicators.

3.2 Non-Target Stocks

3.2.1 Prohibited Species

Per other IATTC resolutions, there are three species and one family that are prohibited to be retained while a vessel is fishing for tropical tunas. These are: oceanic white tip shark (*Carcharinus longimanus*), whale shark (*Rhincodon typus*), and silky shark (*Charcharhinus falciformis*), and the family Mobulidae—in the EPO, this includes giant manta ray (*Manta birostris*), spinetail devil ray (*Mobula japanica*), Munk's devil ray (*Mobula munkiana*), Chilean devil ray (*Mobula tarapacana*), and smoothtail devil ray *(Mobula thurstoni*).

Table 1: Observed Prohibited Species Caught in U.S. Large Purse Seine Vessels. Note: none of these species were retained, they were returned to sea.

Species	Cumulative Observed Catch 2012-2016
oceanic white-tip	32
silky shark	3425
whale shark	5
giant manta	1
Chilean devil ray	7
Munk's devil ray	2
unidentified ray	13

Table 2: Observed Prohibited Species Caught in U.S. Deep-Set Longline Vessels (>20 meters) in the EPO. Note: none of these species were retained, they were returned to sea.

Species	Cumulative Observed Catch 2013-2016
oceanic white-tip	14
silky shark	15
unidentified mobula	2

3.2.2 Protected Species

The EPO hosts an array of species protected under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). According to the proposed 2018 List of Fisheries (NOAA, 2017), which classifies U.S. commercial fisheries into categories according to the level of interactions that result in incidental mortality of serious injury of marine mammals, the fisheries affected by these actions, and described in the following section, are classified as follows:

- Longline – Deep-Set: Category I (frequent interactions)
- Large Purse Seine: Category III (remote likelihood of/no known interactions)

Since the large PS fishery is classified as Category III, and has remote likelihoods of, or no known interactions with protected species, interactions for these fleets will not be analyzed further in this PEA. Observed interactions between the DSLL fishery and protected species (under the ESA and MMPA, including "strategic stocks"[1] and "depleted stocks"[2]) are listed in Table 3.

[1] defined as a marine mammal stock for which the best scientific information available indicates that: (1) the level of direct human-caused mortality exceeds the potential biological removal level, (2) the stock is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future, or (3) the stock is listed as a threatened or endangered species under the ESA, or is designated as "depleted" under the MMPA.

[2] defined as any case in which a marine mammal stock is: (1) determined by the Secretary of Commerce, after consultation with the Marine Mammal Commission and the Committee of Scientific Advisors on Marine Mammals established under MMPA title II, to be a species or population stock below its optimum sustainable population, (2) determined by a State, to which authority for the conservation and management of a species or population stock is transferred under section 109, to be a species or stock that is below its optimum sustainable population, or (3) a species or population stock is listed as an endangered species or a threatened species under the ESA.

Table 3: Observed Deep Set Longline Protected Species Interactions. Cumulative observed interactions in the deep set longline fleet (vessels > 20 meters in overall length) for 2013-2016.

Species	ESA or MMPA status	Cumulative Observed Interactions 2013-2016
unidentified porpoise	none	1
bottlenose dolphin	none	1
false killer whale	endangered (ESA) depleted/strategic (MMPA)	5
nidentified shearwater	none	3
black-footed albatross	none	37
olive ridley sea turtle	endangered (ESA)	4
loggerhead sea turtle	endangered (ESA)	2

Given the availability of comprehensive, detailed information on the life history for such species likely to be found in the action area, this information is incorporated by reference in the PEA: A full description of all marine mammal species likely to occur in the proposed action area can be found in the 2017 U.S. Marine Mammal Stock Assessments (Carretta, et al., 2017). A comprehensive review of the status of sea turtles can be found in the most recent the Five Year Sea Turtle Status Review Reports published by the U.S. Fish and Wildlife Service and NMFS (NMFS and FWS, 2013-2015[3]). The following information summarizes the status of the endangered species that interact with this fishery.

3.2.2.1 *False killer whales*

False killer whales (*Pseudorca crassidens*) are found along the west coast of the United States and from Mexico out to the Hawaiian Islands. They feed on fish and cephalopods and trend to travel in pods of 10-20 individuals, and may be found near other cetaceans. Little data are available to assess the three stocks, but minimum sizes (observed numbers) are available: Northwestern Hawaiian Islands stock: 617 animals; Main Hawaiian Islands Insular stock: 92 animals; and Hawaii Pelagic stock: 928 animals. The Main Hawaiian Islands Insular stock is listed as endangered under the ESA and depleted and strategic under the MMPA. To reduce bycatch in the DSLL fishery, a Take Reduction Team (TRT) was assembled and a Take Reduction Plan was created based on the TRT's recommendations (NOAA Fisheries, 2017).

3.2.2.2 *Loggerhead sea turtles*

Loggerhead sea turtles (*Caretta caretta*) are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. The North Pacific Ocean Distinct Population Segment is listed as endangered under the ESA. In the EPO, the waters off Baja California, Mexico, have been identified as a key foraging area for juvenile and sub-adult loggerheads that feed on pelagic red crabs (Polovina, et al., 2005). The most significant threats facing loggerheads in the North Pacific include coastal development and bycatch in commercial fisheries. Bycatch serves as a major threat to juvenile and adult individuals; bycatch occurs in both coastal and pelagic fisheries, including the DSLL fishery, throughout the species' range.

3.2.2.3 *Olive Ridley sea turtles*

The olive ridley sea turtle (*Lepidochelys olivacea*) has an extensive global distribution and is considered the most abundant sea turtle in the world, with an estimated 800,000 nesting females annually. In the EPO, they occur from Northern Chile to southern California where they can be bycatch in the DSLL fishery. The olive ridley sea turtle is mainly a pelagic sea turtle, but has been known to inhabit coastal areas, including bays and estuaries. The olive ridley sea turtles is omnivorous feeding on a wide variety of food items, including algae, lobster, crabs, tunicates, mollusks, shrimp, and fish. Olive ridley sea turtles that nest on the Pacific Coast of Mexico are listed as endangered.

[3] http://www.nmfs.noaa.gov/pr/listing/reviews.htm#seaturtles

3.2.3 Incidental Finfish

The U.S. purse seine and longline fleets operating in the EPO catch various non-target fish species. In the PS fleet, any incidentally caught species may not be retained, per IATTC resolutions and U.S. regulations. However, there is minimal incidental finfish caught by PS vessels, and as such, it will not be discussed further in this PEA. DSLL vessels catch many different non-target species. Some may be either retained or marketed or both (species marked with an asterisk), and others are discarded. Such catch is included in Table 4, followed by an overview of only the most prevalent non-target species listed in the table.

Table 4: Other Fish Interactions in DSLL. Number of individual observed fish caught in the Hawaii deep-set longline fleet (vessels > 20 m in overall length) for 2013-2016.

Species	Cumulative Total Observed Interactions 2013-2016
albacore tuna*	845
bigeye sand tiger shark	2
bigeye thresher shark*	266
black gemfish	28
bramma pomfret*	366
black marlin*	3
black tip reef shark	1
blue marlin*	292
blue shark	7821
cigarfishes	9
common mola	21
cookie cutter shark	3
crestfish	23
crocodile shark	10
dagger pomfret*	1212
deepwater dogfish	63
dolphinfish*	15438
escolar*	5447
fanfishes	15
gaping needle fish	1
hammerjaw	37
longfin escolar	302
longfin mako shark*	32
longnose lancetfish*	49363
louvar*	1
lustrous pomfret*	10
oilfish*	240
opah*	9360
other identified bony fish	29
other identified shark	1
pelagic puffer	58
pelagic ray	449
pelagic thresher shark*	6
pompano dolphinfish*	140
razorback scabbardfish*	7
remora / suckerfish	1
Roudi's escolar*	6
rough pomfret*	161
rough triggerfish*	1
sailfish*	57

scalloped ribbonfish	4
sharptail mola	10
shortbill spearfish*	2098
shortfin mako shark*	738
shortnose lancetfish	2
sickle pomfret*	12087
slender mola	62
smooth hammerhead shark	4
snake mackerel*	22379
striped marlin*	1408
swallower	11
swordfish*	1677
tapertail ribbonfish	13
tiger shark	1
unidentified billfish*	33
unidentified bony fish	74
unspecified kahala (amberjack)	1
unidentified mako shark*	10
unidentified pomfret*	8
unidentified puffer fish	4
unidentified shark	92
unidentified thresher shark*	57
unidentified tuna*	358
velvet dogfish	68
wahoo*	1869
yellowtail*	1

3.2.3.1 *Longnose lancetfish*

Longnose lancetfish (*Alepisaurus ferox*) range from Alaska to Chile and are considered nearly worldwide in distribution ranging from temperate to tropical seas. They are prey for sharks, marlins, tunas, opahs, and other predatory fish that are commercially important. There is no directed fishery for longnose lancetfish as they are not highly desirable, though they are sometimes retained for the crew or marketed. The longnose lancetfish is one of the most commonly caught non-target bony fish species cumulatively on observed sets from 2004 to 2007 (WPFCMC, 2009). However, there is scant information available on the population dynamics for this species.

3.2.3.2 *Snake mackerel*

There is little information available on the population dynamics for snake mackerel (*Gempylus serpens*). Because of the vast amount of available habitat combined with the overall minimal capture rate of snake mackerel, they are not considered to be overexploited.

3.2.3.3 *Dolphinfish (or mahi-mahi)*

In 2013, more than 1.5 million pounds of dolphinfish was harvested from Hawaii and the U.S. West Coast. There is currently no available stock assessment for dolphinfish. Although the population is not formally assessed, scientists assume dolphinfish populations are stable because the species is highly productive and widely distributed throughout the tropical/subtropical Pacific (NMFS, 2017). Dolphinfish can handle relatively high fishing rates, but precautionary management seeks to maintain current harvest levels.

3.2.3.4 *Sickle pomfret*

Monchong is a generic local name given to two deepwater pomfret species: the sickle pomfret (*Taractichthys steindachner)* and the lustrous pomfret (*Eumegistis illustris)* (WPFCMC, 2009). The sickle

pomfret is commonly found at the shelf edge and considered oceanic and highly migratory. Both monchong species are valued by Hawaii seafood wholesale and processing firms who have successfully promoted it in the fresh market and restaurant trade. Concerns over the sustainability of current pomfret removal rates with respect to recruitment prompted the Western Pacific Regional Fisheries Management Council, in coordination with Pacific Islands Fisheries Science Center, to launch an investigation into understanding pomfret life history and ecology.

3.3 Socioeconomic Environment

3.3.1 Purse Seine

Large U.S. PS vessel catch of tropical tuna is summarized here:

Table 5: Average Annual Landings (in mt) of Tropical Tunas for the Entire U.S. Large Purse Seine Fleet

	yellowfin	skipjack	bigeye
OBJ	173	1262	313
NOA	177	584	0
DOL	No U.S. vessel has had a DML until 2017, so no record of fish caught with this method.		

Because large U.S. PS vessels usually land their catch at canneries in other countries, revenue information is derived from those market prices. In 2016, the average ex-vessel prices for tropical tuna were: $1,314.5/mt for frozen skipjack tuna, $1,800/mt for frozen yellowfin tuna, and $6,712/mt for frozen bigeye tuna.

3.3.2 Longline Fishery

From 2013-2016, the U.S. fleet of LL vessels cumulatively caught annual averages of tropical tunas as follows: 19 mt of skipjack tuna, 122 mt of yellowfin tuna, and 2,313 mt of bigeye tuna. Average ex-vessel prices from 2015-2016 for tropical tuna caught by longline vessels were: $6,888/mt for bigeye tuna and $1,600/mt for yellowfin tuna (because such small amounts of skipjack are caught using this gear, no reliable ex-vessel revenue data are available). Some non-target species ex-vessel prices were: albacore tuna - $1.64/lb, swordfish - $2.57/lb, shortfin mako shark - $0.85/lb, and dolphinfish - $1.75/lb. The average ex-vessel revenue for each DSLL vessel is approximately $302,222.

4 ENVIRONMENTAL CONSEQUENCES

The impact analysis in this PEA is based on estimates of the change in catch and fishing effort that would occur under each of the alternatives. The baseline is the recent level of catch and fishing effort in the longline and purse seine fleets.

4.1 Direct and Indirect Impacts of Purse Seine Closure Period Alternatives

4.1.1 Alternative 1 (preferred): A purse seine closure, meaning no fishing, for a period of up to 260 days out of 365.

4.1.1.1 *Target Stocks*

This alternative encompasses the baseline condition of a closure up to 72 days for large PS vessels. Also, including small purse seine vessels in the closure period would not impact bigeye tuna, yellowfin tuna, or skipjack tuna, because small PS vessels catch relatively small amounts of all three target stocks. A closure period at the higher end of the range of days in this alternative may decrease the catch of all three target stocks, which could provide benefit to target stocks by reducing fishing mortality. However, any benefit is

not likely to be significant as the U.S. catch of target stocks is relatively small overall. A closure period at the lower end of this range (0 days) would allow vessels to fish more than they have previously been allowed. However, historically U.S. PS vessels have not fished in the EPO for more than an average of 105 days, in a year. As such, it's unlikely that vessels would increase their fishing effort, even in an unrestrained setting, and bigeye, skipjack, and yellowfin tuna stocks would not be significantly affected.

4.1.1.2 *Non-Target Stocks*

A purse seine closure period beyond the historical management parameters for this fishery would decrease fishing effort and thereby decrease catch and interactions with prohibited, protected, and incidentally caught fish stocks. However, any benefit would be negligible as interactions with non-target stocks are low in the PS fishery.

4.1.1.3 *Socioeconomic Environment*

As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. Taking into consideration the last ten years of U.S. PS fishing data in the EPO, the highest average days fished in a given year per vessel was 105, with 6 vessels exceeding the average in that year. Since most vessels are not fishing for 260 days currently, they would not lose any revenues by such a regulation being put in place. If the closure were 0 days, the vessels would benefit by not having any restrictions on their effort and the opportunity to fish more. However, as mentioned previously, these vessels would likely not greatly increase their fishing efforts. Any increases would likely be minor, as would any resulting increases in revenue. As such, a closure period of up to 260 days would likely not have a significant economic impact on the large U.S. PS fleet, regardless of set type. Small PS vessels fish throughout the year and primarily target species such as squid and sardines, and opportunistically target tuna species when available (generally May to October). A closure period of up to 260 days would likely not have a significant impact on this part of the fleet as tropical tuna catch is a minor part of their annual profits.

4.1.2 Alternative 2: No-action: no fishing closure period for purse seine vessels.

4.1.2.1 *Target Stocks*

Purse seine closure periods were introduced as a way to manage effort and ensure the sustainability of all three target stocks. Without closure periods, the purse seine fleet could potentially fish 365 days per year for tropical tuna in the EPO. However, since 2003, annual closure periods have ranged from 31-72 days, leaving 293-335 days available for large PS vessels to fish. The maximum days fished by any vessel since 2003 is less than 240 days. As such, bigeye, yellowfin, and skipjack tuna would not be significantly impacted if there was no closure period for U.S. PS vessels because the fleet would likely continue to only fish for a fraction of the year.

4.1.2.2 *Non-Target Stocks*

There would likely be no significant impacts to prohibited, protected, and incidentally caught fish stocks under this alternative. Though this alternative would allow vessels to fish without effort restrictions, based on their previous historical fishing patterns, they would likely only fish for a fraction of the year, as explained above. Additionally, PS fisheries have minimal catch of prohibited species and incidentally caught fish, and virtually no protected species interactions when targeting tropical tunas, so no action would not significantly impact non-target stocks.

4.1.2.3 *Socioeconomic Environment*

While this alternative would allow PS vessels to fish in the EPO throughout the entire year, as described above, the fleet's fishing behavior has been self-limited beyond any existing closure periods. While the lack of a closure period might feel like a benefit to PS vessel operators, they would likely not experience any significant benefit under this alternative.

4.2 Direct and Indirect Impacts of Purse Seine Time/Area Closure Alternatives

4.2.1 Alternative 1 (preferred): A fishing closure in the corralito for purse seine vessels for a period of 31 to 181 days per calendar year.

4.2.1.1 *Target Stocks*

This alternative (with varying geographical boundaries and periods of time, and for large PS vessels only) has been the baseline for this fishery since 2003 and it has proven to be an effective tool at keeping target stocks at sustainable levels, especially bigeye tuna, as the area encompasses bigeye tuna spawning grounds. As such, a continuation of this management parameter under this alternative would not have an impact on target stocks. Additionally, an IATTC scientific staff analysis (IATTC Scientific Staff, 2017) evaluated impacts of different lengths of time for this area to be closed. Impacts varied between stocks such that bigeye tuna would experience a benefit from having the spawning ground protected for a longer period of time, but a hindrance to yellowfin tuna and skipjack tuna due to a shift in effort. However, those impacts, both positive and negative, were not significant throughout the range of 31-181 days of closure in the corralito. Including small PS vessels in this measure would not have any impact on the three target stocks as small U.S. vessels do not historically fish in this area.

4.2.1.2 *Non-Target Stocks*

Because this alternative (at 31 days) is the baseline, it would not impact prohibited, protected, or incidentally caught fish stocks at that level. If the closure was extended to the maximum of this alternative, 181 days, there would be a benefit to individual non-target species within this specific area as fishing effort would be more limited and, therefore, interactions and mortality would decrease. However, because PS vessels have minimal catch of prohibited species and incidentally caught fish, and virtually no protected species interactions when targeting tropical tunas, this alternative would not significantly impact non-target stocks.

4.2.1.3 *Socioeconomic Environment*

As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. The closure area known as the corralito, with an annual 31-day closure is the baseline for large PS vessels. Fishing location information, specific to large U.S. PS vessels is unavailable in the corralito. However, fishing location information for the entire international PS fleet is available (IATTC Scientific Staff, 2016) and can be used as a proxy. Based on these distribution maps, which include the 31 day closure in this area, this area is not where a majority of target stock catch is made. Additionally, effort could shift elsewhere if the area was closed for an extended period of time, so if the closure was extended beyond the current level of 31 days, the large PS fleet would likely be unaffected. Small PS vessels do not fish this far away from the U.S. West Coast and would not be affected by this measure. As such, this alternative would not have a significant impact on the fleet.

4.2.2 Alternative 2: No-action: no corralito closure for purse seine vessels.

4.2.2.1 *Target Stocks*

This time/area closure has been used to manage effort and ensure the sustainability of target stocks, especially bigeye, which spawn in this area. Without a closure of the corralito, the purse seine fleet could fish for bigeye, yellowfin, and skipjack tuna in this area throughout the entire year. Without a comparable replacement measure to achieve the same conservation benefit, and if vessels did fish in this area when they previously did not, target stocks could be negatively affected as fishing mortality could increase. Bigeye tuna, in particular, could be negatively impacted if spawning was interrupted by disruption or by removing spawning age bigeye tuna from the spawning grounds via capture.

4.2.2.2 *Non-Target Stocks*
Although this alternative would allow vessels to fish in this area without effort restrictions, PS vessels have minimal catch of prohibited species and incidentally caught fish, and virtually no protected species interactions when targeting tropical tunas; therefore, this alternative would not significantly impact non-target stocks.

4.2.2.3 *Socioeconomic Environment*
Without the closure of the corralito, large U.S. PS vessels may fish in this area more than they currently do. This could increase their revenues, but likely not by a significant amount as it is a relatively short additional timeframe during which they would be able to fish compared to the current conditions.

4.3 Direct and Indirect Impacts of Retention of Tropical Tuna Alternatives

4.3.1 Alternative 1 (preferred): Purse seine vessels must retain on board and land all tropical tuna caught, except in cases when fish are unfit for human consumption or when, on the last set of the trip, the well is full and no more fish will fit.

4.3.1.1 *Target Stocks*
This measure has been the baseline in place for large PS vessels since 2009. Full retention, with minor exceptions, disincentives catching small fish, prevents high-grading (only keeping the largest and best fish and leaving smaller fish behind with reduced chances for survival post-release), encourages more selective fishing practices, and ensures all impacts of fishing operations are accounted for. Since this is the baseline, this alternative will not change the baseline conditions for large PS vessels and, therefore, will not have a significant impact to bigeye, yellowfin, or skipjack tuna. Having this measure also apply to small vessels would be new and different from the baseline. There are no discard data available for small PS vessels, but because tropical tunas are not their usual target species and they catch relatively few to begin with, it's unlikely this measure would have a significant benefit to the target stocks.

4.3.1.2 *Non-Target Stocks*
This alternative will not change the baseline conditions and therefore will not have a significant impact to the prohibited, protected, or incidentally caught fish stocks.

4.3.1.3 *Socioeconomic Environment*
As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. Large PS vessels have operated under this measure since 2009. Based on a 2016 analysis, minor exceptions for full retention—i.e., if fish are unfit for human consumption or there is not enough well space at the end of a trip—have resulted in about 1% of catch being discarded (IATTC Scientific Staff, 2016). Because this alternative will not change the baseline conditions for large PS vessels, it will not have a significant impact to them. Should this measure be applied to small PS vessels, it would it could potentially decrease revenues by requiring the vessels to keep less desirable fish they would have historically discarded. However, because tropical tunas are a relatively minor part of the small PS vessel portfolio, this measure would not have a significant impact on this fleet.

4.3.2 Alternative 2: No-action: no mandate for purse seine vessels to retain any specified amount of tropical tunas.

4.3.2.1 *Target Stocks*
No action would mean that vessels could discard tropical tunas for any reason, though there are no data to indicate how much they would discard without restriction. If the entire fleet discarded a significant

amount, there could be negative impacts to the stock because mortality of bigeye, yellowfin, and skipjack tuna could increase. Furthermore, important data would be lost and not accounted for if discards and high-grading were permitted, which could also negatively affect the target stocks in the long term by not having accurate stock assessments.

4.3.2.2 *Non-Target Stocks*

This alternative could potentially make PS vessels less selective with their sets and fishing methods if they knew that they could discard any amount of fish that were low value and just set again. However, because PS vessels have minimal catch of prohibited species and incidentally caught fish, and virtually no protected species interactions when targeting tropical tunas, it's likely the lower selectivity would not significantly impact non-target stocks.

4.3.2.3 *Socioeconomic Environment*

Under this alternative PS vessels could discard any amount of tropical tuna. This could increase the amount of high quality fish they land and, therefore, increase their ex-vessel revenue. However, there are no data to indicate how much a vessel would discard without limits, and how much higher their revenues would be. Additionally, much of the catch of the U.S. PS fleet goes to canneries, which generally have standardized prices, regardless of the fish quality. As such, this alternative would not likely significantly affect P.S. vessels.

4.4 Direct and Indirect Impacts of Purse Seine Total Allowable Catch Limits for Tropical Tunas Alternatives

4.4.1 Alternative 1: A convention-wide TAC for tropical tunas caught by all IATTC purse seine vessels of up to 650,000 mt per calendar year.

4.4.1.1 *Target Stocks*

Historically, without a TAC in place, the average tropical tuna catch in the EPO by all PS vessels of the IATTC from 2012-2016 was 574,782 mt, with the maximum being 640,483. Keeping catches of bigeye, yellowfin, and skipjack tuna stocks from increasing beyond those levels (i.e., having a catch limited to 650,000 mt) would have no impact to the target stock since it has been the baseline condition. Restricting PS catch of tropical tunas below that historic level (e.g. to a TAC of 0 mt) would benefit the target stocks by decreasing fishing mortality and, thereby, increasing biomass. No significant adverse impacts are expected under this alternative.

4.4.1.2 *Non-Target Stocks*

If a TAC was set at the higher end of this range (near 650,000 mt), it would not impact prohibited, protected, and incidentally caught fish stocks because that level of fishing would be the same as the baseline conditions. Restricting the TAC below baseline condition levels of catch (near 0 mt) could be of benefit to non-target stocks; however, not in a significant way as PS vessels have minimal catch of prohibited species and incidentally caught fish, and virtually no protected species interactions when targeting tropical tunas.

4.4.1.3 *Socioeconomic Environment*

As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. Under this alternative, the U.S. PS fleet would be subject to a TAC shared with other countries' fleets that fish in the EPO for tropical tunas. This would likely create a race-to-fish scenario where vessels fished early and frequently to ensure they got part of the TAC. Likely, this EPO-wide TAC would be reached sometime before the end of the year. This could decrease revenues for the U.S. PS vessels and negatively impact the fleet. However, the fleet has alternatives: the small PS vessels could fish other species, and the large PS fleet

could fish in the western Pacific Ocean. As such, this measure would not significantly affect U.S. PS vessels.

4.4.2 Alternative 2 (preferred): No-action: no TAC limits for tropical tunas caught by purse seine vessels.

4.4.2.1 *Target Stocks*

Presently there is no TAC in place, but the catch has averaged 574,782 mt between 2012 and 2016. While no TACs mean that PS vessels in the EPO could collectively fish as many bigeye, yellowfin, and skipjack tunas as they wanted and were able, the fleet has practical levels of catch it can achieve based on costs, regional availability of the stocks, and other management measures. Under this alternative it is not expected that catch would increase above the baseline conditions. As such, this alternative would likely not have a significant effect on target stocks.

4.4.2.2 *Non-Target Stocks*

Without TACs, there could be unlimited fishing for tropical tunas in a given a year. However, there are practical limitations to the amount of fishing that would occur, as described above. Under this alternative it is not expected that catch would increase above the baseline conditions. As these practical limitations limit fishing, they also limit catch of prohibited, protected, and incidental fish stocks. In addition to interactions and catch of non-target species being rare in PS fisheries, this is a historical management parameter of this fishery, so it will not change the baseline conditions and therefore will not have a significant impact on non-target stocks.

4.4.2.3 *Socioeconomic Environment*

This alternative has been a historical management parameter for this fishery. Under this alternative it is not expected that catch would increase above the baseline conditions. As such, it will not change the baseline conditions and therefore will not have a significant impact on PS vessel revenues.

4.5 Direct and Indirect Impacts of FAD Limit Alternatives

4.5.1 Alternative 1 (preferred): Each purse seine vessel will have no more than 500 active FADs at any one time.

4.5.1.1 *Target Stocks*

There is no scientific correlation between number of FADs and tuna fishing mortality. However, theoretically if there are limits on FADs, there are limits on opportunities for purse seine vessels to have successful catches from FAD sets. Although there are no current limits on FADs, according to information compiled by IATTC scientific staff from 2013-2015, most purse seine vessels fishing in the IATTC Convention Area deploy 450 or fewer FADs within a year (IATTC Scientific Staff, 2016). As such, at the high end of the range of limits on the number of FADs (500), there would be no impact to bigeye, yellowfin, or skipjack tuna. If the limit was set to the lower end, vessels could shift their fishing practices to make more NOA sets and sets on naturally occurring floating objects to make up for decreased catch from FAD sets. While there is not presently a limit on the number of FADs that can be deployed, limiting the number of FADs would not likely not change the baseline condition, and would likely have no significant impact to the target stocks.

4.5.1.2 *Non-Target Stocks*

This FAD limit of 500 under this alternative is the *de facto* maximum in the baseline of this fishery in that most vessels have not deployed more than 450 FADs in a year even without any regulation to cap them. As such, this alternative would not impact target stocks at that level. Limiting FADs lower than 500 could mean fewer opportunities for entanglements with protected species like turtles. However, catch of

prohibited species and incidentally caught fish, and virtually no protected species interactions when targeting tropical tunas, so this alternative would not significantly impact non-target stocks.

4.5.1.3 *Socioeconomic Environment*

As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. With respect to limits on active FADs, small U.S. PS vessels do not use FADs, and would not be impacted by this measure. Although it is unknown how many active FADs each large U.S. purse seine vessel maintains at any given time, according to discussions between NMFS and U.S. industry representatives, it is not more than 450 FADs. Because this alternative, at the high end (500) would not practically restrict the amount of FADs currently used by large PS vessels, this would not likely affect the fleet. If the FAD limit was set at a level that would change fishing behavior (as low as 0), vessels might shift effort to NOA sets or sets on naturally occurring floating objects. Overall, though this alternative may induce changes to fishing behavior, like shifting set types, they would be minor changes and will not have a significant impact.

4.5.2 Alternative 2: No-action: no limit on the number of active FADs a purse seine vessel could have active at any one time.

4.5.2.1 *Target Stocks*

Under this alternative, there would be no change to the current conditions and, therefore, it will not have a significant effect on bigeye, yellowfin, or skipjack tuna.

4.5.2.2 *Non-Target Stocks*

Under this alternative, there would be no change to the current conditions and, therefore, it will not have a significant effect on prohibited, protected, or incidentally caught fish stocks.

4.5.2.3 *Socioeconomic Environment*

Under this alternative, there would be no change to the current conditions and, therefore, it will not have a significant effect on PS vessels.

4.6 Direct and Indirect Impacts of FAD Reporting Alternatives

4.6.1 Alternative 1 (preferred): Daily information, including, but not limited to, identification number and location, for all active FADs belonging to a purse seine vessel shall be reported in monthly batches no later than 90 days after the month covered under the report.

4.6.1.1 *Target Stocks*

As this is just a reporting requirement, there are no direct impacts to bigeye, yellowfin, or skipjack tuna.

4.6.1.2 *Non-Target Stocks*

As this is just a reporting requirement, there are no direct impacts to prohibited, protected, or incidentally caught fish stocks.

4.6.1.3 *Socioeconomic Environment*

As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. This would be a new reporting requirement for PS vessels. The allowed delay in reporting would ensure that confidential information (e.g., location) is not disclosed. The information PS vessels would be required to report (e.g., location, number of FADs) is available on a constant basis on board the vessel, so the information is already being collected by the vessels. Communicating this information from the vessel each month could

cost $20-$40 per month, equaling $240-$480 per year per vessel. This requirement is not expected to reduce the fleet's profitability and as such would not have a significant effect on the PS fleet.

4.6.2 Alternative 2: No-action: no reporting of daily FAD information.

4.6.2.1 *Target Stocks*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on bigeye, yellowfin, or skipjack tuna.

4.6.2.2 *Non-Target Stocks*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on prohibited, protected, or incidentally caught fish stocks.

4.6.2.3 *Socioeconomic Environment*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on PS vessels.

4.7 Direct and Indirect Impacts of FAD Deployment and Retrieval Alternatives

4.7.1 Alternative 1 (preferred): Purse seine vessels must cease deploying FADs for a period of time each calendar year, and retrieve a percentage of FADs it deploys each calendar year. Under normal circumstances, these requirements would occur in the time period prior to the purse seine closure period, but could occur in other situations as needed.

4.7.1.1 *Target Stocks*
There is no studied scientific correlation between number of FADs and tuna fishing mortality. However, theoretically, if there are fewer FADs, or FADs soaking for less time, there will be fewer aggregations of fish worth setting on by PS vessels. Because this alternative could would require ceasing deployment, and, thereby, potentially decrease the amount of FADs in the water, as well as require retrieval of FADs, which would decrease soak times of those FADs, the catch of bigeye, yellowfin, and skipjack tuna could decrease. However, vessels could change their fishing behavior and deploy more FADs during parts of these year when there are no cease restrictions, and those FADs may attract more fish since they could be soaking longer. Additionally, the FADs retrieved by a vessel could be ones that have not been aggregating fish well (underperforming FADs). As such, this alternative is not likely going to affect target stocks.

4.7.1.2 *Non-Target Stocks*
Fewer FADs or FADs soaking for less time could mean reduced interactions with prohibited, protected, and incidentally caught fish stocks. However, vessels could shift their efforts outside of any time restrictions or retrieval requirements to still deploy and set on the same number of FADs they were in recent history. As such, they will likely be no change from the baseline conditions and no significant impact to non-target stocks.

4.7.1.3 *Socioeconomic Environment*
As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. According to an IATTC staff analysis, seasonality of FAD deployment and retrieval is variable (Hall & Roman, 2017). This alternative would not significantly impact the fleet because they could adapt their fishing behavior by deploying more FADs during different parts of the year. Additionally, FADs have historically been retrieved by vessels throughout the year, without a mandate to do so. Under this alternative, a percentage retrieval requirement (e.g., vessels had to retrieve half as many FADs as the number of FAD sets they made during a year) would add a time burden for vessel operators and crew to pull the FADs out of the

water. Vessels have, on average, 2.5 times as many active FADs as the number of FAD sets they make in a year, so retrieving the same amount of FADs as FAD sets would likely not be difficult. These proposed restrictions on FAD deployments and required retrievals would not restrict the number of FADs in the water, but could change the amount of time vessel operators or crew engage in activities, other than fishing, on the water. Thus, these measures are not expected to reduce the overall profitability of PS vessels.

4.7.2 Alternative 2: No-action - no mandate to limit deployment or retrieval of FADs.

4.7.2.1 *Target Stocks*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on bigeye, yellowfin, or skipjack tuna.

4.7.2.2 *Non-Target Stocks*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on prohibited, protected, or incidentally caught fish stocks.

4.7.2.3 *Socioeconomic Environment*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on PS vessels.

4.8 Direct and Indirect Impacts of FAD Design Alternatives

4.8.1 Alternative 1 (preferred): FADs on board or deployed must comply with design standards specified by NMFS to reduce the entanglement of sharks, sea turtles, and other species.

4.8.1.1 *Target Stocks*
FAD materials and design differ between countries, areas of the ocean, companies, and individual vessels. However, they all attract the bigeye, skipjack, and yellowfin tuna. There are no studies to indicate if there are significant changes in attracting target stocks between different materials. Additionally, vessels would likely adapt to any change in fish per FAD by adjusting their effort so that catch, and profits, remain constant. Therefore, there would likely be no significant impact to the target stocks.

4.8.1.2 *Non-Target Stocks*
1.1 percent of the catch from FAD sets is non-target catch. Between 74 percent and 92 percent of that non-target catch is other tunas and bony fishes (Restrepo, V.; Dagorn, L.; and Justel-Rubio, A, 2017). The rest of the non-target catch could be prohibited or protected species. The impetus to establish criteria for FAD material and design is to decrease entanglement with these stocks. While research cruises have shown decreases in non-target entanglement with certain FAD designs and materials (Restrepo, et al., 2016), minor beneficial impacts are expected. However, since interactions rates are low these impacts would not be significant.

4.8.1.3 *Socioeconomic Environment*
As this measure and its alternatives do not apply to longline vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. Although information compiled by International Seafood Sustainability Foundation (ISSF) show that the majority of the U.S. purse seine fleet currently use materials on FADs that have a high risk of entanglement (e.g., hanging nets), the U.S. purse seine industry in the Pacific Ocean are in the process of transitioning to materials that do not have the highest risk of entanglement. This is a result of coordination with ISSF, and is expected to become effective in March 2018. Although there may be some costs associated with this

transition, these measures are not expected to reduce the profitability of the fishery or significantly impact the fleet.

4.8.2 Alternative 2: No-action: no mandate for FAD design.

4.8.2.1 *Target Stocks*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on bigeye, yellowfin, or skipjack tuna.

4.8.2.2 *Non-Target Stocks*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on prohibited, protected, or incidentally caught fish stocks.

4.8.2.3 *Socioeconomic Environment*
Under this alternative there would be no change to the current conditions and, therefore, it will not have a significant effect on PS vessels.

4.9 Direct and Indirect Impacts of Longline Catch Limits for Bigeye Tuna Alternatives

4.9.1 Alternative 1 (preferred): U.S. longline vessels have a cumulative annual catch limit for bigeye tuna of up to 4,000 mt per calendar year.

4.9.1.1 *Target Stocks*
The IATTC scientific staff analyzed the impacts of 1,000 more metric tons being caught by large U.S. longline vessels in the context of reviewing catch limits for large LL vessels and found that: “The effect on the spawning biomass over the 10-year projection period would be indistinguishable…” (IATTC Scientific Staff, 2017). The 1,000 mt in addition to historic fishing levels of 3,050 mt by the U.S. LL fleet, would not have a significant impact on bigeye tuna, or the other target stocks (yellowfin and skipjack tuna) which are caught in smaller amounts in this fishery.

4.9.1.2 *Non-Target Stocks*
Since this alternative could allow for higher catch than historical levels by the U.S. LL fleet, effort would likely increase too. As such, the catch of prohibited, protected, and incidentally caught fish stocks would also likely increase. However, interactions with prohibited species are low, and there are other controls to manage bycatch of protected species—gear modifications, incidental take statements, and a TRT for false killer whales. These measures ensure these populations are not significantly impacted. Therefore, this alternative is not likely to have a significant effect on non-target stocks.

4.9.1.3 *Socioeconomic Environment*
As this measure and its alternatives do not apply to purse seine vessels, there would be no impacts to that fishery and it will not be discussed in subsequent alternatives under this measure. The increase from the historical catch levels under this alternative may allow for additional flexibility and fishing opportunity for U.S. LL vessels. However, since it would only equate to about 6.5 more mt per vessel (1000 mt divided amongst 156 vessels) it is not likely to significantly increase profits, and therefore would not have a significant effect on the commercial fleet.

4.9.2 Alternative 2: No-action: no longline catch limit for bigeye tuna.

4.9.2.1 *Target Stocks*
Without a catch limit, the U.S. LL fleet could catch any amount of bigeye in the EPO. If the fleet caught more than the historical average, there is a potential that bigeye would be negatively impacted since

fishing mortality would increase. However, potential U.S. catch (based on historical values) is small relative to the total LL catch of bigeye in the EPO, and as such it would not be a significant impact. Yellowfin and skipjack tuna are caught in very small amounts in this fishery and even under this alternative with unlimited fishing, they are not likely to be significantly affected.

4.9.2.2 *Non-Target Stocks*

Without a catch control on the fleet, fishing effort could increase from historical values. As a result, the catch of prohibited, protected, and incidentally caught fish species would also likely increase. However, interactions with prohibited species are low, and there are other controls to manage bycatch of protected species—gear modifications, incidental take statements, and a TRT for false killer whales. This alternative is not likely to have a significant effect on non-target stocks.

4.9.2.3 *Socioeconomic Environment*

Without a catch limit, the longline fleet could fish as many bigeye tuna in the EPO as they could or wanted. The large LL vessels have historically been restricted by a 500 mt limit and the fishery for those vessels has closed before the end of the year since 2013. The fishery closed sometime in August – November in those years. Without a catch limit, vessels could continue to fish throughout the year and likely increase profits from historical averages. However, since it would increase access by a relatively small amount (1-4 months), it is not likely to have a significant impact on the fishery.

5 CUMULATIVE IMPACTS

Cumulative impacts are the impacts on the environment which result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions; cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Overall, the incremental effects of the action alternatives are small relative to baseline levels and cumulative effects are not expected to be significant.

5.1 Past, Present, and Reasonably Foreseeable Future Actions

5.1.1 Fishery-Related Actions

5.1.1.1 *Other Fisheries - Domestic and International*

U.S. commercial fisheries that target tropical tunas in the EPO include longline and purse seine fisheries; however, other fisheries, such as the drift gillnet fishery and the pole and line fishery catch tropical tunas incidentally. Whether targeted or incidental, vessels must be on the IATTC Regional Vessel Register (RVR) to harvest tuna and tuna-like species in the EPO. This is a requirement of all fishing nations targeting tunas in the EPO.

As of December 4, 2017, the IATTC RVR included the following U.S. vessels: 14 gillnet, 8 harpoon, 350 multi-purpose, 28 pole-and-line, 194 recreational, and 892 troll.

Like the U.S., the other 20 IATTC Members also have either purse seine or longline fleets or both that target tropical tunas, as well as other vessels of different gear types that incidentally catch them. All gear types combined, from all countries, caught the following amounts of tropical tunas in the last 4 years for which there are data (IATTC Scientific Staff, 2016):

Table 6: Total Tropical Tuna Catch in the EPO

Species	Year	Catch (mt)
yellowfin	2012	213,310
	2013	231,803

	2014	246,512
	2015	246,380
skipjack	2012	273,519
	2013	284,043
	2014	265,644
	2015	333,456
bigeye	2012	102,687
	2013	86,063
	2014	95,809
	2015	101,652

In U.S. waters, experimental fisheries are being tested that may be added to the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) as authorized gears, and, therefore, subject to any applicable IATTC measures. Those fisheries include testing longline gear, deep-set buoy gear, and deep-set linked buoy gear within the west coast U.S. EEZ. The deep-set LL fishery in the EEZ would target bigeye. Shallow-set LL and buoy gear fisheries would target swordfish, but could also catch tropical tunas incidentally. Many of the vessels experimenting with these gears are already on the IATTC RVR and are HMS FMP permit holders.

5.1.1.2 *Regulatory Adjustments under International Management - IATTC*

The IATTC was established in 1949 with the intent to assess and manage the sustainability of tuna and tuna-like species throughout the EPO. The IATTC meets at least once a year to agree to review stock assessments, the effectiveness of existing conservation and management measures, and to consider new measures or modify existing measures as necessary. Recently, the IATTC participated in joint meetings with the WCPFC on cross-Pacific matters such as Pacific bluefin tuna and Management Strategy Evaluations for shared stocks.

Currently, IATTC members are obligated to implement Resolution C-17-02, which was adopted during its annual meeting in 2017. Resolution C-17-02 is set to expire at the end of 2020. At that point, based on analyses of its effectiveness and taking stock assessments into consideration, IATTC members are expected to negotiate new measures, or roll over measures from C-17-02.

5.1.1.3 *Illegal, Unreported, and Unregulated (IUU) Fishing*

Some IUU fishing may occur in the vicinity of the action area with some effects to marketable HMS, non-target finfish, and protected species. Information on catch, effort, and protected species interactions for these activities is sparse and difficult to obtain. Nonetheless, it is expected that these activities may contribute some negative impacts on the species described in Chapter 3.

There are private and public efforts underway to address IUU fishing, but what the impacts of these efforts will be on curbing illegal fishing is unknown at this time.

5.1.2 Non-fishery Related Actions

5.1.2.1 *Scientific Research*

The IATTC scientific staff maintains a scientific research program, based primarily out of its lab in Achotines, Panama and offices in La Jolla, California. Ongoing research includes life-history of tunas including growth rates and genetics, but also fishery-related research. Future research proposals include management strategy evaluations (MSE) for tropical tunas in the EPO, a joint IATTC-WCPFC workshop to advance spatial stock assessments of bigeye tuna in the Pacific Ocean, analyses of the effects of fisheries targeting on longline catch per unit effort standardization, improving data collection and stock assessments for sharks in the EPO, electronic monitoring of purse-seine vessel activities and catches,

testing the potential of sorting grids for reducing the mortality of small tunas and other species in the purse-seine fishery in the EPO (IATTC Scientific Staff, 2017).

5.2 Effects of Past, Present, and Reasonably Foreseeable Future Actions and Cumulative Impacts

5.2.1 Purse Seine Closure Periods

5.2.1.1 *Cumulative Impacts to Target Stocks*

As discussed in Chapter 4, neither of the alternatives under this measure would have a significant impact on target stocks. In addition to the past, present, and reasonably foreseeable future actions identified in this chapter, the alternatives would not be expected to significantly impact target stocks. The impacts from the U.S. purse seine fleet on tropical tuna stocks in the EPO is minimal (2 to 6 percent of PS catch of tropical tunas in the EPO from 2012-2016) compared to other fishing nations. If other IATTC members *also* implemented no closure periods as under Alternative 2 (No-action), there would likely be a significant negative impact to the target stocks. The intent of the closure periods has been to manage the impacts of capacity by limiting effort. However, this alternative was not agreed to at the 2017 IATTC meeting, and would likely not be adopted in the future without a commensurate management measure as the aim of the IATTC is to prevent overexploitation of target stocks and associated species.

5.2.1.2 *Cumulative Impacts to Non-Target Stocks*

Closure periods of any sort will decrease effort and, thereby, interactions with non-target stocks, which would be beneficial. However, catch and interactions of non-target stocks with purse seine vessels are minimal, so even in addition to other past, present, and future actions described above, there would be no significant impact on non-target stocks under either of the alternatives.

5.2.1.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 2 (No-action) is less restrictive to the U.S. PS fleet than Alternative 1. However, in addition to other past, present, and foreseeable actions, Alternative 1 is likely beneficial to the fleet also, as having closure periods makes enforcement and identification of IUU fishing somewhat easier to identify. The elimination of IUU fishing is beneficial to legitimate fishing operations. However, this benefit is not likely to be significant as IUU fishing would not be eliminated. As such, overall, the past, present, and reasonably foreseeable future actions combined with either alternative under this measure will not have a significant cumulative impact on the commercial fleet.

5.2.2 Purse Seine Time/Area Closure

5.2.2.1 *Cumulative Impacts to Target Stocks*

As stated in Chapter 4, Alternative 1 under this measure would be more beneficial to target stocks than Alternative 2 (No-action). Past, present, and reasonably foreseeable actions described above are not directly related to this specific time and area of the ocean and as such, cumulatively, are likely not to have significant impacts on target stocks with either alternative.

5.2.2.2 *Cumulative Impacts to Non-Target Stocks*

The action alternative under this measure would be more beneficial to non-target stocks located in the closure area than the no-action alternative as there would be no purse seine fishing effort for a period of time, but would likely not have a significant impact on the entirety of the stocks themselves. Past, present, and reasonably foreseeable actions described above are not directly related to this specific time and area of the ocean and, as such, cumulatively, are likely not to have significant impacts on non-target stocks with either alternative.

5.2.2.3 *Cumulative Impacts to Socioeconomic Environment*

While the action alternative under this measure is more restrictive to the U.S. commercial PS fleet than the no-action alternative, it is similar to a baseline measure and, therefore, would not significantly impact them. Other U.S. fisheries do not fish in this area, and the foreign fleets that do are subject to the same regulations, so there is no unequal burden. This closure period does allow for some unique scientific research (an unfished area for a period of time to compare to fished areas during the same period) and any improvements to scientific understanding of fishing and the stocks could lead to more refined and efficient measures which would benefit the fishing fleet, though likely not significantly. As such, the cumulative impacts from past, present, and reasonably foreseeable future actions are not likely to be significant under either alternative.

5.2.3 Retention of Tropical Tunas

5.2.3.1 *Cumulative Impacts to Target Stocks*

Alternative 1 encompasses the baseline condition in this fishery and would not likely have a significant impact on target stocks. Alternative 2 (No-action) under this measure could negatively impact target stocks by allowing for increased fishing mortality. However, since it would only be to a point that is economically practical to vessels, there would likely be an economical limit to discards and the impact on target stocks would not be significant. The action alternative, which limits discards, in addition to scientific research, is beneficial to target stocks as retention allows for more precise length and weight estimates and more confidence in stock assessments, which leads to more focused management of the target stocks. Cumulatively, the past, present, and reasonably foreseeable future actions will not have a significant impact on target stocks under either alternative of this measure.

5.2.3.2 *Cumulative Impacts to Non-Target Stocks*

The retention measure does not relate to non-target stocks and, therefore, neither of the alternatives would have an impact on them. The past, present, and reasonably foreseeable future actions would not significantly impact non-target stocks identified in this PEA. Therefore, cumulatively there would be no significant impacts, positive or negative, to non-target stocks under either alternative.

5.2.3.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 2 (No-action) is less restrictive to the U.S. PS fleet than Alternative 1. However, in addition to other past, present, and foreseeable actions, Alternative 1 is also likely beneficial to the fleet as retention allows for better scientific analysis and more confidence in stock assessments, and leads to more efficient management measures. This impact would not likely be of significant benefit to the fleet. Since the past, present, and reasonably foreseeable future fishery related actions wouldn't have a direct impact on the fleet either, the cumulative impacts would be insignificant under either alternative of this measure.

5.2.4 Purse Seine Total Allowable Catch Limits

5.2.4.1 *Cumulative Impacts to Target Stocks*

Alternative 2 (No-action) is the baseline condition in this fishery, and Alternative 1 encompasses the historical average catch without any management, so neither would have a significant effect on target stocks. The monitoring of an ocean-wide TAC under Alternative 1 would require additional IATTC resources that are currently unavailable. The redirection of resources could negatively impact the successful management of the TAC and, thereby, negatively impact the target stocks if the TAC were to be accidentally exceeded. However, it likely would not be to a point that was significantly harmful to the sustainability of the target stocks. Other fisheries and efforts to combat IUU fishing would not impact this TAC. As such, the cumulative impacts would not be significant on target stocks under either alternative.

5.2.4.2 *Cumulative Impacts to Non-Target Stocks*

Because Alternative 2 (No-action) encompass the baseline is in this fishery, there would be no impact to non-target stocks because there would be no change from historic conditions. Alternative 1 could reduce catch of non-target species if set below the current five-year average, which would benefit non-target species. However, because catch and interactions of non-target species are infrequent, benefits would not be significant. The impacts to non-target species from past, present, and reasonably foreseeable actions is minimal and already accounted for and managed under other management measures and activities under alternative authorities for conserving marine resources (e.g., recovery planning under ESA and stock assessments and fishery authorizations under MMPA). As such, the cumulative impacts under this measure would not be significant under either alternative of this measure.

5.2.4.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 2 (No-action) is the baseline for this fishery and would not have an impact on the PS vessels. Though Alternative 1 would allow for the same average global catch of target stocks as has been reached in the past, the nature of a TAC often creates a race to fish. Under Alternative 1, the fishery could close before the end of the year and negatively impact fishing fleets. As mentioned above, if the IATTC resources had to be shifted to monitor a TAC in real time, it could have negative effects on the fleet, such as not closing the fishery on time or redirecting resources that vessels rely upon (e.g., observer program). However, these are worst case scenarios and not likely to significantly affect the fleet. As such, the other past, present, and reasonably foreseeable future actions would not likely impact the U.S. commercial PS fleet and so cumulative impacts would not be significant under either alternative.

5.2.5 Purse Seine FAD Limits

5.2.5.1 *Cumulative Impacts to Target Stocks*

Alternative 2 (No-action) is in this fishery so it would have no impact on target stocks. Although there are not FAD restrictions, Alternative 1 at its highest range captures the number of FADs used without any regulations, and at its lowest would likely cause a shift in effort to compensate for any losses from limiting FADs—this alternative would also not have an impact on target stocks. Alternative 1 could theoretically reduce fishing mortality by limiting the number of FADs if the cap was set low enough, but no correlation has been shown between the numbers of FADs and fishing mortality. Alternative 1 could decrease IUU fishing by reducing the amount of FADs for IUU vessels to also utilize; however, this would not be significant as there would still be other FADs and other general opportunities for IUU fishing to occur. If Alternative 1 was implemented it could provide new data to analyze whether there is a relationship between the number of FADs and fishing mortality, which could inform future policies. While these cumulative impacts of past, present, and reasonably foreseeable future actions in addition to either alternative could be beneficial to the target stocks, they are not likely to be significant.

5.2.5.2 *Cumulative Impacts to Non-Target Stocks*

As mentioned above, Alternative 2 (No-action) encompasses the baseline in the fishery and would not have an impact on non-target stocks. Alternative 1 could reduce non-target species interactions, but they are already very low in this fishery, so any benefit would not be significant. Past, present, and reasonably foreseeable future fishery and non-fishery actions do not directly impact non-target species and as such would not cumulatively create a significant impact on non-target stocks under either alternative.

5.2.5.3 *Cumulative Impacts to Socioeconomic Environment*

Since Alternative 2 (No-action) encompasses the baseline, it would not have an impact on the commercial fleet. Alternative 1 could have a negative impact by restricting vessels more than they have been in the past, and could potentially decrease their catch and therefore profits, though not significantly as they could easily shift fishing behavior to other set types. If Alternative 1 were put in place, it could provide new data to analyze whether there is a relationship between the number of FADs and fishing mortality.

This could inform future policies and benefit the commercial fleet. However, it is unlikely it would be a significant benefit and as such the cumulative impacts of past, present, and reasonably foreseeable future actions with this measure and its alternatives is not significant.

5.2.6 FAD Reporting

5.2.6.1 *Cumulative Impacts to Target Stocks*

Alternative 2 (No-action) is the baseline in this fishery and would have no impact on target stocks. Alternative 1 is a reporting requirement and wouldn't have any impact on target stocks either. As such, the past, present, and reasonably foreseeable future actions, which on their own have minor impacts on each of the three resources, would not make any cumulative significant impact on target stocks under either alternative.

5.2.6.2 *Cumulative Impacts to Non-Target Stocks*

Alternative 2 (No-action) is the baseline in this fishery and would have no impact on non-target stocks. Alternative 1 is a reporting requirement and wouldn't have any impact on non-target stocks either. As such, the past, present, and reasonably foreseeable future actions, which on their own have no to minor impacts on each of the three resources, would not have any cumulative significant impact on non-target stocks under either alternative of this measure.

5.2.6.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 2 (No-action) is the baseline in this fishery and would have no impact on the commercial fleet. Alternative 1 is a reporting requirement for the fleet, but it would not be a significant burden. As such, the past, present, and reasonably foreseeable future actions, which on their own have no to minor impacts on each of the three resources, would not have any cumulative significant impact on the commercial fleet under either alternative.

5.2.7 FAD Deployment and Retrieval

5.2.7.1 *Cumulative Impacts to Target Stocks*

Alternative 2 (No-action) is the baseline in this fishery and as such would have no significant impacts to target stocks. Alternative 1 could theoretically have minor benefits to target stocks if vessel FAD soak time was limited; however, fishing behavior could adjust to maintain catch levels. The scientific research from catch data compared to the practices under the action alternative could inform future policies regarding FAD deployment and retrieval. This could have a benefit to target stocks if a relationship is found; however, it would likely not be significant. The past, present, and reasonably foreseeable future fishery actions would not have a direct cumulative impact on the target stocks with either alternative under this measure.

5.2.7.2 *Cumulative Impacts to Non-Target Stocks*

Alternative 2 (No-action) is the baseline in this fishery and as such would have no significant impacts to non-target stocks. Because Alternative 1 would not directly reduce the amount of FADs in the water, and may shift fishing behavior to deploy more FADs earlier so they are soaking for longer, there would be no significant impact to non-target species. The past, present, and reasonably foreseeable future actions do not have direct impacts on non-target stocks and therefore cumulatively would have not significant effect with either alternative under this measure.

5.2.7.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 2 (No-action) is the baseline in this fishery and as such would have no significant impacts to the commercial fleet. Alternative 1 could change fishing behavior, but would not significantly affect profits. The scientific research from catch data compared to the practices under Alternative 1 could

inform future policies regarding FAD deployment and retrieval, which could improve the efficiency of IATTC Resolutions and be beneficial to the commercial fleet; however, it's not likely that any benefit would be significant. The other past, present, and reasonably foreseeable future fishery actions would not impact the commercial fleet in addition to either alternative under this measure, so the cumulative impacts would not be significant.

5.2.8 FAD Design

5.2.8.1 *Cumulative Impacts to Target Stocks*

Alternative 2 (No-action) is the baseline for this fishery and would have no impact on target stocks. Alternative 1 would not impact target stocks as FAD designs to reduce entanglements do not impact the aggregation of target stocks around FADs. The past, present, and reasonably foreseeable future fishery and non-fishery actions would not have any additional impacts on target stocks with this measure and its alternatives, and as such there would be no significant cumulative impacts on target stocks.

5.2.8.2 *Cumulative Impacts to Non-Target Stocks*

Alternative 2 (No-action) is the baseline for this fishery and would have no impact on non-target stocks. Alternative 2 would benefit non-target stocks, specifically, protected or prohibited species that tend to become entangled with FAD materials. However, because these interactions are rare, it's not likely the benefit will be significant. The past, present, and reasonably foreseeable future fishery and non-fishery actions would not have any additional impacts on non-target stocks with this measure and its alternatives, and as such there would be no significant cumulative impacts on non-target stocks.

5.2.8.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 2 (No-action) is the baseline for this fishery and would have no impact on the commercial fleet. Alternative 1 would require FAD designs to reduce entanglements. Though there would costs to FAD transitions, because the U.S. fleet was already pursuing such designs, it is unlikely the fleet would be significantly impacted. IUU fishing that uses FADs without such design requirements under Alternative 1 could compete with U.S. vessels, without the extra cost in money and time of creating new FADs. However, IATTC member nations would be subject to the same requirements, thus, minimizing the unequal impact to U.S. vessels. Other past, present, and reasonably foreseeable future fishery actions and the non-fishery action would not have direct additional impacts on the commercial fleet and as such there would be no significant cumulative impacts under either alternative.

5.2.9 Longline Catch Limits for Bigeye Tuna

5.2.9.1 *Cumulative Impacts to Target Stocks*

Alternative 1 is a relatively small increase in allowed fishing from the historical levels of this fishery, and as such would not impact target stocks, bigeye tuna specifically. Alternative 2 (No-action) could negatively impact bigeye tuna by not having any limit on the catch of bigeye tuna by longline vessels and likely increasing fishing mortality from historical values. However, it's not likely this would be a significant impact as the U.S. impact on the longline catch of bigeye tuna is relatively small compared to all countries in the EPO. Past, present, and future fishery impacts like the catch from other IATTC member countries, especially China, Japan, Korea and Taiwan (that have a combined limit of 54,381 mt per year) could negatively impact the stock; however, it is accounted for in stock assessments and IATTC Resolutions. IUU fishing, if a large enough amount, could negatively impact bigeye in the EPO. Again, IATTC scientific staff would make recommendations for resolutions and adjust for any declines in the stock. As such, cumulative impacts with either alternative, in addition to past, present, and reasonably foreseeable actions would not be significant under either alternative.

5.2.9.2 *Cumulative Impacts to Non-Target Stocks*

Alternative 1 is a relatively small increase in allowed fishing from historical levels, and as such would not impact non-target stocks. Alternative 2 (No-action) could have a negative impact on non-target stocks, particularly protected species. However, there are other mechanisms (under MMPA and ESA) in place to manage interactions with those species. Other IATTC member nations may not have similar measures in place domestically, and without a catch limit they could negatively affect protected species. However, member nations do have catch limits and most do not come close to reaching them. So, the impact from other fisheries would not be significant. The other past, present, and reasonably foreseeable future fishery actions and non-fishery action would not directly impact the target stocks and as such there would be no significant cumulative impacts under either alternative.

5.2.9.3 *Cumulative Impacts to Socioeconomic Environment*

Alternative 1 is a relatively small increase in allowed fishing from historical levels, and as such would not significantly impact the commercial fleet. Alternative 2 (No-action) would allow for more flexibility for the fleet to fish more and, thereby, increase profits, though likely not by a significant amount as the unrestricted segment (small vessels) have fished about the same amount each year, and the restricted segment has only been stopped from fishing for a short time each year. Catch limits for other IATTC member nations have been in place since 2009, so they would have no additional impact on the U.S. commercial fleet. The other past, present, and reasonably foreseeable future fishery related actions and the non-fishery related action do not have direct impacts on the commercial fleet under the alternatives of this measure, and as such there would be no significant cumulative impacts.

5.3 Climate Change

While none of the alternatives discussed in this PEA would affect climate change as they only apply to managing fishing, there is a potential for climate change to affect the resources pertaining to this PEA. Two mesoscale climate phenomena likely affect frontal activity and the distribution of tuna, other target and non-target finfish, and protected species found in the proposed action area. The first is the El Niño-Southern Oscillation (El Niño), which is characterized by a relaxation of the Indonesian Low and subsequent weakening or reversal of westerly trade winds, causing warm surface waters in the western Pacific to shift eastward. Although the effects can be global, an El Niño event brings warm waters and a weakening of coastal upwelling off the west coast. Tunas and billfish are found farther north during El Niño years (Field & Ralston, 2005). La Niña, a related condition, results in inverse conditions, including cooler water in the eastern tropical Pacific and California Current System (CCS).

The second mesoscale climate phenomenon likely to affect the distribution of species in action area is the Pacific Decadal Oscillation (PDO). It has important ecological effects in the CCS. Regime shifts indicated by the PDO have a periodicity operating at both 15-25 and 50–70 year intervals (Schwing, 2005). The PDO indicates shifts between warm and cool phases. The warm phase is characterized by warmer temperatures in the Northeast Pacific (including the west coast), and cooler-than-average sea surface temperatures and lower-than-average sea level air pressure in the Central North Pacific; opposite conditions prevail during cool phases.

Studies conducted by Perry *et al.* (2005) indicate that climate change is affecting marine fish distributions in ways that may have important ecological impacts on fish as well as important impacts on commercial fisheries. Impacts to commercial fisheries include: increases in ocean stratification leading to less primary production, which in turn leads to less overall energy for fish production; shifts in mixing areas of water zones leading to decreases in spawning habitat and decreased stock sizes; and changes in currents that may lead to changes in larval dispersals and retention among certain habitats, which could lead to decreases in stock sizes or availability of resources to certain fisheries (Roessig, Woodley, Cech, & Hansen, 2004).

As a result of climate change, catch rates in the EPO are expected to increase, while catch rates in the WCPO are expected to decrease. That is, over the entire North Pacific region, catch rates are predicted to decrease by 7.5 percent by 2100 (Lehodey, et al., 2011). This is due largely to changes in distribution of these species as a result of climate change, which will likely impact the management procedures to ensure these stocks are not over exploited as well as the economics associated with fishing these species. Geographic shifts in the range of target, non-target or prey, and protected species may cause the biggest climate change related impact on fisheries.

6 LIST OF PREPARERS AND PERSONS AND AGENCIES CONSULTED

Preparer Names and Affiliations	**Responsibility**
Taylor Debevec, Fishery Policy Analyst, NMFS WCR	Primary author
Heidi Taylor, Supervisory Fishery Policy Analyst, NMFS WCR	Project management, edits and revisions
Persons and Agencies Consulted	**Roles and Responsibilities**
NMFS did not consult on the proposed action with any other persons or agencies.	Not applicable

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FINDING OF NO SIGNIFICANT IMPACT

Background

Proposed Action: To implement management measures as agreed to at the Inter-American Tropical Tuna Commission (IATTC) for commercial fishing of tropical tunas in the eastern Pacific Ocean (EPO).

Alternatives Evaluated in the Environmental Assessment:

Purse Seine Closure Period

1) A purse seine closure, meaning no fishing, for a period of up to 260 days out of 365.
2) No-action: no fishing closure period for purse seine vessels.

Purse Seine Time/Area Closure

1) A closure in the corralito (area that encompasses 96° and 110°W and between 4°N and 3°S) for purse seine vessels for a period of 31 to 181 days per calendar year.
2) No-action: no corralito closure for purse seine vessels.

Retention of Tropical Tunas

1) Purse seine vessels must retain on board and land all tropical tuna caught, except in cases when fish are unfit for human consumption or when, on the last set of a trip, the well is full and no more fish will fit.
2) No-action: no mandate for purse seine vessels to retain any specified amount of tropical tunas.

Purse Seine Total Allowable Catch Limits for Tropical Tunas

1) A convention-wide total allowable catch (TAC) for tropical tunas caught by all IATTC purse seine vessels of up to 650,000 metric tons (mt) per calendar year.
2) No-action: no TAC limits for tropical tunas caught by purse seine vessels.

Purse Seine Fish-Aggregating Device (FAD) Limits

1) Each purse seine vessel will have no more than 500 active FADs at any one time.
2) No-action: no limit on the number of active FADs a purse seine vessel could have active at any one time.

FAD Reporting

1) Daily information, including, but not limited to, identification number and locations, for all active FADs belonging to a purse seine vessel shall be reported in monthly batches no later than 90 days after the month covered under the report.
2) No-action: no reporting of daily FAD information.

FAD Deployment and Retrieval

1) Purse seine vessels must cease deploying FADs for a period of time each calendar year, and retrieve a percentage of the total FADs it deploys each calendar year. Under normal circumstances, these requirements would occur in the time period prior to the purse seine closure period, but could occur in other situations as needed.
2) No-action: no mandate to limit deployment or retrieval of FADs.

FAD Design

1) FADs on board or deployed must comply with design standards specified by NMFS to reduce the entanglement of sharks, sea turtles, and other species.
2) No-action: no mandate for FAD design.

Longline Catch Limits for Bigeye Tuna

1) U.S. longline vessels have a cumulative annual catch limit for bigeye tuna of up to 4,000 mt per calendar year.
2) No-action: no longline catch limit for bigeye tuna.

Selected Alternatives:

Purse Seine Closure Period: (Alternative 1) A purse seine closure, meaning no fishing, for a period of up to 260 days out of 365.

Purse Seine Time/Area Closure: (Alternative 1) A fishing closure in the corralito (area that encompasses 96° and 110°W and between 4°N and 3°S) for purse seine vessels for a period of 31 to 181 days per calendar year.

Retention of Tropical Tunas: (Alternative 1) Purse seine vessels must retain on board and land all tropical tuna caught, except in cases when fish are unfit for human consumption or when, on the last set of a trip, the well is full and no more fish will fit.

Purse Seine Total Allowable Catch Limits for Tropical Tunas: (Alternative 2) No-action: no total allowable catch limits for tropical tunas caught by purse seine vessels.

Purse Seine FAD Limits: (Alternative 1) Each purse seine vessel will have no more than 500 active FADs at any one time.

FAD Reporting: (Alternative 1) Daily information, including but not limited to identification number and location, for all active FADs belonging to a purse seine vessel shall be reporting in monthly batches no later than 90 days.

FAD Deployment and Retrieval: (Alternative 1) Purse seine vessels must cease deploying FADs for a period of time each calendar year, and retrieve a percentage of the total FADs it deploys each calendar year. Under normal circumstances, these requirements would occur in the time period prior to the purse seine closure period, but could occur in other situations as needed.

FAD Design: (Alternative 1) FADs on board or deployed must comply with design standards specified by NMFS to reduce the entanglement of sharks, sea turtles, and other species.

Longline Catch Limits for Bigeye Tuna: (Alternative 1) U.S. longline vessels have a cumulative annual catch limit for bigeye tuna of up to 4,000 mt per calendar year.

Related Environmental Documents and Consultations:

This FONSI is attached to the Environmental Assessment

Significance Review

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity, and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. Each criterion is discussed below with respect to the proposed action and considered individually as well as in combination with the others.

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?

No. The impacts of the proposed action are insignificant. The action will have little to no effect on the affected resources (target stocks, non-target stocks, and commercial fisheries and socioeconomic environment) as it is mostly comprised of measures that are similar to the current baseline. The measures that are different or new could provide some benefit to target and non-target stocks by potentially reducing effort, which would have some adverse impacts on the commercial fishery and socioeconomic environment. However, overall these impacts are minor, especially when compared to the entire fishery operation with other countries in the EPO.

2. Can the proposed action reasonably be expected to significantly affect public health or safety?

No. The only identified potential impact to public health and safety from the proposed action would be from vessel operators and their crew retrieving a certain amount of vessel-deployed FADs. Retrieving FADs, which is something crews do regularly and is part of normal vessel operations, entails the crew pulling it out of the water. A requirement to retrieve a certain amount of FADs could change the amount of time vessel operators and crews engage in activities with FADs on the water; however, the selected alternative would limit the amount of FADs that could be used, resulting in a potential reduction in FAD retrieval. Thus, substantial adverse impacts on public health or safety are not anticipated to result from promulgation of the rule.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

No. There are several National Wildlife Refuges and one National Monument (California Coastal National Monument) in the action area, specifically along the west coast of the United States. However, these areas would not be affected because fishing takes place outside of these areas. Furthermore, the seafloor or benthic habitats will not be impacted as purse seine and longline fishing do not involve contact with the seafloor.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?

No. This proposed action would implement several measures that are similar to the baseline for fisheries in the action area. New or different measures have been discussed and vetted during IATTC meetings, which includes input by U.S. non-governmental organizations, industry, and scientists. The primary effects of the proposed action on the U.S. commercial fishery are effort limits, with which the industry is familiar. Overall, these effects could lead to no impact or minor benefit to bigeye tuna, skipjack tuna, and yellowfin tuna stocks. It is unlikely that there would be any controversy regarding the effects of the action (i.e., the effects of the action on the quality of the human environment).

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

No. This proposed action would implement several measures that are similar to the baseline of this fishery. Although the magnitude of effects on the human environment from the new or different measures cannot be quantified with certainty, effects can be predicted. The purpose of the proposed action is to manage fishing for tropical tuna in the EPO at sustainable levels. The primary effects of the proposed action on the commercial fishery are managing effort, which could result in minor benefits to target stocks. Thus, the effects on the human environment from the proposed action would not be highly uncertain or involve unique or unknown risks.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

No. The purpose of the proposed action is to monitor and manage fishing mortality of tropical tuna stocks in the IATTC Convention Area to ensure that fishing effort and catch do not result in a significant reduction of the potential production of these resources. This is needed to ensure overexploitation of the stocks does not occur, and to fulfill the obligations of the United States as a Contracting Party to the Antigua Convention. Thus, the proposed action is limited to an immediate and focused objective, and it does not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration.

7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?

No. The cumulative impacts on the resources in the affected environment that could be impacted by the selected alternatives would likely be beneficial as a result of a reduction in fishing effort in comparison to operation of the fishery absent the selected alternatives. Based on the best available information, the proposed action would not be expected to result in substantial cumulative impacts on the status of the stocks of bigeye tuna, skipjack tuna, and yellowfin tuna in the EPO, and no significant cumulative impacts on the human environment, including protected resources.

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

No. Such resources would not be affected because the potential changes in fishing patterns of the fleet would take place in areas of the ocean far from shorelines and would not affect the seafloor or benthic habitats because purse seine and longline fishing do not involve contact with the seafloor. Shipwrecks would be the only known cultural objects potentially within the affected environment. The location of most shipwrecks is unknown, though they typically rest on the ocean seafloor. Because purse seine and longline fishing operations do not come into contact with the seafloor, the operations of the U.S. fleet would not be expected to affect any material from shipwrecks. Thus, there would be no effects to districts, sites, highways, structures or objects listed in or eligible for listing in the National Register of Historic Places or, potential loss or destruction of significant scientific, cultural, or historical resources.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?

No. The proposed action would not be expected to adversely affect species listed as endangered or threatened under the Endangered Species Act (ESA) or their critical habitat. The U.S. purse seine fishery in the EPO has had limited to no interactions with such species. The U.S. deep-set longline fishery had observed interactions with two species listed as endangered under the ESA from 2013-2016. There are mechanisms under the ESA and separate from this proposed action to mitigate interactions with those species, such as gear

requirements and incidental take statements. The numbers of individual animals with which there were interactions by the deep-set longline fleet were low relative to the incidental take allowances. Overall, the direct and indirect effects to ESA-listed species from the implementation of the proposed action would likely be negligible, although it is possible there would be a minor increase in interactions with ESA-listed species because a higher catch limit of bigeye tuna for U.S. longline vessels in the EPO may result in an increase in fishing effort. However, the increase to the catch limit is minor relative to EPO-wide effort of longline vessels and miniscule to effort levels without a limit. Thus, the proposed action would not cause any effects to ESA-listed species that have not been addressed in prior or ongoing consultations.

10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?

No. The purpose of the rule is to monitor and manage fishing mortality of tropical tuna stocks to ensure no significant reduction in the production of these resources and the need is to fulfill the obligations of the United States as a Contracting Party to the Antigua Convention. As such, the rule would not be expected to violate any laws or requirements imposed for the protection of the environment.

11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?

No. The proposed action would not be expected to adversely affect stocks of marine mammals. The U.S. purse seine fishery in the EPO has had limited to no interactions with marine mammals. The U.S. deep-set longline fishery had observed interactions with three species of marine mammals from 2013-2016. There are mechanisms under the MMPA and separate from this proposed action to protect those species, especially strategic and depleted stocks, such as gear requirements and take reduction teams. Overall, the direct and indirect effects to marine mammals from the implementation of the proposed action would likely be negligible, although it is possible there would be a minor increase in interactions with marine mammals because a higher catch limit of bigeye tuna for U.S. longline vessels in the EPO may result in an increase in fishing effort. However, the increase to the catch limit is minor relative to EPO-wide effort of longline vessels and miniscule to effort levels without a limit. Thus, the proposed action would not cause any effects to marine mammals that have not been addressed in prior or ongoing consultations.

12. Can the proposed action reasonably be expected to adversely affect managed fish species?

No. The target species of the U.S. tropical tuna fishery in the EPO are bigeye tuna *(Thunnus obesus),* skipjack tuna *(Katsuwonus pelamis),* and yellowfin tuna *(Thunnus albacares).* The proposed action could lead to a benefit on the stocks of bigeye tuna, skipjack tuna, and yellowfin tuna by a potential overall reduction in fishing effort from the implementation of the management measures when compared to operation of the fishery without these measures. The U.S. purse seine fleet contributes only a small portion of the total fishing mortality on these stocks. These effects would be relatively small, because the proposed action would result in only a small reduction in the overall fishing mortality on these stocks.

13. Can the proposed action reasonably be expected to adversely affect essential fish habitat (EFH) as defined under the Magnuson-Stevens Fishery Conservation and Management Act?

No. The proposed action would not cause any adverse impacts to areas designated as EFH or Habitat Areas of Potential Concern (HAPC) under MSA provisions, or to ocean and coastal habitats. Such resources would not be affected because the potential changes in fishing patterns of the fleet would take place in areas of the ocean far from shorelines and would not affect the seafloor or benthic habitats because purse seine and longline fishing do not involve contact with the seafloor. Also, because any effects to fish stocks would be minor or negligible, as discussed above, any pelagic fish habitat designated as EFH, including the water column, or HAPC, would not be expected to experience any substantial effects—either beneficial or adverse—from implementation of the proposed action. Similarly, the negligible effects on the stocks would be unlikely to lead to any indirect effects to fish habitat (e.g., an increase in predator or prey leading to trophic interactive effects leading to effects on habitat).

14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?

No. The tropical tuna fishery in the EPO takes place in areas of the ocean far from shorelines, and would not affect the seafloor or benthic habitats because purse seine and longline fishing do not involve contact with the seafloor. Because these vulnerable ecosystems are coastal or deep, the fishery would not affect them.

15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?

No. The purpose of the proposed action is to monitor and manage fishing mortality of exploited tropical tuna stocks in the IATTC Convention Area to ensure that fishing effort and catch do not result in a significant reduction of the potential production of these resources. Adult bigeye, skipjack, and yellowfin tuna are considered among the top predators of the tropical or warm pool marine ecosystem. Changes to EPO stocks of these species could lead to trophic interactive effects, including increased competition for prey species with other top predators. Larval and juvenile tunas are also a significant source of food for other marine species, such as fish, seabirds, porpoises, marine mammals, and sharks. Thus, increases in larval and juvenile tuna could increase the food available for these other species. However, it is unlikely that the effects of the proposed action to the EPO stocks of bigeye, skipjack, and yellowfin tuna would be large enough to impact the marine ecosystem. Overall, the proposed action would not cause substantial effects on biodiversity and ecosystem function.

16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

No. The only potential transfer of species to a different area under this proposed action would be if a FAD was retrieved with a species attached and re-deployed in a different area to which it was not native. However, it is unlikely that species would remain intact and attached to a retrieved FAD, and that it was also kept alive on board for long enough to

reach an area that was part of a different ecosystem. The pelagic areas of the ocean, where this fishery occurs, is vast and supports a large diversity of species that move freely through it. It is unlikely a species on a FAD in one area would not be found on a FAD in another common area for FAD deployment in this fishery.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for U.S. Commercial Fishing for Tropical Tuna in the EPO, it is hereby determined that U.S. Commercial Fishing for Tropical Tuna in the EPO will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

2-22-2018

Barry A. Thom
Regional Administrator
West Coast Region
National Marine Fisheries Service

Date