



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
LONG BEACH, CA 90802

December 13, 2024

Dear Recipient:

In accordance with provisions of the National Environmental Policy Act, we announce the availability for review of the Programmatic Draft Environmental Assessment (PDEA) to Revise U. S. Commercial Fishing Regulations for Pacific Bluefin Tuna in the Eastern Pacific Ocean.

The proposed action is to implement Inter-American Tropical Tuna Commission resolutions which establish catch limits for U.S. vessels fishing for Pacific bluefin tuna in the eastern Pacific Ocean.

The document is accessible electronically through the regulations.gov website, docket number NOAA-NMFS-2024-0146, at <https://www.regulations.gov/docket/NOAA-NMFS-2024-0146>. It is also accessible through the NOAA NEPA website at: <https://www.fisheries.noaa.gov/west-coast/laws-policies/west-coast-region-national-environmental-policy-act-documents>.

Comments on the PDEA, and on the proposed rule which accompanies this proposed action, may be submitted to NOAA's National Marine Fisheries Service through the regulations.gov site linked above. Comments must be received by January 29, 2025.

Comment Coordinator:

Karter Harmon
Fish Biologist
National Marine Fisheries Service
West Coast Region
501 West Ocean Boulevard, Suite 4200, Long Beach, CA 90802
Karter.Harmon@noaa.gov

Thank you in advance for your input and assistance in finalizing the Environmental Assessment.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jennifer Quan".

Jennifer Quan
Regional Administrator





PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

**To Revise U.S. Commercial Fishing Regulations for
Pacific Bluefin Tuna in the Eastern Pacific Ocean**

Prepared By:

**U.S. Department of Commerce
National Marine Fisheries Service
West Coast Region
Sustainable Fisheries Division
Highly Migratory Species Branch
Long Beach, California**



December 2024

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Cover Sheet

Programmatic Environmental Assessment to Revise U. S. Commercial Fishing Regulations for Pacific Bluefin Tuna in the Eastern Pacific Ocean

Proposed Action:	Revise U. S. commercial fishing regulations for Pacific bluefin tuna in the Eastern Pacific Ocean.
Type of Document:	Programmatic Environmental Assessment
For Further Information:	Karter Harmon (Karter.Harmon@noaa.gov) Fish Biologist Rachael Wadsworth (Rachael.Wadsworth@noaa.gov) Highly Migratory Species Branch Chief National Marine Fisheries Service West Coast Region 501 West Ocean Boulevard, Suite 4200 Long Beach, CA 90802 Telephone: (562) 980-4039

Abstract

Pacific bluefin tuna is a highly migratory species of substantial ecological and economic importance. The National Marine Fisheries Service (NMFS) regularly implements management measures for Pacific bluefin tuna harvest in the eastern Pacific Ocean, where the species is caught by U.S. coastal purse seine vessels, hook-and-line boats, and other gears. These measures follow from Inter-American Tropical Tuna Commission (IATTC) resolutions, which specify annual and biennial bluefin catch limits for each Member and Cooperating Non-Member, including the United States.

From 2012, when the IATTC began adopting Pacific bluefin tuna resolutions, until 2022, stock assessments showed that the Pacific-wide stock of bluefin tuna was overfished and subject to overfishing with respect to commonly used reference points. In response, U.S. managers worked with regional fishery management organizations to implement numerous management measures, monitoring programs, and collaborative working groups in an effort to rebuild the stock. This effort led to rebuilding of the population. By 2024, the stock was no longer overfished nor subject to overfishing, based on the best scientific information available.

In 2024, following the success in rebuilding the stock, the IATTC adopted a resolution which increased the Pacific bluefin tuna catch limits for the United States (and other countries). Under this proposed action, NMFS seeks to implement revised Pacific bluefin tuna catch limits that ensure equitable fishing opportunity to U.S. fleets. The current management regime expires at the end of calendar year 2024, and implementing new catch limits is necessary to satisfy U.S. obligations as a Member of the IATTC.

This Programmatic Environmental Assessment, prepared in accordance with the National Environmental Policy Act, assesses the environmental and socioeconomic impacts that could result from the proposed action. It includes three alternatives: (1) a No Action alternative, (2) an alternative based on the catch limits in the most recent IATTC resolution, and (3) a higher catch limit than the 2024 IATTC recommended catch limit. We analyzed the impacts of the proposed action to the natural environment as well as the socioeconomic environment, and found no significant impact. The biological impacts of the proposed action alternatives are likely to be minor due to the selective nature of Pacific bluefin tuna fishing methods and the IATTC's precautionary approach to management. The socioeconomic effects are expected to be positive. If future IATTC resolutions fall within the scope of alternatives analyzed in this Programmatic Environmental Assessment, and the impacts on the affected environment have not significantly changed, this document may be used to evaluate the impacts of those actions.

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List of Acronyms

<i>Acronym</i>	<i>Meaning</i>
CFR	Code of Federal Regulations
CPS	Coastal Pelagic Species
DGN	Drift Gillnet (Large-Mesh)
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EPO	Eastern Pacific Ocean
ESA	Endangered Species Act
FMP	Fishery Management Plan
FOSS	Fisheries One-Stop Shop
FR	Federal Register
HMS	Highly Migratory Species
IATTC	Inter-American Tropical Tuna Commission
ISC	International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean
JWG	IATTC-WCPFC Northern Committee Joint Working Group on the Management of PBF
MCS	Monitoring, Control, and Surveillance
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fisheries Conservation and Management Act
MSE	Management Strategy Evaluation
mt	Metric Tons
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSBG	Night-Set Buoy Gear
PacFIN	Pacific Fishery Information Network
PBF	Pacific Bluefin Tuna
PFMC	Pacific Fishery Management Council
RFMO	Regional Fishery Management Organization
TCA	Tuna Conventions Act of 1950
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean

1.0 Introduction

Pacific bluefin tuna (PBF) is a highly migratory species (HMS) of substantial ecological and economic importance. Their life history includes a remarkable migration pattern spanning the full breadth of the Pacific Ocean, from the Sea of Japan to the West Coast of North America and back again. They are targeted by commercial and recreational fisheries throughout this range. Over the past century they have undergone severe depletion due to overfishing, and were reduced to as little as two percent of their natural, unfished stock size by the late 2000s. This prompted a series of management actions, scientific studies, and collaborative rebuilding plans by the nations who harvest PBF. As part of this effort, NMFS has established catch limits and other management measures for U.S. commercial vessels that catch PBF in every year since 2012. In a display of ecological resilience and management success, these efforts were ultimately successful, and the PBF stock has rebounded to over 20 percent of its unfished level as of 2021. NMFS is proposing to revise the existing management regime for PBF harvests going forward. In this Environmental Assessment (EA) we analyze and compare three alternatives for catch limits, as well as three sub-options for limits on individual fishing trips. Our goal is to evaluate whether the proposed action will have significant impacts on the affected environment, which includes both biological and socioeconomic factors.

1.1 Background

The United States is a member of the IATTC, a regional fisheries management organization (RFMO) established under the 1949 Convention for the Establishment of an Inter-American Tropical Tuna Commission (1949 Convention).¹

The IATTC consists of 21 member nations and 5 cooperating non-member nations who collaborate on research, conservation, and management of tuna and tuna-like species in the IATTC Convention Area. The IATTC Convention Area is defined as waters of the eastern Pacific Ocean (EPO) within the area bounded by the west coast of the Americas and by 50° N latitude, 150° W longitude, and 50° S latitude. The IATTC regularly assesses the status of tuna, sharks, and billfish stocks in the IATTC Convention Area to determine appropriate catch limits and other measures deemed necessary to promote sustainable fisheries and prevent the overexploitation of these stocks.

As an IATTC member nation, the United States is obligated to implement the decisions of the IATTC in a legally binding manner. When implementing PBF conservation and management measures through U.S. regulatory procedures, NMFS notifies the public through posting in the Federal Register. NMFS also engages with industry participants and other interested parties through participation of the U.S. Delegation in RFMO meetings, stakeholder workshops, and the proceedings of the Pacific Fishery Management Council (PFMC).

IATTC resolutions consider IATTC staff recommendations, recommendations from the IATTC's Scientific Advisory Committee, and research conducted by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). The IATTC typically adopts catch limit

¹ In 2003, the IATTC strengthened the 1949 Convention through the adoption of what is known as the Antigua Convention. The Antigua Convention entered into force in 2010, and the United States acceded to it in 2016. The full text of the Antigua Convention is available [here](#).

regimes for 2-year management cycles. All IATTC resolutions on PBF since 2012 have included a catch limit regime for the commercial catch of PBF in the EPO. All IATTC member nations, including the United States, must ensure that their annual commercial catches of PBF in the Convention Area adhere to these limits. The United States first implemented catch limits on the U.S. commercial catch of PBF from the IATTC Convention Area in 2013 (78 FR 33240, June 4, 2013) and has continued to do so in accordance with IATTC resolutions every year since. Most recently, the United States established catch limits, as well as individual-trip limits and reporting requirements, for 2022-2024 (88 FR 5273, January 27, 2023).

In 2012, based on a stock assessment conducted by the ISC, NMFS determined the PBF stock to be in an overfishing and overfished status² and notified the regional Fishery Management Councils to consider taking further action under the Magnuson-Stevens Fisheries Conservation and Management Act (MSA). In 2014, the ISC updated the 2012 assessment with data through 2012, and found that the recruitment level (i.e., new fish entering the population) in 2012 near its lowest level in over 50 years (ISC 2014). This led to the establishment of rebuilding targets for the PBF stock. In 2022, the ISC assessment showed the stock was no longer subject to overfishing compared to commonly used reference points (ISC 2022). In 2024, the ISC published its most recent stock assessment to date, which found that PBF had reached its second rebuilding target of 20 percent of the potential unfished spawning stock biomass in 2021 (ISC 2024a). Using the results of this stock assessment, NMFS determined that the stock is no longer overfished, nor subject to overfishing (NMFS 2024a).

² Regarding NMFS status determinations: As described in the HMS Fishery Management Plan, a stock is considered “overfished” if its estimated stock size is lower than a minimum stock size threshold, and “subject to overfishing” if its estimated fishing mortality is higher than a maximum mortality threshold. These biomass and mortality thresholds are determined based on calculations of maximum sustainable yield, the maximum amount that can be caught from a stock over an extended period of time while still ensuring the population's long-term survival.

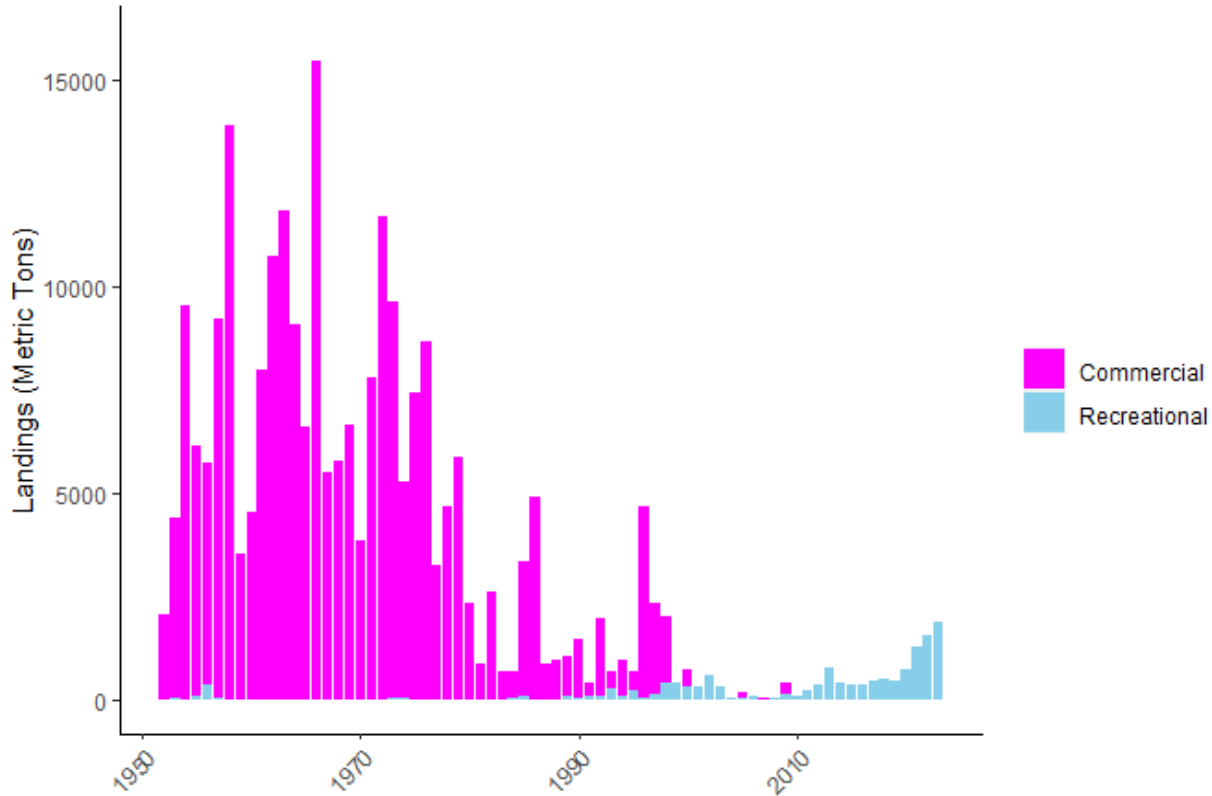


Figure 1. Historical U.S. Catch of PBF per Year, 1952-2023

Several countries harvest commercial volumes of PBF in the Pacific Ocean. In the Western and Central Pacific Ocean (WCPO), most of the harvest is made by Japan, Korea, and Taiwan.³ In the EPO, PBF is targeted by the United States and Mexico. U.S. fisheries generally account for a small fraction of the total Pacific-wide harvest of PBF. Between 2019 and 2023, the total Pacific-wide harvest of PBF ranged between 11,588 and 18,058 mt. U.S. landings made up less than ten percent (9.5%) of the total harvest in those years. PBF landings by U.S. vessels fishing in the EPO represent about one-third of the landings by all fleets fishing in the EPO from 2019 through 2023, with Mexico making the other two-thirds of the landings (ISC 2024b).

NMFS implements catch and trip limits for PBF through rulemakings in the Federal Register under the authority of the Tuna Conventions Act of 1950 (TCA). In September 2024, the IATTC adopted Resolution C-24-02 (*Measures for the Conservation and Management of Pacific Bluefin Tuna in the Eastern Pacific Ocean*). Per the Resolution, the U.S. PBF biennial catch limit for 2025-2026 is 1,822 metric tons (mt), not to exceed 1,285 mt in a single year. This represents a nearly 80 percent increase to the current biennial catch limit. This increase was a result of international negotiations after the recent stock assessment showed the PBF stock in the EPO is likely not overfished nor subject to overfishing. Shortly after the IATTC adopted Resolution C-24-02, NMFS presented several options for a revised trip limit scheme to the PFMC and its advisory bodies (NMFS 2024b). In November 2024, the PFMC recommended that NMFS implement an option with a 60 mt initial trip limit, a 40 mt intermediate limit,

³ U.S. vessels fishing in the WCPO (specifically Hawaii-based longline vessels) incidentally catch a small amount of PBF on occasion, on the order of one or two fish per year. The overwhelming majority of U.S. PBF harvest occurs in the EPO.

and a 5 mt terminal limit, with seasonally adjusting buffer points where the trip limits are reduced based on anticipated landings (PFMC 2024).

1.2 The Proposed Action

The proposed action is to implement IATTC resolutions which establish catch limits for U.S. vessels fishing for PBF in the EPO.

1.3 Proposed Action Area

The proposed action area is the IATTC Convention area, which 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. This area encompasses the U.S. West Coast Exclusive Economic Zone (EEZ) where most of the fishing that would be affected by the proposed action occurs.



1.4 Purpose and Need

The purpose of the proposed action is to provide a management scheme for PBF fishing in the EPO after the most recent catch limits expire at the end of calendar year 2024. The proposed action is necessary for

the United States to satisfy its international obligations as a Member of the IATTC and should be in effect by January 2025, or as soon as possible thereafter, to comply with IATTC provisions. Additionally, a revised scheme for catch and trip limits is necessary to provide adequate fishing opportunity to U.S. fishermen now that the PBF stock is rebuilt, while ensuring that catches remain within the annual and biennial limits.

2.0 Alternatives

2.1 No Action

Under the No Action alternative, NMFS would not complete a proposed and final rule to implement the IATTC Resolution. No catch or trip limits would be established after the current limits expire at the end of the calendar year, and none would be in place before the U.S. fishing season begins in 2025. The United States would fail to satisfy its obligations as a Member of the IATTC. No trip limits would be in place for 2025 or 2026, and NMFS would lose the ability to manage PBF harvests by reducing the trip limits. There would be no mechanism under the TCA to ensure that catches do not exceed the limits established in the latest IATTC resolution, or potential future resolutions.

2.2 Alternative 1 (Preferred Alternative)

Under Alternative 1, the United States would establish catch limits of between 50 and 1,500 mt per year, and between 100 and 3,000 mt biennially. This range encompasses the limits established in the most recent IATTC resolution on PBF, and includes some flexibility for increased catch limits in future years, as well as the possibility for NMFS to reduce the catch limits in future years if stock assessments indicate the PBF stock returns to an overexploited state. For any given calendar year, NMFS will publish catch limits in the Federal Register. If the annual or biennial limits are reached, NMFS will announce a closure in the Federal Register prohibiting U.S. commercial vessels from targeting, retaining on board, transshipping, or landing additional PBF catch from the Convention Area, effective on a date following the closure announcement and through the last day of that calendar year. The catch limits would apply to all U.S. commercial vessels fishing for PBF in the IATTC Convention Area.

2.2.1 Sub-Options: Specify Trip Limit Scheme

In addition to setting annual and biennial catch limits to comply with IATTC resolutions, NMFS can establish procedures that limit the maximum allowed harvest on individual trips.

Existing regulations at [50 CFR 300.25\(g\)](#), which expire at the end of calendar year 2024, include trip limits for the 2022-2024 management cycle. The annual limit for 2024 is 720 mt with an initial trip limit of 30 mt. The regulations also allowed for adding under-harvest in 2023 to the 2024 annual limit. The trip limits are adjusted based on estimated catch relative to the annual limits, and also based on the time of year. The schedule for reducing the trip limits is outlined below:

- January - June: If cumulative catch is within 320 mt of the annual limit (i.e., cumulative catch reaches 400 mt), the trip limit will be 20 mt. If cumulative catch is within 220 mt of the annual limit (i.e., cumulative catch reaches 500 mt), the trip limit will be 3 mt.
- July - September: If cumulative catch is within 290 mt of the annual limit (i.e., cumulative catch reaches 430 mt), the trip limit will be 20 mt. If cumulative catch is within 200 mt of the annual limit (i.e., cumulative catch reaches 520 mt), the trip limit will be 3 mt.
- October - December: If cumulative catch is within 250 mt of the annual limit (i.e., cumulative catch reaches 470 mt), the trip limit will be 20 mt. If cumulative catch is within 100 mt of the annual limit (i.e., cumulative catch reaches 620 mt), the trip limit will be 3 mt.

As sub-options of the proposed alternatives, NMFS could choose not to re-establish the existing trip limit scheme in future years, or choose to establish it either with or without the adjusting seasonal component.

Sub-Option A: No Trip Limits

Under this sub-option, NMFS would not re-establish a trip limit scheme. PBF catches would be managed by simply closing the fishery once NMFS determines that the annual or biennial limits are soon to be reached. Commercial vessels would only be limited in their PBF harvest by the amount of space available in each vessel's hold, for as long as the fishery remains open.

Sub-Option B: Adjust Trip Limits Based on Landings

Under this sub-option, NMFS would re-establish a trip limit scheme in a manner similar to the existing trip limit scheme, but without adjusting the "buffer points" (i.e., the amount of harvest which triggers a reduction in the trip limit) at different times of year. The initial trip limit in each year would be between 30 mt and 75 mt per trip, then reduce to between 25 and 50 mt per trip, and finally to between 1 and 5 mt per trip. NMFS would establish these catch limits through a rulemaking in the Federal Register at each biennial management cycle, and implement the specific reductions through inseason action procedures that included notice of inseason actions through web posting, emails to affected vessel owners, and publication in the Federal Register. The trip limits would be in place for the duration of each calendar year, or until the fishery is closed upon attainment of the annual catch limit.

Sub-Option C: Adjust Trip Limits Based on Landings and Season (Preferred Sub-Option)

Under this sub-option, NMFS would re-establish a trip limit scheme with the same components as the existing trip limit scheme. As with Sub-Option B, the initial trip limit in each year would be between 30 mt and 75 mt per trip, then reduce to between 25 and 50 mt per trip, and finally to between 1 and 5 mt per trip. The "buffer points" would adjust based on the time of year, such that more high-volume trips can be undertaken later in the year without triggering the reductions. NMFS would establish these catch limits through a rulemaking in the Federal Register at each biennial management cycle, and implement the specific reductions through inseason action procedures that include notice of the inseason action through web posting, emails to affected vessel owners, and publication in the Federal Register. The trip limits would be in place for the duration of each calendar year, or until the fishery is closed upon attainment of the annual catch limit.

Example Scenario under Sub-Option C: Trip Limits for 2025-2026

Sub-option C is consistent with a November 2024 PFMC recommendation to implement IATTC Resolution C-24-02 (PFMC 2024). The proposed annual catch and trip limits for the 2025-2026 biennial management cycle are as follows:

In 2025, the annual limit is 1,285 mt. In 2026, the annual limit is the total cumulative catch in 2025 subtracted from 1,872 mt, not to exceed 1,285 mt. The initial trip limit for both 2025 and 2026 is 60 mt, and reduces as follows:

- *January - June:*
 - The trip limit reduces to 40 mt once total catch is within 400 mt of the annual limit.
 - The trip limit reduces to 5 mt once total catch is within 225 mt of the annual limit.
- *July - September:*
 - The trip limit reduces to 40 mt once catch is within 300 mt of the annual limit.
 - The trip limit reduces to 5 mt once total catch is within 175 mt of the annual limit.
- *October - December:*
 - The trip limit reduces to 40 mt once catch is within 200 mt of the annual limit.
 - The trip limit reduces to 5 mt once total catch is within 125 mt of the annual limit.

2.3 Alternative 2

Under Alternative 2, the United States would establish catch limits of between 1,500 and 10,000 mt per year, and between 3,000 and 20,000 mt biennially. NMFS would only implement higher catch limits if this was established in a future IATTC resolution, which would require review of stock assessment science and negotiations with other IATTC Member states. The same general procedures for establishing the catch limits, and closing the fishery to commercial vessels when the limit is reached, would apply.

2.3.1 Sub-Options: Specify Trip Limit Scheme

Alternative 2 includes the same sub-options for trip limit schemes as Alternative 1. Based on the higher potential catch limits of Alternative 2, it may be appropriate to adjust the specific trip limits and buffer points to ensure adequate utilization of the annual limits, and equitable access to the PBF resource for different gear types. NMFS would consider recent trends in PBF effort and landings, as well as discussions with industry participants and other stakeholders through the PFMC process, when establishing trip limits as part of future management measures.

2.4 Alternatives Considered but Not Analyzed in Detail

While preparing this EA, NMFS considered other potential approaches to PBF management in addition to the alternatives and sub-options discussed above. These approaches include variations on trip limit schemes and buffer points, management through the PFMC process, and management through taking in-season actions under MSA authority. Because NMFS intends to continue managing PBF catches in accordance with IATTC resolutions and under the authority of the TCA, and because the variations on trip limit schemes do not differ significantly from the main alternatives in terms of impacts, these alternatives are not considered in further detail in this document.

3.0 Affected Environment

3.1 Introduction

The affected environment includes species in the action area, their habitat, and the fisheries and fishing communities engaged in PBF harvest and consumption throughout the U.S. West Coast. Specifically, in this section we describe the PBF stock in the EPO, essential fish habitat (EFH) which overlaps with the proposed action area, protected species in the proposed action area, U.S. West Coast fisheries which are authorized to harvest PBF either routinely or opportunistically, other fisheries which may be affected, and processors, restaurants, and consumers who receive downstream economic effects from changes to domestic PBF fishing. None of the alternatives will have an adverse impact on public health or safety.

Because of the low probability of the proposed PBF management regimes impacting any non-target finfish, invertebrates, or protected species, including marine mammals, sea turtles, and seabirds, we do not consider these species likely to be affected by the proposed action, and they are not discussed further in this EA.

3.2 Biological Environment

3.2.1 *Pacific Bluefin Tuna (PBF)*

PBF is a highly migratory species of tuna found throughout the northern Pacific. They are the largest tuna species in the Pacific, with the largest adults reaching 10 feet in length and weighing nearly 1,000 pounds. They spawn during summertime in the western Pacific near Japan and the Philippines, during which time each female can lay up to 10 million eggs. Young bluefin then migrate over 5,000 miles to the eastern Pacific, where they feed and grow near the west coast of North America. Their diet consists primarily of coastal pelagic species (CPS) such as squids, sardines, anchovies, and hake (Pinkas *et al.* 1971). They also prey on other tunas, and occasionally invertebrates like red crabs and krill. Around age 7, adults migrate all the way back to the western Pacific to spawn. PBF have an average lifespan of 15 years, but can live up to 26 years (NMFS 2024c, California Sea Grant 2024).

PBF spend most of their time foraging near the surface of the water column. Tagging studies have shown that PBF will occasionally dive through the surface mixed layer, or thermocline. Scientists assume this is a feeding behavior (Kitagawa *et al.* 2007). Juvenile PBF in the EPO spend the majority of the time in the surface mixed layer at depths shallower than 50 meters (Mantua *et al.* 1997). One recent study suggests that PBF are highly opportunistic, generalist predators who display different forage strategies at different times. For example, tagged PBF in 2009-2014 ate a wide array of fishes and invertebrates, whereas in 2015-2016 they appeared to specialize in surface-schooling prey like anchovy and red crab (Portner *et al.* 2022). This demonstrates that PBF can adapt their feeding behaviors and target prey to changing ecological conditions throughout the California Current Ecosystem. Their natural predators include sharks, orcas, and pilot whales, but the primary threat to the population in recent history has been human fishing pressure.

PBF is an important commercial species for several countries across the Pacific. The stock provides a protein source for numerous communities around the Pacific Ocean basin, and livelihood to thousands of commercial fishermen. Since 1952, total Pacific-wide catch has averaged over 21,000 mt per year (ISC

2024b). PBF is targeted in the WCPO by Korean, Japanese, and Taiwanese fleets, and in the EPO by U.S. and Mexican fleets.⁴ Japanese and Mexican vessels harvest the majority of the annual catch, with the United States accounting for about 10 percent of the total Pacific-wide catch from 2019-2023.

Overfishing in the late 1990s and 2000s reduced the PBF stock to a historic low of 2 percent of its unfished level. This alarming decline prompted multilateral action to stem overfishing and rebuild the stock. Beginning in 2011 the IATTC and Western and Central Pacific Fisheries Commission (WCPFC)⁵ began adopting resolutions on PBF that established catch limits, data reporting procedures, and a rebuilding plan with the goal of replenishing at least 20 percent of the unfished spawning stock biomass by 2034. This rebuilding plan, and associated management measures, had the intended effect much faster than expected. In 2022, an ISC stock assessment found that PBF was no longer subject to overfishing (ISC 2022). In 2024, the ISC's most recent stock assessment showed that the number of spawning bluefin had reached 23.2 percent of the unfished spawning stock biomass. This milestone marks the first time the population has surpassed the associated maximum sustainable yield level for the species. Using the results of this stock assessment, NMFS determined that the stock is no longer overfished, nor subject to overfishing (NMFS 2024a). The rapid rebuilding of the Pacific bluefin stock suggests that increased harvests in future years might be viable as the population continues to grow (NMFS 2024e).

3.2.2 *Other Species in the Action Area*

The California Current Ecosystem, and in particular the U.S. West Coast EEZ where most PBF harvest by U.S. vessels takes place, is a highly diverse area of the ocean and home to a wide array of fish, invertebrates, seabirds, marine mammals, and reptiles. However, in spite of the high biodiversity and spatial associations of local species, the fishing methods used to target PBF in U.S. waters are not known to have significant impacts on non-target finfish, or interactions with protected species.

Coastal purse seine gear harvests the majority of commercially-caught PBF off the U.S. West Coast. This fishery is rated as Category III under the Marine Mammal Protection Act (MMPA), indicating no known interactions. No protected species or stocks have been historically documented as caught in coastal purse seine gear while targeting tunas off the U.S. West Coast (NMFS 2024f). The other gear type that harvests PBF in significant amounts is commercial hook-and-line, another Category III fishery with no historically documented protected species interactions. Hook-and-line vessels may occasionally catch non-target unmarketable finfish, but due to the nature of hook-and-line gear (where a single hook is cast at a time and actively tended) these incidences would be limited in frequency and not likely to result in death or injury. Bycatch is also not a documented issue in the albacore fishery or in the non-HMS fisheries which incidentally land small amounts of bluefin to the U.S. West Coast.

This leaves the drift gillnet (DGN) fishery as the only gear used to target PBF which is associated with catch of unmarketable non-target species and/or interactions with protected species. DGN vessels catch mainly swordfish and thresher shark, but also retain other marketable species such as PBF. DGN gear consists of a wide net with a mesh size greater than 14 inches which fishermen deploy and drag through the water column overnight. The fleet developed beginning in the 1970s, and by 1990 about 250 vessels participated each year. Concerns about marine mammal and sea turtle bycatch prompted many successive

⁴ Hawaii-based U.S. longline fleets also incidentally catch a small amount of PBF in the WCPO each year.

⁵ The WCPFC manages tuna fisheries in the WCPO, while the IATTC's jurisdiction covers the EPO. Since some of these stocks are transboundary and occur in both regions, the two organizations frequently collaborate through various committees and joint working groups.

waves of regulation which dramatically lowered bycatch rates, and also caused substantial attrition in this fishery (NMFS 2023). The number of active participants in the DGN fishery declined by nearly half, from 78 vessels in 2000 to 18 in 2010 (NMFS 2015). In recent years, fewer than 10 vessels have participated. Additionally, in 2022, Federal legislation was enacted to phase out the DGN fishery entirely by December 2027. Fishing behavior of DGN fishermen would not be affected by the proposed action (or by the catch limits imposed by IATTC resolutions) because the fishery only lands PBF in small amounts (i.e., metric tonnage lower than the lowest trip limit proposed in the sub-options of this action). Over the past 10 years, all PBF landings by DGN vessels have been under 5 mt per trip.

3.2.3 Essential Fish Habitat

Fish in the California Current Ecosystem depend on many types of habitat to survive, including seagrass, salt marsh, coral reefs, kelp forests, rocky intertidal areas, rivers, and streams. NMFS and the PFMC work together to address threats to these habitats by identifying Essential Fish Habitat (EFH) under the MSA for each federally-managed fish stock on the West Coast, and developing conservation measures to protect and enhance these habitats. Some areas within the proposed action area have been identified as essential fish habitat (EFH) for several fishery management plans (FMPs), including the CPS and HMS FMPs. Commercial fisheries that catch PBF in the EPO take place in pelagic habitats (i.e., open ocean waters), which are not affected by these fishing gears. Purse seine and DGN gear are not associated with adverse impacts to ocean and coastal habitats or forage fish biomass. Hook-and-line gear may have extremely minimal bottom contact on rare occasions, but all PBF fishing under the proposed action would occur more than 3 miles offshore, in deep waters where bottom contact by hand-casted fishing lines is unlikely. Due to these factors, the proposed action would not have any impact on EFH in the proposed action area, and EFH is not discussed further in this EA.

3.3 Socioeconomic Environment

The socioeconomic environment affected by the proposed action includes fisheries that target PBF in the action area, other fisheries, and downstream participants in the market for bluefin products on the U.S. West Coast (i.e., processors, restaurants, and consumers). Information in this subsection is sourced from the Pacific Fishery Information Network (PacFIN), the NOAA Fisheries One-Stop Shop, and the ISC.

PBF is an economically important seafood product in year-round demand on the U.S. West Coast. Recently it has provided the majority of ex-vessel revenues for commercial vessels in multiple years. The United States also imports PBF in large quantities, indicating that demand tends to exceed domestic supply throughout the year. Data from the past decade shows average imports of around 150 mt per month, with landings by domestic fleets concentrated mainly in summertime (see Figure 3). Over the past 5 years, landings by coastal purse seine vessels have fluctuated significantly, while landings by other gears (primarily hook-and-line) have steadily increased (see Figure 4).

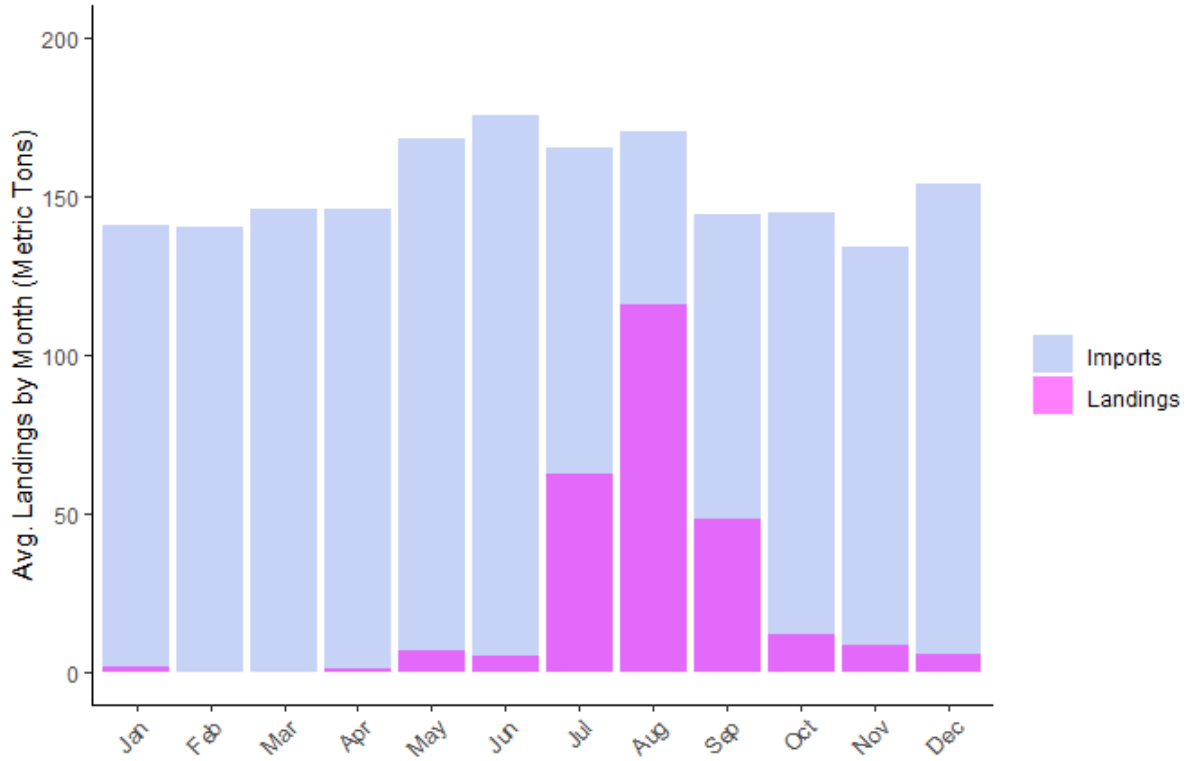


Figure 3. Average monthly PBF landings and imports, 2014-2023.

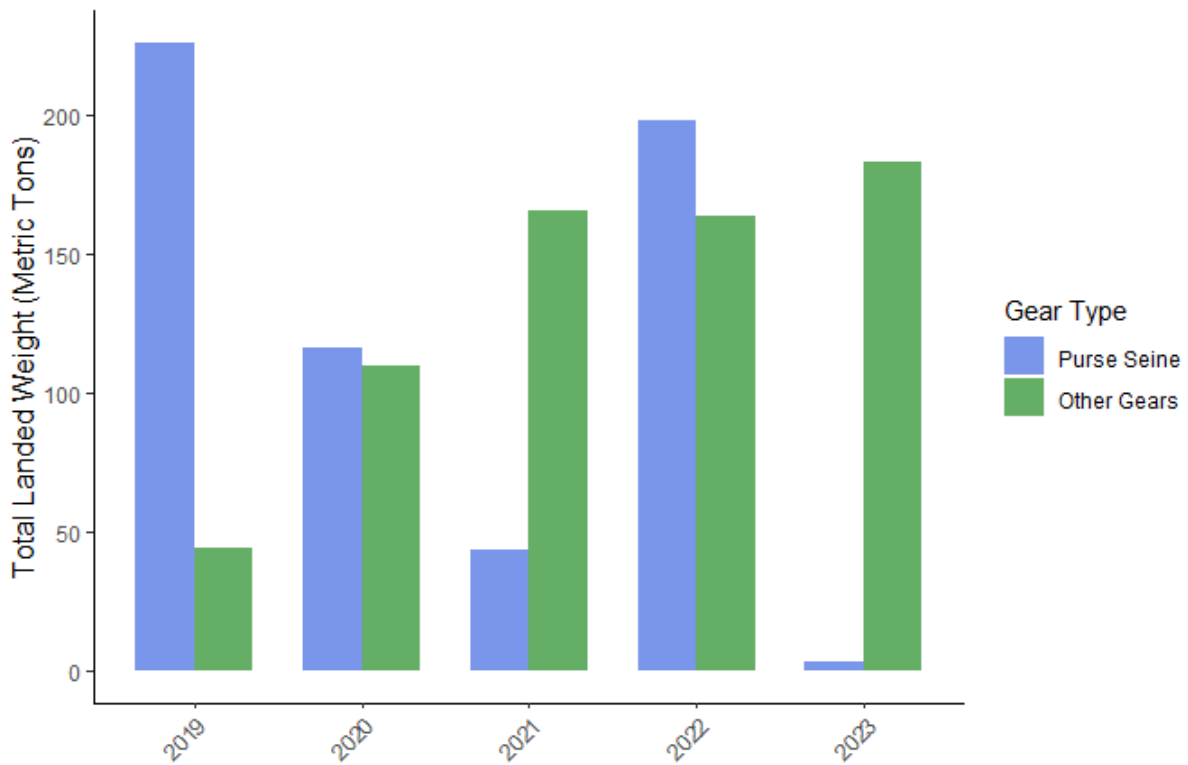


Figure 4. Landings of PBF by gear type, 2019-2023.

3.3.1 Coastal Purse Seine Fishery

A purse seine is a large wall of netting deployed around an entire area or school of fish. The seine has floats along the top line with a lead line threaded through rings along the bottom. Once a school of fish is located, a skiff encircles the school with the net. The lead line is then pulled in, "pursing" the net closed on the bottom, preventing fish from escaping by swimming downward (see Figure 5).

There are two components to U.S. tuna purse seine fishing in the EPO. Large purse seiners, with well volumes greater than 425 cubic meters, target tropical tunas (i.e., bigeye, skipjack, and yellowfin tunas) on the high seas outside of the U.S. West Coast EEZ. Small coastal purse seiners, with well volumes less than 212 cubic meters, fish closer to shore in U.S. Federal waters of the West Coast EEZ. They primarily target small coastal pelagic species (e.g., Pacific mackerel, Pacific sardine, anchovy, and market squid), and opportunistically target schools of tuna. These small coastal purse seiners are a primary focus of the proposed action, as they have the potential to catch the most PBF per trip out of all the gears used by U.S. fishermen in the EPO.

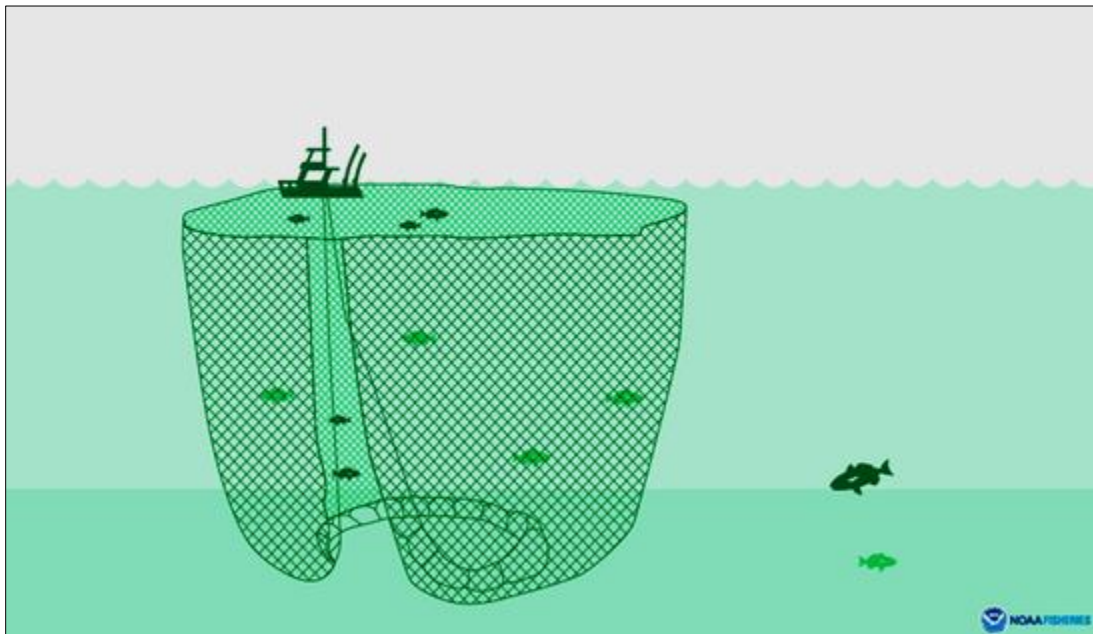


Figure 5. Diagram of purse seine gear.

Coastal purse seiners generally fish from May to October. Landings and revenues fluctuate year-to-year and are constrained by U.S.-mandated catch limits, such as those contained in the proposed action alternatives. Purse seine vessels are directly constrained by trip limits, as they can target entire schools of tuna and have large well volumes. This is in contrast to other gears targeting PBF, who either catch small amounts incidentally (e.g., DGN) or target PBF on a small scale (e.g., hook-and-line).

As of November 2024, there are 18 small U.S. purse seine vessels registered to fish in the IATTC Convention Area. From 2019 to 2023, fewer than 10 of these vessels landed PBF each year. Revenue data from 2019-2023 indicate that annual revenue for this fleet ranged from \$72,165 to \$2,046,082 per vessel per year, with an overall average annual revenue of \$745,692 per vessel. Depending on the year, revenue from PBF landings made up between 1% and 79% of the fleet's total revenue.

Table 1. PBF landings and revenue for the coastal purse seine fishery.

Year	Total Vessels	Total Revenue	PBF landings (mt)	# Vessels that landed PBF	Revenue from PBF landings
2019	11	\$633,195	226.11	9	\$258,937
2020	12	\$2,046,082	116.19	6	\$126,054
2021	3	\$72,165	≤ 50	≤ 3	≤ \$60,000
2022	10	\$776,258	197.92	8	\$263,708
2023	8	\$200,761	≤ 50	≤ 3	≤ \$60,000

3.3.2 Commercial Hook-and-Line Fishery

Hook-and-line vessels possess a commercial HMS permit and target PBF along with other species in Federal waters off the U.S. West Coast. The number of active hook-and-line vessels each year has ranged from 100 to 195 over the past 5 years, with a mean of 160 total vessels. The annual revenue for this fleet over the same time period has steadily increased from \$463,680 to \$2,168,305 with an overall mean of \$1,287,875. The majority of that revenue has come from PBF landings, ranging from 86% to 97% of total revenue in any given year. Landings of PBF by this fleet have also steadily increased over the past 5 years, from 36 mt in 2019 to 163 mt in 2023.

Table 2. PBF landings and revenue for the hook-and-line fishery.

Year	Total Vessels	Total Revenue	PBF landings (mt)	# Vessels that landed PBF	Revenue from PBF landings
2019	100	\$463,680	36.07	79	\$403,385
2020	128	\$953,227	86.57	111	\$911,899
2021	156	\$1,320,435	115.51	145	\$1,292,689
2022	220	\$1,914,047	148.91	190	\$1,783,596
2023	195	\$2,168,305	162.63	180	\$2,047,804

3.3.3 Other Gears

Other gears known to land Pacific bluefin tuna include DGN, North Pacific albacore surface hook-and-line, and non-HMS fisheries. The number of vessels from these fisheries that have landed PBF have ranged from 14-39 over the past 5 years, with an average of 23. Landings of PBF by these gears have ranged from 11.38 to 57.15 mt per year, with a mean of 27.34 mt. Revenues from PBF landings by these fleets make up a small percentage of their total revenue.

Of these other gear types, DGN has harvested the most PBF in recent years, with annual catches ranging from 9 mt to 52 mt per year from 2019-2024. These vessels primarily target swordfish and thresher shark, but may opportunistically land PBF. DGN gear is being phased out due to Federal legislation enacted in 2022, and the fishery will close entirely after December 2027. Regarding the trip limit sub-options of this proposed action, DGN gear has never landed PBF in quantities greater than 5 mt in a single trip (which is the lowest trip limit proposed in the sub-options), so they are not likely to be impacted by any of the proposed trip limits.

Table 3. PBF landings and revenue for other gears that land PBF to the U.S. West Coast.

Year	Total Vessels	Total Revenue	PBF landings (mt)	# Vessels that landed PBF	Revenue from PBF landings
2019	553	\$26,524,028	11.38	39	\$68,002
2020	403	\$23,506,017	28.51	18	\$148,976
2021	298	\$16,093,430	57.15	19	\$411,733
2022	407	\$33,979,317	20.97	14	\$167,857
2023	306	\$9,822,629	18.73	23	\$145,972

3.3.4 Other Fisheries in the Action Area

PBF is a popular target of U.S. recreational fishing vessels operating off the U.S. West Coast. Between 2019 and 2023, recreational vessels caught between 483 and 1,887 mt of PBF each year. These vessels are subject to bag limits and other recreational fisheries regulations. They are exempt from the commercial catch limits established under IATTC resolutions, although as in prior resolutions, there is a provision in the current Resolution that sport catch be managed to levels commensurate with commercial catch. Since the management measures under the proposed action do not apply to recreational vessels, they are not discussed further in this EA.

Mexican commercial and recreational fisheries target PBF in the EPO. Mexico also provides the large majority of PBF imports to U.S. West Coast markets. Aquaculture facilities for PBF were established in Mexico in 1999, and Mexican purse seiners began to direct their effort toward PBF during that year (IATTC 2011). During recent years, most of the catches by Mexico’s commercial fleet have been transported to holding pens, where the fish are held for fattening and later sale to sashimi markets. From 2019 to 2023, Mexico’s reported PBF harvest was about 3,000 mt per year, roughly three times the total U.S. harvest. Mexico’s fleets that target PBF are not discussed further in the EA, as they are not directly affected by U.S. regulations.

3.3.5 Processors, Restaurants, and Consumers

Commercially-caught PBF is purchased, processed, and/or consumed by downstream users including seafood processors, restaurants, and consumers. Seafood processing companies purchase PBF from HMS fishermen to prepare and package it for users further down the supply chain (i.e., restaurants and consumers). Restaurants and some consumers may purchase PBF directly from fishermen as well.

Different sources of PBF are perceived as having varying levels of quality, and in turn receive varying prices. For example, from 2019-2023, the average price of purse seine-caught PBF was \$0.57 per pound, while the average price of hook-and-line-caught PBF was \$5.51 per pound. Prices are also subject to market dynamics, including the availability of imports and the presence of substitute species at different times of year. In general, when high volumes of PBF enter the market at the same time, prices are lower.

4.0 Impacts

4.1 Introduction

The impact analysis in this EA is based on estimates of the change in catch and fishing effort that would occur under each of the alternatives. We examine impacts on both dimensions of the affected environment: the biological impacts to the PBF stock and the socioeconomic impacts to U.S. fisheries and fishing communities. As discussed in Section 3, we do not expect any of the proposed action alternatives to impact species other than PBF, due to the selective nature of the affected gear types. We also do not anticipate any direct impacts to essential fish habitat, or to other fisheries in the action area. In addition to the action alternatives, we discuss the impacts of the three sub-options identified in Section 2.4. We also discuss cumulative impacts of the proposed action alongside other past, present, and future actions which may affect PBF fishing in the IATTC Convention Area.

4.2 No Action Alternative

Under the No Action alternative, NMFS would not implement IATTC resolutions on PBF through a proposed and final rule. No catch or trip limits would be established after the current limits expire at the end of the calendar year, and none would be in place when the fishing season begins. Under this alternative, the United States would be out of compliance with its obligations as a Member of the IATTC.

There are two PBF management measures in current regulations which, unlike the catch limits, do not expire. These include a mandatory reporting requirement that PBF buyers submit receipts within 24 hours of each landing, and procedures for inseason actions and notifications to fishermen. This allows NMFS to track landings throughout the year and take timely action to manage catches.

4.2.1 Biological Impacts

Without annual catch limits in place, there would be no clear mechanism for managing PBF catches throughout the year. Potential impacts to the PBF stock could vary widely and would be determined primarily by market forces and economic considerations rather than stock assessment science and international negotiation. Should the lack of catch limits incentivize fishermen to target PBF without restraint, the United States could begin to negatively impact the recovery and sustainable fishing of the stock, potentially pushing the population back towards an overfishing or overfished status.

4.2.2 Socioeconomic Impacts

Without annual catch limits in place, fishermen would be free to target PBF without restriction once the latest catch limits expire at the end of 2024. This could result in increased catches and potentially short-term benefits to U.S. fishermen by increasing catch. However, this could also create an unclear management environment where fishermen and managers are unclear about the impacts of PBF harvests on the overall stock. Any increases in effort could have an adverse effect on the PBF stock by hindering continued rebuilding, and could lead to negative economic impacts to the fleet through reduced availability of PBF over the long term.

4.3 Alternative 1 (Preferred Alternative)

Under Alternative 1, the United States would establish catch limits of between 50 and 1,500 mt per year, and between 100 and 3,000 mt biennially. This range encompasses the limits established in IATTC Resolution C-24-02. The proposed catch limits for 2025 and 2026 represent approximately an 80% increase over the current (i.e., 2022-2024) catch limits. However, Alternative 1 would also allow NMFS to implement more restrictive catch limits in future years if new information indicates that the stock is at risk of becoming overexploited again.

4.3.1 Biological Impacts

The proposed catch limits for 2025 and 2026 represent approximately an 80% increase over the current (i.e., 2022-2024) catch limits. With an annual limit of 1,500 mt per year, the maximum proposed under Alternative 1, annual U.S. commercial catches would approach their highest level since 1999. However, the proposed catch limits were determined based on the most recent PBF stock assessment (ISC 2024a), and are not expected to have a negative impact on the stock. Additionally, any future increases beyond the levels outlined in IATTC Resolution C-24-02 would only occur after review of future stock assessments and negotiations between IATTC Member states. Alternative 1 would also allow NMFS to establish more restrictive catch limits in future years should concerns arise about overfishing and recovery.

Because the best scientific information available suggests that the catch levels under Alternative 1 would not hinder the PBF stock's recovery or result in overfishing, we find the biological impacts to be insignificant.

4.3.2 Socioeconomic Impacts

Under Alternative 1, U.S. fleets would be allowed to land about 80% more PBF in 2025 and 2026 than under the previous biennial management cycle. In future years, landings could approach the highest levels since 1999. This would likely have positive impacts on U.S. fleets that commercially target PBF, particularly the coastal purse seine fleet and the growing hook-and-line fleet. Increased domestic harvest could also reduce the U.S. West Coast market's reliance on imported PBF to meet demand throughout the year. However, increased harvests may also result in a negative price effect, which could hamper the economic viability of PBF fishing, particularly for coastal purse seiners who generally receive a low price per pound. A previous NEPA analysis found that increasing swordfish landings in the deep-set buoy gear fishery resulted in a slight decrease in price, with other market factors accounted for (NMFS 2023). A similar negative price effect for increased bluefin landings could result in an equilibrium harvest level that is lower than the annual catch limit. However, it could also result in benefits to processors, restaurants, and consumers by lowering the downstream price of bluefin products. Given the high variability in price received for PBF landed on the West Coast, and the large market share of imports which could be substituted by domestic landings, we expect that any price effect of increased landings on the overall socioeconomic environment would be minor.

Overall, Alternative 1 would likely result in an increased U.S. harvest of PBF that would not threaten the recovery or sustainability of the PBF stock. We expect the socioeconomic effects to be positive, and any negative impacts to be insignificant.

4.4 Alternative 2

Under Alternative 2, the United States would establish catch limits of between 1,500 and 10,000 mt per year, and between 3,000 and 20,000 mt biennially. This is a more permissive alternative which allows for the possibility of significant increases to the catch limits afforded the United States in future IATTC resolutions, if the PBF stock continues to increase.

4.4.1 Biological Impacts

The catch limits under Alternative 2 would be higher than any of the actual annual landings by U.S. fleets since the late 1990s. The last time the United States harvested more than 10,000 mt of PBF in a single year was in 1972. Annual harvests prior to 1972 were frequently above 5,000 mt, with a one-year maximum of 15,482 mt all the way back in 1966 (ISC 2024b). This suggests that the PBF stock can sustain harvests on the order of 10,000 mt when it is healthy and present off the West Coast. However, the drastic depletion of the stock during the 1990s and 2000s, and the fact that it has only recovered to around 20 percent of the potential unfished level, imply that such high catches are unlikely to be sustainable in the near future.

NMFS would only implement catch limits higher than 1,500 mt per year if this was established in a future IATTC resolution, which would require review of stock assessment science and corresponding negotiations with other IATTC Member states. Because these stock assessments represent the best scientific information available for evaluating the impacts of fishing mortality on the health of the stock, these higher catch limits, if established, would not be likely to result in overfishing.

While attaining these catch levels would likely require higher PBF fishing effort than has occurred in over 50 years, the gears used to harvest PBF are selective and not known to impact other species during the course of PBF fishing operations. However, bycatch can occur in rare, unpredictable events, or in data-limited environments, such as when a fishing method is scaled up to unprecedented levels of effort (Stohs & Harmon 2022). Management under uncertainty is crucial in such situations. NMFS regularly consults with its Protected Resources Division through the Endangered Species Act (ESA) Section 7 process to determine how fishery management actions may affect protected species. These consultations are a requirement for all discretionary Federal actions that may affect ESA-listed species, to ensure that the proposed action is not likely to jeopardize these species or result in adverse modification of their critical habitat (see Section 5.3). Should higher PBF catch limits in the future significantly alter fishing behavior or levels of effort, if new information suggests that bycatch may be occurring in fisheries where it was not previously reported, NMFS can re-consult on these activities to ensure that the higher catch limits do not place any ESA-listed species in jeopardy. Given these considerations, we expect the biological impacts of Alternative 2 to be insignificant.

4.4.2 Socioeconomic Impacts

As with Alternative 1, increased harvest as a result of more permissive catch limits would likely result in positive socioeconomic effects to fishermen who target PBF, as well as positive downstream effects to processors, restaurants, and consumers. Based on total demand for PBF over the past 5 years, an annual catch limit of 4,000 mt or more would exceed the total volume of recent imports (see Table 4). However, the ability of domestic catches to replace imports in the market would be constrained by price considerations and the timing of fishing. Imports from Mexican tuna pens are available year-round,

whereas most U.S. fishing for PBF occurs during the summer. Additionally, imports may fetch a lower price than domestically-caught fish, particularly the higher-value PBF caught by hook-and-line vessels.

Table 4. Annual PBF imports and landings to the U.S. West Coast, 2019-2023

Year	Imports (mt)	Landings (mt)
2019	1,572	271
2020	1,293	226
2021	3,060	209
2022	3,622	361
2023	3,740	186

Alternative 2 may result in an even stronger negative price effect than that anticipated for Alternative 1. Fishermen may have to accept a lower price per pound if the market becomes oversaturated, especially if a large amount of effort occurs at the same time. Higher PBF commercial catch limits could also impact the availability of PBF to recreational fleets in the proposed action area. However, the United States regularly provides recreational catch statistics to the IATTC, and negotiators consider these catches when developing IATTC resolutions on commercial catch limits. Therefore it is unlikely that the IATTC would establish U.S. catch limits at a level that would threaten the viability of recreational fishing.

Overall, Alternative 2 would likely result in an increased U.S. harvest of PBF that would not threaten the recovery or sustainability of the PBF stock. We expect the socioeconomic effects to be positive, and any negative impacts to be insignificant.

4.5 Biological and Socioeconomic Impacts of Sub-Options

The sub-options analyzed in this EA could be implemented under either of the action alternatives.⁶ All of them satisfy U.S. obligations as a Member of the IATTC. Differences in impacts between the various trip limit schemes are minimal, but there are some considerations related to equity among various gears that target PBF, which we discuss in this subsection.

During discussions of PBF trip limits at the September 2024 PFMC meeting, industry representatives noted that a trip limit of 30 mt or lower is likely too low to incentivize much effort by coastal purse seine vessels (NMFS 2024d). Purse seiners may still catch limited amounts of PBF opportunistically, such as when no other target species are readily available, but overall a higher trip limit would be needed to make active targeting of PBF economically viable by these vessels. Another concern with trip limits is the amount of the annual limit that can be harvested by smaller-volume gears such as hook-and-line. Utilizing a lower trip limit when catch approaches the annual limit ensures that some amount of PBF will be available to these smaller-volume gears throughout the year.

⁶ In theory, NMFS could implement Sub-Option B or C along with the No Action alternative, but it is unclear how to justify imposing trip limits without any tie-in to an annual catch limit.

4.5.1 *Sub-Option A: No Trip Limits*

Under Sub-Option A, NMFS would establish catch limits without annual trip limits. NMFS would close the fishery when fish ticket data indicate that landings are soon to reach the annual limit. This may run the risk of creating a “derby-style” fishery where coastal purse seine vessels rush to catch as much of the annual limit as possible before the fishery closes. In this scenario there may be little or no fishing opportunity for non-purse seine gears after the full catch limit is attained. Because the current management regime includes trip limits which preserve some opportunity for lower-volume PBF fishing vessels, these vessels could experience significant economic impacts. This would be particularly pronounced for hook-and-line vessels whose annual revenues primarily derive from PBF landings.

4.5.2 *Sub-Option B: Adjust Trip Limits Based on Landings*

Under Sub-Option B, NMFS would establish trip limits which are static throughout the year and include three trip limit levels. At the highest level, high-volume trips by coastal purse seine vessels would be incentivized. At the intermediate level, purse seiners could catch a smaller amount of PBF, allowing for opportunistic catches which would hopefully still result in profitable trips. At the lowest level, vessels would only be able to land PBF in small amounts. This low trip limit preserves fishing opportunity for lower-volume gears, while also reducing the potential for regulatory discards⁷ if some PBF are incidentally caught during the course of targeting other species.

Because the current management regime includes trip limits, Sub-Option B would not likely result in significant negative impacts to any vessels. Establishing a higher initial trip limit than the current initial limit of 30 mt may incentivize more PBF fishing by purse seine vessels and could have positive economic results for these vessels. Other gears do not land PBF in quantities that would be limited by the initial or intermediate trip limits. Increasing the low trip limit from 3 mt (as in the current regime) to 5 mt may help avoid regulatory discards by DGN vessels, which on rare occasions have made PBF landings between 3 mt and 5 mt in a single trip. Because PBF is not a primary target of the DGN fishery, this change would not be likely to affect DGN fishing behavior, and would only serve to reduce the potential for waste if a DGN vessel happened to catch PBF while the total annual catch was close to the annual limit.

Because the current management regime includes seasonal adjustments to the reduction points for the trip limits, Sub-Option B may result in minor socioeconomic effects related to the seasonal component (see discussion of Sub-Option C below). We do not expect these impacts to be significant.

4.5.3 *Sub-Option C Adjust Trip Limits Based on Landings and Season (Preferred Sub-Option)*

Under Sub-Option C, NMFS would establish trip limits with three levels, with the buffer points that trigger the reductions adjusting throughout the year. This is the approach identified by the PFMC and its advisory bodies as the most likely to fully utilize the annual catch limits, while preserving an equitable distribution of fishing opportunity between different gears. (See Section 2.4.3 for a detailed description of the trip limit regime recommended by the PFMC at its November 2024 meeting.) This is also the approach in the previous management regime for 2022-2024.

⁷ Regulatory discards occur when a fishing vessel catches fish which would normally be marketable, but which are prohibited due to regulations. Especially in situations where fish cannot be released alive, these discards constitute a waste of valuable fish, and are best avoided.

Of the three trip limit sub-options, Sub-Option C would have the lowest impact relative to the management scheme for 2022-2024. As with Sub-Option B, the increased initial and intermediate trip limits would likely incentivize more purse seine fishing, and the low limit of 5 mt would reserve some of the catch limits for lower-volume gears while also allowing for low-volume incidental catches. Adjusting the buffer points based on season would allow purse seiners to catch more PBF later in the year, if the threshold for reducing the trip limit to 5 mt has not been reached. This helps to ensure full utilization of the annual limit, while avoiding a scenario where high purse seine effort early in the year ends up precluding opportunity for smaller-scale gears later on.

Because the current management regime includes seasonal adjustments to the reduction points for the trip limits, Sub-Option C would not result in any additional socioeconomic effects related to the seasonal. We do not expect the impacts of Sub-Option C to be significant.

4.6 Environmental Justice

NEPA regulations at [40 CFR 1508\(m\)](#) define “environmental justice” as the just treatment and meaningful involvement of all people so that they are fully protected from disproportionate and adverse human health and environmental effects and hazards, and have equitable access to a healthy, sustainable, and resilient environment (89 FR 35442, May 1, 2024). The proposed action would not cause any significant adverse human health or environmental effects on any population in the United States, including minority and low-income groups. PBF fishing activities occur at sea and do not affect public health or safety. The proposed action would provide additional fishing opportunity to U.S. West Coast fishermen who target PBF, and would not cause disproportionate or adverse effects on communities with environmental justice concerns, whether direct, indirect, or cumulative. Relative to No Action, both of the action alternatives would benefit communities throughout the West Coast by establishing a management regime which provides sustainable access to the resource, while furthering equity between different gear types and complying with IATTC Resolutions.

4.7 Cumulative Impacts

In this subsection, we consider the impacts of the proposed action alongside other past, present, and future foreseeable actions which affect the same biological and socioeconomic components of the affected environment. These impacts are generally the same for both action alternatives and for No Action, but we attempt to differentiate the cumulative impacts of the alternatives where possible.

4.7.1 The Driftnet Act

On December 29, 2022, President Biden signed the Driftnet Modernization and Bycatch Reduction Act into law as part of the fiscal year 2023 omnibus spending package. The explanatory note accompanying the legislation directs NMFS “to consult with the Pacific Fishery Management Council on a strategy to phase out the use of large mesh driftnets and permit the use of alternative fishing methods to increase the economic viability of the West Coast-based swordfish fishery while minimizing bycatch to the maximum extent possible.” The phase-out of the gear is to occur within 5 years of the legislation’s enactment, i.e., the gear will be prohibited after December 2027.

The Driftnet Act has cumulative impacts with the proposed action by removing DGN fishing opportunity entirely after 2027. DGN vessels would no longer catch a small proportion of the annual or biennial PBF

catch limits, as they have in recent years. Because the DGN fleet does not primarily target PBF, we do not anticipate any of the proposed action alternatives altering DGN fishing behavior or significantly impacting the fishery (see Section 3.3.3). The ongoing (and ultimately total) attrition of DGN vessels under the Driftnet Act will eliminate any impacts of the DGN fishery on the affected environment overall. Like the action alternatives, No Action would have a negligible cumulative impact on DGN fishing.

4.7.2 *Exempted Fishing Permits (EFPs)*

In addition to the fisheries operating in the proposed action area (described in Section 3.3), NMFS and the PFMC have considered EFPs to target HMS that may have cumulative effects with the proposed action. EFPs are permits issued for the purpose of data collection and exploration of new gear configurations which are not authorized under the HMS FMP. In spring 2019, NMFS issued two EFPs to fish longline gear inside the U.S. West Coast EEZ.⁸ In 2020, NMFS issued a single EFP to fish deep-set buoy gear at nighttime, also known as night-set buoy gear (NSBG). In 2024, NMFS expanded this to five NSBG EFPs. NSBG fishermen have caught a handful of PBF to date, but swordfish is their primary target species. Information on catch of target and non-target species in these EFPs is sparse, as the longline EFPs were discontinued shortly after issuance, and NSBG effort has been limited. Fishing under such EFPs may result in incidental PBF catches, and may contribute to some unknown biological impacts in the proposed action area. However, because all EFPs currently issued have only caught PBF in very small amounts, and would not be affected by trip limits, we expect the cumulative impacts of EFPs with the proposed action to be insignificant.

NMFS and the PFMC continue to review and consider issuance of EFP applications proposing to target HMS in the proposed action area. New EFPs which may be issued in the future could be subject to the catch and trip limits under the proposed action, if they catch PBF in significant amounts. If new methods are developed which increase the PBF catch per unit of effort, or allow fishermen to harvest a higher-quality product that receives a premium price, this could affect the landscape of the overall PBF fishery as new gear types come under consideration by NMFS and the Council for authorization. However, these innovation-based effects are hypothetical and would take time to come to fruition.

In terms of providing fishing opportunity and support for an EFP program, Alternative 2 may have more benefits for prospective fishermen than Alternative 1. Higher catch limits would incentivize U.S. fishermen to capitalize by increasing PBF catches, which could inspire the development of new gears or approaches to sustainably harvest the stock. In the short term, No Action could have a similar effect by allowing increased PBF catches by EFPs, but without catch limits in place this could threaten the rebuilding of the stock and the sustainability of fishing PBF in the future. Overall we anticipate the cumulative impacts of the proposed action on current and future EFPs to be positive, and any negative effects of the action alternatives to be insignificant.

4.7.3 *Other Fishery Management Actions*

Other pending actions may impact the management landscape for PBF fishing, alter fishing behavior, or cause changes to the socioeconomic environment which affects the economic viability of targeting PBF. For example, at the 2024 meeting of the PBF Joint Working Group (JWG),⁹ Japan submitted a proposal

⁸ These EFPs did not land any PBF, and ceased fishing after the 2019 season due to litigation.

⁹ The full name of the JWG is “Inter-American Tropical Tuna Commission-Western and Central Pacific Fisheries Commission Northern Committee Joint Working Group on the Management of Pacific Bluefin Tuna.”

for the establishment of a new framework to strengthen monitoring, control, and surveillance (MCS) measures for PBF fisheries, including general requirements for nations to strengthen monitoring and data collecting systems (IATTC 2024). If this MCS proposal from the JWG goes forward, it could have cumulative impacts with the proposed action by requiring additional data collections or mitigation measures for U.S. vessels targeting PBF. These measures could disincentivize PBF fishing to the extent that they are burdensome, but they could also provide justification for more permissive catch limits in the future. The JWG through the ISC and associated scientists are making progress toward a management strategy evaluation (MSE) and long-term harvest strategy for PBF, which could improve management and provide greater clarity on catch limits, stock status, and management objectives for the stock going forward (IATTC 2021).

As negotiations and work on the MCS, MSE, and the long-term harvest strategy progress, cumulative impacts with the proposed action may emerge. In an ideal scenario these impacts would be positive, as continued collaboration results in more effective, clear, and mutually beneficial management of the shared PBF resource. However, international negotiations necessitate tradeoffs and some aspects of future monitoring or management measures may require the United States to implement measures that are less advantageous to certain components of the affected environment. While the specifics of future PBF management actions remain to be decided, the success of collaborative PBF management to date suggests that any negative cumulative impacts of such efforts alongside the proposed action are likely to be insignificant. In contrast, the No Action alternative could cause negative impacts on future fishery management actions by bringing the United States out of compliance with its obligations as an IATTC member and contradicting years of collaboration on these issues.

4.7.4 *Climate Change*

Recent reports by the Intergovernmental Panel on Climate Change (IPCC) have made it clear that the Earth's climate is changing, and with it the environmental conditions in the ocean are also changing (IPCC 2023). Climate change affects the marine environment by raising water temperatures, impacting the established hydrologic cycle (precipitation and evaporation rates) and increasing the incidence of disease in aquatic organisms (Roessig *et al.* 2004). Other climate change impacts on the marine environment include changes in ice cover, salinity, oxygen levels, and circulation (IPCC 2023). These effects are leading to shifts in the range of species, changes to species abundance, and damage to various habitats (IPCC 2023, Scavia *et al.* 2002). Plankton studies demonstrate that climate change is affecting phytoplankton, copepod herbivores, and zooplankton carnivores, which affect primary ecosystem services (e.g., oxygen production, carbon sequestration, and biogeochemical cycling).

The California Current Ecosystem has large natural variability in its oceanography and community ecology, which may impact the abundance and location of Pacific bluefin tuna in the EPO. Baumgartner *et al.* 1992) and Field *et al.* (2009) examined deposits of coastal pelagic fish scales and were able to identify historic periods or regimes of anchovy and sardine abundance that they suggest are linked to large-scale climate phenomena. For example, during the 1930s through the 1950s when the California Current was undergoing a warm period, sardines were highly abundant, whereas these populations experienced steep declines as the California Current and the North Pacific entered a cool period (Mantua *et al.* 1997).

Studies conducted by Perry *et al.* (2005) indicate that climate change is affecting marine fish distributions in ways that impact commercial fisheries. Climate impacts on commercial fisheries include: (1) increases

in ocean stratification leading to less primary production, which leads to less overall energy for fish production, (2) shifts in mixing areas of water zones leading to decreases in spawning habitat and stock sizes, and (3) changes in currents that may affect larval dispersals lead to changes in stock sizes and availability of resources to certain fisheries (Roessig *et al.* 2004).

Few studies have explicitly analyzed the impacts of climate change on the PBF stock so far. The species is known to exhibit rapid changes in distribution in response to changing environmental conditions and prey availability (Boustany *et al.* 2010, Runcie *et al.* 2018, Ijima *et al.* 2019), but examining how a changing climate may influence the species over the medium and long term is more difficult. An early effort identified a relationship between PBF abundance and sardine availability, and linked the decline in catches in the EPO to periods where sardines were more plentiful in the WCPO (Polovina 1996). A 2010 study examined the effects of water temperature on PBF larval recruitment and found that larvae survival rates may decline to 36% of present recruitment levels (Kimura *et al.* 2010). More recently, one study found that PBF body size may decrease up to 15% by 2050 as a result of declining prey availability (Erauskin-Extramiana *et al.* 2023). Studies on other Pacific tuna species suggests that climate change may shift these stocks northward or vertically in the water column, resulting in new spawning grounds and potentially more availability of tropical tunas in the California Current Ecosystem (Lehodey *et al.* 2015, Erauskin-Extramiana *et al.* 2019, Chen *et al.* 2024).

Overall, the effects of ongoing environmental changes on the PBF stock, and the implications for U.S. fisheries, remain unclear. In the near term, the ongoing recovery of the stock from historic overfishing is likely to be the primary factor determining the availability of PBF to U.S. fishermen, and the impacts of climate change are not likely to be significant in terms of their cumulative effects alongside the proposed action. Further research into the impacts of environmental conditions on prey availability and PBF abundance would fill an important knowledge gap regarding how management measures might incorporate climate effects to ensure ongoing sustainability of the fishery.

All of the action alternatives may have a minor impact on climate change itself by incentivizing increased PBF fishing effort and corresponding carbon dioxide emissions from vessel fuel. From this perspective No Action would likely be the most impactful alternative on climate change, as it does not include any restrictions on PBF fishing or a mechanism for closing the fishery once catch limits are reached. However, increased PBF fishing may also divert effort from other fishing opportunities. Fishermen constantly make economic decisions based on the availability and profitability of different fishing opportunities, so increased PBF effort may not actually represent a net increase in emissions, but a shift in fishing activity from one fishery to another. For example, purse seine vessels derive most of their income from fishing CPS, and hook-and-line vessels target species other than PBF as well. For these reasons we expect the impacts of the proposed action on climate change to be insignificant.

5.0 Applicable Mandates

5.1 Tuna Conventions Act of 1950 (TCA)

The proposed action would implement a resolution adopted by IATTC and approved by an authorized official representing the U.S. Secretary of State. As a Contracting Party to the 1949 Convention for the Establishment of an IATTC (Convention) and an IATTC Member, the United States is obligated to implement the decisions of the IATTC in a legally binding manner. The TCA authorizes the Secretary of Commerce, in consultation with the Secretary of State, to promulgate such regulations as may be necessary to carry out the obligations of the United States under the Convention, including recommendations and decisions of the IATTC. The authority to promulgate regulations has been delegated to NMFS. All of the proposed action alternatives, except for the No Action alternative, would implement catch limits as established in IATTC Resolution C-24-02, and satisfy the United States's obligations as an IATTC Member.

5.2 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the CZMA, as amended in 2006, requires all Federal actions that have reasonably foreseeable effects on any land or water use, or any natural resource of the coastal zone, to be consistent with the enforceable policies of a coastal state's federally-approved coastal management program to the maximum extent practicable. The proposed action would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the coastal zone management programs of Washington, Oregon, and California. The proposed action is not expected to affect any state's coastal management program.

5.3 Endangered Species Act (ESA)

NMFS conducted a Section 7 consultation for the coastal tuna purse seine fishery in the EPO in 1999. NMFS Protected Resources Division amended the incidental take statement (ITS) for this consultation in 2004. The consultation concluded that coastal the purse seine fishery would be unlikely to jeopardize the continued existence of endangered or threatened species. NMFS most recently completed a Biological Opinion of U.S. West Coast fisheries for HMS in 2013. NMFS estimates that the proposed action would be within the scope of these previous Biological Opinions and the amended 2004 and 2013 ITSs. The actual observed take and mortality rates of ESA-listed species have been substantially lower than the estimated take and mortality rates in the Biological Opinions and ITSs. Because the commercial fishing activities affected by this proposed action will not affect endangered and threatened species or critical habitat in any manner that has not been considered in prior consultations, a formal consultation is not required for this action. NMFS could reinitiate consultation on the purse seine fishery in the future if new information suggests impacts to ESA-listed species that were not considered in the previous consultations.

5.4 Marine Mammal Protection Act (MMPA)

Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoises, seals, sea lions, and fur seals. The MMPA is the principal Federal legislation that guides marine mammal species protection and conservation policy in the United States. Although PBF is not a primary target of the DGN fleet, regulatory measures including the use of pingers and net extenders

are in place to reduce marine mammal interactions with DGN gear which might occur while opportunistically harvesting PBF. Additionally, the proposed action is not anticipated to result in any increases to DGN effort, since DGN vessels are not affected by any of the trip limit levels being proposed (see Section 4). In the U.S. purse seine fishery, interactions with marine mammals are uncommon throughout the Pacific Ocean. The tuna purse seine fisheries operating in the EPO are currently listed as a Category III fishery under Section 118 of the MMPA, indicating remote likelihood of, or no known incidental mortality or serious injury of, marine mammals (89 FR 12257, February 16, 2024).

5.5 Migratory Bird Treaty Act (MBTA)

The MBTA of 1918 was enacted to end the commercial trade of migratory birds and their feathers. The MBTA states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and implements a multilateral treaty between the United States, Canada, Japan, Mexico, and Russia to protect common migratory bird resources. The MBTA also prohibits the directed take of seabirds. The MBTA applies within three nautical miles of the U.S. coastline. All of the fishing that would be affected by the proposed action occurs in Federal waters (seaward of three nautical miles), or on the high seas, so the MBTA does not apply to the proposed action. In addition, we do not anticipate any impacts to seabirds under any of the action alternatives.

5.6 EO 12866 Regulatory Impact Review (RIR)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993. EO 12866 requires agencies to assess the economic impacts of proposed government regulations on the national economy before implementation. In most instances, the measurement of changes to gross domestic product is an adequate measure of impact. Section 1 of EO 12866 states, “In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory measures, including the alternative of not regulating.” The emphasis of the analysis is on the net benefit to the nation of the proposed management measures. The government should choose only those sets of regulations that produce measurable benefits, while considering social and distributional effects. NMFS requires that this analysis be done through an RIR for all regulatory actions of public interest. The RIR also includes analysis of distributive impacts and the costs of government administration and private compliance with the proposed measures. See the proposed rule for this action for further analysis of the expected economic effects on businesses, particularly small business entities. The proposed rule has been determined to be not significant for purposes of Executive Order 12866.

5.7 EO 12898 Environmental Justice

EO 12898 obligates Federal agencies to identify and address “disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States” as part of any overall environmental impact analysis associated with an action. Agencies should also encourage public participation, especially by affected communities during scoping, as part of a broader strategy to address environmental justice issues.

The proposed action would not cause any significant adverse human health or environmental effects on any population in the United States, including minority and low-income groups. The proposed action would occur at sea and would not affect public health or safety. There will not be any disproportionately high or adverse human health or environmental effects on minority and low-income populations in the

United States. Nevertheless, NMFS encourages public participation through the public comment process on this EA, especially by communities that could experience disproportionate or adverse impacts.

5.8 EO 13132 Federalism

The proposed rule being analyzed includes no conflicts with State law and imposes no mandates on States. This action does not contain policies with federalism implications under EO 13132.

5.9 EO 13175 Consultation and Coordination with Indian Tribal Governments

EO 13175 ensures regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications. This is intended to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes. The proposed action would not have a substantial direct effect on any Indian tribes, or on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes. Therefore, consultation with tribal officials under E.O. 13175 is not required, and the requirements of sections (5)(b) and (5)(c) of E.O. 13175 also do not apply. A tribal summary impact statement under section (5)(b)(2)(B) and section (5)(c)(2)(B) of E.O. 13175 is not required and has not been prepared.

6.0 List of Preparers

NMFS West Coast Region, Sustainable Fisheries Division, Highly Migratory Species Branch		
Karter M. Harmon	<i>Fish Biologist</i>	Lead Author and Analyst
Rachael Wadsworth	<i>HMS Branch Chief</i>	Document Review and Preparation
Alexander Rayburn	<i>Scientist</i>	Data Analysis and Quality Control
Amanda Munro	<i>Fishery Management Specialist</i>	Drafting and Data Preparation
Amber Rhodes	<i>Fishery Policy Analyst</i>	Drafting and Data Preparation

7.0 References

- Baumgartner, T. R., A. Soutar, and V. Ferreira-Bartrina (1992). Reconstruction of the History of Pacific Sardine and Northern Anchovy Populations over the Past Two Millennia from Sediments of the Santa Barbara Basin, CA. *California Cooperative Oceanic Fisheries Investigations Report 33*. 24-40.
- Boustany, A. M., R. Matteson, M. Castleton, C. Farwell, B. A. Block (2010). Movements of pacific bluefin tuna (*Thunnus orientalis*) in the Eastern North Pacific revealed with archival tags. *Progress in Oceanography*. 86(1-2):94-104. <https://doi.org/10.1016/j.pocean.2010.04.015>
- California Sea Grant (2024). *Pacific Bluefin Tuna*. California Sea Grant - Seafood Profiles. Available [here](#).
- Chen, X. J., J. Wang, B. Kang, F. Zhang, J. Zhu (2024). Climate Change may not Reduce but Redistribute Global Tuna Abundance. *Researchsquare (In Press)*. <https://doi.org/10.21203/rs.3.rs-3849275/v1>
- Erauskin-Extramiana M., H. Arrizabalaga, A. J. Hobday, A. Cabré, L. Ibaibarriaga, I. Arregui, H. Murua, G. Chust (2019). Large-scale distribution of tuna species in a warming ocean. *Global Change Biology*. 25: 2043-2060. <https://doi.org/10.1111/gcb.14630>
- Erauskin-Extramiana M., G. Chust, H. Arrizabalaga, W.W.L. Cheung, J. Santiago, G. Merino, and J.A. Fernandes-Salvador (2023). Implications for the global tuna fishing industry of climate change-driven alterations in productivity and body sizes. *Global and Planetary Change* 222: 104055.
- Field, D. B., T. R. Baumgartner, V. Ferreira, D. Gutierrez, H. Lozano-Montes, R. Salvattecí, and A. Soutar (2009). Variability from Scales in Marine Sediments and Other Historical Records in D. Checkley, J. Alheit, Y. Oozeki, and C. Roy, eds. *Climate Change and Small Pelagic Fish*. Cambridge University Press, Cambridge, United Kingdom. 45-63. <https://doi.org/10.1017/CBO9780511596681.006>
- IATTC (2011). Document IATTC-82-05. Tunas and Billfishes in the Eastern Pacific Ocean in 2010. La Jolla, California, 2011. Available [here](#).
- IATTC (2021). Update on Management Strategy Evaluation of Pacific Bluefin Tuna. *Joint IATTC and WCPFC-NC Working Group Meeting on the Management of Pacific Bluefin Tuna, Sixth Session (JWG-06)*. Available [here](#).
- IATTC (2024). Chairs' Summary of the Ninth Joint IATTC and WCPFC-NC Working Group Meeting on the Management of Pacific Bluefin Tuna. *Joint IATTC and WCPFC-NC Working Group Meeting on the Management of Pacific Bluefin Tuna, Ninth Session (JWG-09)*. Available [here](#).
- ISC (2014). Stock assessment of Pacific bluefin tuna in the Pacific Ocean in 2014. *Report of the Pacific Bluefin Tuna Working Group of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean*. Available [here](#).
- ISC (2022). Stock Assessment of Pacific bluefin tuna in the Pacific Ocean in 2022. *22nd Meeting of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean, Kona, Hawaii, USA, July 12-18, 2022*. Available [here](#).

- ISC (2024a). Stock Assessment of Pacific bluefin tuna in the Pacific Ocean in 2024. *24th Meeting of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean, Victoria, Canada, June 19-24, 2024*. Available [here](#).
- ISC (2024b). *Data Inventory of ISC*. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. Available [here](#).
- Ijima, H., M. Jusep, T. Takada, T. Akita, H. Matsuda, T. Klanjscek (2019). Effects of environmental change and early-life stochasticity on Pacific bluefin tuna population growth. *Marine Environmental Research*. 149:18-26. <https://doi.org/10.1016/j.marenvres.2019.05.003>
- IPCC (2023). AR6 Synthesis Report: Climate Change 2023. *Intergovernmental Panel on Climate Change*. Available [here](#).
- Kimura, S., Y. Kato, T. Kitagawa, N. Yamaoka (2010). Impacts of environmental variability and global warming scenario on Pacific bluefin tuna (*Thunnus orientalis*) spawning grounds and recruitment habitat. *Progress in Oceanography*. 86(1-2):39-44. <https://doi.org/10.1016/j.pocean.2010.04.018>
- Kitagawa, T., A. M. Boustany, C. J. Farwell, T. D. Williams, M. R. Castleton, and B. A. Block (2007). Horizontal and vertical movements of juvenile bluefin tuna (*Thunnus orientalis*) in relation seasons and oceanographic conditions in the eastern Pacific Ocean. *Fisheries Oceanography*. (5):409-421. <https://doi.org/10.1111/j.1365-2419.2007.00441.x>
- Lehodey, P., I. Senina, S. Nicol, J. Hampton (2015). Modelling the impact of climate change on South Pacific albacore tuna. *Deep Sea Research Part II: Topical Studies in Oceanography*. 113: 246-259, <https://doi.org/10.1016/j.dsr2.2014.10.028>
- Mantua, N. J., S. R. Hare, J. M. Wallace, and R. C. Francis (1997). A Pacific interdecadal oscillation with impacts on salmon production. *Bulletin of the American Meteorological Society*. 78:1069-1079. [https://doi.org/10.1175/1520-0477\(1997\)078%3C1069:APICOW%3E2.0.CO;2](https://doi.org/10.1175/1520-0477(1997)078%3C1069:APICOW%3E2.0.CO;2)
- NMFS (2015). Programmatic environmental assessment to revise U.S. commercial fishing regulations for rebuilding Pacific bluefin tuna in the eastern Pacific ocean. Available [here](#).
- NMFS (2023). Final Environmental Impact Statement. *Amendment 6 to the Fishery Management Plan for West Coast Highly Migratory Species Fisheries: Authorization of Deep-set Buoy Gear*. Available [here](#).
- NMFS (2024a). *Stock SMART data records*. NOAA Fisheries. Available [here](#).
- NMFS (2024b). National Marine Fisheries Service Report on International Highly Migratory Species Management. *Supplemental NMFS Report 2, Agenda Item J.2.a*. September 2024. Available [here](#).
- NMFS (2024c). *Pacific Bluefin Tuna*. NOAA Fisheries. Available [here](#).
- NMFS (2024d). National Marine Fisheries Service Report on International Highly Migratory Species Management Activities. *NMFS Report 1, Agenda Item H.2.a*. November 2024. Available [here](#).
- NMFS (2024e). *From overfished to sustainable harvests: Pacific bluefin tuna rebound to new highs*. NOAA Fisheries. Available [here](#).

- NMFS (2024f). *California Tuna Purse Seine Fishery - MMPA List of Fisheries*. NOAA Fisheries. Available [here](#).
- NOAA FOSS (2024). *Fisheries One Stop Shop*. Available [here](#).
- PacFIN (2024). *Pacific Fisheries Information Network APEX Reporting System*. Available [here](#).
- Perry, A. L., P. J. Low, J. R. Ellis, and J. D. Reynolds (2005). Climate Change and Distribution Shifts in Marine Fishes. *Science*. 308, 1912-1915. <https://doi.org/10.1126/science.1111322>
- PFMC (2024). *November Council Meeting Decision Summary Document*. Available [here](#).
- Pinkas L., M. S. Oliphant, and I. L. K. Iverson (1971). Food Habits of Albacore, Bluefin Tuna, and Bonito in California Waters. *State of California Fish Bulletin*. 152. <https://escholarship.org/uc/item/7t5868rd>
- Polovina, J. J. (1996). Decadal variation in the trans-Pacific migration of northern bluefin tuna (*Thunnus thynnus*) coherent with climate-induced change in prey abundance. *Fisheries Oceanography*. 5(2):114-119. <https://doi.org/10.1111/j.1365-2419.1996.tb00110.x>
- Portner E. J., O. Snodgrass, H. Dewar (2022). Pacific bluefin tuna, *Thunnus orientalis*, exhibits a flexible feeding ecology in the Southern California Bight. *PLoS ONE* 17(8): e0272048. <https://doi.org/10.1371/journal.pone.0272048>
- Roessig, J. M., C. M. Woodley, J. J. Cech, and L. J. Hansen (2004). Effects of Global Climate Change on Marine and Estuarine Fishes and Fisheries. *Reviews in Fish Biology and Fisheries*. 14: 251-275. <https://doi.org/10.1007/s11160-004-6749-0>
- Runcie R. M., B. Muhling, E. L. Hazen, S. J. Bograd, T. Garfield, G. DiNardo (2019). Environmental associations of Pacific bluefin tuna (*Thunnus orientalis*) catch in the California Current system. *Fish Oceanography*. 28: 372-388. <https://doi.org/10.1111/fog.12418>
- Scavia, D., J. C. Field, D. F. Boesch, R. W. Buddemeier, V. Burkett, D. R. Cayan, and M. Fogarty. (2002). Climate Change Impacts on U.S. Coastal and Marine Ecosystems. *Estuaries*. 25: 149-164. <https://doi.org/10.1007/BF02691304>
- Stohs, S. M., K. M. Harmon. (2022). Bayesian prediction of fishery biological impacts from limited data: a deep-set buoy gear case study. *Fisheries Research*. 249: 106228. <https://doi.org/10.1016/j.fishres.2022.106228>